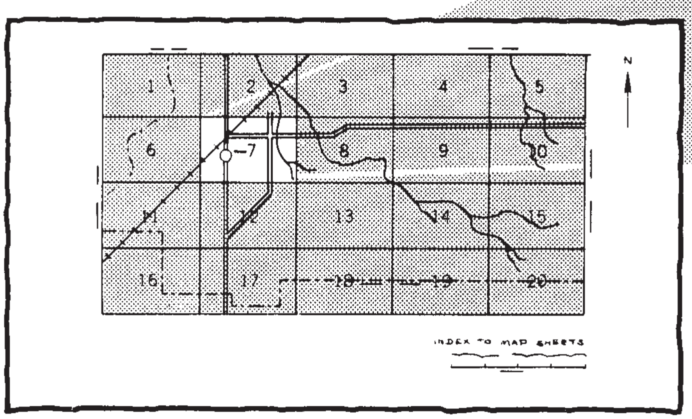
Soil Survey of

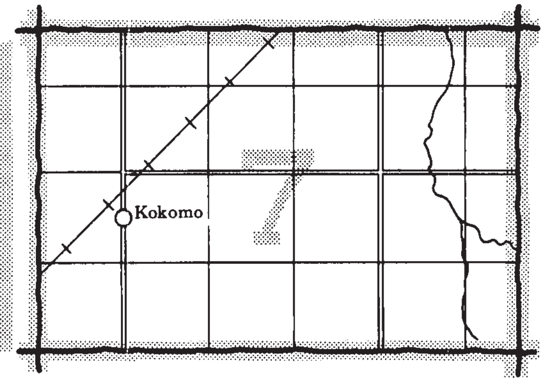
Lunenburg County Virginia

United States Department of Agriculture, Soil Conservation Service
in cooperation with the
Virginia Polytechnic Institute and State University and the
Lunenburg County Board of Supervisors

HOW TO USE

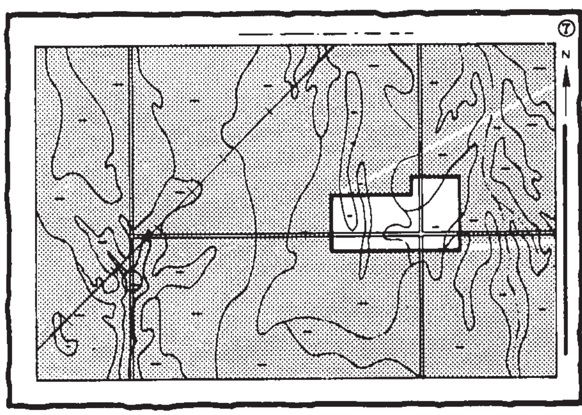
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

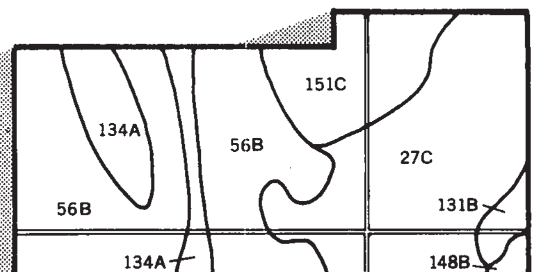




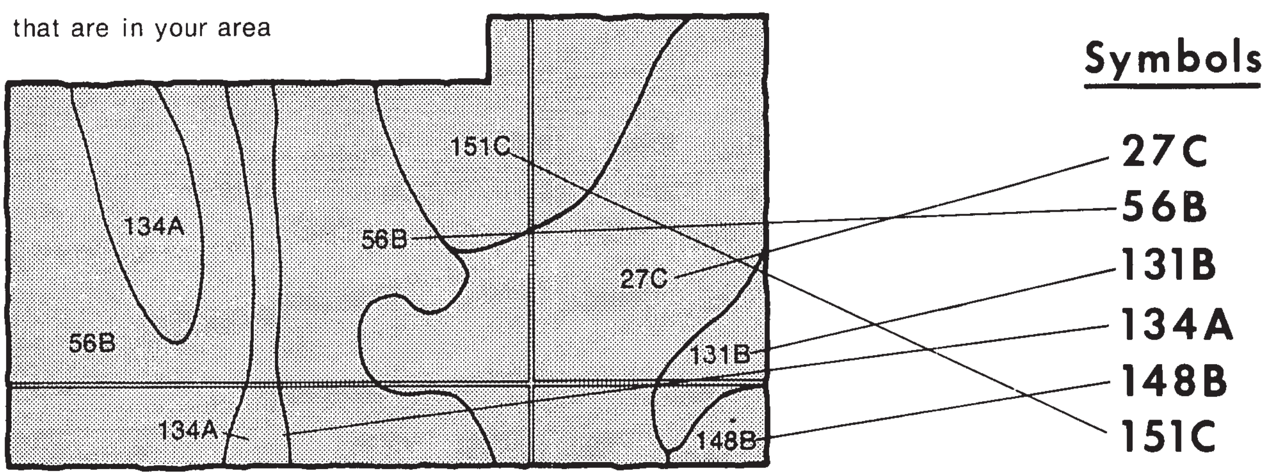
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



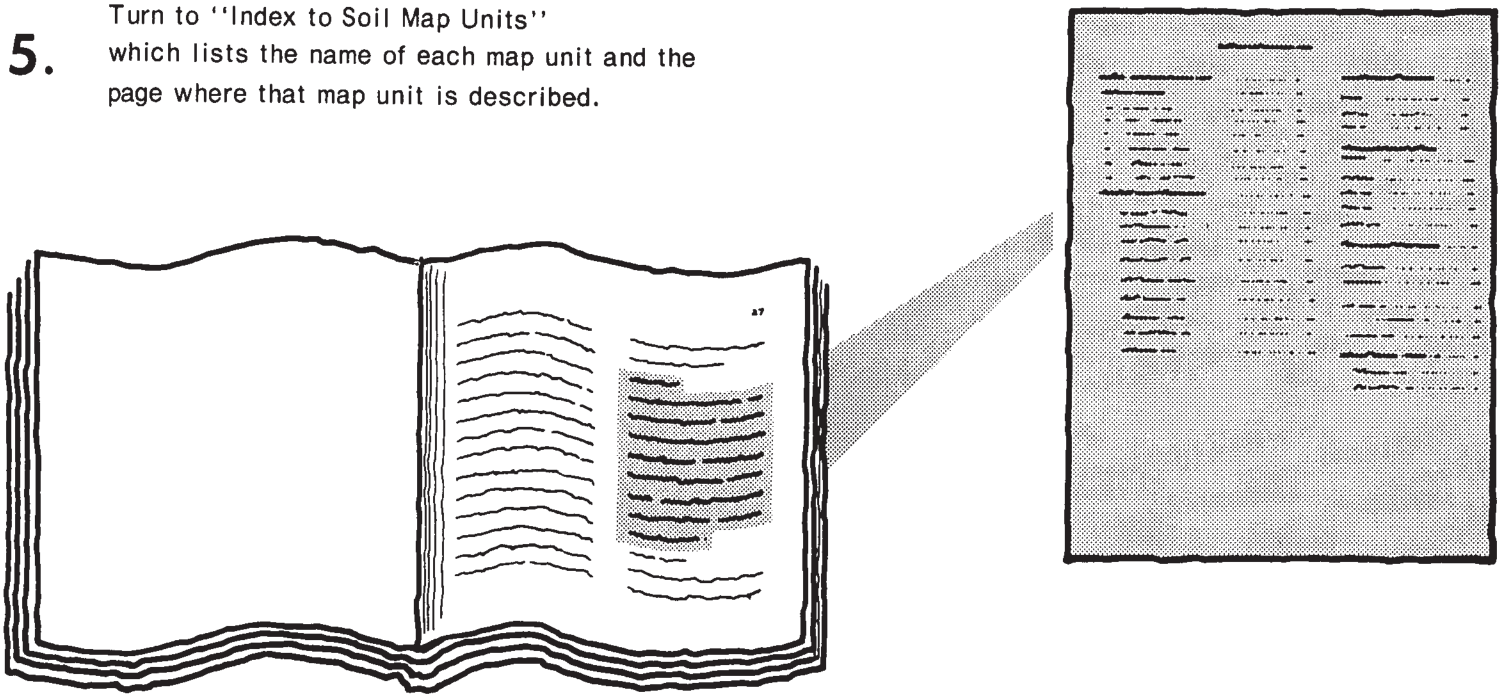


4. List the map unit symbols that are in your area

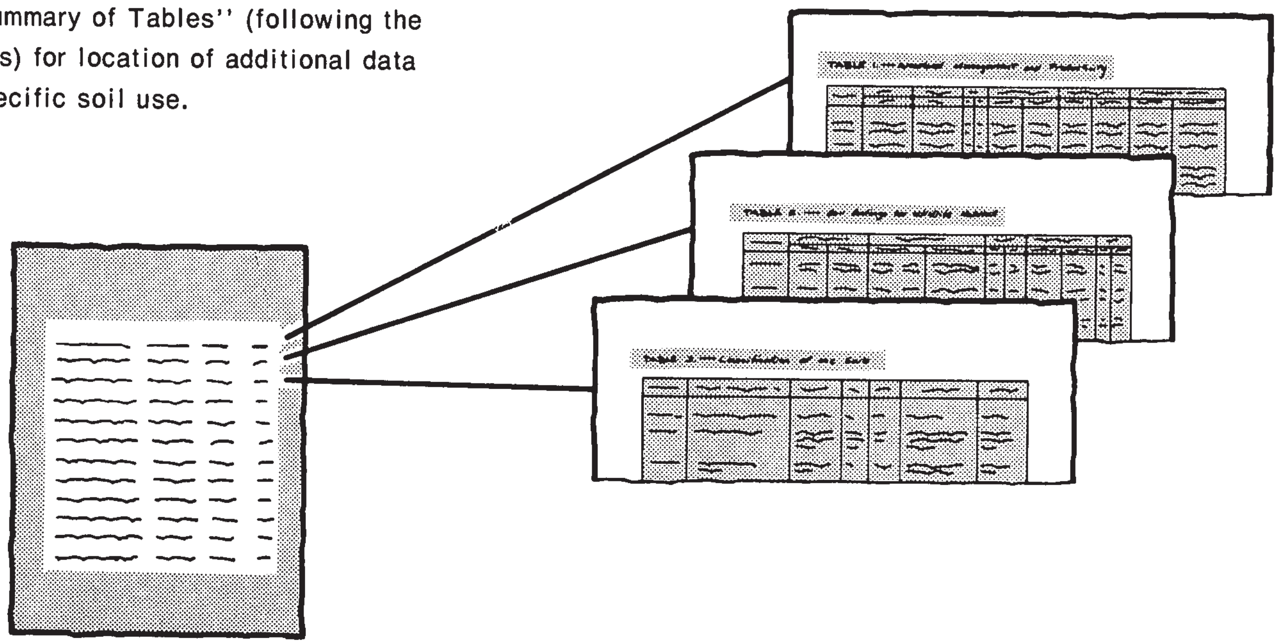


THIS SOIL SURVEY

5. Turn to ''Index to Soil Map Units'' which lists the name of each map unit and the page where that map unit is described.



6. See ''Summary of Tables'' (following the Contents) for location of additional data on a specific soil use.



7. Consult ''Contents'' for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

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, or age.

Major fieldwork for this soil survey was performed in the period 1972-77. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service, the Virginia Polytechnic Institute and State University, and the Lunenburg County Board of Supervisors. The survey is part of the technical assistance furnished to the Southside 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.

contents

soil series

Issued January 1981

index to map units

summary of tables

foreword

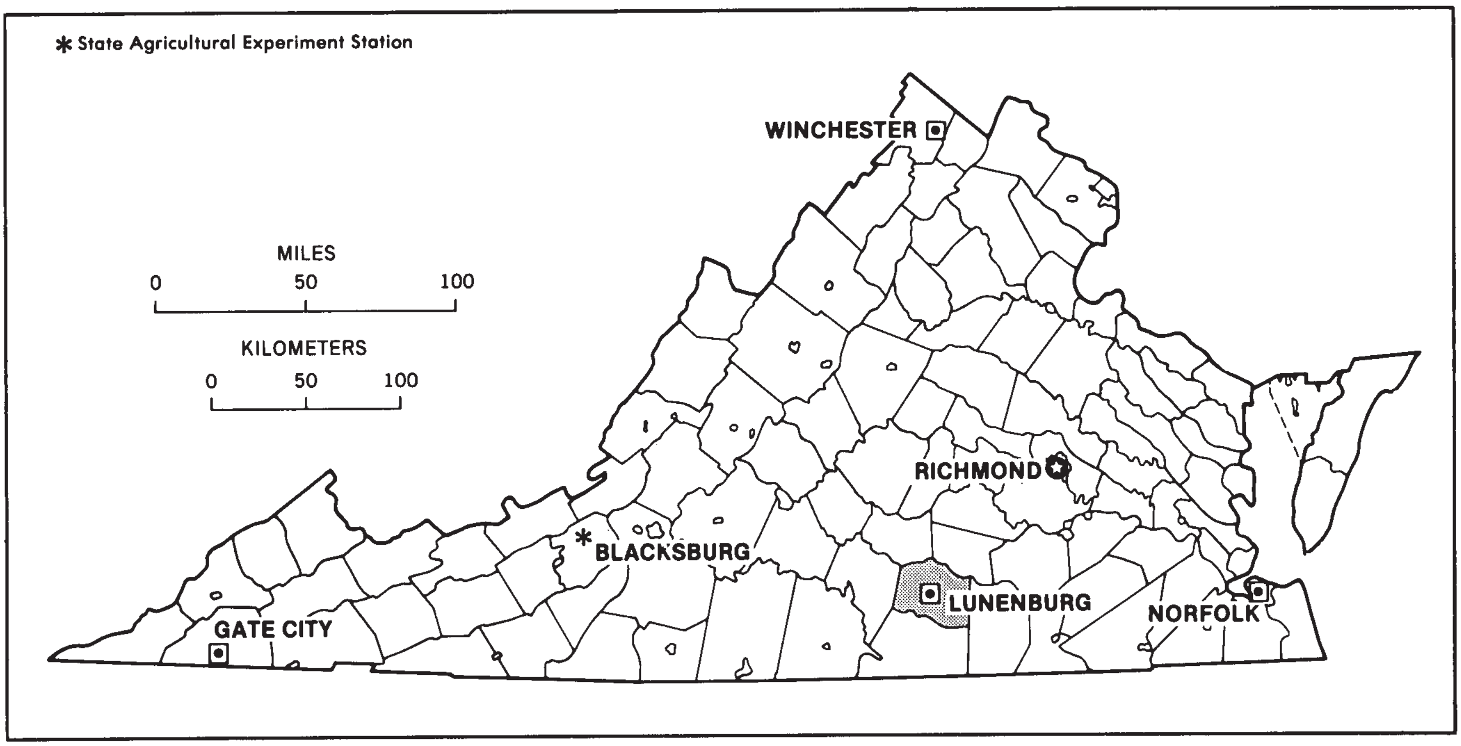
This soil survey contains information that can be used in land-planning programs in Lunenburg County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact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

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to 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.

Manly S. Wilder
State Conservationist
Soil Conservation Service



Location of Lunenburg County in Virginia.

soil survey of
Lunenburg County, Virginia

By Jerry C. McDaniel, Herbert L. Gillispie, and James Ali,
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with the
Virginia Polytechnic Institute and State University and the
Lunenburg County Board of Supervisors

LUNENBURG COUNTY is in south-central Virginia. The county has an area of 443 square miles, or 283,500 acres. The population in 1970 was 11,687. Victoria and Kenbridge are the largest towns in the county, and Lunenburg Courthouse is the county seat.

The transportation needs of the county are served by several State highways, two major rail lines, and a county airport between Kenbridge and Victoria.

Wells throughout the county provide a potable water supply for farm and domestic use. Kenbridge has one reservoir, and Victoria has three.

general nature of the survey area

This section provides data on the climate of the survey area and describes the trends in farming and industry. Also described are physiographic characteristics of the county and the relief and drainage.

climate

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

Lunenburg County is hot and generally humid in summer. Winter is moderately cold but short because the mountains to the west protect the area against many cold waves. Precipitation is evenly distributed throughout the year and is adequate for all commonly grown crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Charlotte, Virginia, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 36 degrees F, and the average daily minimum temperature is 26 degrees. The lowest temperature on record, which occurred at Charlotte on January 19, 1976, is -1 degree. In summer the average temperature is 74 degrees, and the average daily maximum temperature is 86 degrees. The highest recorded temperature, which occurred at Charlotte on July 15, 1954, 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.

Of the total annual precipitation, 22 inches, or 55 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 5.35 inches at Charlotte on July 14, 1975. Thunderstorms occur on about 40 days each year, and most occur in summer.

Average seasonal snowfall is 13 inches. The greatest snow depth at any one time during the period of record was 20 inches. On an average of 4 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter.

The prevailing wind is from the southwest. Average windspeed is highest, 9 miles per hour, in spring.

farming

Cultivated crops cover about 16 percent of the county and pasture about 6 percent. The number of farms and the acreage in cropland has generally been decreasing, and the size of farms has been increasing.

The major crops grown in the county are flue-cured tobacco, dark tobacco, corn, soybeans, grain sorghum, wheat, oats, barley, and rye. Flue-cured tobacco is the major cash crop. Tall fescue is grown for pasture and hay. A small acreage of orchardgrass is raised primarily for hay.

Raising beef cattle is the major livestock enterprise in the county, but hogs, sheep, horses, and dairy cattle are also raised.

Most of the woodland in the county is composed of mixed hardwoods and pine. Much of the harvested acreage is planted in loblolly pine. The timber is dominantly harvested for pulpwood, but some of the larger hardwoods and pines are sawed into lumber.

industry

Most of the manufacturing and business establishments in Lunenburg County are in or near the towns of Kenbridge and Victoria. Some of the major industries produce lumber, furniture, tobacco, fertilizer, and clothing. Kenbridge is a major market for flue-cured tobacco and has several tobacco warehouses. Several sawmills are scattered throughout the county. A small livestock market is near Victoria.

physiography, relief, and drainage

Lunenburg County is in the Piedmont physiographic province, a gently sloping to steep landform. The county consists of ridges dissected by numerous short drainageways. The ridges are commonly broader and the side slopes less steep in the eastern half of the county. Slopes are generally steeper near the larger streams. Elevation in the county ranges from about 227 feet above sea level in the southeastern corner of the county to about 600 feet above sea level in the northwestern corner.

The survey area is underlain by igneous and metamorphic rock formations that consist primarily of granite, granite gneiss, sericite schist, mica schist, greenstone, diabase, and hornblende gneiss. Most of the soils in this survey area formed in the material weathered from these rocks.

The northern part of the county is drained primarily by the Nottoway River and its tributaries—Cedar Creek, Nash Mill Creek, Seay Creek, Big Hounds Creek, Little Hounds Creek, Modest Creek, and Dry Creek. These streams generally flow to the east and northeast. The southern part of the county is drained by the South Meherrin River and Meherrin River and the major tributaries of Stony Creek, Flat Rock Creek, North Meherrin River, Middle Meherrin River, and Juniper Creek. These streams generally flow to the south and southeast.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

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, or association, on the general soil map is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in others 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 building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

soil descriptions

1. Appling association

Gently sloping and sloping, well drained soils formed in material weathered from granite and granite gneiss; on ridgetops and side slopes

This association consists primarily of long, broad ridges dissected by short drainageways. The ridgetops are gently sloping, and the sides of the ridges commonly are sloping. Slopes commonly range from about 2 to 30 percent. Most areas are drained by small perennial streams.

This association makes up about 30 percent of the survey area. The association is about 60 percent Appling soils and 40 percent minor soils.

The Appling soils are generally on the tops and sides of ridges. They have a surface layer of yellowish brown sandy loam and a moderately permeable subsoil of yellowish red to yellowish brown clay.

The minor soils are deep, well drained Caroline, Cecil, Madison, Pacolet, Wedowee, and Toccoa soils; moderately deep, excessively drained Ashlar soils; deep, moderately well drained Helena soils; deep, poorly drained Worsham soils; and deep, somewhat poorly drained Augusta and Chewacla soils.

Most of the cleared acreage of this association is suitable for cultivated crops and pasture. Some of the gently sloping and sloping areas in woodland would also be suitable if cleared. The common trees in the wooded areas are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods.

Most of the cleared areas are used for cultivated crops such as flue-cured tobacco, corn, soybeans, and small grains. A few areas are used for pasture and hay. Flue-cured tobacco is the major cash crop in the area. Slope, high acidity, low natural fertility, and the hazard of erosion are the main limitations of the soils for cultivated crops and pasture. The soils in this association are among the better suited soils in the county for cultivated crops, especially flue-cured tobacco.

Much of this association is suitable for community development. The main limitations of the soils are slope and the permeability and clayey texture of the subsoil. Some of the minor soils have poor drainage, are frequently flooded, are steep, or are shallow to bedrock.

2. Cecil-Appling-Madison association

Gently sloping to moderately steep, well drained soils formed in material weathered from granite, granite gneiss, and mica gneiss; on ridgetops and side slopes

This association consists primarily of long, broad to narrow ridges dissected by short drainageways. The ridgetops are gently sloping, and the sides of the ridges are commonly sloping to moderately steep. Slopes commonly range from 2 to 30 percent. Most areas are drained by small perennial streams, the Nottoway River, and the North Meherrin River.

This association makes up about 30 percent of the survey area. The association is about 30 percent Cecil soils, 20 percent Appling soils, 10 percent Madison soils, and 40 percent minor soils.

The Cecil soils are gently sloping and sloping. They have a surface layer of brown fine sandy loam and a subsoil of moderately permeable clay.

The Appling soils are gently sloping and sloping. They have a surface layer of brown fine sandy loam and a subsoil of moderately permeable clay.

The Madison soils are gently sloping to moderately steep. They have a surface layer of brown sandy loam and a subsoil of moderately permeable clay.

The minor soils in this association are deep, well drained Caroline, Georgeville, Herndon, Mecklenburg, Pacolet, Poindexter, Toccoa, and Wedowee soils; moderately deep, excessively drained Ashlar soils; deep, moderately well drained Helena soils; deep, moderately well drained or somewhat poorly drained Iredell soils; deep, somewhat poorly drained Augusta and Chewacla soils; and deep, poorly drained Worsham soils.

Much of the cleared acreage of this association is suitable for cultivated crops and pasture. Some of the gently sloping and sloping areas in woodland would also be suitable if cleared. The moderately steep and steep soils on the sides of some ridges are mostly in woodland. The common tree species are loblolly pine, shortleaf pine, Virginia pine, and mixed hardwoods.

Most of the cleared areas are used for cultivated crops such as flue-cured and dark tobacco, corn, soybeans, and small grains. A few areas are used for pasture. Slope, high acidity, low natural fertility, and the hazard of erosion are the main limitations of the soils for farming.

Much of this association is suitable for community development. The major limitations of the soils are slope and the permeability and clayey texture of the subsoil.

3. Georgeville-Herndon association

Gently sloping and sloping, well drained soils formed in material weathered from sericite schist; on ridgetops and side slopes

This association consists primarily of long, broad to narrow ridges dissected by short drainageways. The ridgetops are gently sloping, and the sides of the ridges are commonly sloping to steep. Slopes commonly range from about 2 to 45 percent. Most areas are drained by small streams and by the Nottoway River, North Meherrin River, Middle Meherrin River, South Meherrin River, and Meherrin River.

This association makes up about 30 percent of the survey area. The association is about 50 percent Georgeville soils, 15 percent Herndon soils, and 35 percent minor soils.

The Georgeville soils are gently sloping and sloping. They have a surface layer of strong brown loam and a subsoil of moderately permeable, red clay.

The Herndon soils are gently sloping and sloping. They have a surface layer of brown loam and a subsoil of moderately permeable, yellowish red clay.

The minor soils in this association are deep, well drained Caroline, Cecil, Mecklenburg, Nason, Poindexter, Tatum, and Toccoa soils; moderately deep, excessively drained Goldston soils; deep, moderately well drained or somewhat poorly drained Iredell and Lignum soils; and deep, somewhat poorly drained Augusta and Chewacla soils.

Much of the cleared acreage of this association is suitable for cultivated crops and pasture. Some of the gently sloping and sloping areas in woodland would also be suitable if cleared. The common trees are shortleaf pine, Virginia pine, and mixed hardwoods.

About half of the cleared areas are used for cultivated crops such as corn, soybeans, grain sorghum, small grains, dark tobacco, and flue-cured tobacco. Some of the acreage is used for pasture. Slope, high acidity, low natural fertility, and the hazard of erosion are the main limitations of the soils for farming.

Much of the acreage of the association is suitable for community development. The major limitations of the soils are slope and the permeability and clayey texture of the subsoil.

4. Herndon-Lignum-Orange association

Nearly level to sloping, well drained to somewhat poorly drained soils formed in material weathered from sericite schist and basic rocks; on ridgetops and side slopes

This association consists primarily of long, broad ridges dissected by short drainageways. The ridgetops are nearly level or gently sloping, and the sides of the ridges are commonly sloping. Slopes commonly range from about 1 to 30 percent. Most areas are drained by small, meandering streams and by the South Meherrin River.

This association makes up about 3 percent of the survey area. The association is about 40 percent Herndon soils, 35 percent Lignum soils, 8 percent Orange soils, and 17 percent minor soils.

The Herndon soils are gently sloping and sloping. They have a surface layer of brown loam and a subsoil of moderately permeable, yellowish red clay.

The Lignum soils are nearly level and gently sloping. They have a surface layer of very pale brown loam and a subsoil of moderately slowly permeable to slowly permeable, yellowish brown clay.

The Orange soils are nearly level and gently sloping. They have a surface layer of grayish brown loam and a subsoil of slowly permeable, light olive brown clay.

The minor soils in this association are deep, well drained Georgeville, Mecklenburg, Nason, and Toccoa soils; deep, moderately well drained or somewhat poorly drained Iredell soils; moderately deep, excessively drained Goldston soils; and deep, somewhat poorly drained Augusta and Chewacla soils.

About half of the cleared acreage of this association is suitable for cultivated crops and pasture. The steeper areas are less suited for cultivated crops and are mostly in woodland. The common trees are shortleaf pine, Virginia pine, and mixed hardwoods.

About half of the cleared acreage is used for cultivated crops such as flue-cured tobacco, corn, grain sorghum, and small grains. Some of the acreage is used for pasture. Slope, high acidity, low natural fertility, the hazard of erosion, wet spots, and gravelly areas are the main limitations of the soils for farming.

The Herndon soils are generally suitable for community development. Slow permeability, poor drainage, frequent flooding, slope, or the depth to bedrock make the Lignum and Orange soils, as well as most of the minor soils, less suited to community development.

5. Iredell-Mecklenburg association

Gently sloping to moderately steep, well drained to somewhat poorly drained soils formed in material weathered from basic rocks; on ridgetops and side slopes

This association consists primarily of long, broad ridges dissected by short drainageways. The ridgetops are gently sloping, and the sides of the ridges are commonly sloping to moderately steep. Slopes commonly range from about 2 to 30 percent. Most areas are drained by small perennial streams and by the North Meherrin River, Middle Meherrin River, and South Meherrin River.

This association makes up about 7 percent of the survey area. The association is about 70 percent Iredell soils, 20 percent Mecklenburg soils, and 10 percent minor soils.

The Iredell soils are gently sloping and sloping. They have a surface layer of dark grayish brown loam and a subsoil of slowly permeable, yellowish brown clay.

The Mecklenburg soils are gently sloping to moderately steep. They have a surface layer of reddish brown loam and a subsoil of slowly permeable, reddish brown and yellowish red clay.

The minor soils in this association are deep, well drained Georgeville, Poindexter, Tatum, and Toccoa soils; deep, somewhat poorly drained to moderately well drained Orange soils; and deep, somewhat poorly drained Augusta and Chewacla soils.

Most of the acreage of this association is in woodland, but about half of the cleared acreage is suitable and used for cultivated crops and pasture. The common trees are shortleaf pine, Virginia pine, and mixed hardwoods.

The main cultivated crops are dark tobacco, corn, and small grains. Slope, the hazard of erosion, and seasonal wetness are the main limitations of the soils for farming.

Most of the acreage in this association is poorly suited for community development. The major limitations are slow permeability, the depth to bedrock, a high shrink-swell potential, low strength, and wetness.

detailed soil map units

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

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

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

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

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Madison sandy loam, 2 to 7 percent slopes, eroded, is one of several phases in the Madison series.

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

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

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

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.

soil descriptions

1B2—Appling sandy loam, 2 to 7 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on narrow to broad ridgetops that are about 200 to 1,200 feet wide. Areas of this soil are irregularly shaped or long and winding. They range from about 3 to 300 acres.

Typically, the surface layer of this soil is yellowish brown sandy loam about 6 inches thick. The subsoil is mostly yellowish red clay and sandy clay loam about 40 inches thick. The substratum is strongly weathered granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar soils, well drained Caroline soils, moderately well drained Helena soils, and poorly drained Worsham soils. Ashlar soils are mostly on points of ridges and along the crests of narrow ridges and finger ridges. Caroline soils are mostly along the crests of broad ridges. Helena soils are scattered along broad ridges. Worsham soils are around the heads of small drainageways. Also included are small areas of soils with a very firm, slowly permeable clay subsoil, spots of soils with a gravelly surface layer, small gullied areas, and a few small areas of exposed bedrock. Included areas make up about 20 percent of this unit.

