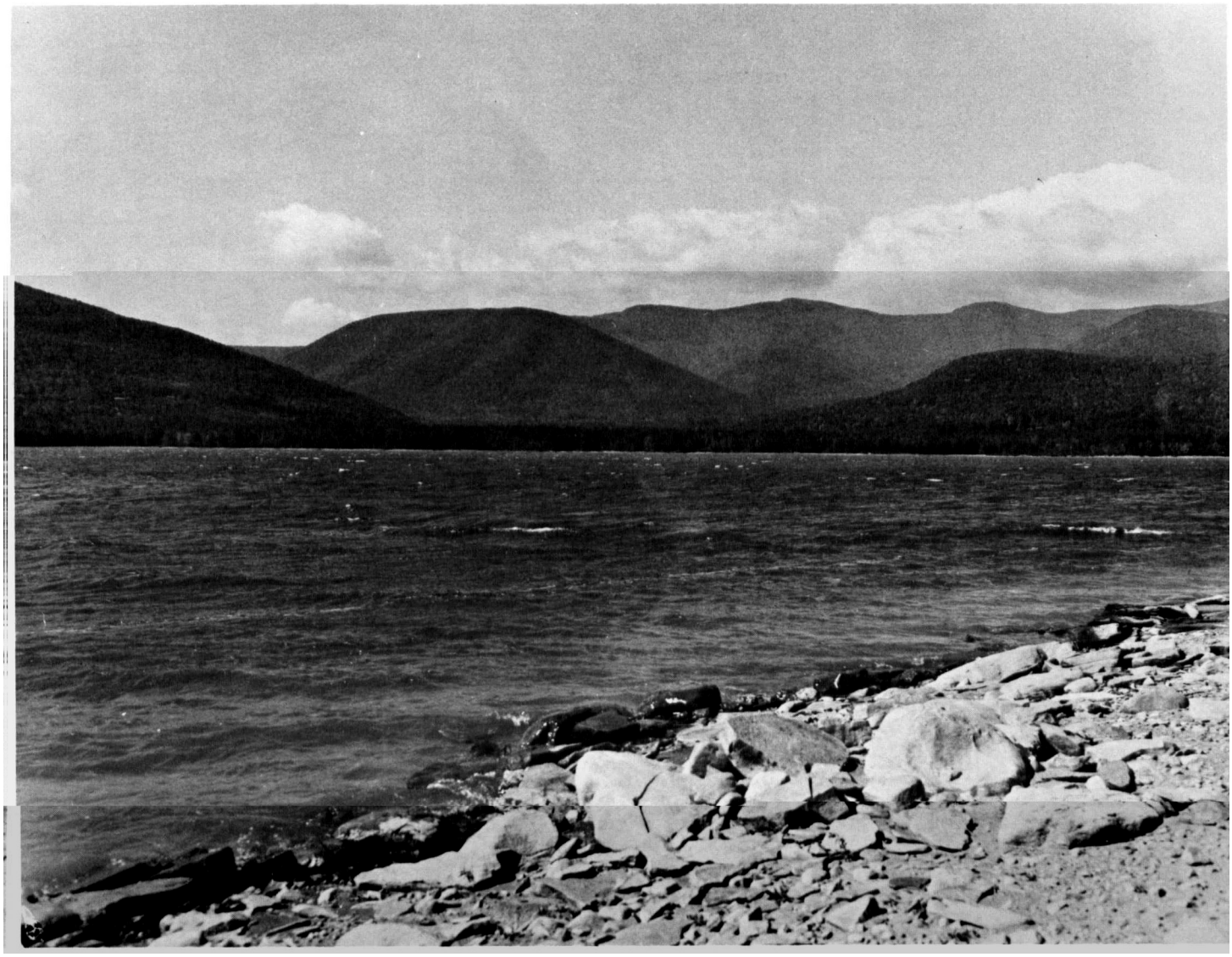
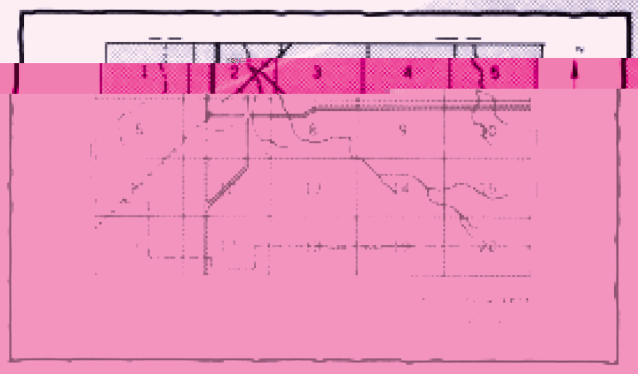
SOIL SURVEY OF
Ulster County, New York

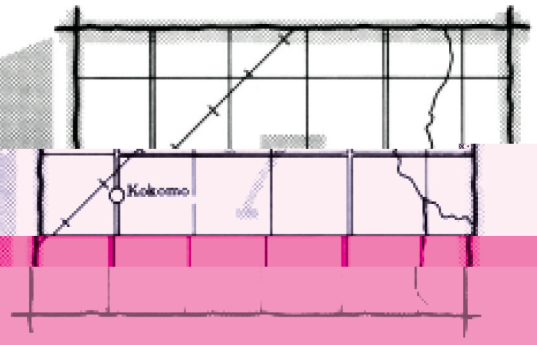


United States Department of Agriculture
Soil Conservation Service
in cooperation with
Cornell University Agricultural Experiment Station

HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"





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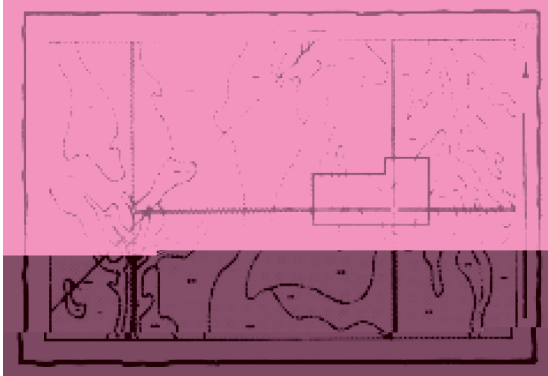

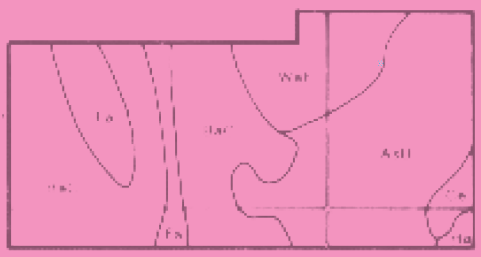

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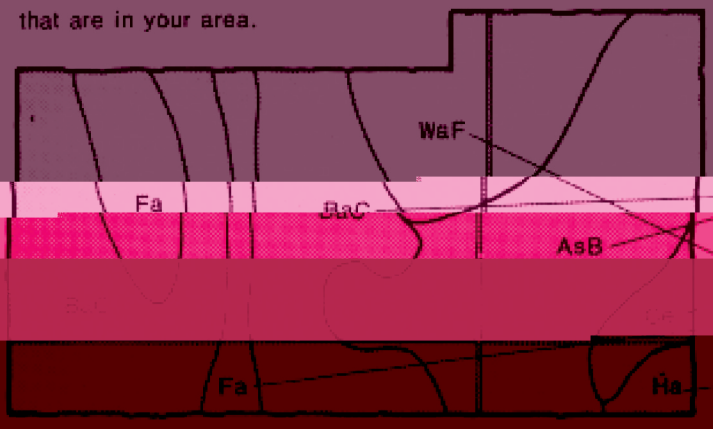
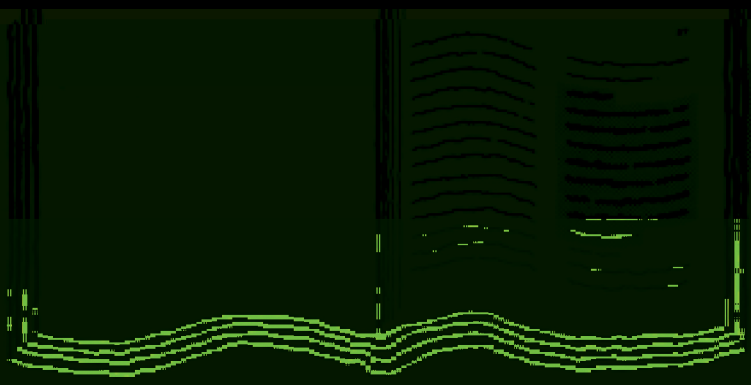


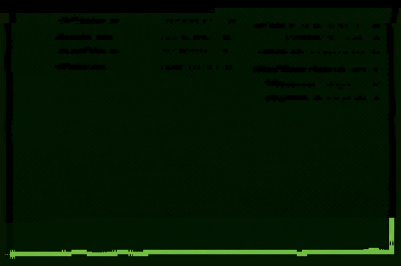
Symbols

- AsB
- BaC
- Ce
- Fa
- Ha
- WaF

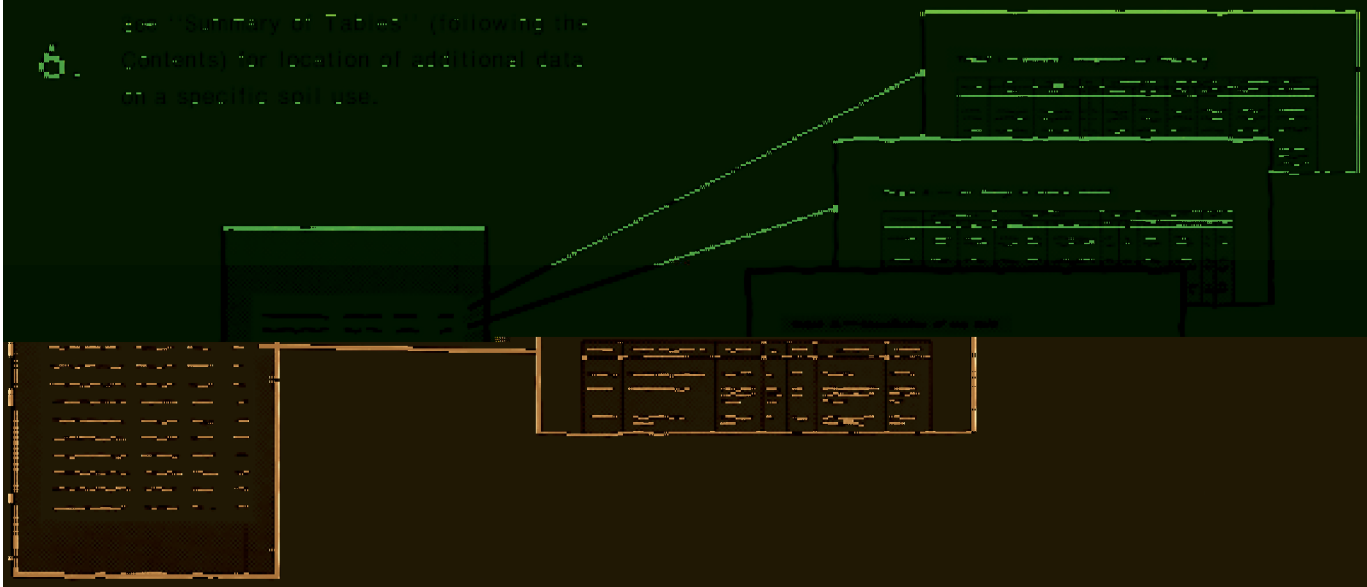
THIS SOIL SURVEY

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.



"Contents" for parts of the publication that will meet your specific needs.

Consult

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. 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 completed in the period 1968-73. Soil names and descriptions were approved in 1974. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1974. This survey was made cooperatively by the Soil Conservation Service and the Cornell University Agricultural Experiment Station. It is part of the technical assistance furnished to the Ulster County Soil and Water Conservation District. Part of the funding for this survey was provided by the Ulster County Legislature and the Palisades Interstate Park Commission through the Ulster County Soil and Water Conservation District and the Ulster County Planning Board. Also providing financial aid were the U.S. Department of Housing and Urban Development and the New York State Office of Planning Services.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: The Ashokan Reservoir is in the foreground, and the Catskill Mountains are in the background. Arnot, Oquaga, and Lackawanna soils are extensive in the mountains. Stones in the foreground help to control wave action erosion.

