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
Cabarrus County Board of
Commissioners

Soil Survey of Cabarrus County, North Carolina

How To Use This Soil Survey

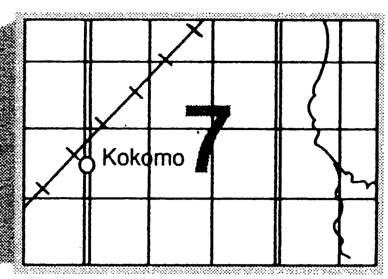
General Soil Map

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.

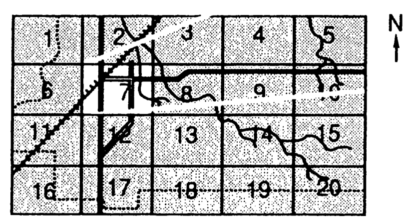
Detailed Soil Maps

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



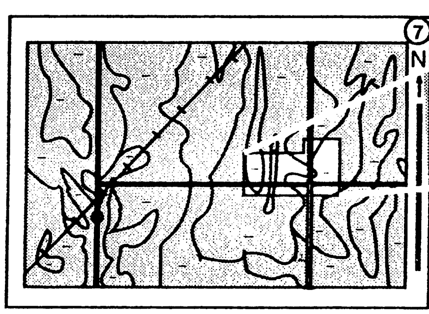
MAP SHEET

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

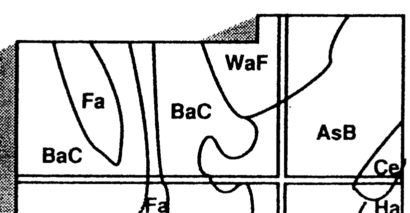


INDEX TO MAP SHEETS

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. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

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

Cover: Corn and soybeans are the major crops in this area of Mecklenburg loam, 2 to 8 percent slopes.

Contents

Soil Series

Issued September 1988

Index to Map Units

Summary of Tables

Foreword

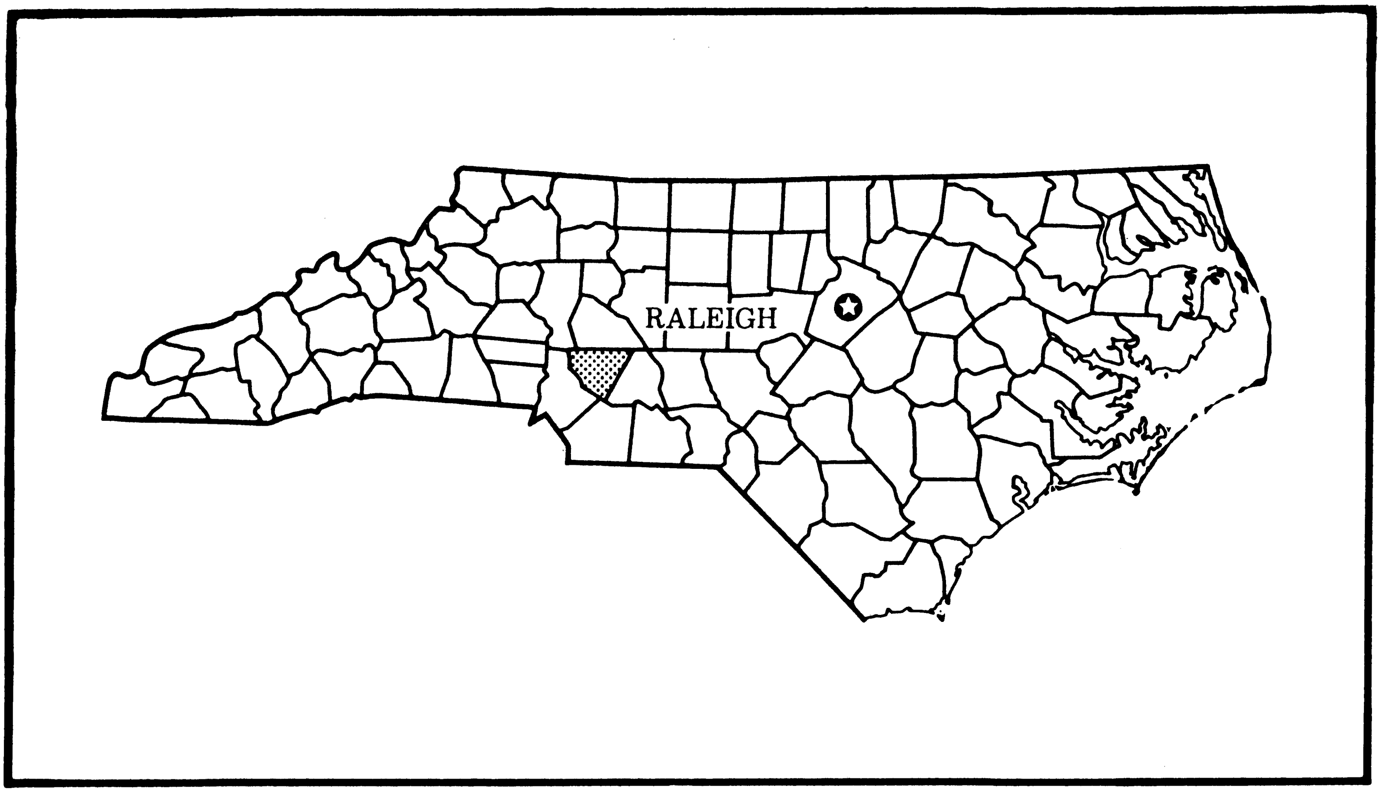
This soil survey contains information that can be used in land-planning programs in Cabarrus County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

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

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

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

Bobbye Jack Jones
State Conservationist
Soil Conservation Service



Location of Cabarrus County in North Carolina.

Soil Survey of Cabarrus County, North Carolina

By Ronald B. Stephens, Soil Conservation Service

Soils surveyed by Ronald B. Stephens, Moulton A. Bailey, Henry S. Huntt, Roy L. Mathis, Jr., Douglas J. Thomas, and John Kick, Soil Conservation Service; and Eugene Mellette and Hiram Chapin, 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,
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General Nature of the Survey Area

Cabarrus County is in south-central North Carolina. It is bounded by Mecklenburg County on the southwest, Iredell and Rowan Counties on the north, Stanly County on the east, and Union County on the south. According to the 1980 U.S. Census, the population of Cabarrus County was 85,895. The city of Concord is the county seat and is in the center of the county. In 1980, Concord had a population of 16,942. Kannapolis, north of Concord, is the largest unincorporated town in North Carolina.

The county has a total area of 233,312 acres or 360 square miles. The land is generally rolling but has moderately steep slopes along the main drainageways.

Cabarrus County is primarily agricultural but is rapidly becoming an industrial and urban county. The diversified agricultural economy includes corn, wheat, oats, barley, sorghum, and soybeans, as well as beef, dairy cattle, and swine. Diversified industry, wholesale and retail outlets, and transportation also contribute substantially to the county's economy.

This survey updates an earlier survey of Cabarrus County published by the U.S. Department of Agriculture in 1910 and a report by the North Carolina Department of Agriculture in 1917.

History

Cabarrus County was formed in 1792. It was named in honor of Stephen Cabarrus, a member of the General Assembly and Speaker of the House of Commons. The first courthouse was built in 1796, the second in 1875, and the present courthouse in 1975 *(7)*.

The first Europeans, a group from Switzerland, settled in the eastern part of the county between 1730 and 1740. Shortly after the Revolutionary War, Dutch, Germans, and Hessians from Pennsylvania also settled in the eastern part of the county. About the same time, Scotch-Irish from Pennsylvania settled in the western part of the county *(7)*.

Cabarrus County was one of the first gold mining areas in the country. The first gold discovery in the United States, a nugget weighing about 17 pounds, was made in Cabarrus County in 1799 at the Reed Gold Mine *(10)* about 10 miles southeast of Concord. The mine was purchased by the North Carolina Historical Society and is now a state historic site.

A 6-acre portion of the Stonewall Jackson School campus has been designated as a North Carolina Natural Heritage Area by the North Carolina Department of Natural Resources because of its setting in a geological formation, the "Concord Ring Dike" (fig. 1).

Figure 1.—Syenite boulders on Cecil sandy clay loam, 2 to 8 percent slopes, eroded, are part of the Concord Ring Dike.

Industry and Transportation

Cabarrus County is located along the Piedmont Crescent, the heavily industrialized area extending from Charlotte to Raleigh. More than 85 manufacturing plants in the county employ more than 22,000 people, and produce textiles, hosiery, cigarettes, food, apparel and fabrics, printed and published material, lumber and wood products, and fabricated metal and machinery products.

Most of the commerce centers are along Interstate Highway 85 and U.S. Highway 29. The old Stage Coach Trail, the major transportation artery in the 1800's from Atlanta to Washington, historically followed a similar route in the county. U.S. Highway 601 and North Carolina State Highways 27, 49, 73, and 200 help connect Cabarrus County to all parts of the nation. Concord and Kannapolis are on the main north-south line of the Southern Railroad. The county is served by 65 certified motor freight carriers. Douglas Airport in Charlotte is less than 25 miles away.

Water Supply

Cabarrus County currently has an adequate water supply from surface streams, lakes, and ground water. Over 2,500 ponds supply water for irrigation, livestock, recreation, fire protection, and flood prevention (fig. 2).

Figure 2.—This pond in Cabarrus County is used for recreation and other purposes.

Concord obtains its water supply from Lake Concord and Lake Fisher. Kannapolis obtains its water from Kannapolis Lake in Rowan County. A number of municipalities and subdivisions obtain water from community wells.

Drilled and bored wells are used in Cabarrus County. Drilled wells are the most common. They are safer and more reliable than bored wells. They are tightly cased and water is obtained from crevices in the bedrock, thus decreasing the danger of pollution or contamination. Because drilled wells generally extend far below the fluctuating water table, they rarely go dry.

Bored wells generally range from 30 to 40 feet in depth and 18 to 24 inches in diameter. Because bored wells can easily be drilled for a considerable depth below the water table, they are not apt to go dry during periods of drought. However, bored wells cannot be used if the water table is below the zone of completely decayed and disintegrated rock.

Rocky River, Dutch Buffalo Creek, and other streams in the county have enough water flow for large impoundments for future water supplies.

Climate

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

Cabarrus County is hot and generally humid in summer. Winter is moderately cold but short because the mountains to the west protect the county from many cold waves. Precipitation is evenly distributed throughout the year and is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Concord, North Carolina, in the period 1951 to 1973. 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 41 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Concord on January 30, 1966, is 4 degrees. In summer the average temperature is 77 degrees, and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred at Concord on July 28, 1952, is 106 degrees.

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

The total annual precipitation is 43.8 inches. Of this, 23 inches, or 53 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 5.06 inches at Concord on October 1, 1955. Thunderstorms occur on about 40 days each year, and most occur in summer. Every few years late in summer or in fall, a tropical storm moving inland from the Atlantic Ocean causes extremely heavy rain for 1 to 3 days.

The average seasonal snowfall is 6 inches. The greatest snow depth at any one time during the period of record was 11 inches. On an average of 2 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 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 70 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

How This Survey Was Made

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

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

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

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

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

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

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

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

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

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

General Soil Map Units

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

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

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

1. Cecil

Gently sloping to strongly sloping, well drained soils that have a clayey subsoil; formed in residuum from acidic igneous and metamorphic rock

These soils are dominantly in the northwestern part of Cabarrus County. The map unit makes up 9 percent of the county. It is 83 percent Cecil soils and 17 percent soils of minor extent.

Cecil soils are on broad, gently sloping ridges and narrow, strongly sloping side slopes. The surface layer is sandy clay loam. The upper part of the subsoil is clay, and the lower part is clay loam.

Of minor extent in this map unit are the Appling, Cullen, Pacolet, and Chewacla soils. The Appling and Cullen soils are on gently undulating ridges, and the Pacolet soils are on steep side slopes. These soils are well drained. The Chewacla soils are on flood plains and are somewhat poorly drained.

Most of the soils of this map unit are used as cropland or pasture. The rest is mainly used as woodland or for urban development. The main limitations for the use of these soils as cropland or pasture are slope and surface runoff. Erosion is a hazard.

2. Mecklenburg-Iredell

Nearly level to strongly sloping, well drained and moderately well drained soils that have a clayey subsoil; formed in residuum from diorite, gabbro, and other rocks that are high in content of ferromagnesian minerals

These soils are in the southwestern part of Cabarrus County, known locally as the "Concord Ring Dike." The landscape typically is very broad, nearly level areas and gently sloping to strongly sloping ridges and side slopes. The very broad areas are broken by many knolls of slightly higher elevation, which range up to 20 acres in size.

This map unit makes up about 11 percent of the county. It is about 44 percent Mecklenburg soils, 29 percent Iredell soils, and 27 percent soils of minor extent.

Mecklenburg soils are well drained. They are on convex ridges, gently sloping to strongly sloping side slopes, and large knolls on the flat landscape. The surface layer is loam. The upper part of the subsoil is clay, and the lower part is clay loam.

Iredell soils are moderately well drained. They are dominantly in broad, nearly level areas and on gently sloping ridges. The surface layer is loam, and the subsoil is clay and clay loam.

Of minor extent in this map unit are the Poindexter, Enon, Armenia, Chewacla, and Wehadkee soils. The Poindexter and Enon soils are on more dissected parts of the landscape. The Armenia soils are in depressions, and the Chewacla and Wehadkee soils are on flood plains.

The soils of this map unit are used mainly as cropland or pasture. Some areas are used as woodland or for urban development. Wetness, slow permeability, moderate to very high shrink-swell potential, and slope are the main limitations in the use and management of these soils. Erosion is a hazard.

3. Enon-Mecklenburg-Poindexter

Gently sloping to very steep, well drained soils that have a clayey or loamy subsoil; formed in residuum from mixed acidic and basic igneous and metamorphic rock

These soils are throughout most of Cabarrus County. The map unit makes up 31 percent of the county. It is 41 percent Enon soils, 11 percent Mecklenburg soils, 11 percent Poindexter soils, and 37 percent soils of minor extent.

Enon soils are on broad, gently sloping, convex ridges and narrow, strongly sloping side slopes. The surface layer is sandy loam. The upper part of the subsoil is clay loam, the middle part is clay, and the lower part is clay loam.

Mecklenburg soils are on broad, gently sloping, convex ridges and narrow, strongly sloping side slopes. The surface layer is loam. The upper part of the subsoil is clay, and the lower part is clay loam.

Poindexter soils are on narrow ridges and on strongly sloping to very steep, narrow, broken side slopes. The surface layer is loam, and the subsoil is sandy clay loam.

Of minor extent in this map unit are the Iredell, Sedgefield, Pacolet, Cecil, Cullen, Coronaca, Vance, Chewacla, and Altavista soils. The Iredell and Sedgefield soils are moderately well drained and are on broad ridges, in depressions, and in low areas around the head of drainageways. The Pacolet soils are well drained and are on steep side slopes. The Cecil, Cullen, Coronaca, and Vance soils are well drained and are on broad, slightly convex ridges and side slopes. The Chewacla soils are somewhat poorly drained and are on flood plains adjacent to streams. The Altavista soils are moderately well drained and are on terraces adjacent to flood plains.

The soils of this map unit are used as cropland, pasture, woodland, and for urban development. The steeper areas are mostly woodland. Slope, slow permeability, and moderate to high shrink-swell potential are the main limitations to these uses. Erosion is a hazard.

4. Poindexter-Enon

Gently sloping to very steep, well drained soils that have a loamy or clayey subsoil; formed in residuum from diorite, schist, and other basic rock, or from mixed acidic and basic rock

These soils are mostly along Coldwater Creek and its feeder streams northeast of Concord. The map unit makes up about 6 percent of Cabarrus County. It is about 50 percent Poindexter soils, 20 percent Enon soils, and 30 percent soils of minor extent (fig. 3).

Poindexter soils are on narrow, gently sloping ridges and rolling to very steep side slopes adjacent to drainageways. The surface layer is loam, and the subsoil is sandy clay loam.

Enon soils are on gently sloping ridges and strongly sloping, broken side slopes. The surface layer is sandy loam. The upper part of the subsoil is clay loam, the middle part is clay, and the lower part is clay loam.

Of minor extent in this map unit are the Mecklenburg, Iredell, Pacolet, and Chewacla soils. The Mecklenburg soils are well drained and are on broad ridges. The Iredell soils are moderately well drained and are on broad ridges and in depressions. The Pacolet soils are well drained and are on steep side slopes. The Chewacla soils are somewhat poorly drained and are on flood plains adjacent to streams.

The soils of this map unit are used mainly as pasture or woodland. Some gently sloping areas are used as

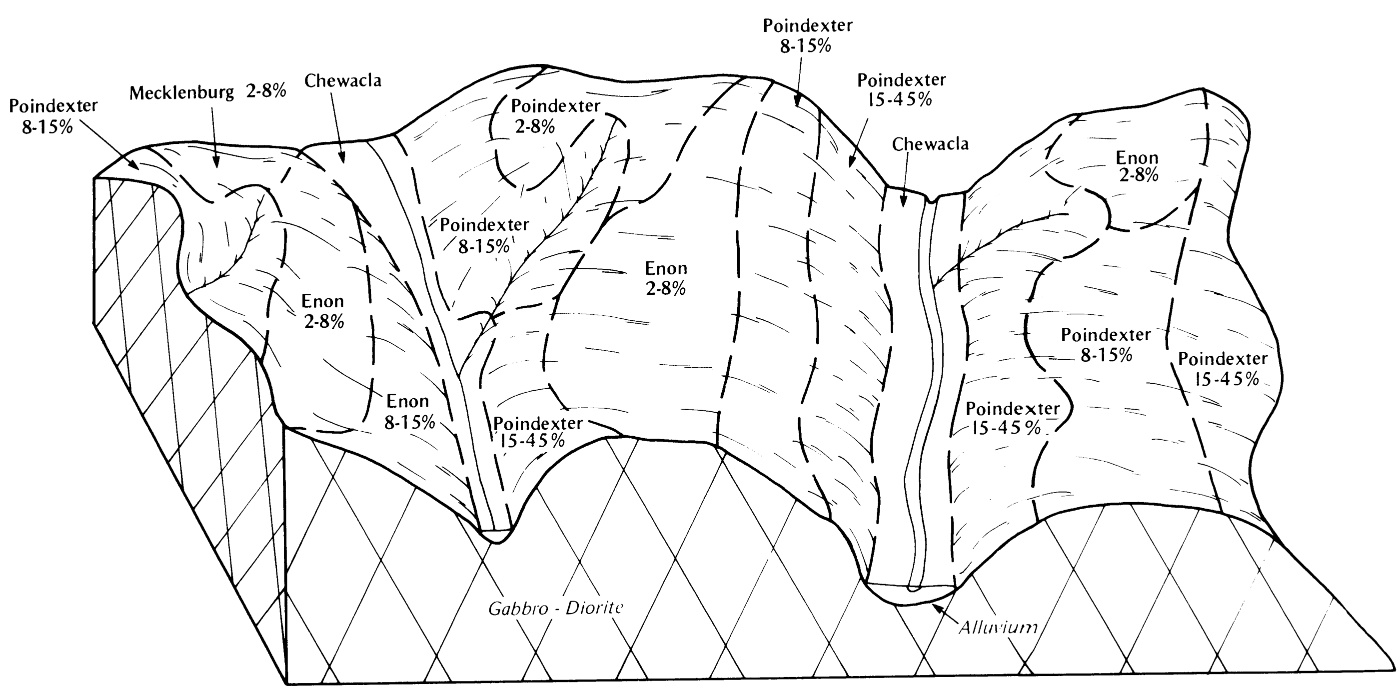

Figure 3.—Typical soil-bedrock-landscape relationships in the Poindexter-Enon general soil map unit.

cropland. Slope and the depth to bedrock are the main limitations to agricultural uses. Erosion is a hazard.

Slope, depth to bedrock, slow permeability, and high shrink-swell potential are the main limitations if the soils of this map unit are used for urban development.

5. Cullen-Cecil-Hiwassee

Gently sloping to strongly sloping, well drained soils that have a clayey subsoil; formed in residuum from acidic and mixed acidic and basic crystalline rock

These soils are in the southwestern part of Cabarrus County and northeast of Concord. The map unit makes up 15 percent of the county. It is 46 percent Cullen soils, 28 percent Cecil soils, 10 percent Hiwassee soils, and 16 percent soils of minor extent (fig. 4).

Cullen soils are on broad, gently sloping ridges and narrow, strongly sloping side slopes. The surface layer is clay loam. The upper part of the subsoil is clay, and the lower part is silty clay loam.

Cecil soils are are on broad, gently sloping ridges and narrow, strongly sloping side slopes. The surface layer is sandy clay loam. The upper part of the subsoil is clay, and the lower part is clay loam.

Hiwassee soils are well drained. They are on broad, gently sloping ridges and narrow, strongly sloping side slopes. Most of the acreage of this soil is around Rimer and Watts Cross Roads. The surface layer is clay loam. The upper and middle parts of the subsoil are clay, and the lower part is clay loam.

Of minor extent in the map unit are the Mecklenburg, Enon, Poindexter, Pacolet, and Chewacla soils. The Mecklenburg and Enon soils are well drained and are on narrow ridges and side slopes. The Poindexter and Pacolet soils are well drained and are on the steeper side slopes, and the Chewacla soils are somewhat poorly drained and are on flood plains adjacent to streams.

The soils of this map unit, especially those on gently sloping ridgetops, are used mainly as cropland or pasture. The steeper areas are mostly pasture or woodland. Large areas near the towns are used for urban development. Slope is the main limitation for the use of these soils as cropland and pasture. Erosion is a hazard.

The high clay content of the subsoil and excessive slope are limitations for building site development.

6. Badin-Tatum-Georgeville

Gently sloping to very steep, well drained soils that have a clayey subsoil; formed in residuum from slate rock

These soils are in the southeastern part of Cabarrus County in the slate belt. The map unit makes up 18 percent of the county. It is 42 percent Badin soils, 27 percent Tatum soils, 5 percent Georgeville soils, and 26 percent soils of minor extent.

Badin soils are on narrow, gently sloping ridges and strongly sloping to very steep side slopes. The areas are dissected by many short drainageways. The surface layer is channery silt loam. The upper part of the subsoil is channery silty clay loam, the middle part is silty clay, and the lower part is channery silty clay loam.

Tatum soils are on broad, gently sloping ridges and narrow, strongly sloping side slopes. The surface layer is silt loam. The upper part of the subsoil is silty clay, and the lower part is silty clay loam.

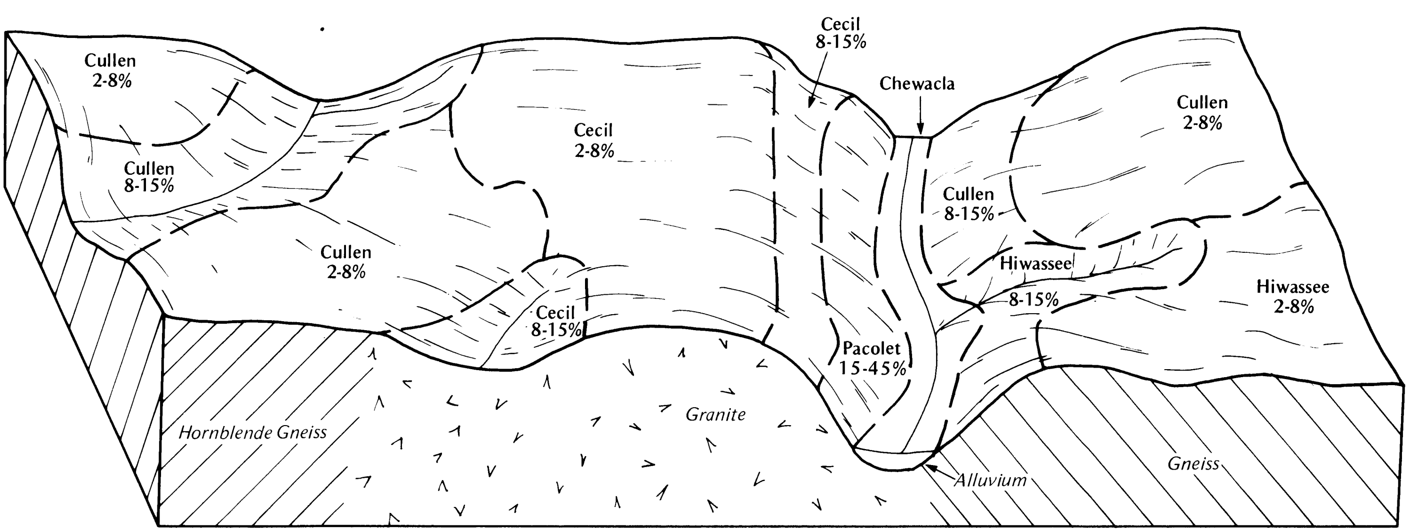

Figure 4.—Typical soil-bedrock-landscape relationships in the Cullen-Cecil-Hiwassee general soil map unit.

Georgeville soils are on broad, gently sloping ridges. The surface layer is silty clay loam. The upper part of the subsoil is clay, and the lower part is silty clay loam.

Of minor extent in the map unit are the Enon, Poindexter, Herndon, Goldston, Misenheimer, Kirksey, and Chewacla soils. Enon and Poindexter soils are well drained and are on long, narrow ridges on some of the higher landscapes. The Herndon soils are well drained and are on broad ridges. The Goldston soils are well drained to excessively drained and are on very narrow ridges and steep side slopes. The Misenheimer and Kirksey soils are moderately well drained and are in broad areas, depressions, and along drainageways. The Chewacla soils are somewhat poorly drained and are on flood plains adjacent to streams.

The soils of this map unit, especially those on gently sloping ridgetops, are used mainly as cropland or pasture (fig. 5). The steeper areas are mostly used as woodland. Slope is the main limitation for cropland and pasture. Erosion is a hazard. Slope and depth to bedrock are the main limitations for urban development.

7. Goldston-Badin

Gently sloping to steep, well drained and excessively drained soils that have a loamy or clayey subsoil; formed in residuum from slate rock

These soils are in the southeastern part of Cabarrus County in the slate belt. The map unit makes up about 4 percent of the county. It is about 65 percent Goldston soils, 23 percent Badin soils, and 12 percent soils of minor extent.

Goldston soils are well drained to excessively drained. They are on narrow, convex, gently sloping to strongly sloping ridges and steep to very steep side slopes that are broken by many drainageways. The surface layer and subsoil are very channery silt loam.

Figure 5.—The soils of the Badin-Tatum-Georgeville general soil map unit are the most intensively cultivated soils in the Carolina slate belt because of the gently rolling topography.

Badin soils are well drained. They are on gently sloping ridges and strongly sloping to very steep side slopes. The Badin soils are on broader ridges and smoother side slopes than the Goldston soils. The surface layer is channery silt loam. The upper part of the subsoil is channery silty clay loam, the middle part is silty clay, and the lower part is channery silty clay loam.

Of minor extent in the map unit are the Tatum, Kirksey, Misenheimer, Poindexter, and Chewacla soils. The Tatum soils are well drained and are on broad ridges. The Kirksey and Misenheimer soils are moderately well drained and are in broad areas, depressions, and along drainageways. The Poindexter soils are well drained and are on steep side slopes, and the Chewacla soils are somewhat poorly drained and are on flood plains adjacent to streams.

The soils of this map unit are used mainly as pasture or woodland (fig. 6). Some gently sloping areas are cropland. Slope and the depth to bedrock are the main limitations for these uses. Erosion is a hazard.

Slope and depth to bedrock are the main limitations if the soils of this map unit are used for urban development.

8. Kirksey-Misenheimer-Badin

Nearly level to very steep, moderately well drained and well drained soils that have a loamy or clayey subsoil; formed in residuum from slate rock

Figure 6.—The soils of the Goldston-Badin general soil map unit are used mostly as pasture and woodland because the topography is often very broken and rolling.

These soils are in the southeastern part of Cabarrus County in the slate belt. The landscape is one of broad flats and gently sloping knolls and long, narrow, strongly sloping to very steep side slopes adjacent to drainageways.

The map unit makes up about 6 percent of the county. It is about 45 percent Kirksey soils, 41 percent Misenheimer soils, 9 percent Badin soils, and 5 percent soils of minor extent.

Kirksey soils are moderately well drained. They are on broad, gently sloping ridges, gentle side slopes, in depressions, and in low areas along drainageways. Kirksey soils normally are in lower-lying areas if they are adjacent to Misenheimer soils. The surface layer is silt loam. The upper part of the subsoil is silt loam, and the lower part is silty clay loam.

Misenheimer soils are moderately well drained. They are on broad, nearly level to gently sloping ridges. The surface layer and subsoil are channery silt loam.

Badin soils are well drained. They are on knolls on the nearly level landscapes; on broad, gently sloping ridges; and on long, narrow, strongly sloping to very steep side slopes adjacent to drainageways. The surface layer is channery silt loam. The upper part of the subsoil is channery silty clay loam, the middle part is silty clay, and the lower part is channery silty clay loam.

Of minor extent in this map unit are the Tatum, Goldston, and Chewacla soils. The Tatum soils are well drained, and the Goldston soils are well drained to excessively drained. These soils are on narrow, convex ridges at higher elevations throughout the map unit. The Chewacla soils are somewhat poorly drained and are on flood plains.

The soils of this map unit are used mainly as cropland or pasture. Wetness and depth to bedrock are the main limitations to agricultural uses. Erosion is a hazard.

Wetness and depth to bedrock are the main limitations for the use of these soils for urban development.

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 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, Badin channery silt loam, 2 to 8 percent slopes is one phase in the Badin series.

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

A *soil complex* consists of two or more soils or a soil and a miscellaneous area intermingled 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. Cecil-Urban land complex, 2 to 10 percent slopes is an example.

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

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

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

AaB—Altavista sandy loam, 2 to 6 percent slopes. This soil is moderately well drained and gently sloping. It is on narrow stream terraces along the major streams in the county. Slopes are slightly concave. Individual areas are elongated and range from 4 to 25 acres.

Typically, the surface layer is yellowish brown sandy loam 6 inches thick. The subsurface layer is light yellowish brown sandy loam to a depth of about 10 inches. The subsoil is sandy clay loam. It extends to a depth of about 41 inches. The upper part is brownish yellow, the middle part is yellowish brown, and the lower part is strong brown. The underlying material to a depth of 60 inches is light gray sandy loam.

Permeability and the available water capacity are moderate. A seasonal high water table is at a depth of 1.5 to 2.5 feet mainly in winter and early in spring. Low-lying areas of this soil are subject to rare flooding.

Included with this soil in mapping are a few small areas of Appling, Enon, and Cecil soils. These soils are commonly in small, slightly raised areas that are adjacent to the uplands. A few areas of similar soils that have a sandier subsoil than that in the Altavista soil are also included. Small wet areas in old oxbows or depressions are shown on the soil map with a special symbol. These included soils make up 15 to 25 percent of the map unit.

About two-thirds of this Altavista soil is used as cropland or pasture. The rest is mainly woodland.

Corn, oats, and soybeans are the main crops. Horticultural crops, such as tomatoes, sweet corn, green beans, and peas, grow in some areas. Seasonal wetness, rare flooding, and a moderate hazard of erosion are the main limitations. Conservation tillage and crop residue management help to control runoff and erosion. Grassed drainageways, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Artificial drainage is used in some of the less sloping areas.

White oak, black oak, post oak, southern red oak, poplar, sweetgum, hickory, red maple, loblolly pine, and shortleaf pine are the main trees. The understory includes dogwood, sourwood, holly, redbud, black cherry, and sassafras. No significant limitations for woodland use and management are present.

Seasonal wetness and rare flooding limit the use of this soil for building sites, septic tank absorption fields, and recreational activities. An artificial drainage system can reduce wetness. Erosion is a moderate hazard at construction sites where the ground cover is removed. Determining the hazard of flooding for specific sites is necessary before use and management are planned.

This Altavista soil is in capability subclass IIe and in woodland group 9W.

ApB—Appling sandy loam, 2 to 8 percent slopes. This soil is well drained. It is on gently undulating, smooth uplands. Some larger areas of this soil are in the Mt. Pleasant area. Mapped areas are generally oblong and irregular in width. Individual areas range from 10 to 50 acres. Areas of 3 to 10 acres are common on the more narrow ridges.

Typically, the surface layer is brown sandy loam 3 inches thick. The subsurface layer is yellowish brown sandy loam to a depth of about 8 inches. The subsoil extends to a depth of 47 inches. The upper part is yellowish red sandy clay loam, the middle part is yellowish red clay, and the lower part is yellowish red sandy clay loam. The underlying material to a depth of 62 inches is mottled red and yellowish red saprolite that crushes to sandy loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability and the available water capacity are moderate. The subsoil is strongly acid or very strongly acid.