The permeability of this Appling soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist, but it breaks up into clods if the soil is tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid throughout, but the reaction of the surface layer varies because of local liming practices.

About half of the acreage of this soil is used for cultivated crops. Much of the remainder is wooded, and some of the acreage is used for pasture and hay.

This soil is well suited to cultivated crops, especially to flue-cured tobacco and to pasture and hay (fig. 1). Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion and crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species on this soil.

Low strength and the moderate shrink-swell potential, clayey texture, and permeability of the subsoil are the main limitations for community development. The low strength and the shrink-swell potential limit the use of the soil as a site for buildings and roads. The clayey subsoil limits excavations and use of the soil for trench sanitary landfills. The permeability of the subsoil limits use of the soil for septic tank absorption fields.

The capability subclass is IIe.

1C2—Appling sandy loam, 7 to 15 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on ridgetops and on side slopes along drainageways and streams. The side slopes are about 200 to 800 feet long. Areas of this soil are long and winding. They range from about 3 to 50 acres.

Typically, the surface layer of this soil is yellowish brown sandy loam about 6 inches thick. The subsoil is mostly yellowish red clay and sandy clay loam about 40

Figure 1.—Flue-cured tobacco on an area of Appling sandy loam, 2 to 7 percent slopes, eroded.

inches thick. The substratum is strongly weathered granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar soils, moderately well drained Helena soils, and poorly drained Worsham soils. Ashlar soils are on the points of ridges, along the crests of ridges, on finger ridges, and on upper side slopes. Helena soils are on some side slopes. Worsham soils are around the heads of drainageways and on lower side slopes. Also included are small areas of soils with a very firm, slowly permeable clay subsoil, spots of soils with a gravelly surface layer, small gullied areas, and small areas of exposed bedrock. Included areas make up about 20 percent of this unit.

The permeability of this Appling soil is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if the soil is tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid throughout, but the reaction of the surface layer varies because of local liming practices.

About half of the acreage of this soil is wooded. Most of the rest is used for cultivated crops. Some of the acreage is used for pasture and hay.

This soil is moderately well suited to most cultivated crops and to pasture and hay. It is well suited to flue-cured tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common trees on this soil.

Slope, low strength, and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, the low strength, and the shrink-swell potential limit use of the soil as a site for buildings and roads. The clayey subsoil limits excavation and use of the soil for trench sanitary landfills. Slope and the permeability of the subsoil limit use of the soil for septic tank absorption fields.

The capability subclass is IIIe.

2C—Ashlar loamy coarse sand, 7 to 15 percent slopes. This soil is moderately deep, sloping, and excessively drained. It is on the points of ridges and on narrow side slopes along drainageways and small streams. Slopes are about 200 to 400 feet long. Areas of this soil are irregularly shaped or long and winding. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is dark brown and yellowish brown loamy coarse sand about 10 inches thick. The subsoil is yellowish brown loamy coarse sand about 11 inches thick. The substratum is weathered granite 16 inches thick. Hard granite is at a depth of 37 inches.

Included with this soil in mapping are intermingled areas of well drained Appling, Madison, and Wedowee soils scattered throughout the map unit. Also included are small gullied areas, small areas of exposed bedrock, and spots covered by quartz and granite pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Ashlar soil is moderately rapid, and the available water capacity is low. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of about 20 to 40 inches. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid throughout, but the reaction varies because of local liming practices.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is poorly suited to farming. The soil is droughty during the growing season, and crop response to lime and fertilizer is limited by the lack of moisture. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter and tilth, control erosion, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species on this soil.

The depth to bedrock and the sandy texture of the soil are the main limitations for community development. The depth to bedrock limits use of the soil as a building site and as a site for septic tank absorption fields or sanitary landfills, and it limits excavations. The soil holds a low amount of moisture, which limits the growth of grasses and shrubs.

The capability subclass is IVe.

2D—Ashlar loamy coarse sand, 15 to 25 percent slopes. This soil is moderately deep, moderately steep, and excessively drained. It is on narrow side slopes along drainageways and streams. Slopes are 200 to 400 feet long. Areas of this soil are long and winding. They range from 3 to 30 acres.

Typically, the surface layer of this soil is dark brown and yellowish brown loamy coarse sand about 10 inches thick. The subsoil is yellowish brown loamy coarse sand 11 inches thick. The substratum is weathered granite 16 inches thick. Hard granite is at a depth of 37 inches.

Included with this soil in mapping are intermingled areas of well drained Madison and Wedowee soils scattered throughout the map unit. Also included are small gullied areas, small areas of exposed bedrock, and spots covered by quartz and granite pebbles and cobblestones (fig. 2). Included areas make up about 20 percent of this unit.

The permeability of this Ashlar soil is moderately rapid, and the available water capacity is low. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled through a wide range of moisture conditions. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of about 20 to 40 inches. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid throughout, but the reaction varies because of local liming practices.

Droughtiness and slope make this soil generally unsuitable for cultivated crops and poorly suited to pasture and hay. The soil is especially droughty during the growing season, and response to lime and fertilizer is limited by the lack of moisture. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, and deferred grazing help to increase the carrying capacity of pastures and control erosion. Overgrazing causes

Figure 2.—These areas of exposed rock limit cultivation on Ashlar loamy coarse sand, 15 to 25 percent slopes.

compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high, and most areas are wooded. Slope limits the safe operation of heavy timber equipment, and the survival of seeds and seedlings is limited by drought during the growing season. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species on this soil. Placing logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion.

Slope is the main limitation of the soil for community development, especially as a building site, as a site for sanitary landfills or septic tank absorption fields, or for many types of recreation.

The capability subclass is VIe.

2E—Ashlar loamy coarse sand, 25 to 45 percent slopes. This soil is moderately deep, steep, and excessively drained. It is on narrow side slopes along drainageways and streams. Slopes are 200 to 400 feet long. Areas of this soil are long and winding. They range from about 3 to 30 acres.

Typically, the surface layer of this soil is dark brown and yellowish brown loamy coarse sand about 10 inches thick. The subsoil is yellowish brown loamy coarse sand 11 inches thick. The substratum is weathered granite 16 inches thick. Hard granite is at a depth of 37 inches.

Included with this soil in mapping are intermingled areas of well drained Wedowee soils scattered throughout the map unit. Also included are small gullied areas, small areas of exposed bedrock, and spots covered by quartz and granite pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this soil is moderately rapid, and the available water capacity is low. Surface runoff is rapid. The erosion hazard is very severe. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of about 20 to 40 inches. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid throughout.

Slope and droughtiness make this soil generally unsuitable for cultivated crops and poorly suited to pasture. The soil is especially droughty during the growing season. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, and deferred grazing help to increase the carrying capacity of pastures and control erosion. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high, and most areas are wooded. The survival of seeds and seedlings is limited by drought during the growing season. The slope limits the safe operation of heavy timber equipment. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species on this soil. Placing logging roads and skid trails on the contour of the landscape helps to reduce runoff and control erosion.

The slope of the soil is the main limitation for community development, especially as a building site, as a site for sanitary landfills or septic tank absorption fields, and for many types of recreation.

The capability subclass is VIIe.

3B—Bolling fine sandy loam, 1 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on low terraces along streams. Slopes are 200 to 600 feet wide. Areas of this soil are long and narrow or roughly oval. They range from about 3 to 30 acres.

Typically, the surface layer of this soil is yellowish brown fine sandy loam about 6 inches thick. The subsoil is about 45 inches thick. It is mostly light olive brown and yellowish brown loam, clay loam, and clay with gray mottles below a depth of about 15 inches. The substratum is light gray sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of somewhat poorly drained Augusta and Chewacla soils, poorly drained Forestdale soils, and well drained Masada and Toccoa soils. The Augusta and Forestdale soils are in slight depressions and along small drainageways. The Chewacla soils are in low-lying areas next to streams. The Masada soils are in areas scattered throughout the unit. Toccoa soils are on higher areas next to streams. Also included in mapping are small terrace breaks. Included areas make up about 20 percent of this unit.

The permeability of this Bolling soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is slight. The surface layer is friable and easily tilled when moist. The subsoil has a moderate shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and medium in natural fertility. It is very strongly acid to neutral, but the reaction of the surface layer varies because of local liming practices. During winter and spring the soil is occasionally flooded and has a seasonal high water table commonly at a depth of 1-1/2 to 2-1/2 feet.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is well suited to cultivated crops and to pasture and hay. Alfalfa is often short lived because of seasonal wetness. The soil is wet and cold in early spring, and wetness interferes with tillage in some years. Crops are damaged by flooding during the spring on an average of once in 2 to 5 years. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, control erosion, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer.

The potential for trees on this soil is high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, yellow-poplar, sweetgum, and oaks are the common species on this soil. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table and flooding are the main limitations of the soil for community development. Both limitations restrict the use of the soil as a building site, as a site for sanitary landfills or septic tank absorption fields, and for many types of recreation.

The capability subclass is IIw.

4B—Caroline sandy loam, 1 to 7 percent slopes. This soil is deep, gently sloping, and well drained. It is on narrow to broad ridgetops. Slopes range from about 200 to 1,200 feet long. Areas of this soil are irregularly shaped or elongated. They range from about 3 to 100 acres.

Typically, the surface layer of this soil is brown and light yellowish brown sandy loam about 14 inches thick. The subsoil extends to a depth of 60 inches or more. It is mostly yellowish brown sandy clay and clay to a depth of 46 inches and mottled red, brown, and gray clay at a depth of more than 46 inches.

Included with this soil in mapping are intermingled areas of well drained Appling and Herndon soils, moderately well drained Helena soils, and poorly drained Worsham soils. The Appling and Herndon soils are scattered throughout the unit. The Helena soils are mostly on the broader ridges. The Worsham soils are around the heads of small drainageways and in depressions. Also included are small areas of gravelly soils. Included soils make up about 20 percent of this unit.

The permeability of this Caroline soil is moderately slow, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is used for cultivated crops. Some of the acreage is in woodland, and a few areas are used for pasture.

This soil is well suited to cultivated crops, especially to flue-cured tobacco, and to pasture and hay. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Slope, low strength, and the moderate shrink-swell potential, clayey texture, and permeability of the subsoil are the main limitations for community development. The low strength and the shrink-swell potential limit use of the soil as a site for buildings and roads, and the clayey texture limits excavations and use of the soil for trench sanitary landfills. The permeability of the subsoil restricts use of the soil for septic tank absorption fields. Slope limits areas of the soil for some types of recreation.

The capability subclass is IIe.

5B2—Cecil sandy loam, 2 to 7 percent slopes, eroded. This soil is deep, well drained, and gently sloping. It is on narrow to broad ridgetops. Slopes are about 200 to 1,000 feet long. Areas of this soil are irregularly shaped or long and winding. They range from about 3 to 200 acres.

Typically, the surface layer of this soil is brown sandy loam about 7 inches thick. The subsoil is mostly red clay and clay loam about 38 inches thick. The substratum is strongly weathered schist and granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of moderately well drained Helena soils and well drained Madison soils. The Helena soils are mostly on broader ridgetops; the Madison soils are scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered by quartz pebbles and cobblestones. Included areas make up about 20 percent of the unit.

The permeability of this Cecil soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid throughout, but the reaction of the surface layer varies because of local liming practices.

About half of the acreage of this soil is wooded. Most of the remaining acreage is used for cultivated crops, and a few areas are used for pasture.

This soil is well suited to cultivated crops and to pasture and hay. It is well suited to flue-cured tobacco and dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Low strength and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. Low strength and the shrink-swell potential limit use of the soil as a site for roads and buildings, and the clayey subsoil limits excavations and use of the soil for trench sanitary landfills. The permeability of the subsoil limits use of the soil for septic tank absorption fields.

The capability subclass is IIe.

5C2—Cecil sandy loam, 7 to 15 percent slopes, eroded. This soil is deep, well drained, and sloping. It is on narrow side slopes along drainageways and small streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and winding. They range from about 3 to 50 acres.

Typically, the surface layer of this soil is brown sandy loam about 7 inches thick. The subsoil is mostly red clay and clay loam about 38 inches thick. The substratum is strongly weathered schist and granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Madison soils scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered by quartz pebbles and cobblestones. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Cecil soil is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if the soil is tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid throughout, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is wooded. Some areas are used for cultivated crops, and a few are used for pasture.

This soil is moderately well suited to cultivated crops and well suited to pasture and hay. It is moderately well suited to flue-cured tobacco and dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Slope, low strength, and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, low strength, and the shrink-swell potential limit use of the soil as a site for buildings and roads, and the clayey texture limits excavations and use of the soil for trench sanitary landfills. Slope restricts the use of soil as a site for sewage lagoons and, along with the permeability of the subsoil, is a limitation of the soil as a site for septic tank absorption fields and recreation.

The capability subclass is IIIe.

6—Chewacla, Toccoa, and Augusta loams, frequently flooded. This unit is made up of deep, nearly level, well drained and somewhat poorly drained soils on narrow flood plains. The mapped acreage of the unit is about 30 percent Chewacla soils, 30 percent Toccoa soils, 20 percent Augusta soils, and 20 percent other soils. Some units are made up of one or two of the major soils, and some consist of all three. The soils were mapped together because they have no major differences in use and management. Areas of this unit are commonly long and winding. They are 400 to 1,200 feet wide and range from about 25 to 400 acres.

Typically, the surface layer of the Chewacla soils is brown silt loam and loam about 8 inches thick. The subsoil extends to a depth of 60 inches or more and has gray and brown mottles throughout. It is brown silt loam and loam to a depth of about 43 inches and yellowish brown, pale brown, and light brownish gray clay loam at a depth of more than 43 inches.

The surface layer of the Toccoa soils is dark yellowish brown loam about 9 inches thick. The substratum is brown sandy loam and loam to a depth of 60 inches or more.

The surface layer of the Augusta soils is brown and yellowish brown loam and sandy loam about 14 inches thick. The subsoil mostly is mottled, light gray loam and clay loam to a depth of 60 inches or more.

Included with these soils in mapping are intermingled areas of poorly drained Forestdale soils and moderately well drained Bolling soils. The Forestdale soils are in slightly concave areas and low-lying areas; the Bolling soils are on slightly higher areas throughout the unit.

Also included are small, low-lying areas where water stands on the surface during the winter, small areas where floodwater has cut small channels into the surface, and spots of sandy soils.

The permeability of the Chewacla, Toccoa, and Augusta soils is moderate to moderately rapid, and the available water capacity is moderate to high. Surface runoff is slow. The erosion hazard is slight. The surface layer of each is friable and easily tilled when moist. The subsoil has a low shrink-swell potential. The soils are low in organic matter content and low to medium in natural fertility. They are commonly very strongly acid to slightly acid. During winter and spring the soils are commonly flooded for brief periods and have a seasonal high water table at a depth of 1/2 foot to 5 feet.

Most of the acreage of this unit is wooded. A few areas are used for pasture and a few for cultivated crops.

If these soils are drained and protected from flooding, they are well suited to cultivated crops and to pasture and hay. In unprotected areas crops are damaged by brief flooding during spring on an average of once every year. Alfalfa is short lived because of seasonal wetness. These soils are wet and cold in spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, drainage and flood control, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soils are wet cause compaction of the surface layer.

The potential for trees on these soils is high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, sweetgum, and yellow-poplar are the common species. The soils are soft when wet, limiting the use of heavy timber equipment.

The high water table and flooding are the main limitations of the soils for community development, especially as a building site, as a site for septic tank absorption fields and sanitary landfills, and for most recreational uses.

The capability subclass is IIIw if drained and protected from flooding; IIIw if drained and not protected from flooding; and IVw if not drained and not protected from flooding.

7—Forestdale loam. This soil is deep, nearly level, and poorly drained. It is on low terraces near streams. Areas of this soil are commonly long and narrow. They range from about 3 to 35 acres. Slopes are 0 to 2 percent.

Typically, the surfce layer of this soil is grayish brown and light brownish gray loam about 11 inches thick. The subsoil is mottled, gray clay loam and clay 35 inches thick. The substratum is light gray sand to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of somewhat poorly drained Augusta and Chewacla soils, moderately well drained Bolling soils, and well drained Toccoa soils. The Augusta and Chewacla soils are scattered throughout the unit; the Bolling and Toccoa soils are on slightly higher areas mostly along the edges of the unit. Also included are small, low areas where water stands on the surface during the fall, winter, and spring and small areas where floodwaters have cut small channels into the surface. Included areas make up about 15 to 20 percent of this unit.

The permeability of this Forestdale soil is very slow, and the available water capacity is moderate. Surface runoff is very slow. The erosion hazard is slight. The surface layer is friable and easily tilled when moist. The subsoil has a high shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more, but it is somewhat restricted by a seasonal high water table that is between the surface and a depth of 1/2 foot both during winter and spring and during prolonged wet periods the rest of the year. The soil is low in organic matter content and medium in natural fertility. It is commonly very strongly acid to neutral. The soil is frequently flooded for long periods during winter and spring.

Most of the acreage of this soil is wooded. A few areas are used for pasture.

The seasonal high water table and flooding hazard make this soil generally unsuitable for cultivated crops or hay and poorly suited to pasture. Providing drainage and protection from flooding are the main management concerns. The soil is suitable for a drainage system of open ditches, but outlets are difficult to locate. Even if the soil is drained, wetness interferes with tillage and harvesting. Grazing during periods of wetness compacts the surface layer.

The potential for trees on this soil is high. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, sweetgum, sycamore, and willow oak are the common species. The soil is soft when wet, limiting the operation of heavy timber equipment.

The high water table and flooding are the main limitations of the soil for community development, especially as a building site, as a site for septic tank absorption fields and sanitary landfills, and for most recreational uses.

The capability subclass is IIIw if drained and protected from flooding; Vw if not drained and not protected from flooding.

8B2—Georgeville loam, 2 to 7 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on narrow to broad ridgetops. Slopes are about 200 to 1,000 feet long. Areas of this soil are irregularly shaped or are long and winding. They range from about to 3 to 250 acres.

Typically, the surface layer of this soil is strong brown loam about 5 inches thick. The subsoil is mostly red clay, clay loam, and silty clay loam 55 inches thick. The substratum is red schist to a depth of about 70 inches.

Included with this soil in mapping are intermingled areas of moderately well drained or somewhat poorly drained Iredell soils and well drained Mecklenburg soils. The Iredell soils are mostly on broader ridges, and the Mecklenburg soils are mostly on narrower ridges. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Georgeville soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is well suited to cultivated crops and to pasture and hay. It is well suited to dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Slope, low strength, and the permeability and clayey texture of the subsoil are the main limitations for community development. Low strength limits use of the soil as a site for roads. The clayey texture of the subsoil limits excavations and restricts use of the soil for trench sanitary landfills. The permeability of the subsoil limits use of the soil as a site for septic tank absorption fields, and the slope, limits its use as a site for sewage lagoons.

The capability subclass is IIe.

8C2—Georgeville loam, 7 to 15 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on narrow ridgetops, on points of ridges, and on narrow side slopes along drainageways and small streams. Slopes range from 200 to 600 feet long. Areas of this soil are long and narrow. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is strong brown loam about 5 inches thick. The subsoil is mostly red clay, clay loam, and silty clay loam 55 inches thick. The substratum is red schist to a depth of about 70 inches.

Included with this soil in mapping are intermingled areas of moderately well drained or somewhat poorly drained Iredell soils and well drained Mecklenburg soils. The Iredell soils are mostly on lower side slopes; the Mecklenburg soils are mostly on narrow ridgetops, points of ridges, and upper side slopes. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered by quartz pebbles and cobblestones. Included areas make up about 10 to 15 percent of this unit.

The permeability of this Georgeville soil is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. It is moderately well suited to dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Slope, low strength, and the permeability and clayey texture of the subsoil are the main limitations for community development. Slope and low strength limit use of the soil as a site for buildings and roads and streets. The subsoil limits excavations and use of the soil for trench sanitary landfills. Slope restricts the use of the soil as a site for sewage lagoons and sanitary landfills and for recreation. Slope and the permeability of the subsoil limit the soil as a site for septic tank absorption fields.

The capability subclass is IIIe.

9D—Goldston channery loam, 15 to 45 percent slopes. This soil is moderately deep, steep, and excessively drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and winding. They range from about 3 to 35 acres.

Typically, the surface layer of this soil is brown channery loam about 6 inches thick. The subsoil is brown channery loam about 9 inches thick. The substratum is weathered schist 23 inches thick. Schist bedrock is at a depth of 38 inches.

Included with this soil in mapping are intermingled areas of well drained Nason, Poindexter, and Tatum soils scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, small areas of exposed bedrock, and spots covered with quartz cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Goldston soil is moderately rapid, and the available water capacity is very low. Surface runoff is very rapid. The erosion hazard is very severe. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 20 to 40 inches. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid throughout.

Most of the acreage of this soil is wooded. A few areas are used for pasture.

Slope and droughtiness during the growing season make this soil generally unsuitable for cultivated crops and poorly suited to pasture. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, and deferred grazing help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderate. The survival of seeds and seedlings is restricted by droughtiness during the growing season, and losses exceed 50 percent in some years. Some trees are uprooted during windy periods because of the limited rooting depth. Shortleaf pine, Virginia pine, and upland oaks are the common species. Placing logging roads and skid trails on the contour helps to reduce runoff and erosion, but slope limits the safe use of timber equipment.

Slope and the depth to bedrock are the main limitations of the soil for community development, especially as a building site, as a site for sanitary landfills and septic tank absorption fields, and for most recreational uses.

The capability subclass is VIIs.

10B—Helena sandy loam, 1 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained. It is on narrow to broad ridgetops, on the ends of ridges, and around the heads of drainageways. Slopes are about 200 to 600 feet long. Areas of this soil are irregularly shaped and range from about 3 to 50 acres.

Typically, the surface layer of this soil is yellowish brown sandy loam about 7 inches thick. The subsoil mostly is mottled, brownish yellow and light brownish gray clay loam and clay 37 inches thick. The substratum is weathered granite 12 inches thick. Hard granite is at a depth of 56 inches.

Included with this soil in mapping are intermingled areas of well drained Appling, Cecil, and Caroline soils and poorly drained Worsham soils. The Appling, Cecil, and Caroline soils are commonly along the crests of ridges. The Worsham soils are at the heads of and along small drainageways. Also included are spots of wet soils, small areas of soils with a gravelly surface layer, and spots covered with quartz pebbles and cobblestones. A few areas consist of soils similar to this Helena soil but that have a surface layer of fine sandy loam or a thicker surface layer. Included areas make up about 15 to 20 percent of this unit.

The permeability of this Helena soil is slow, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist. The subsoil has a high shrink-swell potential. The root zone extends to bedrock at a depth of 48 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices. The soil has a seasonal high water table at a depth of 1 to 2-1/2 feet during winter and early spring.

Most of the acreage of the soil is wooded. Some areas are farmed.

This soil is well suited to cultivated crops and to pasture and hay. Alfalfa is often short lived because of seasonal wetness. The soil is wet and cold in the early spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. This soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, depth to rock, low strength, and the high shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. The depth to the water table, low strength, and the shrink-swell potential limit use of the soil as a site for buildings and roads. The texture of the subsoil hinders excavation. The depth to the water table and depth to rock limit the soil as a site for sanitary landfills, and the slow permeability limits it as a site for septic tank absorption fields.

The capability subclass is IIe.

10C2—Helena sandy loam, 6 to 10 percent slopes, eroded. This soil is deep, sloping, and moderately well drained. It is on narrow side slopes along drainageways. Slopes are about 200 to 400 feet long. Areas of this soil are long and narrow. They range from about 3 to 30 acres.

Typically, the surface layer of this soil is yellowish brown sandy loam about 5 inches thick. The subsoil mostly is mottled, brownish yellow and light brownish gray clay loam and clay 37 inches thick. The substratum is weathered granite 12 inches thick. Hard granite is at a depth of 54 inches.

Included with this soil in mapping are intermingled areas of well drained Appling and Cecil soils and poorly drained Worsham soils. The Appling and Cecil soils are scattered throughout the unit. The Worsham soils are at the heads of and along small drainageways. Also included are small areas of soils that have a gravelly surface layer, small wet areas mainly along the base of slopes, and spots covered by quartz pebbles and cobblestones. A few areas are similar to this Helena soil but have a surface layer of fine sandy loam. Included areas make up about 15 to 20 percent of this unit.

The permeability of this Helena soil is slow, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a high shrink-swell potential. The root zone extends to bedrock at a depth of 48 inches or more. The soil is low in organic matter content and natural fertility. It is strongly acid or very strongly acid, but the reaction of the surface layer varies because of local liming practices. The soil has a seasonal high water table at a depth of 1 to 2-1/2 feet during winter and early spring.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is often short lived because of seasonal wetness. The soil is wet and cold in the early spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and increase runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. The soil is soft when wet, limiting the use of heavy timber equipment.

Slope, the depth to the seasonal high water table, the depth to bedrock, low strength, and the high shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, the water table, low strength, and the shrink-swell potential limit use of the soil as a site for buildings and roads. The texture of the subsoil hinders excavations. The water table, depth to rock, and slope limit the soil as a site for sanitary landfills and sewage lagoons. Slope and the slow permeability limit the soil as a site for septic tank absorption fields.

The capability subclass is IIIe.

11B2—Herndon loam, 2 to 7 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on narrow to broad ridgetops. Slopes range from about 200 to 800 feet long. Areas of this soil are irregularly shaped. They range from about 3 to 150 acres.

Typically, the surface layer of this soil is brown loam about 5 inches thick. The subsoil is yellowish red silty clay loam and clay 40 inches thick. The substratum is weathered schist to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Caroline and Mecklenburg soils and moderately well drained to somewhat poorly drained Iredell and Lignum soils. The Caroline soils are mostly on the broader ridges. The Iredell and Lignum soils are on broad ridges and around the heads of and along small drainageways. The Mecklenburg soils are scattered throughout the unit. Also included are small gullied areas, small areas of soils with a gravelly surface layer, and spots covered with quartz pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Herndon soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to extremely acid, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is wooded. Some areas are farmed.

This soil is well suited to cultivated crops and to pasture and hay. It is well suited to flue-cured tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Low strength and the permeability and clayey texture of the subsoil are the main limitations of the soil for community development. The low strength limits use of the soil as a site for roads, and the clayey texture limits use of the soil as a site for trench sanitary landfills. The clayey texture also hinders excavation. The permeability of the subsoil restricts use of the soil as a site for septic tank absorption fields. The slope and seepage limit use of the soil as a site for sewage lagoons. The clayey subsoil limits the use of this soil for trench type sanitary landfills.

The capability subclass is IIe.

11C2—Herndon loam, 7 to 15 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on narrow side slopes along drainageways and small streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and winding. They range from about 3 to 45 acres.

Typically, the surface layer of this soil is brown loam about 5 inches thick. The subsoil is yellowish red silty clay loam and clay 40 inches thick. The substratum is weathered schist to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of moderately well drained to somewhat poorly drained Iredell and Lignum soils and well drained Mecklenburg soils. The Iredell and Lignum soils are commonly on broader side slopes and around the heads of and along small drainageways. The Mecklenburg soils are scattered throughout the unit. Also included are small gullied areas, small areas of soils with a gravelly surface layer, and spots covered with quartz pebbles and cobblestones. Included areas make up about 15 to 20 percent of this unit.

The permeability of this Herndon soil is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to extremely acid, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is wooded. A few areas are used for farming.

This soil is moderately well suited to cultivated crops and to pasture and hay. It is moderately well suited to flue-cured tobacco. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Slope, low strength, and the permeability and clayey texture of the subsoil are the main limitations of the soil for community development. Slope and low strength limit the soil as a site for buildings and roads, and the clayey texture limits the soil as a site for trench sanitary landfills. The clayey texture also hinders excavation. Slope and the permeability of the subsoil restrict use of the soil as a site for septic tank absorption fields. Slope limits use of the soil as a site for sewage lagoons. Slope and the clayey subsoil limit the use of the soil for trench sanitary landfills.

The capability subclass is IIIe.

12B—Iredell loam, 1 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained or somewhat poorly drained. It is on broad, convex ridgetops. Slopes are about 200 to over 3,200 feet long. Areas of this soil are irregularly shaped and range from about 3 to 500 acres.

Typically, the surface layer of this soil is dark grayish brown and olive loam about 9 inches thick. The subsoil is yellowish brown clay 20 inches thick. The substratum is strongly weathered greenstone to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Herndon, Mecklenburg, and Poindexter soils scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, spots covered with pebbles and cobblestones, and spots of exposed bedrock. Some included areas consist of soils similar to this Iredell soil; some of these areas have a surface layer of fine sandy loam, and in some others the surface layer and subsoil have been mixed by plowing and the surface layer is yellowish brown or gray clay loam. Included areas make up about 20 percent of this unit.

The permeability of this Iredell soil is slow, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist. The subsoil has a very high shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more, but root growth is restricted by the clayey subsoil. The soil is low in organic matter content and medium in natural fertility. It is commonly medium acid to neutral throughout, but in some areas the substratum ranges to moderately alkaline. A seasonal high water table is at a depth of 1 to 2 feet during winter and early spring.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of wetness. The soil is wet and cold in early spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer.

The potential for trees on this soil is moderate. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, low strength, and the very high shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. The water table, low strength, and the very high shrink-swell potential limit the soil as a building site, and the clayey texture hinders excavation. The water table also limits the soil as a site for sewage lagoons and sanitary landfills. The slow permeability restricts use of this soil for septic tank absorption fields.