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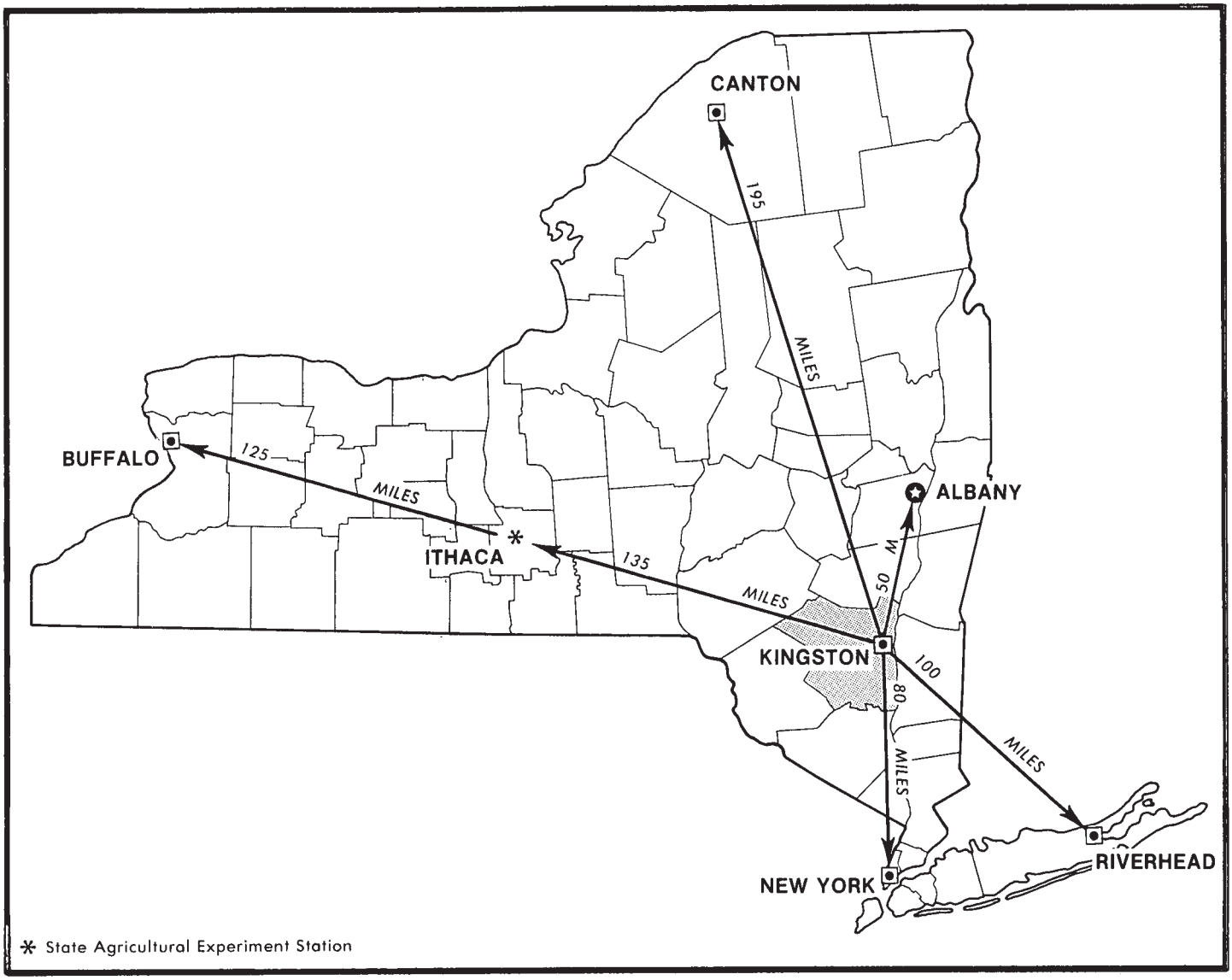
Foreword

The Soil Survey of Ulster County, New York contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

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

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for



Location of Ulster County in New York

SOIL SURVEY OF ULSTER COUNTY, NEW YORK

By Lawrence A. Tornes, Soil Conservation Service

Fieldwork by James H. Brown, Leslie Crandall, Gary C. Nightingale, and Lawrence A. Tornes, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with Cornell University Agricultural Experiment Station

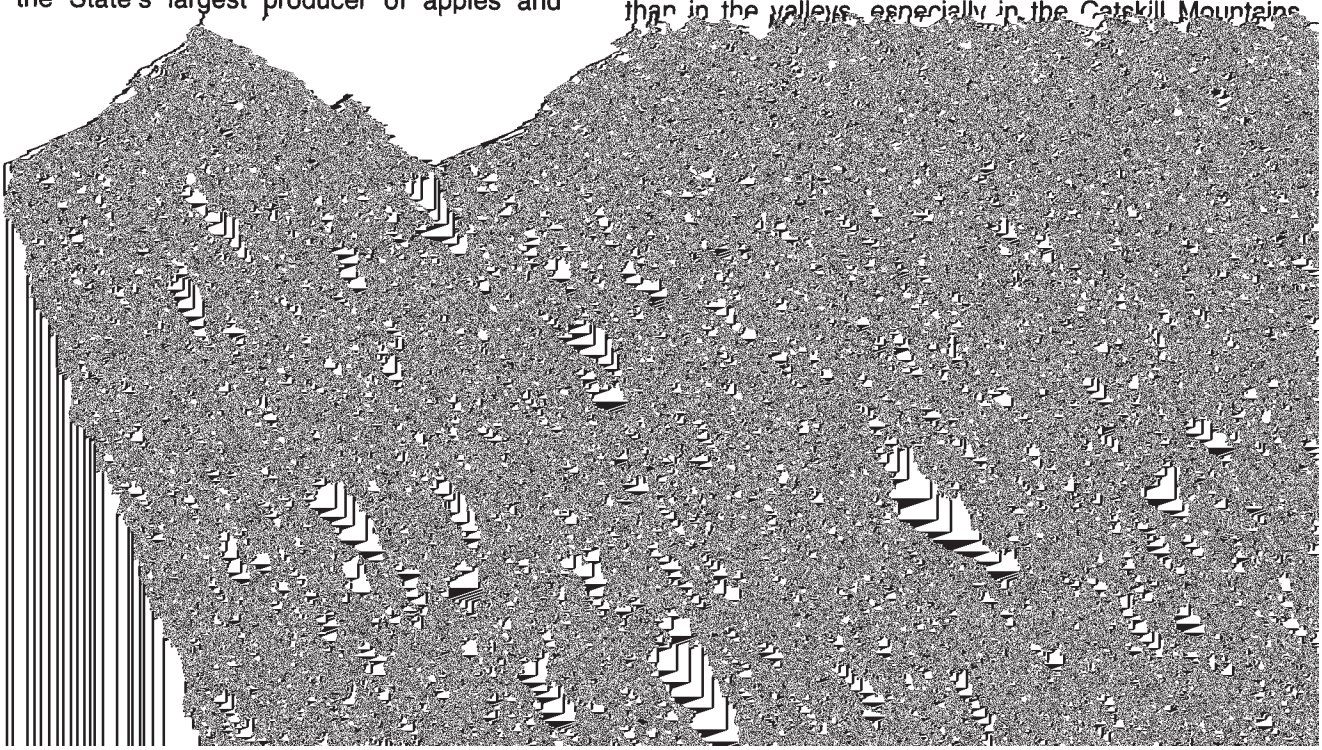
ULSTER COUNTY borders the west side of the Hudson River in the southeastern part of New York State (see map on facing page). It has a total area of 731,520 acres, or 1,143 square miles. Elevation ranges from sea level at the Hudson River to 4,204 feet on Slide Mountain in the Catskills. The Hudson River separates the survey area from Columbia and Dutchess Counties on the east. Ulster County is bounded by Greene and Delaware Counties on the north, by Orange and Sullivan Counties on the south, and by Sullivan and Delaware Counties on the west. Kingston, the county seat and largest city, has a population of about 25,544.

About 79 percent of Ulster County is in commercial and noncommercial forests (*9*). Most of the land in the Catskill, Shawangunk, and Marlboro Mountains is in forest. Only 12.5 percent of the county is in farms. Ulster County is the State's largest producer of apples and

are markedly cooler than the lowlands. Precipitation is well distributed throughout the year. In winter, snow occurs frequently, occasionally as blizzards; and snow covers the ground much of the time.

Normal rainfall is adequate for all crops, except for those on the shallow to bedrock soils and those on the excessively drained and somewhat excessively drained, moderately deep and deep soils that have low or very low available water capacity. Vegetables, orchards, and vineyards are irrigated on some farms during extended dry periods.

Orchards and vineyards are common in the southeastern part of the county, mainly because the length of the growing season and good air drainage are suited to these uses. In the mountainous parts of the county, snowfall generally occurs earlier in fall and later in spring than in the valleys, especially in the Catskill Mountains.



single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 24 inches, or 51 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 19 inches. The heaviest 1-day rainfall during the period of record was 6.35 inches at Mohonk Lake on August 19, 1955. Thunderstorms occur on about 31 days each year, and most occur in summer.

Average seasonal snowfall is 68 inches. The greatest snow depth at any one time during the period of record was 35 inches. On the average, 50 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent in spring and 65 percent during the rest of the year. Humidity is higher at night, and the average at dawn is about 85 percent. The percentage of possible sunshine is 65 in summer and 35 in winter. The prevailing wind is from the west-southwest. Average windspeed is highest, 12 miles per hour, in March.

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Physiography and bedrock geology

Russell H. Waines, professor of geology, Department of Geological Sciences, State University College at New Paltz, New York and Bernard S. Ellis, senior staff geologist, Soil Conservation Service, helped to prepare this section.

Ulster County is within two main physiographic provinces of the Eastern United States. The northwestern half of the county lies in the Catskill Mountain area of the Appalachian Plateaus province, and the southeastern half lies in the Hudson Lowland area of the Valley and Ridge province (fig. 1). The physiography, relief, rock type, and rock structure in the county are somewhat interrelated.

The Catskill Mountain area is generally underlain by interbedded Devonian sandstone, siltstone, and shale formations that have very gentle inclinations toward the west and northwest. In Ulster County, the Catskill Mountain area can be divided into two regions. The Catskill Mountain region to the northwest is essentially an uplifted dissected plateau with elevations that range from about 1,400 feet in the lowest part to 4,204 feet at Slide Mountain in the southern part of the town of Shandaken. A lower region, lying between the Catskill Mountains and the Rondout-Esopus Valley region, also seems to be a dissected plateau with hilltop elevations that range from 500 feet in the north to 1,300 feet in the south.

The Hudson Lowland area is made up of a complex of six regions that differ in elevation, rock type, and rock structure. Throughout the area the rocks have been previously folded and faulted at least once during mountain building. In addition to sandstone, siltstone, and shale, limestone and quartz conglomerates are locally abundant in this area.

The Rondout-Esopus Valley region on the western margin of the area is a belt of folded and faulted Devonian and Silurian limestone, shale, and sandstone which underlie valley floors in places and form resistant ridges in places. Elevation ranges from sea level to about 500 feet.

The Shawangunk Mountain region, between the Rondout-Esopus Valley region and the Wallkill Valley region, is underlain by generally northwesterly-inclined, faulted and folded, highly resistant beds of Silurian quartz pebble conglomerate and sandstone. These form a caprock that overlies the less resistant shale and sandstone of the Wallkill Valley region to the southeast. Nearly vertical cliffs that are as much as 300 feet are common along the southeastern margin, and elevation ranges to almost 2,300 feet.

The Wallkill Valley region lies between the Shawangunk Mountain region to the west and the Marlboro Mountain region to the east. It is underlain by Ordovician strata; mainly shale and lesser amounts of siltstone and sandstone which have been folded and faulted twice. Elevation ranges from near sea level to more than 1,000 feet.

The Marlboro Mountain region is along the eastern margin of Ulster County, between the Hudson River and the Wallkill Valley region to the south and the northern extension of the Rondout-Esopus Valley region to the north. It formed in twice folded and faulted Ordovician sandstone, siltstone, and shale. Sandstone is especially common between the city of Kingston and the Orange County line where it underlies a series of ridges and hills which reach an elevation of 1,100 feet in the town of Lloyd.

A region lies between the southern part of the Wallkill Valley region and the Shawangunk Mountain region and is mainly in the western part of the town of Shawangunk. It is underlain by twice folded and faulted Ordovician sandstone, siltstone, and shale that are somewhat similar to those of the Marlboro Mountain region.

In the southeastern part of the town of Marlboro is an area of shale and siltstone that are similar to those in the Wallkill Valley region, and in the extreme southeastern corner of that town is a sequence of limestones of Cambro-Ordovician age.

This description of geological subdivisions of the Hudson Lowland area in Ulster County is largely based on the Geologic Map of New York State (*13*). The Devonian sequence is divided into about twenty formations; the Silurian, four; and the Ordovician, three. The Cambro-Ordovician is represented by one formation. The soil survey of Ulster County indicates that approximately 11 percent of the surface area of the county is either exposed bedrock or bedrock covered by less than 10 inches of soil.

Glacial geology

Ulster County was completely covered by a continental glacier, which probably reached maximum thickness about 27,000 years ago (*3*). All preglacial landforms were modified by this glaciation until the ice margin withdrew from the county about 14,000 years ago.

The present relief of the county tends to be more subdued than the preglacial relief. Depth of glacial erosion by abrasion, scouring, and plucking is notable in some instances but is mostly only slight (*5*). Deposition of glacial till directly from the ice has masked most of original bedrock relief.