Included with this soil in mapping are small areas of Cecil, Vance, and Enon soils. The Cecil soils are redder than the Appling soil and are on small knolls and near the outer edge of the larger areas. The Enon and Vance soils are common where the Appling soil extends onto small, narrow ridgetops. Similar soils that have a gravelly surface layer are also included. In other small areas, the surface layer is eroded and has a sandy clay loam texture. These included soils make up 20 to 30 percent of this map unit.

This Appling soil is used mainly for crops, hay, and pasture. Corn, soybeans, grain sorghum, and small grains are the main crops. Tomatoes, sweet corn, green beans, and peas are also grown. Slope, runoff, and the hazard of erosion limit the use of this soil for crops. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, redbud, red maple, and sassafras. No significant limitations for woodland use and management are present.

Moderate permeability and the clayey texture are the main limitations in using this soil for building sites and septic tank absorption fields. Erosion is a hazard at construction sites if the ground cover is removed. This soil has no major limitations for most recreational uses.

This Appling soil is in capability subclass IIe and in woodland group 8A.

Ar—Armenia loam. This soil is nearly level and poorly drained. It is on broad flats and in depressions around the head of intermittent drainageways in the southwestern part of the county. The mapped areas are generally oblong, irregular in width, and range from 3 to more than 20 acres.

Typically, the surface layer is very dark gray loam 8 inches thick. The subsoil extends to a depth of 47 inches. The upper part is very dark grayish brown clay loam that has olive brown mottles, the middle part is dark olive gray clay that has dark gray and olive brown mottles, and the lower part is mottled gray and olive gray clay loam. The substratum to a depth of 60 inches is mottled saprolite that crushes to sandy loam.

Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is high. The subsoil is plastic and sticky if it is wet. Runoff is slow. A seasonal high water table is at a depth of 0.5 foot to 1.5 feet. Areas in depressions are subject to brief periods of ponding.

Included with this soil in mapping are a few small areas of Iredell and Wehadkee soils. The Iredell soils are slightly higher on the landscape than the Armenia soil. The Wehadkee soils are along the narrow drainageways that are subject to frequent flooding for brief periods. The included soils make up about 20 percent of this map unit.

This Armenia soil is mainly used as woodland. In the cleared areas, it is used mostly as pasture.

Post oak, white oak, water oak, ash, sweetgum, shortleaf pine, and loblolly pine are the dominant trees. The understory includes cedar, cottonwood, alder, and sourwood. Wetness is the main limitation for woodland use and management.

This soil is generally not used for row crops because of wetness. Some areas are used as pasture.

Wetness and high shrink-swell potential are severe limitations for building sites, septic tank absorption fields, and recreational uses. Low strength and wetness are severe limitations for local roads and streets.

This Armenia soil is in capability subclass IIIw and in woodland group 6W.

BaB—Badin channery silt loam, 2 to 8 percent slopes. This soil is well drained. It is in the eastern part of the county on narrow, undulating upland ridges that are highly dissected by intermittent drainageways. Mapped areas are irregular in shape and are mostly 5 to 35 acres. A few areas are more than 100 acres.

Typically, the surface layer is brown channery silt loam 7 inches thick. The subsoil extends to a depth of 28 inches. The upper part is yellowish red channery silty clay loam. The middle part is red silty clay. The lower part is mottled red, yellowish red, and strong brown channery silty clay loam. The underlying material to a depth of 40 inches is moderately hard, highly fractured slate. Unweathered bedrock is at a depth of 40 inches.

If this soil is unprotected, runoff is rapid and erosion is a moderate hazard. The flat slate fragments in the surface layer create a mulch effect, help hold water, and reduce erosion. Permeability and the shrink-swell potential are moderate. Fractured bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are small areas of Goldston, Misenheimer, Kirksey, and Tatum soils. The Goldston soils are in areas that have the most broken topography, especially on knolls and short side slopes. The Misenheimer and Kirksey soils are in depressions and around the intermittent drainageways. The Tatum soils commonly are in large areas that are smooth or less sloping. A few small eroded areas that have a channery silty clay loam surface layer are also included. These included soils make up 15 to 30 percent of this map unit.

This Badin soil is used mainly for crops or pasture. In other areas, it is used as woodland or for urban development.

The major crops are corn, soybeans, and small grains (fig. 7). Slope, runoff, and the susceptibility to erosion limit the use of this soil for crops. Conservation tillage and return of crop residue to the soil help to control runoff and erosion. Grassed drainageways, stripcropping, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is also used for hay and pasture. Fertilizing and controlled grazing help maintain adequate protective cover to reduce runoff and control erosion.

Red oak, white oak, post oak, chestnut oak, yellow poplar, hickory, loblolly pine, shortleaf pine, and Virginia pine are dominant in woodland areas. The understory includes dogwood, sweetgum, blackgum, sourwood, holly, cedar, black cherry, redbud, and red maple. No major limitations for woodland use and management are present.

Depth to bedrock, clayey texture, and moderate shrink-swell potential are the main limitations for building sites and septic tank absorption fields. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Small stones on the surface and dustiness are the main limitations for most recreational uses.

This Badin soil is in capability subclass IIIe and in woodland group 8A.

BaD—Badin channery silt loam, 8 to 15 percent slopes. This soil is well drained. It is on side slopes that are adjacent to intermittent drainageways in the eastern part of the county. Typical mapped areas are irregular in shape and range from 4 to more than 50 acres.

Typically, the surface layer is brown channery silt loam 7 inches thick. The subsoil extends to a depth of 28 inches. The upper part is yellowish red channery silty clay loam. The middle part is red silty clay. The lower part is mottled red, yellowish red, and strong brown channery silty clay loam. The underlying material to a depth of 40 inches is moderately hard, highly fractured slate. Unweathered bedrock is at a depth of 40 inches.

If this soil is unprotected, runoff is very rapid and erosion is a very severe hazard. The flat slate fragments create a mulch effect, help hold water, and reduce erosion. Permeability and the shrink-swell potential are moderate. Fractured bedrock is at a depth of 20 to 40 inches.

Included with this soil is mapping are some small areas of Goldston, Misenheimer, and Kirksey soils. The Goldston soils are in areas that have broken topography, especially on knolls and short side slopes that have ledges of bedrock near the soil surface. The Misenheimer and Kirksey soils are along the intermittent drainageways. A few small eroded areas that have a channery silty clay loam surface layer are also included. These included soils make up 20 to 30 percent of this map unit.

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

Red oak, white oak, post oak, chestnut oak, yellow poplar, hickory, loblolly pine, shortleaf pine, and Virginia pine are the dominant trees. The understory includes dogwood, sweetgum, blackgum, sourwood, holly, cedar, black cherry, redbud, and red maple. The windthrow hazard is a concern in management. Depth to weathered bedrock is a moderate limitation for woodland use and management.

Corn, soybeans, small grains, and grain sorghum are the major crops. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. Conservation tillage and return of crop residue to the soil help to control runoff and erosion. Grassed drainageways, terraces and diversions, stripcropping, contour cultivation, field borders, and crop rotations that include close-growing crops also help to conserve soil and

Figure 7.—Badin channery silt loam, 2 to 8 percent slopes, is suited to small grains, such as winter wheat.

water. Controlled grazing and adequate fertilizing and liming help maintain adequate protective cover to reduce runoff and control erosion on pasture.

Depth to bedrock, slope, clayey texture, and moderate shrink-swell potential are the main limitations for building sites and septic tank absorption fields. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope, small stones, and dustiness are the main limitations for most recreational uses.

This Badin soil is in capability subclass IVe and in woodland group 8A.

BaF—Badin channery silt loam, 15 to 45 percent slopes. This soil is well drained. It is in the eastern part of the county on side slopes that are adjacent to the major drainageways. Typical mapped areas are irregular in shape and have irregular slope patterns. The upper slopes tend to be convex, and the lower slopes tend to be concave. Slopes are broken by many intermediate drainageways. Individual areas are 3 to more than 35 acres.

Typically, the surface layer is brown channery silt loam 7 inches thick. The subsoil extends to a depth of 28 inches. The upper part is yellowish red channery silty clay loam. The middle part is red silty clay. The lower part is mottled red, yellowish red, and strong brown channery silty clay loam. The underlying material to a depth of 40 inches is moderately hard, highly fractured slate. Unweathered slate rock is at a depth of 40 inches.

The erosion hazard is severe if this soil is unprotected. Permeability and the available water capacity are moderate. Fractured bedrock is at a depth of 20 to 40 inches or more.

Included with this soil in mapping are some small areas of Goldston, Misenheimer, Kirksey, and Tatum soils. The Goldston soils are in areas that have the most broken topography, especially on knolls and short side slopes that have ledges of bedrock near the surface. The Misenheimer and Kirksey soils are along the intermittent drainageways. A few small eroded areas that have channery silty clay loam surface layer are also included. These included soils make up 15 to 25 percent of this map unit.

This Badin soil is used mainly as woodland. Some cleared areas are in hay or pasture.

This soil is suited to use for hay and pasture, but slope is a limitation. Controlled grazing and adequate nutrients are needed to maintain adequate protective cover to reduce runoff and control erosion.

Red oak, white oak, post oak, chestnut oak, yellow poplar, hickory, loblolly pine, shortleaf pine, and Virginia pine are the dominant trees. The understory includes dogwood, sweetgum, blackgum, sourwood, holly, cedar, redbud, black cherry, and red maple. The windthrow hazard is a concern in management. Slope and depth to weathered bedrock are the main limitations for woodland use and management.

The soil has severe limitations for sanitary facilities, building site development, and recreational uses. Slope and depth to bedrock are the main limitations for these uses. Low strength and slope are severe limitations for local roads and streets.

This Badin soil is in capability subclass VIIe and in woodland group 8R.

CcB2—Cecil sandy clay loam, 2 to 8 percent slopes, eroded. This soil is well drained and gently sloping. It is in the northwestern part of the county on broad upland ridges that are dissected by intermittent drainageways. Slopes are slightly convex. The mapped areas are generally oblong and variable in width. Individual areas range from 20 to 150 acres. Smail areas of 20 acres or less are common on the more narrow ridges.

Typically, the surface layer is reddish brown sandy clay loam 7 inches thick. The subsoil extends to a depth of 48 inches. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 72 inches is red saprolite that crushes to loam.

Runoff is rapid, and the susceptibility to additional erosion is severe. The surface layer is sticky if it is wet and is cloddy and difficult to till in many places. Permeability and the available water capacity are moderate.

Included with this soil in mapping are small areas of Appling, Cullen, and Mecklenburg soils. The Appling and Cullen soils are commonly in large areas that have a smooth surface. The Mecklenburg soils are in small areas on narrow ridges. Small areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is less eroded and is sandy loam. Large boulders on the surface are shown on the soil map with a special symbol. They are in the Stonewall Jackson School area. These included soils make up 15 to 25 percent of the map unit.

This Cecil soil is used as cropland, pasture, woodland, or for hay. Corn, soybeans, grain sorghum, and small grains are the main crops. Tomatoes, sweet corn, green beans, and peas are also grown. Slope, clayey surface, runoff, and susceptibility to erosion limit the use of this soil for crops. The surface layer of this soil is somewhat difficult to keep in good tilth because of the amount of clay in it. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Proper fertilizing, liming, and controlled grazing are needed to maintain adequate protective cover to reduce runoff and control erosion on pasture.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, redbud, and sassafras. The sandy clay loam surface layer is the main limitation for woodland use and management.

This soil has moderate limitations for most urban uses. Moderate permeability and clayey texture are the main limitations. Low strength is a limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. The limitations for recreational uses are slight.

This Cecil soil is in capability subclass IIIe and in woodland group 7C.

CcD2—Cecil sandy clay loam, 8 to 15 percent slopes, eroded. This soil is well drained. It is in the northwestern part of the county on narrow side slopes of the uplands. Mapped areas are slightly convex and strongly sloping. They are generally adjacent to streams and are long and variable in width. Individual areas range from 5 to 50 acres.

Typically, the surface layer is reddish brown sandy clay loam 7 inches thick. The subsoil extends to a depth of 48 inches. It is red clay in the upper part and red clay loam in the lower part. The underlying material to a depth of 72 inches is red saprolite that crushes to loam.

If this soil is unprotected, runoff is very rapid and erosion is a very severe hazard. Permeability and the available water capacity are moderate.

Included with this soil in mapping are small areas of Appling, Cullen, Pacolet, and Vance soils. The Appling and Cullen soils are on the broader, smoother side slopes. The Pacolet soils are on the steeper, more broken slopes. Small areas of the Vance soils are on narrow slopes adjacent to the Cecil soil. Small areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is severely eroded and is clay loam. These included soils make up 15 to 25 percent of this map unit.

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

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes flowering dogwood, sourwood, American holly, eastern redcedar, black cherry, red maple, redbud, and sassafras. The sandy clay loam surface layer is the main limitation for woodland use and management.

The major crops are corn, soybeans, and small grains. Runoff, slope, and susceptibility to erosion limit the use of this soil for crops. The surface layer of this soil is somewhat difficult to keep in good tilth because of the amount of clay in the surface layer. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Proper fertilizing, liming, and controlled grazing are needed to maintain adequate protective cover to reduce runoff and control erosion on pasture.

Slope, moderate permeability, and clayey texture are the main limitations for urban uses. Low strength is a limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope is the main limitation for recreational uses.

This Cecil soil is in capability subclass VIe and in woodland group 7C.

CeB—Cecil-Urban land complex, 2 to 10 percent slopes. This complex consists of Cecil soil and Urban land primarily in the suburban areas of Concord and Kannapolis. These areas are too small and too intricately mixed to be mapped separately. The Cecil soil makes up 50 to 70 percent of the acreage, and Urban land makes up 15 to 35 percent. The rest of this complex consists of areas where most of the natural soil has been altered or covered as the result of grading and digging.

The Cecil soil is well drained. Typically, the surface layer is reddish brown sandy clay loam about 7 inches thick. The subsoil extends to a depth of 48 inches. The upper part is red clay, and the lower part is red clay loam. The underlying material to a depth of 72 inches is red saprolite that crushes to loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability and the available water capacity are moderate.

Small areas of Appling, Cullen, and Mecklenburg soils can occur at random in this complex. Also, Georgeville and Tatum soils occur in the Mt. Pleasant area. These included soils make up as much as 15 percent of this map unit.

The Urban land areas have houses, paved streets, parking lots, driveways, small shopping centers, industrial buildings, schools, churches, and apartment complexes.

In some altered or disturbed areas, more than 20 inches of fill material covers the original Cecil soil. In other areas, cutting and grading have removed more than two-thirds of the natural soil.

In disturbed areas, erosion is a hazard because of the slope and the runoff. Runoff from rooftops and paved surfaces increases the hazard of flooding in low-lying areas downstream. The clayey subsoil is a limitation in landscaping. The moderate permeability is a limitation for septic tank absorption fields. Modifying the field, increasing the size of the absorption area, or both of these methods, can help to overcome this limitation. Low strength is a limitation for local roads and streets.

Generally, onsite investigation is needed before use and management of specific sites on this complex can be planned.

This complex is not assigned to a capability subclass nor to a woodland group.

Ch—Chewacla sandy loam, frequently flooded. This soil is nearly level and somewhat poorly drained. It is on broad and flat flood plains along the major streams and long, narrow, and flat flood plains along minor creeks and drainageways (fig. 8). Individual areas range from 25 to more than 200 acres in the larger valleys and seldom exceed 25 acres in the smaller valleys.

Typically, the surface layer is dark brown sandy loam 7 inches thick. The subsoil extends to a depth of 50 inches. The upper part is yellowish brown loam. The middle part is mottled grayish brown and dark yellowish brown loam. The lower part is grayish brown sandy clay loam. The underlying material to a depth of 70 inches is gray mixed fine sand and loamy sand.

Permeability is moderate, and the available water capacity is high. A seasonal high water table is at a depth of about 0.5 foot to 1.5 feet from November to

Figure 8.—This area of Chewacla sandy loam is under cultivation. In the background is an area of Poindexter loam, 15 to 45 percent slopes.

April. This soil is also subject to frequent flooding for brief periods from November through April of most years.

Included with this soil in mapping are some small areas of the poorly drained Wehadkee soils in depressions. Small areas of sandy material on narrow, convex ridges that are adjacent to the streams and slightly higher in elevation than the Chewacla soil are also included. Some areas within the slate belt have bedrock within 60 inches of the surface. These included soils make up about 20 percent of the map unit.

This Chewacla soil is used mainly as woodland. In some of the cleared areas, it is used for hay, pasture, or crops, such as corn and soybeans. Flooding, however, can damage these crops. Most uses require drainage and flood prevention, but a lack of suitable outlets limits the installation of drainage systems. Conservation tillage and cover crops that include grasses and legumes in the conservation cropping system help maintain tilth and production.

This soil can be used for hay and pasture if properly drained. Liming and fertilizing as needed and maintaining the drainage system are essential for proper pasture and hay management.

Loblolly pine, yellow poplar, American sycamore, sweetgum, water oak, and willow oak are dominant in woodland areas. The understory includes cottonwood, hornbeam, alder, and red maple. Wetness is the main limitation for woodland use and management.

This soil is not suited to most urban and recreational uses because of wetness and flooding. In addition, low strength is a severe limitation for local roads and streets.

This Chewacla soil is in capability subclass IVw and in woodland group 9W.

CoB—Coronaca clay loam, 2 to 8 percent slopes. This soil is well drained and gently sloping. It is in the southern part of the county on broad uplands. Slopes are slightly convex. The mapped areas are generally oblong and variable in width. Individual areas range from 10 to more than 100 acres. Small areas of 10 acres or less are common on the more narrow ridges.

Typically, the surface layer is dark reddish brown clay loam 6 inches thick. The subsoil extends to a depth of 96 inches. The upper part is dark red clay, and the lower part is dark red clay loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability and the available water capacity are moderate.

Included in this soil in mapping are small areas of Cecil, Cullen, Hiwassee, and Mecklenburg soils. The Cecil, Cullen, and Hiwassee soils are commonly in the larger areas that have a broad and smooth landscape. The Mecklenburg soils are in the smaller areas that have narrow ridges. Small areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is loam. These included soils make up 15 to 25 percent of this map unit.

This Coronaca soil is used for crops, hay, pasture, or woodland. Corn, soybeans, grain sorghum, and small grains are the main crops. Tomatoes, sweet corn, green beans, and peas are also grown. Slope, the clay loam surface layer, runoff, and susceptibility to erosion limit the use of this soil for crops. The clay loam surface layer is difficult to keep in good tilth. As a result, seed germination is reduced. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Controlled grazing and proper use of fertilizer and lime are needed to maintain adequate protective cover to reduce runoff and control erosion on pasture.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, redbud, and sassafras. The clay loam surface layer is the main limitation for woodland use and management.

Moderate permeability and the clayey subsoil are the main limitations for urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Limitations for recreational uses are slight.

This Coronaca soil is in capability subclass IIe and in woodland group 6C.

CoD—Coronaca clay loam, 8 to 15 percent slopes. This soil is well drained and strongly sloping. It is in the southern part of the county on narrow side slopes of the uplands. Slopes are slightly convex. The mapped areas are generally adjacent to streams and are long and irregular in width. Individual areas range from 5 to 40 acres.

Typically, the surface layer is dark reddish brown clay loam 6 inches thick. The subsoil extends to a depth of 96 inches. The upper part is dark red clay, and the lower part is dark red clay loam.

If this soil is unprotected, runoff is very rapid and erosion is a very severe hazard. Permeability and the available water capacity are moderate. The clayey texture of the subsoil limits the use of this soil for some types of development. Depth to bedrock is more than 60 inches.

Included in this soil in mapping are small areas of Cecil, Cullen, Hiwassee, and Mecklenburg soils. Small areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is loamy. These included soils make up 15 to 25 percent of this map unit.

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

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, redbud, and sassafras. The clay loam surface layer is the main limitation for woodland use and management.

The major crops are corn, soybeans, and small grains. Slope, clay loam surface layer, runoff, and susceptibility to erosion limit the use of this soil for crops. The clayey surface layer is difficult to keep in good tilth. As a result, seed germination is reduced. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Controlled grazing and proper use of lime and fertilizer help to maintain adequate protective cover to reduce runoff and control erosion on pasture.

This soil is moderately suited to building site development. Slope, moderate permeability, and clayey texture are the main limitations. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope is the main limitation for most recreational uses.

This Coronaca soil is in capability subclass IVe and in woodland group 6C.

CuB2—Cullen clay loam, 2 to 8 percent slopes, eroded. This soil is well drained and gently sloping. It is in many parts of the county on upland ridges that are dissected by intermittent drainageways. Slopes are slightly convex. The mapped areas are generally oblong and variable in width. Individual areas range from 4 to more than 100 acres.

Typically, the surface layer is reddish brown clay loam 7 inches thick. The subsoil extends to a depth of 54 inches. The upper part is red clay. The lower part is red silty clay loam. The underlying material to a depth of 66 inches is mottled red and yellow silt loam.

Permeability and the shrink-swell potential are moderate. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are some small areas of Cecil, Coronaca, Hiwassee, and Mecklenburg soils. The Cecil, Coronaca, and Hiwassee soils commonly are in large delineations and in areas that have a broad and smooth landscape. The Mecklenburg soils are on the more broken ridges. Small areas of soils that have a loam surface layer and a few small areas of soils that have gravel in the surface layer are also included. These included soils make up 15 to 25 percent of this map unit.

This Cullen soil is used for crops, hay, pasture, or as woodland. Corn, soybeans, grain sorghum, and small grains are the main crops. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. The eroded surface layer is difficult to keep in good tilth. As a result, seed germination is reduced. Tillage is restricted after rainfall. A crust forms after hard rains, and clods form if these areas are worked when they are wet. Erosion is a severe hazard. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control additional erosion. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay (fig. 9) and pasture, but controlled grazing and proper use of lime and fertilizer are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, redbud, and sassafras. The clay loam surface layer is the main limitation for woodland use and management.

This soil is suitable for most urban uses. Moderate permeability and the clayey subsoil are the main limitations. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. The soil has slight limitations for recreational uses.

This Cullen soil is in capability subclass IIIe and in woodland group 6C.

CuD2—Cullen clay loam, 8 to 15 percent slopes, eroded. This soil is well drained and strongly sloping. It is in many parts of the county on upland side slopes that are dissected by intermittent drainageways. Slopes are slightly convex. The mapped areas are generally adjacent to small streams and are long and variable in width. Individual areas range from 4 to more than 30 acres.

Typically, the surface layer is reddish brown clay loam 7 inches thick. The subsoil extends to a depth of 54 inches. The upper part is red clay. The lower part is red silty clay loam. The underlying material to a depth of 66 inches is mottled red and yellow silt loam.

Permeability and the shrink-swell potential are moderate. Runoff is very rapid and erosion is a very severe hazard. The depth to bedrock is more than 60 inches.

Included with this soil in mapping are some small areas of Cecil, Coronaca, Hiwassee, and Mecklenburg soils. A few small areas of soils that have a loam surface layer and a few small areas of soils that have gravel in the surface layer are also included. These included soils make up 15 to 25 percent of this map unit.

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

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, redbud, and sassafras. The clay loam surface layer is the main limitation for woodland use and management.

The major crops are corn, soybeans, and small grains. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. The eroded surface layer is difficult to keep in good tilth. As a result, seed germination is reduced. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

Figure 9.—Fescue hay is being harvested on Cullen clay loam, 2 to 8 percent slopes, eroded.

This soil is suited to hay and pasture, but controlled grazing and proper use of lime and fertilizer are needed to maintain adequate protective cover to reduce runoff and control erosion.

This soil is moderately suited to building site development. Slope, moderate permeability, and the clayey subsoil are the main limitations. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope and susceptibility to erosion are the main limitations for recreational uses.

This Cullen soil is in capability subclass IVe and in woodland group 6C.

EnB—Enon sandy loam, 2 to 8 percent slopes. This soil is well drained and slightly undulating. It is on uplands throughout most of the county. Slopes are slightly convex. The mapped areas are irregularly shaped. Individual areas range from 4 to more than 200 acres. Small areas of 20 acres or less are common on long, narrow ridges.

Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil extends to a depth of 27 inches. The upper part is yellowish brown clay loam. The middle part is strong brown clay that has yellowish brown mottles. The lower part is mottled yellowish brown, brown, and very pale brown clay loam. The underlying material to a depth of 60 inches is light olive brown, pale yellow, and olive yellow saprolite that crushes to loam.

Infiltration is good, but permeability is slow. The available water capacity is moderate, and shrink-swell potential is high. This soil is difficult to keep in good tilth. Tillage needs to be restricted after heavy rains. Runoff is rapid, and erosion is a severe hazard.

Included with this soil in mapping are small areas of Mecklenburg, Iredell, Sedgefield, Poindexter, Appling, and Vance soils. The Mecklenburg soils are commonly in slightly higher positions on the landscape than the Enon soil. The Iredell and Sedgefield soils are in the wet areas that are slightly lower. The Poindexter soils are on the more broken landscapes. The Appling and Vance soils are in areas that have acid crystalline rocks near the surface. A few small areas of soils that have a clay loam surface layer are also included. Some small areas of soils that have a gravelly surface layer and stones on the surface are shown on the soil map with a special symbol. These included soils make up 15 to 25 percent of this map unit.

About half of this Enon soil is used for crops, hay, or pasture. In other areas, it is used as woodland or for urban development.

Corn, soybeans, small grains, and grain sorghum are the main crops. Tomatoes, sweet corn, peas, and green beans are also grown. Slope, runoff, susceptibility to erosion, and slow permeability limit the use of this soil for crops. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways (fig. 10), diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture, but controlled grazing and proper use of lime and fertilizer are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar, white oak, hickory, blackjack oak, post oak,

Figure 10.—Grassed waterways in this area of Enon sandy loam, 2 to 8 percent slopes, reduce sedimentation in ponds.

red oak, and sweetgum are dominant in woodland areas. The understory includes red maple, redbud, sourwood, blackgum, black cherry, and dogwood. No significant limitations for woodland use and management are present.

Slow permeability, high shrink-swell potential, and clayey subsoil are limitations for most urban uses. Low strength and high shrink-swell potential are severe limitations for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slow permeability is the main limitation for recreational uses.

This Enon soil is in capability subclass IIIe and in woodland group 7A.

EnD—Enon sandy loam, 8 to 15 percent slopes. This soil is well drained. It is on side slopes of uplands throughout most of the county. Mapped areas are generally adjacent to small streams and are long and variable in width. They range from 4 to more than 40 acres.

Typically, the surface layer is brown sandy loam 7 inches thick. The subsoil extends to a depth of 27 inches. The upper part is yellowish brown clay loam. The middle part is strong brown clay that has yellowish brown mottles. The lower part is mottled yellowish brown, brown, and very pale brown clay loam. The underlying material to a depth of 60 inches is light olive brown, pale yellow, and olive yellow saprolite that crushes to loam.

Runoff is very rapid, and erosion is a very severe hazard. The permeability is slow, and the available water capacity is moderate. Shrink-swell potential is high.

Included with this soil in mapping are Mecklenburg and Poindexter soils. The Mecklenburg soils normally are on the wider, smoother slopes, and the Poindexter soils are mostly on the steeper, more broken slopes. A few small areas of soils that have a clay loam surface layer, some small areas of soils that have a gravelly surface layer and stones on the surface, and soils that have slopes of more than 15 percent are also included. These included soils make up 15 to 25 percent of this map unit.

This Enon soil is used mainly as woodland. Some areas are in hay, pasture, crops, or urban uses.

Loblolly pine, shortleaf pine, Virginia pine, eastern redcedar, white oak, hickory, blackjack oak, post oak, red oak, and sweetgum are dominant in woodland areas. The understory includes sourwood, red maple, black cherry, redbud, blackgum, and dogwood. No significant limitations for woodland use and management are present.

Corn, soybeans, small grains, and grain sorghum are the main crops. Slope, runoff, and the clayey subsoil limit the use of this soil for crops. Conservation tillage, grassed drainageways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This Enon soil is suitable for hay and pasture, but controlled grazing and proper fertilizing are needed to maintain adequate protective cover to reduce runoff and control erosion.

This soil has severe limitations for most urban uses. Slope, slow permeability, high shrink-swell potential, and the clayey subsoil are the main limitations. Low strength and high shrink-swell potential are severe limitations for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slow permeability and slope are the main limitations for recreational uses.

This Enon soil is in capability subclass IVe and in woodland group 7A.

EoB—Enon-Urban land complex, 2 to 10 percent slopes. This complex consists of Enon soil and Urban land primarily in the suburban areas of Concord and Kannapolis. These areas are too small and too intricately mixed to be mapped separately. The Enon soil makes up 50 to 70 percent of the acreage, and Urban land makes up 15 to 35 percent. The rest of this complex consists of areas where most of the natural soil has been altered or covered as the result of grading and digging.

The Enon soil is well drained. Typically, the surface layer is brown sandy loam about 7 inches thick. The subsoil extends to a depth of 27 inches. The upper part is yellowish brown clay loam, the middle part is strong brown and yellowish brown clay, and the lower part is mottled yellowish brown, brown, and very pale brown clay loam. The underlying material to a depth of 60 inches is mottled pale yellow, light olive brown, and pale yellow saprolite that crushes to loam.

Erosion is a hazard at construction sites where the ground cover is removed. Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is high. Depth to bedrock is at a depth of 40 to 60 inches or more.

This complex includes areas of Mecklenburg and Poindexter soils. The Mecklenburg soils are mostly on the broad, smooth ridges, and the Poindexter soils are mostly in the more sloping areas.

The Urban land areas mostly have houses that are closely spaced, paved streets, parking lots, driveways, shopping centers, industrial buildings, schools, churches, and apartment complexes.

In some altered or disturbed areas, more than 20 inches of fill material covers the Enon soil. In other areas, more than two-thirds of the natural soil has been removed by cutting and grading.

Runoff from rooftops and paved surfaces increases the hazard of flooding in low-lying areas downstream. The clayey subsoil is a limitation to landscaping. The slow permeability, the high shrink-swell potential, and the depth to bedrock limit most urban uses. Low strength is a severe limitation for local roads and streets.

Generally, onsite investigation is needed before the use and management of specific sites on this complex can be planned.

This complex is not assigned to a capability subclass nor to a woodland group.

GeB2—Georgeville silty clay loam, 2 to 8 percent slopes, eroded. This soil is well drained and gently sloping. It is in the eastern part of the county on broad upland ridges that are dissected by intermittent drainageways. Slopes are slightly convex. The mapped areas range from 4 to more than 80 acres.

Typically, the surface layer is reddish brown silty clay loam 6 inches thick. The subsoil extends to a depth of 51 inches. The upper part is red clay. The lower part is red silty clay loam. The underlying material to a depth of 64 inches is mottled red, light brown, yellow, and white saprolite that crushes to silt loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability and the available water capacity are moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Tatum, Badin, Herndon, and Kirksey soils. The Tatum and Badin soils are on narrow ridgetops and knolls and on slopes that are slightly more than 8 percent. The Herndon soils are on the broader landscapes. The Kirksey soils are in areas around intermittent drainageways and in small depressions. Areas of soils that have a silt loam surface layer are also included. These included soils make up 15 to 20 percent of the map unit.

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

Corn, soybeans, grain sorghum, and small grains are the main crops. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. This soil is easy to keep in good tilth, but tillage is restricted after most rains. Conservation tillage and crop residue management help to control runoff and erosion. Grassed drainageways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture, but controlled grazing and proper use of lime and fertilizer help to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, redbud, holly, cedar, black cherry, red maple, and sassafras. The silty clay loam surface layer is the main limitation for woodland use and management.

This soil has moderate limitations for most urban uses. Moderate permeability and the clayey subsoil are the main limitations. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. The soil has slight limitations for most recreational uses.

This Georgeville soil is in capability subclass IIIe and in woodland group 6C.

GoC—Goldston very channery silt loam, 4 to 15 percent slopes. This soil is well drained to excessively drained. It is on rolling side slopes, knolls, and narrow ridge crests throughout the slate belt of the county. The topography is uneven and highly dissected by intermittent drainageways. The mapped areas are variable in size and shape. The small knolls are generally oval and range from 4 to 10 acres. The short side slopes are oblong and are as large as 25 acres. The large, dissected ridgetops, which often include side slopes, are irregular in shape and are as large as 150 acres or more.

Typically, the surface layer is brown very channery silt loam 5 inches thick. The subsoil is pale yellow very channery silt loam to a depth of 16 inches. The underlying material to a depth of 26 inches is mixed slate fragments and silt loam. Hard fractured bedrock is at a depth of 26 inches.

Permeability is moderately rapid, and the available water capacity is low. The content of slate fragments ranges from 35 to 60 percent throughout. The depth to hard bedrock is 20 to 40 inches.