The capability subclass is IIe.

12C2—Iredell loam, 6 to 12 percent slopes, eroded. This soil is deep, sloping, and moderately well drained or somewhat poorly drained. It is commonly on narrow side slopes along drainageways and small streams. Slopes are about 200 to 600 feet long. Areas of this soil are long and winding. They range from about 3 to 50 acres.

Typically, the surface layer of this soil is dark grayish brown and olive loam about 5 inches thick. The subsoil is yellowish brown clay about 20 inches thick. The substratum is strongly weathered greenstone to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Herndon, Mecklenburg, and Poindexter soils scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, spots covered with pebbles and cobblestones, spots of exposed bedrock, and small wet areas along lower slopes. Some areas consist of soils similar to this Iredell soil; some of these areas have a surface layer of fine sandy loam, and in some others the surface layer and subsoil have been mixed by plowing and the surface layer is yellowish brown or grayish brown fine sandy loam. Included areas make up about 20 percent of this unit.

The permeability of this Iredell soil is slow, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a very high shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more, but root growth is somewhat restricted by the clayey subsoil. The soil is low in organic matter content and medium in natural fertility. It is commonly medium acid to neutral throughout, but in some areas the substratum ranges to moderately alkaline. A seasonal high water table is at a depth of 1 to 2 feet during winter and early spring.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of wetness. The soil is often wet and cold in early spring, and wetness interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and increase runoff and erosion.

The potential for trees on this soil is moderate. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. The soil is soft when wet, limiting the use of timber equipment.

Slope, the seasonal high water table, low strength, and the very high shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, the water table, low strength, and the shrink-swell potential limit use of the soil as a site for buildings and roads. The shrink-swell potential is a hazard for foundations and basements. Slope and the water table limit the use of the soil as a site for sewage lagoons and sanitary landfills. Slope and the slow permeability limit the soil for septic tank absorption fields.

The capability subclass is IVe.

13B—Lignum loam, 1 to 6 percent slopes. This soil is deep, gently sloping, and moderately well drained or somewhat poorly drained. It is on narrow to broad ridgetops and around the heads of drainageways. Slopes are about 400 to 1,000 feet long. Areas of this soil are irregularly shaped. They range from about 3 to 100 acres.

Typically, the surface layer of this soil is brown loam about 9 inches thick. The subsoil is 28 inches thick. It mostly is mottled, yellowish brown and light brownish gray clay, silty clay, and silty clay loam. The substratum is weathered schist 25 inches thick. Hard schist is at a depth of about 62 inches.

Included with this soil in mapping are intermingled areas of well drained Georgeville and Herndon soils and poorly drained Worsham soils. The Georgeville and Herndon soils are mostly on narrow ridges. The Worsham soils are mostly around the heads of drainageways and along small drainageways. Also included are small wet spots and small areas of soils with a gravelly surface layer. Included soils make up about 15 to 20 percent of this unit.

The permeability of this Lignum soil is moderately slow to slow, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 40 inches or more. The soil is low in organic mater content and natural fertility. It is very strongly acid to strongly acid throughout, but the reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1 to 2-1/2 feet during winter and spring.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of wetness. The soil is wet and cold in spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, low strength, and the moderate shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. The water table, shrink-swell potential, and low strength limit the soil as a site for buildings and roads. The clayey texture hinders excavation. The shrink-swell potential is a hazard for foundations and basements. The water table also limits the soil as a site for sewage lagoons and sanitary landfills, and the slow permeability limits it as a site for septic tank absorption fields.

The capability subclass is IIe.

13C2—Lignum loam, 6 to 10 percent slopes, eroded. This soil is deep, sloping, and moderately well drained or somewhat poorly drained. It is on narrow side slopes along drainageways. Slopes are about 200 to 600 feet long. Areas of this soil are long and narrow. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is brown loam about 5 inches thick. The subsoil is mostly mottled, yellowish brown and light brownish gray clay, silty clay, and silty clay loam 28 inches thick. The substratum is weathered schist 24 inches thick. Hard schist is at a depth of about 57 inches.

Included with this soil in mapping are intermingled areas of well drained Georgeville and Herndon soils and poorly drained Worsham soils. The Georgeville and Herndon soils are scattered throughout the unit. The Worsham soils are mostly around the heads of drainageways and along small drainageways. Also included are small areas of soils with a gravelly surface layer, small wet areas mostly along the base of slopes, and small gullied areas. Included areas make up 15 to 20 percent of this unit.

The permeability of this Lignum soil is moderately slow to slow, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 40 inches or more. The soil is low in organic matter content and natural fertility. It is very acid to strongly acid throughout, but the reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1 to 2-1/2 feet during winter and spring.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of wetness. The soil is wet and cold in spring, and wetness often interferes with tillage. Crops respond well to lime and fertilizer. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and increase runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. The soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table, slope, low strength, and the moderate shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, the water table, the shrink-swell potential, and the low strength limit the soil as a site for buildings and roads. The clayey texture hinders excavation. The shrink-swell potential is a hazard for foundations and basements. Slope and the water table limit the soil as a site for sewage lagoons and sanitary landfills, and slope and the slow permeability limit it as a site for septic tank absorption fields.

The capability subclass is IIIe.

14B2—Madison sandy loam, 2 to 7 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on narrow to broad ridgetops. Slopes are about 400 to 1,000 feet long. Areas of this soil are irregularly shaped. They range from about 3 to 150 acres.

Typically, the surface layer of this soil is brown sandy loam about 4 inches thick. The subsoil is mostly red clay and clay loam 28 inches thick. The substratum is weathered gneiss and granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Appling, Cecil, and Wedowee soils that are scattered throughout the map unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up 10 to 15 percent of this unit.

The permeability of this Madison soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is very strongly acid to strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is well suited to cultivated crops, to pasture and hay, and to dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Low strength and the permeability and clayey texture of the subsoil are the main limitations for community development. Low strength limits the soil for roads and streets, and the clayey subsoil limits it for trench sanitary landfills. The permeability of the subsoil limits use of the soil for septic tank absorption fields.

The capability subclass is IIe.

14C2—Madison sandy loam, 7 to 15 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on narrow side slopes along drainageways and small streams. Slopes are about 200 to 600 feet long. Areas of this soil are commonly long and winding. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is brown sandy loam about 4 inches thick. The subsoil is mostly red clay and clay loam 28 inches thick. The substratum is weathered gneiss and granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Appling, Cecil, and Wedowee soils that are scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up 10 to 15 percent of this unit.

The permeability of this Madison soil is moderate, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry.

The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is very strongly acid to strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is wooded. A few areas are farmed.

This soil is moderately well suited to cultivated crops, to pasture and hay, and to dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Slope, low strength, and the permeability and clayey texture of the subsoil are the main limitations for community development. Slope and low strength limit the soil as a site for buildings and roads and the clayey subsoil and slope for trench sanitary landfills and sewage lagoons. Slope and the permeability of the subsoil limit use of the soil for septic tank absorption fields.

The capability subclass is IIIe.

14D2—Madison sandy loam, 15 to 30 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 600 feet long. Areas of this soil are long and winding. They range from about 3 to 30 acres.

Typically, the surface layer of this soil is brown sandy loam about 4 inches thick. The subsoil is mostly red clay and clay loam 28 inches thick. The substratum is weathered gneiss and granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar soils and well drained Wedowee soils that are scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. In some included areas the soil is similar to this Madison soil; some of these areas have a surface layer of fine sandy loam, and in some others the surface layer and subsoil have been mixed by plowing and the surface layer is yellowish red or red sandy clay loam or clay loam. Included areas make up about 15 to 20 percent of this unit.

The permeability of this Madison soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is very strongly acid to strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. A few are farmed.

This soil is poorly suited to cultivated crops and moderately well suited to pasture and hay. The soil is droughty during the growing season because of the rapid runoff, and crop response to lime and fertilizer is limited. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. Building logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope, low strength, and the permeability and clayey texture of the subsoil are the main limitations for community development. Slope especially limits the soil as a site for buildings and roads, sewage lagoons, sanitary landfills, and septic tank absorption fields. The low strength is also a limitation for buildings and roads, and the permeability of the subsoil for septic tank absorption fields. The clayey texture of the subsoil restricts use of the soil as a site for trench sanitary landfills.

The capability subclass is IVe.

15B—Masada fine sandy loam, 2 to 7 percent slopes. This soil is deep, gently sloping, and well drained. It is on narrow terraces along streams. Slopes are 200 to 400 feet wide. Areas of this soil are oval or elongated. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 11 inches thick. The subsoil is brown and red sandy clay loam and clay 31 inches thick. The substratum is red, yellowish brown, and pale brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of moderately well drained Bolling soils, somewhat poorly drained Chewacla soils, and well drained Toccoa soils. The Bolling soils are in slightly concave areas and along small drainageways. The Toccoa soils are on higher areas along streams. Also included are small areas of soils with a gravelly surface layer. Included soils make up about 20 percent of this unit.

The permeability of this Masada soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and is easily tilled when moist. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. A few areas are farmed.

This soil is well suited to cultivated crops, pasture and hay, and flue-cured tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Low strength and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. The low strength and moderate shrink-swell potential limit use of the soil as a site for buildings and roads, and the clayey subsoil limits its use as a site for trench sanitary landfills. The permeability of the subsoil limits use of the soil for septic tank absorption fields.

The capability subclass is IIe.

16B2—Mecklenburg loam, 2 to 7 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on narrow to broad ridgetops. Slopes are about 200 to 1,000 feet long. Areas of this soil are irregularly shaped and range from about 3 to 100 acres.

Typically, the surface layer of this soil is reddish brown loam about 5 inches thick. The subsoil is reddish brown and yellowish red clay and clay loam 28 inches thick. The substratum is weathered greenstone to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Georgeville and Herndon soils and moderately well drained or somewhat poorly drained Iredell soils. The Georgeville and Herndon soils are scattered throughout the unit. The Iredell soils are around the heads of small drainageways. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Some included areas consist of soils that are similar to this Mecklenburg soil; the surface layer and upper part of the subsoil have been mixed by plowing in these areas, and the surface layer is reddish brown clay loam or silty clay loam. Included areas make up about 20 percent of this unit.

Permeability of this Mecklenburg soil is slow, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and is easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 48 inches or more. The soil is low in organic matter content and medium in natural fertility. It is commonly medium acid to neutral, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is wooded. Some areas are farmed.

This soil is well suited to cultivated crops, to pasture and hay, and to dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderate. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species.

Low strength and the moderate shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. The low strength and shrink-swell potential limit use of the soil as a building site, and the clayey subsoil limits its use as a site for trench sanitary landfills. The slowly permeable subsoil limits use of the soil for septic tank absorption fields.

The capability subclass is IIe.

16C2—Mecklenburg loam, 7 to 15 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on narrow side slopes along drainageways and small streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and narrow. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is reddish brown loam about 5 inches thick. The subsoil is reddish brown and yellowish red clay and clay loam 28 inches thick. The substratum is weathered greenstone to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Georgeville and Herndon soils and moderately well drained or somewhat poorly drained Iredell soils. The Georgeville and Herndon soils are scattered throughout the unit. The Iredell soils are around the heads of small drainageways and along the sides of drainageways. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Mecklenburg soil is slow, and the available water capacity is moderate. Surface runoff is medium to rapid. The erosion hazard is severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 48 inches or more. The soil is low in organic matter content and medium in natural fertility. It is commonly medium acid to neutral, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. A few are farmed.

This soil is moderately well suited to cultivated crops, to pasture and hay, and to dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing compacts the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderate. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species.

Slope, low strength, and the moderate shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, low strength, and the shrink-swell potential limit the soil as a site for buildings and roads, and the clayey subsoil limits it as a site for sanitary landfills. Slope limits the soil for sewage lagoons. The slowly permeable subsoil is a limitation for septic tank absorption fields.

The capability subclass is IIIe.

16D2—Mecklenburg loam, 15 to 20 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and narrow. They range from about 3 to 20 acres.

Typically, the surface layer of this soil is reddish brown loam about 5 inches thick. The subsoil is reddish brown and yellowish red clay and clay loam 28 inches thick. The substratum is weathered greenstone to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Nason, Poindexter, and Tatum soils that are scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Mecklenburg soil is slow, and the available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 48 inches or more. The soil is low in organic matter content and medium in natural fertility. It is commonly medium acid to neutral, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. A few are farmed.

This soil is poorly suited to farming. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderate. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species.

Slope, low strength, and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, low strength, and the shrink-swell potential limit the soil as a site for buildings and roads, and the clayey subsoil and slope limit it as a site for sanitary landfills. Slope limits the use of the soil as a site for sewage lagoons and, along with the slowly permeable subsoil, limits use of the soil for septic tank absorption fields.

The capability subclass is IVe.

17D2—Nason loam, 15 to 25 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and narrow. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is yellowish brown loam about 5 inches thick. The subsoil is reddish yellow and yellowish red clay loam and loam 22 inches thick. The substratum is weathered schist 15 inches thick. Hard schist bedrock is at a depth of 42 inches.

Included with this soil in mapping are intermingled areas of well drained Georgeville and Tatum soils and excessively drained Goldston soils. The Georgeville and Tatum soils are scattered throughout the unit. The Goldston soils are mostly around areas of exposed bedrock. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up about 20 to 25 percent of this unit.

The permeability of this Nason soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 40 to 60 inches or more. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is poorly suited to cultivated crops but is better suited to close-growing crops and to pasture and hay. The soil is droughty during the growing season because of rapid surface runoff, and crop response to lime and fertilizer is limited. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species. Building logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope, the depth to bedrock, low strength, and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. Slope, low strength, the shrink-swell potential, and the depth to bedrock limit use of the soil as a site for buildings and roads. Slope limits the use of the soil as a site for sewage lagoons and septic tanks and, along with the clayey subsoil, limits the use of trench sanitary landfills.

The capability subclass is IVe.

18B—Orange loam, 1 to 7 percent slopes. This soil is deep, gently sloping, and somewhat poorly drained or moderately well drained. It is on broad slopes and at the heads of drainageways. Slopes are about 300 to 800 feet long. Areas of this soil are irregularly shaped. They range from about 3 to 200 acres.

Typically, the surface layer of this soil is grayish brown and light brownish gray loam about 10 inches thick. The subsoil is mottled, olive brown and yellow and brown clay 27 inches thick. The substratum is white, brown, and black weathered schist 6 inches thick. Hard schist bedrock is at a depth of 43 inches.

Included with this soil in mapping are intermingled areas of well drained Herndon and Poindexter soils and poorly drained Worsham soils. The Herndon and Poindexter soils are on slightly higher areas scattered throughout the unit. The Worsham soils are at the heads and along small drainageways. Also included are small areas of soils with a gravelly surface layer and small wet spots. Included areas make up about 20 percent of this unit.

The permeability of this Orange soil is slow, and the available water capacity is low. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a high shrink-swell potential. The root zone generally extends to bedrock at a depth of 40 to 60 inches, but root growth is restricted by the clayey subsoil. The soil is low in organic matter content and medium in natural fertility. It is commonly strongly acid to medium acid in the upper part of the subsoil and medium acid to moderately alkaline in the lower part, but the reaction of the surface layer varies because of local liming practices. A seasonal high water table is at a depth of 1 to 3 feet during winter and spring.

Most areas of this soil are wooded. A few are farmed.

This soil is moderately well suited to cultivated crops and to pasture and hay. Alfalfa is short lived because of seasonal wetness. The soil is wet and cold in spring, and wetness often interferes with tillage. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer and increase runoff and erosion.

The potential for trees on this soil is moderate. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. Trees on this soil blow over during windy periods because of the restricted rooting depth. The soil is soft when wet, limiting the use of heavy timber equipment.

The depth to bedrock, the seasonal high water table, low strength, and the high shrink-swell potential, slow permeability, and clayey texture of the subsoil are the main limitations for community development. Low strength, the shrink-swell potential, the water table, and the depth to bedrock limit the soil as a site for buildings and roads. The depth to bedrock is a limitation for sewage lagoons and, along with the water table and clayey texture, is a limitation for sanitary landfills. The water table and the slow permeability restrict the use of the soil for septic tank absorption fields.

The capability subclass is IIIe.

19D2—Pacolet sandy loam, 15 to 30 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and narrow. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is dark yellowish brown sandy loam about 5 inches thick. The subsoil is mostly red clay, clay loam, and sandy clay loam 33 inches thick. The substratum is weathered granite and mica schist to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar soils and well drained Tatum soils. The Ashlar soils are mostly around areas of exposed bedrock. The Tatum soils are scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Pacolet soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a low shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid throughout, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is poorly suited to cultivated crops but is better suited to close-growing crops and to pasture and hay. The soil is droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is limited. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species. Building logging roads and skid trails on the contour helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope, low strength, and the permeability and clayey texture of the subsoil are the main limitations for community development. Slope limits the soil as a site for buildings, sewage lagoons, sanitary landfills, and septic tanks. The clayey texture is an additional limitation for sanitary landfills and the permeability for septic tanks. The low strength restricts the soil as a site for roads.

The capability subclass is IVe.

20D—Poindexter silt loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and winding. They range from about 3 to 40 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 6 inches thick. The subsoil is dark brown silt loam 15 inches thick. The substratum is olive brown, strongly weathered greenstone 26 inches thick. Hard greenstone bedrock is at a depth of 47 inches.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar and Goldston soils and well drained Mecklenburg, Nason, and Tatum soils. The Ashlar soils are mostly on lower slopes, and the Goldston soils are mostly on upper slopes and around areas of exposed bedrock. The Mecklenburg, Nason, and Tatum soils are scattered throughout the unit. Also included are small areas of soils with bedrock at a depth of 20 to 40 inches, small areas of gravelly soils, small gullied areas, and spots covered by pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Poindexter soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 40 inches or more. The soil is low in organic matter content and has medium fertility. It is strongly acid to neutral.

This soil is not suited to cultivated crops but is moderately well suited to pasture. The soil is droughty because of the rapid runoff, and response to lime and fertilizer is limited. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderate, and most areas are wooded. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. Building logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope, depth to bedrock, and the moderate shrink-swell potential and clayey texture of the subsoil are the main limitations for community development. Slope and the shrink-swell potential limit the use of the soil as a building site. Slope and seepage limit the use of the soil as a site for sewage lagoons. Slope and the depth to bedrock restrict use for sanitary landfills and septic tank absorption fields.

The capability subclass is VIe.

20E—Poindexter silt loam, 25 to 45 percent slopes. This soil is deep, steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 400 feet long. Areas of this soil are long and winding. They range from about 3 to 35 acres.

Typically, the surface layer of this soil is dark yellowish brown silt loam about 6 inches thick. The subsoil is dark brown silt loam 15 inches thick. The substratum is olive brown, strongly weathered greenstone 26 inches thick. Hard greenstone bedrock is at a depth of 47 inches.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar and Goldston soils and well drained Mecklenburg, Nason, and Tatum soils. The Ashlar soils are mostly on lower slopes, and the Goldston soils are mostly on upper slopes and around areas of exposed bedrock. The Mecklenburg, Nason, and Tatum soils are scattered throughout the unit. Also included are small areas of soils with bedrock at a depth of 20 to 40 inches, small areas of gravelly soils, small gullied areas, and spots covered by pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Poindexter soil is moderate, and the available water capacity is moderate. Surface runoff is very rapid. The erosion hazard is very severe. The surface layer is friable, and the subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 40 inches or more. The soil is low in organic matter content and medium in natural fertility. It is strongly acid to neutral.

Slope and the rapid runoff make this soil unsuitable for cultivated crops and poorly suited to pasture. The soil is droughty. Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, and deferred grazing help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderate, and most areas are wooded. Seedlings survive and grow if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, and upland oaks are the common species. Building logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope and the depth to bedrock are the main limitations of the soil for community development, especially as a site for buildings and trench sanitary landfills. Slope also limits the use of sewage lagoons, area sanitary landfills, and septic tank absorption fields.

The capability subclass is VIIe.

21D2—Tatum loam, 15 to 30 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 600 feet long. Areas of this soil are long and winding. They range from about 3 to 50 acres.

Typically, the surface layer of this soil is brown loam about 4 inches thick. The subsoil is mostly red clay and clay loam 31 inches thick. The substratum is strongly weathered schist to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Georgeville, Herndon, Mecklenburg, and Nason soils and excessively drained Goldston soils. The Georgeville, Herndon, and Mecklenburg soils are mostly on upper slopes. The Nason soils are scattered throughout the unit. The Goldston soils are around areas of exposed bedrock and on lower slopes. Also included are small areas of soils with a surface layer of silt loam or a gravelly surface layer, small gullied areas, and spots covered by pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Tatum soil is moderate, and the available water capacity is moderate. Surface runoff is rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist, and the subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is poorly suited to cultivated crops but is better suited to close-growing crops and to pasture and hay. The soil is droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is limited. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species. Building logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy equipment.

Slope, low strength, and the moderate shrink-swell potential and clayey texture of the subsoil are the main limitations of the soil for community development, especially as a site for buildings and roads. Slope also limits the soil as a site for area sanitary landfills and septic tank absorption fields and, along with the clayey subsoil, is a limitation for trench sanitary landfills.

The capability subclass is IVe.

22B—Turbeville fine sandy loam, 2 to 7 percent slopes. This soil is deep, gently sloping, and well drained. It is on narrow ridgetops. Slopes are about 200 to 600 feet long. Areas of this soil are irregularly shaped. They range from about 3 to 65 acres.

Typically, the surface layer of this soil is brown fine sandy loam about 7 inches thick. The subsoil is mostly dark red clay to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Georgeville, Madison, and Tatum soils scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer or a surface layer of clay loam or sandy clay loam. Included soils make up about 20 percent of this unit.

The permeability of this Turbeville soil is moderate, and the available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The surface layer is friable and is easily tilled when moist. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 60 inches or more. The soil is low in organic matter content and natural fertility. It is commonly strongly acid to very strongly acid, but the reaction of the surface layer varies because of local liming practices.

Most of the acreage of this soil is wooded. Some areas are farmed.

This soil is well suited to cultivated crops, to pasture and hay, and to flue-cured and dark tobacco. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration. Crops respond well to lime and fertilizer.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species.

Low strength and the moderate shrink-swell potential, permeability, and clayey texture of the subsoil are the main limitations for community development. The low strength and shrink-swell potential limit the soil as a site for buildings and roads and the clayey subsoil for trench sanitary landfills. The permeability of the subsoil is a limitation for septic tank absorption fields.

The capability subclass is IIe.

23D2—Wedowee sandy loam, 15 to 30 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on narrow side slopes along drainageways and streams. Slopes are about 200 to 600 feet long. Areas of this soil are long and narrow. They range from about 3 to 25 acres.

Typically, the surface layer of this soil is yellowish brown sandy loam about 5 inches thick. The subsoil is about 28 inches thick. It is mostly strong brown and yellowish red clay loam, sandy clay, and sandy clay loam. The substratum is weathered granite to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of excessively drained Ashlar soils and well drained Appling, Cecil, Madison, and Pacolet soils. The Ashlar soils are mostly around areas of exposed bedrock. The Appling, Cecil, Madison, and Pacolet soils are scattered throughout the unit. Also included are small areas of soils with a gravelly surface layer, small gullied areas, and spots covered with quartz pebbles and cobblestones. Included areas make up about 20 percent of this unit.

The permeability of this Wedowee soil is moderate, and the available water capacity is moderate. Surface runoff is very rapid. The erosion hazard is very severe. The surface layer is friable and easily tilled when moist, but it breaks up into clods if tilled when too wet or too dry. The subsoil has a moderate shrink-swell potential. The root zone extends to bedrock at a depth of 48 inches or more. The soil is low in organic matter content and natural fertility. It is strongly acid to very strongly acid throughout, but the reaction of the surface layer varies because of local liming practices.

Most areas of this soil are wooded. Some of the acreage is farmed.

This soil is poorly suited to cultivated crops but is better suited to close-growing crops and to pasture and hay. The soil is droughty during the growing season because of the rapid surface runoff, and crop response to lime and fertilizer is limited. Minimum tillage, using cover crops and grasses and legumes in the cropping system, and returning crop residue to the soil help to maintain organic matter content and tilth, control erosion, reduce crusting, and increase water infiltration.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, and the use of lime and fertilizer help to increase the carrying capacity of pastures. Overgrazing causes compaction of the surface layer and increases runoff and erosion.

The potential for trees on this soil is moderately high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, shortleaf pine, Virginia pine, yellow-poplar, and upland oaks are the common species. Building logging roads and skid trails on the contour of the landscape helps to reduce the concentration of runoff and control erosion. The slope of the soil limits the safe operation of heavy timber equipment.

Slope and the clayey subsoil are the main limitations for community development. Slope limits use of the soil as a site for buildings, sewage lagoons, and septic tank absorption fields. Slope and the clayey subsoil limit the soil for trench sanitary landfills.

The capability subclass is IVe.

24B—Worsham loam, 0 to 4 percent slopes. This soil is deep, nearly level to very gently sloping, and poorly drained. It is in areas mostly at the heads of drainageways. The areas of the soil are irregularly shaped and range from about 3 to 20 acres.

Typically, the surface layer of this soil is dark grayish brown and gray loam about 7 inches thick. The subsoil mostly is mottled, light gray clay about 41 inches thick. The substratum is mostly light brownish gray clay loam to a depth of 60 inches or more.

Included with this soil in mapping are intermingled areas of well drained Appling and Caroline soils, somewhat poorly drained Augusta and Chewacla soils, moderately well drained Helena soils, and moderately well drained to somewhat poorly drained Lignum soils. The Appling, Caroline, Helena, and Lignum soils are on slightly higher areas. The Augusta and Chewacla soils are along drainageways and streams. Also included are areas of soils with a hard, compact layer in the subsoil and small areas of seeps and springs. Included areas make up about 20 percent of the unit.

The permeability of this Worsham soil is moderately slow to slow, and the available water capacity is moderate. Surface runoff is slow. The erosion hazard is slight. The surface layer is friable. The subsoil has a moderate shrink-swell potential. The root zone generally extends to bedrock at a depth of 60 inches or more but is restricted by the clayey subsoil. The soil is strongly acid to very strongly acid. A seasonal high water table is between the surface and a depth of 1 foot during fall, winter, and spring.

Most of the acreage of this soil is wooded. A few areas are used for pasture.

This soil is not suited to cultivated crops but is moderately well suited to pasture. The soil is wet and cold in the spring and is droughty during the growing season. Crop response to lime and fertilizer is limited by the moderate available water capacity.

Establishing and maintaining a mixture of grasses and legumes, the use of proper stocking rates, rotation of pastures, deferred grazing, the use of lime and fertilizer, and drainage help increase the carrying capacity of pastures. Overgrazing and grazing when the soil is wet cause compaction of the surface layer.

The potential for trees on this soil is high. Seedlings survive and grow well if competing vegetation is controlled. Loblolly pine, Virginia pine, shortleaf pine, and oaks are the common species. This soil is soft when wet, limiting the use of heavy timber equipment.

The seasonal high water table limits this soil for most types of community development. The clayey texture of the subsoil is an additional limitation for trench sanitary landfills and slow permeability for septic tank absorption fields.

The capability subclass is Vw.

use and management of the soils

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

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

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

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

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

L. Willis Miller, 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.

More than 63,000 acres in the survey area was used for crops and pasture in 1967, according to the Virginia Conservation Needs Inventory. Of this total, about 14,000 acres was used for row crops (tobacco, corn, and soybeans); 6,500 acres for close-grown crops (wheat, rye, oats, and barley); 2,000 acres for rotation hay and pasture; 4,500 acres for hay; 17,000 acres for pasture; 9,000 acres for miscellaneous use; and 10,000 acres for idle land. An additional 103,000 acres used for woodland and 12,000 acres used for pasture have good potential for crops.

The acreage in crops in the county has gradually been decreasing; the acreage in pasture has been increasing as more beef cattle are being raised. A small acreage of cropland and pasture has been converted to community development.

Soil erosion is the major concern on most of the cropland in Lunenburg County. Most soils in the county have slopes of more than 2 percent and thus are susceptible to erosion.

Loss of the surface layer of the soil to erosion reduces the productivity of the soil and reduces the fertility and water holding capacity. Erosion is especially damaging to soils with a clayey subsoil, such as Appling, Cecil, Georgeville, Herndon, Iredell, Madison, and Mecklenburg soils, and on soils with bedrock near the surface. Erosion also reduces productivity on soils that tend to be droughty, such as Ashlar and Goldston soils.

Soil erosion also results in sediment-loaded streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Preparing a good seedbed through tillage is difficult on severely eroded spots because much of the original surface soil has been lost. It is also difficult to establish a good stand of any crop on the eroded spots because of the reduced available moisture in the seedbed. Such severely eroded spots are common in areas of moderately eroded Cecil, Georgeville, Madison, Mecklenburg, Nason, Pacolet, Tatum, and Wedowee soils. Severely eroded spots are generally less common in areas of Appling and Herndon soils.

Erosion control practices that provide protective surface cover help to reduce runoff and increase water infiltration. For example, using a cropping system that keeps the plant cover on the soil for extended periods can hold erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion, provide nitrogen, and improve soil tilth for the following crop in the system.