Many of the preglacial valleys were filled by glaciolacustrine deposits overlain by glaciofluvial deposits. Gen-

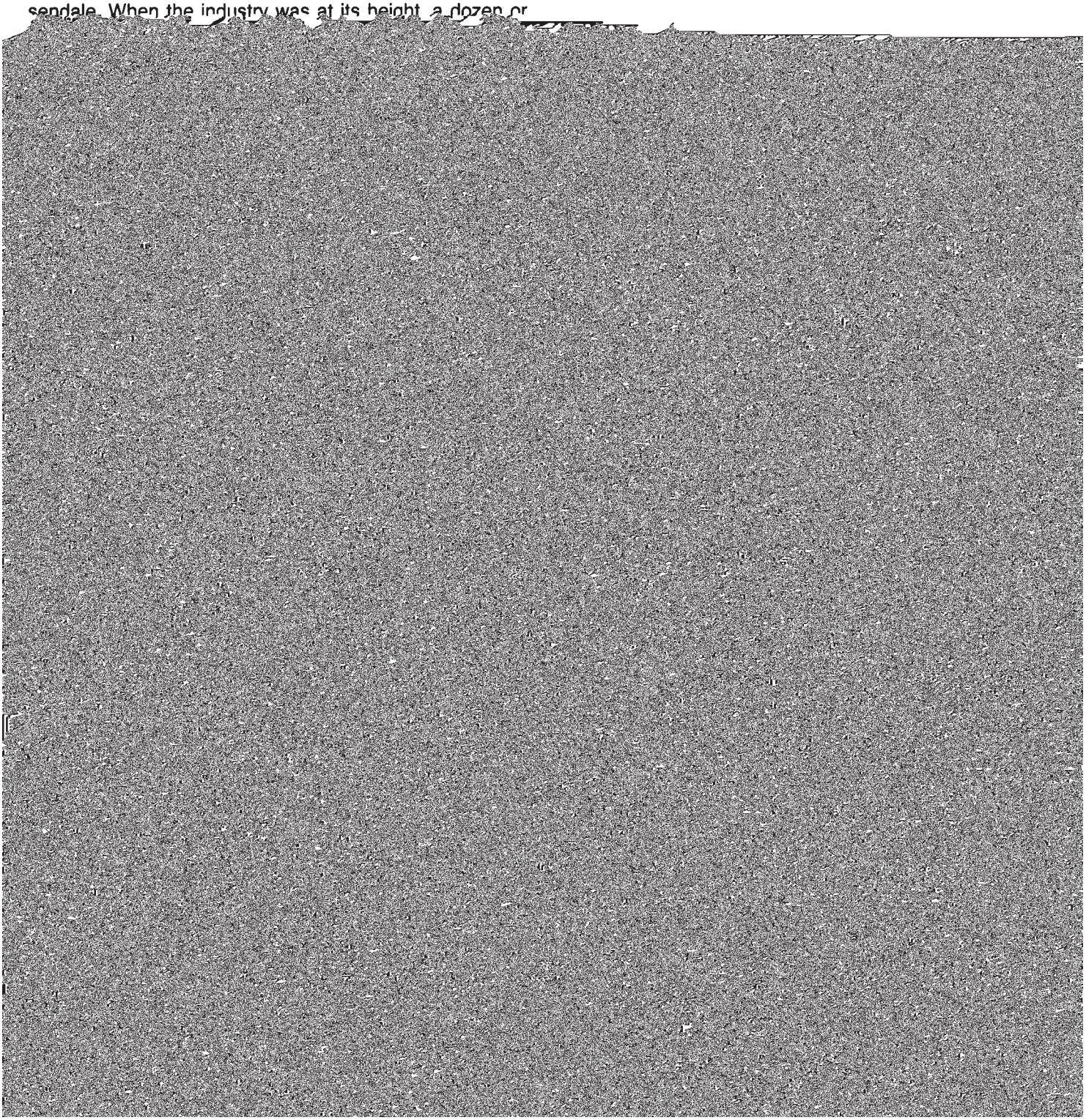
from developed springs. Approximately 50 percent of the population is served by public water systems that furnish water from reservoirs, wells, and the Hudson River.

The ground water resources are in sand and gravel deposits of glacial origin and in consolidated rock. The sand and gravel aquifers generally are small and restricted to the valley areas but are recharged rapidly and, therefore, yield large quantities of water. Aquifers with the most potential are in the valley from Wawarsing to south of Ellenville and at Ruby, Mount Marion, Veteran, and the confluence of the Saw Kill and Esopus Creek. Major parts of the Wallkill River and Esopus Creek valleys do not contain sand and gravel aquifers but are filled with relatively impermeable clay and silt.

Bedrock generally yields sufficient quantities of water

vania to the tidewater on the Hudson River (*6*). This canal has been abandoned for a long time, but stretches of the old canal and many locks can be seen in many places throughout the county. During construction of the canal, natural cement was accidently discovered in Rosendale. When the industry was at its height, a dozen or

The number of dairy cows decreased from 7,694 in 1959 to 4,719 in 1969. The number of chickens and sheep has remained the same during this period, but that of beef cattle and hogs has decreased. The number of horses and ponies has gradually increased.



After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it 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 kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other char-

but are in lower and wetter areas of the landscape. The

These gently sloping to steep soils are on the sides and

20 percent. Soils of minor extent make up the remaining 30 percent.

The Wellsboro soils formed in reddish glacial till deposits derived from sandstone, siltstone, and shale. They are deep, moderately well drained, and have a medium textured surface layer and upper part of the subsoil. The lower part of the subsoil and substratum is medium textured or moderately coarse textured. A dense fragipan starting at a depth of 15 to 25 inches restricts root penetration and the downward movement of water. A seasonal high water table is perched above the pan early in spring. Water movement in the soil layers above the pan is moderate. These gently sloping and sloping soils have smooth convex slopes and commonly receive runoff from adjacent higher soils.

The Wurtsboro soils formed in brownish glacial till deposits derived from sandstone, quartz, and conglomerate. They are deep, moderately well drained, and have a medium textured surface layer and medium textured or moderately coarse textured subsoil and substratum. A dense fragipan starts at a depth of 17 to 28 inches. Water movement in the soil layers above the pan is moderate and in the fragipan and substratum it is slow. A seasonal high water table is perched above the fragi-

20 inches. The well drained, brownish Bath soils are in areas where the fragipan has a relatively high silt content. The well drained Valois soils do not have a fragipan and generally are along lower valley sides. The somewhat excessively drained Hoosic soils are on terraces, benches, and small rounded hills containing gravelly glacial outwash deposits. Rock outcrop occasionally protrudes along the steepest parts of hillsides and ridge crests.

Many areas of this unit are in woodland. A few areas are used for hay and permanent pasture. The large number of stones and boulders on the surface makes the operation of farm machinery extremely difficult for crop production and pasture renovation. Temporary seasonal wetness in many areas, surface boulders, slow water movement through the fragipan, and slope in some areas are the main limitations for community developments. Improvement of wildlife habitat has potential in numerous areas.

4. Arnot-Oquaga-Lackawanna

Shallow to deep, excessively drained to moderately well drained, dominantly very steep, medium textured soils;

The Lackawanna soils are deep, well drained, and medium textured. They have a dense fragipan starting at a depth of 17 to 36 inches that restricts rooting. Water movement is moderate in the soil layers above the pan and slow in the fragipan and substratum. Most areas are very bouldery. These sloping to very steep soils commonly are on valley sides and mountainsides at the base of "step-risers."

Soils of minor extent include the Lordstown, Tuller, Swartswood, Wurtsboro, Wellsboro, Mardin, Valois, Tunkhannock, Hoosic, Barbour, and Suncook series. Large areas of Rock outcrop and areas of Alluvial land are also included in this unit. Numerous areas of the well drained Lordstown soils are where the glacial till deposits are brownish and 20 to 40 inches deep over rock. is dominantly hilltops, hillsides, and ridges that are affected by the bedrock. Side slopes commonly have a stairstep appearance because of the underlying bedrock. Many areas have large stones and boulders on the surface. Slope is mainly 3 to 15 percent but ranges from 0 to 35 percent.

This unit covers about 19 percent of the county. Lordstown soils make up about 25 percent of the unit, Arnot soils about 25 percent, and Mardin soils about 10 percent. Soils of minor extent make up the remaining 40 percent.

The Lordstown, Arnot, and Mardin soils formed in glacial till deposits that are similar and derived mainly from brownish siltstone, shale, and sandstone.

The Lordstown soils are moderately deep, well drained

The Hoosic and Chenango soils formed in glacial outwash deposits that are similar and have a high content of sand and gravel.

The Hoosic soils are deep, brownish colored, somewhat excessively drained, and have a medium textured or moderately coarse textured surface layer. The subsoil is medium textured to coarse textured. The substratum is commonly stratified sand and gravel. Water movement through the surface layer and subsoil is moderately rapid, and in the substratum it is rapid or very rapid. These nearly level to very steep soils are on low, complex sloping hills and ridges and on benches and terraces in valleys. A few areas of Hoosic soils are on outwash plains.

The Schoharie soils formed in coarse fragment-free glacial lake deposits dominated by clay and silt. They are deep, moderately well drained and well drained, and have a medium textured or moderately fine textured surface layer. The subsoil is fine textured or moderately fine textured, and the substratum is commonly varved silt and clay. Water movement through the subsoil and substratum is slow or very slow. In lesser sloping areas, a temporary seasonal high water table is perched in the lower part of the subsoil early in spring. These gently sloping to steep soils are on low convex ridges and knolls and on side slopes adjacent to dissecting drainageways.

The Chenango soils are deep, brownish colored, well drained to somewhat excessively drained, and have a medium textured surface layer. The gravelly or very gravelly subsoil is medium textured or moderately coarse textured. The substratum is dominantly stratified sand and gravel. Water movement through the surface layer and subsoil is moderate or moderately rapid, and in the substratum it is rapid. These nearly level to sloping soils are on ridges, benches, and terraces along valley floors and on undulating plains.

Soils of minor extent include the Tioga, Middlebury, Hamlin, Barbour, Wayland, Haven, Tunkhannock, Red Hook, Atherton, Unadilla, Raynham, Hudson, Odessa, and Valois soils. The well drained Tioga soils, and moderately well drained to somewhat poorly drained Middlebury soils are on alluvial flood plains adjacent to major streams traversing this unit. The well drained Hamlin and Barbour soils are on flood plains along some valley bottoms. The Hamlin soils are in alluvial deposits that have higher content of silt than Tioga soils, and Barbour soils are redder than Hamlin or Tioga soils. The poorly drained and very poorly drained Wayland soils are in low areas and slack water areas on flood plains along many streams. The well drained Haven soils are on a few benches and do not have the high gravel content of Hoosic soils. The well drained to somewhat excessively drained Tunkhannock soils are in many areas where the glacial outwash deposits are redder than in the similar, but more brownish, Chenango soils. The somewhat poorly drained Red Hook and poorly drained and very poorly drained Atherton soils are on low benches and are in depressions and potholes containing gravelly glacial outwash deposits. The well drained Unadilla soils and somewhat poorly drained Raynham soils are in areas of coarse fragment-free silty deposits. The moderately well drained and well drained Hudson soils are similar to reddish Schoharie soils, but they are in areas dominated by grayish glacial lake deposits. The somewhat poorly drained Odessa soils are similar to Schoharie soils, but wetter, and are on foot slopes and low flats. The well drained Valois soils are along lower valley sides where glacial till deposits overlie or merge with lower glacial outwash deposits; they are similar to, but do not have the high gravel content of Hoosic and Chenango soils.

Most areas of this unit are openland that is used for orchards, cultivated crops, hay, and pasture. Droughtiness and hazard of pollution of underground water supplies are the main limitations in the use of the gravelly Hoosic and Chenango soils. Slow or very slow internal water movement, temporary seasonal wetness, and instability are the chief concerns for most uses of the clayey Schoharie soils. Some areas, particular areas of Hoosic and Chenango soils, have good potential for community development but careful site selection is important. Alluvial soils, such as Tioga, on flood plains adjacent to streams that traverse this unit should be avoided for residential development.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the

soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic

AA—Alluvial land. This map unit consists of deep, unconsolidated alluvium that is commonly shifted or redeposited by stream overflow. The soil pattern is so

that can tolerate dryness are better suited than most other crops. Flat stone fragments hinder tillage and harvesting. The hazard of erosion and loss of moisture through runoff are moderate concerns. Conserving moisture, improving tilth, and maintaining the content of organic matter are needed. Such practices as minimum tillage, use of cover crops, incorporating crop residue into the soil, crop rotation, and tillage at the proper moisture condition can be used. The use of lime and fertilizers is also important in management.

Woodland productivity is poor. Machine planting of tree seedlings is practical on this soil. Seedling mortality is high because of droughtiness of the soil.

The shallow depth to bedrock severely limits most community development. Effluent from septic tank absorption fields seeps over the bedrock and comes to the surface at rock outcrop or in very shallow areas. A vegetative cover maintained on the site helps to prevent erosion. This soil has potential for some recreational uses, even though the shallow depth to bedrock and flat stone fragments can present hazards for some uses.

inches. It is channery silt loam in the upper part and channery loam in the lower part. Thick-bedded gray sandstone and siltstone bedrock is at a depth of about 32 inches.