Included with this soil in mapping are some small areas of Poindexter, Enon, Badin, Misenheimer, and Kirksey soils. The Poindexter and Enon soils are on the highest points on the landscape where basic dikes extend up to or near the surface. The Badin soils commonly are on the less broken topography, narrow summits, and toe slopes. The Misenheimer soils are in the less sloping areas and in depressions. The Kirksey soils generally are around the head of intermittent drainageways that have slopes that are less than 4 percent. A few small areas of soils that have rock ledges that extend to the surface are also included. Many small areas have stones on the surface that are larger than 10 inches. These included soils make up about 20 percent of this map unit.

This Goldston soil is used mainly as woodland. In some areas, it is used for hay and pasture. The rest is in crops.

White oak, red oak, chestnut oak, post oak, blackjack oak, hickory, shortleaf pine, and Virginia pine are dominant in woodland areas. The understory includes cedar, sweetgum, blackgum, red maple, and dogwood. Windthrow hazard is a concern in management. Depth to bedrock is the main limitation for woodland use and management.

Corn, soybeans, small grains, and grain sorghum are the main crops. Slope, runoff, susceptibility to erosion, surface fragments, and droughtiness limit the use of this soil for crops. Conservation tillage, crop residue management, grassed waterways, stripcropping, field borders, and crop rotations help to maintain crop production on this Goldston soil. Periods of limited rainfall can cause moisture stress for crops grown on this soil.

Slope, runoff, susceptibility to erosion, surface fragments, and droughtiness limit the use of this soil for hay and pasture. Controlled grazing, mowing, and fertilizing are needed.

This soil has severe limitations for most urban uses. Depth to bedrock, high content of slate fragments, and slope are the main limitations. The main limitations for recreational uses are small stones, slope, and depth to bedrock.

This Goldston soil is in capability subclass IVs and in woodland group 7D.

GoF—Goldston very channery silt loam, 15 to 45 percent slopes. This soil is well drained to excessively drained. It is in the eastern part of the county on steep, complex side slopes throughout the slate belt. The slopes and valley walls are adjacent to the major drainageways on the uplands. Uneven surfaces are common. The mapped areas range from 4 to more than 80 acres.

Typically, the surface layer is brown very channery silt loam 5 inches thick. The subsoil is pale yellow very channery silt loam to a depth of 16 inches. The underlying material to a depth of 26 inches is mixed slate fragments and silt loam. Hard fractured bedrock is at a depth of 26 inches.

Permeability is moderately rapid, and the available water capacity is low. The content of slate fragments range from 35 to 60 percent throughout. Hard fractured bedrock is at a depth of 20 to 40 inches.

Included with this soil in mapping are some small areas of Poindexter, Enon, Badin, Misenheimer, and Kirksey soils. The Poindexter and Enon soils are on the higher slopes on the landscape where basic dikes extend up to or near the surface. The Badin soils are in areas that have less broken topography and on smoother side slopes and toe slopes. The Misenheimer and Kirksey soils are around the head of intermittent drainageways that have slopes that are less than 4 percent. A few small areas that have rock ledges that extend to the surface are also included. Some small areas have stones on the surface that are larger than 10 inches. These included soils make up about 20 percent of this map unit.

This Goldston soil is used mainly as woodland. In some areas, it is used for hay and pasture. Slope, runoff, susceptibility to erosion, droughtiness, and depth to bedrock are the major limitations for use of this soil.

White oak, red oak, chestnut oak, post oak, blackjack oak, hickory, shortleaf pine, and Virginia pine are dominant in woodland areas. The understory includes cedar, sweetgum, blackgum, red maple, and dogwood. Windthrow hazard is a concern in management. Depth to bedrock and slope are the main limitations for woodland use and management.

This soil is not suitable for crops because of slope. It is suitable for hay and pasture. Periods of limited rainfall can cause moisture stress for plants on this soil. Controlled grazing, mowing in dry periods, liming, and fertilizing are needed.

This soil has severe limitations for sanitary facilities, building site development, and recreational uses. Slope and depth to bedrock are the main limitations.

This Goldston soil is in capability subclass VIIs and in woodland group is 7D.

HeB—Herndon silt loam, 2 to 8 percent slopes. This soil is well drained and gently sloping. It is in the eastern part of the county on upland ridges that are dissected by intermittent drainageways. Slopes are slightly convex. The mapped areas range from 4 to more than 20 acres.

Typically, the surface layer is yellowish brown silt loam 7 inches thick. The subsoil extends to a depth of 48 inches. The upper part is strong brown silty clay loam. The middle part is yellowish red silty clay. The lower part is yellowish red silty clay loam. The underlying material to a depth of 60 inches is coarsely mottled red, yellow, and white soft saprolite that crushes to silt loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability and the available water capacity are moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Tatum, Badin, Georgeville, and Kirksey soils. The Tatum and Badin soils are on narrow ridgetops, knolls, and slopes that are slightly more than 8 percent. The Georgeville soils are on the broader landscapes. The Kirksey soils are in areas around intermittent drainageways and in small depressions. Some areas of soils that have a silty clay loam surface layer are also included. These included soils make up about 20 percent of this map unit.

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

The main crops are corn, soybeans, grain sorghum, and small grains. Tomatoes, cucumbers, sweet corn, and green beans are also grown. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. Conservation tillage and crop residue management help to control runoff and erosion. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture, but controlled grazing and proper use of lime and fertilizer help to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present.

This soil has moderate limitations for most urban uses. Moderate permeability and clayey texture are the main limitations. Low strength is a severe limitation for local roads and streets. The soil has slight limitations for recreational uses.

This Herndon soil is in capability subclass IIe and in woodland group 8A.

HwB—Hiwassee clay loam, 2 to 8 percent slopes. This soil is well drained and gently sloping. It is dominantly in the northern part of the county on broad uplands. Some of the larger mapped areas are in the vicinity of Rimer. Slopes are slightly convex. The mapped areas are generally oblong and variable in width. Individual areas range from 10 to more than 100 acres. Small areas of 10 acres or less are common on the narrow ridges.

Typically, the surface layer is dark reddish brown clay loam 7 inches thick. The subsoil extends to a depth of 73 inches. It is dark red clay in the upper part, red clay in the middle part, and red clay loam in the lower part. The underlying material to a depth of 80 inches is mottled red, yellowish red, and brownish yellow saprolite that crushes to loam.

If this soil is unprotected, runoff is medium and erosion is a severe hazard. Permeability and the available water capacity are moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Cecil, Cullen, Coronaca, and Mecklenburg soils. The Cecil, Cullen, and Coronaca soils are on the broad, smooth ridges. The Mecklenburg soils are in the smaller areas that have narrow ridges. A few areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is loam. These included soils make up 20 to 30 percent of this map unit.

This Hiwassee soil is used as cropland, hayland, pasture, or woodland. The main crops are corn, soybeans, grain sorghum, and small grains. Tomatoes, sweet corn, green beans, and peas are also grown. Slope, the clay loam surface layer, runoff, and susceptibility to erosion limit the use of this soil for crops. This soil is difficult to keep in good tilth. Tillage is restricted after most rains. A surface crust forms after heavy rains, and clods form if these areas are worked when they are wet. The crust and clods interfere with seed germination. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture, but lime and fertilizer are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, redbud, and sassafras. This soil has no significant limitations for woodland use and management.

Moderate permeability and the clayey subsoil are the main limitations for urban uses. Low strength is a limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Limitations for recreational uses are slight.

This Hiwassee soil is in capability subclass IIe and in woodland group 8A.

HwD—Hiwassee clay loam, 8 to 15 percent slopes. This soil is well drained. It is mainly in the northern part of the county on strongly sloping, narrow side slopes. These slopes are smooth and slightly convex. The mapped areas are generally adjacent to streams and are long and variable in width. Individual areas range from 5 to 40 acres.

Typically, the surface layer is dark reddish brown clay loam 7 inches thick. The subsoil extends to a depth of 73 inches. It is dark red clay in the upper part, red clay in the middle part, and red clay loam in the lower part. The underlying material to a depth of 80 inches is mottled red, yellowish red, and brownish yellow saprolite that crushes to loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability and the available water capacity are moderate. Depth to bedrock is more than 60 inches.

Included with this soil in mapping are small areas of Cecil, Cullen, Coronaca, and Mecklenburg soils. Some areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is loam. These included soils make up about 20 percent of this map unit.

This Hiwassee soil is used mostly as woodland or pasture. Some acreage is cropland.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, redbud, cedar, black cherry, red maple, and sassafras. This soil has no significant limitations for woodland use and management.

The major crops are fescue and small grains. Slope, runoff, the clay loam surface layer, and susceptibility to erosion limit the use of this soil for crops. This soil is difficult to keep in good tilth. Tillage is restricted after most rains. Surface crusting is common after heavy rains, interferes with seed germination, and increases runoff. Conservation tillage, returning crop residue to the soil, and using cover crops, including grasses and legumes, improve tilth, reduce runoff, and help to reduce erosion. Grassed drainageways, terraces and diversions, stripcropping, and field borders also help to conserve soil and water. Controlled grazing and proper use of fertilizer and lime are needed to maintain adequate protective cover to reduce runoff and control erosion on pasture.

Slope, moderate permeability, and the clayey subsoil are the main limitations for most urban uses. Erosion is a hazard at construction sites if the ground cover is removed. Slope is the main limitation for recreational uses.

This Hiwassee soil is in capability subclass IVe and in woodland group 8A.

IdA—Iredell loam, 0 to 2 percent slopes. This soil is moderately well drained. It is in very broad, nearly level areas, depressions, and around the head of intermittent drainageways dominantly in the southwestern part of the county. Mapped areas range from 5 to 300 acres or more.

Typically, the surface layer is dark grayish brown loam 6 inches thick. The subsoil extends to a depth of 28 inches. The upper part is dark yellowish brown clay. The middle part is olive brown clay that has dark grayish brown mottles. The lower part is mottled light olive brown and dark grayish brown clay loam. The underlying material to a depth of 60 inches is pale yellow, yellowish brown, dark grayish brown, and black saprolite that crushes to sandy clay loam or sandy loam.

Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is very high, and runoff is slow. Because of the slowly permeable subsoil, a perched high water table is at a depth of 1 foot to 2 feet during wet periods. Depth to soft bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Armenia, Enon, Mecklenburg, and Poindexter soils. The Armenia soils are in draingeways and small depressions. The Enon, Mecklenburg, and Poindexter soils are on narrow side slopes and small knolls. Small areas of soils that have a sandy loam surface layer and a few small, slightly depressed areas where water is ponded for brief periods after heavy rains are also included. Many ring-like configurations of boulders are in the map unit and are shown on the soil map with a special symbol. These included soils make up about 15 to 25 percent of this map unit.

This Iredell soil is used mainly for crops, hay, or pasture. In some of the more poorly drained areas, it is used as woodland.

The main crops are corn, soybeans, small grains, and grain sorghum. Wetness, slow permeability, and the clayey subsoil limit the use of this soil for crops. To prevent excessive clodding, the soil should not be tilled if it is wet. Some surface drainage is needed. This soil is suitable for pasture (fig. 11).

Post oak, white oak, and cedar are dominant in woodland areas. Loblolly pine and shortleaf pine also occur. The understory includes dogwood, redbud, holly, sourwood, and black cherry. The clayey subsoil and wetness are the main limitations for woodland use and management.

This soil has severe limitations for most urban uses. Very high shrink-swell potential, wetness, and slow permeability are the main limitations. Low strength and very high shrink-swell potential are severe limitations for local roads and streets. Surface drainage is needed. This soil has severe limitations for most recreational uses. Wetness is the main limitation.

This Iredell soil is in capability subclass IIw and in woodland group 6C.

IdB—Iredell loam, 2 to 6 percent slopes. This soil is moderately well drained. It is on broad, gently sloping upland ridges throughout most of the county. The largest mapped areas are in the southern part of the county on broad ridges and in slightly concave areas around the head of intermittent streams. Individual areas range from 4 to more than 30 acres.

Typically, the surface layer is dark grayish brown loam 6 inches thick. The subsoil extends to a depth of 28 inches. The upper part is dark yellowish brown clay. The middle part is olive brown clay that has dark grayish brown mottles. The lower part is mottled light olive brown and dark grayish brown clay loam. The underlying material to a depth of 60 inches is pale yellow, yellowish brown, dark grayish brown, and black saprolite that crushes to sandy clay loam or sandy loam.

Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is very high, and runoff is medium. A perched seasonal high water table is at a depth of 1 foot to 2 feet from December to April of most years. Depth to soft bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Enon, Poindexter, and Sedgefield soils. The Enon and Poindexter soils are in slightly steeper and more broken areas of the map unit. The Sedgefield soils are on the broader, more level landscapes. A few areas of soils that have a sandy loam surface layer are also included. These included soils make up about 15 to 25 percent of this map unit.

More than half of the Iredell soil is used for crops or hay and pasture. The rest is used as woodland. Slope, runoff, susceptibility to erosion, wetness, and slow permeability limit use and management.

Figure 11.—This fescue pasture is in an area of Iredell loam, 0 to 2 percent slopes.

The main crops are corn, soybeans, small grains, and grain sorghum. Conservation tillage, restricted tillage during wet periods, and return of crop residue to the soil improve tilth and help to control runoff and erosion. Grassed drainageways, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture. Maintaining adequate protective cover to reduce runoff and control erosion is essential for proper pasture management.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, black cherry, red maple, and sassafras. The clayey subsoil is the main limitation for woodland use and management.

This soil has severe limitations for most urban uses. Very high shrink-swell potential, wetness, and slow permeability are the main limitations. Low strength and very high shrink-swell potential are severe limitations for local roads and streets. Surface drainage of the less sloping areas is commonly used. Wetness is the main limitation for most recreational uses.

This Iredell soil is in capability subclass IIe and in woodland group 6C.

KkB—Kirksey silt loam, 1 to 6 percent slopes. This soil is moderately well drained. It is throughout the eastern part of the county on gently sloping upland ridges, in depressions, and around the head of intermittent drainageways. The mapped areas range from 4 to more than 200 acres. Small areas of 20 acres or less are along drainageways.

Typically, the surface layer is grayish brown silt loam 2 inches thick. The subsurface layer is brown silt loam to a depth of 7 inches. The subsoil extends to a depth of 37 inches. The upper part is brownish yellow silt loam that has pale yellow mottles. The middle and lower parts are brownish yellow silty clay loam that has light gray mottles. The underlying material to a depth of 49 inches is mottled gray, brownish yellow, and pale yellow channery silt loam. Moderately hard, fractured slate bedrock is at a depth of 49 inches.

Permeability is moderately slow, and the available water capacity is moderate to high. A perched seasonal high water table is at a depth of 1.5 to 3 feet during December through March of most years. The depth to bedrock is 40 to 60 inches.

Included with this soil in mapping are a few small areas of Misenheimer and Badin soils. The Misenheimer soils are in slightly elevated positions if ledges of bedrock are at or near the surface. The Badin soils are on small knolls and ridges. Small areas of soils that have a channery silt loam surface layer are also included. Small to medium areas of nearly level soils that have a clayey subsoil are in depressions and around the heads of intermittent drainageways. These included soils make up 15 to 25 percent of the map unit.

This Kirksey soil is used as cropland, pasture, or woodland. Wetness and moderately slow permeability limit use and management.

The main crops are corn, soybeans, small grains, and grain sorghum. Tomatoes, cucumbers, cantaloupes, watermelons, sweet corn, green beans, and peas are also grown. In years of low rainfall, this soil is among the most productive in the county. In years of above average rainfall, drowning of crops can be a problem. Surface and artificial drainage is needed. Drainage channels must be kept open. Grassed waterways help to keep drainage channels open for removal of surface water. Conservation tillage, crop residue management, diversions, field borders, and crop rotations are good conservation practices to use on this soil.

This soil is suitable for hay and pasture, but wetness and permeability are limitations. Controlled grazing, fertilizing, and liming are needed.

White oak, red oak, willow oak, blackjack oak, post oak, hickory, shortleaf pine, Virginia pine, and yellow poplar are dominant in woodland areas. The understory includes blackgum, redbud, sweetgum, cedar, sourwood, and red maple. Wetness is the main limitation for woodland use and management.

This soil has severe limitations for most sanitary facilities. Wetness and moderately slow permeability are the main limitations. Wetness and low strength are the main limitations for building site development. Wetness and moderately slow permeability are the main limitations for recreational uses.

This Kirksey soil is in capability subclass IIe and in woodland group 6W.

MeB—Mecklenburg loam, 2 to 8 percent slopes. This soil is well drained and gently sloping. It is on upland ridges that are dissected by intermittent drainageways. This soil is throughout most of the county, but it is dominant in the southwestern part. Slopes are slightly convex. The mapped areas are generally oblong and variable in width. Individual areas range from 4 to more than 200 acres.

Typically, the surface layer is dark reddish brown loam 6 inches thick. The subsoil extends to a depth of 36 inches. The upper part is dark reddish brown clay, the middle part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is mottled yellow, strong brown, and black saprolite that crushes to sandy loam.

Erosion is a hazard if this soil is unprotected. Permeability is slow, and the shrink-swell potential is moderate. Depth to soft bedrock is 48 to 60 inches or more.

Included with this soil in mapping are some small areas of Enon, Iredell, Cecil, Cullen, and Poindexter soils. The Enon soils occur at random within the map unit. The Iredell soils are in depressions mostly in large delineations. Cecil and Cullen soils are in large delineations that are in close proximity to adjacent map units of Cecil and Cullen soils. The Poindexter soils are on the slightly steeper, more broken slopes. Areas of soils that have a gravelly loam surface layer are also included, and are shown on the soil map with a special symbol. These included soils make up 20 to 30 percent of this map unit.

More than half of this Mecklenburg soil is used for crops, hay, or pasture. In other areas, it is used as woodland or for urban uses.

The major crops are corn, soybeans, grain sorghum, and small grains. Tomatoes, sweet corn, green beans, and peas are also grown. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. This soil is easy to keep in good tilth, but tillage is restricted after most rains. Conservation tillage and crop residue management help to control runoff and erosion and improve tilth. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture. Controlled grazing and proper use of lime and fertilizer help to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, redcedar, Virginia pine, yellow poplar, hickory, red oak, white oak, sycamore, and post oak are dominant in woodland areas. The understory includes redbud, dogwood, sourwood, holly, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present (fig. 12).

Slow permeability and the clayey subsoil are the main limitations for most urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. The limitations for recreational uses are slight.

Figure 12.—This strip of vegetation provides wildlife habitat in an area of Mecklenburg loam, 2 to 8 percent slopes.

This Mecklenburg soil is in capability subclass IIe and in woodland group 7A.

MeD—Mecklenburg loam, 8 to 15 percent slopes. This soil is well drained and strongly sloping. It is on upland side slopes that are dissected by intermittent drainageways. This soil occurs in small areas throughout most of the county. Slopes are slightly convex. The mapped areas are generally adjacent to small streams and are long and variable in width. Individual areas range from 4 to more than 20 acres.

Typically, the surface layer is dark reddish brown loam 6 inches thick. The subsoil extends to a depth of 36 inches. The upper part is dark reddish brown clay, the middle part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is mottled yellow, strong brown, and black saprolite that crushes to sandy loam.

Erosion is a hazard if this soil is unprotected. Permeability is slow, and the shrink-swell potential is moderate. Depth to soft bedrock is 48 to 60 inches or more.

Included with this soil in mapping are some small areas of Enon, Cecil, Cullen, and Poindexter soils. Many small areas of soils that have a gravelly loam surface layer and a few small eroded areas of soils that have a clay loam surface layer are also included. These included soils make up 20 to 30 percent of this map unit.

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

Slope, runoff, and erosion limit the use of this soil for crops. Conservation tillage and crop residue management help to control runoff and erosion and improve tilth. Grassed drainageways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water and improve crop production.

This soil is suitable for hay and pasture. Proper liming and fertilizing are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, redcedar, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, redbud, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present.

Slope, slow permeability, and the clayey subsoil are the main limitations for most urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope is the main limitation for recreational uses.

This Mecklenburg soil is in capability subclass IVe and in woodland group 7A.

MkB—Mecklenburg-Urban land complex, 2 to 10 percent slopes. This complex consists of Mecklenburg soil and Urban land primarily in the suburban areas of Concord. These areas are too small or too intricately mixed to be mapped separately. The Mecklenburg soil makes up 50 to 70 percent of the acreage, and Urban land makes up 15 to 35 percent. The rest of this complex consists of areas where most of the natural soil has been altered or covered as the result of grading and digging.

The Mecklenburg soil is well drained. Typically, the surface layer is dark reddish brown loam about 6 inches thick. The subsoil extends to a depth of 36 inches. The upper part is dark reddish brown clay, the middle part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is mottled strong brown, black, and yellow saprolite that crushes to sandy loam.

Erosion is a hazard if this soil is unprotected. Permeability is slow, and the shrink-swell potential is moderate. Depth to soft bedrock is 48 to 60 inches or more.

Included with this complex in mapping are areas of Cullen, Enon, and Poindexter soils. The Cullen soils are dominantly in the broader areas. The Enon soils are in areas where the narrow bedrock dikes that are high in ferromagnesian minerals extend to or near the surface. The Poindexter soils are mostly on the slightly steeper parts of the complex. These included soils make up as much as 15 percent of this map unit.

The Urban land areas have closely spaced houses, paved streets, parking lots, driveways, shopping centers, industrial buildings, schools, churches, and apartment complexes.

In some altered or disturbed areas, more than 20 inches of fill material covers the original Mecklenburg soil. In other areas, cutting and grading have removed more than two-thirds of the natural soil.

If this soil is disturbed for urban development, erosion is a hazard because of the slope and the runoff. Runoff from rooftops and paved surfaces increases the hazard of flooding in low-lying areas downstream. The clayey subsoil is a limitation for landscaping. The slow permeability, moderate shrink-swell potential, and depth to bedrock are limitations for several urban uses. Low strength is a severe limitation for local roads and streets.

Generally, onsite investigation is needed before use and management of specific sites on this complex can be planned.

This complex has not been assigned to a capability subclass nor to a woodland group.

MsA—Misenheimer channery silt loam, 0 to 4 percent slopes. This soil is moderately well drained and shallow. It is in the eastern part of the county on broad, nearly level to gently undulating ridges, in depressions, and around the head of intermittent drainageways on uplands. The bedding plane of the underlying rock is nearly level. The individual areas range from 4 to 200 acres or more.

Typically, the surface layer is grayish brown channery silt loam 2 inches thick. The subsurface layer is light gray channery silt loam to a depth of 7 inches. The subsoil is pale yellow channery silt loam to a depth of 15 inches. The underlying material to a depth of 24 inches is mottled brown, gray, and yellow channery saprolite. Moderately hard, fractured slate bedrock is at a depth of 24 inches.

Permeability is moderate or moderately rapid, and the available water capacity is low. Shrink-swell potential is low. Depth to bedrock is 20 to 40 inches. A perched seasonal high water table is at a depth of 1 foot to 1.5 feet late in winter, early in spring, and during wet periods. This soil is droughty during dry periods.

Included with this soil in mapping are small areas of Goldston, Badin, and Kirksey soils. The Goldston soils are on knolls and short side slopes. The slopes of these Goldston soils are slightly more than 4 percent. The Badin soils are in slightly higher positions on the landscape. The Kirksey soils are generally around the head of intermittent drainageways. A few small areas of soils that have stones larger than 10 inches in diameter on the surface are also included. These included soils make up about 20 percent of this map unit.

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

White oak, red oak, post oak, blackjack oak, willow oak, hickory, sweetgum, Virginia pine, and shortleaf pine are dominant in woodland areas. The understory includes cedar, blackgum, red maple, and dogwood. The windthrow hazard is a concern in management. Depth to bedrock and stress because of summer droughtiness are the main limitations for woodland use and management.

The main crops are corn, soybeans, grain sorghum, and small grains. Seasonal wetness, droughtiness, and depth to bedrock limit the use of this soil for crops. Conservation tillage, crop residue management, grassed waterways, field borders, and crop rotations are good conservation practices to use on this soil. Controlled grazing, fertilizing, and liming are needed for pasture and hay forage.

This soil has severe limitations for most urban uses because of depth to bedrock and wetness. It is suitable for most recreational uses, but small stones and wetness are limitations. Depth to bedrock is a limitation if cuts and fills are anticipated in landscaping.

This Misenheimer soil is in capability subclass IIIw and in woodland group 6D.

PaF—Pacolet sandy loam, 15 to 35 percent slopes. This soil is well drained. It is mostly in the northwestern part of the county on steep upland side slopes that are adjacent to the major drainageways. Slopes are convex. The mapped areas are long and irregular in width. Individual areas range from 5 to more than 40 acres.

Typically, the surface layer is dark brown sandy loam 2 inches thick. The subsurface layer is reddish brown sandy loam to a depth of 6 inches. The subsoil extends to a depth of 31 inches. The upper part is red sandy clay loam, the middle part is red clay, and the lower part is red clay loam. The underlying material to a depth of 60 inches is mottled red and reddish yellow gneiss saprolite that crushes to loam.

Erosion is a very severe hazard if this soil is unprotected. Permeability and the available water capacity are moderate. The subsoil is strongly acid. Depth to hard bedrock is more than 60 inches.

Included with this soil in mapping are some small areas of Poindexter and Cecil soils. The Poindexter soils are in areas that have the most broken topography. The Cecil soils are in less sloping, smoother, longer areas than Pacolet soils. A few small eroded areas of soils that have a sandy clay loam surface layer are also included. The included soils make up 20 to 30 percent of this map unit.

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

This soil is not suitable for crops because of slope. It is suitable for hay and pasture. Controlled grazing and sufficient fertilizing are needed to maintain forage to reduce runoff and control erosion.

Red oak, white oak, post oak, chestnut oak, yellow poplar, hickory, loblolly pine, shortleaf pine, and Virginia pine are dominant in woodland areas. The understory includes dogwood, sweetgum, blackgum, sourwood, holly, cedar, black cherry, redbud, and red maple. Slope is the main limitation for woodland use and management.

This soil has severe limitations for sanitary facilities, building site development, and recreational uses. Slope is the main limitation. Low strength and slope are severe limitations for local roads and streets.

This Pacolet soil is in capability subclass VIe and in woodland group 8R.

PcE3—Pacolet-Udorthents complex, 12 to 25 percent slopes, gullied. This complex consists of eroded Pacolet soil and gullies that have cut through the original soil into the underlying weathered bedrock. Small areas of this soil are scattered throughout the county. The mapped areas are generally narrow, irregularly shaped, and range up to about 35 acres.

The Pacolet soil is in the areas between the gullies. It makes up 40 to 70 percent of the map unit. Most of the original surface layer and part of the subsoil has eroded away. The present surface layer is clay loam or clay 2 to 5 inches thick. The subsoil is red clay that extends to a depth of about 30 inches.

Udorthents are in the V-shaped gullies that make up 30 to 60 percent of the map unit. They consist of weathered rock material exposed by erosion. This material commonly is soft, non-cohesive, and has little resistance to the cutting action of water. The gullies are mostly 3 to 15 feet deep and 15 to about 60 feet apart. Some gullies are still subject to active erosion, and others are either stabilized or partly stabilized.

Included in mapping are small areas of Enon soils that are gullied. These soils are adjacent to map units of Enon soils. The included soils make up about 15 percent of this map unit.

Vegetation is sparse in areas of this map unit. It is mostly shortleaf and Virginia pines that reseed naturally.

Gullies, slope, slow infiltration, rapid runoff, and erodibility are severe limitations for crops and urban uses. In addition, low strength and slope are severe limitations for local roads and streets. Extensive grading is needed if these areas are to be reclaimed. Establishing vegetation is difficult because of slope, the low content of organic matter, available plant nutrients, and low available water capacity.

Onsite investigation is generally needed before use and reclamation of specific sites on this complex can be planned.

This complex is in capability subclass VIIe and in woodland group 8R.

PoB—Poindexter loam, 2 to 8 percent slopes. This soil is well drained. It is in many parts of the county on broken uplands that have long, narrow ridges and side slopes. Some of the largest areas are in the northern part of the county along Coldwater Creek. Slopes are undulating and convex. The mapped areas are irregular in shape and range from 3 to 15 acres or more.

Typically, the surface layer is brown loam 7 inches thick. The subsoil extends to a depth of 22 inches. It is yellowish brown sandy clay loam. The underlying material to a depth of 48 inches is multicolored saprolite that crushes to sandy loam or loamy sand. Hard bedrock is at a depth of 48 inches.

Erosion is a hazard if this soil is unprotected. Rills are common in many areas. Permeability is moderate, and the available water capacity is low. Depth to hard bedrock is 40 to 60 inches.

Included with this soil in mapping are small areas of Enon, Mecklenburg, and Pacolet soils. The Enon and Mecklenburg soils are in the smoother areas of the larger delineations. The Pacolet soils occur at random. Small areas of soils that have an eroded sandy clay loam surface layer are also included. Some small areas have stones or rock outcrop on the surface. These included soils make up 20 to 30 percent of this map unit.

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

White oak, red oak, chestnut oak, post oak, blackjack oak, hickory, shortleaf pine, redcedar, and Virginia pine are dominant in woodland areas. The understory includes sourwood, redbud, holly, black cherry, sweetgum, blackgum, red maple, and dogwood. The windthrow hazard is a concern in management. Depth to bedrock is the main limitation for woodland use and management.

If the soil is cultivated, the main crops are corn, soybeans, small grains, and grain sorghum. Slope, runoff, susceptibility to erosion, and droughtiness limit the use of this soil for crops. Conservation tillage and crop residue management help to control runoff and erosion and to conserve moisture. Grassed waterways, conservation tillage, diversions, stripcropping, field borders, and crop rotations are good conservation practices to use on this soil.

This soil is suitable for hay and pasture. Proper liming, fertilizing, and controlled mowing and grazing help to overcome the effects of droughtiness and to maintain adequate protective cover to reduce runoff and control erosion.

This soil has slight limitations for building site development in areas that do not require excavation. Limitations are moderate because of depth to bedrock in areas that need excavation. Erosion is a hazard at construction sites if the ground cover is removed. This soil is suitable for most recreational uses.

This Poindexter soil is in capability subclass IIIe and in woodland group 6A.

PoD—Poindexter loam, 8 to 15 percent slopes. This soil is well drained. It is in many parts of the county on broken uplands that have long irregular side slopes. Some of the largest mapped areas are in the northern part of the county along Coldwater Creek. The mapped areas are rolling and have convex slopes. They are variable in width and range from 4 to 30 acres or more.

Typically, the surface layer is brown loam 7 inches thick. The subsoil extends to a depth of 22 inches. It is yellowish brown sandy clay loam. The underlying material to a depth of 48 inches is multicolored saprolite that crushes to sandy loam or loamy sand. Hard bedrock is at a depth of 48 inches.

Erosion is a severe hazard if this soil is unprotected. Permeability is moderate, and the available water capacity is low. Depth to hard bedrock is 40 to 60 inches.

Included with this soil in mapping are some small areas of Enon, Mecklenburg, and Pacolet soils. These soils are in the smoother areas of the larger delineations. The Pacolet soils occur at random. Small areas of soils that have an eroded sandy clay loam surface layer are also included. These eroded areas commonly have some shallow gullies or rills. Some small areas also have stones or rock outcrop on the surface. These included soils make up 20 to 35 percent of the map unit.

This Poindexter soil is used mainly as woodland. In some areas, it is used for hay, pasture, or residential developments (fig. 13).

White oak, red oak, chestnut oak, post oak, blackjack oak, hickory, shortleaf pine, loblolly pine, redcedar, and Virginia pine are dominant in woodland areas. The understory includes sweetgum, blackgum, red maple, redbud, holly, black cherry, sourwood, and dogwood. Depth to bedrock and the thin subsoil are the main limitations for woodland use and management.

Corn, soybeans, small grains, and grain sorghum are the main crops if the soil is cultivated. Slope, runoff, susceptibility to erosion, and droughtiness limit the use of this soil for crops. Conservation tillage and crop

Figure 13.—This area of Poindexter loam, 8 to 15 percent slopes, is used as pasture and woodland.

residue management help to control runoff and erosion and to conserve moisture.

This soil is suitable for hay and pasture. Controlled grazing, fertilizing, and liming overcome the effects of droughtiness. Maintaining protective cover can reduce runoff and help to control erosion.

Depth to bedrock is a severe limitation for most sanitary facilities. Slope and depth to bedrock are moderate limitations for urban use. Roadbank and slope stabilization are concerns of some homeowners. Slope is the main limitation for recreational uses.

This Poindexter soil is in capability subclass IVe and in woodland group 6R.

PoF—Poindexter loam, 15 to 45 percent slopes. This soil is well drained. It is commonly on steep to very steep uplands that are adjacent to the flood plains in many parts of the county. Some of the largest mapped areas are in the northern part of the county along Coldwater Creek. The mapped areas are long and narrow. They range from 4 to 50 acres or more.

Typically, the surface layer is brown loam 7 inches thick. The subsoil extends to a depth of 22 inches. It is yellowish brown sandy clay loam. The underlying material to a depth of 48 inches is multicolored saprolite that crushes to sandy loam or loamy sand. Hard bedrock is at a depth of 48 inches.