Contour stripcropping and using grassed waterways are the common erosion control practices in the survey area. They are best suited to soils with smooth, uniform slopes. Terraces and diversions reduce the length of slope and reduce runoff and erosion. They are most practical on deep, well drained soils with long, regular slopes. Appling, Caroline, and some Cecil soils are suitable for terraces. Contour tillage or terracing is not practical in most areas of Mecklenburg, Nason, Pacolet, Poindexter, Tatum, and Wedowee soils. Substantial plant cover is required to control erosion on these soils.

Minimum tillage, leaving crop residue on the surface, and using winter cover crops help to increase infiltration and reduce the hazards of runoff and erosion (fig. 3). These practices are suitable for most soils in the survey area but are difficult to use on the more eroded soils.

Soil fertility is low in most soils in the county, and most are very strongly acid or strongly acid unless they have been limed. However, the Iredell, Mecklenburg, Orange, and Poindexter soils on uplands, the Chewacla, Forestdale, and Toccoa soils on flood plains, and the

Figure 3.—Minimum tillage was used to plant corn on this area of Appling soils.

Bolling soils on stream terraces are commonly less acid and have moderate natural fertility. The proper pH level enables crops to use fertilizer and soil moisture more efficiently. Crops on most soils in the county respond well to applications of fertilizer.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth are granular and porous.

Most soils used for crops in the survey area have a surface layer of sandy loam, fine sandy loam, loam, or silt loam and are low in organic matter content. Generally the structure of such soils is weak, and rainfall causes a crust to form on the surface. The crust is hard when dry and reduces infiltration of water and increases runoff. Regular additions of crop residue and other organic material help to improve soil structure and reduce crust formation.

Tilth is a particular concern on the Augusta, Bolling, Chewacla, Forestdale, Helena, Iredell, and Lignum soils. These soils often stay wet until about midspring. If they are wet when plowed, they tend to be cloddy when dry and a good seed bed is difficult to prepare.

Drainage is a major management need on a small acreage used for crops and pasture in the survey area. Some soils are naturally so wet that the production of crops common to the area is generally not practical or possible unless the soils are drained. These include the somewhat poorly drained Augusta, Chewacla, Iredell, Lignum, and Orange soils and the poorly drained Forestdale and Worsham soils.

The design of surface and subsurface drainage systems varies with the kind of soil. Sometimes a combination of surface drainage and tile drainage can be used. Drains have to be more closely spaced in soils with slow permeability than in the more permeable soils. Tile drainage is suited to soils with moderate permeability, such as Augusta, Bolling, and Chewacla soils. However, these soils are subject to flooding. Furthermore, finding adequate outlets is often difficult in areas of Chewacla soils.

Field crops suited to the soils and climate of the survey area include flue-cured tobacco, dark tobacco, corn, soybeans, and grain sorghum. Cotton and peanuts can be grown on some soils in the county. Wheat, oats, barley, and rye are the common small grains.

Pastures in the county commonly consist of tall fescue, bluegrass, orchardgrass, ryegrass, or clover. Most improved pastures are seeded to tall fescue and ladino clover mixtures. Pastures of cool-season plants provide most of the grazing in the spring and autumn. Warm-season plants, such as common Bermudagrass, midland Bermudagrass, and lespedezas, provide summer grazing.

Establishing and maintaining a mixture of grasses and legumes and the prevention of overgrazing are the major pasture management concerns. The use of proper stocking rates, rotational and deferred grazing, weed control, restriction of grazing during the wet season on the moderately well drained to poorly drained soils, and the use of lime and fertilizer are the major pasture management practices. Stockpiling the accumulated growth of tall fescue for winter grazing reduces the need for hay.

The major plants grown and harvested for hay are Kentucky-31 fescue, orchardgrass, and red clover. Alfalfa is suitable for many soils in the survey area if the proper amounts of lime and fertilizer are applied. Midland Bermudagrass can be grown and managed for good quality hay.

Special crops grown in the county on a small scale are vegetables, apples, peaches, strawberries, and nursery plants. Most are produced for local markets. The deep, well drained Appling and Caroline soils in the eastern part of the county are especially well suited to most of these special crops.

Most of the well drained soils in the county are suitable for orchards and nursery plants. Soils in low positions, where frost is frequent and air drainage is poor, are generally poorly suited to early vegetables, small fruits, or orchards.

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 Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. 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 grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

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

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

Class I soils have slight 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 have other limitations, impractical to remove, that limit their use.

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

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

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

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

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

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

woodland management and productivity

Norman Wilson, woodland conservationist, Soil Conservation Service, helped prepare this section.

Woodland covers about 75 percent of Lunenburg County. All of the woodland is privately owned, and the timber harvesting and wood-related industries provide employment for many people in the area.

The major hardwoods in the county include various species of oak, hickory, yellow-poplar, sycamore, black walnut, and sweetgum. The major pine species include loblolly pine, shortleaf pine, and Virginia pine (fig. 4). Much of the woodland consists of stands of mixed hardwoods and pine.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

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

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

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

Figure 4.—A recently thinned area of loblolly pine on Cecil soils.

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

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor for production. They are the most important tree species in regard to growth rate, quality, value, and marketability. Other tree species that commonly occur on the soils are also listed, regardless of potential value or growth.

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

recreation

The soils of the survey area are rated in table 7 according to 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 recreation 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 7, 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 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

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 mild 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 or 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, horseback riding, and bicycling 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

Prepared by Larry Robinson, staff biologist, Soil Conservation Service.

Lunenburg County has extensive habitat for a variety of wildlife. White-tailed deer, wild turkey, bobwhite quail, cottontail rabbits, and gray squirrel are examples of the species that inhabit the county. Migratory gamebirds include mourning dove, Wilsons snipe, woodcock, and wood duck. The major wetland mammals are beaver, mink, muskrat, and otter. Oppossum, red fox and gray fox, and raccoon are other common fur-bearing mammals.

The Nottoway River has a number of sunfish species, largemouth bass, chain pickeral, channel catfish, and suckers. The Meherrin River contains these species and has a population of smallmouth bass in its North Fork. Over 1,000 acres of farm ponds have been stocked with largemouth bass, bluegills, and channel catfish.

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 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

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

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

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

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

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, 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, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are bush honeysuckle, mulberry, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. 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 redcedar.

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, cordgrass, 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 rabbit, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, 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, snipe, shore birds, muskrat, mink, and beaver.

engineering

Charles McDowell, conservation engineer, assisted in preparing this section.

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. 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 need to 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 (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) 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 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, 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, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 60 inches, and the content of salts, sodium, and sulfidic materials 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 10 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 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and 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, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. 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 10 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, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, 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 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high 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 11 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 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

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

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

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are 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 or stones or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

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

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 12 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 for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

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

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

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even 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, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

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

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

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

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

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

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

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 13 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 a soil contains particles coarser than sand, 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.

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 oven-dry 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.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water 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 is given in inches of water per inch of soil for each major soil layer. 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 in tons per acre per year. The 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 0.05 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 without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter of the plow layer 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 15 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 not protected by vegetation 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 a 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 inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months.

The information 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 depth; and absence of distinctive horizons that form in soils 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. Only saturated zones within a depth of about 6 feet are indicated. 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 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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 severe corrosion 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 amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*5*). 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 from laboratory measurements. In table 16, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that have a 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. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. 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 (*4*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*5*). 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."

Appling series

Soils of the Appling series are deep and well drained They formed in material weathered from granite, granite gneiss, and coarse-grained sericite schist. They are on ridgetops and side slopes of the Piedmont Upland. Slopes are 2 to 15 percent.

Appling soils are commonly near Ashlar, Caroline, Cecil, Helena, Madison, Pacolet, and Wedowee soils. Appling soils have a thicker solum and more clay in the subsoil than the Ashlar or Wedowee soils. They have a thinner solum than Caroline soils and do not have the gray mottles typical in the lower part of the subsoil of the Caroline soils. The subsoil of Appling soils is not as red as the subsoil of Cecil, Madison, or Pacolet soils. Appling soils are better drained than Helena soils.

Typical pedon of Appling sandy loam, 2 to 7 percent slopes, eroded, 0.15 mile west of the intersection of State roads VA-714 and VA-645, on south side of 714:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partly decomposed organic matter.

Ap—0 to 6 inches, yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable, slightly sticky, nonplastic; many fine and medium roots; few coarse roots; 2 percent angular quartz pebbles; very strongly acid; abrupt smooth boundary.

B1t—6 to 10 inches, reddish yellow (7.5YR 6/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; few thin clay films; few fine mica flakes; very strongly acid; clear smooth boundary.

B2t—10 to 26 inches, yellowish red (5YR 5/6) clay; common fine faint red (2.5Y 4/8) mottles; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; thin continuous clay films; few fine mica flakes; very strongly acid; clear wavy boundary.

B3t—26 to 46 inches, yellowish red (5YR 5/6) sandy clay loam; few fine faint red (2.5YR 5/8) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; thin discontinuous clay films; few fine mica flakes; 20 percent very strongly weathered granite and feldspar fragments; very strongly acid; gradual wavy boundary.

C—46 to 72 inches, red (2.5YR 5/8), reddish yellow (5YR 6/8), and white (10YR 8/2) strongly weathered granite that crushes to sandy clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few thin clay flows; few fine mica flakes; very strongly acid.

The solum is 40 to 60 inches thick. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to strongly acid unless the soil is limed. Angular quartz pebbles make up 0 to 15 percent of the A horizon and 0 to 5 percent of the B and C horizons.

The A horizon has hue of 10YR, value of 4 through 6, and chroma of 4 through 6. It is sandy loam or fine sandy loam.

The B horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 6 through 8. It commonly has high chroma mottles. It is clay, clay loam, or sandy clay loam.

The C horizon is strongly weathered granite, granite gneiss, or coarse-grained sericite schist that crushes to sandy loam or sandy clay loam.

Ashlar series

Soils of the Ashlar series are moderately deep and excessively drained. They formed in material weathered from granite and granite gneiss. Ashlar soils are on ridgetops and side slopes of the Piedmont Upland. Slopes are 7 to 45 percent.

Ashlar soils in this survey area are a taxadjunct because they have more sand and less clay in the solum than is defined in the range for the series. In this survey area the soils are classified as sandy, mixed, thermic Typic Dystrochrepts.

Ashlar soils are commonly near Appling, Cecil, Madison, Pacolet, and Wedowee soils. Ashlar soils have a thinner solum than any of these soils and do not have the argillic horizon typical of these soils.

Typical pedon of Ashlar loamy coarse sand, 15 to 25 percent slopes, 90 yards south and 265 yards east of the intersection of State roads VA-655 and VA-637, on the north side of Flat Rock Creek:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partly decomposed organic material.

A1—0 to 3 inches, dark brown (10YR 4/3) loamy coarse sand; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common fine and medium roots; 1 percent angular quartz and granite pebbles; 5 percent granite cobblestones; very strongly acid; clear smooth boundary.

A2—3 to 10 inches, yellowish brown (10YR 5/6) loamy coarse sand; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common fine and medium roots; 10 percent angular granite pebbles up to 1/2 inch in diameter; common fine mica flakes; strongly acid; clear wavy boundary.

B—10 to 21 inches, yellowish brown (10YR 5/4) gravelly loamy coarse sand: weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common fine and medium roots; 15 percent angular granite pebbles up to 1/2 inch in diameter; common fine mica flakes; strongly acid; clear wavy boundary.

C—21 to 37 inches, yellowish brown (10YR 5/4), very dark gray (10YR 3/1), and pale yellow (2.5Y 8/4) weathered granite that crushes to gravelly loamy coarse sand; massive; slightly hard, firm, nonsticky, nonplastic; few fine roots in seams and cracks; few thin dark yellowish brown (10YR 4/4) clay flows in seams and cracks; 30 percent angular granite pebbles up to 1/2 inch in diameter; common fine mica flakes; strongly acid; clear wavy boundary.

R—37 inches, hard granite.

The solum is 15 to 24 inches thick. The depth to bedrock is 20 to 40 inches. Reaction ranges from strongly acid to very strongly acid. Angular quartz and granite pebbles and granite cobblestones make up from 0 to 20 percent of the A and B horizons and 10 to 30 percent of the C horizon.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 6. It is loamy coarse sand, coarse sandy loam, sandy loam, or fine sandy loam.

The B horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 6. It is loamy coarse sand, coarse sandy loam, sandy loam, fine sandy loam, and their gravelly analogs.

The C horizon has hue of 7.5YR through 2.5Y, value of 3 through 8, and chroma of 1 through 8. It is loamy coarse sand, coarse sandy loam, sandy loam, fine sandy loam, and their gravelly analogs.

Augusta series

Soils of the Augusta series are deep and somewhat poorly drained. They formed in alluvium on low terraces along streams in the Piedmont province. Slopes range from 0 to 2 percent. Augusta soils in this survey area were mapped only in an undifferentiated group with Chewacla and Toccoa soils.

Augusta soils are commonly near Bolling, Chewacla, Forestdale, and Toccoa soils. Augusta soils are more poorly drained than Bolling or Toccoa soils and have an argillic horizon, which neither the Toccoa nor Chewacla soils have. Augusta soils are not as poorly drained as Forestdale soils and have less clay in the subsoil.

Typical pedon of Augusta loam, in an area of Chewacla, Toccoa, and Augusta loams, frequently flooded, 0.45 mile east and 0.4 mile south of the intersection of State roads VA-645 and VA-604, about 150 feet north of 604, on the east side of Cedar Creek:

A1—0 to 6 inches, brown (10YR 4/3) loam; many fine distinct grayish brown (2.5Y 5/2) mottles; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine medium and coarse roots; very strongly acid; clear smooth boundary.

A2—6 to 14 inches, yellowish brown (10YR 5/4) sandy loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine medium and coarse roots; very strongly acid; clear smooth boundary.

B21t—14 to 23 inches, brown (10YR 5/3) loam; many medium faint dark yellowish brown (10YR 4/4) and distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; slightly hard, firm, sticky, slightly plastic; few fine medium and coarse roots; thin continuous clay films; very strongly acid; clear smooth boundary.

B22tg—23 to 36 inches, light gray (N 7/0) clay loam; many medium prominent strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; hard, firm, sticky, plastic; few fine roots; thin continuous clay films; very strongly acid; clear smooth boundary.

B23tg—36 to 58 inches, light gray (N 7/0) clay loam; common medium prominent strong brown (7.5YR 5/6) and brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; hard, firm, sticky, plastic; few fine roots; thin continuous clay films; very strongly acid; gradual smooth boundary.

B3—58 to 63 inches, light gray (N 6/0) clay loam; few fine distinct reddish yellow (7.5YR 6/8) mottles; weak medium subangular blocky structure; few fine roots; very strongly acid.

The solum is 40 inches to more than 60 inches thick. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to strongly acid unless the soil is limed.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 through 4. It is commonly loam or sandy loam.

The B horizon is neutral or has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 0 through 3. The B horizon is loam and clay loam.

Some pedons have a C horizon that is neutral or has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 0 through 2. It is commonly sandy loam or loam.

Bolling series

Soils of the Bolling series are deep and moderately well drained. They formed in alluvium on low terraces along streams in the Piedmont province. Slopes are 1 to 6 percent.

Bolling soils are commonly near Augusta, Chewacla, Forestdale, Masada, and Toccoa soils. Bolling soils are better drained than Augusta or Forestdale soils and have less clay in the subsoil than Forestdale soils. They have an argillic horizon, which the Chewacla and Toccoa soils do not have, and are not as well drained as the Toccoa soils. They are not as well drained as the Masada soils and have less clay in the subsoil.

Typical pedon of Bolling fine sandy loam, 1 to 6 percent slopes, 0.5 mile east and 0.55 mile north of the intersection of State road VA-659 and Reedy Creek:

Ap—0 to 6 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; slightly hard, friable, slightly sticky, nonplastic; common fine roots; very strongly acid; abrupt smooth boundary.

B1t—6 to 10 inches, light olive brown (2.5Y 5/4) loam; moderate medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; few fine roots; thin continuous clay films; few rounded soft black oxide concretions 1 to 5 millimeters in diameter; very strongly acid; clear smooth boundary.

B21t—10 to 16 inches; light olive brown (2.5Y 5/4) loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; few fine roots; thin continuous clay films; very strongly acid; clear smooth boundary.

B22t—16 to 24 inches, yellowish brown (10YR 5/6) clay loam; common medium faint strong brown (7.5YR 5/

6) mottles and many medium distinct gray (10YR 6/1) mottles; moderate medium subangular blocky structure; slightly hard, firm, sticky, slightly plastic; thick continuous clay films; very strongly acid; clear smooth boundary.

B23t—24 to 51 inches, mottled yellowish brown (10YR 5/6), gray (10YR 6/1), and strong brown (7.5YR 5/6) clay; moderate coarse subangular structure; hard, firm, sticky, plastic; thin discontinuous clay films; very strongly acid; clear smooth boundary.

C—51 to 60 inches, light gray (10YR 7/1) sandy loam; massive; slightly hard, friable, slightly sticky, nonplastic; 10 percent quartz pebbles up to 3 inches in diameter; medium acid.

The solum is 30 to 60 inches thick or more. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to neutral. Rounded quartz pebbles up to 3 inches in diameter make up 0 to 5 percent of the A and B horizons and 0 to 15 percent of the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 4 through 6, and chroma of 2 through 4. It is fine sandy loam or loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 8. Low chroma mottles are below a depth of about 12 inches. High chroma mottles are in the B horizon of most pedons. The B horizon is loam or clay loam and is commonly clay in the lower part.

The C horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. It is sandy loam or loam.

Caroline series

Soils of the Caroline series are deep and well drained. They formed in fluviomarine sediments and are on ridgetops of the Piedmont Upland. Slopes range from 1 to 7 percent.

Caroline soils are commonly near Appling, Georgeville, Helena, and Herndon soils. Caroline soils have a thicker solum than any of these soils, are not as red in the subsoil as the Georgeville soils, and are better drained than the Helena soils.

Typical pedon of Caroline sandy loam, 1 to 7 percent slopes, 0.5 mile east and 0.65 mile north of the intersection of State roads VA-647 and VA-609, about 50 feet east of 609:

O1—2 inches to 1 inch, loose leaves, twigs, and pine needles.

02—1 inch to 0, partially decomposed organic material.

A1—0 to 3 inches, pale brown (10YR 6/3) sandy loam; moderate fine granular structure; soft, very friable, slightly sticky, nonplastic; many fine and few medium and coarse roots; few crushable brownish yellow (10YR 6/6) siliceous nodules up to 1/2 inch in diameter; strongly acid; abrupt smooth boundary.

A2—3 to 14 inches, light yellowish brown (10YR 6/4) sandy loam; weak fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; common fine and medium roots and few coarse roots; few crushable brownish yellow (10YR 6/6) siliceous nodules up to 1/2 inch in diameter; strongly acid; clear smooth boundary.

B1t—14 to 17 inches, brownish yellow (10YR 6/6) sandy loam; weak medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; common fine roots and few medium roots; few thin clay films; few crushable brownish yellow (10YR 6/6) siliceous nodules up to 1/2 inch in diameter; peds coated with light yellowish brown (10YR 6/4) material; strongly acid; clear smooth boundary.

B21t—17 to 26 inches, yellowish brown (10YR 5/6) sandy clay; moderate medium subangular blocky structure; slightly hard, friable, very sticky, slightly plastic; common fine roots and few medium roots; thin continuous clay films; root channels and some ped faces in upper part of horizon coated with light yellowish brown (10YR 6/4) material; very strongly acid; clear smooth boundary.

B22t—26 to 35 inches, yellowish brown (10YR 5/8) clay; many medium distinct yellowish red (5YR 5/6) mottles; weak thick platy structure; slightly hard; firm, sticky, slightly plastic; few fine roots; thin continuous clay films; slightly compact in places; very strongly acid; clear smooth boundary.

B23t—35 to 46 inches, yellowish brown (10YR 5/8) clay; many coarse distinct red (2.5YR 4/8) mottles and common medium faint brownish yellow (10YR 6/6) mottles; moderate very thick platy structure; slightly hard, firm, sticky, slightly plastic; few fine roots; thin continuous clay films; compact in place; very strongly acid; clear smooth boundary.

B3t—46 to 70 inches, mottled dark red (2.5YR 3/6), strong brown (7.5YR 5/8), and light gray (10YR 7/1) clay; strong very thick platy structure; hard, firm, sticky, slightly plastic; thin continuous clay films; compact in place; very strongly acid.

The solum is more than 60 inches thick. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to strongly acid throughout the solum unless the soil is limed. Rounded or semirounded quartz pebbles up to 2 inches in diameter make up 0 to 5 percent of the solum.

The A1 horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 through 6. The Ap horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 3 through 6. The A horizon is sandy loam or fine sandy loam.

The B1t horizon has hue of 10YR, value of 4 through 6, and chroma of 6 through 8. It is clay loam or sandy loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of mainly 6 through 8 in the upper part.

In some pedons it has high chroma mottles in the upper part. The B2t horizon is mottled in the lower part, usually below a depth of about 36 inches, in shades of dark red, red, yellow, brown, or gray; hue of 2.5YR through 10YR; value of 4 through 6; and chroma of 1 through 8. Mottles with chroma of 2 or less are below a depth of 36 inches. The B2t horizon is clay or sandy clay.

Cecil series

Soils of the Cecil series are deep and well drained. They formed in material weathered from granite, granite gneiss, mica schist, and coarse-grained sericite schist. The soils are on ridgetops and side slopes of the Piedmont Upland. Slopes range from 2 to 15 percent.

Cecil soils commonly are near Ashlar, Appling, Georgeville, Madison, Pacolet, and Wedowee soils. Cecil soils have a thicker solum and more clayey subsoil than the Ashlar soils, have a redder subsoil than the Appling or Wedowee soils, and have less silt and more sand than the Georgeville soils. They have a thicker solum than the Madison or Pacolet soils and have less mica in the subsoil than the Madison soils.

Typical pedon of Cecil sandy loam, 2 to 7 percent slopes, eroded, 0.3 mile west and 0.1 mile north of the intersection of State roads VA-600 and VA-627, on the north side of 600:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

Ap—0 to 7 inches, brown (7.5YR 4/4) sandy loam; weak fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; many fine and medium roots and few coarse roots; 2 percent angular quartz pebbles up to 2 inches in diameter; very strongly acid; clear smooth boundary.

B1t—7 to 11 inches, yellowish red (5YR 4/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots and few coarse roots; thin discontinuous clay films; very strongly acid; clear wavy boundary.

B2t—11 to 38 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine medium and coarse roots; thin continuous clay films; few fine mica flakes; very strongly acid; clear wavy boundary.

B3t—38 to 45 inches, red (2.5YR 4/6) clay loam; weak medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few fine roots; thin continuous clay films; common medium mica flakes; 25 percent strongly weathered granite and mica schist; very strongly acid; gradual wavy boundary.

C—45 to 72 inches, red (2.5YR 4/6) strongly weathered mica schist that crushes to clay loam; massive; slightly hard, friable, nonsticky, nonplastic; few strongly weathered granite fragments; common medium mica flakes; very strongly acid; gradual wavy boundary.

The solum is 40 to 60 inches thick. The depth to hard bedrock is more than 60 inches. Reaction ranges from strongly acid to very strongly acid throughout the solum unless the soil is limed. Angular quartz pebbles up to 2 inches in diameter make up 0 to 15 percent of the A horizon and 0 to 10 percent of the B and C horizons.

The A horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 4. It is sandy loam or fine sandy loam.

The B1t horizon has hue of 5YR or 2.5YR, value of 4, and chroma of 6 through 8. It is sandy clay loam or clay loam.

The B2t horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 through 8. It is clay or clay loam.

The B3t horizon has hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 through 8. High chroma mottles are in some pedons. The horizon is clay loam or sandy clay loam.

The C horizon is commonly highly weathered granite, granite gneiss, mica schist, or coarse-grained sericite schist that commonly crushes to clay loam or loam.

Chewacla series

Soils of the Chewacla series are deep and somewhat poorly drained. They formed in alluvium on low flood plains along streams in the Piedmont providnce. Slopes range from 0 to 2 percent.

Chewacla soils are commonly near Augusta, Bolling, Forestdale, and Toccoa soils. Chewacla soils do not have an argillic horizon, which the Augusta, Bolling, and Forestdale soils have. They are more poorly drained than the Bolling or Toccoa soils and not as poorly drained as the Forestdale soils.

Typical pedon of Chewacla loam, in an area of Chewacla, Toccoa, and Augusta loams, frequently flooded, 400 feet east and 100 feet south of the intersection of Reedy Creek and State road VA-659, on the flood plain of Reedy Creek:

A11—0 to 3 inches, brown (10YR 5/3) silt loam; many fine distinct dark brown (7.5YR 4/4) mottles; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots; few fine mica flakes; strongly acid; clear smooth boundary.

A12—3 to 8 inches, dark brown (7.5YR 4/4) loam; common medium distinct pale brown (10YR 6/3) and very dark gray (10YR 3/1) mottles; moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots; few soft black oxide concretions up to 2 millimeters in diameter; few fine mica flakes; medium acid; clear smooth boundary.

B1—8 to 15 inches, brown (7.5YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) and very dark grayish brown (10YR 3/2) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few fine mica flakes; medium acid; clear smooth boundary.

B21—15 to 27 inches, brown (10YR 4/3) loam; common medium distinct light brownish gray (10YR 6/2) and very dark grayish brown (10YR 3/2) mottles; weak medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; few fine roots; few fine mica flakes; medium acid; clear smooth boundary.

B22—27 to 31 inches, brown (7.5YR 4/4) loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few fine mica flakes; medium acid; abrupt smooth boundary.

B23—31 to 43 inches, brown (10YR 4/3) loam; common medium faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few fine mica flakes; medium acid; clear smooth boundary.

B24—43 to 50 inches, yellowish brown (10YR 5/4) clay loam; common medium faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; hard, friable, sticky, slightly plastic; few fine roots, few fine mica flakes; medium acid; clear smooth boundary.

B3—50 to 70 inches, pale brown (10YR 6/3) clay loam; many medium distinct strong brown (7.5YR 5/6) and dark brown (7.5YR 3/2) mottles; weak medium subangular blocky structure; hard, friable, sticky, slightly plastic; few fine roots; few black oxide concretions up to 3 millimeters in diameter; few fine mica flakes; strongly acid.

The solum is 36 inches to more than 60 inches thick. The depth to hard bedrock is more than 60 inches. Reaction ranges from strongly acid to slightly acid in all horizons. The content of fine mica flakes ranges from few to common in all horizons. Dark concretions are common in some horizons.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 through 4. Mottles are in some pedons. The horizon is loam, silt loam, or fine sandy loam.

The upper part of the B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. The lower part of the B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 through 4. Gray mottles with chroma of 2 or less are in the upper part of the B horizon, and brownish mottles are common throughout the horizon. The horizon is loam, silt loam, or clay loam.

The C horizon is stratified loam, sandy loam, or sand and gravel.

Forestdale series

Soils of the Forestdale series are deep and poorly drained. They formed in alluvium. The soils are on low terraces along streams in the Piedmont province. Slopes range from 0 to 2 percent.

The Forestdale soils in this survey area are a taxadjunct because they have more sand and less silt and are less acid in the lower part of the solum than is defined in the range for the series.

Forestdale soils are commonly near Augusta, Bolling, Chewacla, and Toccoa soils. Forestdale soils are more poorly drained and have more clay in the solum than any of these soils.

Typical pedon of Forestdale loam, 0.2 mile south and 1.65 miles east of the intersection of State roads VA-626 and VA-644, along the Nottoway River:

O2—1 inch to 0, partially decomposed organic material; many fine roots.

Ap—0 to 8 inches, grayish brown (10YR 5/2) loam; common fine faint light brownish gray (10YR 6/2) mottles; weak medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many fine and common medium and coarse roots; very strongly acid; clear smooth boundary.

A2—8 to 11 inches, light brownish gray (10YR 6/2) loam; many medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; common soft very dark gray (10YR 3/1) oxide concretions up to 3 millimeters in diameter; medium acid; clear smooth boundary.

B21tg—11 to 19 inches, gray (10YR 5/1) clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; hard, firm, sticky, plastic; few fine roots; thin continuous clay films; common soft very dark gray (10YR 3/1) concretions up to 3 millimeters in diameter; slightly acid; clear smooth boundary.

B22tg—19 to 36 inches, gray (10YR 5/1) clay; weak coarse subangular blocky structure; very hard, very firm, sticky, plastic; few fine roots; thin continuous clay films; common soft very dark gray (10YR 3/1) concretions up to 3 millimeters in diameter; few fine mica flakes; neutral; gradual smooth boundary.

B3tg—36 to 46 inches, gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few medium roots; thin continuous clay films; common soft very dark gray (10YR 3/1) concretions up to 3 millimeters in diameter; few fine mica flakes; neutral; clear wavy boundary.

C—46 to 62 inches, light gray (10YR 7/1) sand; single grain; soft, very friable, nonsticky, nonplastic; few fine mica flakes; neutral.

The solum is 40 to 60 inches thick. The depth to hard bedrock is more than 5 feet. Reaction ranges from very strongly acid to neutral. Few to common soft dark concretions are in the B horizon.

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

The B horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. Mottles with chroma of more than 2 are commonly in the B horizon. The B horizon is clay loam or clay.

The C horizon has hue of 10YR or 2.5Y, value of 5 through 7, and chroma of 1 or 2. It ranges from sand to clay.