Included with this unit in mapping are Swartswood, Bath, Valois, and Hoosic soils that are intermingled with the Lordstown soils where the soil mantle is deep to bedrock; small areas of Tuller and Scriba soils that are in seeps and along drainageways; many areas of soils that have slopes of 25 to 35 percent; and some areas of soils on narrow benches that have slopes of 3 to 15 percent. Some included areas are nonbouldery, and a few areas have small spots of quarry rubble. Also included are large areas of soils that are similar to the Arnot and Lordstown soils but have a gravelly loam to gravelly sandy loam subsoil where the bedrock is quartz pebble conglomerate and sandstone.

The Arnot soil can have free water above the bedrock for periods in spring and after heavy rains. The root zone consists of 10 to 20 inches of well aerated soil over bedrock. A few roots penetrate fractures in the bedrock

areas across the slope wherever possible helps to protect them from erosion. Capability subclass VIIs.

ARF—Arnot-Oquaga-Rock outcrop complex, very steep. This map unit consists of a shallow, somewhat excessively drained and moderately well drained Arnot soils; moderately deep, well drained excessively drained Oquaga soils; and exposed bedrock. The Arnot soil is [illegible] consists of 20 to 40 inches of soil over bedrock. Available water capacity is low to moderate.

Permeability is moderate in both soils. Runoff is very rapid. Boulders are dominantly 2 to 6 feet across and 1 to 2 feet thick, but many are smaller and a few are larger. Distance between boulders varies, but it is generally 5 to 30 feet. Boulders cover 0.1 to 3 percent of the [illegible]

soil in these areas, but as the water table recedes, a few roots extend below this depth. Available water capacity of this zone is low, but generally enough water is present for plant growth. Permeability is moderate in the surface layer and subsoil and is moderate or moderately rapid in the substratum. Runoff is very slow. This soil also re-

sandy loam. Also included are thin, narrow strips of Tunkhannock soils on glacial-stream terraces and Alluvial land bordering the streams.

This soil is subject to occasional flooding. Flooding generally occurs when runoff is heavy in winter and early in spring. Floods are generally of brief duration. Depth of

Wayland soils that are in lower positions and are wetter; and some areas of soils that have a surface layer of loam, gravelly silt loam, and gravelly loam. Also included are small areas of Alluvial land and areas of a soil that is similar to this Basher soil but has stratified sand and gravel in the substratum.

This soil is subject to flooding any time during the year, but it occasionally is flooded for brief periods when runoff is heavy in winter and in spring. In many areas, the seasonal high water table is controlled by the water level in the adjacent stream. It is at a depth of 6 to 24 inches in winter, in spring, and in other excessively wet periods. Rooting depth is controlled by the water table; the root zone is mainly in the upper 18 to 24 inches of the soil. Available water capacity of this zone is moderate. Permeability is moderate in the surface layer, is moderate or moderately slow in the subsoil, and is moderate or moderately rapid in the substratum. Runoff is slow or very slow. In unlimed areas, reaction is very strongly acid to medium acid in the surface layer and subsoil.

Most areas of this soil are used for hay, pasture, and woodland. Broad areas have good potential for farming. Some areas are so narrow and uneven that cropping is not feasible. The more commonly flooded areas are better suited to pasture and trees than to other uses.

This soil is suited to row crops, hay, and pasture. Specialty crops can be grown, but flooding may result in crop loss in some years. Flooding and seasonal wetness are the main limitations. Spring planting is delayed because of wetness. Intensively cultivated areas should be artificially drained with surface and subsurface drains for high production. Keeping the soil from crusting after rains and maintaining tilth and a high level of fertility are concerns in management. Minimum tillage, incorporating crop residue into the soil, use of cover crops, and tilling and harvesting at the proper moisture condition are important in management.

Woodland productivity is high. Machine planting of tree seedlings is practical on this soil.

The hazard of flooding and seasonal wetness severely limit community development. This soil has potential for such recreational uses as paths and trails, golfing, and boating. Recreational buildings need to be anchored when constructed on the flood plain. This soil is a good

subsoil is a firm, dark yellowish brown gravelly loam fragipan that extends to a depth of 55 inches. The substratum to a depth of 65 inches is firm, dark yellowish brown gravelly loam.

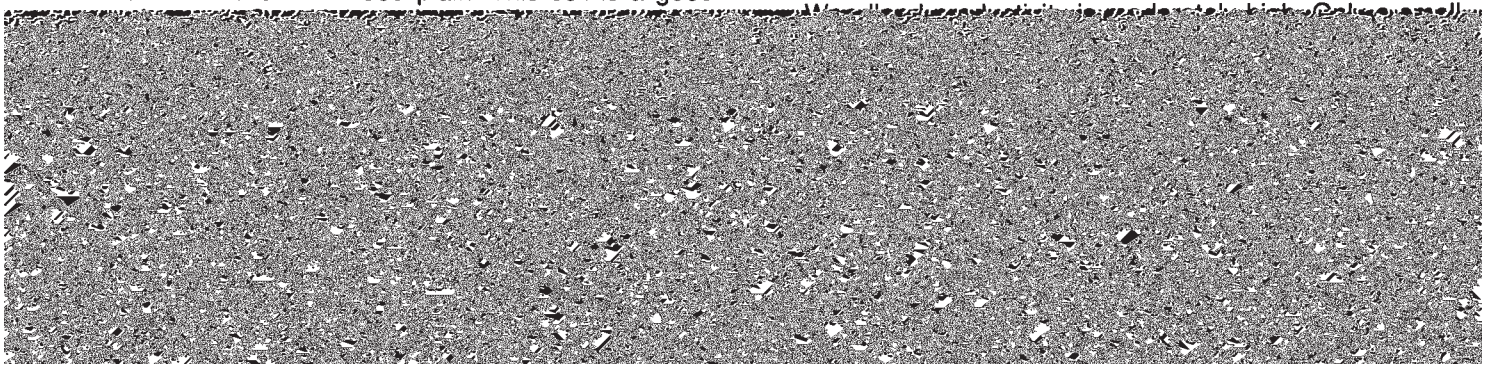
Included with this soil in mapping are small areas of moderately well drained Mardin soils in which the fragipan is at a shallower depth than in this Bath soil; small areas of somewhat poorly drained Volusia soils that are on foot slopes and in some drainageways; and narrow strips of Lordstown and Manlius soils that have bedrock at a depth of 20 to 40 inches.

This soil generally has free water above the fragipan for brief periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it. Roots are mainly confined to the 26- to 38-inch zone above the slowly permeable fragipan. Available water capacity is moderate. Permeability is moderate in the surface layer and in the upper part of the subsoil. Runoff is rapid. In unlimed areas, reaction is very strongly acid to medium acid in the surface layer and subsoil.

This soil has fair potential for farming. Most of the acreage is used for fruit crops, hay, and pasture. This soil has good potential for orchards. Slope, slight wetness, and slow permeability in the fragipan are limitations for community developments.

This soil is suited to crops, pasture, or forest. Use of this soil in farming is somewhat limited because of slope. Gravel and small stones hinder tillage in some areas. Erosion is a major concern, especially if slopes are long. Sod-forming crops are needed in the cropping system a large percentage of the time. Standard management practices, for example, minimum tillage, use of cover crops, good fertilization, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation, help to improve tilth and maintain the content of organic matter.

This soil is suited to orchards maintained in permanent sod cover. It is only moderately suited to vineyards, because vineyards are cultivated and erosion is a hazard. Soil compaction is a continuous hazard because spraying operations are commonly done during wet periods. Using lighter machinery with wider tire treads or using specially designed machinery when spraying helps to prevent soil compaction.

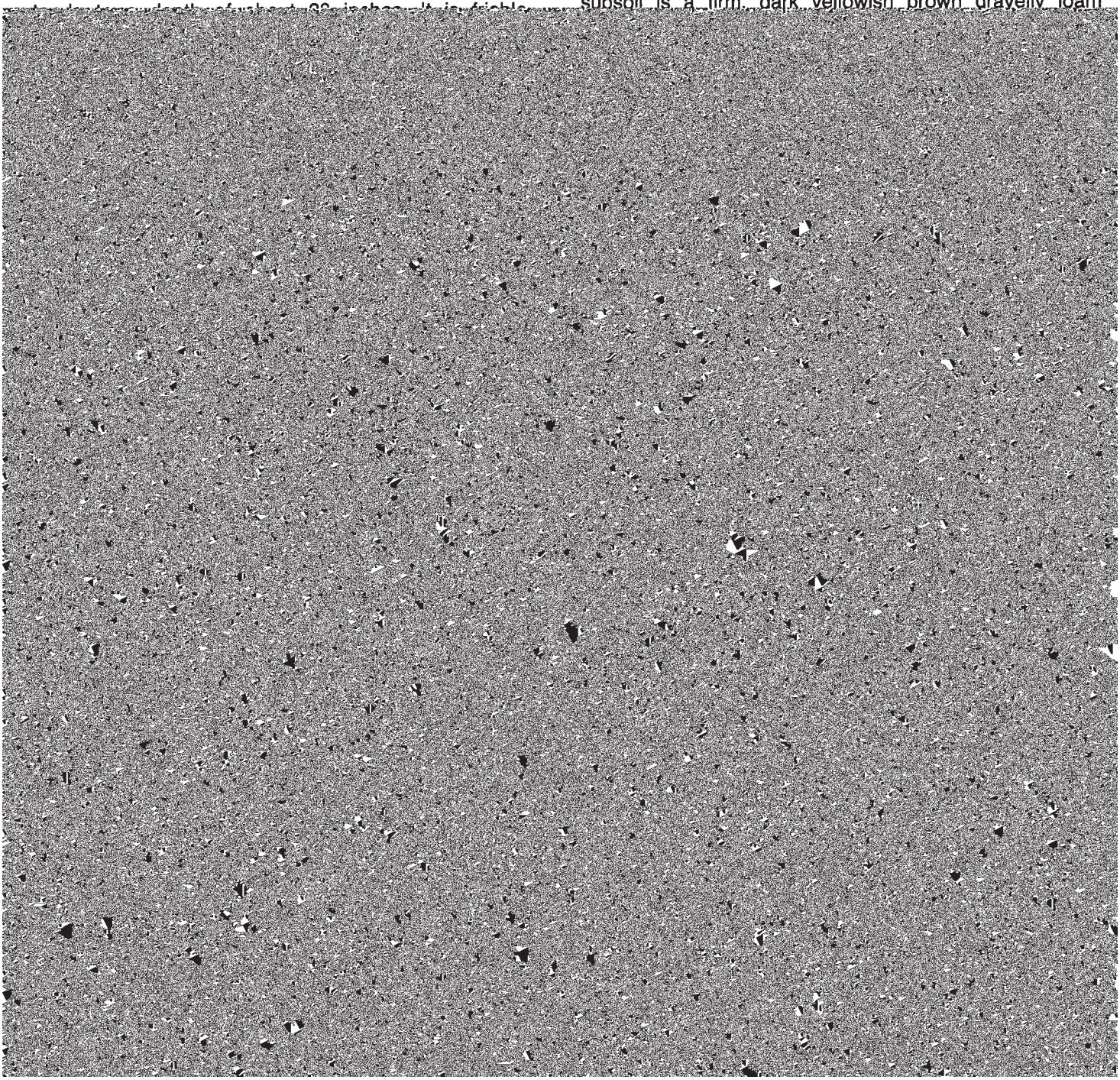


BgD—Bath gravelly silt loam, 15 to 25 percent slopes. This deep, moderately steep, well drained soil formed in glacial till. It is mainly on convex hillsides and valley sides. Most areas are dissected by narrow drainageways. Runoff generally is received from higher adjacent soils. Areas are mainly long and narrow in shape and are 5 to 30 acres in size.

Typically, the surface layer is dark brown gravelly silt loam about 6 inches thick. The upper part of the subsoil

BHE—Bath very stony soils, steep. These deep, well drained soils formed in glacial till. They are on convex hillsides and valley walls. Slope ranges from 25 to 35 percent. Most areas are long and narrow in shape and are 5 to 60 acres in size.

Typically, the surface layer is brown, very stony silt loam about 4 inches thick. The upper part of the subsoil extends to a depth of about 26 inches. It is friable, yellowish brown gravelly loam. The lower part of the subsoil is a firm, dark yellowish brown gravelly loam



on the sides and tops of the bedrock ridges. Areas are 10 to more than 500 acres in size. They vary in shape.

This unit is made up of 50 percent Bath gravelly silt loam, 30 percent Nassau shaly silt loam, and 20 percent other soils. Bath and Nassau soils are in such an intricate pattern that they are not shown separately on the soil map.

Typically, the surface layer of the Bath soil is dark brown gravelly silt loam about 6 inches thick. The upper part of the subsoil extends to a depth of about 28 inches. It is friable, yellowish brown gravelly loam. The lower part of the subsoil extends to a depth of 48 inches. It is a firm, dark yellowish brown gravelly loam fragipan. Dark gray shale bedrock is at a depth of about 48 inches.