Erosion is a hazard if this soil is unprotected. Permeability is moderate, and the available water capacity is low. Depth to hard bedrock is 40 to 60 inches.

Included with this soil in mapping are small areas of Enon and Pacolet soils. The Enon soils are in less sloping areas of the map unit. The Pacolet soils occur at random. Small areas of soils that have an eroded sandy clay loam surface layer and shallow gullies are also included. Small stones and rock outcrops are in some areas. These included soils make up about 20 percent of the map unit.

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

White oak, red oak, chestnut oak, post oak, blackjack oak, hickory, shortleaf pine, redcedar, and Virginia pine are dominant in woodland areas. The understory includes sourwood, holly, black cherry, redbud, sweetgum, blackgum, red maple, and dogwood. Depth to bedrock and slope are the main limitations for woodland use and management.

This soil is not suitable for agronomic and horticultural crops. Slope, runoff, susceptibility to erosion, and droughtiness limit the use of this soil for crops. Controlled grazing and proper liming and fertilizing help to overcome the effects of droughtiness and to maintain adequate protective cover to reduce runoff and control erosion.

Slope and depth to bedrock are limitations for urban uses. Slope is a limitation for recreational uses.

This Poindexter soil is in capability subclass VIIe and in woodland group 6R.

SfB—Sedgefield sandy loam, 2 to 8 percent slopes. This soil is moderately well drained and somewhat poorly drained. It is on broad uplands. Some large mapped areas are in the vicinity of Mt. Pleasant on ridges that have gentle slopes and in slightly concave areas around the head of intermittent streams. The mapped areas are generally oblong and irregular in width. They range from 5 to more than 100 acres.

Typically, the Sedgefield soil has a dark brown sandy loam surface layer 7 inches thick. The subsurface layer is brown sandy loam that extends to a depth of 12 inches. The subsoil extends to a depth of 34 inches. The upper part is yellowish brown sandy clay loam. The middle part is yellowish brown clay that has grayish brown and strong brown mottles. The lower part is grayish brown clay loam that has dark brown and yellowish brown mottles. The underlying material to a depth of 52 inches is coarsely mottled black, yellow, and white saprolite that crushes to loam. Moderately hard bedrock that has white and black minerals is at a depth of 52 inches.

Permeability is slow, and the available water capacity is moderate to high. Shrink-swell potential is high. A perched seasonal high water table is at a depth of 1 foot to 1.5 feet during January to March of most years. Depth to bedrock is more than 4 feet.

Included with this soil in mapping are a few areas of Enon, Armenia, Iredell, and Vance soils. The Armenia soils are in small depressions, the Iredell soils are in nearly level areas, and the Enon and Vance soils are on the more rolling landscapes. A few small areas of soils that have a loamy sand surface layer are also included. These included soils make up about 20 percent of this map unit.

About two-thirds of this Sedgefield soil is used as cropland or for hay and pasture. The rest is used as woodland.

The main crops are corn, soybeans, small grains, and grain sorghum. Tomatoes, strawberries, cantaloupes, watermelons, sweet corn, green beans, and peas are also grown. Conservation tillage and crop residue management help to control runoff and erosion. Grassed waterways, field borders, and crop rotations that include close-growing crops also help to conserve soil and water. Some surface and artificial drainage is needed.

This soil is suitable for hay and pasture. Overgrazing compacts the surface layer and restricts new growth of grasses and legumes. Grazing if the soil is wet also compacts the surface layer. Deferred grazing, rotation grazing, and proper stocking can increase the carrying capacity of pastures. Fertilizing, liming, and providing some surface drainage are needed.

White oak, red oak, willow oak, blackjack oak, post oak, hickory, loblolly pine, shortleaf pine, Virginia pine, and yellow poplar are dominant in woodland areas. The understory includes blackgum, sourwood, sweetgum, redcedar, and red maple. Wetness is the main limitation for woodland use and management.

Slow permeability, wetness, and high shrink-swell potential are severe limitations for most sanitary facilities. Wetness and high shrink-swell potential are the main limitations for building site development. Low strength and high shrink-swell potential are severe limitations for local roads and streets. Wetness and slow permeability are the main limitations for recreational uses.

This Sedgefield soil is in capability subclass IIe and in woodland group 8W.

TaB—Tatum silt loam, 2 to 8 percent slopes. This soil is well drained. It is throughout the eastern part of the county on upland ridges that are dissected by intermittent drainageways. Slopes are slightly convex and undulating. The mapped areas are generally oblong and irregular in width. Individual areas range from 4 to more than 100 acres.

Typically, the surface layer is strong brown silt loam 6 inches thick. The subsoil extends to a depth of 39 inches. The upper part is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 49 inches is mottled brownish yellow, yellowish red, and red saprolite that crushes to silt loam. Weathered, fractured slate bedrock is at a depth of 49 inches.

Erosion is a hazard if this soil is unprotected. Permeability is moderate. Shrink-swell potential is moderate. Depth to soft bedrock is more than 40 inches.

Included with this soil in mapping are some small areas of Badin and Kirksey soils. The Badin soils are on narrow ridges and knolls. The Kirksey soils are in areas around the intermittent drainageways and in small depressions. Many small areas of soils that have a channery silt loam surface layer and a few small areas of eroded soils that have a silty clay loam surface layer are also included. These included soils make up 20 to 30 percent of this map unit.

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

The main crops are corn, soybeans, grain sorghum, and small grains. Tomatoes, cucumbers, cantaloupes, sweet corn, green beans, and peas are also grown. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. Conservation tillage and crop residue management help to control runoff and erosion and improve tilth. Grassed waterways, diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture. Controlled grazing, fertilizing, and liming are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, sycamore, yellow poplar, hickory, white oak, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, redbud, holly, cedar, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present.

Moderate permeability and the clayey subsoil are the main limitations for urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. No significant limitations for recreational uses are present.

This Tatum soil is in capability subclass IIe and in woodland group 8A.

TaD—Tatum silt loam, 8 to 15 percent slopes. This soil is well drained. It is in the eastern part of the county on upland side slopes that are dissected by intermittent drainageways. Slopes are rolling and slightly convex. The mapped areas are generally adjacent to small streams and are long and irregular in width. Individual areas range from 4 to more than 30 acres.

Typically, the surface layer is strong brown silt loam 6 inches thick. The subsoil extends to a depth of 39 inches. The upper part is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 49 inches is mottled brownish yellow, yellowish red, and red saprolite that crushes to silt loam. Weathered, fractured slate bedrock is at a depth of 49 inches.

Erosion is a hazard if this soil is unprotected. Permeability is moderate. Shrink-swell potential is moderate. Depth to soft bedrock is more than 40 inches.

Included with this soil in mapping are some small areas of Badin and Kirksey soils. The Badin soils are on short side slopes, knolls, and on slopes that are slightly more than 15 percent. The Kirksey soils are in areas around the intermittent drainageways and in small depressions. Many small areas of soils that have a channery silt loam surface layer and a few small areas of eroded soils that have a silty clay loam surface layer are also included. These included soils make up 20 to 30 percent of this map unit.

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

Corn, soybeans, small grains, and grain sorghum are the main crops. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. Grassed drainageways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture. Controlled grazing and proper fertilization are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, sycamore, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, redbud, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present.

Slope, moderate permeability, and the clayey subsoil are the main limitations for most urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope is the main limitation for recreational uses.

This Tatum soil is in capability subclass IIIe and in woodland group 8A.

TbB2—Tatum silty clay loam, 2 to 8 percent slopes, eroded. This soil is well drained. It is in the southeastern part of the county on upland ridges that are dissected by intermittent drainageways. Slopes are slightly convex and undulating. The mapped areas are generally oblong and irregular in width. Individual areas range from 4 to more than 50 acres.

Typically, the surface layer is strong brown silty clay loam 6 inches thick. The subsoil extends to a depth of 39 inches. The upper part is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 49 inches is mottled brownish yellow, yellowish red, and red saprolite that crushes to silt loam. Weathered, fractured slate bedrock is at a depth of 49 inches.

Additional erosion is a hazard if this soil is unprotected. Permeability is moderate. Shrink-swell potential is moderate. Depth to soft bedrock is more than 40 inches.

Included with this soil in mapping are some small areas of Georgeville, Badin, and Kirksey soils. The Georgeville soils are on the broader, smoother ridges. The Badin soils are on narrow ridges and knolls. The Kirksey soils are in areas around the intermittent drainageways and in small depressions. Many small areas of soils that have a channery silt loam or silt loam surface layer and small areas of soils that have a yellowish red or strong brown subsoil are also included. These included soils make up 20 to 30 percent of this map unit.

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

The main crops are corn, soybeans, grain sorghum, and small grains. Tomatoes, cucumbers, cantaloupes, sweet corn, green beans, and peas are also grown. Slope, the clayey surface layer, runoff, and susceptibility to erosion limit the use of this soil for crops. Because of erosion, this soil is difficult to keep in good tilth. As a result, seed germination is reduced. Surface crusting is common after heavy rainfalls. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed waterways, diversions, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture. Controlled grazing, fertilizing, and liming are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, sycamore, red oak, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, redbud, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present.

Moderate permeability and the clayey subsoil are the main limitations for most urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. The clayey surface layer is the main limitation for recreational uses.

This Tatum soil is in capability subclass IIIe and in woodland group 8A.

TbD2—Tatum silty clay loam, 8 to 15 percent slopes, eroded. This soil is well drained. It is in the southeastern part of the county on upland side slopes that are dissected by intermittent drainageways. Slopes are rolling and slightly convex. The mapped areas are generally adjacent to small streams and are long and variable in width. Individual areas range from 4 to more than 30 acres.

Typically, the eroded surface layer is strong brown silty clay loam 6 inches thick. The subsoil extends to a depth of 39 inches. The upper part is red silty clay, and the lower part is red silty clay loam. The underlying material to a depth of 49 inches is mottled brownish yellow, yellowish red, and red saprolite that crushes to silt loam. Weathered, fractured slate bedrock is at a depth of 49 inches.

Additional erosion is a hazard if this soil is unprotected. Permeability is moderate. Shrink-swell potential is moderate. Depth to soft bedrock is more than 40 inches.

Included with this soil in mapping are some small areas of Badin and Kirksey soils. The Badin soils are on short side slopes, knolls, and on slopes that are slightly more than 15 percent. The Kirksey soils are in areas around the intermittent drainageways and in small depressions. Many small areas of soils that have a slaty silt loam or non-eroded silt loam surface layer are also included. These included soils make up 20 to 30 percent of this map unit.

This Tatum soil is used mainly as woodland. In some areas, it is used for hay and pasture. A small acreage is in crops.

In cultivated areas, soybeans, grain sorghum, and small grains are the main crops. Slope, runoff, and susceptibility to erosion limit the use of this soil for crops. This soil is difficult to keep in good tilth because of erosion. Surface crusting is common after hard rainfalls, and clods form if this soil is worked when wet. The crust and clods interfere with seed germination. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes improve tilth, reduce runoff, and help to control erosion. Grassed waterways, terraces and diversions, stripcropping, field borders, and crop rotations that include close-growing crops also help to conserve soil and water.

This soil is suitable for hay and pasture. Controlled grazing, fertilizing, and liming are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, shortleaf pine, Virginia pine, yellow poplar, hickory, white oak, red oak, sycamore, and post oak are dominant in woodland areas. The understory includes dogwood, sourwood, holly, cedar, redbud, black cherry, red maple, and sassafras. No significant limitations for woodland use and management are present.

Slope, moderate permeability, and the clayey subsoil are the main limitations for most urban uses. Low strength is a severe limitation for local roads and streets. Erosion is a hazard at construction sites if the ground cover is removed. Slope is the main limitation for recreational uses.

This Tatum soil is in capability subclass IVe and in woodland group 8A.

Ud—Udorthents, loamy. This map unit consists of soil areas in which the natural soils have been altered by earth-moving operations. These areas are borrow pits (fig. 14), gold mines, landfills, and quarries and are designated as such on the detailed soil map. The altered soils are dominantly loamy and have thickness, underlying material, and slope that are variable. Some small areas can have undisturbed natural soils. The mapped areas range from 4 to more than 50 acres.

In borrow pits, the original soil and many of the underlying layers have been removed for use as fill material or construction aggregate. Cuts range in depth from 3 to 25 feet. The base surface in these cuts is generally uneven. The exposed surface layer consists mainly of weathered bedrock or is partly covered by mounds of spoil material.

Included in this area of borrow pits in mapping are ponds, small areas of intermittent ponded water, and small areas of fill material that was pushed aside during excavation.

Wild grasses, weeds, shortleaf pine, and Virginia pine that reseed are in most borrow pits. Physical properties needed for plant growth are poor. The rooting depth is generally shallow, and available water capacity, soil fertility, and content of organic matter are low. Major reclamation is generally necessary to prepare these areas for economic plant growth or development for any other purpose. The ponded water areas and vegetated areas provide habitat for wildlife.

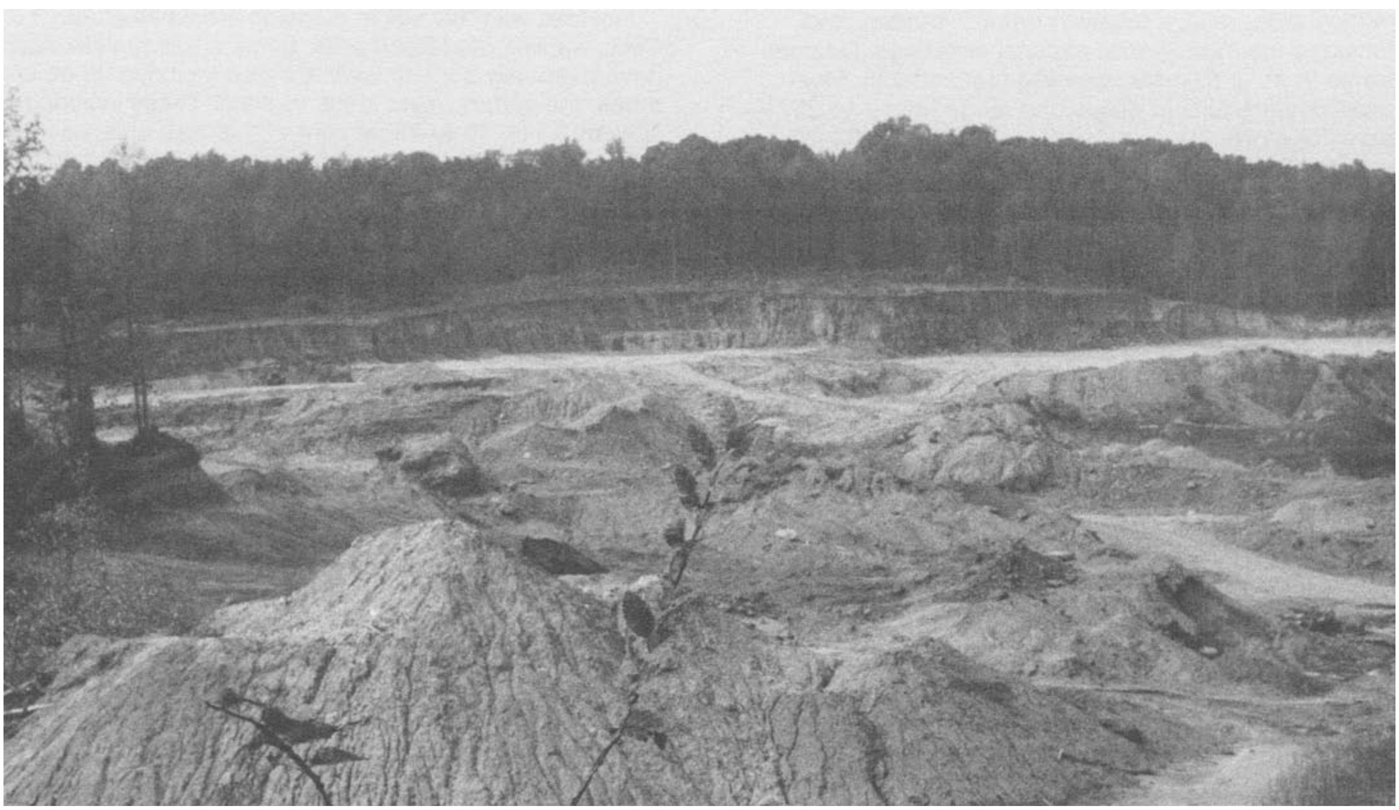

Figure 14.—This borrow pit is in an area of Udorthents, loamy.

Gold mines are areas in which surface and subsurface digging have occurred. Shafts in these areas can be several feet deep. Spoil tailings are piled onsite. Most of these areas have a highly irregular surface. Abandoned mining areas have partly stabilized under pine, cedar, and other vegetation. Some active mining areas are unprotected and are subject to accelerated erosion.

Landfills are areas where landfill operations have altered the natural soil. They consist of graded trenches that are backfilled by alternate layers of solid refuse and soil material. About 2 feet of soil is on the surface as a final cover. These areas are commonly sloping after the final covering and grading.

Included in this area of landfills in mapping are areas of undisturbed soil that are commonly near the edge of the delineations. The soil between the trenches is relatively undisturbed except for the final cover used to smooth the entire area.

Generally, landfills have been reseeded and are being maintained. The soil material characteristics within the delineation vary to such a degree that interpretations cannot be made except during onsite examinations of individual areas.

In quarries, the entire soil has been removed and part of the underlying bedrock is used for crushed stones or the manufacture of bricks. The quarries consist of vertical side walls, a relatively smooth bottom, and localized mounds of spoil material or tailings. Quarries range from 10 to more than 100 feet in depth. Most areas are irregular in shape and range from 4 to 25 acres or more.

Where quarrying is still in progress, the areas are generally barren of vegetation, except for a few Virginia pine. Erosion is a hazard, but most sediment is trapped onsite. Water is in the deepest levels of a few areas where quarrying no longer takes place. These water areas are identified as water on the detailed soil map.

The spoil material commonly has poor physical properties for establishing and supporting plant growth. Rooting depth is generally shallow, and the available water capacity, soil fertility, and content of organic matter are low or very low. Areas that have adequate vegetation provide habitat for wildlife.

Recommendations for use and management require onsite investigation.

Udorthents, loamy, has not been assigned to a capability subclass nor to a woodland group.

Ur—Urban land. This map unit consists of areas where asphalt, concrete, buildings, or related urban uses cover more than 85 percent of the surface area. Most of the soil material has been cut, filled, and graded, and its natural characteristics have been altered or destroyed. The rest is landscape areas of small lawns or shrub gardens near buildings, sidewalks, and parking lots.

Most Urban land is in or near the business districts in Concord or Kannapolis. Isolated areas are more than 5 acres.

The main problem in Urban land areas is that the very high volume of runoff can cause flooding in low-lying areas downstream.

Urban land has not been assigned to a capability subclass nor to a woodland group.

VaB—Vance sandy loam, 2 to 8 percent slopes. This soil is well drained and gently sloping. It is on upland ridges. Some of the larger mapped areas are in the Mt. Pleasant area. Slopes are slightly convex. The mapped areas are generally oblong and variable in width. Individual areas range from 5 to 50 acres.

Typically, the surface layer is light yellowish brown sandy loam 7 inches thick. The subsoil extends to a depth of 33 inches. The upper part is yellowish brown sandy clay, the middle part is yellowish brown clay, and the lower part is mottled red, yellow, yellowish brown, and white clay loam. The underlying material to a depth of 72 inches is mottled red, white, and yellow saprolite that crushes to sandy loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is moderate. The subsoil is sticky and plastic if wet.

Included with this soil in mapping are small areas of Cecil, Appling, and Enon soils. Some areas of soils that have a gravelly surface layer are also included. In other areas, the surface layer is loamy sand. These included soils make up 15 to 25 percent of this map unit.

This Vance soil is used mainly for crops or for hay and pasture. In some areas, it is used as woodland.

The main crops are corn, soybeans, and small grains. Beans, tomatoes, and potatoes are also grown. Slope, susceptibility to erosion, and slow permeability limit the use of this soil for crops. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes reduce runoff and help to control erosion. Grassed waterways, field borders, diversions, and stripcropping (fig. 15) are good conservation practices to use on this soil.

This soil is suitable for hay and pasture. Controlled grazing, fertilizing, and liming are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, Virginia pine, sweetgum, sycamore, white oak, hickory, and yellow poplar are dominant in woodland areas. The understory includes dogwood, redbud, holly, sourwood, and black cherry. No significant limitations for woodland use and management are present.

Slow permeability and low strength are severe limitations for most urban uses. The slow permeability restricts the absorption of effluent from septic tank absorption fields. Modifying the field, increasing the size

Figure 15.—Stripcropping is used in this area of Vance sandy loam, 2 to 8 percent slopes.

of the absorption area, or both of these methods can generally overcome this limitation. Corrective measures commonly used for low strength are increasing the size of the footings and, where appropriate, placing structures on slabs. Erosion is a hazard at construction sites if the ground cover is removed. The main limitation for recreational uses is the slow permeability.

This Vance soil is in capability subclass IIIe and in woodland group 7A.

VaD—Vance sandy loam, 8 to 15 percent slopes. This soil is well drained. It is on narrow side slopes. Some of the larger mapped areas are in the vicinity of Mt. Pleasant. Slopes are rolling and slightly convex. The mapped areas are generally adjacent to streams and are long and irregular in width. Individual areas range from 5 to 35 acres.

Typically, the surface layer is light yellowish brown sandy loam 7 inches thick. The subsoil extends to a depth of 33 inches. The upper part is yellowish brown sandy clay, the middle part is yellowish brown clay, and the lower part is mottled red, yellow, yellowish brown, and white clay loam. The underlying material to a depth of 72 inches is mottled red, white, and yellow saprolite that crushes to sandy loam.

If this soil is unprotected, runoff is rapid and erosion is a severe hazard. Permeability is slow, and the available water capacity is moderate. Shrink-swell potential is moderate.

Included with this soil in mapping are small areas of Appling, Cecil, Cullen, and Enon soils. Some areas of soils that have a gravelly surface layer are also included. In spots, the surface layer is eroded and is sandy clay loam. These included soils make up 15 to 25 percent of this map unit.

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

In cultivated areas, the main crops are soybeans and small grains. Slope, susceptibility to erosion, and slow permeability limit the use of this soil for crops. Conservation tillage, return of crop residue to the soil, and cover crops that include grasses and legumes help to control erosion. Grassed waterways, stripcropping, field borders, diversions, and terraces are good conservation practices to use on this soil.

This soil is suitable for hay and pasture. Controlled grazing, fertilizing, and liming are needed to maintain adequate protective cover to reduce runoff and control erosion.

Loblolly pine, Virginia pine, sweetgum, sycamore, white oak, hickory, and yellow poplar are dominant in woodland areas. The understory includes dogwood, redbud, holly, sourwood, and black cherry. No significant limitations for woodland use or management are present.

Slow permeability and slope are severe limitations for most urban uses. Low strength is a severe limitation for most local roads and streets. The slow permeability restricts the absorption of effluent in septic tank absorption fields. Modifying the field, increasing the size of the absorption area, or both of these methods can generally overcome this limitation. Special planning, design, and maintenance can reduce or modify the slope limitation. Erosion is a hazard at construction sites if the ground cover is removed. Slope and slow permeability are the main limitations for recreational uses.

This Vance soil is in capability subclass IVe and in woodland group 7A.

We—Wehadkee loam, frequently flooded. This soil is poorly drained. It is on narrow flood plains along major creeks and streams throughout the county. These mapped areas range from nearly level to slight depressions and are generally narrow and long. Individual areas range from 4 to 50 acres.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil extends to a depth of 43 inches. The upper part is grayish brown loam, and the lower part is gray sandy clay loam. The underlying material to a depth of 72 inches is light gray sandy loam that has dark brown and grayish brown mottles.

Permeability and the available water capacity are moderate. A seasonal high water table is at or near the surface during wet periods. This soil is frequently flooded for brief periods from November through June. Water often ponds for short periods in depressions.

Included with this soil in mapping are a few small areas of Chewacla soils in the broader areas of this map unit. A few small areas of soils that have a silt loam or fine sandy loam surface layer are also included. These included soils make up about 15 percent of the map unit.

This Wehadkee soil is used mostly as woodland. Sweetgum, yellow poplar, willow oak, water oak, white ash, and loblolly pine are dominant in woodland areas. The understory includes cottonwood, sourwood, and alder. The main limitations for woodland use and management are wetness and flooding.

If this soil is undrained, it is not suited to crops because of wetness and flooding. This soil is suited to use as pasture, but flooding is a hazard. Wetness is a severe limitation for most urban and recreational uses, and flooding is a hazard.

This Wehadkee soil is in capability subclass VIw and in woodland group 9W.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Cabarrus County are listed.

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

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

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

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

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

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

AaB Altavista sandy loam, 2 to 6 percent slopes
ApB Appling sandy loam, 2 to 8 percent slopes
CoB Coronaca clay loam, 2 to 8 percent slopes
CuB2 Cullen clay loam, 2 to 8 percent slopes, eroded
HeB Herndon silt loam, 2 to 8 percent slopes
HwB Hiwassee clay loam, 2 to 8 percent slopes
KkB Kirksey silt loam, 1 to 6 percent slopes
MeB Mecklenburg loam, 2 to 8 percent slopes
TaB Tatum silt loam, 2 to 8 percent slopes
VaB Vance sandy loam, 2 to 8 percent slopes

Use and Management of the Soils

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

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

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. This information can be used to identify the suitabilities 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

Hugh D. Price, district conservationist, and Foy D. Hendrix, conservation agronomist, Soil Conservation Service, helped prepare this section.

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

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

According to the Cabarrus County Planning Department, the acreage available for crops and pasture in Cabarrus County has been steadily decreasing. Land is being converted to nonagricultural use at the rate of 1.5 average-sized farms every month. More than 33,000 acres have been converted to nonagricultural use since 1965.

According to the 1981 Agricultural Statistics, Cabarrus County had approximately 34,630 acres in the following crops: corn for grain on 8,950 acres; soybeans for beans on 10,700 acres; small grains, including wheat, oats, and barley, on 10,940 acres; grain sorghum on 1,740 acres; corn for silage on 2,300 acres; and hay on 7,400 acres.

Erosion is a hazard on about 75 percent of the cropland and pasture in the county. This hazard is more serious on cropland and pasture that have slopes of more than 2 percent. Erosion is a hazard on all soils that have slopes of more than 2 percent.

Erosion is costly for a variety of reasons. Productivity and soil tilth decrease as the surface layer erodes away. Preparing a good seedbed is difficult in eroded, clayey areas and, as a result, seed germination is reduced. If erosion is left unchecked, costly herbicides, fertilizers, and lime are carried out of the field along with valuable topsoil and organic matter. In addition to being costly from an agricultural standpoint, social and environmental costs also increase when eroded soil is deposited into streams, lakes, and reservoirs. Effective agricultural control of erosion increases productivity and minimizes the cost to the public for maintaining water quality standards.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. Plant cover that is on the soil for extended periods of time, such as winter cover crops of small grains, holds erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, the legumes and grass forage crops in the cropping system reduce erosion on sloping land, provide nitrogen, and improve tilth for the following crop.

Slopes are so short and complex that contour tillage or parallel terraces are not practical on many of the Badin, Goldston, Pacolet, and Poindexter soils. On these soils, it is essential to use effective conservation cropping systems that have substantial plant cover to control erosion. Conservation tillage is also effective in controlling erosion on these soils. Grassed waterways, generally planted in tall fescue, provide safe disposal areas for surplus field water runoff. Borders help filter sediment-laden runoff around the field boundaries.

Terraces and diversions reduce erosion by intercepting excess runoff and safely routing this water to suitable outlets, such as grassed waterways. These conservation practices are both practical and highly effective on uniform slope patterns of Appling, Cecil, Coronaca, Cullen, Georgeville, Hiwassee, and Tatum soils. They are not practical on steep slopes or in shallow soils, such as Goldston and Poindexter soils.

Contour tillage and stripcropping are also effective conservation practices on many soils in Cabarrus County. Like terraces and diversions, these practices are most effective on the more uniform slopes but can adapt to a wide range of slope patterns.

The local Soil Conservation Service offices can supply information for the design and application of erosion control practices for each kind of soil.

Approximately 9,500 acres presently used as cropland and pasture in Cabarrus County have drainage problems. Soils that have drainage problems, such as Armenia, Altavista, Chewacla, Iredell, Kirksey, and Sedgefield soils, require some drainage improvements if high production levels are desired. Drainage problems are most significant on soils that have slopes of 2 percent or less. In other areas, proper surface drainage is the main concern. Drainage systems that have artificial tile drainage, open ditches, and land smoothing practices allow the growth of crops, such as corn, soybeans, small grains, truck crops, and pasture.

A majority of these wet soils respond favorably to artificial drainage; however, the Armenia and Iredell soils respond poorly. Chewacla soils also need some flood prevention practices. Draining the poorly drained Wehadkee soils is not practical.

As in most areas in the Piedmont, most soils in Cabarrus County are low in natural fertility. However, high levels of fertilization on some of the well drained soils has built up high levels of phosphorus in these soils. Many farmers use fertilizers that are low in phosphorus to utilize the phosphorus build-up in these soils.

Many soils in Cabarrus County are naturally acid. These soils, as well as the less acid soils, need applications of ground limestone to raise the pH level sufficiently for optimum crop production. Actual soil tests should be used to establish the amounts of lime and fertilizer needed for specific crops. The Agricultural Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

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

The soils in Cabarrus County have a surface layer of variable textures, including sandy loam, loam, sandy clay loam, clay loam, silt loam, and silty clay loam. Most soils are low in organic matter content. Cullen and Hiwassee soils, which have a clay loam surface layer, are prone to crusting after intense rainfalls. Other soils that have a silt loam surface layer or an eroded surface layer are also prone to crusting. Addition of organic material, such as crop residue, manure, and mulch, reduces crusting by protecting the surface from raindrop impact, thus improving soil structure and tilth.

Because soils that have a silt loam surface layer or an eroded surface layer tend to crust, fall plowing is generally not a good practice. This crust is hard and almost impervious to water infiltration, and runoff and erosion increase during the winter. Many soils in this category are nearly as hard and dense at planting time as they were before plowing. Some areas of most soils in the county have this problem and are subject to severe erosion after fall plowing.

The poorly drained Armenia soils and the somewhat poorly drained Chewacla soils have poor tilth because they remain wet until late in spring. If they are wet when plowed, they tend to be cloddy if dry. Thus, good seedbeds are difficult to prepare in these soils.

Corn and soybeans are the principal row crops. Corn and grain sorghum for silage are the principal row crops used for cattle feed. Wheat, oats, and barley are the common close-growing crops that are harvested for grain. Wheat is grown primarily as a winter cover crop. Where wheat is grown for grain, soybeans often follow late in spring or early in summer.

Pasture

Most of the soils in Cabarrus County are suited to pasture. Once pasture is established, it does well on soils that are too eroded for row crops. Tall fescue and clover are the main pasture plants. Alfalfa and tall fescue are the main plants for hay. Sudex and other forage sorghums can be used in the summer as hay or pasture plants.

Soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, the hazard of flooding, and slope. Management practices include soil testing for lime and fertilizer needs, rotation grazing, and clipping pastures. Pasture and hayland that are well managed provide high yields and help to conserve soil and reduce surface runoff.

Vegetables, small fruits, tree fruits, and nursery plants are special crops grown commercially on a limited basis. Melons, strawberries, potatoes, sweet corn, tomatoes, peppers, and other vegetables and small fruits grow on small acreages throughout the county.

The local offices of the Agricultural Extension Service and the Soil Conservation Service can provide the latest information and suggestions for growing special crops.

Soil Fertility

None of the soils in Cabarrus County have enough natural fertility to produce economic returns on crops. The soils are naturally acid and require additions of lime to make them usable for most crops.

Liming requirements are a major concern to the farmer because the acidity level in the soil affects the availability of many of the nutrient elements to plants and the activity of beneficial bacteria. Liming neutralizes exchangeable aluminum and thereby counteracts the adverse effects that high levels of aluminum have on many crops. Liming also adds to the soil elements which would otherwise be in short supply, such as calcium if calcitic lime is used, or calcium and magnesium if dolomitic lime is used.

Liming requirement recommendations are based upon soil test determinations as to the amount and kind of lime that should be used. In soils that have a sandy surface texture, magnesium as well as available calcium levels can be low. Also, the desired pH levels differ depending upon the soil properties and the crop to be grown. The recommendations that are available through soil testing take these factors into account.

Nitrogen fertilizing is required for most crops. Application of nitrogen is generally not required for peanuts, clover, in some rotations of soybeans, or in alfalfa after it has been established. No soil test, however, is available for predicting nitrogen requirements. Appropriate rates are discussed in the "Yields Per Acre" section. Nitrogen can be applied to sandy soils more than once during the growing season because it can be readily leached from these soils.