Georgeville series

Soils of the Georgeville series are deep and well drained. They formed in material weathered from sericite schist. They are on ridgetops and side slopes of the Piedmont Upland. Slopes range from 2 to 15 percent.

The Georgeville soils in this survey area are a taxadjunct because the B2t horizon has less silt than is defined in the range for the series.

Georgeville soils are commonly near Goldston, Iredell, Lignum, and Mecklenburg soils. Georgeville soils have a thicker solum and more clay than the Goldston soils. They are better drained than the Iredell or Lignum soils. They have a thicker solum and a redder subsoil than the Mecklenburg soils.

Typical pedon of Georgeville loam, 2 to 7 percent slopes, eroded, 1.65 miles west and 0.3 mile south of the intersection of State roads VA-670 and VA-40, about 50 feet west of a forest fire trail:

O2—1 inch to 0, partially decomposed organic material.

Ap—0 to 5 inches, strong brown (7.5YR 5/6) loam; weak fine granular structure; slightly hard, friable, slightly sticky, nonplastic; many fine and few medium roots; 10 percent angular quartz pebbles up to 3 inches in diameter; strongly acid; abrupt smooth boundary.

B1t—5 to 8 inches, yellowish red (5YR 5/6) clay loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and few medium roots; thin continuous clay films; 5 percent angular quartz pebbles up to 1 inch in diameter; very strongly acid; clear wavy boundary.

B21t—8 to 20 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, sticky, slightly plastic; few fine and coarse roots; thin continuous clay films; 5 percent angular quartz pebbles up to 1 inch in diameter; 1 percent soft sericite schist fragments up to 2 inches in length; very strongly acid; gradual wavy boundary.

B22t—20 to 40 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, sticky, slightly plastic; few fine roots; thin continuous clay films; 15 percent soft sericite schist fragments up to 2 inches in length; few fine mica flakes; very strongly acid; gradual wavy boundary.

B3t—40 to 60 inches, red (2.5YR 4/6) silty clay loam; common medium distinct yellowish red (5YR 5/8) and strong brown (7.5YR 5/6) mottles; moderate medium angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few coarse roots; thin discontinuous clay films; 15 percent hard sericite schist fragments up to 3 inches in length; very strongly acid; gradual wavy boundary.

C—60 to 70 inches, strongly weathered red (2.5YR 4/6) sericite schist that crushes to clay loam; few fine faint red (10R 4/6) and strong brown (7.5YR 5/8) mottles; massive; slightly hard, friable, slightly sticky, slightly plastic; few thin clay flows; very strongly acid.

The solum is 50 to 70 inches thick. The depth to hard bedrock is more than 5 feet. Reaction ranges from strongly acid to very strongly acid throughout unless the soil is limed. Angular quartz pebbles up to 3 inches in diameter and sericite schist fragments make up 0 to 15 percent of the solum.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 through 8. It is loam or silt loam.

The B1 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 through 8. The B2 and B3 horizons have hue of 2.5YR, value of 4 or 5, and chroma of 6 through 8. The B horizon is clay or silty clay loam.

The C horizon is strongly weathered sericite schist that crushes to loam, silt loam, or clay loam.

Goldston series

Soils in the Goldston series are moderately deep and excessively drained. They formed in material weathered from sericite schist. They are on side slopes of the Piedmont Upland. Slopes range from 15 to 45 percent.

Goldston soils in this survey area are a taxadjunct because the fragments throughout the solum consist of schist rather than slate.

Goldston soils are commonly near Georgeville, Herndon, Nason, Poindexter, and Tatum soils. Goldston soils have a thinner solum, less clay, and more coarse fragments throughout the solum than the Georgeville, Herndon, Nason, or Tatum soils. They do not have an argillic horizon, which the Poindexter soils have, and have more coarse fragments throughout than the Poindexter soils.

Typical pedon of Goldston channery loam, 15 to 45 percent slopes, 0.15 mile north and 0.5 mile east of the intersection of State roads VA-694 and VA-631, about 200 yards south of VA-631:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material; many fine roots.

A1—0 to 6 inches, brown (10YR 5/3) channery loam; weak fine granular structure; soft, very friable, slightly sticky, nonplastic; common fine and medium roots; 20 percent angular quartz pebbles up to 3 inches in diameter, hard sericite schist fragments up to 5 inches in length; few fine mica flakes; strongly acid; clear wavy boundary.

B—6 to 15 inches, strong brown (7.5YR 5/6) channery loam; weak medium subangular blocky structure; soft, friable, slightly sticky, nonplastic; common fine and medium roots; 45 percent hard sericite schist fragments up to 5 inches in length; few fine mica flakes; intermittent pockets of strong brown (7.5YR 5/6) silty clay loam; 50 percent thin patchy clay films; strongly acid; clear wavy boundary.

Cr—15 to 38 inches, brown (10YR 4/3), very pale brown (10YR 7/3), and light gray (10YR 7/2) strongly weathered sericite schist that crushes to very channery loam; massive; hard, firm; 75 percent hard sericite schist fragments; faces of schist fragments coated with thin yellowish red (5YR 5/6) clay flows; common fine mica flakes; strongly acid; clear wavy boundary.

R—38 inches, sericite schist.

The solum is less than 20 inches thick. The depth to bedrock is 20 to 40 inches. Reaction ranges from strongly acid to very strongly acid. Angular quartz pebbles up to 3 inches in diameter and sericite schist fragments up to 5 inches in length make up 15 to 40 percent of the A horizon, 35 to 75 percent of the B horizon, and 50 to 90 percent of the Cr horizon.

The A horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or 3. It is channery loam or channery silt loam.

The B horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 through 6. It is channery loam or channery silt loam.

The Cr horizon is weathered sericite schist.

Helena series

Soils of the Helena series are deep and moderately well drained. They formed in material weathered from granite and granite gneiss. They are on the Piedmont Upland on ridgetops, around the heads of drainageways, and on side slopes. Slopes range from 1 to 10 percent.

Helena soils are commonly near Appling, Cecil, and Worsham soils. Helena soils are not as well drained as Appling or Cecil soils and are not as poorly drained as Worsham soils.

Typical pedon of Helena sandy loam, 1 to 6 percent slopes, 0.25 mile west and 0.35 mile north of the intersection of State roads VA-600 and VA-601, about 0.1 mile north of VA-600:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

A1—0 to 7 inches, yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many fine and medium roots and few coarse roots; 5 percent angular quartz pebbles up to 2 inches in diameter; very strongly acid; abrupt smooth boundary.

B1t—7 to 12 inches, brownish yellow (10YR 6/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots and few coarse roots; thin discontinuous clay films; very strongly acid; abrupt smooth boundary.

B21t—12 to 22 inches, brownish yellow (10YR 6/6) clay loam; few fine distinct red (2.5YR 5/8) mottles; moderate medium subangular blocky structure; hard, firm, sticky, plastic; common fine and medium roots; thin continuous clay films; 2 percent angular quartz pebbles up to 1 inch in diameter; very strongly acid; clear wavy boundary.

B22t—22 to 30 inches, brownish yellow (10YR 6/6) clay; common medium distinct red (2.5YR 5/8) and light gray (2.5Y 7/2, N 7/0) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky, plastic; common fine and few medium roots; thin continuous clay films; few soft white feldspar fragments; very strongly acid; clear wavy boundary.

B23tg—30 to 36 inches, light brownish gray (2.5Y 6/2) clay; common medium prominent red (2.5YR 5/8) mottles and few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak medium and coarse subangular blocky; very hard, very firm, very sticky, very plastic; few fine and medium roots; thin continuous clay films; few fine mica flakes; soft white feldspar fragments; 10 percent angular quartz pebbles up to 1 inch in diameter; very strongly acid; clear wavy boundary.

B3tg—36 to 44 inches, light brownish gray (2.5Y 6/2) clay loam; few fine distinct white (N 8/0), yellowish brown (10YR 5/8), and olive yellow (5Y 6/6) mottles; weak coarse subangular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; thin continuous clay films; few fine mica flakes; 25 percent weathered granite and feldspar fragments; very strongly acid; clear wavy boundary.

C—44 to 56 inches, yellowish brown (10YR 5/8), white (10YR 8/1), light gray (2.5Y 7/2), and olive yellow (5Y 6/6) weathered granite that crushes to sandy clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; few fine mica flakes; common soft feldspar crystals; very strongly acid; abrupt wavy boundary.

R—56 inches, hard granite.

The solum is 36 to 50 inches thick. The depth to bedrock is more than 48 inches. Reaction ranges from very strongly acid to strongly acid unless the soil is limed. Angular quartz pebbles up to 2 inches in diameter make up 0 to 15 percent of the solum.

The A horizon has hue of 10YR, value of 4 through 6, and chroma of 2 through 4. It is sandy loam or fine sandy loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 5 or 6, and chroma of 2 through 8. A chroma of 2 is commonly in the lower part of the B horizon. Low chroma mottles are in the upper 24 inches of the B horizon, and the B horizon commonly has high chroma mottles. The B horizon is clay, clay loam, or sandy clay loam.

The C horizon is weathered granite or granite gneiss that crushes to sandy loam, sandy clay loam, or clay loam.

Herndon series

Soils of the Herndon series are deep and well drained. They formed in material weathered from sericite schist. They are on ridgetops and side slopes of the Piedmont Upland. Slopes are 2 to 15 percent.

Herndon soils are commonly near Georgeville, Goldston, Iredell, Lignum, Mecklenburg, Nason, and Tatum soils. Herndon soils are not as red in the subsoil as the Georgeville or Tatum soils. They have a thicker solum than the Goldston, Mecklenburg, or Nason soils and contain more clay than the Goldston soils. They are better drained than the Iredell or Lignum soils.

Typical pedon of Herndon loam, 2 to 7 percent slopes, eroded, 0.1 mile east of the intersection of State roads VA-687 and VA-628:

O1—2 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic matter.

Ap—0 to 5 inches, brown (7.5YR 5/4) loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; 5 percent quartz pebbles up to 2 inches in diameter; strongly acid; abrupt smooth boundary.

B1t—5 to 7 inches, yellowish red (5YR 5/6) silty clay loam; weak fine subangular blocky structure; slightly hard, friable, sticky, slightly plastic; few fine and medium roots; thin continuous clay films; very strongly acid; clear smooth boundary.

B21t—7 to 16 inches, yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; slightly hard, firm, sticky, slightly plastic; few fine and medium roots; thick continuous clay films; few fragments of soft brownish yellow (10YR 6/6) sericite schist; very strongly acid; clear wavy boundary.

B22t—16 to 33 inches, yellowish red (5YR 5/6) clay; common fine distinct brownish yellow (10YR 6/6) and pale yellow (2.5Y 7/4) mottles; moderate medium angular blocky structure; slightly hard, firm, sticky, slightly plastic; few fine and medium roots; thin continuous clay films; very strongly acid; clear wavy boundary.

B3t—33 to 45 inches, yellowish red (5YR 5/6) silty clay loam; common fine prominent pale yellow (2.5Y 7/4), white (2.5Y 8/2), and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; thin continuous clay films; very strongly acid; gradual wavy boundary.

C—45 to 80 inches, yellowish red (5YR 4/6), brownish yellow (10YR 6/8), white (10YR 8/1), and light gray (N 7/0) weathered sericite schist that crushes to silt loam; massive; slightly hard, friable, slightly sticky, nonplastic; very strongly acid.

The solum is 40 to 60 inches thick. The depth to hard bedrock is more than 5 feet. Reaction ranges from extremely acid to strongly acid unless the soil is limed. Angular quartz pebbles up to 2 inches in diameter make up 0 to 10 percent of the A horizon.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

The B horizon has hue of 5YR through 10YR, value of 5 or 6, and chroma of 6 through 8. In many areas the B horizon has mottles with hue of 7.5YR through 2.5Y, value of 5 through 8, and chroma of 2 through 8. Mottles with chroma of 2 are from the parent material. The B horizon is silty clay loam, silty clay, or clay.

The C horizon is weathered sericite schist that crushes to silt loam or loam.

Iredell series

Soils of the Iredell series are deep and moderately well drained or somewhat poorly drained. They formed in material weathered from greenstone, hornblende gneiss, or diabase. Iredell soils are on ridgetops and side slopes of the Piedmont Upland. Slopes range from 1 to 12 percent.

Iredell soils are commonly near Georgeville, Herdnon, Lignum, Mecklenburg, Orange, and Poindexter soils. Iredell soils are not as well drained as Georgeville, Herndon, Mecklenburg, or Poindexter soils. They are not as acid as the Lignum soils and have a higher base saturation. They do not have the gray mottles in the upper 10 inches of the subsoil that are typical of the Orange soils.

Typical pedon of Iredell loam, 1 to 6 percent slopes, 0.4 mile southeast of the intersection of State roads VA-628 and VA-685:

O1—2 inches to 1 inch, loose pine needles.

O2—1 inch to 0, partially decomposed organic matter.

Ap1—0 to 6 inches, dark grayish brown (2.5Y 4/2) loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and few medium roots; 3 percent angular quartz pebbles up to 1 inch in diameter; few soft dark oxide concretions about 3 millimeters in diameter; medium acid; clear smooth boundary.

Ap2—6 to 9 inches, olive (5Y 5/3) loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and few medium roots; few soft dark oxide concretions about 3 millimeters in diameter; slightly acid; abrupt smooth boundary.

B21t—9 to 14 inches, yellowish brown (10YR 5/4) clay; weak medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots; thin continuous clay films; ped surfaces coated with olive (5Y 5/3) material in upper half of horizon; common slickensides; neutral; gradual wavy boundary.

B22t—14 to 26 inches, yellowish brown (10YR 5/4) clay; weak coarse subangular blocky structure; very hard, very firm, very sticky, very plastic; few fine and medium roots; thin continuous clay films; common slickensides; neutral; clear wavy boundary.

B23t—26 to 29 inches, yellowish brown (10YR 5/4) clay; weak medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots; thin discontinuous clay films; few slickensides; neutral; clear smooth boundary.

C—29 to 80 inches, light yellowish brown (10YR 6/4), reddish brown (5YR 4/4), pale olive (5Y 6/3), and black (10YR 2/1) strongly weathered greenstone that crushes to loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; neutral.

The solum is 20 to 40 inches thick. The depth to bedrock is more than 5 feet. Reaction ranges from medium acid to slightly acid in the A horizon, slightly acid to neutral in the Bt horizon, and neutral to mildly alkaline in the C horizon. Few to common, dark concretions are throughout the solum of some pedons. Angular quartz and basic rock pebbles up to 3 inches in diameter make up 0 to 10 percent of the A and C horizons.

The A horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 2 through 4. It is loam, silt loam, or fine sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 through 6.

A B3t horizon is in some pedons. It has colors similar to the B2t horizon. It is loam or clay loam.

The C horizon is weathered greenstone, hornblende gneiss, or diabase that crushes to sandy loam or clay loam.

Lignum series

Soils of the Lignum series are deep and moderately well drained or somewhat poorly drained. They formed in material weathered from sericite schist. The soils are on ridgetops and side slopes of the Piedmont Upland. Slopes range from 1 to 10 percent.

Lignum soils are commonly near Georgeville, Herndon, Iredell, Orange, and Worsham soils. Lignum soils are not as well drained as Georgeville or Herndon soils. They are more acid and have a lower base saturation than the Iredell or Orange soils, and they are not as poorly drained as the Pouncey or Worsham soils.

Typical pedon of Lignum loam, 1 to 6 percent slopes, 0.2 mile south and 0.1 mile west of the intersection of State roads VA-631 and VA-632, about 100 feet east of VA-631:

A1—0 to 2 inches, dark grayish brown (10YR 4/2) loam; weak fine granular structure; soft, very friable, slightly sticky, nonplastic; many fine roots and few medium and coarse roots; 5 percent quartz pebbles up to 3 inches in diameter; very strongly acid; abrupt smooth boundary.

A2—2 to 9 inches, very pale brown (10YR 7/3) loam; few fine faint strong brown (7.5YR 5/8) mottles; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots and few medium and coarse roots; 5 percent quartz pebbles up to 3 inches in diameter; very strongly acid; clear smooth boundary.

B1t—9 to 12 inches, yellowish brown (10YR 5/6) loam; few fine distinct yellowish red (5YR 5/8) mottles; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots and few medium and coarse roots; few thin clay films; 10 percent quartz pebbles up to 3 inches in diameter; very pale brown (10YR 7/3) material coats some ped surfaces and root channels; very strongly acid; clear wavy boundary.

B21t—12 to 25 inches, yellowish brown (10YR 5/6) clay; common medium distinct gray (10YR 6/1) and red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; very hard, very firm, sticky, very plastic; common fine roots and few medium roots; thin continuous clay films; 5 percent quartz pebbles up to 3 inches in diameter; very strongly acid; clear wavy boundary.

B22t—25 to 31 inches, yellowish brown (10YR 5/6) silty clay; many medium distinct light brownish gray (2.5Y 6/2) mottles and common fine distinct yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots; thin continuous clay films; 5 percent quartz pebbles up to 3 inches in diameter; very strongly acid; clear wavy boundary.

B3t—31 to 37 inches, light brownish gray (10YR 6/2) silty clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few fine roots; thin continuous clay films; 10 percent hard sericite schist fragments up to 3 inches in length; very strongly acid; clear wavy boundary.

C—37 to 62 inches, light gray (10YR 7/1) and brownish yellow (10YR 6/6) weathered sericite schist that crushes to silt loam; massive; hard, firm, slightly sticky, slightly plastic; few fine roots; 25 percent hard sericite schist fragments; rock faces coated with thin gray clay flows; very strongly acid; clear wavy boundary.

R—62 inches, gray and yellowish brown sericite schist.

The solum is 20 to 40 inches thick. The depth to bedrock is more than 40 inches. Reaction ranges from very strongly acid to strongly acid unless the soil is limed. Angular quartz pebbles up to 3 inches in diameter and sericite schist fragments up to 3 inches in length make up 5 to 15 percent of the A and B horizons. Schist fragments make up 10 to 30 percent of the C horizon.

The A horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 through 4. It is loam.

The B1 and B2 horizons have hue of 7.5YR through 2.5Y, value of 5 through 7, and chroma of 4 through 8. The B3 horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 1 through 8. The B horizon is clay, silty clay, silty clay loam, loam, or silt loam.

The C horizon is weathered sericite schist that crushes to silt loam or silty clay loam.

Madison series

Soils of the Madison series are deep and well drained. They formed in material weathered from micaceous metamorphic rock. The soils are on ridgetops and side slopes of the Piedmont Upland. Slopes are 2 to 30 percent.

Madison soils are commonly near Ashlar, Appling, Cecil, Helena, Pacolet, and Wedowee soils. Madison soils have a thicker solum and more clay than the Ashlar soils, a thinner solum than the Appling or Cecil soils, and a redder subsoil than the Appling or Wedowee soils. They are better drained than the Helena soils and have more mica in the lower part of the solum than the Pacolet or Wedowee soils.

Typical pedon of Madison sandy loam, 2 to 7 percent slopes, eroded, 0.35 mile west and 0.3 mile south of the intersection of State routes VA-600 and VA-601:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

Ap—0 to 4 inches, brown (10YR 4/3) sandy loam; weak fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; many fine and medium and few coarse roots; 5 percent quartz pebbles up to 2 inches in diameter; strongly acid; clear smooth boundary.

B1t—4 to 6 inches, yellowish red (5YR 5/8) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, sticky, slightly plastic; many fine and medium and few coarse roots; few thin clay films; few fine mica flakes; very strongly acid; clear wavy boundary.

B2t—6 to 21 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, sticky, slightly plastic; common fine and medium and few coarse roots; thick continuous clay films; common medium mica flakes increasing in quantity with depth and imparting a greasy feel; very strongly acid; clear wavy boundary.

B3t—21 to 32 inches, red (2.5YR 4/6) clay loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; thin discontinuous clay films; many medium mica flakes imparting a greasy feel; 35 percent strongly weathered mica gneiss; very strongly acid; clear wavy boundary.

C—32 to 80 inches, red (2.5YR 4/6), yellowish red (5YR 5/8), and reddish yellow (7.5YR 6/8) weathered mica gneiss and granite that crushes to clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; red (2.5YR 4/6) clay flows in seams and cracks in upper 15 inches; many medium mica flakes; very strongly acid.

The solum is 20 to 40 inches thick. The depth to hard bedrock is more than 5 feet. Reaction ranges from very strongly acid to strongly acid unless the soil is limed. Fine and medium mica flakes increase with depth and give a greasy feel to the lower part of the solum and to the substratum. Angular quartz pebbles up to 3 inches in diameter make up 0 to 15 percent of the A horizon and 0 to 5 percent of the B and C horizons.

The A horizon has hue of 5YR through 10YR, value of 4 or 5 and chroma of 3 through 6. It is sandy loam or fine sandy loam.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 through 8. It is clay, clay loam, or sandy clay loam.

The C horizon is strongly weathered mica schist or mica gneiss and granite that crushes to loam, clay loam, or sandy clay loam.

Masada series

Soils of the Masada series are deep and well drained. They formed in alluvium. They are on terraces along streams in the Piedmont province. Slopes are 2 to 7 percent.

Masada soils are commonly near Bolling, Chewacla, Forestdale, and Toccoa soils. Masada soils are better drained than the Bolling, Chewacla, or Forestdale soils and have more clay than the Chewacla or Toccoa soils. Masada soils have an argillic horizon, which the Toccoa soils do not have.

Typical pedon of Masada fine sandy loam, 2 to 7 percent slopes, 0.15 mile east and 0.2 mile north of the intersection of State road VA-659 and Reedy Creek, about 100 yards east of VA-659:

Ap1—0 to 2 inches, brown (10YR 4/3) fine sandy loam; weak fine granular structure; soft, friable, slightly sticky, nonplastic; many fine roots and common medium roots; 1 percent quartz pebbles up to 1/2 inch in diameter; slightly acid; abrupt smooth boundary.

Ap2—2 to 11 inches, yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots; 1 percent quartz pebbles up to 1/2 inch in diameter; slightly acid; abrupt smooth boundary.

B1t—11 to 14 inches, strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; slightly hard, firm, sticky, slightly plastic; few fine roots; thin continuous clay films; 1 percent quartz pebbles up to 1/2 inch in diameter; slightly acid; clear smooth boundary.

B21t—14 to 23 inches, strong brown (7.5YR 5/6) clay; few fine distinct red (2.5YR 4/6) mottles; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots; thin continuous clay films; 1 percent quartz pebbles up to 1/2 inch in diameter; strongly acid; clear smooth boundary.

B22t—23 to 36 inches, strong brown (7.5YR 5/6) clay; many fine distinct red (2.5YR 4/6) mottles and few fine distinct very pale brown (10YR 7/3) mottles; moderate medium angular blocky structure; hard, firm, sticky, plastic; few fine roots; thin discontinuous clay films; 1 percent quartz pebbles up to 1/2 inch in diameter; strongly acid; abrupt smooth boundary.

B3t—36 to 42 inches, red (2.5YR 4/6) sandy clay loam; common coarse distinct brownish yellow (10YR 6/8) mottles and common fine distinct brown (7.5YR 5/4) mottles; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; thin discontinuous clay films; 1 percent quartz pebbles up to 1/2 inch in diameter; few fine mica flakes; strongly acid; clear wavy boundary.

C1—42 to 54 inches, red (2.5YR 4/6) sandy loam; common coarse distinct yellowish brown (10YR 5/8) mottles; massive; slightly hard, friable, slightly sticky, slightly plastic; 1 percent quartz pebbles up to 1/2 inch in diameter; few fine mica flakes; strongly acid; clear smooth boundary.

C2—54 to 70 inches, mottled red (2.5YR 4/6), yellowish brown (10YR 5/8), and pale brown (10YR 6/3) sandy loam; massive; slightly hard, friable, slightly sticky, nonplastic; few fine mica flakes; strongly acid.

The solum is 40 to 60 inches thick. The depth to bedrock is more than 60 inches. Reaction ranges from strongly acid to very strongly acid unless the soil is limed. Rounded quartz pebbles up to 2 inches in diameter make up 0 to 10 percent of the solum and substratum.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 through 6. It is fine sandy loam or loam.

The B horizon has hue of 2.5YR through 10YR, value of 4 through 6, and chroma of 6 through 8. It is clay, sandy clay loam, or clay loam.

The C horizon has hue of 2.5YR through 10YR, value of 4 through 6, and chroma of 3 through 8. It is sandy loam, sandy clay loam, or clay loam.

Mecklenburg series

Soils of the Mecklenburg series are deep and well drained. They formed in material weathered from greenstone, hornblende gneiss, or diabase. They are on ridgetops and side slopes of the Piedmont Upland. Slopes are 2 to 20 percent.

Mecklenburg soils are commonly near Georgeville, Herndon, Iredell, Nason, Poindexter, and Tatum soils. Mecklenburg soils have a redder subsoil than the Iredell or Poindexter soils and have more clay than the Poindexter soils. Mecklenburg soils have a higher base saturation than the Nason, Georgeville, Herndon, or Tatum soils.

Typical pedon of Mecklenburg loam, 2 to 7 percent slopes, eroded, 0.2 mile north and 0.25 mile west of the intersection of State roads VA-626 and VA-683, in a road cut on the west side of VA-683:

Ap—0 to 5 inches, reddish brown (5YR 4/4) loam; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many fine roots and few medium roots; few fine round soft black oxide concretions; 2 percent angular quartz pebbles up to 3 inches in diameter; medium acid; abrupt smooth boundary.

B21t—5 to 15 inches, reddish brown (2.5YR 4/4) clay; moderate fine and medium subangular blocky structure; hard, firm, sticky, plastic; common fine roots and few medium roots; thick continuous clay films; few fine round soft black oxide concretions; medium acid; gradual wavy boundary.

B22t—15 to 27 inches, reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; thick continuous clay films; few fine round soft black oxide concretions; few black streaks; 2 percent weathered greenstone fragments up to 2 inches in diameter; medium acid; gradual wavy boundary.

B3t—27 to 33 inches, yellowish red (5YR 4/6) clay loam; weak medium subangular blocky structure; slightly hard, firm, sticky, slightly plastic; few fine and medium roots; thin discontinuous clay films; common black streaks; medium acid; gradual wavy boundary.

C1—33 to 47 inches, yellowish red (5YR 5/6) weathered greenstone, that crushes to silt loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; medium acid; gradual wavy boundary.

C2—47 to 70 inches, yellowish red (5YR 5/6), strong brown (7.5YR 5/6), and black (N 2/0) weathered greenstone that crushes to silt loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine mica flakes; medium acid.

The solum is 20 to 40 inches thick. The depth to hard bedrock is more than 48 inches. Reaction ranges from medium acid to neutral acid throughout the solum unless the soil is limed. Oxide concretions are few to common throughout the solum. Angular quartz or hard pebbles up to 3 inches in diameter make up 0 to 15 percent of the A horizon.

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

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 through 6. It is clay, silty clay, or clay loam.

The C horizon is weathered basic rock that crushes to loam or silt loam.

Nason series

Soils of the Nason series are deep and well drained. They formed in material weathered from sericite schist. They are on side slopes of the Piedmont Upland. Slopes range from 15 to 25 percent.

Nason soils are commonly near Georgeville, Goldston, Herndon, and Tatum soils. Nason soils are not as red in the subsoil as the Georgeville or Tatum soils, and they have more clay than the Goldston soils. Nason soils have a thinner solum than Herndon soils.

Typical pedon of Nason loam, 15 to 25 percent slopes, eroded, 2.1 miles west and 0.45 mile south of the intersection of State roads VA-670 and VA-40, about 0.3 mile west of a fire trail:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

Ap—0 to 5 inches, yellowish brown (10YR 5/4) loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and common coarse roots; 10 percent angular quartz pebbles up to 3 inches in diameter and hard sericite schist fragments up to 3 inches in length; very strongly acid; clear wavy boundary.

B1t—5 to 9 inches, reddish yellow (5YR 6/6) loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and few medium roots; thin discontinuous clay films; 5 percent hard sericite schist fragments up to 3 inches in length; very strongly acid; clear wavy boundary.

B2t—9 to 21 inches, yellowish red (5YR 5/8) clay loam; moderate medium subangular blocky structure; hard, firm, sticky, slightly plastic; common fine roots and few medium roots; thick continuous clay films; few fine mica flakes; 10 percent hard schist fragments up to 1 inch in length; very strongly acid; clear wavy boundary.

B3t—21 to 27 inches, yellowish red (5YR 5/8) clay loam; common medium distinct red (2.5YR 5/8) and reddish yellow (7.5YR 7/8) mottles from soft weathered sericite schist fragments; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine roots; thin discontinuous clay films; 15 percent hard sericite schist fragments up to 3 inches in length; very strongly acid; clear smooth boundary.

C—27 to 42 inches, strong brown (7.5YR 5/8), reddish yellow (7.5YR 7/6), yellowish red (5YR 5/6), and yellow (10YR 7/6) weathered sericite schist that crushes to channery silt loam; massive; hard, firm, nonsticky, nonplastic; few fine roots; red (2.5YR 5/8) clay flows coat rock faces; 20 percent hard sericite schist fragments; very strongly acid; abrupt smooth boundary.

R—42 inches, sericite schist bedrock.

The solum is 25 to 40 inches thick. The depth to hard bedrock is 40 to 60 inches or more. Reaction is strongly acid to very strongly acid unless the soil is limed. Angular quartz pebbles up 3 inches in diameter and schist fragments up to 3 inches in length make up from 0 to 15 percent of the solum and 15 to 30 percent of the C horizon.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam.