Typically, the surface layer of the Nassau soil is brown shaly silt loam 6 inches thick. The upper part of the subsoil extends to a depth of 10 inches. It is very friable, yellowish brown very shaly silt loam. The lower part of the subsoil extends to a depth of 16 inches. It is friable, brown very shaly silt loam. Dark gray shale bedrock is at a depth of about 16 inches.

Included with these soils in mapping are small areas of well drained and excessively drained Manlius soils that are underlain with folded bedrock at a depth of 20 to 40 inches. They are intermingled with the major soils on the ridges and between the ridges. The somewhat poorly drained Volusia soils are in a few small depressions between the ridges. A few rock outcrop and wet spots are included, and most of these are shown on the soil map by special symbols. A strip about 3 miles wide in unit are used for vineyards and hay. The variable depth to bedrock; irregular relief; and the dense, slowly permeable fragipan in the Bath soil limit intensive use of these soils.

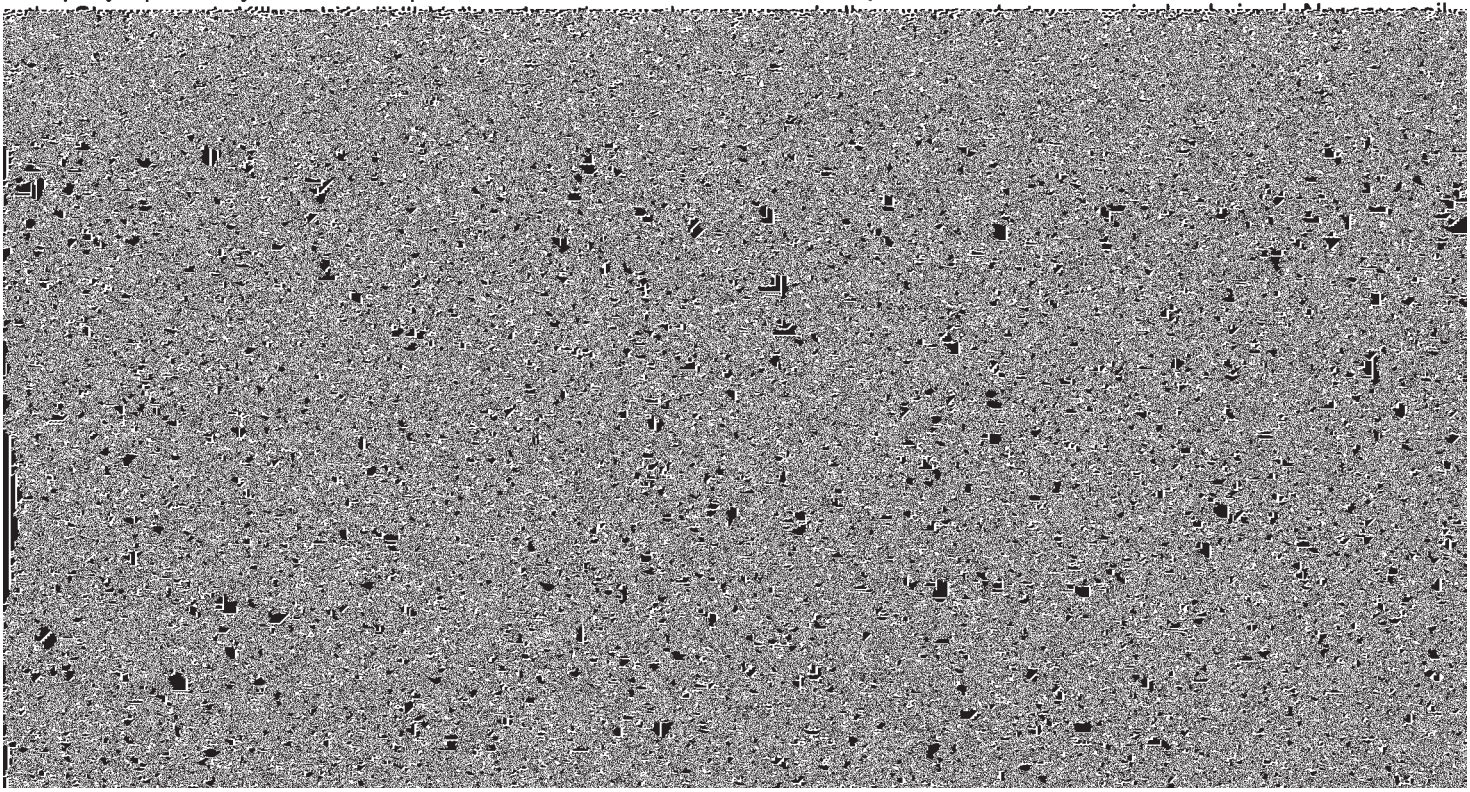
These soils can be cropped, but the cropping system needs to include a high proportion of sod-forming crops and pasture. Available water capacity varies within short distances. Erosion is a severe hazard. Conservation practices, other than sod-forming crops and minimum tillage, are very difficult to install because of the uneven topography.

Orchards maintained in permanent sod cover are suited to these soils. Driving lanes are needed in some areas to avoid the hazard of machinery upset. Because vineyards are clean cultivated, they are poorly suited to these soils because of the hazard of erosion.

Woodland productivity is moderately high on the Bath soils and poor on the Nassau soils. Machine planting of tree seedlings is practical in large areas of these soils.

The variable depth to bedrock, irregular relief, and the dense, slowly permeable fragipan in the Bath soil are severe limitations for most urban uses. Some esthetic homesite areas are in this unit but sites for sewage disposal can be very limiting. Most areas have potential for dwellings without basements if public sewers are available. Erosion is a hazard during construction. A vegetative cover maintained on the site helps prevent erosion. Capability subclass IVe.

BOD—Bath-Nassau-Rock outcrop complex, hilly. This map unit consists of a deep, well drained Bath soil;



Typically, the surface layer of the Nassau soil is brown shaly silt loam about 6 inches thick. The upper part of the subsoil extends to a depth of 10 inches. It is very friable, yellowish brown, very shaly silt loam. The lower part of the subsoil extends to a depth of 16 inches. It is friable, brown, very shaly silt loam. Dark gray shale bedrock is at a depth of about 16 inches.

Included with this unit in mapping are somewhat poorly drained Volusia soils and moderately well drained Mardin soils that are intermingled with the Bath soils on foot slopes and in depressions in areas between ridges; well drained to excessively drained Manlius soils that have bedrock at a depth of 20 to 40 inches and are intermingled with the major soils on ridges and between ridges; and lake-deposited Hudson, Cayuga, and Schoharie soils that are intermingled with the Bath soil between ridges. Also included are some very stony areas; areas that have slopes of 3 to 10 percent; and a strip about 3 miles wide in the Wallkill and Shawangunk Kill Valleys in which moderately well drained Cambridge soils are in the Bath position.

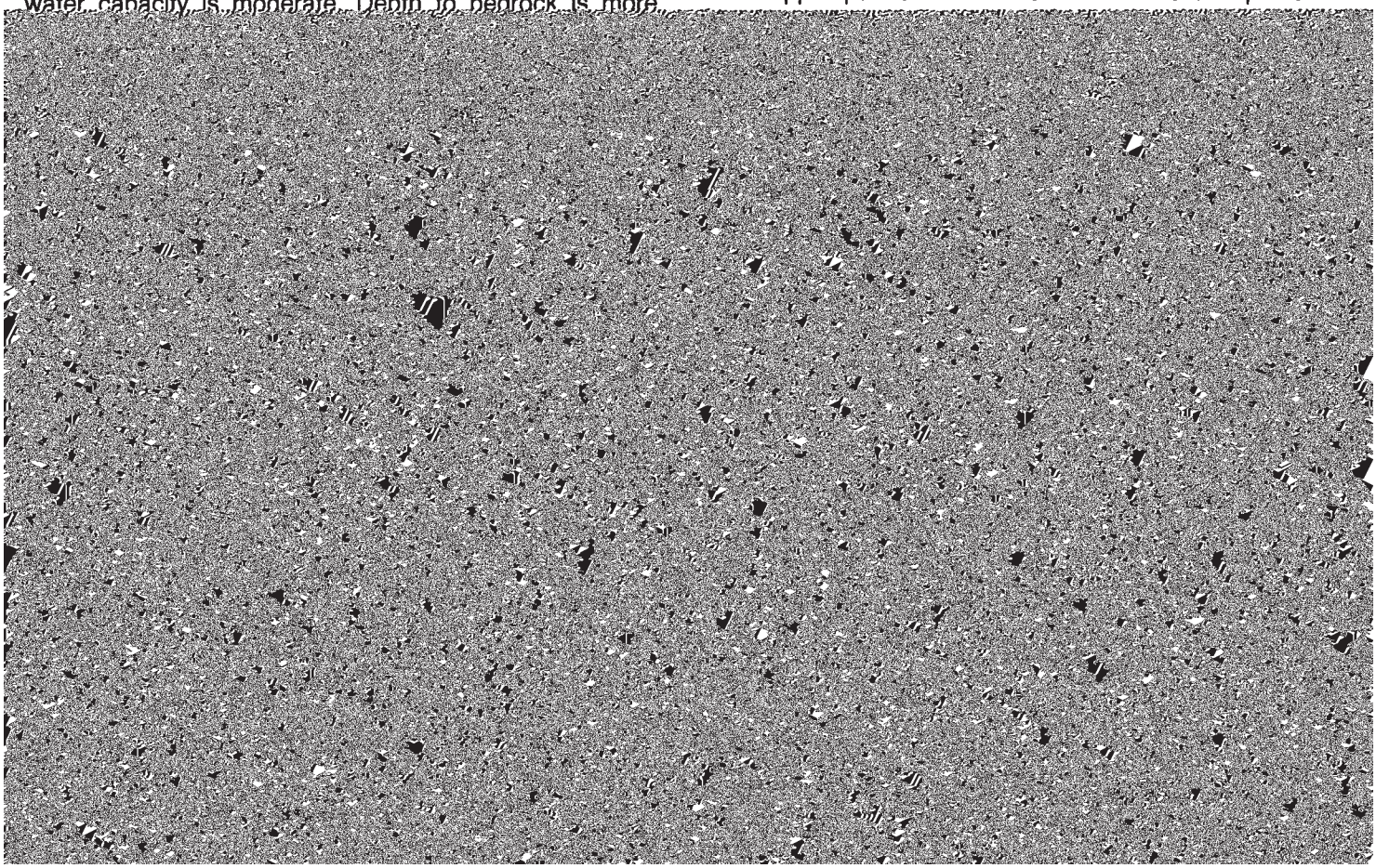
The Bath soil generally has free water above the fragipan for short periods late in fall, in winter, and early in spring. Roots are confined mainly to the 26- to 38-inch zone above the slowly permeable fragipan. Available water capacity is moderate. Depth to bedrock is more