The need for phosphorus and potassium fertilizers can be predicted from soil tests. Soil test samples from each field are needed to determine phosphate and potassium requirements for specific crops because past applications of these nutrients tend to build up in the soil to such an extent that fertilizer requirements change over a period of time.

A high management level includes maintaining proper soil reaction and fertility levels, as indicated by standard soil tests. Nitrogen rates for corn on soils that have a yield potential of 125 to 150 bushels per acre need to 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 need to be used.

Application of nitrogen in excess of potential yields is generally not a sound practice. Excess fertilizer that is not used by the crop can cause pollution and is expensive. For example, nitrogen rates can be reduced to 20 to 30 pounds per acre if corn is grown after soybeans are harvested.

Chemical Weed Control

The use of herbicides for weed control in crops is a common practice in Cabarrus County. Successful use results in less tillage and is an integral part of modern farming. Soil properties, such as organic matter content and texture of the surface layer, affect the rate of herbicide application. Estimates for both of these properties were determined for the soils described in this survey. Table 15 shows a general range of organic matter content. The surface texture is shown in table 14 in the "USDA texture" column.

In some cases, the organic matter content projected for the different soils can range outside the amounts shown in table 15. Higher organic matter content can occur in soils that have received high amounts of animal or manmade waste. Soils currently being brought into cultivation can have higher organic matter content in their surface layer than similar soils that have been in cultivation for a long time. Conservation tillage can also increase organic matter content in the surface layer. Lower levels of organic matter are common in soils where the surface layer has been partly or completely removed by erosion, land smoothing, or other activities. Current soil tests should be used to measure organic matter content before determining required herbicide rates. The labels of herbicides show specific application rates based on organic matter content and soil surface texture.

Rapid leaching of herbicides can damage young plants or prevent normal seed germination in sandy soils that have less than 2 percent organic matter content. The effectiveness of herbicides commonly decreases as organic matter level exceeds 6 to 10 percent.

Yields Per Acre

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

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

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

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 woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

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

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

Woodland Management and Productivity

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

Forest managers are challenged to produce greater yields from smaller areas of forest land. Meeting this challenge requires an intensity of management and silvicultural practices that were unheard of a few decades ago. Current silvicultural techniques resemble methods long practiced in agriculture, such as establishing, weeding, and thinning desirable young stands; propagating trees and genetic varieties that are more productive; short rotations and total fiber utilization; controlling insects, disease, and forest weeds; and increasing growth through forest fertilization and drainage. Though timber crops require decades to grow, the goal of intensive management is similar to that of intensive agriculture, to produce the greatest yield of the most valuable crop as quickly as possible.

Commercial forests cover 98,733 acres, or about 42 percent of the land area of Cabarrus County *(17, 18)*. Commercial forests are defined as lands that produce or can produce crops of industrial wood and that are not withdrawn from timber utilization. Loblolly pine can be the most important timber producing tree in the county because it grows fast, adapts to the soil and climate, brings the highest average sale value per acre, and is easy to establish and manage.

One of the first steps for intensively managing forest land is to determine the productive capacity of the land for several alternative kinds of trees. Comparisons are then made of potential yield and value so that the most productive trees can be selected for each parcel of land. A forest manager can use this site and yield information to estimate future wood supplies. These estimates can be used to make realistic decisions about future expenses and profits associated with intensive forest management, land acquisition, or industrial investments.

The productive capacity of forests depends on physiography, soil properties, climate, and the effects of past management. Specific soil properties and site characteristics, including soil depth, texture, structure, and depth to water table, affect forest productivity primarily by influencing available water capacity, aeration, and root development. The net effects of the interaction of these factors determine site productivity. For example, coarse textured soils are generally low in nutrient content and available water capacity. Fine textured soils can have high nutrient content and high available water capacity. If clays are compacted, however, aeration is reduced and root growth is inhibited.

Other site factors can also be important. Steepness of topography and length of slopes affect water movement and availability. In mountainous areas, elevation and aspect affect solar radiation and rates of evaporation so that south aspects are warmer and drier than north aspects. The best tree growth is generally on lower slopes on north and east aspects, in sheltered coves, and on gentle concave slopes. Rainfall and length of growing season also influence site productivity.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, some are more susceptible to landslides and erosion after building roads and harvesting timber, and some require special efforts to reforest. In the section "Detailed soil map units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for 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 for 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 *D* indicates a soil that has a limitation because of restricted rooting depth, such as a shallow soil that is underlain by hard rock, hardpan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the soil. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, D, and C.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations 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 of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot operate; more sophisticated systems are needed. 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 slopes are steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, 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 avoid or reduce 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 operations.

Ratings of *seedling mortality* refer to the probability of 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 and duration of the water table, rock fragments in the surface layer, rooting depth, and the aspect of the slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing surface drainage, or providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

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

The soils that are commonly used to produce timber have the yield predicted in cubic feet and board feet. The yield is predicted at the point where mean annual increment culminates. The productivity of the soils in this survey is mainly based on loblolly pine, shortleaf pine, sweetgum, Virginia pine, white oak, or yellow poplar *(3, 4, 6, 8, 11, 13)*.

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 important trees, expressed in cubic feet per acre per year. It can be converted to board feet by multiplying by a factor of about 5. For example, a productivity class of 8 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 568 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. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for reforestation.

Recreation

Myers Park in Concord, Frank Liske Park, and numerous other recreational facilities throughout the county provide recreation *(5)*. Reed Gold Mine State Historic Site has a museum, mine tours, and trails. The Charlotte Motor Speedway, located in Cabarrus County, holds various auto races. Cook's Buffalo Ranch, featuring buffalo and other animals, is open to the public. Nearby Lake Norman offers many recreational facilities.

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

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

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

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

The soils throughout Cabarrus County are rated good for use as habitat for small game, such as rabbits, quails, and doves. Turkeys and deer are also throughout the county, but residential and industrial development is greatly reducing their habitat.

Altavista, Appling, Badin, Cecil, Coronaca, Herndon, Hiwassee, and Iredell soils are best suited to use as habitat for wildlife in the county. These soils respond well to the establishment of food and cover plants for wildlife. Basically, future wildlife management in the county centers around the preservation of existing high quality habitat or the development of habitat on soils that have high potential. This type of intensive management program is needed to reverse the long-term trends in the county toward an overall reduction in quality and quantity of wildlife habitat.

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 developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are goldenrod, beggarweed, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

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

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

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, raccoon, and deer.

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

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

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

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

Building Site Development

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

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm, dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and 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, 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 a high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

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 the soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage 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 and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation 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 bedrock, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

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

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

All soils in Cabarrus County are rated as an improbable source of sand and gravel. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

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

Water Management

Table 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 embankments, dikes, and levees. 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, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

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

The ratings do not indicate the ability of the natural soil to support an embankment, nor do the ratings indicate the potential seepage through fractured bedrock or other permeable material under the embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock and by large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 17.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications *(12)*, 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. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

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

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 17.

Rock fragments 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 *(16)*.

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 of 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 intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams or by runoff from adjacent slopes. 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,* 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). *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 *brief* (2 to 7 days). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 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 the water table exists for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 17 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the North Carolina Department of Transportation, Division of Highways, Materials and Tests Unit.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO); Liquid limit—T 89 (AASHTO); Plasticity index—T 90 (AASHTO); Moisture density, Method A—T 99 (AASHTO).

Factors of Soil Formation

Soils result from processes that act on material deposited or altered by geologic forces. Climate, plant and animal life, parent material, topography, and time are factors that contribute to the differences among soils. Climate and plant and animal life are active in soil formation. The role of vegetation is particularly active in this process. Topography and the length of time the parent material has been in place modifies the effect of climate and plant and animal life on parent material. The relative importance of each factor differs from place to place. In some places one factor dominates the formation and determines most of the properties of a soil, but normally the interaction of all five factors determines the soil that develops in any given place.

Climate

As a factor of soil formation, climate affects the physical, chemical, and biological relationships in the soil primarily through the influence of precipitation and temperature. The temperature and rainfall influence the rate of weathering rock and decomposing organic matter. The amount of leaching in a soil is also related to the amount of precipitation and its movement through the soil. The effects of climate also control the plants and animals that can thrive in a region. Temperature influences the kinds of organisms in the soil and their growth. It also influences the speed of chemical and physical reactions in the soil.

Cabarrus County has a warm, humid climate. The county is located on a moderate plateau. The elevation ranges from 368 feet at the eastern extent of Rocky River in the southeastern corner of the county to about 890 feet in the extreme northwestern part of the county *(19)*. This gradual change has a modifying effect on changes in temperature and precipitation. The climate of Cabarrus County is favorable to rapid chemical processes that result in decomposing of organic matter and weathering of rocks. The temperature and rainfall are especially favorable to intense leaching and oxidizing.

The soils of Cabarrus County reflect the effects of climate. Mild temperatures throughout the year and abundant rainfall have depleted the organic matter and considerably leached the soluble bases from most soils, leaving them acid. The minor variations in climate in the county probably have not caused major local differences in the soils. The most important effect that climate has had on the formation of soils in Cabarrus County is in the altering of parent materials through changes in the temperature and in the amount of precipitation, and through influences on plant and animal life.

Plant and Animal Life

Plant and animal life influences the formation and differentiation of soil horizons. The type and number of organisms in the soil and on the surface are determined partly by climate and partly by the nature of the soil material, the relief, and the age of the soil. Bacteria, fungi, and other micro-organisms aid in weathering rocks and in decomposing organic matter. The plants and animals that live on the soil are the primary source of organic material.

Plants largely determine the organic matter that enters the soil under normal conditions, as well as how the organic matter is added. Plants also contribute to the changes of base status in the leaching process of a soil through the nutrient cycle.

Animals convert compounds from complex to simpler forms and, later, their bodies themselves are added to the organic matter. Organisms also modify certain chemical and physical properties. In the soils of Cabarrus County, most organic matter accumulates on the surface, and micro-organisms, fungi, earthworms, and other forms of life, and direct chemical reaction act upon this material. Earthworms and other small invertebrates then mix the material with the uppermost minerals in the soil. Rodents have had little effect on the formation of soils in the county.

Plants do not bring enough base material to the surface from under the native forest of Cabarrus County to counteract the effects of leaching. In general, the soils of the county developed under a hardwood forest. These trees took up elements from the subsoil. The deposit of leaves, roots, twigs, and eventually the whole tree to the surface added organic matter to the soil, where organisms acted on this material and chemical reaction took place.

Organic material decomposes rapidly in the soils of Cabarrus County because of the moderate temperatures, the abundant moisture, and the character of the organic material. Little organic matter accumulates in the soil.

Parent Material

In Cabarrus County, parent material is largely responsible for the chemical and mineralogical composition of soils and for the major differences among soils of the county. The characteristics of parent material affect the profile and the degree in which it develops. Major differences in parent material, such as texture, can be observed in the field. Less distinct differences, such as mineralogical composition, can be determined only by careful laboratory analysis.

The bedrock from which the unconsolidated mass has formed is mostly granite, syenite, diorite, gabbro, slate, greenstone, or a combination of these *(9)*.

Residuum and alluvium are the broad classes of parent material in Cabarrus County. Residual material is the weathering product from the underlying rock. Transported material was removed from soils or rocks and is related directly to them.

In Cabarrus County, the parent material of the residual soils derived chiefly from acid and basic rock. The acid, or felsic, rock is mostly granite. The Cecil and Appling soils formed in material derived from acid igneous and metamorphic rock, as indicated by the low pH of these soils. In addition, the characteristics of the parent material influenced the texture of soils that have a clayey subsoil as well as the texture of other soils that are more friable and have coarser textures.

The basic, or mafic, rocks are mostly gabbro and diorite. The Iredell and Mecklenburg soils formed in material derived from those rocks. Thus, they are less acid than many of the other soils in the county. They also have a sticky, clayey subsoil texture. A mixture of acid and basic rocks underlies large areas of the county. The Enon and Poindexter soils are dominant in these areas; the Enon soil is the most common.

The county is mainly a complex of granite and diorite. The complex consists of interpenetrated granite and diorite. Granite dominates in one place, and diorite in another. The soils deriving from this material tend to be highly contrasting over short distances *(9)* because these areas have such a mix of these acid and basic rocks.

The slate rocks known as "Carolina slates" include argillites, greenstones, siltstones, and other fine textured rocks. The Georgeville and Badin soils derived from the slates and are high in silt content.

The transported parent material is mostly recent alluvium. It consists of material that has been changed very little by the soil-forming processes. The Chewacla and Wehadkee soils formed in recent alluvium. They are on flood plains along the large and small streams.

Relief

Relief influences drainage, runoff, soil temperature, and the extent of erosion. In Cabarrus County, relief is largely determined by the underlying bedrock, the geology of the area, and the amount of landscape dissected by streams.

Relief affects the percolation of water through the profile. Water movement through the profile develops the soil because it aids in chemical reactions and is necessary for leaching.

Slopes in the county range from 0 to 45 percent. On uplands that have slopes of less than 10 percent, the well developed Cecil, Appling, and Hiwassee soils generally have deeper, better defined profiles than the steeper soils. Relief can also affect the depth of soils. Geologic erosion removes soil material almost as fast as it forms from some soils that have slopes of 15 percent. As a result, most of the strongly sloping to steep soils have a thinner solum than those that are level. The Poindexter and Pacolet soils are not as deep nor as well developed as the less sloping soils.

Relief can also affect drainage. A high water table, for example, is generally related to nearly level relief. The Iredell soils on uplands are moderately well drained because they are nearly level and have slow internal movement of water.

Soils in the lower positions are less sloping and receive runoff from adjacent higher areas. This water accumulates in the nearly level to depressional areas. The Chewacla soils are somewhat poorly drained and are on flood plains.

Time

The length of time that soil material has been exposed to the soil-forming processes accounts for some differences in soils. The length of time required for a well defined soil profile depends on the other factors of soil formation. Less time is required to develop a soil profile in coarse textured material than in similar, finer textured material, even though the environment is the same for both soils. Less time is required to develop a soil in a warm, humid area that has dense plant cover than in a cold, dry area that has sparse plant cover.

The age of soils varies considerably, and the length of time that a soil has been developing is generally reflected in the profile. Old soils generally have better defined horizons that young soils. In Cabarrus County, the effects of time as a soil forming factor is more apparent in the older soils, such as the Cecil and Appling soils, which are in the broader parts of the uplands. These soils have more distinct horizons than Chewacla soils, which formed in alluvium and are still acquiring new deposits from the uplands.

The Chewacla soils and other soils on first bottoms are young soils, having not been in place long enough to have developed distinct horizons. Other soils in the county are considered young because of their topographic position. The Poindexter soils, for example, are not well developed because they are steep and erosion keeps pace with their development. The fact that erosion keeps pace with soil development partly accounts for the shallowness over bedrock.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(15)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udults (*Ud*, meaning in a humid climate, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that has an udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

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

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. An example is the Cecil series, which is a member of the clayey, kaolinitic, thermic family of Typic Hapludults.

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (14)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (15)*. 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, moderately permeable soils on stream terraces. These soils formed under forest vegetation in alluvial deposits. Slopes are 2 to 6 percent.

Typical pedon of Altavista sandy loam, 2 to 6 percent slopes; east of Concord, about 500 feet east of Coldwater Creek on North Carolina Highway 73, about 660 feet north of North Carolina Highway 73: (160,500X; 1,538,250Y).

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

E—6 to 10 inches; light yellowish brown (2.5Y 6/4) sandy loam; weak medium granular structure; very friable; common fine roots; common medium pores; medium acid; clear smooth boundary.

Bt1—10 to 13 inches; brownish yellow (10YR 6/6) sandy clay loam; few medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine and medium roots; common medium pores; medium acid; clear wavy boundary.

Bt2—13 to 20 inches; yellowish brown (10YR 5/8) sandy clay loam; common coarse faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable, slightly sticky; common distinct clay films on faces of peds; common fine and medium roots; common medium pores; strongly acid; clear wavy boundary.

Bt3—20 to 41 inches; strong brown (7.5YR 5/6) sandy clay loam; many medium prominent light gray (10YR 7/1) mottles; moderate medium subangular blocky structure; firm, sticky and slightly plastic; common distinct clay films on faces of peds; few fine and medium roots; few medium pores; strongly acid; clear wavy boundary.

Cg—41 to 60 inches; light gray (10YR 7/1) sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; few fine roots; strongly acid.

Altavista soils have an A horizon and a Bt horizon that extend to a depth of 30 to 60 inches. Depth to bedrock is typically more than 10 feet. Coarse fragments and pebbles range from 0 to 5 percent in the A and B horizons and are common or many in the C horizon of some pedons. Reaction ranges from very strongly acid to medium acid except in areas where the surface layer has been limed. Flakes of mica are few or common in the B and C horizons of some pedons.

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

The E horizon has hue of 10YR or 2.5Y, value of 5 or 7, and chroma of 2 to 5. Some pedons do not have an E horizon.

The Bt horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 3 to 8. Many pedons have mottles in shades of red, brown, and yellow. The lower part of the Bt horizon has mottles with chroma of 1 or 2. Texture is loam, sandy clay loam, or clay loam.

Some pedons have a BC horizon that is similar in color to the Bt1 horizon, has a gray matrix, or is mottled. Most pedons have common or many mottles in shades of gray, brown, and red. Texture is sandy loam, loam, or sandy clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 8. Texture is sandy loam or stratified sand and gravel.

Some pedons have a IIC horizon. It has the same color range as the C horizon. Texture is sandy clay or clay.

Appling Series

The Appling series consists of well drained, moderately permeable soils on broad, smooth ridges. These soils formed in residuum weathered from acidic crystalline rocks. Slopes are 2 to 8 percent.

Typical pedon of Appling sandy loam, 2 to 8 percent slopes; 2.2 miles west of Mt. Pleasant on North Carolina Highway 73 to a farm road, 220 yards north on the farm road, then 200 yards northeast, in a hardwood forest: (610,050X; 1,562,225Y).

A—0 to 3 inches; brown (10YR 4/3) sandy loam; weak medium granular structure; very friable; common medium pores; common medium and coarse roots; few quartz gravel; slightly acid; clear wavy boundary.

E—3 to 8 inches; yellowish brown (10YR 5/4) sandy loam; weak medium granular structure; very friable; common medium pores; common medium and coarse roots; few fine mica flakes; few quartz gravel; slightly acid; gradual smooth boundary.

Bt1—8 to 12 inches; yellowish red (5YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few distinct clay films on faces of peds; common fine and medium roots; few fine mica flakes; very strongly acid; gradual smooth boundary.

Bt2—12 to 37 inches; yellowish red (5YR 4/8) clay; common fine prominent brownish yellow (10YR 6/8) mottles and few fine distinct red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few medium and large roots and common medium pores; few fine mica flakes; strongly acid; gradual wavy boundary.

Bt3—37 to 47 inches; yellowish red (5YR 4/8) sandy clay loam; many coarse brownish yellow (10YR 6/8) mottles and few medium red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few fine mica flakes; few bodies of saprolite; strongly acid; gradual wavy boundary.

C—47 to 62 inches; mottled yellowish red and red saprolite that crushes to sandy loam; massive; friable; few fine mica flakes; strongly acid.

Appling soils have an A horizon, an E horizon, and a Bt horizon that extend to a depth of 40 to 60 inches. Depth to hard bedrock ranges from 6 to 10 feet or more. Reaction is strongly acid or very strongly acid throughout unless lime has been added. The content of coarse fragments ranges from 0 to 10 percent in the A horizon and from 0 to 5 percent in the Bt horizon. Most pedons have few flakes of mica in the A and Bt horizons and few or common flakes of mica in the C horizon.

The A or Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6.

The E horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 5. Texture is sandy loam. Some pedons do not have an E horizon.

The Bt horizon has hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Pedons that have hue of 5YR have evident patterns of mottling in a Bt subhorizon. Mottles in shades of red, yellow, and brown range from few to many. Texture is sandy clay, clay loam, clay, or thin layers of sandy clay loam.

Some pedons have a BC horizon that has colors similar to those of the Bt horizon. Texture is sandy clay loam or clay loam.

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

Armenia Series

The Armenia series consists of poorly drained, slowly permeable soils on nearly level flats and in depressions on uplands and on small to medium flood plains. These soils formed in clayey material weathered mostly from diorite and gabbro. A thin layer of loamy alluvium overlies some pedons. Slopes are commonly less than 1 percent but can range to 2 percent.

Typical pedon of Armenia loam; 4.1 miles southwest of Concord on U.S. Highway 29, 0.5 mile north of State Road 1432, 0.4 mile east on a private road, 700 feet northeast of the road, in a field: (602,600X; 1,507,950Y).

Ap—0 to 8 inches; very dark gray (10YR 3/l) loam; weak medium subangular blocky structure; friable; many fine and medium roots; few black concretions; slightly acid; clear wavy boundary.

Btg1—8 to 11 inches; very dark grayish brown (2.5Y 3/2) clay loam; common fine distinct olive brown (2.5Y 4/4) mottles; moderate medium blocky structure; firm, sticky and plastic; common medium and large roots; few distinct clay films on faces of peds; common fine and medium black concretions; slightly acid; clear wavy boundary.

Btg2—11 to 41 inches; dark olive gray (5Y 3/2) clay; few medium distinct dark gray (N 4/0) mottles and few fine distinct olive brown (2.5Y 4/4) mottles; moderate coarse subangular blocky structure; very firm, very sticky and very plastic; few medium roots; common prominent clay films on faces of peds; common fine and medium black concretions; neutral; gradual wavy boundary.

Btg3—41 to 47 inches; mottled gray (N 4/0) and olive gray (5Y 4/2) clay loam, moderate coarse subangular blocky structure; firm, sticky and plastic; few fine roots; few distinct clay films on faces of peds; common fine and medium black concretions; few fine mineral grains; few coarse quartz gravel; common bodies of sandy saprolite; neutral; gradual wavy boundary.

C—47 to 60 inches; mottled dark grayish brown (10YR 4/2), olive brown (2.5Y 4/4), and pale yellow (2.5Y 7/4) saprolite that crushes to sandy loam; massive; few fine roots; streaks of clayey material; neutral.

Armenia soils have an A horizon and a Btg horizon that extend to a depth of 30 to more than 60 inches. Depth to bedrock is more than 5 feet. The content of dark concretions are few or common. The content of pebbles range from 0 to 6 percent, by volume. Reaction is medium acid to neutral in the A horizon and slightly acid to mildly alkaline in the B and C horizons.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3. Some pedons have recent deposition that has value of 4.

The Btg horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 or 2, or it is neutral and has value of 3 to 5. It commonly has mottles in shades of brown, yellow, or olive. Texture is clay, silty clay, or clay loam.

The C horizon is mottled in hue of 10YR to 5Y, or it is neutral and has value of 3 to 8 and chroma of 1 to 8. Texture is sandy loam or sandy clay loam.

Badin Series

The Badin series consists of well drained, moderately permeable soils on gently sloping to steep Piedmont uplands. These soils formed in residuum weathered from fine textured rocks, such as argillites and graywacke sandstones, that are classed as Carolina slates. Slopes are 2 to 45 percent.

Typical pedon of Badin channery silt loam, 2 to 8 percent slopes; 3 miles north of North Carolina Highway 49 on State Road 2442, 0.3 mile west on State Road 2416, 220 yards southeast, in a cultivated field: (630,950X; 1,588,150Y).

Ap—0 to 7 inches; brown (7.5YR 5/4) channery silt loam; weak medium granular structure; very friable; many fine and medium roots; 30 percent, by volume, slate fragments 1/8 inch to 2 inches long; medium acid; clear wavy boundary.

Bt1—7 to 10 inches; yellowish red (5YR 5/8) channery silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and medium roots; few faint clay films on faces of peds; few fine and medium pores; 20 percent, by volume, slate fragments 1/8 inch to 2 inches long; strongly acid; clear wavy boundary.

Bt2—10 to 23 inches; red (2.5YR 5/8) silty clay; moderate medium subangular blocky structure;

friable, sticky and plastic; few fine roots; common distinct clay films on faces of peds; 10 percent slate fragments; strongly acid; gradual wavy boundary.

Bt3—23 to 28 inches; mottled red (2.5YR 5/8), yellowish red (5YR 5/8), and strong brown (7.5YR 4/6) channery silty clay loam; weak medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; 25 percent slaty saprolite; strongly acid; irregular boundary.

Cr—28 to 40 inches; weak red (2.5YR 5/2), red (2.5YR 5/6), and brownish yellow (10YR 6/8) moderately hard, highly fractured slate; common rock seams; silt loam material in seams; strongly acid; irregular boundary.

R—40 inches; weak red hard fractured slate bedrock.

Badin soils have an A horizon and a Bt horizon that extend to a depth of 20 to 40 inches. Reaction ranges from strongly acid to extremely acid throughout except in areas where the surface layer has been limed. The content of slate fragments ranges from 15 to 30 percent, by volume, in the A horizon and from 5 to 30 percent, by volume, in the B horizon.

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

Some pedons have a BA horizon that has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is silty clay loam or channery silty clay loam.

The Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 6 or 8. The Bt2 horizon of many pedons has mottles in shades of red, yellow, or brown. Texture is silty clay, silty clay loam, or channery silty clay loam.

The Cr horizon is multicolored slate that has relict rock structure. It has hue of 10YR, 7.5YR, 5YR, or 2.5YR. The Cr horizon has more than 60 percent, by volume, slate fragments. Silt loam is in the cracks and between slate fragments.

The R horizon is varicolored hard fragmented slate rock.

Cecil Series

The Cecil series consists of well drained, moderately permeable soils on broad to very broad, smooth ridges and on long, narrow side slopes. These soils formed in residuum weathered from acidic crystalline rocks, such as granite and syenite. Slopes are 2 to 15 percent.

Typical pedon of Cecil sandy clay loam, 2 to 8 percent slopes, eroded; 7 miles west of Kannapolis on State Road 1609 to State Road 1601, 0.5 mile north on State Road 1601, 150 yards west of the road, in a cultivated field: (634,725X; 1,476,700Y).

Ap—0 to 7 inches; reddish brown (5YR 5/4) sandy clay loam; weak medium granular structure; very friable; many fine roots; few fine quartz fragments; slightly acid; clear smooth boundary.

Bt1—7 to 42 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine roots; few fine root channels; few fine pores; strongly acid; gradual wavy boundary.

Bt2—42 to 48 inches; red (2.5YR 4/6) clay loam; few medium prominent reddish yellow (5YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few fine roots; few fine pores; few fine flakes of mica; strongly acid; gradual wavy boundary.

C—48 to 72 inches; red (2.5YR 5/6) saprolite that crushes to loam; common medium prominent reddish yellow (5YR 6/8) mottles; massive; friable; few fine roots in upper part; few fine flakes of mica; strongly acid.

Cecil soils have an A horizon and a Bt horizon that extend to a depth of 40 to 60 inches. Depth to bedrock is more than 6 feet and can range to 10 feet or more. Reaction ranges from very strongly acid to medium acid throughout. The content of coarse fragments ranges from 0 to 10 percent, by volume, in the A horizon and 0 to 5 percent, by volume, in the B horizon. Some pedons have few or common flakes of mica throughout.

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

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. Hue also can range to 5YR if the Bt horizon does not have evident patterns of mottling. Texture is clay loam or clay and has less than 30 percent silt.

The C horizon is dominantly red, ranging to brown, gray, or white soft saprolite of acid crystalline rock that crushes to loam, sandy loam, or sandy clay loam.

Chewacla Series

The Chewacla series consists of somewhat poorly drained, moderately permeable soils on nearly level flood plains. These soils formed in recent alluvium. Slopes range from 0 to 2 percent.

Typical pedon of Chewacla sandy loam, frequently flooded; 0.3 mile west of the Coldwater Fire Department on North Carolina Highway 73 to Coldwater Creek, 300 feet southwest of Coldwater Creek, in a field: (609,650X; 1,537,425Y).

Ap—0 to 7 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine roots; few fine flakes of mica; few fine concretions; few fine quartz gravel; slightly acid; abrupt smooth boundary.

Bw1—7 to 10 inches; yellowish brown (10YR 5/4) loam; common medium distinct dark brown (10YR 4/3) stains; weak medium subangular blocky structure;

friable; common fine roots; common fine and medium pores; few fine flakes of mica; common pockets of A horizon material; medium acid; abrupt smooth boundary.

Bw2—10 to 17 inches; yellowish brown (10YR 5/4) loam; few medium distinct grayish brown (2.5Y 5/2) mottles; few medium dark brown (10YR 3/3) stains; weak medium subangular blocky structure; friable, slightly sticky; few medium roots; common fine and medium pores; few fine flakes of mica; few fine dark concretions; medium acid; gradual wavy boundary.

Bg1—17 to 31 inches; mottled grayish brown (2.5Y 5/2) and dark yellowish brown (10YR 4/4) loam; weak medium subangular blocky structure; friable, slightly sticky; few fine roots; common fine and medium pores; few fine dark concretions; few fine flakes of mica; strongly acid; gradual wavy boundary.

Bg2—31 to 50 inches; grayish brown (2.5Y 5/2) sandy clay loam; common medium distinct dark brown (10YR 3/3) pockets of sandy loam; few medium dark yellowish brown (10YR 4/4) mottles and few coarse gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few black mineral particles; few fine flakes of mica; strongly acid; gradual wavy boundary.

Cg—50 to 70 inches; gray (10YR 6/1) mixed fine sand and loamy sand; many medium distinct dark yellowish brown (10YR 4/4) mottles; common fine to medium dark brown (7.5YR 4/4) brittle nodules of loamy sand; very friable to loose; few fine flakes of mica; strongly acid.

Chewacla soils have an A horizon, Bw horizon, and Bg horizon that extend to a depth of 36 to more than 60 inches. Depth to hard bedrock is 5 feet to more than 10 feet. Fine mica flakes are few or common throughout. Except where lime has been added, reaction is very strongly acid to slightly acid throughout. Dark concretions are common in some pedons.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 3 to 6, and chroma of 2 to 4.

The upper part of the B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6. The lower part of the B horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 6. Gray mottles indicative of wetness are within 24 inches of the surface. Mottles in shades of brown are common in the B horizon. Texture is sandy clay loam, sandy loam, loam, or clay loam. Individual subhorizons can be silt loam or silty clay loam.

The C horizon has colors similar to those in the lower part of the B horizon. Texture is stratified loam, sandy loam, loamy sand, or sand and gravel.

Coronaca Series

The Coronaca series consists of well drained, moderately permeable soils on broad, smooth ridges and on the adjacent side slopes. These soils formed in residuum weathered from gneiss, gabbro, and diorite. Slopes are 2 to 15 percent.

Typical pedon of Coronaca clay loam, 2 to 8 percent slopes; 5 miles south of Concord on Zion Church Road to Ridge Run, 20 feet west of the road, in a pasture: (562,050X; 1,530,550Y).

Ap—0 to 6 inches; dark reddish brown (2.5YR 3/4) clay loam; moderate medium granular structure; friable; many fine roots; few medium pores; few fine and medium dark concretions; medium acid; abrupt smooth boundary.

Bt1—6 to 44 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; common fine roots; few fine pores; few fine dark concretions; few fine mica flakes; slightly acid; gradual wavy boundary.

Bt2—44 to 80 inches; dark red (2.5YR 3/6) clay; common medium prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few dark fine and medium concretions; few small soft fragments; few fine mica flakes; slightly acid; gradual wavy boundary.

Bt3—80 to 96 inches; dark red (2.5YR 3/6) clay loam; common medium prominent white (5YR 8/1) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few medium dark concretions; few medium brownish yellow fragments; slightly acid.

Coronaca soils have an A horizon and a Bt horizon that extend to a depth of 60 to more than 99 inches. Reaction is medium acid to neutral except where lime has been added. Dark concretions and flakes of mica are in the A horizon of some pedons and in the B horizon of most pedons. The content of coarse fragments is as much as 5 percent, by volume, in the upper part of the solum and as much as 10 percent, by volume, in the lower part.

The Ap or A horizon has hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6.

The upper part of the Bt horizon has hue of 10R or 2.5YR, value of 3, and chroma of 4 to 6. The lower part of the Bt horizon that is below the control section has hue of 10R or 2.5YR, value of 3 or 4, and chroma of 6 to 8. Most pedons have mottles in shades of red, brown, yellow, or white in the lower part of the Bt horizon. Texture of the Bt horizon is clay, clay loam, or silty clay loam.

Cullen Series

The Cullen series consists of well drained, moderately permeable soils on broad or very broad, smooth ridges and on adjacent side slopes. These soils formed in residuum weathered from mixed basic and acidic crystalline rocks. Slopes are 2 to 15 percent.

Typical pedon of Cullen clay loam, 2 to 8 percent slopes, eroded; in a cultivated field 0.5 mile south of the junction of State Road 2400 and State Road 2411 on State Road 2411, and 250 feet east of the road: (629,425X; 1,550,000Y).

Ap—0 to 7 inches; reddish brown (5YR 4/4) clay loam; weak medium granular structure; friable; common fine roots; slightly acid; clear smooth boundary.