The B horizon has hue 5YR through 10YR, value of 4 through 6, and chroma of 6 through 8. It is clay loam, clay, or loam.

The C horizon is weathered sericite schist that crushes to silt loam or channery silt loam.

Orange series

Soils of the Orange series are deep and somewhat poorly drained or moderately well drained. They formed in material weathered from basic rocks such as greenstone schist or hornblende schist interbedded with sericite schist. The soils are on ridgetops of the Piedmont Upland. Slopes are 1 to 7 percent.

Orange soils are commonly near Georgeville, Herndon, Iredell, Lignum, Mecklenburg, and Poindexter soils. Orange soils are not as well drained as the Georgeville, Herndon, Mecklenburg, or Poindexter soils and are not as acid as the Lignum soils. The gray mottles in the Orange soils are at a depth of 10 to 20 inches in the subsoil, and the gray mottles in the Iredell soils are at a depth of more than 20 inches.

Typical pedon of Orange loam, 1 to 7 percent slopes, 0.1 mile south and 0.05 mile east of the intersection of State roads VA-623 and VA-719, about 50 feet southwest of VA-623:

O1—1 inch to 0, loose leaves, pine needles, and twigs.

Ap—0 to 5 inches, grayish brown (10YR 5/2) loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and few medium and coarse roots; 2 percent angular quartz pebbles up to 2 inches in diameter; strongly acid; abrupt smooth boundary.

A2—5 to 10 inches, light brownish gray (2.5Y 6/2) loam; common medium distinct strong brown (7.5YR 5/8) mottles; weak, medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and few medium roots; 2 percent angular quartz pebbles up to 2 inches in diameter; strongly acid; clear smooth boundary.
B21t—10 to 17 inches, light olive brown (2.5Y 5/4) clay; common fine faint light brownish gray (10YR 6/2) mottles and few fine faint strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots; thin continuous clay films; 5 percent angular quartz pebbles up to 3 inches in diameter; medium acid; clear wavy boundary.
B22t—17 to 26 inches, light olive brown (2.5Y 5/4) clay; weak coarse subangular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots; thin discontinuous clay films; 2 percent fine white soft feldspar fragments; neutral; clear wavy boundary.
B23t—26 to 37 inches, yellowish brown (10YR 5/4) clay; many medium faint grayish brown (10YR 5/2) and common fine distinct strong brown (7.5YR 5/8) mottles; weak coarse subangular blocky structure; very hard, very firm, very sticky, very plastic; thin discontinuous clay films; 2 percent fine white soft feldspar fragments; neutral; clear wavy boundary.
C—37 to 43 inches, white (5Y 8/1), yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and black (N 2/0) weathered greenstone schist that crushes to very channery loam; massive; hard, firm, slightly sticky, slightly plastic; few thin light olive gray (5Y 6/2) clay lenses in seams; 60 percent hard greenstone schist fragments up to 6 inches in length; moderately akaline; abrupt wavy boundary.
R—43 inches, hard greenstone schist.

The solum is 20 to 40 inches thick. The depth to hard bedrock is 40 to 60 inches. Reaction ranges from strongly acid to slightly acid in the upper part of the solum and from medium acid to moderately alkaline in the lower part of the solum and in the substratum. Angular quartz pebbles up to 3 inches in diameter and fine feldspar fragments make up 2 to 10 percent of the solum. The C horizon is 0 to 60 percent hard schist fragments.

The A horizon has hue of 10YR through 5Y, value of 4 through 7, and chroma of 4 or less.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 8. Low chroma mottles are in the upper 10 inches of the B horizon. The B horizon is mainly clay but ranges to silty clay loam.

The C horizon is weathered greenstone schist that crushes to loam or silt loam or their channery or very channery analogues.

Pacolet series

Soils of the Pacolet series are deep and well drained. They formed in material weathered from granite, granite gneiss, mica schist, and coarse-grained sericite schist. The soils are on side slopes of the Piedmont Upland. Slopes are 15 to 30 percent.

Pacolet soils are commonly near Appling, Ashlar, Cecil, Madison, and Wedowee soils. Pacolet soils have a thinner solum than the Appling or Cecil soils and a redder subsoil than the Appling or Wedowee soils. Pacolet soils have more clay than the Ashlar soils and have mica than the Madison soils.

Typical pedon of Pacolet sandy loam, 15 to 30 percent slopes, eroded, 0.1 mile north of the intersection of State roads VA-600 and VA-627, about 50 yards north of VA-600:

O1—3 inches to 1 inch, loose leaves and twigs.
O2—1 inch to 0, partially decomposed organic material.
Ap—0 to 5 inches, dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; soft, very friable, slightly sticky, nonplastic; many fine roots and few medium and coarse roots; 5 percent angular quartz pebbles up to 3 inches in diameter; very strongly acid; clear wavy boundary.
B1t—5 to 8 inches, yellowish red (5YR 5/6) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, sticky, slightly plastic; few fine medium and coarse roots; thin discontinuous clay films; few fine mica flakes; very strongly acid; clear wavy boundary.
B21t—8 to 21 inches, red (2.5YR 4/8) clay; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine medium and coarse roots; thin continuous clay films; peds and root channels coated with dark yellowish brown (10YR 4/4) material in upper half of horizon; few medium mica flakes; few scattered fragments of weathered granite; very strongly acid; clear wavy boundary.
B22t—21 to 28 inches, red (2.5YR 4/8) clay loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; thin continuous clay films; 30 percent weathered granite and feldspar fragments; few medium mica flakes; very strongly acid; clear wavy boundary.
B3t—28 to 38 inches, mottled red (2.5YR 4/8), yellowish red (5YR 5/8), and white (10YR 8/2) sandy clay loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; thin discontinuous red (2.5YR 4/8) clay films; white mottles from weathered granite and feldspar; common medium mica flakes; common soft feldspar crystals; 45 percent weathered granite and mica schist; very strongly acid; gradual wavy boundary.
C—38 to 72 inches, red (2.5YR 4/8), yellowish red (5YR 5/8), reddish yellow (7.5YR 6/6), white (10YR 8/2),

and dark grayish brown (10YR 4/2) weathered granite and mica schist that crushes to sandy loam; massive; soft, friable, slightly sticky, nonplastic; common medium mica flakes; common soft feldspar crystals; very strongly acid.

The solum is 20 to 40 inches thick. The depth to hard bedrock is more than 60 inches. Reaction ranges from very strongly acid to strongly acid throughout the solum. Angular quartz pebbles make up 0 to 15 percent of the A horizon.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 through 5. It is sandy loam or fine sandy loam.

The B1t horizon has hue of 5YR, value of 4 or 5, and chroma of 6 through 8. It is clay loam or sandy clay loam.

The B2t horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 through 8. It is clay or clay loam.

The B3t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 through 8. It typically has high chroma mottles. It is clay loam or sandy clay loam.

The C horizon is weathered granite, granite gneiss, mica schist, or coarse-grained sericite schist that crushes to sandy loam or loam.

Poindexter series

Soils in the Poindexter series are deep and well drained. They formed in material weathered from basic rocks such as greenstone or hornblende gneiss. The soils are on side slopes of the Piedmont Upland. Slopes are 15 to 45 percent.

Poindexter soils in this survey area are a taxadjunct because they have more silt, have more very fine sand, and are more acid in the solum than is defined in the range for the series. In this survey area they are classified as fine-silty, mixed, thermic Typic Hapludalfs.

Poindexter soils are commonly near Georgeville, Goldston, Herndon, Iredell, Mecklenburg, Nason, Orange, and Tatum soils. Poindexter soils are not as red in the subsoil as and have less clay in the subsoil than the Georgeville, Mecklenburg, or Tatum soils; have a higher base saturation and fewer rock fragments in the subsoil than the Goldston soils; and have a higher base saturation and less clay in the subsoil than the Herndon or Nason soils. Poindexter soils have less clay and are better drained than the Iredell or Orange soils.

Typical pedon of Poindexter silt loam, 15 to 25 percent slopes, 0.1 mile north and 0.25 mile east of the intersection of State roads VA-669 and VA-722:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

A1—0 to 6 inches, dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; slightly hard, very friable, sticky, slightly plastic; many fine roots and few medium and coarse roots; 10 percent angular greenstone and quartz pebbles up to 2 inches in diameter; few round crushable black oxide concretions up to 2 millimeters in diameter; very strongly acid; clear wavy boundary.

B1—6 to 9 inches, strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; common fine roots and few medium and coarse roots; thick continuous coatings of yellowish brown (10YR 5/4) material on ped faces; 5 percent greenstone pebbles up to 2 inches in diameter; few round crushable black oxide concretions up to 2 millimeters in diameter; very strongly acid; clear wavy boundary.

B2t—9 to 17 inches, strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; common fine roots; thick continuous clay films; 5 percent fragments of crushable greenstone up to 2 inches in diameter; few round crushable black concretions up to 2 millimeters in diameter; very strongly acid; clear wavy boundary.

B3t—17 to 21 inches, strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; few fine roots; thick continuous clay films; 30 percent fragments of crushable weathered greenstone up to 3 inches in diameter; very strongly acid; clear wavy boundary.

C—21 to 47 inches, olive brown (2.5Y 4/4) highly weathered greenstone that crushes to silt loam; massive; hard, firm, sticky, slightly plastic; few fine roots; thick strong brown (7.5YR 5/6) clay flows in seams and cracks; medium acid; clear wavy boundary.

R—47 inches, hard greenstone.

The solum is 18 to 36 inches thick. The depth to hard bedrock ranges from 40 to 60 inches. Reaction ranges from very strongly acid to neutral in all horizons. Angular quartz and basic rock fragments make up 0 to 10 percent of the solum.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. It is silt loam or loam.

The B1 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It is silt loam or loam.

The B2t horizon has hue of 7.5YR of 10YR, value of 4 or 5, and chroma of 4 through 6. It is silt loam, loam, or clay loam.

The B3t horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It is silt loam or loam.

The C horizon is weathered basic rock, such as greenstone or hornblende gneiss, that crushes to loam or silt loam.

Tatum series

Soils in the Tatum series are deep and well drained. They formed in material weathered from sericite schist.

The Tatum soils are on side slopes of the Piedmont Upland. Slopes range from 15 to 30 percent.

Tatum soils commonly are near Georgeville, Goldston, Herndon, Mecklenburg, and Nason soils. Tatum soils have mixed mineralogy rather than the kaolinitic mineralogy of the Georgeville soils. They have more clay than the Goldston soils, a redder subsoil than the Herndon or Nason soils, and a lower base saturation than the Mecklenburg soils.

Typical pedon of Tatum loam, 15 to 30 percent slopes, eroded, 0.55 mile east and 0.1 mile north of the intersection of State roads VA-628 and VA-687:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

A1—0 to 4 inches, brown (7.5YR 5/4) loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and few medium and coarse roots; 10 percent quartz pebbles up to 3 inches in diameter and hard sericite schist fragments up to 3 inches in length; very strongly acid; clear wavy boundary.

B1—4 to 8 inches, yellowish red (5YR 5/6) loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and medium and few coarse roots; root channels and some ped faces coated with brown (7.5YR 5/4) material; 5 percent quartz pebbles up to 3 inches in diameter and hard sericite schist fragments up to 3 inches in length; very strongly acid; clear wavy boundary.

B2t—8 to 27 inches, red (2.5YR 4/6) clay; moderate medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; common fine roots and few medium and coarse roots; thin continuous clay films; brown (7.5YR 5/4) material coats root channels and some ped faces in the upper part of the horizon; few very fine mica flakes; 5 percent quartz pebbles up to 3 inches in diameter and hard sericite schist fragments up to 3 inches in length; very strongly acid; clear wavy boundary.

B3t—27 to 35 inches, red (2.5YR 5/6) clay loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine medium and coarse roots; few thin clay films; 35 percent weathered crushable sericite schist fragments; 10 percent quartz pebbles up to 3 inches in diameter and hard sericite schist fragments; very strongly acid; gradual wavy boundary.

C—35 to 60 inches, reddish yellow (7.5YR 6/8), red (2.5YR 4/8), light gray (2.5Y 7/2), and black (10YR 2/1) weathered sericite schist that crushes to silt loam; massive; hard, firm, slightly sticky, slightly plastic; few fine roots; thin red (2.5YR 4/6) clay flows in seams and cracks; 10 percent quartz pebbles and hard sericite schist fragments; very strongly acid.

The solum is 25 to 40 inches thick. The depth to bedrock ranges from 40 to 60 inches or more. Reaction is very strongly acid throughout the solum. Each horizon is 0 to 15 percent angular quartz pebbles up to 3 inches in diameter and hard sericite schist fragments 3 inches or more in length.

The A horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 2 through 4. It is loam or silt loam.

The B1 horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 through 8. It is loam or clay loam.

The B2t horizon has hue of 2.5YR, value of 4 or 5, and chroma of 6 through 8. It is clay and more than 30 percent silt or more than 40 percent silt and very fine sand.

The B3t horizon has hue of 2.5YR or 5YR, value of 5, and chroma of 6 through 8. It has high chroma mottles in some pedons. It is clay loam or silty clay loam.

The C horizon is weathered sericite schist that crushes to silt loam or loam.

Toccoa series

Soils in the Toccoa series are deep and well drained. They formed in alluvium. The Toccoa soils are on flood plains of streams in the Piedmont province. Slopes range from 0 to 2 percent.

Toccoa soils commonly are near Augusta, Bolling, Chewacla, Masada, and Forestdale soils. Toccoa soils are better drained and have less clay in the subsoil than the Augusta or Forestdale soils. They have less clay in the subsoil than the Bolling or Masada soils and are better drained than the Chewacla soils.

Typical pedon of Toccoa loam in an area of Chewacla. Toccoa, and Augusta loams, frequently flooded, 0.7 mile south and 0.35 mile east of the intersection of State roads VA-690 and VA-680, about 75 feet west of VA-690, on the south side of Juniper Creek:

O1—3 inches to 1 inch, loose leaves and twigs.

O2—1 inch to 0, partially decomposed organic material.

A1—0 to 9 inches, dark yellowish brown (10YR 4/4) loam; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many fine roots and common medium roots; few fine mica flakes; medium acid; clear smooth boundary.

C1—9 to 26 inches, yellowish brown (10YR 5/4) sandy loam; massive; slightly hard, friable, slightly sticky, slightly plastic; many fine roots and few medium roots; few fine mica flakes; thin layers of loam; strongly acid; clear smooth boundary.

C2—26 to 34 inches, yellowish brown (10YR 5/6) loam; common medium faint light yellowish brown (10YR 6/4) mottles; massive; slightly hard, friable, slightly sticky, slightly plastic; common fine roots and few medium roots; few fine mica flakes; thin layers of sandy loam; medium acid; clear smooth boundary.

C3—34 to 43 inches, brown (7.5YR 4/4) loam; common medium faint very pale brown (10YR 7/4) mottles;

massive; slightly hard, friable, slightly sticky, slightly plastic; few fine and large roots; few fine mica flakes; thin layers of sandy loam; strongly acid; clear smooth boundary.

C4—43 to 65 inches, strong brown (7.5YR 5/6) loam; common medium faint light yellowish brown (10YR 6/4) mottles; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few fine mica flakes; thin layers of sandy loam; medium acid.

The depth to bedrock is more than 60 inches. Reaction ranges from strongly acid to slightly acid. Sandy or loamy pockets and thin layers are throughout the C horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 through 4. It is loam or sandy loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 through 6. Mottles with chroma of 2 or less are below a depth of 20 inches in some pedons. The C horizon is loam, sandy loam, or fine sandy loam.

Turbeville series

Soils in the Turbeville series are deep and well drained. They formed in old alluvial sediment. The Turbeville soils are on upland ridgetops bordering major streams in the Piedmont Upland. Slopes range from 2 to 7 percent.

Turbeville soils commonly are near Georgeville, Madison, and Tatum soils. Turbeville soils have a darker subsoil and a thicker solum than the Georgeville, Madison, or Tatum soils and have less mica in the subsoil than the Madison soils.

Typical pedon of Turbeville fine sandy loam, 2 to 7 percent slopes, 0.1 mile south and 0.55 mile east of the intersection of State roads VA-690 and VA-680:

O1—3 inches to 1 inch, loose leaves, pine needles, and twigs.

O2—1 inch to 0, partially decomposed organic material.

A1—0 to 1 inch, dark brown (7.5YR 4/2) fine sandy loam; weak fine granular structure; soft, very friable, slightly sticky, nonplastic; many fine roots; strongly acid; abrupt smooth boundary.

A2—1 to 7 inches, brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; medium acid; clear wavy boundary.

B1t—7 to 11 inches, yellowish red (5YR 4/6) loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots and few medium roots; thick red (2.5YR 4/6) discontinuous clay films; brownish yellow (10YR 6/6) material coats some peds and root channels; strongly acid; clear wavy boundary.

B21t—11 to 31 inches, dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; hard, firm, very sticky, slightly plastic; common fine roots; thin continuous clay films; 5 percent quartz pebbles up to 1 inch in diameter; strongly acid; gradual wavy boundary.

B22t—31 to 72 inches, dark red (10YR 3/6) clay; weak medium subangular blocky structure; hard, firm, very sticky, slightly plastic; few fine roots; thick continuous clay films; 2 percent quartz pebbles up to 2 inches in diameter; compact in place and difficult to dig with spade; strongly acid.

The depth to bedrock is more than 60 inches. Reaction is very strongly acid to strongly acid unless the soil is limed. Angular quartz pebbles up to 2 inches in diameter make up 0 to 15 percent of each horizon.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 through 4. It is fine sandy loam or loam.

The B1t horizon has hue of 5YR, value of 4 or 5, and chroma of 6. It is loam, sandy clay loam, or clay loam.

The upper part of the B2t horizon has hue of 2.5YR, value of 3, and chroma of 6. The lower part of the B2t horizon has hue of 2.5YR or 10R, value of 3, and chroma of 6. Mottles with chroma of 4 through 8 are in the lower part of the B2t horizon in some pedons.

Wedowee series

Soils in the Wedowee series are deep and well drained. They formed in material weathered from granite, granite gneiss, and coarse-grained sericite schist. The Wedowee soils are on side slopes of the Piedmont Upland. Slopes range from 15 to 30 percent.

Wedowee soils commonly are near Ashlar, Appling, Cecil, Madison, and Pacolet soils. Wedowee soils have a thicker solum and a more clayey subsoil than the Ashlar soils, have a thinner solum than the Appling soils, and have a thinner solum than the Cecil soils and a less red subsoil than the Cecil or Pacolet soils. They have less mica in the subsoil than the Madison soils.

Typical pedon of Wedowee sandy loam, 15 to 30 percent slopes, eroded, 0.3 mile south and 0.3 mile east of the intersection of State roads VA-604 and VA-645:

O1—3 inches to 1 inch, loose leaves, pine needles, and twigs.

O2—1 inch to 0, partially decomposed organic material.

A1—0 to 1 inch, dark grayish brown (10YR 4/2) sandy loam; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many fine roots and few medium and coarse roots; very strongly acid; abrupt smooth boundary.

A2—1 to 5 inches, yellowish brown (10YR 5/6) sandy loam; weak fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; common fine roots and few medium and coarse roots; 2 percent angular quartz pebbles up to 3 inches in diameter; very strongly acid; clear wavy boundary.

B1t—5 to 8 inches, reddish yellow (7.5YR 6/6) sandy clay loam; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots and few medium and coarse roots; few thin clay films; very strongly acid; clear wavy boundary.

B21t—8 to 19 inches, strong brown (7.5YR 5/6) clay loam; common medium faint yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; hard, firm, sticky, slightly plastic; common fine roots and few medium and coarse roots; thin continuous clay films; root channels coated with yellowish brown (10YR 5/6) material; few fine mica flakes; few fragments of weathered crushable granite; very strongly acid; clear wavy boundary.

B22t—19 to 27 inches, yellowish red (5YR 5/8) sandy clay; common medium faint distinct (2.5YR 5/8) mottles; moderate medium subangular blocky structure; hard, firm, sticky, slightly plastic; few fine and medium roots; thin continuous clay films; yellowish brown (10YR 5/6) material coats old root channels; few medium mica flakes; 10 percent of horizon composed of weathered crushable granite and feldspar; very strongly acid; clear wavy boundary.

B3t—27 to 33 inches, yellowish red (5YR 5/8) sandy clay loam; common fine faint reddish yellow (5YR 6/8) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few thin clay films; few medium mica flakes; 55 percent strongly weathered crushable granite; very strongly acid; gradual wavy boundary.

C1—33 to 53 inches, white (2.5Y 8/2), strong brown (7.5YR 5/8), and yellowish red (5YR 5/8) strongly weathered granite that crushes to sandy clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; many thin yellowish red (5YR 5/8) clay flows in seams and cracks; common medium mica flakes; common soft white feldspar fragments; very strongly acid; gradual wavy boundary.

C2—53 to 72 inches, white (2.5Y 8/2), very pale brown (10YR 7/4), and reddish yellow (7.5YR 6/8) weathered granite that crushes to sandy loam; massive; slightly hard, friable, nonsticky, nonplastic; few medium mica flakes; common soft feldspar fragments; very strongly acid.

The solum is 20 to 40 inches thick. The depth to hard bedrock is greater than 48 inches. Reaction ranges from very strongly acid to strongly acid in all horizons. Angular quartz and granite pebbles up to 3 inches in diameter make up 0 to 5 percent of each horizon.

The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 6. It is sandy loam or fine sandy loam.

The B1t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 through 8.

The B2t horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 6 through 8. It has high chroma mottles in most pedons. The B2t horizon is clay loam, sandy clay, or clay.

The B3t horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 6 through 8. It has high chroma mottles in most pedons. The B3t horizon is sandy clay loam or clay loam.

The C horizon is weathered granite, granite gneiss, or coarse-grained sericite schist that crushes to sandy clay loam, clay loam, or sandy loam.

Worsham series

Soils in the Worsham series are deep and poorly drained. They formed primarily from local alluvium. The Worsham soils are commonly at the heads of drainageways in the Piedmont Upland. Slopes range from 0 to 4 percent.

Worsham soils commonly are near Appling, Augusta, Caroline, Chewacla, Helena, and Lignum soils. Worsham soils are more poorly drained than the Appling, Augusta, Caroline, Chewacla, Lignum, or Helena soils. They have more clay in the subsoil than the Augusta or Chewacla soils.

Typical pedon of Worsham loam, 0 to 4 percent slopes, 0.15 mile west and 0.05 mile south of the intersection of State roads VA-604 and VA-137:

O1—5 to 2 inches, loose leaves and twigs.

O2—2 inches to 0, partially decomposed organic material; many fine and medium roots.

A1—0 to 3 inches, dark grayish brown (10YR 4/2) loam; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine and medium roots; very strongly acid; abrupt smooth boundary.

A2—3 to 7 inches, gray (10YR 5/1) loam; few fine faint brownish yellow (10YR 6/6) mottles; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine and medium roots; very strongly acid; abrupt smooth boundary.

B1tg—7 to 12 inches, light gray (10YR 6/1) sandy clay loam; many medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; few thin clay films; few fine mica flakes; very strongly acid; clear smooth boundary.

B21tg—12 to 22 inches, light gray (10YR 6/1) clay; many medium distinct brownish yellow (10YR 6/8) mottles and few fine distinct yellowish red (5YR 4/6) mottles; weak coarse subangular blocky structure; very hard, very firm, sticky, plastic; few fine medium and coarse roots; thin continuous clay films; few fine mica flakes; very strongly acid; gradual smooth boundary.

B22tg—22 to 32 inches, light gray (10YR 6/1) clay; many coarse distinct strong brown (7.5YR 5/8) mottles and few fine distinct yellowish red (5YR 4/6) mottles; weak coarse subangular blocky structure; very hard, very firm, sticky, plastic; few fine roots; thin continuous clay films; few fine mica flakes; 2 percent quartz pebbles up to 2 inches in diameter; very strongly acid; gradual smooth boundary.

B23tg—32 to 40 inches, light gray (10YR 6/1) clay; few medium distinct strong brown (7.5YR 5/8) and few coarse distinct yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; very hard, very firm, sticky, plastic; thin continuous clay films; few fine mica flakes; very strongly acid; gradual smooth boundary.

B3tg—40 to 48 inches, light gray (10YR 7/1) clay loam; common medium distinct yellow (2.5Y 8/6), pale yellow (2.5Y 8/4), and light yellowish brown (2.5Y 6/4) mottles; weak coarse subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few thin clay films; few fine mica flakes; very strongly acid; gradual smooth boundary.

Cg—48 to 62 inches, light brownish gray (2.5Y 6/2) clay loam; many medium distinct olive yellow (2.5Y 6/6) and pale yellow (2.5Y 8/4) mottles; massive; hard, firm, slightly sticky, slightly plastic; few fine mica flakes; very strongly acid.

The solum is 40 to 60 inches thick. The depth to bedrock is more than 60 inches. Reaction ranges from very strongly acid to strongly acid throughout the solum. Quartz pebbles up to 2 inches in diameter make up 0 to 5 percent of each horizon.

The A horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 1 through 3. It is loam or sandy loam.

The B1tg horizon has a hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It has mottles with hue of 2.5Y through 5YR and chroma of 4 through 8. It is sandy clay loam or clay loam.

The B2tg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It has mottles with hue of 2.5Y through 5YR and chroma of 4 through 8. It is clay or sandy clay containing less than 30 percent silt.

The B3tg horizon has hue of 10YR or 2.5Y, value of 4 through 7, and chroma of 1 or 2. It has mottles with hue of 2.5Y through 5YR and chroma 4 through 8. It is clay loam or sandy clay loam.

The C horizon is clay loam, sandy clay loam, or sandy loam.

formation of the soils

The five major factors of soil formation are parent material, relief, climate, plants and animals, and time (*3*). Climate and plants and animals are the active forces in soil formation. Their effects on the parent material are modified by relief and the length of time the parent material has been subjected to weathering. In some areas one factor may dominate in the formation of a soil and determine most of its properties. Normally, however, the interaction of all factors determines the kind of soil that forms.

parent material

Parent material is the material in which a soil forms. The two broad classes of parent material in the survey area are residual material and transported material.

Residual material has weathered in place from the underlying bedrock. The characteristics of the residual parent material are related directly to the characteristics of the underlying bedrock.

Transported material includes alluvial sediments that were moved by water and laid down as unconsolidated deposits of sand, silt, clay, and rock fragments. Alluvial sediments are materials transported by floodwaters and deposited on the flood plains of streams. Marine sediments are materials deposited into the ocean that once covered the entire county millions of years ago. The characteristics of transported materials are related to the characteristics of the soils or rocks from which the materials were washed.

The broad rock types, from which many soils in the survey area were formed, are igneous and metamorphic.

Igneous rocks formed by the cooling and solidification of molten rock material. Examples of igneous rocks in the county are granite and diabase.

Metamorphic rocks formed from pre-existing rocks that were altered by heat and pressure. Examples of metamorphic rocks in the county include granite gneiss, hornblende gneiss, sericite schist, mica gneiss, mica schist, and greenstone.

Igneous and metamorphic rocks are also classified as acidic or basic. This classification is dependent on the type and amount of minerals in the rocks. Basic rocks commonly contain some amount of calcium, which is not present in acidic rocks.

Granite, granite gneiss, mica gneiss, mica schist, and sericite schist are examples of acidic rocks that weathered to form the parent material for the Appling, Cecil, Georgeville, Helena, Herndon, Lignum, Madison, Nason, Pacolet, Tatum, and Wedowee soils. These soils commonly have a very strongly acid or strongly acid reaction.

Basic rocks such as diabase, hornblende gneiss, and greenstone weathered into parent material for the Iredell, Mecklenburg, Orange, and Poindexter soils. These soils commonly have a medium acid to neutral reaction.

Caroline soils formed from marine sediments deposited by streams into the ocean that once covered the county. Erosion has removed most of the marine sediments, but some remain on broad, nearly level to very gently sloping ridgetops.

Chewacla and Toccoa soils formed in transported alluvial sediments deposited by floodwaters on the flood plains of streams. Soils that formed in transported materials on stream terraces include Augusta, Bolling, Forestdale, Masada, and Turbeville soils. Worsham soils formed in local alluvial sediments commonly deposited at the heads of drainageways.

relief

Relief affects the formation of soils by influencing the quantity of water infiltration, rate of surface water runoff, soil drainage, soil temperature, and geologic erosion. It can alter the effects of climatic factors acting on the parent material to the extent that several different kinds of soils may form from the same kind of parent material. Relief also affects the amount of radiant energy absorbed by the soils, which in turn affects the type of native vegetation that grows on the soils.

Relief in Lunenburg County ranges from nearly level to steep. The nearly level soils are commonly on flood plains of streams, on low stream terraces, and at the heads of drainageways. Most of these soils are often wet because of frequent flooding or a seasonal high water table, and surface water runoff is usually slow. The soils typically have a subsoil that is gray or mottled gray, and they are somewhat poorly drained or poorly drained. Augusta, Chewacla, Forestdale, and Worsham soils are examples of such soils.

The gently sloping and sloping soils are commonly well drained or moderately well drained. Geologic erosion is slight, surface water runoff is medium to rapid, and water infiltration is optimum. Translocation of bases and clay has occurred downward through the soil. Appling, Cecil, Georgeville, Helena, Herndon, and

Madison soils are included in this group of soils. Most of these soils have well defined soil horizons.