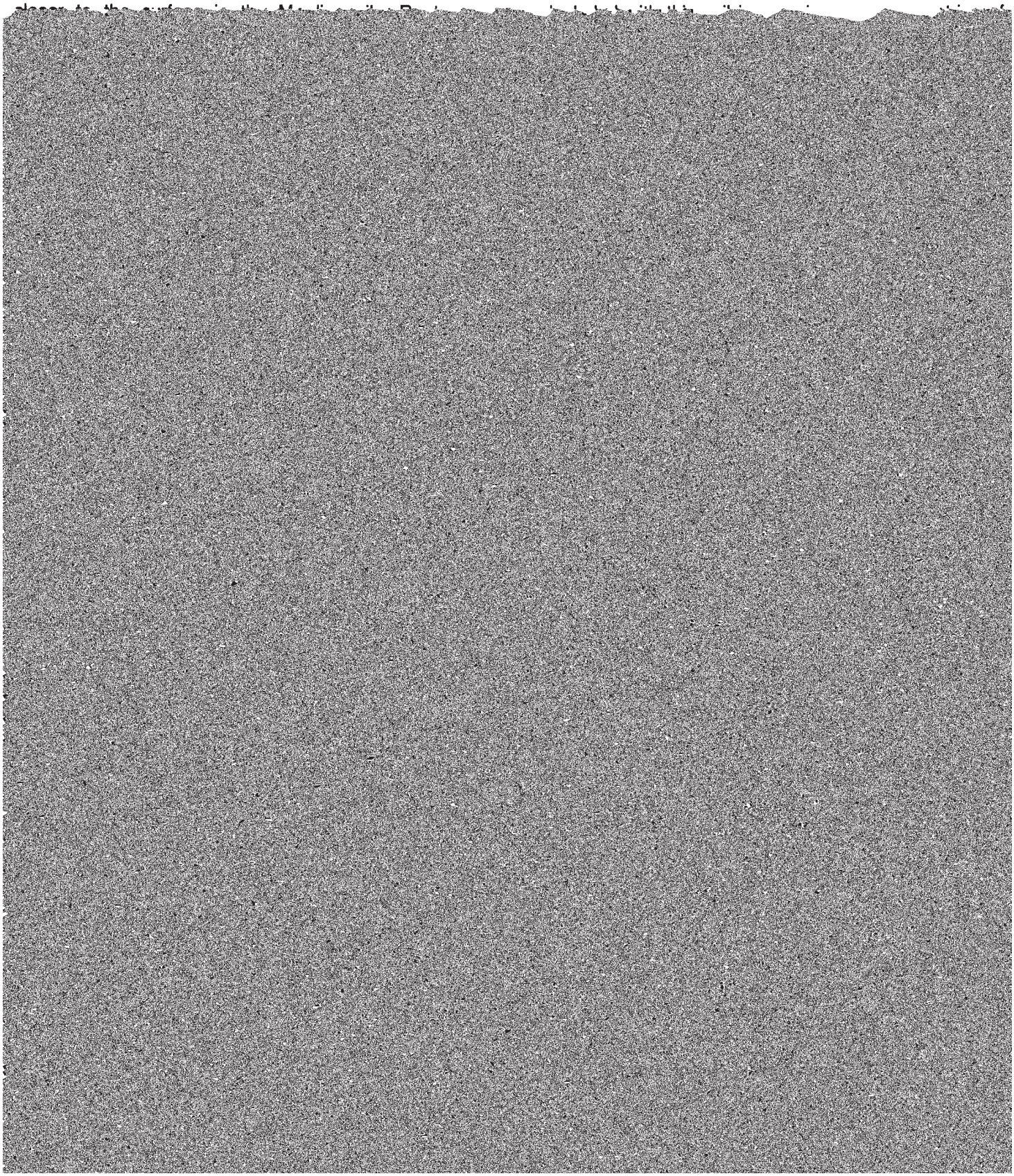
The variable depth to bedrock, the slope, rock outcrops, and the dense, slowly permeable fragipan in the Bath soil are severe limitations for most urban uses. Some esthetic homesites are in areas of this unit, but sites for sewage disposal can be very limiting. Most areas have potential for dwellings without basements if public sewers are available. Slope and rock outcrops are minor limitations to uses such as paths and trails. A vegetative cover maintained on the site during construction helps prevent erosion. Capability subclass VIs.

BRC—Bath and Mardin very stony soils, sloping. This map unit consists of well drained Bath soils and moderately well drained Mardin soils that are mainly on convex hilltops and hillsides and on foot slopes. These deep, very stony soils formed in glacial till. Slope ranges from 8 to 15 percent. Areas are oblong or irregular in shape and are 10 to 300 acres in size.

Many areas of this unit are made up of both soils, but some areas consist only of the Bath soils and others of only the Mardin soils. Surface stoniness dominates the capabilities of the unit so much that the difference between the Bath and Mardin soils is relatively unimportant.

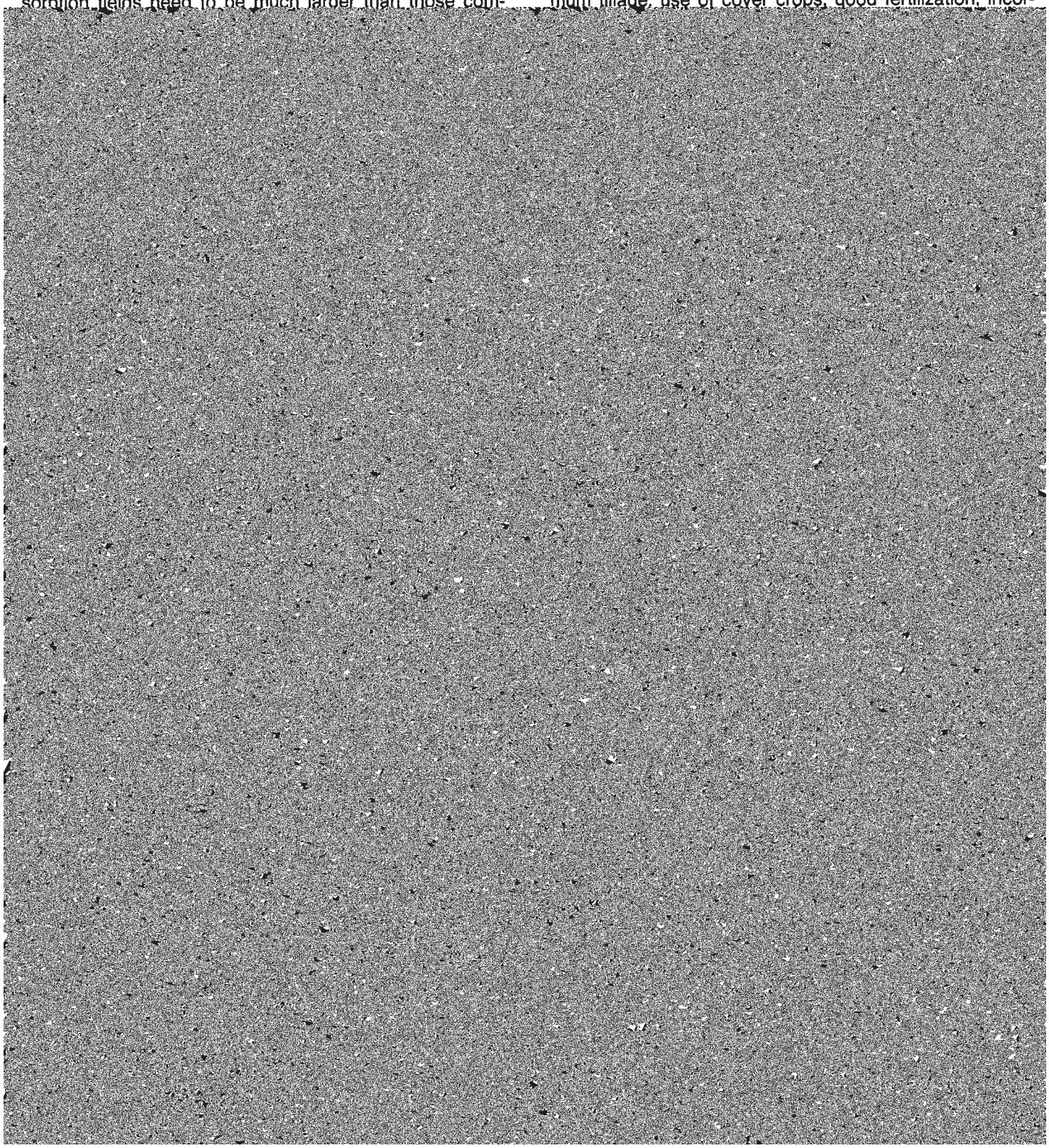
Typically, the surface layer of the Bath soil is dark grayish brown, very stony silt loam about 5 inches thick. The upper part of the subsoil extends to a depth of 28





basements are needed. Effluent from many septic tank absorption fields seeps to the surface in this soil. Absorption fields need to be much larger than those com-

be grown a large proportion of the time. Contour farming is practical and needs to be used in many areas. Minimum tillage, use of cover crops, good fertilization, incor-



in the surface layer. Also included are small areas of the more sandy Lamson soils and the finer textured Madalin soils, both of which have drainage similar to that of this soil.

This soil mainly is on lake plains and in upland basins that are not subject to flooding. Some areas on low stream terraces are subject to flooding during abnormal conditions. Unless this soil is artificially drained, it has water at the surface late in fall, in winter, in spring, and

or long and narrow in shape and are 5 to 80 acres in size.

Typically, the surface layer is black silt loam about 9 inches thick. The subsoil is friable, mottled, gray silt loam that extends to a depth of about 37 inches. The substratum is mottled, yellowish brown silt loam to a depth of about 40 inches and mottled, yellowish brown gravelly silt loam to a depth of about 60 inches.

many areas, this soil is a suitable site for ponds. Capability subclass IVw.

Ce—Carlisle muck. This deep, nearly level to depressional, very poorly drained soil formed in organic deposits more than 51 inches thick. It is in basins or depressions in swamps and marshes on glaciated uplands and outwash plains. Slope is generally less than 2 percent. Most areas are broad in shape and are 50 to 200 acres in size.

Typically, the surface layer is black muck about 12 inches thick. Very dark grayish brown, nonsticky, slightly plastic muck extends to a depth of about 61 inches.

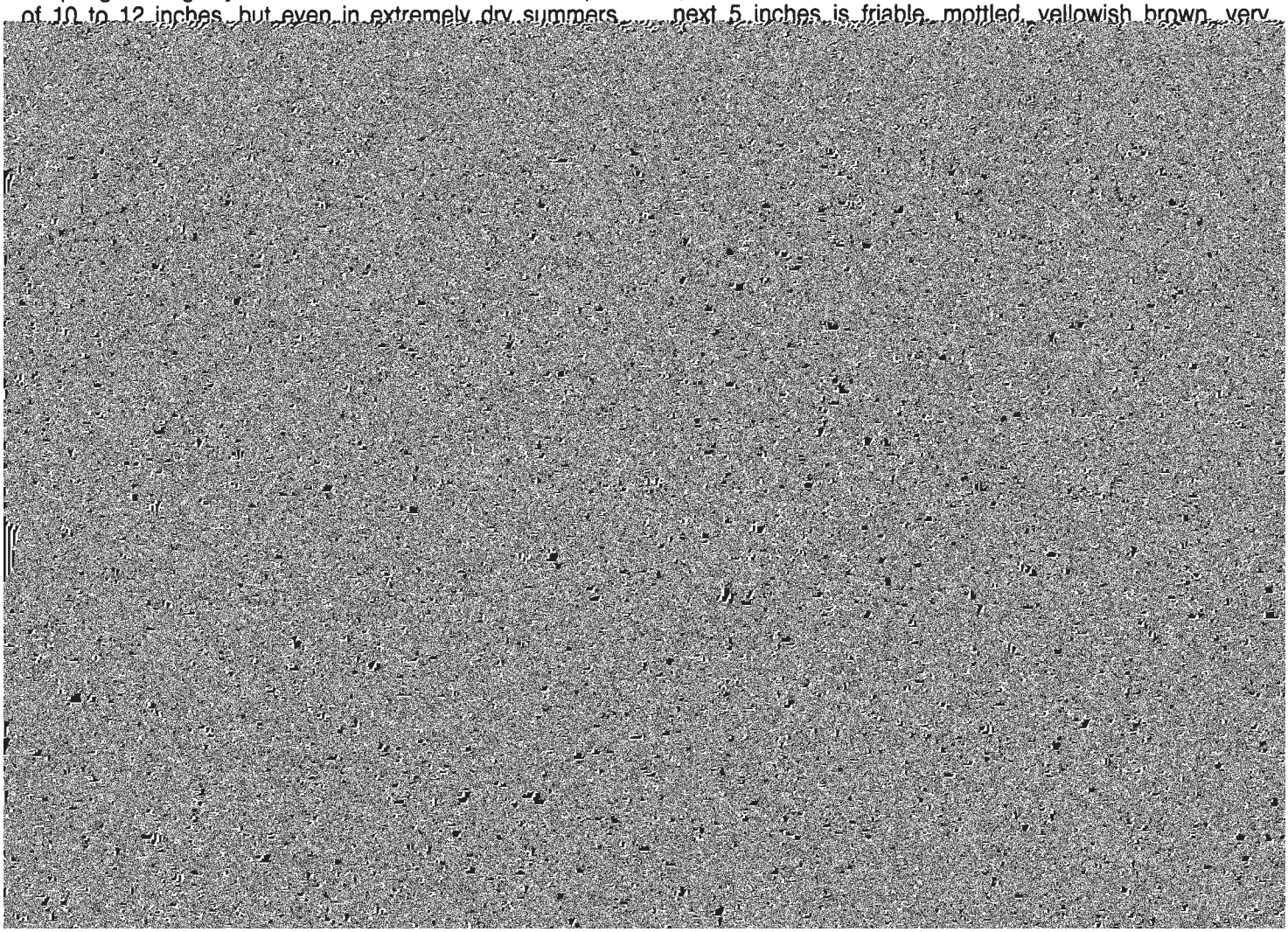
Included with this soil in mapping are narrow strips of Palms, Canandaigua, Atherton, Lyons, and Menlo soils around the periphery of basins. Palms soils make up nearly 15 percent of some areas. Also included are small areas of Fresh water marsh.

This soil has a seasonal water table and is ponded for long periods in undrained areas late in fall, in winter, and in spring. During dry summers, this soil dries to a depth of 10 to 12 inches, but even in extremely dry summers

This soil generally is not used for community and recreational developments because of prolonged wetness, low strength, frost damage, and poor trafficability (fig. 4). Mosquitoes generally present problems when this soil and surrounding soils are used in developments. Sloughing is a severe hazard in excavations in this soil. This soil is a potential commercial source of organic material. In some areas, this soil is a suitable site for dugout ponds or wildlife marshes. Capability subclass IVw.