Bt1—7 to 14 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; few fine mica flakes; slightly acid; gradual wavy boundary.

Bt2—14 to 49 inches; red (2.5YR 4/6) clay; common medium distinct reddish yellow (7.5YR 6/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; few fine mica flakes; slightly acid; gradual wavy boundary.

Bt3—49 to 54 inches; red (2.5YR 4/6) silty clay loam; common medium prominent yellow (10YR 7/6) mottles; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; few fine mica flakes; medium acid; gradual wavy boundary.

C—54 to 66 inches; mottled red (10YR 4/6) and yellow (10YR 7/8) silt loam; massive; friable; common fine mica flakes; 10 percent gravel; strongly acid.

Cullen soils have an A horizon and a Bt horizon that extend to a depth of 40 to 60 inches. Depth to hard bedrock is more than 60 inches. The content of coarse fragments is 0 to 10 percent throughout the solum. The coarse fragments commonly are from crystalline rocks. Reaction is strongly acid or medium acid throughout except where lime has been added.

The Ap or A horizon has hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 4 to 8.

The Bt horizon has hue of 2.5YR, value of 3 to 5, and chroma of 4 to 8. In most pedons, this horizon has high chroma mottles and dark streaks or stains. Texture is clay or silty clay loam.

Some pedons have a B/C horizon that has hue of 2.5YR, value of 4 to 6, and chroma of 6 or 8. In some pedons, this horizon has high chroma mottles and dark streaks or stains. Texture is clay loam, silty clay loam, or loam.

Colors of the C horizon are highly variable and commonly have shades of red, brown, and yellow. Generally, the C horizon does not have a dominant matrix color. Mica flakes are common in some pedons. Texture is loam, silt loam, or silty clay loam. The C horizon has 5 to 25 percent weathered crystalline rock fragments.

Enon Series

The Enon series consists of well drained, slowly permeable soils on gently sloping to strongly sloping Piedmont uplands. These soils formed in residuum weathered from gabbro and other rocks that are high in ferromagnesian minerals. Slopes are 2 to 15 percent.

Typical pedon of Enon sandy loam, 2 to 8 percent slopes; in a pine forest 4 miles south of Concord on U.S. Highway 601, and 1.5 miles east on State Road 1132, 200 feet north of the road: (589,675X; 1,547,300Y).

O—2 to 0 inches; partly decomposed pine litter.

Ap—0 to 7 inches; brown (10YR 5/3) sandy loam; about 10 percent yellowish brown (10YR 5/4) clay loam; weak medium granular structure; very friable; common fine and medium roots; few or common medium and small fragments; few fine black concretions; medium acid; clear smooth boundary.

Bt1—7 to 9 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; common fine and medium roots; few quartz gravel; few black concretions; medium acid; gradual wavy boundary.

Bt2—9 to 15 inches; strong brown (7.5YR 5/6) clay; many medium distinct yellowish brown (10YR 5/6) mottles; strong medium and coarse angular blocky structure; firm, sticky and plastic; few fine and medium roots; few fine pores; common prominent clay films on faces of peds; few fine black concretions; slightly acid; gradual wavy boundary.

Bt3—15 to 24 inches; yellowish brown (10YR 5/4) clay; common fine faint very pale brown mottles; moderate medium and coarse angular blocky structure; very firm, very sticky and very plastic; few fine and medium roots; few fine pores; common prominent clay films on faces of peds; many fine light mineral fragments; slightly acid; gradual wavy boundary.

Bt4—24 to 27 inches; mottled yellowish brown (10YR 5/6), brown (10YR 5/3), and very pale brown (10YR 7/4) clay loam; moderate medium angular blocky structure; firm, sticky and plastic; few fine and medium roots; few fine pores; few distinct clay films on faces of peds; few black concretions; slightly acid; irregular boundary.

C—27 to 60 inches; pale yellow (5Y 7/3), light olive brown (2.5Y 5/4), and olive yellow (2.5Y 6/6) saprolite that crushes to loam; massive; friable; few fine root hairs; few black concretions; few seams of clay; slightly acid.

Enon soils have an A horizon and a Bt horizon that extend to a depth of 20 to 40 inches. Depth to the C horizon is 20 to 40 inches. Depth to bedrock is more than 60 inches. Reaction is medium acid or slightly acid in the A horizon and slightly acid to mildly alkaline in the B and C horizons. Most pedons have manganese concretions that are few or common in some horizons. Content of coarse fragments ranges from 0 to 10 percent. Coefficient of linear extensibility (COLE) ranges from 0.04 to 0.08.

The Ap or A horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4.

Some pedons have a BA horizon that has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Texture is sandy clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8. Mottles in shades of brown and yellow are in the upper part of this horizon in some pedons and in the lower part of most pedons. Texture is mainly clay or clay loam, but the Bt horizon can have thin subhorizons of sandy clay loam.

The C horizon is varicolored saprolite that crushes to sandy loam or loam. It can have few or common fragments of parent rock.

Georgeville Series

The Georgeville series consists of well drained, moderately permeable soils on broad, smooth ridges. These soils formed in material weathered from rocks that are classed as Carolina slates. Slopes are 2 to 8 percent.

Typical pedon of Georgeville silty clay loam, 2 to 8 percent slopes, eroded; 2 miles from Georgeville north on Georgeville-Barrier Road to State Road 1132, 0.3 mile west on State Road 1132, 300 feet south of the road, in an open field: (581,550X; 1,567,400Y).

Ap—0 to 6 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium granular structure; friable; many fine roots; common fine and medium pores; few fine and medium slate and quartz fragments; acid; clear smooth boundary.

Bt1—6 to 30 inches; red (2.5YR 4/6) clay; weak fine subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine and medium roots; few fine and medium pores; few fine slate fragments; strongly acid; gradual wavy boundary.

Bt2—30 to 44 inches; red (2.5YR 4/6) clay; strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine and medium roots; common fine and medium pores; few fine and medium soft slate fragments; strongly acid; irregular boundary.

Bt3—44 to 51 inches; red (2.5YR 4/6) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few fine roots; few fine pores; common medium soft varicolored slate fragments; strongly acid; irregular boundary.

C—51 to 64 inches; coarsely mottled red, light brown, yellow, and white soft saprolite that crushes to silt loam; massive; few fine roots in cracks; strongly acid.

Georgeville soils have an A horizon and a Bt horizon that extend to a depth of 40 to 60 inches. Depth to bedrock is more than 60 inches. Reaction is very strongly acid or strongly acid throughout except in areas where the surface layer has been limed. The content of coarse fragments is as much as 10 percent, by volume, in the A horizon and as much as 5 percent, by volume, in the Bt horizon. Some pedons have few fine flakes of mica in the lower part of the solum.

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

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. Mottles in shades of yellow or brown are common in most pedons. Texture of the Bt horizon is clay, silty clay, or silty clay loam.

The C horizon is mottled in white, brown, yellow, gray, and red. Texture is silty clay loam, silt loam, or loam that has as much as 90 percent soft saprolite of Carolina slate or fine-grained rock material. In some pedons, the C horizon is as much as 10 percent, by volume, hard, coarse fragments.

Goldston Series

The Goldston series consists of well drained to excessively drained, shallow, moderately rapidly permeable soils on gently sloping to very steep Piedmont upland side slopes and knolls. These soils formed in residuum weathered from fine textured rocks, such as argillites and graywacke sandstones, which are classed as Carolina slates. Slopes are 4 to 45 percent.

Typical pedon of Goldston very channery silt loam, 15 to 45 percent slopes; 0.6 mile north of North Carolina Highway 49 on State Road 2450, 250 feet west of the road, in a pasture: (626,525X; 1,601,000Y).

Ap—0 to 5 inches; brown (10YR 5/3) very channery silt loam; weak medium granular structure; very friable; many fine and medium roots; few medium pores; 40 percent, by volume, fragments 0.25 inch to 2 inches long; slightly acid; abrupt smooth boundary.

Bw—5 to 16 inches; pale yellow (2.5Y 7/4) very channery silt loam; weak fine subangular blocky structure; very friable; common fine and medium roots; few fine pores; 45 percent, by volume, slate fragments 0.25 inch to 3 inches long; strongly acid; irregular boundary.

Cr—16 to 26 inches; moderately hard, fractured slate rock, massive; firm; common seams of light yellowish brown (2.5Y 6/4) silt loam in cracks; very strongly acid; irregular boundary.

R—26 inches; gray hard fractured slate rock; about 45 degree strike; few seams of silt loam in cracks.

Goldston soils have an A horizon and a Bw horizon that extend to a depth of 10 to 20 inches. This soil has a weighted average of more than 35 percent, by volume, coarse fragments throughout the particle-size control section. Depth to hard, fractured bedrock is 20 to 40 inches or more. Reaction ranges from extremely acid to medium acid throughout except where lime has been added.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. Coarse fragments from 0.25 inch to 6 inches or more in length are 35 to 60 percent, by volume.

The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5 to 7, and chroma of 4 to 8. Texture is very channery silt loam. Some pedons have mottles of yellow, strong brown, yellowish red, and red. Coarse fragments from 0.5 inch to 6 inches or more in length are 35 to 60 percent, by volume.

The Cr horizon is moderately hard fractured slate rock. It has 60 percent or more coarse fragments.

The R horizon is hard, fractured slate rock.

Herndon Series

The Herndon series consists of well drained, moderately permeable soils on broad, smooth ridges. These soils formed in material from rocks that are classed as Carolina slates. Slopes are 2 to 8 percent.

Typical pedon of Herndon silt loam, 2 to 8 percent slopes; from junction of North Carolina Highway 49 and State Road 2450, 1.2 miles north on State Road 2450 to State Road 2455, 0.25 mile east, in a field 50 feet south of the road: (630,875X; 1,602,700Y).

Ap—0 to 7 inches; yellowish brown (10YR 5/4) silt loam; weak medium granular structure; friable; common fine roots; common fine and medium pores; few fine and medium slate fragments; medium acid; abrupt smooth boundary.

Bt1—7 to 10 inches; strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; few fine and medium pores; few fine slate fragments; strongly acid; gradual wavy boundary.

Bt2—10 to 38 inches; yellowish red (5YR 5/8) silty clay; few medium distinct brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine and medium roots; few fine and medium pores; few fine and medium soft slate fragments; strongly acid; gradual wavy boundary.

Bt3—38 to 48 inches; yellowish red (5YR 5/8) silty clay loam; red (2.5YR 5/8) and brownish yellow (10YR 6/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few faint clay films on faces of peds; few fine and medium roots; few fine pores; common medium soft slate fragments; very strongly acid; clear irregular boundary.

C—48 to 60 inches; coarsely mottled red, yellow, and white soft saprolite that crushes to silt loam; massive; few fine roots in cracks; very strongly acid.

Herndon soils have an A horizon and a Bt horizon that extend to a depth of 40 to 60 inches. Depth to bedrock is more than 60 inches. The soil is very strongly acid or strongly acid except in areas where the surface layer has been limed. In some pedons, content of coarse fragments are as much as 20 percent, by volume, in the A horizon and as much 5 percent, by volume, in the B horizon.

The Ap or A horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Most pedons have mottles in shades of brown, yellow, or red. Texture of the Bt horizon is silty clay loam, silty clay, or clay. The particle-size control section averages more than 30 percent silt or more than 40 percent silt plus very fine sand.

The C horizon is coarsely mottled red, yellow, and white soft saprolite that crushes to silt loam, loam, or fine sandy loam. In some pedons, this horizon is as much as 10 percent, by volume, hard, coarse fragments.

Hiwassee Series

The Hiwassee series consists of well drained, moderately permeable soils on broad to very broad, smooth ridges and on long, narrow side slopes. These soils formed in residuum weathered from acidic igneous and metamorphic rocks. Slopes are 2 to 15 percent.

Typical pedon of Hiwassee clay loam, 2 to 8 percent slopes; 6 miles north of Mt. Pleasant on Mt. Pleasant Road to Klutz Road, 300 feet northwest of the intersection, in a cultivated field: (636,875X; 1,568,850Y).

A—0 to 7 inches; dark reddish brown (5YR 3/4) clay loam; moderate medium granular structure; friable; common fine roots; few fine concretions; slightly acid; abrupt smooth boundary.

Bt1—7 to 46 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few medium roots; few fine pores; strongly acid; gradual wavy boundary.

Bt2—46 to 58 inches; red (2.5YR 4/6) clay; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few medium roots; few fine pores; very strongly acid; gradual wavy boundary.
Bt3—58 to 73 inches; red (2.5YR 4/6) clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few medium roots; very strongly acid; gradual wavy boundary.
C—73 to 80 inches; coarsely mottled red, yellow, and brownish yellow saprolite that crushes to loam; massive; very strongly acid.

Hiwassee soils have an A horizon and a Bt horizon that extend to a depth of 40 to 75 inches. Depth to hard bedrock is 10 feet or more. Some pedons have few fine pebbles of quartz and dark concretions throughout the solum. Some pedons have few or common flakes of mica. Reaction is medium acid to very strongly acid except where the surface has been limed.

The A or Ap horizon has hue of 2.5YR or 5YR, value of 3, and chroma of 3 to 6.

The Bt horizon has hue of 10R or 2.5YR, value of 3, and chroma of 3 to 6 to a depth of 40 inches or more. It has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8 below a depth of 40 inches in many pedons. Yellowish brown mottles are in the middle and lower part of the Bt horizon in most pedons. Texture is clay or clay loam. Clay content in the upper 20 inches of the Bt horizon ranges from 35 to 60 percent.

The C horizon is coarsely mottled red, yellowish red, strong brown, yellowish brown, yellow, or white saprolite that crushes to loam, sandy clay loam, or sandy loam.

Iredell Series

The Iredell series consists of moderately well drained, slowly permeable soils on broad to very broad, nearly level to gently sloping uplands. These soils formed in residuum weathered from diorite and gabbro. Slopes are 0 to 6 percent.

Typical pedon of Iredell loam, 0 to 2 percent slopes; 2 miles north of Roberta Mill on State Road 1304, 1.1 miles south from State Road 1375, 200 yards northwest, in an idle field: (595,075X; 1,520,000Y).

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) loam; moderate medium granular structure; friable; many fine roots; few fine gravel; few fine iron and manganese concretions; few fine flakes of mica; slightly acid; clear smooth boundary.
Bt1—6 to 19 inches; dark yellowish brown (10YR 4/4) clay; strong coarse angular blocky structure; very firm, very sticky and very plastic; many prominent clay films on faces of peds; common fine roots; few fine pores; few fine iron and manganese concretions; few small gravel; slightly acid; gradual smooth boundary.
Bt2—19 to 25 inches; olive brown (2.5Y 4/4) clay; common medium distinct dark grayish brown (2.5Y 4/2) mottles; moderate coarse angular blocky structure; very firm, sticky and very plastic; many prominent clay films on faces of peds; few fine roots; few fine iron and manganese concretions; few fine gravel; few soft fragments; slightly acid; gradual wavy boundary.
Bt3—25 to 28 inches; mottled light olive brown (2.5Y 5/4) and dark grayish brown (2.5Y 4/2) clay loam; moderate medium angular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine roots; few black iron and manganese concretions; few fine flakes of mica; slightly acid; gradual wavy boundary.
C1—28 to 33 inches; coarsely mottled yellowish brown, dark grayish brown, pale yellow, and black saprolite that crushes to sandy clay loam; massive, rock structure; friable; few fine roots in cracks; few fine flakes of mica; neutral; gradual wavy boundary.
C2—33 to 60 inches; mottled light olive brown, black, and pale yellow saprolite that crushes to sandy loam; massive, rock structure; friable; few hard fragments; neutral.

Iredell soils have an A horizon and a Bt horizon that extend to a depth of 20 to 40 inches. Depth to soft bedrock is more than 40 inches. Horizons that have more than 35 percent clay and a coefficient of linear extensibility (COLE) that is more than 0.09 are less than 20 inches thick. Most pedons have few to many dark iron and manganese concretions throughout. Many pedons have few to many dark mottles. Some pedons have few or common flakes of mica or crystals of feldspar in the Bt and C horizons. Reaction is strongly acid to neutral in the A horizon and slightly acid or neutral in the Bt and C horizons.

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

The upper part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. The lower part of the Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 6. Mottles in hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2 are below a depth of 18 inches. The weighted average content of clay in the upper 20 inches of the Bt horizon ranges from 40 to 60 percent. In some subhorizons, clay content can range as high as 85 percent. Texture is clay. Most pedons have thin subhorizons of clay loam, sandy clay loam, or loam.

The C horizon commonly is coarsely mottled in shades of white, gray, brown, olive, yellow, or black. Texture is commonly sandy loam, sandy clay loam, or loam that have as much as 90 percent soft saprolite that crushes easily.

Some pedons have a Cr horizon that is mottled in shades of white, gray, brown, olive, yellow, or black. This horizon is firm saprolite that crushes to variable textures.

Kirksey Series

The Kirksey series consists of moderately deep, moderately well drained, moderately slowly permeable soils on broad ridges, in depressions, and around the head of drainageways. These soils formed in residuum weathered from fine textured Carolina slate rocks, such as argillites and graywacke sandstones. Slopes are dominantly 1 to 4 percent but can range to 6 percent.

Typical pedon of Kirksey silt loam, 1 to 6 percent slopes; 0.8 mile southeast of Georgeville on North Carolina Highway 200 to State Road 2625, 0.4 mile north of the intersection of North Carolina Highway 200 and State Road 2625, 150 feet west of the road, in a forest: (571,525X; 1,569,675Y).

O—2 to 0 inches; partly decomposed forest litter.

A—0 to 2 inches; grayish brown (10YR 5/2) silt loam; weak medium granular structure; very friable; many fine roots; few fine slate fragments; very strongly acid; clear smooth boundary.

E—2 to 7 inches; brown (10YR 5/3) silt loam; common medium distinct light yellowish brown (2.5Y 6/4) mottles; weak medium granular structure; friable, slightly hard; common fine and medium roots; common medium pores; few fine slate fragments; very strongly acid; clear smooth boundary.

B/E—7 to 12 inches; brownish yellow (10YR 6/6) silt loam; many medium prominent pale yellow (2.5Y 7/4) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common medium pores; few fine slate fragments; strongly acid; clear smooth boundary.

Bt—12 to 37 inches; brownish yellow (10YR 6/6) silty clay loam; common medium distinct light gray (10YR 7/1) mottles and few medium distinct pale yellow (2.5Y 7/4) mottles; moderate medium subangular blocky structure; firm, sticky and slightly plastic; few distinct clay films on faces of peds; few fine and medium roots; common medium pores; few fine slate fragments; strongly acid; clear wavy boundary.

C—37 to 49 inches; mottled gray, brownish yellow, and pale yellow channery silt loam; few pockets of silty clay loam; massive; friable; few fine roots in cracks; strongly acid; irregular smooth boundary.

R—49 inches; moderately hard rippable slate rock.

Kirksey soils have an A horizon, an E horizon, a B/E horizon, and a Bt horizon that extend to a depth of 20 to 40 inches. Depth to soft bedrock ranges from 40 to 60 inches. Slate fragments and quartz gravel range from 0 to 15 percent, by volume, throughout. Reaction is strongly acid to slightly acid in the A, Ap, and E horizons; very strongly acid or strongly acid in the B/E and Bt horizons; and extremely acid to strongly acid in the C horizon.

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

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. Texture is silt loam. Some pedons do not have an E horizon.

The B/E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8, and commonly has mottles in hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 3 to 8. Texture is silt loam, silty clay loam, or clay loam. Some pedons do not have a B/E horizon.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 to 7, and chroma of 3 to 8, and commonly has mottles in hue of 2.5YR to 2.5Y, value of 4 to 7, and chroma of 1 to 8. Texture is silty clay loam.

The C horizon commonly is mottled in hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 2 to 8. Texture is silt loam. Some pedons have a Cr horizon that is multicolored, moderately hard, highly fractured slate that has silt loam saprolite in fractures.

The R horizon is hard, rippable slate rock.

Mecklenburg Series

The Mecklenburg series consists of well drained, slowly permeable soils on broad, smooth, interstream divides and long narrow side slopes. These soils formed in material weathered from dark, basic rocks, such as diorite, gabbro, and schist. Slopes are 2 to 15 percent.

Typical pedon of Mecklenburg loam, 2 to 8 percent slopes; 4.5 miles west of Concord on State Road 1394, 0.7 mile south on State Road 1430, 100 feet east of the road, in a fescue pasture: (606,925X; 1,504,000Y).

Ap—0 to 6 inches; dark reddish brown (5YR 3/4) loam; weak medium granular structure; friable; many fine roots; few fine black concretions; few fine quartz gravel; slightly acid; clear smooth boundary.

Bt1—6 to 10 inches; dark reddish brown (2.5YR 3/4) clay; moderate medium angular blocky structure; firm, sticky and plastic; common fine roots; few distinct clay films on faces of peds; few fine black concretions; slightly acid; gradual wavy boundary.

Bt2—10 to 30 inches; red (2.5YR 4/6) clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; firm, sticky and plastic; few fine roots; common distinct clay films on faces of peds; common black concretions; slightly acid; gradual wavy boundary.

Bt3—30 to 36 inches; red (2.5YR 4/6) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium angular blocky structure; firm, slightly sticky and slightly plastic; few fine root channels; few distinct clay films on faces of peds;

common fine soft black concretions; 5 percent, by volume, saprolite; slightly acid; gradual wavy boundary.

C—36 to 60 inches; mottled yellow (10YR 7/6), strong brown (7.5YR 5/6), and black (10YR 2/1) highly weathered saprolite that crushes to sandy loam; few lenses of clayey material in upper part; massive; friable; slightly acid.

Mecklenberg soils have an A horizon and a Bt horizon that extend to a depth of 25 to 46 inches. Depth to bedrock is more than 4 feet and ranges to 10 feet or more. Reaction ranges from medium acid to neutral throughout. Content of coarse fragments ranges from 0 to 20 percent, by volume, in the A horizon and 0 to 10 percent in the B horizon. Manganese concretions are few or common throughout the A and B horizons.

The Ap or A horizon has hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 2 to 6. The A or Ap horizon that has value of 3 has chroma of 4 to 6, and if it has value of 4 or 5, chroma is 2 to 6.

The Bt horizon has hue of 2.5YR to 5YR. The upper part of this horizon has value of 3 to 5 and chroma of 4 to 8, and the lower part has value of 4 or 5 and chroma of 4 to 8. Most pedons have few or common brownish yellow to red mottles in the lower part of the Bt horizon. Texture is typically clay. In some pedons, thin subhorizons can be clay loam. Weighted average clay content of the particle-size control section ranges from 40 to 60 percent.

Some pedons have a B/C horizon that has hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 4 to 8, and often has mottles in these colors. Texture is sandy clay loam or clay loam. Saprolite makes up to 25 percent, by volume.

The C horizon is varicolored saprolite that crushes to loam, sandy loam, or sandy clay loam.

Misenheimer Series

The Misenheimer series consists of shallow, moderately well drained, moderately rapidly permeable soils on nearly level to gently rolling broad ridges, in depressions, and around the head of drainageways. These soils formed in residuum weathered from argillites and graywacke sandstones that are classed as Carolina Slates. Slopes are 0 to 4 percent.

Typical pedon of Misenheimer channery silt loam, 0 to 4 percent slopes; in a mixed hardwood and pine forest, 1.6 miles southeast of Mt. Pleasant on State Road 2610, 2 miles south on State Road 2616, 600 feet east of the road: (582,750X; 1,579,700Y).

O—2 to 0 inches; undecomposed pine and hardwood litter.

A—0 to 2 inches; grayish brown (2.5Y 5/2) channery silt loam; weak medium granular structure; very friable; many fine and medium roots; 20 percent, by volume, slate fragments 0.25 to 1 inch long; extremely acid; abrupt smooth boundary.

E—2 to 7 inches; light gray (2.5Y 7/2) channery silt loam; weak fine granular structure; very friable; common medium roots; 20 percent, by volume, slate fragments 0.25 to 1 inch long; extremely acid; abrupt smooth boundary.

Bw—7 to 15 inches; pale yellow (2.5Y 7/4) channery silt loam; few medium distinct light gray (2.5Y 7/2) mottles and few fine faint brownish yellow mottles; weak fine platy structure; common fine roots in primary cracks; 30 percent, by volume, slate fragments 0.25 inch to 1.5 inches long; extremely acid; gradual irregular boundary.

Cr—15 to 24 inches; mottled brown, gray, and yellow, moderately hard, highly fractured slate; common rock seams filled with light brownish gray (2.5Y 6/2) friable silt loam; 55 percent, by volume, slate fragments 0.25 inch to 3 inches long; extremely acid; gradual irregular boundary.

R—24 inches; fractured slate rock.

Misenheimer soils have an A horizon, an E horizon, and a Bw horizon that extend to a depth of 10 to 20 inches over a paralithic contact. Depth to fractured bedrock is 20 to 40 inches. Reaction ranges from extremely acid to strongly acid throughout except where the surface has been limed.

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

The E horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 2 to 4. Texture of the A and E horizons is channery silt loam. These horizons have 15 to 35 percent, by volume, slate fragments.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 6. Texture is channery loam or channery silt loam. This horizon has 15 to 35 percent, by volume, slate fragments. Gray mottles are in the Bw horizon in all pedons. Brown and yellow mottles are in most pedons.

Some pedons have a C horizon that is multicolored channery silt loam. This horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 6. It has 25 to 50 percent or more slate fragments.

The Cr horizon is multicolored weathered slate that has a nearly level bedding plane. This horizon has 50 percent or more slate fragments.

Pacolet Series

The Pacolet series consists of well drained, moderately permeable soils on long, narrow side slopes on uplands. These soils formed in residuum weathered from acidic crystalline rocks, such as granite. Slopes are 12 to 35 percent.

Typical pedon of Pacolet sandy loam, 15 to 35 percent slopes; 5 miles west of Bethpage Church on State Road

1609 to State Road 1608, 0.75 mile south on State Road 1608 to a power line, 0.3 mile east, in a forest: (633,475X; 1,475,075Y).

O—2 to 0 inches; undecomposed forest litter.
A—0 to 2 inches; dark brown (7.5YR 4/4) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.
E—2 to 6 inches; reddish brown (5YR 4/4) sandy loam; weak medium granular structure; very friable; common medium and fine roots; common fine and medium pores; few fine quartz gravel; few fine flakes of mica; strongly acid; clear smooth boundary.
BE—6 to 9 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; few pores; few fine mica flakes; strongly acid; gradual wavy boundary.
Bt1—9 to 24 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky and plastic; common distinct clay films on faces of peds; few fine and medium roots; few fine and medium pores; few to common flakes of mica; strongly acid; gradual irregular boundary.
Bt2—24 to 31 inches; red (2.5YR 4/6) clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, slightly sticky and slightly plastic; few distinct clay films on faces of peds; few fine and medium woody roots; few fine pores; common fine flakes of mica; common soft fragments of weathered gneiss; strongly acid; gradual irregular boundary.
C—31 to 60 inches; coarsely mottled red (2.5YR 5/8) and reddish yellow (5YR 6/6) gneiss saprolite that crushes to loam; massive; friable; few roots in upper part; common or many fine flakes of mica; very strongly acid.

Pacolet soils have an A horizon, an E horizon, a BE horizon, and a Bt horizon that extend to a depth of 20 to 40 inches. Depth to hard bedrock is more than 60 inches. Reaction ranges from very strongly acid to medium acid throughout except where the surface layer has been limed. The content of coarse fragments is as much as 10 percent in the A and B horizons. Most pedons have few or common flakes of mica in one or more horizons.

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

The E horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. Texture commonly is sandy loam. Some pedons do not have an E horizon.

The BE horizon has hue of 2.5YR to 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is clay loam or sandy clay loam. Some pedons do not have a BE horizon.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. Texture is dominantly clay, but this horizon commonly has thin subhorizons of clay loam or sandy clay loam.

The C horizon is mottled in shades of red, yellow, brown, or white. Texture is fine sandy loam, loam, or sandy loam. The horizon has as much as 90 percent saprolite.

Poindexter Series

The Poindexter series consists of well drained, moderately permeable soils on gently sloping to very steep uplands. These soils formed in residuum weathered from a mixture of acidic and basic rocks. Slopes are 2 to 45 percent.

Typical pedon of Poindexter loam, 8 to 15 percent slopes; from entrance to Northwest School on State Road 1622, 0.25 mile west on State Road 1622, in a forest 110 feet north of a power pole beside the road: (639,975X; 1,510,000Y).

O—2 to 0 inches; partly decomposed forest litter.
Ap—0 to 7 inches; brown (10YR 5/3) loam; weak medium granular structure; very friable; common fine roots; few fine pores; few fine gravel; medium acid; clear smooth boundary.
Bt1—7 to 14 inches; yellowish brown (10YR 5/6) sandy clay loam; few veins of clay loam material; moderate medium angular blocky structure; friable, sticky and slightly plastic; few faint clay films on faces of peds; few medium roots; few fine pores; few fine flakes of mica; many pale yellow minerals; brown (10YR 5/3) sandy loam in root channels and cracks; medium acid; clear wavy boundary.
Bt2—14 to 19 inches; yellowish brown (10YR 5/6) sandy clay loam; few veins of clay loam material; coarse angular blocky structure; firm, sticky and slightly plastic; few distinct clay films on faces of peds; few fine and medium roots; few fine pores; few fine flakes of mica; many pale yellow minerals; medium acid; gradual wavy boundary.
Bt/C—19 to 22 inches; yellowish brown (10YR 5/6) sandy clay loam; brown (10YR 5/3) mottles and strong brown (7.5YR 5/6) mottles; weak medium angular blocky structure; firm, sticky and slightly plastic; few faint clay films on faces of peds; common fine and medium roots in cracks; few fine pores; many pale yellow minerals; 20 percent, by volume, saprolite; few fine flakes of mica; slightly acid; abrupt wavy boundary.
C1—22 to 32 inches; mottled pale brown, black, and pale yellow saprolite that breaks to sandy loam; massive, relict rock structure; friable; few fine roots; few fine flakes of mica; few bodies of yellowish brown clayey material; medium white and black weathered rock fragments; neutral; gradual wavy boundary.

Cr—32 to 48 inches; black, olive brown, and white saprolite that breaks to sandy loam; many moderately hard rock fragments; massive, relict rock structure; few fine mica flakes; friable; neutral; diffuse boundary.

R—48 inches; hard fractured basic rocks; many veins and pockets of highly weathered material.

Poindexter soils have an A horizon and a Bt horizon that extend to a depth of 20 to 40 inches. Depth to weathered bedrock ranges from 20 to 40 inches, and depth to hard bedrock ranges from 40 to 60 inches. The content of coarse fragments ranges from 0 to 10 percent in the solum. Flakes of mica are common. Reaction ranges from strongly acid to neutral throughout.

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

Some pedons have an E horizon that has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 4. Texture of the A or E horizon is dominantly loam.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 4 to 5, and chroma of 4 to 8. In some pedons, this horizon is mottled in lighter shades. Texture is sandy clay loam, clay loam, or loam. Some pedons have thin or discontinuous lenses or bodies of clay in the Bt horizon.

The Bt/C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 8. It has mottles in shades of brown and yellow. Texture is sandy clay loam, clay loam, or loam.

The C horizon is multicolored saprolite that crushes to loam, sandy loam, or silty clay loam. This horizon is commonly mottled in white and shades of brown, yellow, black, green, olive, and gray.

Sedgefield Series

The Sedgefield series consists of moderately well drained and somewhat poorly drained, slowly permeable soils on broad ridges and at the head of intermittent streams. These soils formed in residuum weathered from mixed acidic and basic rocks. Slopes are 2 to 8 percent.

Typical pedon of Sedgefield sandy loam, 2 to 8 percent slopes; 5 miles south of Harrisburg on State Road 1138 to State Road 1136, 0.5 mile on State Road 1136 to junction with State Road 1135, 100 feet northwest of the junction, in a pine forest: (552,450X; 1,518,150Y).

Ap—0 to 7 inches; dark brown (10YR 4/3) sandy loam; weak medium granular structure; very friable; common fine roots; few fine gravel and concretions; medium acid; clear smooth boundary.

E—7 to 12 inches; brown (10YR 5/3) sandy loam; weak medium granular structure; very friable; few fine roots; tongues of Ap material; few small gravel and concretions; medium acid; clear wavy boundary.

BE—12 to 16 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; common fine and medium pores; few medium concretions; about 20 percent, by volume, common brown (10YR 5/3) tongues of E material; slightly acid; clear wavy boundary.

Bt—16 to 31 inches; yellowish brown (10YR 5/6) clay; common medium prominent grayish brown (10YR 5/2) mottles and few medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium angular blocky; about 2 to 5 percent, by volume, pale brown (10YR 6/3) tongues of E material extending about 10 cm into horizon; very firm, sticky and very plastic; common fine roots mostly between primary structural aggregates; common fine and medium pores; common fine and medium concretions; common distinct clay films on faces of primary and secondary peds; slightly acid; clear wavy boundary.