The moderately steep and steep soils commonly have very rapid surface runoff, reduced water infiltration, little translocation of clay and bases through the soil, and a severe erosion hazard. They commonly have weakly developed soil horizons. These soils include the Ashlar, Goldston, and Poindexter soils.

climate

Climate is probably the most influential factor in soil formation. It determines in large part the rate and degree of weathering. The weathering of parent material and minerals in the soils is more rapid and intense under the warm and humid climate of Lunenburg County, for example, than under a climate that is cold and dry. Climatic influences are expressed through or in combination with other soil forming factors, especially in the weathering of parent material and the type and abundance of vegetation growing on a soil.

The amount of precipitation and the downward movement of water through the soil affect the translocation of clay and leaching of minerals in the soil. Precipitation is also the prime factor in soil erosion.

The climate of this survey area promotes the leaching of soluble minerals and the translocation of clay downward through the soil. Because of the abundance and infiltration of precipitation, clay has moved downward and accumulated in the subsoil of the Appling, Cecil, and Georgeville soils and most other soils in the county.

Weathering, translocation, and leaching of soil material occur throughout most of each year. These forces are activated by climate and determine, to a large degree, the characteristics of most of the soils in the county.

The climate is uniform throughout the county. Its effect on soil formation may be modified locally by the steepness and position of slopes. Local variation in climate may cause some variation among soils. However, variations resulting from climate are not great enough to account for the wide differences that exist among many soils in the county.

plants and animals

Some of the plants and animals that are active in soil formation include trees, shrubs, grasses, burrowing animals, earthworms, and micro-organisms.

Plants are the major source of organic matter in the soils. Organic matter decomposes and is mixed into the soil primarily by the action of micro-organisms and earthworms. Plants also transfer plant nutrients from lower soil layers to upper layers as the organic matter decomposes. Rapid decomposition caused by the warm temperatures, generally abundant moisture, and large population of micro-organisms in the soils has prevented the accumulation of large amounts of organic matter.

The roots of plants, burrowing animals, and earthworms have also had some influence on the movement and mixing of soil material. The roots of trees have penetrated cracks in the underlying rocks to help break them up into the parent material from which the soils have formed.

The dominant vegetation in the county during the period of soil formation was primarily hardwood forest. Although the density of the stands of trees, the proportion of different species, and the kind of ground cover varied somewhat, these variations do not account for the major differences of the soils in the survey area.

The vegetation in the county consists of stands of hardwoods, pines, and mixed pines and hardwoods. The hardwoods generally have deeper root systems than the pines. The leaves of the hardwoods vary in the content of plant nutrients, but they generally return more bases and phosphorus to the soils than do the needles of pines.

Man has influenced the development of soils by such practices as cultivation, artificial drainage, irrigation, applying lime and fertilizer, and changing the vegetation. Man has also caused an acceleration of erosion and has changed and mixed soils in areas used for various engineering and construction purposes.

time

Because of other factors, soils that formed in the same kind of parent material do not necessarily develop equally in the same length of time. For example, soils that formed from the same parent material, but with different relief or steepness of slope, often do not develop to the same degree in the same time span. The Ashlar and Appling soils have formed from the same type parent material but have different characteristics. The steep Ashlar soils have little development because surface water runoff is very rapid and erosion has removed some soil material before the layers have had time to form. The gently sloping and sloping Appling soils have had time to develop well defined layers because of the decreased effects of surface water runoff and erosion.

Soils that formed in parent material resistant to weathering require more time to develop well defined horizons than soils formed in easily weathered material. The development of genetically related soil layers in soils on the flood plains of streams can also be slowed or prevented if alluvial sediments continue to be deposited.

references

(1) American Association of State Highway and Transportation Officials, 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials, 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 287-69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Jenny, Hans, 1941. Factors of soil formation. McGraw-Hill Book Company, Inc., 281 pp., illus.

(4) United States Department of Agriculture, 1951. Soil survey manual. U.S. Dep. of Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962].

(5) United States Department of Agriculture, 1975. Soil Taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv. U.S. Dep. Agric. Handb. 436, 754 pp., illus.

glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

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.

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, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

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.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) 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 Roman numeral II precedes the letter C.

R layer.—Consolidated rock 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, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

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.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

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 affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). Refers to areas where 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 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.

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.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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 insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm 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 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 which 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).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

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 content of organic matter 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."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data were recorded in the period 1951-78 at Charlotte, Va.]

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[1]	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----	47.0	24.7	34.5	73	1	62	3.11	1.61	4.41	7	4.9
February---	49.4	26.3	37.9	72	7	210	3.13	1.77	4.33	7	2.9
March------	57.7	33.9	45.8	84	15	417	3.80	2.54	4.95	8	2.8
April------	69.5	43.4	56.5	89	26	490	3.29	1.78	4.61	6	.0
May--------	77.3	52.2	64.7	92	32	761	3.50	1.92	4.88	7	.0
June-------	84.1	60.0	72.1	98	43	955	3.84	1.96	5.46	7	.0
July-------	88.0	64.4	76.2	100	50	1,172	3.71	2.10	5.13	6	.0
August-----	86.7	63.4	72.4	98	50	1,080	4.10	1.97	5.94	7	.0
September--	80.8	56.5	68.7	95	38	859	3.36	1.54	4.91	5	.0
October----	70.3	44.4	57.4	89	24	534	3.46	1.11	5.38	5	.0
November---	60.0	35.2	47.7	81	15	227	2.86	1.38	4.13	6	.4
December---	49.2	26.9	35.3	74	6	139	3.29	1.66	4.71	6	2.4
Yearly:											
Average--	68.3	44.3	55.8	---	---	---	---	---	---	---	---
Extreme--	---	---	---	100	1	---	---	---	---	---	---
Total----	---	---	---	---	---	6,916	41.45	34.07	48.52	77	13.4

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-78 at Charlotte, Va.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 8	April 22	May 6
2 years in 10 later than--	April 1	April 16	April 30
5 years in 10 later than--	March 19	April 4	April 19
First freezing temperature in fall:			
1 year in 10 earlier than--	October 24	October 14	October 6
2 years in 10 earlier than--	October 30	October 19	October 10
5 years in 10 earlier than--	November 9	October 28	October 19

TABLE 3.--GROWING SEASON LENGTH

[Data were recorded in the period 1951-78 at Charlotte, Va.]

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	204	184	164
8 years in 10	214	191	171
5 years in 10	234	206	183
2 years in 10	254	221	195
1 year in 10	264	229	202

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1B2	Appling sandy loam, 2 to 7 percent slopes, eroded	40,630	14.3
1C2	Appling sandy loam, 7 to 15 percent slopes, eroded	30,285	10.7
2C	Ashlar loamy coarse sand, 7 to 15 percent slopes	450	0.2
2D	Ashlar loamy coarse sand, 15 to 25 percent slopes	2,879	1.0
2E	Ashlar loamy coarse sand, 25 to 45 percent slopes	939	0.3
3B	Bolling fine sandy loam, 1 to 6 percent slopes	509	0.2
4B	Caroline sandy loam, 1 to 7 percent slopes	3,277	1.1
5B2	Cecil sandy loam, 2 to 7 percent slopes, eroded	20,950	7.4
5C2	Cecil sandy loam, 7 to 15 percent slopes, eroded	7,278	2.5
6	Chewacla, Toccoa, and Augusta loams, frequently flooded	11,804	4.2
7	Forestdale loam	242	0.1
8B2	Georgeville loam, 2 to 7 percent slopes, eroded	38,318	13.5
8C2	Georgeville loam, 7 to 15 percent slopes, eroded	11,501	4.1
9D	Goldston channery loam, 15 to 45 percent slopes	2,475	0.9
10B	Helena sandy loam, 1 to 6 percent slopes	2,822	1.0
10C2	Helena sandy loam, 6 to 10 percent slopes, eroded	3,442	1.2
11B2	Herndon loam, 2 to 7 percent slopes, eroded	9,233	3.2
11C2	Herndon loam, 7 to 15 percent slopes, eroded	7,733	2.7
12B	Iredell loam, 1 to 6 percent slopes	9,826	3.5
12C2	Iredell loam, 6 to 12 percent slopes, eroded	7,433	2.6
13B	Lignum loam, 1 to 6 percent slopes	2,248	0.8
13C2	Lignum loam, 6 to 10 percent slopes, eroded	2,099	0.7
14B2	Madison sandy loam, 2 to 7 percent slopes, eroded	4,549	1.6
14C2	Madison sandy loam, 7 to 15 percent slopes, eroded	2,116	0.7
14D2	Madison sandy loam, 15 to 30 percent slopes, eroded	3,158	1.1
15B	Masada fine sandy loam, 2 to 7 percent slopes	719	0.3
16B2	Mecklenburg loam, 2 to 7 percent slopes, eroded	3,098	1.1
16C2	Mecklenburg loam, 7 to 15 percent slopes, eroded	1,856	0.7
16D2	Mecklenburg loam, 15 to 20 percent slopes, eroded	3,105	1.1
17D2	Nason loam, 15 to 25 percent slopes, eroded	9,052	3.2
18B	Orange loam, 1 to 7 percent slopes	784	0.3
19D2	Pacolet sandy loam, 15 to 30 percent slopes, eroded	4,900	1.7
20D	Poindexter silt loam, 15 to 25 percent slopes	2,165	0.8
20E	Poindexter silt loam, 25 to 45 percent slopes	465	0.2
21D2	Tatum loam, 15 to 30 percent slopes, eroded	12,334	4.3
22B	Turbeville fine sandy loam, 2 to 7 percent slopes	296	0.1
23D2	Wedowee sandy loam, 15 to 30 percent slopes, eroded	14,673	5.2
24B	Worsham loam, 0 to 4 percent slopes	2,434	0.9
	Water	1,423	0.5
	Total	283,500	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Tobacco	Corn	Soybeans	Wheat	Grass hay	Grass-clover	Tall fescue
	Lb	Bu	Bu	Bu	Ton	AUM*	AUM*
1B2----------------------- Appling	2,400	90	35	45	3.5	8.0	7.5
1C2----------------------- Appling	2,200	80	30	40	3.0	7.5	7.0
2C------------------------ Ashlar	1,500	75	---	25	2.0	5.0	4.0
2D------------------------ Ashlar	---	---	---	---	---	4.0	3.0
2E------------------------ Ashlar	---	---	---	---	---	3.0	2.5
3B------------------------ Bolling	---	85	35	35	4.0	7.0	6.5
4B------------------------ Caroline	2,600	110	40	60	4.0	8.0	7.5
5B2----------------------- Cecil	2,100	95	35	50	4.0	8.0	7.5
5C2----------------------- Cecil	2,000	90	30	40	3.5	7.5	7.0
6------------------------- Chewacla, Toccoa, and Augusta	---	90	---	---	5.0	8.5	8.0
7------------------------- Forestdale	---	---	---	---	3.0	4.5	4.0
8B2----------------------- Georgeville	2,000	90	35	45	3.5	7.5	7.0
8C2----------------------- Georgeville	1,800	85	30	40	3.0	7.0	6.5
9D------------------------ Goldston	---	---	---	---	2.0	3.5	3.0
10B----------------------- Helena	2,100	75	30	40	3.5	6.0	5.8
10C2---------------------- Helena	1,800	65	25	35	3.0	5.8	5.3
11B2---------------------- Herndon	2,200	90	35	45	3.0	7.5	7.5
11C2---------------------- Herndon	2,000	85	30	40	2.5	7.0	7.0
12B----------------------- Iredell	---	65	25	35	3.0	8.0	7.5
12C2---------------------- Iredell	---	45	20	30	2.5	6.5	6.0
13B----------------------- Lignum	2,000	75	30	35	2.5	6.0	5.5

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Tobacco	Corn	Soybeans	Wheat	Grass hay	Grass-clover	Tall fescue
	Lb	Bu	Bu	Bu	Ton	AUM*	AUM*
13C2 Lignum	1,700	65	25	30	2.0	5.5	5.0
14B2 Madison	2,100	90	35	50	4.0	7.5	7.0
14C2 Madison	1,900	80	30	40	3.5	7.0	6.5
14D2 Madison	---	70	25	35	3.0	6.5	6.0
15B Masada	2,200	110	40	50	4.0	7.5	7.0
16B2 Mecklenburg	---	90	40	45	4.0	7.5	7.0
16C2 Mecklenburg	---	80	35	40	3.5	7.0	6.5
16D2 Mecklenburg	---	70	30	35	3.0	6.5	6.0
17D2 Nason	---	65	---	30	2.0	6.5	6.0
18B Orange	---	60	---	30	3.0	7.0	6.5
19D2 Pacolet	---	70	25	35	3.0	6.5	6.0
20D Poindexter	---	---	---	---	---	5.0	4.5
20E Poindexter	---	---	---	---	---	3.0	2.5
21D2 Tatum	---	65	---	35	2.5	6.5	6.0
22B Turbeville	---	120	45	50	4.0	8.0	7.5
23D2 Wedowee	---	---	---	---	2.5	6.0	5.5
24B Worsham	---	---	---	---	2.0	5.0	4.5

* 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.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
1B2, 1C2: Appling	3o	Slight	Slight	Slight	Slight	Loblolly pine	81	Eastern redcedar, eastern white pine, loblolly pine, slash pine, yellow-poplar.
						Shortleaf pine	65	
						Scarlet oak	68	
						Southern red oak	76	
						Virginia pine	74	
						White oak	71	
						Yellow-poplar	90	
2C: Ashlar	3o	Slight	Slight	Slight	Slight	Eastern white pine	85	Loblolly pine, eastern white pine.
						Shortleaf pine	70	
						Virginia pine	70	
						Northern red oak	70	
2D, 2E: Ashlar	3r	Slight	Moderate	Slight	Slight	Eastern white pine	85	Loblolly pine, eastern white pine.
						Shortleaf pine	70	
						Virginia pine	70	
						Northern red oak	70	
3B: Bolling	2w	Slight	Moderate	Slight	Slight	Virginia pine	80	Loblolly pine, yellow-poplar, black walnut.
						Shortleaf pine	80	
						Loblolly pine	90	
						Yellow-poplar	90	
4B: Caroline	3o	Slight	Slight	Slight	Slight	Shortleaf pine	70	Loblolly pine.
						Virginia pine	70	
						Loblolly pine	76	
						Southern red oak	70	
						White oak	75	
5B2, 5C2: Cecil	3o	Slight	Slight	Slight	Slight	Eastern white pine	80	Eastern white pine, loblolly pine, slash pine, yellow-poplar.
						Loblolly pine	80	
						Shortleaf pine	69	
						Virginia pine	73	
						Black oak	66	
						Northern red oak	82	
						Post oak	65	
						Scarlet oak	80	
6*:								
Chewacla	1w	Slight	Moderate	Moderate	Moderate	Loblolly pine	96	Loblolly pine, slash pine, American sycamore, yellow-poplar, sweetgum, eastern white pine, green ash.
						Yellow-poplar	104	
						American sycamore	90	
						Sweetgum	97	
						Water oak	86	
						Eastern cottonwood	100	
						Green ash	97	
						Southern red oak	90	
Toccoa	1o	Slight	Slight	Slight	Slight	Loblolly pine	90	Loblolly pine, yellow-poplar, American sycamore, cherrybark oak.
						Yellow-poplar	107	
						Sweetgum	100	
						Southern red oak	---	
Augusta	2w	Slight	Moderate	Slight	Moderate	Loblolly pine	90	Loblolly pine, slash pine, sweetgum, American sycamore, yellow-poplar, cherrybark oak.
						Sweetgum	90	
						American sycamore	90	
						White oak	80	
						Southern red oak	80	
						Water oak	---	
						Shortleaf pine	---	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordi-nation symbol	Management concerns: Erosion hazard	Equip-ment limita-tion	Seedling mortal-ity	Wind-throw hazard	Potential productivity: Common trees	Site index	Trees to plant
7----------------- Forestdale	1w	Slight	Severe	Moderate	Slight	Green ash----------- Eastern cottonwood-- Cherrybark oak------ Nuttall oak--------- Water oak----------- Willow oak---------- Sweetgum------------	78 100 94 99 90 94 100	Green ash, eastern cottonwood, Nuttall oak, sweetgum, American sycamore.
8B2, 8C2----------- Georgeville	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ White oak----------- Scarlet oak--------- Southern red oak----	81 67 63 69 70 67	Loblolly pine, Virginia pine, eastern redcedar, black walnut, yellow-poplar.
9D----------------- Goldston	4r	Moderate	Moderate	Slight	Moderate	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- White oak-----------	73 68 63 66 69	Eastern redcedar, loblolly pine, slash pine, Virginia pine.
10B, 10C2---------- Helena	3w	Slight	Moderate	Slight	Moderate	Loblolly pine------- Shortleaf pine------ White oak----------- Yellow-poplar-------	80 63 64 87	Loblolly pine, Virginia pine, yellow-poplar.
11B2, 11C2--------- Herndon	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Shortleaf pine------ White oak----------- Southern red oak---- Yellow-poplar-------	80 61 65 72 91	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.
12B, 12C2---------- Iredell	4c	Slight	Moderate	Moderate	Moderate	Loblolly pine------- Shortleaf pine------ Post oak------------ White oak-----------	67 58 44 47	Loblolly pine, eastern redcedar.
13B---------------- Lignum	3w	Slight	Moderate	Moderate	Slight	Virginia pine------- Shortleaf pine------ Southern red oak---- Loblolly pine-------	74 66 68 76	Loblolly pine, sweetgum, eastern white pine.
13C2--------------- Lignum	3w	Slight	Moderate	Moderate	Slight	Virginia pine------- Shortleaf pine------ Southern red oak---- Loblolly pine-------	74 66 68 76	Loblolly pine, sweetgum, eastern white pine.
14B2, 14C2--------- Madison	3o	Slight	Slight	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	73 63 66 81 96	Loblolly pine, slash pine, longleaf pine, yellow-poplar.
14D2--------------- Madison	3r	Moderate	Moderate	Slight	Slight	Loblolly pine------- Longleaf pine------- Shortleaf pine------ Southern red oak---- Yellow-poplar-------	73 63 66 81 96	Loblolly pine, slash pine, longleaf pine, yellow-poplar.
15B---------------- Masada	3o	Slight	Slight	Slight	Slight	Southern red oak---- Virginia pine------- Shortleaf pine------ Yellow-poplar------- Eastern white pine-- Loblolly pine-------	70 70 70 85 80 82	Eastern white pine, loblolly pine, yellow-poplar.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
16B2, 16C2, 16D2: Mecklenburg	4o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Southern red oak Sweetgum White oak Yellow-poplar Eastern redcedar	75 67 75 82 71 89 ---	Loblolly pine, Virginia pine, yellow-poplar, slash pine, eastern redcedar.
17D2: Nason	3r	Moderate	Moderate	Slight	Slight	Northern red oak Virginia pine Shortleaf pine Loblolly pine	66 69 66 80	Loblolly pine, eastern white pine.
18B: Orange	4w	Slight	Moderate	Moderate	Moderate	Northern red oak Virginia pine Shortleaf pine Loblolly pine	60 60 60 75	Loblolly pine.
19D2: Pacolet	3r	Moderate	Moderate	Slight	Slight	Loblolly pine Shortleaf pine Yellow-poplar	78 70 90	Loblolly pine, shortleaf pine, yellow-poplar.
20D, 20E: Poindexter	4r	Moderate	Moderate	Slight	Slight	Shortleaf pine Virginia pine Southern red oak Loblolly pine	60 65 60 70	Loblolly pine.
21D2: Tatum	3r	Moderate	Moderate	Slight	Slight	Northern red oak Virginia pine Shortleaf pine Loblolly pine Yellow-poplar	72 68 68 78 83	Loblolly pine, eastern white pine, yellow-poplar.
22B: Turbeville	3o	Slight	Slight	Slight	Slight	Loblolly pine Yellow-poplar Virginia pine Shortleaf pine Southern red oak	80 85 70 70 70	Loblolly pine, yellow-poplar.
23D2: Wedowee	3r	Moderate	Moderate	Slight	Slight	Loblolly pine Virginia pine Shortleaf pine Southern red oak Northern red oak White oak	80 70 70 70 70 65	Loblolly pine, Virginia pine, eastern redcedar, yellow-poplar.
24B: Worsham	2w	Slight	Severe	Severe	Slight	Northern red oak Virginia pine Loblolly pine Pin oak Yellow-poplar	80 80 88 85 91	Loblolly pine, eastern white pine, sweetgum, yellow-poplar.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1B2 Appling	Slight	Slight	Moderate: slope.	Slight	Slight.
1C2 Appling	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
2C Ashlar	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
2D Ashlar	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
2E Ashlar	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
3B Bolling	Severe: floods.	Moderate: wetness.	Moderate: slope, floods, wetness.	Moderate: wetness.	Moderate: wetness, floods.
4B Caroline	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
5B2 Cecil	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
5C2 Cecil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Slight.
6*:					
Chewacla	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.
Toccoa	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.	Severe: floods.
Augusta	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: wetness, floods.	Moderate: wetness.	Severe: floods.
7 Forestdale	Severe: floods, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, floods.	Severe: wetness, erodes easily.	Severe: wetness, floods.
8B2 Georgeville	Slight	Slight	Moderate: slope.	Slight	Slight.
8C2 Georgeville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
9D Goldston	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Moderate: large stones, slopes.	Severe: slope.
10B Helena	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
10C2 Helena	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: wetness, slope.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
11B2: Herndon	Slight	Slight	Moderate: slope.	Slight	Slight.
11C2: Herndon	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
12B: Iredell	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
12C2: Iredell	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness, slope.	Moderate: wetness.	Moderate: wetness, slope.
13B: Lignum	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
13C2: Lignum	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: slope, wetness.
14B2: Madison	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
14C2: Madison	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
14D2: Madison	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
15B: Masada	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
16B2: Mecklenburg	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
16C2: Mecklenburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
16D2: Mecklenburg	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
17D2: Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
18B: Orange	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
19D2: Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
20D: Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
20E: Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
21D2: Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
22B: Turbeville	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23D2------------------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
24B-------------------- Worsham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1B2 Appling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
1C2 Appling	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
2C Ashlar	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
2D Ashlar	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
2E Ashlar	Very poor	Poor	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
3B Bolling	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4B Caroline	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
5B2 Cecil	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5C2 Cecil	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
6*:										
Chewacla	Very poor.	Poor	Poor	Good	Good	Fair	Fair	Poor	Good	Fair.
Toccoa	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Augusta	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
7 Forestdale	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
8B2, 8C2 Georgeville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
9D Goldston	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
10B Helena	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
10C2 Helena	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
11B2 Herndon	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
11C2 Herndon	Fair	Good	Fair	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
12B, 12C2 Iredell	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
13B Lignum	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
13C2---------------- Lignum	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
14B2---------------- Madison	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
14C2---------------- Madison	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
14D2---------------- Madison	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
15B----------------- Masada	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
16B2---------------- Mecklenburg	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
16C2---------------- Mecklenburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
16D2---------------- Mecklenburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
17D2---------------- Nason	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
18B----------------- Orange	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
19D2---------------- Pacolet	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
20D----------------- Poindexter	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
20E----------------- Poindexter	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
21D2---------------- Tatum	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
22B----------------- Turbeville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
23D2---------------- Wedowee	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
24B----------------- Worsham	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--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]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1B2--------------- Appling	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
1C2--------------- Appling	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
2C---------------- Ashlar	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope.
2D, 2E------------ Ashlar	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
3B---------------- Bolling	Severe: wetness.	Severe: floods.	Severe: wetness, floods.	Severe: floods.	Severe: floods.	Moderate: wetness, floods.
4B---------------- Caroline	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
5B2--------------- Cecil	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
5C2--------------- Cecil	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Slight.
6*:						
Chewacla----------	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: low strength, wetness, floods.	Severe: wetness, floods.
Toccoa------------	Moderate: wetness, floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Augusta-----------	Severe: wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.
7----------------- Forestdale	Severe: wetness.	Severe: floods, shrink-swell, wetness.	Severe: floods, wetness.	Severe: floods, shrink-swell, wetness.	Severe: floods, shrink-swell, wetness.	Severe: floods, wetness.
8B2--------------- Georgeville	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
8C2--------------- Georgeville	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
9D---------------- Goldston	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
10B--------------- Helena	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
10C2 Helena	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
11B2 Herndon	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
11C2 Herndon	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
12B Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
12C2 Iredell	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: wetness, slope.
13B Lignum	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
13C2 Lignum	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: low strength.	Moderate: slope, wetness.
14B2 Madison	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
14C2 Madison	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
14D2 Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
15B Masada	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
16B2 Mecklenburg	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
16C2 Mecklenburg	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
16D2 Mecklenburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17D2 Nason	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
18B Orange	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
19D2 Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
20D, 20E Poindexter	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
21D2: Tatum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
22B: Turbeville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
23D2: Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
24B: Worsham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1B2: Appling	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
1C2: Appling	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
2C: Ashlar	Severe: depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: area reclaim.
2D, 2E: Ashlar	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Poor: slope, area reclaim.
3B: Bolling	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, too clayey.	Severe: floods, seepage, wetness.	Poor: too clayey, hard to pack.
4B: Caroline	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
5B2: Cecil	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
5C2: Cecil	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
6*:					
Chewacla	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: hard to pack, wetness.
Toccoa	Severe: floods, wetness.	Severe: seepage, floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, seepage, wetness.	Good.
Augusta	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, seepage, wetness.	Severe: floods, wetness.	Fair: wetness.
7: Forestdale	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
8B2: Georgeville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8C2: Georgeville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
9D: Goldston	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage.	Poor. thin layer, area reclaim.
10B: Helena	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: seépage, wetness.	Poor: too clayey, hard to pack, wetness.
10C2: Helena	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: seepage, wetness.	Poor: too clayey, hard to pack, wetness.
11B2: Herndon	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
11C2: Herndon	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
12B: Iredell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
12C2: Iredell	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
13B: Lignum	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
13C2: Lignum	Severe: percs slowly, wetness.	Severe: slope, wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
14B2: Madison	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Poor: thin layer.
14C2: Madison	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Poor: thin layer.
14D2: Madison	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
15B: Masada	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey.
16B2: Mecklenburg	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
16C2----------------- Mecklenburg	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
16D2----------------- Mecklenburg	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
17D2----------------- Nason	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
18B------------------ Orange	Severe: percs slowly, wetness.	Severe: wetness.	Severe: depth to rock, wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
19D2----------------- Pacolet	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
20D, 20E------------- Poindexter	Severe: slope.	Severe: slope, seepage.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage.	Poor: slope.
21D2----------------- Tatum	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey, hard to pack.
22B------------------ Turbeville	Moderate: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight-----------	Poor: too clayey, hard to pack.
23D2----------------- Wedowee	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
24B------------------ Worsham	Severe: percs slowly, wetness.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1B2: Appling	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
1C2: Appling	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
2C: Ashlar	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer.
2D: Ashlar	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, thin layer.
2E: Ashlar	Poor: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, thin layer.
3B: Bolling	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, small stones.
4B: Caroline	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, too clayey.
5B2, 5C2: Cecil	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
6*:				
Chewacla	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Toccoa	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Augusta	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
7: Forestdale	Poor: shrink-swell, wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
8B2, 8C2: Georgeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
9D: Goldston	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
10B, 10C2: Helena	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
11B2, 11C2: Herndon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
12B, 12C2------------- Iredell	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
13B, 13C2------------- Lignum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
14B2, 14C2------------ Madison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
14D2------------------ Madison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
15B------------------- Masada	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
16B2------------------ Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
16C2------------------ Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
16D2------------------ Mecklenburg	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
17D2------------------ Nason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
18B------------------- Orange	Poor: low strength, shrink-swell, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
19D2------------------ Pacolet	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
20D------------------- Poindexter	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
20E------------------- Poindexter	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
21D2------------------ Tatum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
22B------------------- Turbeville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
23D2------------------ Wedowee	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
24B------------------- Worsham	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--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]

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1B2--------------- Appling	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope---------	Favorable-----	Favorable.
1C2--------------- Appling	Severe: slope.	Severe: hard to pack.	Deep to water	Slope---------	Slope---------	Slope.
2C, 2D, 2E-------- Ashlar	Severe: seepage, slope.	Severe: seepage, piping, thin layer.	Deep to water	Slope, droughty, depth to rock	Slope, depth to rock	Slope, droughty, depth to rock
3B---------------- Bolling	Moderate: seepage, slope.	Severe: wetness.	Floods, slope.	Wetness, slope, floods.	Wetness-------	Favorable.
4B---------------- Caroline	Moderate: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope, erodes easily	Erodes easily, percs slowly.	Erodes easily, percs slowly.
5B2--------------- Cecil	Moderate: seepage, slope.	Severe: piping, hard to pack.	Deep to water	Slope---------	Favorable-----	Favorable.
5C2--------------- Cecil	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope---------	Slope---------	Slope.
6*:						
Chewacla---------	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Floods--------	Wetness, floods.	Wetness-------	Wetness.
Toccoa-----------	Severe: seepage.	Severe: piping.	Floods--------	Floods--------	Favorable-----	Favorable.
Augusta----------	Moderate: seepage.	Severe: piping, wetness.	Floods--------	Wetness, floods.	Wetness-------	Wetness.
7----------------- Forestdale	Slight---------	Severe: wetness, piping.	Floods, percs slowly.	Wetness, percs slowly, floods.	Wetness, percs slowly, erodes easily	Percs slowly, wetness, erodes easily
8B2--------------- Georgeville	Moderate: seepage, slope.	Moderate: piping, hard to pack.	Deep to water	Slope---------	Favorable-----	Favorable.
8C2--------------- Georgeville	Severe: slope.	Moderate: piping, hard to pack.	Deep to water	Slope---------	Slope---------	Slope.
9D---------------- Goldston	Severe: seepage, slope.	Severe: thin layer, seepage.	Deep to water	Slope---------	Slope---------	Slope.
10B--------------- Helena	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily
10C2-------------- Helena	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly.	Slope, erodes easily wetness.	Wetness, slope, erodes easily