CgA—Castile gravelly silt loam, 0 to 3 percent slopes. This deep, nearly level, moderately well drained soil formed in glacial outwash. It is in slight depressions on glacial outwash plains, valley trains, and in water-sorted deposits on moraines. Most areas are long and narrow in shape and are 5 to 20 acres in size.

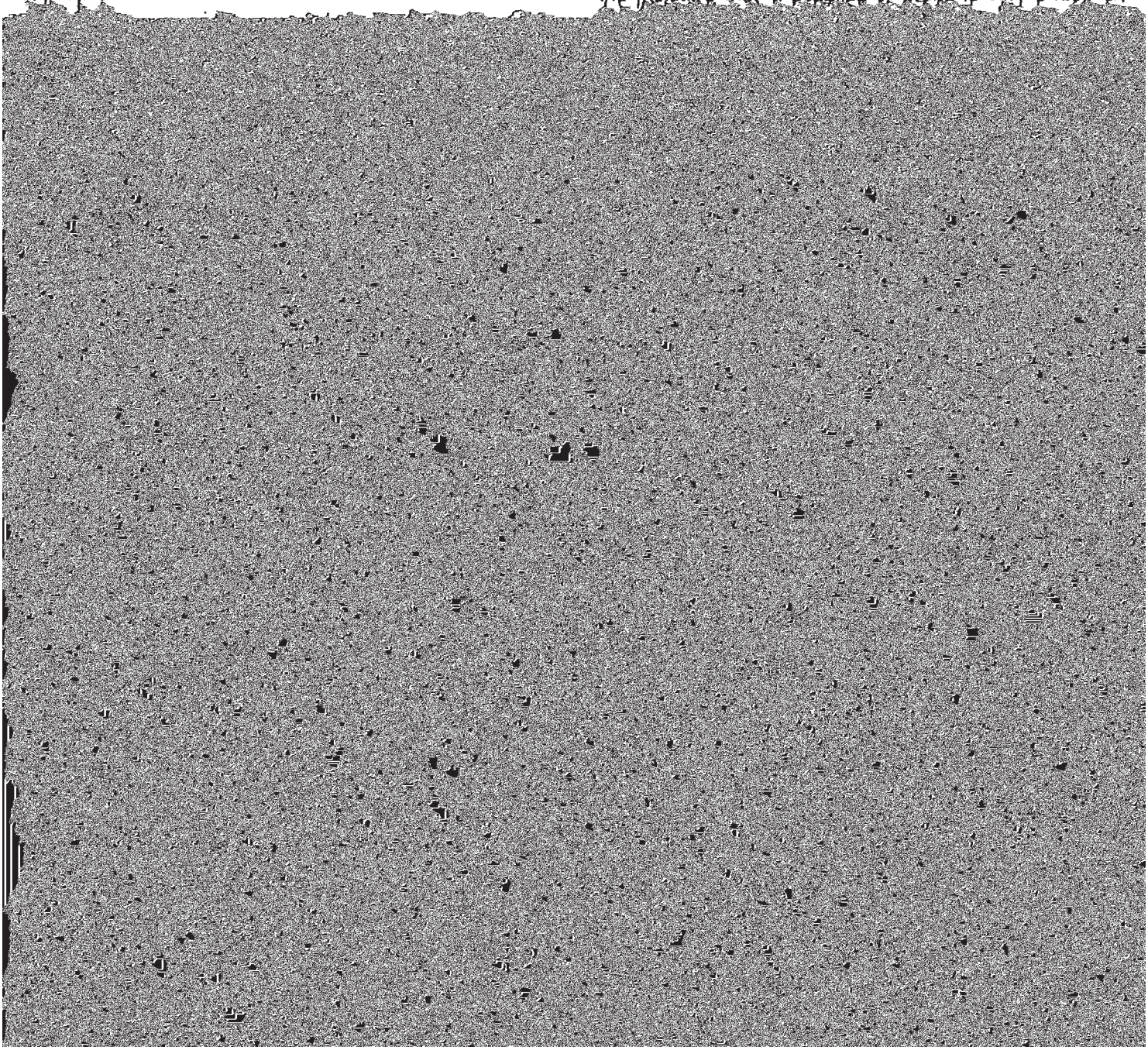
Typically, the surface layer is dark grayish brown gravelly silt loam about 8 inches thick. The subsoil extends to a depth of about 28 inches. The upper 11 inches is friable, yellowish brown and dark yellowish brown gravelly loam and has faint mottles in the lower 5 inches; the next 5 inches is friable, mottled, yellowish brown, very



table, this soil is not ready for cultivation as early as the higher and drier associated Hoosic, Chenango, and Tunkhannock soils. Artificial drainage generally is not needed, except in areas of included wetter soils. Gravel and small stones hinder tillage in some areas. Good fertilization, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation are important in management. Applied lime and fertilizer are leached from this soil at a moderately rapid rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large application.

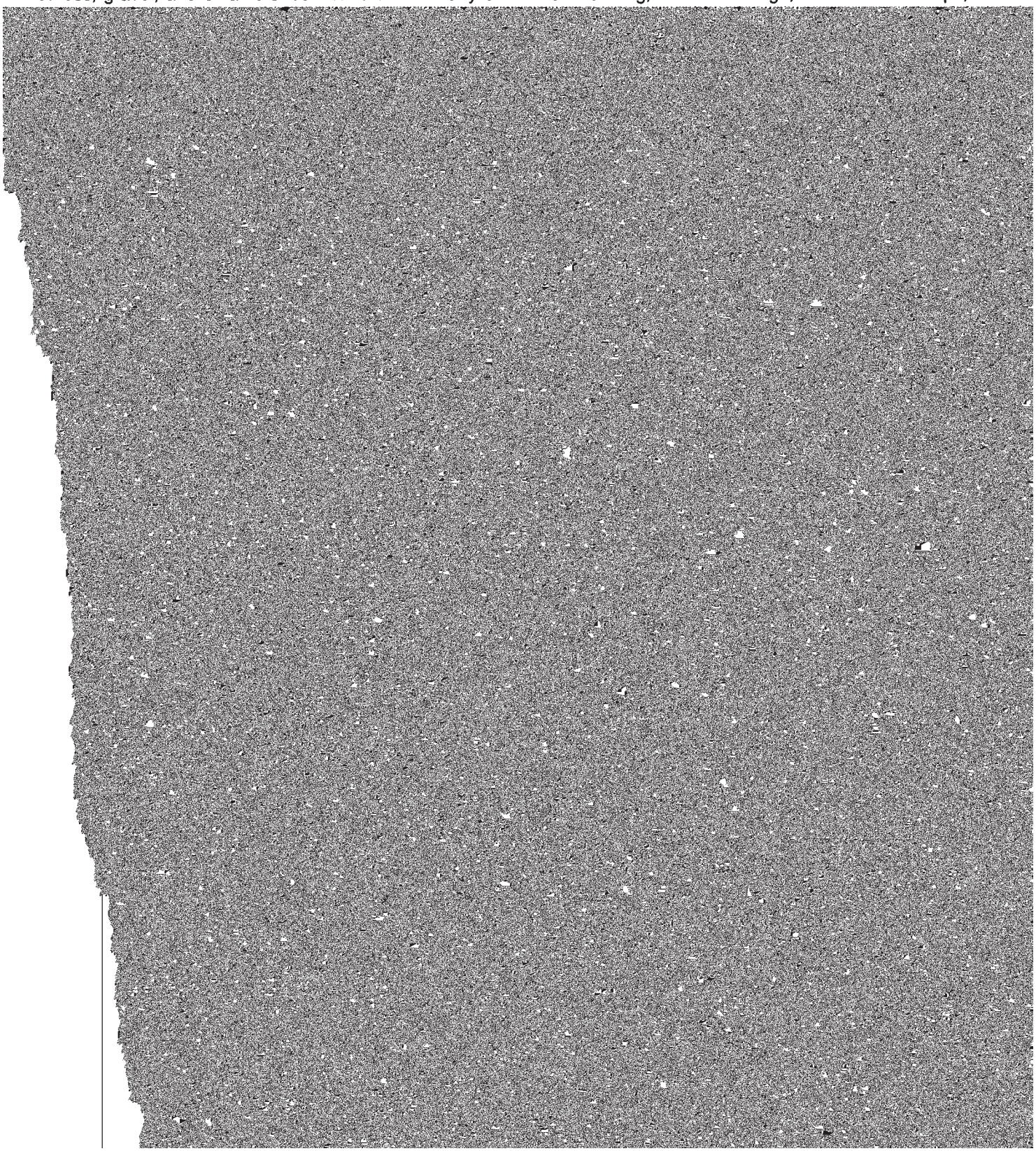
or gravelly sandy loam. Also included are areas of a soil that is similar to the Castile soil but has medium textured and moderately coarse textured layers in the substratum below a depth of 3 1/2 feet.

This soil has a seasonal high water table at a depth of 18 to 24 inches in spring and in excessively wet periods. Roots are influenced by the water table and are mainly confined to the upper 18 to 24 inches of the soil in spring. A few roots penetrate to a greater depth as the water table recedes. Available water capacity is low. Because of excellent water penetration in the root zone, the moisture that is supplied to crops is very effectively



This soil has potential for recreational uses even though wetness, gravel, and small stones interfere with many of

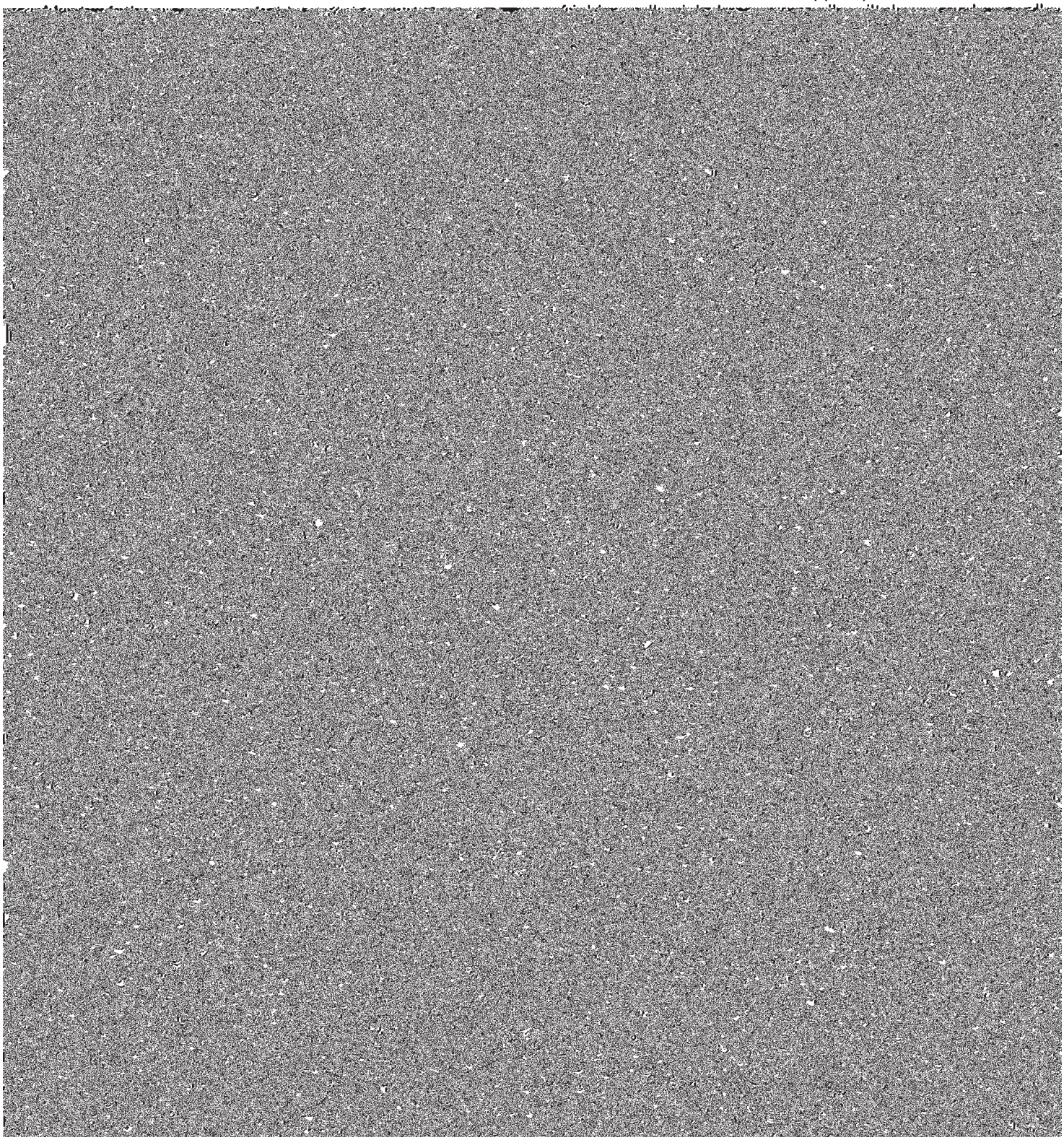
ed. Standard management practices, for example, contour farming, minimum tillage, use of cover crops, incor-



Runoff is rapid. Reaction is medium acid to neutral in the surface layer and in the main part of the subsoil. It is neutral or mildly alkaline immediately above the substratum.

mainly on glacial outwash plains and fans. Areas are irregular in shape and are 5 to 50 acres in size.