BC—31 to 34 inches; grayish brown (10YR 5/2) clay loam; yellowish brown (10YR 5/6) and dark brown (7.5YR 4/4) mottles; weak medium angular blocky structure; firm, sticky and plastic; few fine roots; few medium concretions; few faint clay films on faces of peds; 25 percent, by volume, saprolite; slightly acid; gradual wavy boundary.

C—34 to 52 inches; coarsely mottled black, white, and yellow saprolite that crushes to loam; common brown and gray clayey zones; slightly acid; massive; gradual wavy boundary.

R—52 inches; moderately hard basic rock that has black and white minerals.

Sedgefield soils have an A horizon, an E horizon, a BE horizon, a Bt horizon, and a BC horizon that extend from 20 to 40 inches. Depth to hard bedrock is more than 4 feet. The content of coarse fragments in the surface layer ranges from 0 to 15 percent. Reaction ranges from very strongly acid to slightly acid in the A, E, and B horizons and from medium acid to moderately alkaline in the C horizon.

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 2.5Y or 10YR, value of 5 to 7, and chroma of 3 to 6. Texture is sandy loam or fine sandy loam. Some pedons do not have an E horizon.

The BE horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. Texture is sandy loam or sandy clay loam. Some pedons do not have a BE horizon.

The Bt horizon has hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. Few or common mottles that have chroma 2 or less are in the upper 10 inches of this horizon. Texture is clay loam or clay. Clay content is 35 to 60 percent, and silt content is less than 30 percent.

The BC horizon has colors similar to those of the Bt horizon, or it is gray or has gray mottles. Texture is sandy clay loam or clay loam.

The C horizon is varicolored saprolite that crushes to loam, sandy loam, or sandy clay loam.

Tatum Series

The Tatum series consists of deep, well drained, moderately permeable soils on gently sloping to strongly sloping Piedmont uplands. These soils formed in residuum weathered from fine textured rocks, such as argillites and graywacke sandstones, that are classed as Carolina slates. Slopes are 2 to 15 percent.

Typical pedon of Tatum silt loam, 2 to 8 percent slopes; in a wooded area 8 miles northeast of Concord on State Road 2408 to State Road 2439, 1.6 miles east on State Road 2439, 300 yards north of the road, in a young pine forest: (630,500X; 1,582,025Y).

Ap—0 to 6 inches; strong brown (7.5YR 5/6) silt loam; weak medium granular structure; very friable; many fine roots; few slate fragments; medium acid; abrupt wavy boundary.

Bt—6 to 31 inches; red (2.5YR 5/8) silty clay; moderate medium subangular blocky structure; firm, sticky and slightly plastic; few fine roots; common distinct clay films on faces of peds; few medium slate fragments; strongly acid; gradual wavy boundary.

BC—31 to 39 inches; red (2.5YR 5/8) silty clay loam; common medium distinct yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; 25 percent floating bodies of saprolite; strongly acid; gradual wavy boundary.

C—39 to 49 inches; coarsely mottled brownish yellow, yellowish red, and red saprolite that crushes to silt loam; massive; friable; few pockets of silty clay loam; common slate fragments; strongly acid; gradual irregular boundary.

Cr—49 inches; brownish yellow, yellowish red, and red fractured slate bedrock.

Tatum soils have an A horizon, a Bt horizon, and a BC horizon that extend to a depth of 28 to 50 inches. Depth to soft bedrock ranges from 40 to more than 60 inches. The soil is strongly acid or very strongly acid throughout except where lime has been added.

The Ap or A horizon has hue of 5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. The Ap horizon in the eroded phase has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Texture typically is silt loam, but in eroded areas it is silty clay loam. Coarse fragments range from 0 to 15 percent, by volume.

The Bt horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8. Texture is silty clay, channery silty clay, or clay loam. Coarse fragments range from 0 to 15 percent in the upper part and up to 30 percent in the lower part.

The BC horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 to 8, or it is mottled in hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 6 to 8. Texture is channery silty clay loam or silty clay loam. Coarse fragments range from 10 to 40 percent, by volume.

The C horizon is coarsely mottled in shades of red and yellow. It is saprolite that crushes to silt loam, loam, or silty clay loam, and has common fragments of slate, argillite, or graywacke sandstone.

The Cr horizon is fractured slate bedrock that is difficult to dig with a spade.

Vance Series

The Vance series consists of well drained, slowly permeable soils on gently sloping to strongly sloping Piedmont uplands. These soils formed in residuum of acidic rocks, including granite and gneiss. Slopes are 2 to 15 percent.

Typical pedon of Vance sandy loam, 2 to 8 percent slopes; 1 mile west of Mt. Pleasant on State Road 2637, 15 feet north of the road, in a pine forest: (601,850X; 1,565,300Y).

Ap—0 to 7 inches; light yellowish brown (2.5Y 6/4) sandy loam; weak medium granular structure; very friable; many fine and medium roots; common medium pores; few small and medium quartz gravel; medium acid; abrupt smooth boundary.

Bt1—7 to 10 inches; yellowish brown (10YR 5/8) sandy clay; weak medium subangular blocky structure; friable; few faint clay films on faces of peds; common fine and medium roots; few medium pores; few fine quartz gravel; very strongly acid; clear smooth boundary.

Bt2—10 to 19 inches; yellowish brown (10YR 5/8) clay; common medium distinct red (2.5YR 4/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm, sticky and plastic; common prominent clay films on faces of peds; few fine and medium roots and root channels; few medium pores; very strongly acid; clear wavy boundary.

Bt3—19 to 28 inches; mottled yellowish brown (10YR 5/8), yellow (10YR 7/6), and red (2.5YR 4/8) clay; moderate medium angular blocky structure; very firm, sticky and plastic; common prominent clay films on faces of peds; few fine and medium roots and root channels; few medium pores; very strongly acid; gradual wavy boundary.

Bt4—28 to 33 inches; mottled yellowish brown (10YR 5/8), yellow (10YR 7/6), white (10YR 8/2), and red (2.5YR 4/8) clay loam; weak medium angular blocky structure; firm, sticky and plastic; few faint clay films on faces of peds; very strongly acid; clear wavy boundary.

C1—33 to 38 inches; coarsely mottled yellow, white, and red saprolite that crushes to loam; massive; friable, slightly sticky and slightly plastic; few root hairs in cracks; few old medium root channels; very strongly acid; gradual wavy boundary.

C2—38 to 72 inches; coarsely mottled yellow, red, and white saprolite that crushes to sandy loam; massive; friable; very strongly acid.

Vance soils have an A horizon and a Bt horizon that extend to a depth of 25 to 40 inches. Depth to bedrock ranges from 6 to more than 10 feet. Reaction is strongly acid or very strongly acid throughout except where lime has been added. The content of coarse fragments ranges to 15 percent.

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

The Bt horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 to 8. Texture is mostly clay, sandy clay, or clay loam. In some pedons, this horizon has thin subhorizons of sandy clay loam.

The C horizon is coarsely mottled yellow, red, and white saprolite that crushes to sandy clay loam, loam, or sandy loam.

Wehadkee Series

The Wehadkee series consists of poorly drained, moderately permeable soils on stream flood plains. These soils formed in alluvium from schist, gneiss, granite, and other metamorphic and igneous rock. Slopes are 0 to 1 percent.

Typical pedon of Wehadkee loam, frequently flooded; 1 mile east of Concord on North Carolina Highway 73 to Gold Hill Road, 4 miles northeast on Gold Hill Road to Dutch Buffalo Creek, 400 yards north from bridge, in a wooded area: (624,700X; 1,553,350Y).

Ap—0 to 8 inches; brown (10YR 5/3) loam; weak medium granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

Bg1—8 to 14 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; many fine and few medium roots; few pockets of loamy sand; medium acid; clear smooth boundary.

Bg2—14 to 43 inches; gray (10YR 6/1) sandy clay loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; few fine flakes of mica; few streaks of light gray sand; medium acid; clear smooth boundary.

Cg—43 to 72 inches; light gray (10YR 7/1) sandy loam; many medium distinct dark brown (10YR 3/3) mottles and few medium bodies of grayish brown (10YR 5/2) clayey material; massive; very friable; few fine flakes of mica; slightly acid.

Wehadkee soils have an A horizon and a Bg horizon that extend to a depth of 30 to 60 inches. The content of mica flakes are few or common. Some pedons have few or common concretions. Reaction is medium acid or slightly acid throughout.

The Ap or A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. Some pedons have mottles in shades of brown.

The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2, and has mottles in shades of yellow and brown. Texture is sandy clay loam, silt loam, or loam.

The Cg horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. It has mottles in shades of brown. Texture commonly is sandy loam or loam, but some pedons have stratified layers of clay loam, sand, and gravel.

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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.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Clayey. A general textural term that includes sandy clay, silty clay, and clay.

Clayey (taxonomic). A specific textural name that refers to fine earth (particles less than 2 millimeters) within the control section that has 35 percent or more clay, by weight; rock fragments are less than 35 percent, by volume.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

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.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. 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—

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.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy. A general textural term that includes coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam.

Loamy. (taxonomic) A specific textural name that refers to fine earth (particles less than 2 millimeters in size) within the control section, of loamy very fine sand or finer textures that have less than 35 percent clay by weight; rock fragments are less than 35 percent, by volume.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

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).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

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.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

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.

Saprolite (soil science). Unconsolidated, residual material underlying the soil and grading to hard bedrock below.

Seasonal high water table. The highest level of a saturated zone (the apparent or perched water table) over a continuous period of more than 1 month in most years. This is not a permanent water table.

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.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

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.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Wetness. A soil condition in which water is held on or near the surface for a sufficient period to cause a problem in management.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-73 at Concord, 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----	49.7	28.3	39.1	73	11	13	3.11	1.81	4.26	6	3.2
February---	53.4	29.9	41.7	75	10	22	3.96	2.08	5.60	7	.9
March------	61.8	37.9	49.9	85	19	123	4.26	2.99	5.42	8	1.4
April------	72.7	47.2	60.0	92	30	304	3.56	2.06	4.88	7	.0
May--------	81.5	56.7	69.1	95	38	592	3.43	2.43	4.34	7	.0
June-------	86.2	63.7	75.0	98	51	750	4.49	2.88	5.94	7	.0
July-------	90.0	67.4	78.7	100	56	890	4.68	2.50	6.59	7	.0
August-----	89.1	66.6	77.9	99	54	865	3.88	2.15	5.39	6	.0
September--	83.7	60.2	72.0	97	44	660	3.05	1.26	4.55	4	.0
October----	73.1	48.0	60.6	90	29	334	3.33	.61	5.41	5	.0
November---	62.1	37.9	50.1	81	19	76	2.93	1.24	4.35	5	.0
December---	52.9	30.7	41.8	75	13	18	3.12	1.30	4.66	5	.2
Yearly:											
Average--	71.4	47.9	59.7	---	---	---	---	---	---	---	---
Extreme--	---	---	---	100	7	---	---	---	---	---	---
Total----	---	---	---	---	---	4,647	43.80	39.47	49.45	74	5.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 °F). Summaries are based on incomplete records.

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1951-73 at Concord, 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--	March 29	April 5	April 16
2 years in 10 later than--	March 21	March 30	April 12
5 years in 10 later than--	March 6	March 19	April 3
First freezing temperature in fall:			
1 year in 10 earlier than--	November 7	October 26	October 18
2 years in 10 earlier than--	November 12	October 31	October 23
5 years in 10 earlier than--	November 23	November 9	November 2

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-73 at Concord, 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	235	212	191
8 years in 10	244	220	198
5 years in 10	262	234	212
2 years in 10	279	249	226
1 year in 10	288	256	234

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaB	Altavista sandy loam, 2 to 6 percent slopes	1,140	0.5
ApB	Appling sandy loam, 2 to 8 percent slopes	975	0.4
Ar	Armenia loam	955	0.4
BaB	Badin channery silt loam, 2 to 8 percent slopes	11,495	4.9
BaD	Badin channery silt loam, 8 to 15 percent slopes	6,860	3.0
BaF	Badin channery silt loam, 15 to 45 percent slopes	2,550	1.1
CcB2	Cecil sandy clay loam, 2 to 8 percent slopes, eroded	18,463	7.9
CcD2	Cecil sandy clay loam, 8 to 15 percent slopes, eroded	7,790	3.3
CeB	Cecil-Urban land complex, 2 to 10 percent slopes	5,265	2.3
Ch	Chewacla sandy loam, frequently flooded	19,460	8.3
CoB	Coronaca clay loam, 2 to 8 percent slopes	1,820	0.8
CoD	Coronaca clay loam, 8 to 15 percent slopes	700	0.3
CuB2	Cullen clay loam, 2 to 8 percent slopes, eroded	12,645	5.4
CuD2	Cullen clay loam, 8 to 15 percent slopes, eroded	5,365	2.3
EnB	Enon sandy loam, 2 to 8 percent slopes	23,045	9.9
EnD	Enon sandy loam, 8 to 15 percent slopes	11,355	4.9
EoB	Enon-Urban land complex, 2 to 10 percent slopes	2,375	1.0
GeB2	Georgeville silty clay loam, 2 to 8 percent slopes, eroded	2,330	1.0
GoC	Goldston very channery silt loam, 4 to 15 percent slopes	6,505	2.8
GoF	Goldston very channery silt loam, 15 to 45 percent slopes	1,970	0.8
HeB	Herndon silt loam, 2 to 8 percent slopes	1,055	0.5
HwB	Hiwassee clay loam, 2 to 8 percent slopes	3,105	1.3
HwD	Hiwassee clay loam, 8 to 15 percent slopes	695	0.3
IdA	Iredell loam, 0 to 2 percent slopes	6,030	2.6
IdB	Iredell loam, 2 to 6 percent slopes	3,085	1.3
KkB	Kirksey silt loam, 1 to 6 percent slopes	8,625	3.7
MeB	Mecklenburg loam, 2 to 8 percent slopes	11,638	5.0
MeD	Mecklenburg loam, 8 to 15 percent slopes	4,655	2.0
MkB	Mecklenburg-Urban land complex, 2 to 10 percent slopes	3,065	1.3
MsA	Misenheimer channery silt loam, 0 to 4 percent slopes	6,915	3.0
PaF	Pacolet sandy loam, 15 to 35 percent slopes	4,600	2.0
PcE3	Pacolet-Udorthents complex, 12 to 25 percent slopes, gullied	225	0.1
PoB	Poindexter loam, 2 to 8 percent slopes	2,535	1.1
PoD	Poindexter loam, 8 to 15 percent slopes	5,835	2.5
PoF	Poindexter loam, 15 to 45 percent slopes	7,165	3.1
SfB	Sedgefield sandy loam, 2 to 8 percent slopes	4,250	1.8
TaB	Tatum silt loam, 2 to 8 percent slopes	5,900	2.5
TaD	Tatum silt loam, 8 to 15 percent slopes	3,535	1.5
TbB2	Tatum silty clay loam, 2 to 8 percent slopes, eroded	1,430	0.6
TbD2	Tatum silty clay loam, 8 to 15 percent slopes, eroded	765	0.3
Ud	Udorthents, loamy	670	0.3
Ur	Urban land	720	0.3
VaB	Vance sandy loam, 2 to 8 percent slopes	1,640	0.7
VaD	Vance sandy loam, 8 to 15 percent slopes	760	0.3
We	Wehadkee loam, frequently flooded	1,050	0.5
	Water	301	0.1
	Total	233,312	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield or entry indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Corn	Corn silage	Soybeans	Wheat	Grain sorghum	Grass-legume hay	Pasture
	Bu	Tons	Bu	Bu	Bu	Tons	AUM*
AaB----- Altavista	130	---	40	50	60	4.0	9.0
ApB----- Appling	95	19	35	45	55	5.4	9.0
Ar----- Armenia	70	---	30	---	---	3.0	7.0
BaB----- Badin	85	17	25	40	45	3.9	6.5
BaD----- Badin	75	14	20	35	35	3.6	6.0
BaF----- Badin	---	---	---	---	---	3.0	5.5
CcB2----- Cecil	80	18	30	40	45	4.5	5.5
CcD2----- Cecil	75	15	20	30	35	4.0	5.5
Ch----- Chewacla	100	22	30	---	---	3.0	9.0
CoB----- Coronaca	85	20	35	45	50	5.0	6.5
CoD----- Coronaca	70	17	20	35	40	4.5	6.0
CuB2----- Cullen	85	22	35	45	50	5.5	9.1
CuD2----- Cullen	80	16	25	30	40	5.2	8.7
EnB----- Enon	85	16	30	40	45	3.3	5.5
EnD----- Enon	75	---	25	35	---	3.3	5.5
GeB2----- Georgeville	80	18	30	40	45	4.5	6.5
GoC----- Goldston	65	---	20	30	35	2.8	4.5
GoF----- Goldston	---	---	---	---	---	1.8	3.0
HeB----- Herndon	95	19	35	45	55	5.0	7.5

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Corn silage	Soybeans	Wheat	Grain sorghum	Grass-legume hay	Pasture
	Bu	Tons	Bu	Bu	Bu	Tons	AUM*
HwB------------------------ Hiwassee	95	20	35	45	60	4.5	6.5
HwD------------------------ Hiwassee	75	18	25	35	50	4.0	5.5
IdA, IdB------------------- Iredell	65	---	30	30	---	3.0	5.5
KkB------------------------ Kirksey	85	19	35	40	40	4.0	6.0
MeB------------------------ Mecklenburg	85	17	40	40	55	3.6	6.0
MeD------------------------ Mecklenburg	70	---	30	---	45	3.0	5.0
MsA------------------------ Misenheimer	60	---	20	30	40	3.0	5.0
PaF------------------------ Pacolet	---	---	---	---	---	---	---
PoB------------------------ Poindexter	60	12	25	30	---	1.7	5.0
PoD------------------------ Poindexter	50	10	---	25	---	1.7	4.4
PoF------------------------ Poindexter	---	---	---	---	---	---	---
SfB------------------------ Sedgefield	85	18	35	35	45	3.3	5.5
TaB------------------------ Tatum	90	18	30	50	50	4.8	8.0
TaD------------------------ Tatum	85	17	30	45	40	4.5	7.5
TbB2----------------------- Tatum	75	13	25	35	45	4.2	7.0
TbD2----------------------- Tatum	65	10	---	30	35	3.9	6.5
Ud. Udorthents							
VaB------------------------ Vance	80	17	35	45	45	4.8	8.0
VaD------------------------ Vance	75	---	25	---	---	4.2	7.0
We------------------------- Wehadkee	---	---	---	---	---	---	8.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Major management concerns (Subclass)			
	Total acreage	Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	47,623	41,593	6,030	---
III	84,988	77,118	7,870	---
IV	62,955	36,990	19,460	6,505
V	---	---	---	---
VI	13,440	12,390	1,050	---
VII	11,910	9,940	---	1,970
VIII	---	---	---	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Absence of a map unit indicates that it is not suitable for woodland or it is committed to another land use and is unlikely to become available for woodland]

Map symbol and soil name	Ordination symbol 1/	Management concerns			Potential productivity			Trees to plant 3/
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class 2/	
							Ft3/AC/YR	
AaB: Altavista	9W	Slight	Moderate	Slight	Loblolly pine	91	133	Loblolly pine.
					Shortleaf pine	77	124	
					Sweetgum	84	90	
					White oak	---	---	
					Red maple	---	---	
					Yellow-poplar	---	---	
					Southern red oak	---	---	
					Northern red oak	---	---	
					Water oak	---	---	
ApB: Appling	8A	Slight	Slight	Slight	Loblolly pine	81	112	Loblolly pine.
					Shortleaf pine	65	99	
					Scarlet oak	---	---	
					Southern red oak	---	---	
					Virginia pine	74	114	
					White oak	---	---	
					Yellow-poplar	---	---	
					Sweetgum	---	---	
					Hickory	---	---	
Ar: Armenia	6W	Slight	Moderate	Moderate	Loblolly pine	67	88	Loblolly pine.
					Shortleaf pine	58	84	
					Post oak	---	---	
					White oak	---	---	
					Water oak	---	---	
					Sweetgum	---	---	
BaB, BaD: Badin	8A	Slight	Slight	Slight	Loblolly pine	80	110	Loblolly pine, shortleaf pine.
					Shortleaf pine	68	106	
					Virginia pine	---	---	
					White oak	66	4	
					Scarlet oak	---	---	
					Chestnut oak	---	---	
BaF: Badin	8R	Moderate	Moderate	Slight	Loblolly pine	80	110	Loblolly pine, shortleaf pine.
					Shortleaf pine	68	106	
					Virginia pine	---	---	
					White oak	66	4	
					Scarlet oak	---	---	
					Chestnut oak	---	---	
CcB2, CcD2: Cecil	7C	Moderate	Moderate	Moderate	Loblolly pine	72	96	Loblolly pine.
					Shortleaf pine	66	101	
					Virginia pine	65	100	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol 1/	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class 2/	Trees to plant 3/
							Ft3/AC/YR	
Ch----------------- Chewacla	9W	Slight	Moderate	Slight	Loblolly pine--------	96	145	Loblolly pine.
					Yellow-poplar--------	100	107	
					American sycamore----	---	---	
					Sweetgum-------------	---	---	
					Water oak------------	---	---	
					Eastern cottonwood---	---	---	
					Green ash------------	---	---	
					Southern red oak-----	---	---	
					Blackgum-------------	---	---	
CoB, CoD----------- Coronaca	6C	Moderate	Moderate	Moderate	Loblolly pine--------	70	93	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	62	92	
CuB2, CuD2--------- Cullen	6C	Moderate	Moderate	Moderate	Loblolly pine--------	70	93	Loblolly pine.
					Shortleaf pine-------	---	---	
					Virginia pine--------	---	---	
					Yellow-poplar--------	---	---	
					White oak------------	---	---	
					Northern red oak-----	---	---	
EnB, EnD----------- Enon	7A	Slight	Slight	Slight	Loblolly pine--------	73	98	Loblolly pine.
					Shortleaf pine-------	63	95	
					Virginia pine--------	---	---	
					Northern red oak-----	---	---	
					Sweetgum-------------	---	---	
					White oak------------	---	---	
					Yellow-poplar--------	---	---	
					Hickory--------------	---	---	
GeB2--------------- Georgeville	6C	Moderate	Moderate	Moderate	Loblolly pine--------	70	93	Loblolly pine.
					Shortleaf pine-------	66	101	
GoC---------------- Goldston	7D	Slight	Slight	Slight	Loblolly pine--------	73	98	Loblolly pine.
					Shortleaf pine-------	63	95	
					Southern red oak-----	---	---	
					White oak------------	---	---	
					Longleaf pine--------	---	---	
					Post oak-------------	---	---	
GoF---------------- Goldston	7D	Moderate	Moderate	Slight	Loblolly pine--------	73	98	Loblolly pine.
					Shortleaf pine-------	63	95	
					Southern red oak-----	---	---	
					White oak------------	---	---	
					Longleaf pine--------	---	---	
					Post oak-------------	---	---	
HeB---------------- Herndon	8A	Slight	Slight	Slight	Loblolly pine--------	85	120	Loblolly pine.
					Shortleaf pine-------	68	106	
					White oak------------	---	---	
					Southern red oak-----	---	---	
					Yellow-poplar--------	---	---	
HwB, HwD----------- Hiwassee	8A	Slight	Slight	Slight	Loblolly pine--------	85	120	Loblolly pine.
					Northern red oak-----	---	---	
					Shortleaf pine-------	70	110	
					White oak------------	---	---	
					Yellow-poplar--------	85	81	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol 1/	Management concerns			Potential productivity			Trees to plant 3/
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class 2/	
							Ft3/AC/YR	
IdA, IdB----------- Iredell	6C	Slight	Moderate	Moderate	Loblolly pine--------	67	88	Loblolly pine.
					Shortleaf pine-------	58	84	
					Post oak------------	---	---	
					White oak-----------	---	---	
KkB---------------- Kirksey	6W	Slight	Moderate	Slight	Loblolly pine--------	67	88	Loblolly pine.
MeB, MeD----------- Mecklenburg	7A	Slight	Slight	Slight	Loblolly pine--------	75	101	Loblolly pine.
					Shortleaf pine-------	67	103	
					Southern red oak-----	---	---	
					Sweetgum-------------	---	---	
					White oak-----------	---	---	
					Yellow-poplar--------	---	---	
					Eastern redcedar-----	---	---	
MsA---------------- Misenheimer	6D	Slight	Slight	Moderate	Shortleaf pine-------	58	84	Loblolly pine, Virginia pine.
					Willow oak----------	---	---	
					White oak-----------	59	42	
					Sweetgum-------------	---	---	
PaF, PcE3---------- Pacolet	8R	Moderate	Moderate	Slight	Loblolly pine--------	78	107	Loblolly pine, shortleaf pine.
					Shortleaf pine-------	67	103	
					Yellow-poplar--------	---	---	
					Virginia pine--------	69	107	
					White oak-----------	69	51	
PoB---------------- Poindexter	6A	Slight	Slight	Slight	Loblolly pine--------	70	93	Loblolly pine.
					Shortleaf pine-------	60	88	
					Virginia pine--------	---	---	
					Southern red oak-----	---	---	
PoD---------------- Poindexter	6R	Moderate	Moderate	Slight	Loblolly pine--------	70	93	Loblolly pine.
					Shortleaf pine-------	60	88	
					Virginia pine--------	---	---	
					Southern red oak-----	---	---	
PoF---------------- Poindexter	6R	Severe	Severe	Slight	Loblolly pine--------	70	93	Loblolly pine.
					Shortleaf pine-------	60	88	
					Virginia pine--------	---	---	
					Southern red oak-----	---	---	
SfB---------------- Sedgefield	8W	Slight	Moderate	Slight	Loblolly pine--------	80	110	Loblolly pine.
					Shortleaf pine-------	70	110	
					Virginia pine--------	---	---	
					Southern red oak-----	---	---	
					Sweetgum-------------	---	---	
					Yellow-poplar--------	---	---	
					White oak-----------	---	---	
TaB, TaD, TbB2, TbD2-------------- Tatum	8A	Slight	Slight	Slight	Loblolly pine--------	82	114	Loblolly pine.
					Virginia pine--------	---	---	
					Shortleaf pine-------	---	---	
					Northern red oak-----	---	---	
					Yellow-poplar--------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol 1/	Management concerns			Potential productivity			Trees to plant 3/
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Site index	Productivity class 2/	
							Ft^3/AC/YR	
VaB, VaD----------- Vance	7A	Slight	Slight	Slight	Loblolly pine--------	76	103	Loblolly pine.
					Northern red oak-----	---	---	
					Shortleaf pine-------	68	106	
					White oak------------	---	---	
					Hickory--------------	---	---	
					Yellow-poplar--------	---	---	
We----------------- Wehadkee	9W	Slight	Severe	Severe	Loblolly pine--------	96	145	Loblolly pine.
					Sweetgum-------------	---	---	
					Yellow-poplar--------	98	104	
					Willow oak-----------	---	---	
					Green ash------------	---	---	
					Water oak------------	---	---	
					White ash------------	---	---	

1/ The number in the Ordination symbol represents the yield in cubic meters per hectare.

2/ Productivity class is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

3/ If the site is forested and hardwoods are desired, adequate stocking of acceptable hardwoods can be obtained through natural regeneration of both seeds and sprouts. Specific site preparation techniques are required. Planting of hardwoods requires special care and techniques. A forester can provide assistance in planting.

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]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AaB: Altavista	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
ApB: Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
Ar: Armenia	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
BaB: Badin	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones.
BaD: Badin	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, slope.
BaF: Badin	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
CcB2: Cecil	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
CcD2: Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Slight.
CeB:					
Cecil	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					
Ch: Chewacla	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.	Severe: wetness, flooding.
CoB: Coronaca	Slight	Slight	Moderate: slope.	Slight	Slight.
CoD: Coronaca	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CuB2: Cullen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
CuD2: Cullen	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
EnB: Enon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
EnD: Enon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
EoB: Enon	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight	Slight.
Urban land.					
GeB2: Georgeville	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
GoC: Goldston	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: large stones.	Severe: small stones, thin layer.
GoF: Goldston	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: small stones, slope, thin layer.
HeB: Herndon	Slight	Slight	Moderate: slope.	Slight	Slight.
HwB: Hiwassee	Slight	Slight	Moderate: slope.	Slight	Slight.
HwD: Hiwassee	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
IdA, IdB: Iredell	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
KkB: Kirksey	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: wetness.
MeB: Mecklenburg	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
MeD: Mecklenburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
MkB: Mecklenburg	Slight	Slight	Severe: slope.	Slight	Slight.
Urban land.					
MsA: Misenheimer	Severe: wetness.	Severe: depth to rock.	Severe: small stones, wetness, depth to rock.	Moderate: wetness.	Severe: depth to rock.
PaF: Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
PcE3:					
Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Udorthents.					
PoB Poindexter	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
PoD Poindexter	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
PoF Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
SfB Sedgefield	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
TaB Tatum	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
TaD Tatum	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
TbB2 Tatum	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
TbD2 Tatum	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Ud. Udorthents					
Ur. Urban land					
VaB Vance	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly, small stones.	Slight	Slight.
VaD Vance	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
We Wehadkee	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.