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
11B2----------------- Herndon	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope----------	Favorable-----	Favorable.
11C2----------------- Herndon	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
12B------------------ Iredell	Moderate: depth to rock, slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, percs slowly.	Wetness, percs slowly.
12C2----------------- Iredell	Severe: slope.	Severe: hard to pack.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, slope, percs slowly.
13B------------------ Lignum	Moderate: depth to rock, slope.	Severe: hard to pack, wetness.	Slope, percs slowly.	Slope, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily
13C2----------------- Lignum	Severe: slope.	Severe: hard to pack, wetness.	Slope, percs slowly.	Slope, percs slowly.	Slope, erodes easily wetness.	Wetness, slope, erodes easily
14B2----------------- Madison	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope--------	Favorable-----	Favorable.
14C2, 14D2----------- Madison	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
15B------------------ Masada	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope----------	Favorable-----	Favorable.
16B2----------------- Mecklenburg	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Percs slowly	Percs slowly.
16C2, 16D2----------- Mecklenburg	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
17D2----------------- Nason	Severe: slope.	Severe: thin layer, hard to pack.	Deep to water	Erodes easily, slope.	Slope, erodes easily	Slope, erodes easily
18B------------------ Orange	Moderate: depth to rock, slope.	Severe: hard to pack, wetness.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily
19D2----------------- Pacolet	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
20D, 20E------------- Poindexter	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily	Slope, erodes easily	Slope, erodes easily
21D2----------------- Tatum	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily	Slope, erodes easily	Slope, erodes easily
22B------------------ Turbeville	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope----------	Favorable-----	Favorable.
23D2----------------- Wedowee	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope----------	Slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
24B----------------Worsham	Slight----------	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1B2, 1C2--------- Appling	0-6	Sandy loam-------	SM, SM-SC	A-2	0-5	86-100	80-100	55-75	15-35	<27	NP-5
	6-26	Sandy clay, clay loam, clay.	MH, CL, ML	A-7	0-5	95-100	95-100	70-92	51-80	41-74	15-30
	26-46	Sandy clay, clay loam, sandy clay loam.	SC, CL	A-4, A-6	0-5	95-100	95-100	70-90	40-75	25-45	8-22
	46-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
2C, 2D, 2E------- Ashlar	0-21	Sandy loam-------	SM, SM-SC	A-2, A-4, A-1	0-2	80-95	75-95	40-80	20-50	<25	NP-6
	21-37	Sandy loam, fine sandy loam, gravelly sandy loam.	GM-GC, SM-SC, GM	A-1, A-2, A-4	2-8	55-95	50-90	30-75	15-50	<25	NP-6
	37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
3B--------------- Bolling	0-15	Fine sandy loam	ML, CL, SM, SC	A-4	0	85-100	75-100	60-95	35-85	<30	NP-10
	15-24	Clay loam, sandy clay loam, silty clay loam.	CL, SC	A-6, A-7	0	95-100	75-100	70-95	40-85	30-45	11-20
	24-51	Sandy clay loam, silty clay loam, clay.	CL, CH, SC	A-6, A-7	0	95-100	75-100	70-100	40-90	30-60	11-35
	51-60	Variable---------	---	---	---	---	---	---	---	---	---
4B--------------- Caroline	0-17	Sandy loam-------	SM, ML, CL-ML, SM-SC	A-2, A-4	0	90-100	85-100	60-85	30-55	<25	NP-5
	17-70	Clay loam, clay, silty clay.	CL, CH	A-7	0	90-100	85-100	80-100	60-90	41-70	18-40
5B2, 5C2--------- Cecil	0-7	Sandy loam-------	SM, SM-SC	A-2, A-4	0	84-100	80-100	67-90	26-42	<30	NP-6
	7-45	Clay-------------	MH, ML	A-7, A-5	0	97-100	92-100	72-99	55-95	41-80	9-37
	45-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
6*: Chewacla---------	0-8	Loam-------------	ML	A-4, A-5, A-6, A-7	0	98-100	95-100	70-100	55-90	36-50	4-18
	8-43	Silt loam, silty clay loam, clay loam.	ML, MH	A-4, A-5, A-6, A-7	0	96-100	95-100	80-100	51-98	36-56	4-20
	43-70	Silt loam, clay loam, silty clay loam.	ML, MH	A-4, A-5, A-6, A-7	0	75-100	65-100	60-100	51-98	32-61	4-28
Toccoa-----------	0-9	Loam-------------	SM, ML	A-2, A-4	0	98-100	95-100	85-100	25-60	<30	NP-4
	9-65	Sandy loam, loam	SM, ML	A-2, A-4	0	95-100	90-100	60-100	30-55	<30	NP-4
Augusta----------	0-14	Loam-------------	ML, CL-ML	A-4	0	90-100	75-100	75-100	51-75	<35	NP-10
	14-63	Sandy clay loam, clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	75-100	75-95	51-80	20-45	5-25
7---------------- Forestdale	0-11	Loam-------------	CL, CL-ML	A-4, A-6	0	100	100	95-100	80-95	15-30	5-15
	11-46	Silty clay, clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	20-40
	46-62	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	95-100	75-100	20-50	5-30

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	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	
8B2, 8C2--------- Georgeville	0-5	Loam-------------	ML	A-4	0-2	90-100	85-100	65-100	51-98	40	NP-10
	5-40	Silty clay, clay loam.	CL, ML	A-6, A-7	0-1	90-100	90-100	85-100	70-98	30-49	8-20
	40-60	Clay, silty clay, silty clay loam.	MH, ML	A-7	0-1	95-100	95-100	90-100	75-98	41-75	15-35
	60-70	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
9D--------------- Goldston	0-6	Slaty silt loam	GM, SM, ML, GM-GC	A-4	5-20	60-80	55-75	50-70	40-60	<35	NP-10
	6-15	Slaty silt loam, slaty very fine sandy loam.	GM, SM, ML, GM-GC	A-2, A-4, A-5	10-30	55-100	50-92	45-90	25-80	<45	NP-10
	15-38	Slaty silt loam	GM	A-2	20-40	25-40	25-40	20-40	15-35	<20	NP-3
10B, 10C2-------- Helena	0-7	Sandy loam-------	SM, SM-SC, SC	A-2, A-4	0	95-100	90-100	51-86	27-46	<30	NP-9
	7-22	Sandy clay loam, clay loam.	CL	A-6, A-7	0	95-100	95-100	70-90	55-70	30-49	15-25
	22-44	Clay loam, sandy clay, clay.	CH, MH	A-7	0	95-100	95-100	73-93	56-80	50-85	24-50
	44-56	Variable---------	---	---	---	---	---	---	---	---	---
11B2, 11C2------- Herndon	0-5	Loam-------------	ML	A-4, A-6	0-2	90-100	90-100	80-98	51-90	<36	NP-12
	5-45	Silty clay loam, silty clay, clay.	MH, ML	A-7	0-1	98-100	90-100	80-99	70-98	41-70	13-30
	45-80	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
12B, 12C2-------- Iredell	0-9	Loam-------------	ML, CL-ML, CL	A-4, A-6	0-1	99-100	95-100	80-95	51-70	25-38	5-12
	9-29	Clay-------------	CH	A-7	0	99-100	60-100	60-100	55-95	54-11	29-85
	29-80	Variable---------	---	---	---	---	---	---	---	---	---
13B, 13C2-------- Lignum	0-12	Loam-------------	SC, CL	A-4, A-6	0	95-100	95-100	80-100	55-90	20-35	9-19
	12-31	Salty clay loam, silty clay, clay.	CH CL	A-7	0-5	80-100	75-95	70-85	55-85	45-65	22-36
	31-62	Sandy clay loam, gravelly sandy clay loam, gravelly silty clay loam.	SC, CL, ML, SM	A-4, A-6, A-7, A-2	0-15	70-85	35-80	30-80	20-75	30-50	8-18
	62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
14B2, 14C2, 14D2- Madison	0-4	Sandy loam-------	SM	A-2, A-4	0-3	85-100	80-100	60-90	26-49	<35	NP-8
	4-32	Clay, clay loam	MH, ML	A-7	0-3	90-100	85-100	75-97	57-85	43-82	12-43
	32-80	Weathered bedrock	---	---	---	---	---	---	---	---	---
15B-------------- Masada	0-11	Fine sandy loam	ML, SM, SC, CL	A-4	0-5	90-100	75-100	60-85	35-70	<30	NP-8
	11-42	Clay loam, clay, gravelly clay.	MH, ML, CH, CL	A-7	0-10	80-100	70-100	65-90	50-80	45-65	20-35
	42-70	Clay loam, gravelly clay loam.	CL	A-6, A-7	0-10	80-100	70-100	65-90	50-80	30-45	15-25
16B2, 16C2, 16D2- Mecklenburg	0-5	Loam-------------	ML, SM	A-4, A-6, A-7-6	0-5	90-100	80-100	65-90	36-65	<45	NP-15
	5-33	Clay-------------	CH, MH	A-7	0-5	90-100	85-100	80-100	75-95	51-75	24-45
	33-70	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
17D2: Nason	0-9	Loam	ML, CL-ML, SM	A-4	0-5	80-100	75-100	55-95	35-85	<38	NP-10
	9-27	Silty clay loam, silty clay, clay.	CL, CH	A-7	0-5	80-100	75-100	70-95	65-90	40-60	15-30
	27-42	Channery silt loam, silt loam.	CL-ML, SC, GM-GC	A-2, A-4, A-6	0-5	50-80	45-75	40-75	30-70	20-35	4-12
	42	Weathered bedrock	---	---	---	---	---	---	---	---	---
18B: Orange	0-10	Loam	SM, ML, CL-ML, SM-SC	A-4	0	90-95	85-95	75-95	45-85	<24	NP-6
	10-37	Clay, silty clay, silty clay loam.	CH	A-7	0	90-95	85-95	75-95	65-90	70-99	45-70
	37-43	Silt loam, very channery silt loam, sandy clay loam.	SC, CL	A-6, A-7	0-40	70-100	50-100	45-100	40-90	25-45	10-25
	43	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
19D2: Pacolet	0-5	Sandy loam	SM, SM-SC	A-2, A-1-6	0-2	85-100	80-100	42-80	16-35	<28	NP-7
	5-38	Sandy clay, clay loam, clay.	ML, MH, CL	A-6, A-7	0-1	80-100	80-100	60-95	51-75	38-65	11-30
	38-72	Clay loam, sandy clay loam, sandy loam.	CL, CL-ML, SM-SC, SC	A-2, A-4, A-6	0-2	80-100	70-100	60-80	30-60	20-35	5-15
20D, 20E: Poindexter	0-6	Silt loam	ML, CL-ML	A-4	0	90-100	85-100	85-100	55-90	<25	NP-7
	6-21	Clay loam, sandy clay loam, loam.	SC, CL	A-6	0	90-100	85-100	80-100	35-85	30-40	11-20
	21-47	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
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
21D2: Tatum	0-8	Loam	ML, CL, SM	A-4	0	85-100	80-100	65-100	40-90	20-34	NP-10
	8-35	Silty clay loam, silty clay, clay.	MH	A-7	0	75-100	70-100	60-100	55-95	50-80	10-36
	35-60	Silt loam, loam, silty clay loam.	ML, CL	A-6, A-7	0	75-100	70-100	60-90	60-85	30-45	12-20
22B: Turbeville	0-11	Fine sandy loam	ML, SM, CL-ML	A-2, A-4	0-20	80-100	75-100	50-90	30-75	<28	NP-7
	11-72	Clay, clay loam, sandy clay.	CL, MH, CH	A-7	0-20	70-100	65-100	60-100	55-95	45-65	16-35
23D2: Wedowee	0-5	Sandy loam	SM, SM-SC	A-4	0	95-100	90-100	60-85	30-50	<30	NP-6
	5-8	Loam, sandy clay loam.	SM, SC, CL, ML	A-4, A-6	0	90-100	90-100	80-97	40-75	<32	NP-15
	8-33	Sandy clay, clay loam, clay.	SC, ML, CL, SM	A-4, A-6, A-7	0	95-100	95-100	65-97	45-70	30-58	10-25
	33-72	Variable	---	---	---	---	---	---	---	---	---
24B: Worsham	0-5	Loam	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	70-100	50-90	20-35	4-12
	5-33	Sandy clay loam, sandy clay, clay.	SC, CH, CL	A-2, A-7	0-5	90-100	85-100	70-100	30-95	42-66	22-40
	33-62	Sandy loam, sandy clay loam, clay loam.	SC, CL	A-2, A-4, A-6, A-7	0-10	90-95	80-95	50-90	30-70	20-50	8-30

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less 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 estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
1B2, 1C2--------- Appling	0-6	5-15	1.30-1.55	2.0-6.0	0.10-0.15	4.5-5.5	Low-----------	0.24	4	.5-1
	6-26	35-60	1.25-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Moderate-----	0.20		
	26-46	20-50	1.25-1.55	0.6-2.0	0.12-0.16	4.5-5.5	Low-----------	0.24		
	46-72	---	---	---	---	---	-------------	----		
2C, 2D, 2E------- Ashlar	0-21	5-15	1.30-1.55	2.0-6.0	0.08-0.15	4.5-5.5	Low-----------	0.24	2	.5-1
	21-37	5-15	1.30-1.55	2.0-6.0	0.04-0.14	4.5-5.5	Low-----------	0.24		
	37	---	---	---	---	---	-------------	----		
3B--------------- Bolling	0-15	5-20	1.20-1.55	0.6-6.0	0.10-0.20	4.5-7.3	Low-----------	0.28	4	1-2
	15-24	20-35	1.30-1.60	0.6-2.0	0.13-0.19	4.5-7.3	Moderate-----	0.28		
	24-51	25-55	1.30-1.60	0.6-2.0	0.10-0.19	5.6-7.3	Moderate-----	0.28		
	51-60	---	---	---	---	---	-------------	----		
4B--------------- Caroline	0-17	10-20	1.35-1.45	0.6-6.0	0.08-0.15	4.5-6.0	Low-----------	0.43	5	.5-3
	17-70	35-55	1.40-1.50	0.06-0.6	0.14-0.22	4.5-5.5	Moderate-----	0.32		
5B2, 5C2--------- Cecil	0-7	5-20	1.0-1.5	2.0-6.0	0.12-0.14	4.5-6.0	Low-----------	0.28	3	.7-2
	7-45	40-60	1.3-1.5	0.6-2.0	0.13-0.15	4.5-5.5	Moderate-----	0.28		
	45-72	---	---	---	---	---	-------------	----		
6*:										
Chewacla---------	0-8	10-27	1.25-1.55	0.6-2.0	0.15-0.24	4.5-6.5	Low-----------	0.28	4	1-3
	8-43	18-35	1.25-1.55	0.6-2.0	0.15-0.24	4.5-6.5	Low-----------	0.32		
	43-70	15-35	1.25-1.55	0.6-2.0	0.15-0.24	4.5-6.5	Low-----------	0.32		
Toccoa-----------	0-9	3-17	1.25-1.55	2.0-6.0	0.09-0.12	5.1-6.5	Low-----------	0.10	4	1-2
	9-65	2-19	1.25-1.55	2.0-6.0	0.09-0.12	5.1-6.5	Low-----------	0.10		
Augusta----------	0-14	10-25	1.25-1.55	0.6-2.0	0.15-0.22	4.5-6.0	Low-----------	0.15	4	.5-2
	14-63	20-35	1.25-1.55	0.6-2.0	0.12-0.18	4.5-6.0	Low-----------	0.24		
7---------------- Forestdale	0-11	10-25	1.50-1.55	0.2-0.6	0.20-0.22	4.5-6.0	Low-----------	0.43	3	1-3
	11-46	35-60	1.50-1.60	<0.06	0.14-0.18	4.5-6.0	High---------	0.28		
	46-62	10-35	1.45-1.55	0.2-0.6	0.17-0.22	4.5-7.3	Moderate-----	0.37		
8B2, 8C2--------- Georgeville	0-5	5-27	1.20-1.40	0.6-2.0	0.15-0.20	4.5-6.0	Low-----------	0.32	4	.5-2
	5-40	27-35	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low-----------	0.32		
	40-60	35-60	1.20-1.40	0.6-2.0	0.13-0.18	4.5-5.5	Low-----------	0.28		
	60-70	15-40	1.20-1.40	0.6-2.0	0.05-0.10	4.5-5.5	Low-----------	0.32		
9D--------------- Goldston	0-6	5-25	1.35-1.55	2.0-6.0	0.10-0.15	4.0-6.0	Low-----------	0.20	2	.5-1
	6-15	5-25	1.35-1.55	2.0-6.0	0.10-0.15	4.0-6.0	Low-----------	0.20		
	15-38	5-25	1.35-1.55	2.0-6.0	0.05-0.10	4.0-6.0	Low-----------	0.20		
10B, 10C2-------- Helena	0-7	5-20	1.58-1.62	2.0-6.0	0.10-0.12	4.5-6.0	Low-----------	0.37	3	.6-2
	7-22	20-35	1.46-1.56	0.2-0.6	0.13-0.15	4.5-5.5	Moderate-----	0.37		
	22-44	35-60	1.44-1.55	0.06-0.2	0.13-0.15	4.5-5.5	High---------	0.32		
	44-56	---	---	---	---	---	-------------	----		
11B2, 11C2------- Herndon	0-5	5-27	1.20-1.40	0.6-2.0	0.14-0.20	4.5-6.5	Low-----------	0.32	4	.5-1
	5-45	35-60	1.30-1.60	0.6-2.0	0.13-0.18	3.6-5.5	Low-----------	0.28		
	45-80	10-30	1.20-1.40	0.6-2.0	0.05-0.08	3.6-5.5	Low-----------	0.32		
12B, 12C2-------- Iredell	0-9	15-35	1.20-1.40	0.6-2.0	0.14-0.17	5.6-7.3	Low-----------	0.32	3	.5-2
	9-29	40-60	1.20-1.50	0.06-0.2	0.16-0.22	6.1-7.3	Very high----	0.20		
	29-80	---	---	---	---	---	-------------	----		
13B, 13C2-------- Lignum	0-12	10-25	1.20-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low-----------	0.43	3	.5-2
	12-31	35-55	1.25-1.55	0.06-0.6	0.10-0.18	4.5-5.5	Moderate-----	0.28		
	31-62	20-40	1.25-1.55	0.2-0.6	0.10-0.18	4.5-5.5	Low-----------	0.28		
	62	---	---	---	---	---	-------------	----		

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
14B2, 14C2, 14D2-Madison	0-4	5-20	1.30-1.60	2.0-6.0	0.11-0.15	4.5-6.0	Low-----------	0.32	4	.5-2
	4-32	35-60	1.30-1.60	0.6-2.0	0.13-0.18	4.5-5.5	Low-----------	0.32		
	32-80	---	---	---	---	---	-------------	----		
15B--------------Masada	0-11	5-20	1.20-1.50	2.0-6.0	0.10-0.17	4.5-5.5	Low-----------	0.32	4	1-3
	11-42	35-55	1.30-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Moderate-----	0.24		
	42-70	30-40	1.30-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Moderate-----	0.2		
16B2, 16C2, 16D2-Mecklenburg	0-5	8-25	1.30-1.50	0.6-2.0	0.14-0.19	5.6-7.3	Low-----------	0.28	4	.5-2
	5-33	40-60	1.40-1.60	0.06-0.2	0.12-0.14	5.6-7.3	Moderate-----	0.32		
	33-70	---	---	---	---	---	-------------	----		
17D2-------------Nason	0-9	10-25	1.25-1.55	0.6-2.0	0.14-0.20	4.5-6.5	Low-----------	0.37	4	1-3
	9-27	35-50	1.30-1.60	0.6-2.0	0.12-0.19	4.5-5.5	Moderate-----	0.28		
	27-42	10-25	1.25-1.55	0.6-2.0	0.15-0.20	4.5-5.5	Low-----------	0.28		
	42	---	---	---	---	---	-------------	----		
18B--------------Orange	0-10	10-25	1.25-1.55	0.6-2.0	0.14-0.20	5.1-6.5	Low-----------	0.49	3	1-3
	10-37	35-60	1.35-1.65	0.06-0.2	0.10-0.19	5.1-6.5	High----------	0.28		
	37-43	10-35	1.35-1.65	0.2-0.6	0.13-0.20	5.6-7.8	Low-----------	0.28		
	43	---	---	---	---	---	-------------	----		
19D2-------------Pacolet	0-5	8-20	1.00-1.50	2.0-6.0	0.08-0.12	4.5-6.5	Low-----------	0.28	3	.5-2
	5-38	35-65	1.30-1.50	0.6-2.0	0.12-0.15	4.5-5.5	Low-----------	0.28		
	38-72	15-30	1.20-1.50	0.6-2.0	0.08-0.15	4.5-5.5	Low-----------	0.28		
20D, 20E---------Poindexter	0-6	10-25	1.25-1.55	2.0-6.0	0.12-0.20	5.0-7.3	Low-----------	0.37	3	.5-2
	6-21	20-35	1.35-1.65	0.6-2.0	0.13-0.19	5.0-7.3	Moderate-----	0.24		
	21-47	10-35	1.30-1.60	2.0-6.0	0.08-0.15	5.0-7.3	Low-----------	0.24		
	47	---	---	---	---	---	-------------	----		
21D2-------------Tatum	0-8	12-27	1.10-1.40	0.6-2.0	0.14-0.20	4.5-5.5	Low-----------	0.37	4	0-2
	8-35	45-60	1.40-1.60	0.6-2.0	0.10-0.19	4.5-5.5	Moderate-----	0.28		
	35-60	20-40	1.40-1.60	0.6-2.0	0.12-0.18	4.5-5.5	Low-----------	0.28		
22B--------------Turbeville	0-11	10-25	1.20-1.55	2.0-6.0	0.10-0.17	4.5-5.5	Low-----------	0.32	5	.5-2
	11-72	20-60	1.30-1.50	0.6-2.0	0.13-0.16	4.5-5.5	Moderate-----	0.24		
23D2-------------Wedowee	0-5	5-20	1.30-1.50	2.0-6.0	0.10-0.18	4.5-5.5	Low-----------	0.24	2	.5-1
	5-8	15-40	1.40-1.50	0.6-2.0	0.12-0.18	4.5-5.5	Low-----------	0.28		
	8-33	35-65	1.35-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Moderate-----	0.28		
	33-72	---	---	---	---	---	-------------	----		
24B--------------Worsham	0-5	10-25	1.25-1.55	0.6-2.0	0.14-0.20	4.5-5.5	Low-----------	0.37	4	1-3
	5-33	30-55	1.35-1.65	0.06-0.6	0.10-0.16	4.5-5.5	Moderate-----	0.28		
	33-62	10-40	1.20-1.50	0.2-0.6	0.08-0.19	4.5-5.5	Moderate-----	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--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 more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	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			
1B2, 1C2---------- Appling	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
2C, 2D, 2E-------- Ashlar	B	None--------	---	---	>6.0	---	---	20-40	Hard	Low------	High.
3B---------------- Bolling	C	Occasional	Very brief	Mar-Jul	1.5-2.5	Apparent	Dec-Mar	>60	---	Moderate	High.
4B---------------- Caroline	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
5B2, 5C2---------- Cecil	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
6*:											
Chewacla----------	C	Common------	Brief-----	Nov-Apr	0.5-1.5	Apparent	Nov-Apr	>60	---	High-----	Moderate.
Toccoa-----------	B	Frequent----	Brief-----	Jan-Dec	2.5-5.0	Apparent	Dec-Apr	>60	---	Low------	Moderate.
Augusta----------	C	Common------	Brief-----	Jan-May	1.0-2.0	Apparent	Jan-May	>60	---	High-----	Moderate.
7----------------- Forestdale	D	Frequent----	Brief to long.	Jan-Apr	0.5-2.0	Apparent	Jan-Apr	>60	---	High-----	Moderate.
8B2, 8C2---------- Georgeville	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
9D---------------- Goldston	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
10B, 10C2--------- Helena	C	None--------	---	---	1.0-2.5	Perched	Jan-Mar	48-60	Soft	High-----	High.
11B2, 11C2-------- Herndon	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
12B, 12C2--------- Iredell	D	None--------	---	---	1.0-2.0	Perched	Dec-Apr	>40	Soft	High-----	Low.
13B, 13C2--------- Lignum	C	None--------	---	---	1.0-2.5	Perched	Dec-May	>40	Hard	High-----	High.
14B2, 14C2, 14D2-- Madison	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
15B--------------- Masada	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
16B2, 16C2, 16D2-- Mecklenburg	C	None--------	---	---	>6.0	---	---	48-60	Hard	High-----	Moderate.
17D2-------------- Nason	C	None--------	---	---	6.0	---	---	40-60	Soft	Moderate	High.
18B--------------- Orange	D	None--------	---	---	1.0-3.0	Apparent	Dec-May	40-60	Hard	High-----	Moderate.
19D2-------------- Pacolet	B	None--------	---	---	6.0	---	---	>60	---	High-----	High.
20D, 20E---------- Poindexter	B	None--------	---	---	>6.0	---	---	40-60	Hard	Moderate	Moderate.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	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			
21D2----------- Tatum	C	None--------	---	---	>6.0	---	---	40-60	Soft	High-----	High.
22B------------ Turbeville	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
23D2----------- Wedowee	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	High.
24B------------ Worsham	D	None--------	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High-----	Moderáte.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Appling	Clayey, kaolinitic, thermic Typic Hapludults
*Ashlar	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Augusta	Fine-loamy, mixed, thermic Aeric Ochraquults
Bolling	Fine-loamy, mixed, thermic Aquic Hapludalfs
Caroline	Clayey, mixed, thermic Typic Paleudults
Cecil	Clayey, kaolinitic, thermic Typic Hapludults
Chewacla	Fine-loamy, mixed, thermic Fluvaquentic Dystrochrepts
*Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Georgeville	Clayey, kaolinitic, thermic Typic Hapludults
Goldston	Loamy-skeletal, siliceous, thermic, shallow Ruptic-Ultic Dystrochrepts
Helena	Clayey, mixed, thermic Aquic Hapludults
Herndon	Clayey, kaolinitic, thermic Typic Hapludults
Ijedell	Fine, montmorillonitic, thermic Typic Hapludalfs
Lignum	Clayey, mixed, thermic Aquic Hapludults
Madison	Clayey, kaolinitic, thermic Typic Hapludults
Masada	Clayey, mixed, thermic Typic Hapludults
Mecklenburg	Fine, mixed, thermic Ultic Hapludalfs
Nason	Clayey, mixed, thermic Typic Hapludults
Orange	Fine, montmorillonitic, thermic Albaquic Hapludalfs
Pacolet	Clayey, kaolinitic, thermic Typic Hapludults
*Poindexter	Fine-loamy, mixed, thermic Typic Hapludalfs
Tatum	Clayey, mixed, thermic Typic Hapludults
Toccoa	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Turbeville	Clayey, mixed, thermic Typic Paleudults
Wedowee	Clayey, kaolinitic, thermic Typic Hapludults
Worsham	Clayey, mixed, thermic Typic Ochraquults

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

☆U.S. GOVERNMENT PRINTING OFFICE : 1981—323-292/70

Accessibility Statement

The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at (800) 457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The USDA Target Center can convert USDA information and documents into alternative formats, including Braille, large print, video description, diskette, and audiotape. For more information, visit the TARGET Center's Web site (http://www.targetcenter.dm.usda.gov/) or call (202) 720-2600 (Voice/TTY).

Nondiscrimination Policy

The U.S. Department of Agriculture (USDA) prohibits discrimination against its customers, employees, and applicants for employment on the basis of race, color, national origin, age, disability, sex, gender identity, religion, reprisal, and where applicable, political beliefs, marital status, familial or parental status, sexual orientation, whether all or part of an individual's income is derived from any public assistance program, or protected genetic information. The Department prohibits discrimination in employment or in any program or activity conducted or funded by the Department. (Not all prohibited bases apply to all programs and/or employment activities.)

To File an Employment Complaint

If you wish to file an employment complaint, you must contact your agency's EEO Counselor (http://directives.sc.egov.usda.gov/33081.wba) within 45 days of the date of the alleged discriminatory act, event, or personnel action. Additional information can be found online at http://www.ascr.usda.gov/complaint_filing_file.html.

To File a Program Complaint

If you wish to file a Civil Rights program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, found online at http://www.ascr.usda.gov/complaint_filing_cust.html or at any USDA office, or call (866) 632-9992 to request the form. You may also write a letter containing all of the information requested in the form. Send your completed complaint form or letter by mail to U.S. Department of Agriculture; Director, Office of Adjudication; 1400 Independence Avenue, S.W.; Washington, D.C. 20250-9419; by fax to (202) 690-7442; or by email to program.intake@usda.gov.

Persons with Disabilities

If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).