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]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AaB---------------- Altavista	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ApB---------------- Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ar----------------- Armenia	Fair	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair.
BaB---------------- Badin	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
BaD---------------- Badin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BaF---------------- Badin	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
CcB2, CcD2--------- Cecil	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CeB:										
Cecil--------------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Urban land.										
Ch----------------- Chewacla	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
CoB---------------- Coronaca	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CoD---------------- Coronaca	Fair	Fair	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CuB2--------------- Cullen	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CuD2--------------- Cullen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EnB---------------- Enon	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EnD---------------- Enon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
EoB:										
Enon---------------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GeB2: Georgeville	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
GoC: Goldston	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
GoF: Goldston	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
HeB: Herndon	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HwB: Hiwassee	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HwD: Hiwassee	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
IdA, IdB: Iredell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
KkB: Kirksey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeB: Mecklenburg	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeD: Mecklenburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MkB:										
Mecklenburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
MsA: Misenheimer	Fair	Good	Good	Fair	Fair	Fair	Fair	Good	Good	Fair.
PaF: Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
PcE3:										
Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Udorthents.										
PoB: Poindexter	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PoD: Poindexter	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PoF: Poindexter	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SfB: Sedgefield	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
TaB----------------- Tatum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TaD----------------- Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TbB2---------------- Tatum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TbD2---------------- Tatum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ud. Udorthents										
Ur. Urban land										
VaB----------------- Vance	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
VaD----------------- Vance	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
We------------------ Wehadkee	Very poor.	Poor	Poor	Fair	Fair	Good	Fair	Poor	Fair	Fair.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AaB: Altavista	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Moderate: wetness.
ApB: Appling	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Ar: Armenia	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.
BaB: Badin	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: small stones.
BaD: Badin	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
BaF: Badin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
CcB2: Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
CcD2: Cecil	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.	Slight.
CeB:						
Cecil	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Urban land.						
Ch: Chewacla	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
CoB: Coronaca	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
CoD: Coronaca	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
CuB2: Cullen	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
CuD2------------- Cullen	Moderate: too clayey, slope.	Moderate: slope, shrink-swell.	Moderate: shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
EnB-------------- Enon	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
EnD-------------- Enon	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
EoB: Enon------------	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Slight.
Urban land.						
GeB2------------- Georgeville	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
GoC-------------- Goldston	Severe: depth to rock.	Moderate: slope, depth to rock, large stones.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, large stones.	Severe: small stones, thin layer.
GoF-------------- Goldston	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope, thin layer.
HeB-------------- Herndon	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
HwB-------------- Hiwassee	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
HwD-------------- Hiwassee	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
IdA, IdB--------- Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
KkB-------------- Kirksey	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Moderate: wetness.
MeB-------------- Mecklenburg	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
MeD-------------- Mecklenburg	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MkB:						
Mecklenburg-----	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Urban land.						
MsA------------- Misenheimer	Severe: wetness, depth to rock.	Severe: wetness.	Severe: wetness, depth to rock.	Severe: wetness.	Moderate: wetness, depth to rock.	Severe: depth to rock.
PaF------------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
PcE3:						
Pacolet---------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Udorthents.						
PoB------------- Poindexter	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Moderate: slope.	Slight---------	Slight.
PoD------------- Poindexter	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
PoF------------- Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SfB------------- Sedgefield	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
TaB------------- Tatum	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
TaD------------- Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
TbB2------------ Tatum	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
TbD2------------ Tatum	Moderate: slope, too clayey.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Ud. Udorthents						
Ur. Urban land						
VaB------------- Vance	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
VaD-------------- Vance	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
We--------------- Wehadkee	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaB------------------ Altavista	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
ApB------------------ Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Poor: thin layer.
Ar------------------- Armenia	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
BaB------------------ Badin	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
BaD------------------ Badin	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, hard to pack.
BaF------------------ Badin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, hard to pack.
CcB2----------------- Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
CcD2----------------- Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
CeB:					
Cecil---------------	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.
Urban land.					
Ch------------------- Chewacla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
CoB------------------ Coronaca	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey, hard to pack.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CoD: Coronaca	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
CuB2: Cullen	Moderate: percs slowly.	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
CuD2: Cullen	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
EnB: Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
EnD: Enon	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
EoB:					
Enon	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Urban land.					
GeB2: Georgeville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
GoC: Goldston	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, small stones.
GoF: Goldston	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, small stones, slope.
HeB: Herndon	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
HwB: Hiwassee	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
HwD: Hiwassee	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
IdA, IdB: Iredell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
KkB----------------- Kirksey	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Fair: area reclaim, too clayey.
MeB----------------- Mecklenburg	Severe: percs slowly.	Moderate: slope.	Severe: depth to rock, too clayey.	Slight-----------	Poor: too clayey, hard to pack.
MeD----------------- Mecklenburg	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
MkB: Mecklenburg--------	Severe: percs slowly.	Moderate: slope.	Severe: depth to rock, too clayey.	Slight-----------	Poor: too clayey, hard to pack.
Urban land.					
MsA----------------- Misenheimer	Severe: depth to rock, wetness.	Severe: seepage, depth to rock, wetness.	Severe: depth to rock, seepage, wetness.	Severe: seepage, depth to rock, wetness.	Poor: thin layer, wetness, depth to rock.
PaF----------------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcE3: Pacolet------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Udorthents.					
PoB----------------- Poindexter	Moderate: depth to rock.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: area reclaim, too clayey.
PoD----------------- Poindexter	Moderate: depth to rock, slope.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Fair: too clayey, area reclaim, slope.
PoF----------------- Poindexter	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: slope.
SfB----------------- Sedgefield	Severe: wetness, percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
TaB----------------- Tatum	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
TaD----------------- Tatum	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
TbB2----------------- Tatum	Moderate: depth to rock, percs slowly.	Moderate: slope, seepage, depth to rock.	Severe: too clayey, depth to rock.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
TbD2----------------- Tatum	Moderate: slope, depth to rock, percs slowly.	Severe: slope.	Severe: too clayey, depth to rock.	Moderate: slope, depth to rock.	Poor: too clayey, hard to pack.
Ud. Udorthents					
Ur. Urban land					
VaB------------------ Vance	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
VaD------------------ Vance	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
We------------------- Wehadkee	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
AaB------------------ Altavista	Fair: wetness, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
ApB------------------ Appling	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Ar------------------- Armenia	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
BaB, BaD------------- Badin	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
BaF------------------ Badin	Poor: area reclaim, slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey, slope.
CcB2, CcD2----------- Cecil	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
CeB: Cecil-----------------	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				
Ch------------------- Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
CoB, CoD------------- Coronaca	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
CuB2, CuD2----------- Cullen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
EnB, EnD------------- Enon	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
EoB: Enon-----------------	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				
GeB2----------------- Georgeville	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
GoC------------------ Goldston	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
GoF------------------ Goldston	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
HeB------------------ Herndon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
HwB, HwD------------- Hiwassee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
IdA, IdB------------- Iredell	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
KkB------------------ Kirksey	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
MeB, MeD------------- Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MkB:				
Mecklenburg----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land.				
MsA------------------ Misenheimer	Poor: depth to rock, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: small stones, depth to rock, thin layer.
PaF------------------ Pacolet	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
PcE3:				
Pacolet--------------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Udorthents.				
PoB------------------ Poindexter	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
PoD------------------ Poindexter	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
PoF------------------ Poindexter	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
SfB------------------ Sedgefield	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
TaB, TaD, TbB2, TbD2-- Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ud. Udorthents				
Ur. Urban land				
VaB-------------------- Vance	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
VaD-------------------- Vance	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
We--------------------- Wehadkee	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

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; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
AaB: Altavista	Moderate: seepage.	Moderate: wetness.	Slope	Wetness	Favorable.
ApB: Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
Ar: Armenia	Slight	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.
BaB: Badin	Moderate: seepage, slope, depth to rock.	Severe: thin layer.	Deep to water	Depth to rock	Depth to rock.
BaD, BaF: Badin	Severe: slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
CcB2: Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
CcD2: Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope.
CeB:					
Cecil	Moderate: seepage.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
Urban land.					
Ch: Chewacla	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Flooding	Wetness	Wetness.
CoB: Coronaca	Moderate: seepage.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
CoD: Coronaca	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope.
CuB2: Cullen	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
CuD2: Cullen	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
EnB: Enon	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly	Percs slowly.
EnD: Enon	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
EoB:					
Enon	Moderate: slope.	Severe: hard to pack.	Deep to water	Percs slowly	Percs slowly.
Urban land.					
GeB2 Georgeville	Moderate: slope, seepage.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
GoC, GoF Goldston	Severe: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
HeB Herndon	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Favorable	Favorable.
HwB Hiwassee	Moderate: seepage.	Moderate: hard to pack.	Deep to water	Favorable	Favorable.
HwD Hiwassee	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope.
IdA Iredell	Slight	Severe: hard to pack.	Percs slowly	Wetness	Wetness, percs slowly.
IdB Iredell	Moderate: slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness	Wetness, percs slowly.
KkB Kirksey	Moderate: seepage, depth to rock, slope.	Severe: piping.	Slope	Erodes easily, wetness.	Erodes easily.
MeB Mecklenburg	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Percs slowly	Percs slowly.
MeD Mecklenburg	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, percs slowly.
MkB:					
Mecklenburg	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Percs slowly	Percs slowly.
Urban land.					
MsA Misenheimer	Severe: depth to rock.	Severe: thin layer.	Depth to rock	Large stones, depth to rock, wetness.	Large stones, wetness, depth to rock.
PaF Pacolet	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope.
PcE3:					
Pacolet	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
PcE3: Udorthents.					
PoB: Poindexter	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily.
PoD, PoF: Poindexter	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
SfB: Sedgefield	Moderate: depth to rock.	Severe: hard to pack.	Percs slowly, slope.	Wetness	Wetness.
TaB: Tatum	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
TaD: Tatum	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
TbB2: Tatum	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily.
TbD2: Tatum	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Ud. Udorthents					
Ur. Urban land					
VaB: Vance	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Erodes easily, percs slowly.	Erodes easily, percs slowly.
VaD: Vance	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
We: Wehadkee	Moderate: seepage.	Severe: wetness.	Flooding	Wetness	Wetness.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils have Unified classifications and USDA textures that are supplementary to those shown. In general, the dominant classifications and textures are shown, and the others are inferred]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AaB---------------- Altavista	0-10	Sandy loam--------	ML, CL-ML, SM, SM-SC	A-2, A-4	0	95-100	90-100	65-99	35-60	<23	NP-7
	10-41	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
	41-60	Variable---------	---	---	0	---	---	---	---	---	---
ApB---------------- Appling	0-8	Sandy loam--------	SM	A-2	0-5	86-100	80-100	55-91	15-35	<27	NP-5
	8-47	Sandy clay, clay loam, clay.	MH, ML, CL	A-7	0-5	90-100	90-100	70-95	51-80	41-74	15-30
	47-62	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ar----------------- Armenia	0-8	Loam-------------	ML, CL-ML, SM-SC, SC	A-4, A-6	0-1	95-100	90-100	75-95	45-80	<31	NP-13
	8-47	Clay, silty clay, clay loam.	CH	A-7	0-1	95-100	95-100	85-100	60-95	52-100	30-70
	47-60	Sandy loam, sandy clay loam, clay loam.	SM, SC, ML, CL	A-2, A-4, A-6	0-5	85-100	75-100	55-90	25-70	<40	NP-15
BaB, BaD, BaF---- Badin	0-7	Channery silt loam.	ML, CL, CL-ML, GM	A-4	0-10	60-80	50-75	45-65	40-60	<30	NP-10
	7-28	Silty clay, silty clay loam, channery silty clay loam.	CL, CH	A-6, A-7	0-5	65-85	60-80	55-75	50-70	30-65	15-35
	28-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CcB2, CcD2-------- Cecil	0-7	Sandy clay loam	SM, SC, CL, ML	A-4, A-6	0-5	74-100	72-100	68-95	38-81	21-35	3-15
	7-48	Clay, clay loam.	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	48-72	Variable---------	---	---	---	---	---	---	---	---	---
CeB:											
Cecil------------	0-7	Sandy clay loam	SM, SC, CL, ML	A-4, A-6	0-5	74-100	72-100	68-95	38-81	21-35	3-15
	7-48	Clay, clay loam.	MH, ML, CL	A-7, A-5	0-5	97-100	92-100	72-99	55-95	41-80	9-37
	48-72	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
Ch----------------- Chewacla	0-7	Sandy loam--------	SM, SM-SC	A-2, A-4	0	98-100	95-100	60-90	30-50	<35	NP-7
	7-50	Sandy clay loam, loam, sandy loam.	SM, SM-SC, ML	A-4, A-7-6	0	96-100	95-100	60-96	36-70	20-45	NP-15
	50-70	Variable---------	---	---	---	---	---	---	---	---	---
CoB, CoD---------- Coronaca	0-6	Clay loam---------	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0-2	90-100	90-100	85-98	45-75	20-41	5-18
	6-80	Clay--------------	ML, MH, CH	A-7	0-1	95-100	90-100	80-99	65-95	41-70	12-35
	80-96	Clay loam, silty clay loam, clay.	ML, MH	A-7, A-6	0-2	95-100	85-100	70-98	65-90	36-66	10-28

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CuB2, CuD2------- Cullen	0-7	Clay loam--------	CL	A-7, A-6	0	90-100	85-100	75-100	60-80	35-50	11-25
	7-54	Clay, silty clay loam.	MH, ML	A-7	0	90-100	85-100	75-100	65-95	45-80	15-35
	54-66	Silt loam, loam, silty clay loam.	CL, ML, CL-ML	A-7, A-6	0	90-100	85-100	75-100	60-85	30-50	7-25
EnB, EnD--------- Enon	0-7	Sandy loam-------	SM, SM-SC, SC	A-2-4, A-4	0-5	80-100	80-100	60-85	25-49	<30	NP-10
	7-27	Clay loam, clay	CH, CL	A-7-6, A-6	0-5	85-100	80-100	75-98	65-95	38-60	15-35
	27-60	Variable---------	---	---	---	---	---	---	---	---	---
EoB: Enon------------	0-7	Sandy loam-------	SM, SM-SC, SC	A-2-4, A-4	0-5	80-100	80-100	60-85	25-49	<30	NP-10
	7-27	Clay loam, clay	CH, CL	A-7-6, A-6	0-5	85-100	80-100	75-98	65-95	38-60	15-35
	27-60	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
GeB2------------- Georgeville	0-6	Silty clay loam	CL, ML	A-6, A-7	0-2	90-100	90-100	85-100	65-98	30-49	11-20
	6-51	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-79	15-35
	51-64	Silty clay loam, loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0-5	90-100	90-100	65-100	51-95	<30	NP-12
GoC, GoF--------- Goldston	0-16	Very channery silt loam.	GM, SM, ML	A-2-4, A-4	20-50	40-80	30-80	25-80	20-75	20-40	NP-10
	16-26	Weathered bedrock	---	---	---	---	---	---	---	---	---
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HeB-------------- Herndon	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-2	90-100	90-100	80-98	60-90	<36	NP-12
	7-48	Silty clay loam, silty clay, clay.	MH, ML	A-7	0-1	98-100	90-100	80-99	70-98	41-70	13-30
	48-60	Silt loam, loam, fine sandy loam.	MH, ML	A-7, A-5	0-2	90-100	85-100	80-99	51-95	41-70	9-36
HwB, HwD--------- Hiwassee	0-7	Clay loam--------	CL, ML, CL-ML	A-7-6, A-6, A-4	0-2	95-100	95-100	88-100	50-85	25-49	5-23
	7-73	Clay, silty clay, clay loam.	CL, ML, MH	A-7-5, A-7-6, A-6	0-2	95-100	95-100	80-100	51-95	40-80	12-36
	73-80	Sandy loam, loam, sandy clay loam.	SM, ML, SM-SC, ML	A-4, A-5, A-6, A-7	0-5	93-100	90-99	60-90	36-60	20-49	4-20
IdA, IdB--------- Iredell	0-6	Loam-------------	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	6-25	Clay-------------	CH	A-7	0	99-100	60-100	60-100	55-95	54-115	29-85
	25-28	Loam, sandy clay loam, clay loam.	CL, CH, SC	A-7	0-1	98-100	85-100	70-95	40-75	41-60	20-39
	28-60	Variable---------	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
KkB------------- Kirksey	0-7	Silt loam--------	ML	A-4	0-2	90-100	88-100	80-95	70-90	<40	NP-8
	7-37	Silty clay loam, clay loam, silt loam.	CL, CL-ML	A-4, A-6	0-1	95-100	90-100	90-98	80-95	20-40	4-15
	37-49	Silt loam, fine sandy loam, loam.	ML	A-4, A-6	0-2	70-100	70-100	55-96	50-90	<40	NP-12
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
MeB, MeD--------- Mecklenburg	0-6	Loam-------------	ML, SM	A-4, A-6, A-7-6	0-5	90-100	80-100	65-90	36-65	<45	NP-15
	6-30	Clay-------------	CH, MH	A-7	0-5	90-100	85-100	80-100	75-95	51-75	24-45
	30-36	Loam, sandy clay loam, clay loam.	CL, ML	A-4, A-6, A-7	0-5	90-100	85-100	80-100	50-80	25-49	11-25
	36-60	Variable---------	---	---	---	---	---	---	---	---	---
MkB:											
Mecklenburg-----	0-6	Loam-------------	ML, SM	A-4, A-6, A-7-6	0-5	90-100	80-100	65-90	36-65	<45	NP-15
	6-30	Clay-------------	CH, MH	A-7	0-5	90-100	85-100	80-100	75-95	51-75	24-45
	30-36	Loam, sandy clay loam, clay loam.	CL, ML	A-4, A-6, A-7	0-5	90-100	85-100	80-100	50-80	25-49	11-25
	36-60	Variable---------	---	---	---	---	---	---	---	---	---
Urban land.											
MsA------------- Misenheimer	0-15	Channery silt loam.	GM, SM, ML, CL	A-4, A-2-4, A-6	0-15	65-90	54-80	30-80	0-75	<40	NP-15
	15-24	Weathered bedrock	---	---	---	---	---	---	---	---	---
	24	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
PaF------------- Pacolet	0-6	Sandy loam-------	SM, SM-SC	A-2, A-1-B	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	6-31	Sandy clay, clay loam, clay, sandy clay loam.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	31-60	Sandy loam, fine sandy loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
PcE3:											
Pacolet---------	0-3	Clay loam--------	SM, SM-SC	A-2, A-1-B	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	3-30	Sandy clay, clay loam, clay, sandy clay loam.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	30-60	Sandy loam, fine sandy loam, loam.	SM, SM-SC	A-4, A-2-4	0-2	80-100	70-100	60-80	30-50	<28	NP-6
Udorthents.											

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PoB, PoD, PoF---- Poindexter	0-7	Loam------------	ML, CL-ML	A-4	0	90-100	85-100	85-100	55-90	<25	NP-7
	7-22	Clay loam, sandy clay loam, loam.	SC, CL	A-6	0	90-100	85-100	80-100	35-85	30-40	11-20
	22-32	Silty clay loam, loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	90-100	85-100	55-95	30-70	<20	NP-5
	32-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SfB-------------- Sedgefield	0-12	Sandy loam-------	SM, SM-SC, CL, SC	A-2, A-4, A-6	0-5	85-100	85-100	51-90	27-55	16-35	5-20
	12-31	Sandy clay, clay loam, clay, sandy clay loam.	CL, CH	A-7	0-5	95-100	95-100	73-93	60-85	45-85	25-60
	31-34	Sandy loam, sandy clay loam, clay loam.	SC, CL	A-6, A-7, A-4	0-5	95-100	90-100	60-90	36-65	20-45	8-25
	34-52	Weathered bedrock	---	---	---	---	---	---	---	---	---
	52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
TaB, TaD--------- Tatum	0-6	Silt loam--------	ML, CL	A-4	0	85-100	80-100	65-100	60-90	20-34	NP-15
	6-39	Silty clay loam, silty clay, clay.	MH, CH	A-7	0	75-100	70-95	60-95	55-95	50-80	20-45
	39-49	Silt loam, loam, silty clay loam.	CL	A-6, A-7	0	75-100	75-95	60-90	60-85	30-45	12-25
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
TbB2, TbD2------- Tatum	0-6	Silty clay loam	CL, ML	A-6, A-7	0	75-95	75-90	65-90	60-85	32-44	12-20
	6-39	Silty clay loam, silty clay, clay.	MH, CH	A-7	0	75-100	70-95	60-95	55-95	50-80	20-45
	39-49	Silt loam, loam, silty clay loam.	CL	A-6, A-7	0	75-100	75-95	60-90	60-85	30-45	12-25
	49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ud. Udorthents											
Ur. Urban land											
VaB, VaD--------- Vance	0-7	Sandy loam-------	SM, SM-SC	A-2, A-4	0-5	90-100	80-100	55-80	15-40	<27	NP-7
	7-33	Clay loam, sandy clay, clay.	CH	A-7	0-5	95-100	90-100	75-95	65-80	51-80	25-48
	33-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
We--------------- Wehadkee	0-8	Loam------------	SM, SC, SM-SC	A-2, A-4	0	100	95-100	60-90	30-50	<35	NP-10
	8-43	Loam, sandy clay loam, clay loam, silt loam.	ML, CL, CL-ML	A-6, A-7, A-4	0	100	99-100	85-100	51-90	25-50	7-25
	43-72	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]

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
AaB--------------	0-10	2.0-6.0	0.12-0.20	4.5-6.0	Low------------	0.24	5	.5-3
Altavista	10-41	0.6-2.0	0.12-0.20	4.5-6.0	Low------------	0.24		
	41-60	---	---	---	---------------	----		
ApB--------------	0-8	2.0-6.0	0.10-0.15	4.5-5.5	Low------------	0.24	4	.5-2
Appling	8-47	0.6-2.0	0.15-0.17	4.5-5.5	Low------------	0.20		
	47-62	---	---	---	---------------	----		
Ar---------------	0-8	0.6-2.0	0.16-0.24	5.6-7.3	Low------------	0.37	5	1-4
Armenia	8-47	0.06-0.2	0.12-0.20	6.1-7.8	High-----------	0.20		
	47-60	0.2-0.6	0.10-0.18	6.1-7.8	Low------------	0.28		
BaB, BaD, BaF----	0-7	0.6-2.0	0.14-0.20	3.6-5.5	Low------------	0.24	4	1-3
Badin	7-28	0.6-2.0	0.14-0.19	3.6-5.5	Moderate-------	0.24		
	28-40	---	---	---	---------------	----		
	40	---	---	---	---------------	----		
CcB2, CcD2-------	0-7	0.6-2.0	0.13-0.15	4.5-6.0	Low------------	0.28	4	.5-1
Cecil	7-48	0.6-2.0	0.13-0.15	4.5-6.0	Low------------	0.28		
	48-72	---	---	---	---------------	----		
CeB:								
Cecil-----------	0-7	0.6-2.0	0.13-0.15	4.5-6.0	Low------------	0.28	4	.5-1
	7-48	0.6-2.0	0.13-0.15	4.5-6.0	Low------------	0.28		
	48-72	---	---	---	---------------	----		
Urban land.								
Ch---------------	0-7	0.6-2.0	0.10-0.15	4.5-6.5	Low------------	0.24	5	1-4
Chewacla	7-50	0.6-2.0	0.12-0.20	4.5-6.5	Low------------	0.28		
	50-70	---	---	---	---------------	----		
CoB, CoD---------	0-6	0.6-2.0	0.12-0.16	5.6-7.3	Low------------	0.24	5	.5-2
Coronaca	6-80	0.6-2.0	0.12-0.16	5.6-7.3	Low------------	0.24		
	80-96	0.6-2.0	0.10-0.15	5.6-7.3	Low------------	0.24		
CuB2, CuD2-------	0-7	0.6-2.0	0.12-0.17	5.1-6.0	Moderate-------	0.37	3	1-3
Cullen	7-54	0.6-2.0	0.10-0.14	5.1-6.0	Moderate-------	0.24		
	54-66	0.6-2.0	0.14-0.19	5.1-6.0	Moderate-------	0.24		
EnB, EnD---------	0-7	2.0-6.0	0.11-0.15	5.1-6.5	Low------------	0.28	2	.5-2
Enon	7-27	0.06-0.2	0.15-0.20	5.1-7.8	High-----------	0.28		
	27-60	---	---	---	---------------	----		
EoB:								
Enon------------	0-7	2.0-6.0	0.11-0.15	5.1-6.5	Low------------	0.28	2	.5-2
	7-27	0.06-0.2	0.15-0.20	5.1-7.8	High-----------	0.28		
	27-60	---	---	---	---------------	----		
Urban land.								
GeB2-------------	0-6	0.6-2.0	0.13-0.18	4.5-5.5	Low------------	0.49	4	<.5
Georgeville	6-51	0.6-2.0	0.13-0.18	4.5-5.5	Low------------	0.28		
	51-64	0.6-2.0	0.05-0.10	4.5-5.5	Low------------	0.32		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
GoC, GoF---------	0-16	2.0-6.0	0.06-0.12	3.6-5.5	Low------------	0.05	2	.5-2
Goldston	16-26	---	---	---	---------------	----		
	26	---	---	---	---------------	----		
HeB--------------	0-7	0.6-2.0	0.14-0.20	4.5-6.5	Low------------	0.43	5	.5-1
Herndon	7-48	0.6-2.0	0.13-0.18	3.6-5.5	Low------------	0.28		
	48-60	0.6-2.0	0.05-0.08	3.6-5.5	Low------------	0.32		
HwB, HwD---------	0-7	0.6-2.0	0.12-0.15	4.5-6.5	Low------------	0.28	5	.5-2
Hiwassee	7-73	0.6-2.0	0.12-0.15	4.5-6.5	Low------------	0.28		
	73-80	0.6-2.0	0.10-0.14	4.5-6.5	Low------------	0.28		
IdA, IdB---------	0-6	0.6-2.0	0.14-0.17	5.1-7.3	Low------------	0.32	3	.5-2
Iredell	6-25	0.06-0.2	0.16-0.22	6.1-7.3	Very high------	0.20		
	25-28	0.06-0.2	0.14-0.18	6.1-7.3	High-----------	0.28		
	28-60	---	---	---	---------------	----		
KkB--------------	0-7	0.6-2.0	0.15-0.22	5.1-6.5	Low------------	0.43	3	.5-2
Kirksey	7-37	0.2-0.6	0.12-0.18	4.5-5.5	Low------------	0.43		
	37-49	0.6-2.0	0.11-0.15	3.6-5.5	Low------------	0.43		
	49	---	---	---	---------------	----		
MeB, MeD---------	0-6	0.6-2.0	0.14-0.19	5.6-7.3	Low------------	0.24	4	.5-2
Mecklenburg	6-30	0.06-0.2	0.12-0.14	5.6-7.3	Moderate-------	0.32		
	30-36	0.6-2.0	0.12-0.14	5.6-7.3	Low------------	0.32		
	36-60	---	---	---	---------------	----		
MkB:								
Mecklenburg-----	0-6	0.6-2.0	0.14-0.19	5.6-7.3	Low------------	0.24	4	.5-2
	6-30	0.06-0.2	0.12-0.14	5.6-7.3	Moderate-------	0.32		
	30-36	0.6-2.0	0.12-0.14	5.6-7.3	Low------------	0.32		
	36-60	---	---	---	---------------	----		
Urban land.								
MsA--------------	0-15	0.6-6.0	0.12-0.18	3.6-5.5	Low------------	0.15	2	.5-1
Misenheimer	15-24	---	---	---	---------------	----		
	24	---	---	---	---------------	----		
PaF--------------	0-6	2.0-6.0	0.08-0.12	4.5-6.0	Low------------	0.20	3	.5-2
Pacolet	6-31	0.6-2.0	0.12-0.15	4.5-6.0	Low------------	0.28		
	31-60	0.6-2.0	0.08-0.15	4.5-6.0	Low------------	0.28		
PcE3:								
Pacolet---------	0-6	2.0-6.0	0.08-0.12	4.5-6.0	Low------------	0.20	3	.5-2
	6-31	0.6-2.0	0.12-0.15	4.5-6.0	Low------------	0.28		
	31-60	0.6-2.0	0.08-0.15	4.5-6.0	Low------------	0.28		
Udorthents.								
PoB, PoD, PoF----	0-7	2.0-6.0	0.12-0.20	5.1-7.3	Low------------	0.37	3	.5-2
Poindexter	7-22	0.6-2.0	0.13-0.19	5.1-7.3	Low------------	0.24		
	22-32	2.0-6.0	0.08-0.15	5.1-7.3	Low------------	0.24		
	32-48	---	---	---	---------------	----		
	48	---	---	---	---------------	----		
SfB--------------	0-16	2.0-6.0	0.10-0.14	4.5-6.5	Low------------	0.28	3	.5-2
Sedgefield	16-31	0.06-0.2	0.14-0.18	4.5-6.5	High-----------	0.28		
	31-34	0.6-2.0	0.12-0.15	5.6-8.4	Moderate-------	0.28		
	34-52	---	---	---	---------------	----		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
						K	T	
	In	In/hr	In/in	pH				Pct
TaB, TaD---------- Tatum	0-6 6-39 39-49 49	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.14-0.20 0.10-0.19 0.12-0.18 ---	4.5-5.5 4.5-5.5 4.5-5.5 ---	Low------------ Moderate------- Low------------ ---------------	0.43 0.28 0.28 ----	4	0-2
TbB2, TbD2-------- Tatum	0-6 6-39 39-49 49	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.12-0.18 0.10-0.19 0.12-0.18 ---	4.5-5.5 4.5-5.5 4.5-5.5 ---	Low------------ Moderate------- Low------------ ---------------	0.32 0.28 0.28 ----	3	0-2
Ud. Udorthents								
Ur. Urban land								
VaB, VaD---------- Vance	0-7 7-33 33-72	2.0-6.0 0.06-0.2 ---	0.10-0.14 0.12-0.15 ---	4.5-5.5 4.5-5.5 ---	Low------------ Moderate------- ---------------	0.24 0.37 ----	4	.5-2
We---------------- Wehadkee	0-8 8-43 43-72	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

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]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
AaB Altavista	C	Rare	---	---	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
ApB Appling	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ar Armenia	D	Rare	---	---	0.5-1.5	Apparent	Dec-Apr	>60	---	High	Low.
BaB, BaD, BaF Badin	C	None	---	---	>6.0	---	---	20-40 40-60	Soft Hard	High	High.
CcB2, CcD2 Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
CeB: Cecil	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Urban land.											
Ch Chewacla	C	Frequent	Brief	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High	Moderate.
CoB, CoD Coronaca	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
CuB2, CuD2 Cullen	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
EnB, EnD Enon	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
EoB: Enon	C	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Urban land.											
GeB2 Georgeville	B	None	---	---	>6.0	---	---	>60	---	High	High.
GoC, GoF Goldston	C	None	---	---	>6.0	---	---	10-20 20-40	Soft Hard	Moderate	High.
HeB Herndon	B	None	---	---	>6.0	---	---	>60	---	High	High.
HwB, HwD Hiwassee	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
IdA, IdB Iredell	C/D	None	---	---	1.0-2.0	Perched	Dec-Apr	>40	Soft	High	Low.
KkB Kirksey	C	None	---	---	1.5-3.0	Perched	Dec-Mar	40-60	Soft	Moderate	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
MeB, MeD---------- Mecklenburg	C	None--------	---	---	>6.0	---	---	48-60	Soft	High-----	Moderate.
MkB: Mecklenburg------	C	None--------	---	---	>6.0	---	---	48-60	Soft	High-----	Moderate.
Urban land.											
MsA--------------- Misenheimer	C	None--------	---	---	1.0-1.5	Perched	Dec-May	10-20 20-40	Soft Hard	High-----	High.
PaF--------------- Pacolet	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
PcE3: Pacolet----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Udorthents.											
PoB, PoD, PoF----- Poindexter	B	None--------	---	---	>6.0	---	---	20-40 40-60	Soft Hard	Moderate	Moderate.
SfB--------------- Sedgefield	C	None--------	---	---	1.0-1.5	Perched	Jan-Mar	>48	Hard	High-----	Moderate.
TaB, TaD, TbB2, TbD2------------- Tatum	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
Ud. Udorthents											
Ur. Urban land											
VaB, VaD---------- Vance	C	None--------	---	---	>6.0	---	---	>60	Soft	High-----	High.
We---------------- Wehadkee	D	Frequent----	Brief-----	Nov-Jun	0-2.5	Apparent	Dec-May	>60	---	High-----	Moderate.

TABLE 17.--ENGINEERING INDEX TEST DATA

[Dashes indicate data were not available. NP means nonplastic]

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution							Liquid limit	Plasticity index	Moisture density	
			Percentage smaller than--				Percentage smaller than--					Maximum dry density	Optimum moisture
	AASHTO	Unified	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm				
										Pct		Lb/ft^3	Pct
Armenia loam 1/ S79NC-025-1													
Ap ---- 0 to 8	A-6(2)	SC	99	98	82	45	28	19	15	31	13	118.2	15.7
Btg2 --- 11 to 41	A-7-6(18)	CH	100	99	91	61	45	39	34	52	35	110.8	19.1
C ---- 47 to 60	A-2-4(0)	SM	100	100	75	27	17	12	9	30	7	124.1	14.0
Coronaca clay loam 1/ S79NC-025-2													
Ap ---- 0 to 6	A-7-6(13)	CL	100	99	94	75	57	38	29	41	18	101.4	20.9
Bt1 --- 6 to 44	A-7-5(38)	CH	100	100	98	91	81	72	66	67	35	91.8	28.5
Bt2 --- 44 to 80	A-7-5(33)	MH	100	100	98	92	82	71	63	66	28	90.2	29.9
Kirksey silt loam 1/ S79NC-025-3													
E ---- 2 to 7	A-4(8)	ML	98	95	89	84	70	26	12	38	8	93.1	23.0
Bt ---- 12 to 37	A-4(9)	CL	98	97	94	92	82	37	21	33	10	105.1	18.9
C ---- 37 to 49	A-4(2)	ML	73	71	57	53	43	21	14	33	8	107.8	18.2
Misenheimer channery silt loam 1/ S79NC-025-5													
E ---- 2 to 7	A-4(1)	SM	70	54	46	44	35	17	9	37	7	103.1	19.3
Bw --- 7 to 15	A-4(3)	ML	78	75	66	62	51	29	14	35	6	103.6	20.0
Sedgefield sandy loam 2/ S79NC-025-6													
Ap --- 0 to 8	A-2-6(0)	SC	99	98	69	35	25	19	15	26	11	119.3	12.1
Bt2 --- 12 to 27	A-7-6(49)	CH	100	100	89	79	73	68	63	84	57	93.5	25.1
C --- 31 to 48	A-6(3)	SC	97	94	65	42	29	19	15	39	17	107.9	17.9

1/ Typical pedon for the series in the survey area. See "Soil Series and Their Morphology" in text for additional information.

2/ Sedgefield sandy loam: 5 miles south of Harrisburg on State Road 1138 to State Road 1136; 0.5 mile on State Road 1136 to junction with State Road 1135; 100 feet northwest of junction, in a pine forest.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Altavista	Fine-loamy, mixed, thermic Aquic Hapludults
Appling	Clayey, kaolinitic, thermic Typic Hapludults
Armenia	Fine, montmorillonitic, thermic Typic Argiaquolls
Badin	Clayey, mixed, thermic Typic Hapludults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
Coronaca	Fine, kaolinitic, thermic Rhodic Paleudalfs
Cullen	Clayey, mixed, thermic Typic Hapludults
Enon	Fine, mixed, thermic Ultic Hapludalfs
Georgeville	Clayey, kaolinitic, thermic Typic Hapludults
Goldston	Loamy-skeletal, siliceous, thermic, shallow Typic Dystrochrepts
Herndon	Clayey, kaolinitic, thermic Typic Hapludults
Hiwassee	Clayey, kaolinitic, thermic Typic Rhodudults
Iredell	Fine, montmorillonitic, thermic Typic Hapludalfs
Kirksey	Fine-silty, siliceous, thermic Aquic Hapludults
Mecklenburg	Fine, mixed, thermic Ultic Hapludalfs
Misenheimer	Loamy, siliceous, thermic, shallow Aquic Dystrochrepts
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
Poindexter	Fine-loamy, mixed, thermic Typic Hapludalfs
Sedgefield	Fine, mixed, thermic Aquultic Hapludalfs
Tatum	Clayey, mixed, thermic Typic Hapludults
Vance	Clayey, mixed, thermic Typic Hapludults
Wehadkee	Fine-loamy, mixed, nonacid, thermic Typic Fluvaquents

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