Typically, the surface layer is brown gravelly silt loam about 9 inches thick. The upper part of the subsoil is



Gravel and cobblestones interfere with most recreational uses. In areas where the soil is used for septic tank absorption fields, rapid permeability in the substratum can cause contamination of ground water. This soil is a

frequent or timely applications than to one large application.

This soil is well suited to orchards and vineyards. These crops are deep rooted so they are not as susceptible

This soil has fair potential for farming. Slope limits most urban uses.

This soil is suited to small grain, hay, and pasture. If it is intensively used for intertilled crops, erosion is a major concern. If proper management and conservation measures are practiced, corn can be grown. Contour farming is practical in some areas, but other areas have short or complex slopes that cannot be farmed easily on the contour. Minimum tillage, use of cover crops, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation are needed to improve tilth, maintain the content of organic matter, and reduce the hazard of erosion. Coarse gravel and cobblestones interfere with cultivation. Applied lime and fertilizer are leached from this soil at a moderate rate; consequently, response is better to smaller but more frequent or timely applications than to one large application.

This soil is suited to orchards maintained in permanent sod cover, but only moderately suited to vineyards. Because vineyards are cultivated, erosion is a hazard. Yields are reduced in some years because of lack of water. Spraying operations generally can be performed without excessive soil compaction.

Woodland productivity is high. Machine planting of tree seedlings is practical on this soil.

Even though slope limits many urban uses of this soil, most areas have potential for residential housing. Some areas are esthetic homesites. In areas where the soil is used for septic tank absorption fields, rapid permeability in the substratum can cause contamination of ground water. Erosion is a hazard during construction. A vegetative cover maintained on the site during construction helps to prevent erosion. Sloughing is a hazard in excavations in this soil. This soil is a good source of gravel and a fair source of sand. Capability subclass IIIe.

CvA—Churchville silt loam, 0 to 3 percent slopes. This deep, nearly level, somewhat poorly drained soil formed in 20 to 40 inches of lake-laid clay and silt deposits over glacial till. It is on plains adjacent to or in old glacial lakebeds. Some areas are in drainageways that receive runoff from adjacent soils. Areas are irregular in shape and are 5 to 80 acres in size.

Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil extends to a depth of about 39 inches. The upper 4 inches is firm, mottled, yellowish brown silty clay loam; the next 20 inches is very firm, mottled, dark brown and olive brown silty clay and light silty clay; and the lower 5 inches is very firm, olive brown clay loam. The substratum to a depth of about 54 inches is olive brown gravelly clay loam.

Included with this soil in mapping are narrow strips of Madalin and Canandaigua soils that are wetter than these Churchville soils and are in depressions and along drainageways; areas of well drained and moderately well drained Cayuga soils that are on low knolls; and areas of Rhinebeck and Hudson soils that are where the lake-deposited clay and silt cap is more than 40 inches thick. Also included are a few small areas of Volusia soils that formed in glacial till and Raynham soils that formed in silt and very fine sand.

This soil has a perched seasonal high water table at a depth of 6 to 18 inches in winter, in spring, and in other excessively wet periods. The depth of soil available for rooting ranges from 15 to 24 inches, but a few roots reach a greater depth as the water table recedes. Available water capacity in the root zone is moderate. Permeability is moderate in the surface layer, is slow or very slow in the subsoil, and is slow or moderately slow in the substratum. This soil is puddled and becomes cloddy, if it is cultivated when wet. Runoff is slow. Reaction is medium acid to neutral in the surface layer and is slightly acid to mildly alkaline in the subsoil.

Most of the acreage of this soil is used for hay, pasture, and woodland. Some areas are used for intertilled crops, and other areas are idle. This soil has fair potential for farming and limited potential for urban and recreational developments.

Drained areas of this soil are suited to cultivated crops, hay, and pasture. Undrained areas can be used for hay and pasture, but keeping soil compaction to a minimum and maintaining desirable forage stands are difficult. Planting is delayed and the choice of crops limited in these undrained areas. Wetness, slow or very slow permeability, and the high content of clay and silt in the subsoil limit the suitability of this soil for special crops and fruit crops. Surface drainage is an important practice on this soil, but establishing adequate drainage outlets is a concern in some areas. Subsurface drains need to be closely spaced to give uniform drainage. Maintenance of good tilth is difficult in intensively cultivated areas. This soil needs to be cultivated at the proper moisture condition because it is sticky when wet and fairly hard when dry. Hard clods and a crusty surface form if it is cultivated when wet. Planting when the soil is very dry generally results in poor seed germination. Standard management practices, for example, minimum tillage, use of cover crops, incorporating crop residue into the soil, crop rotation, good fertilization, and harvesting at the proper moisture condition, help to improve tilth and maintain the content of organic matter.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil. Wetness limits the suitability of this soil for some species.

Because of the perched seasonal high water table and slow or very slow permeability in the subsoil and substratum, only a small acreage of this soil is used for urban and recreational developments. Many dwellings have wet basements. Foundation drains and protective coatings on the exterior walls of basements help to prevent this hazard. Footers need to be extended to the underlying glacial till and below the depth of freezing. Specially

designed septic tank absorption fields are needed. Roads need artificial drainage and a thick subbase. Capability subclass IIIw.

CvB—Churchville silt loam, 3 to 8 percent slopes. This deep, nearly level, somewhat poorly drained soil formed in 20 to 40 inches of lake-laid clay and silt deposits over glacial till. It is on broad, low ridges and on foot slopes in areas adjacent to or in old glacial lakebeds. Slopes are long and smooth.

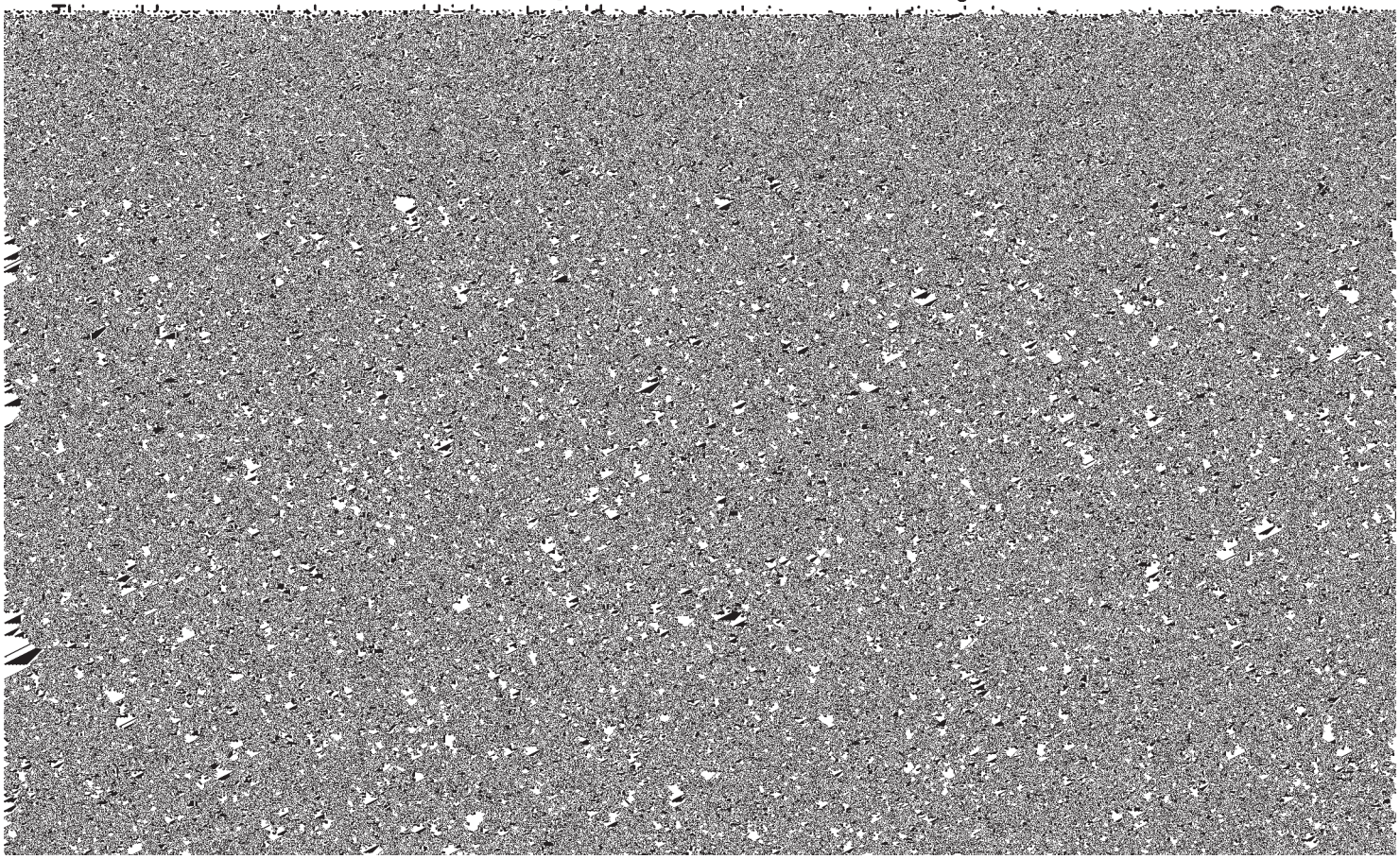
Typically, the surface layer is dark brown silt loam about 10 inches thick. The subsoil extends to a depth of about 39 inches. The upper 4 inches is firm, mottled, yellowish brown silty clay loam; the next 20 inches is very firm, mottled, dark brown and olive brown silty clay and light silty clay; and the lower 5 inches is very firm, olive brown clay loam. The substratum to a depth of about 54 inches is olive brown gravelly clay loam.

Included with this soil in mapping are small areas of Cayuga soils that are better drained than this Churchville soil and are on low ridges; narrow strips of wetter Madalin and Canandaigua soils that are in depressions and drainageways; some small areas of soils that have a surface layer of gravelly silt loam; and areas of Rhinebeck and Hudson soils where lakebed silt and clay sediment is more than 40 inches thick. Also included are a few areas of Volusia soils that formed in glacial till.

areas. This soil needs to be cultivated at the proper moisture condition because it is sticky when wet and hard when dry. Hard clods and a crusty surface form if it is cultivated when wet. Planting when the soil is very dry generally results in poor seed germination. Standard management practices, for example, minimum tillage, contour farming, use of cover crops, incorporating crop residue into the soil, crop rotation, good fertilization, and planting and harvesting at the proper moisture condition, help to improve tilth and maintain the content of organic matter.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil. Wetness limits the suitability of this soil for some species.

Because of the perched seasonal high water table, low strength, and slow or very slow permeability in the subsoil and substratum, only a small acreage of this soil is used for urban and recreational developments. Many dwellings have wet basements. Foundation drains and protective coatings on the exterior walls of basements help prevent wetness in basements. Footers need to extend to the underlying glacial till and below the depth of freezing. Specially designed septic tank absorption fields are needed. Roads need artificial drainage and a thick subbase. A vegetative cover maintained on the site



respectively. In a few areas, the Farmington soil is underlain with calcareous shale bedrock. Stockbridge

They have poor potential for farming and for urban and recreational uses. In some areas, this unit is a suitable

The hazard of flooding severely limits community development. This soil has potential for such recreational uses as picnicking, golfing, and boating. Recreational buildings constructed on the flood plain need to be anchored. This soil is a good source of topsoil. Capability subclass IIw.

He—Haven loam. This deep, nearly level, well drained soil formed in water-sorted loamy material over stratified gravel and sand. It is on glacial-stream terraces. Slope ranges from 0 to 3 percent. Areas are mainly long and narrow in shape and are 5 to 30 acres in size.

because some vegetables are harvested during wet periods. Use of lighter machinery with wider tire treads or use of specially designed machinery helps prevent soil compaction.

Woodland productivity is moderately high. Only a very small acreage of this soil is in woodland. Machine planting of tree seedlings is practical on this soil.

The hazard of flooding limits urban uses of this soil. Most areas have potential for such recreational uses as picnicking, golfing, and boating. Recreational buildings need to be protected from flooding. In areas where the soil is used for septic tank absorption fields, very rapid

cerns in management. Incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation help to improve tilth and maintain the content of organic matter. Applied lime and fertilizer are rapidly leached from this soil; consequently, response is generally better to smaller but more frequent or more timely applications than to one large application.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on large areas of this soil.

In most areas, this soil is a suitable site for housing and industrial development. The included areas where the water table fluctuates to within 3-1/2 feet of the surface are poorly suited to buildings with basements. Cobblestones in the surface layer are limitations for some uses. This soil is a source of sand and gravel in most areas but the cobblestones and an occasional boulder in the substratum cause excessive wear of gravel-sieving equipment. Capability subclass IIIs.

HgA—Hoosic gravelly loam, 0 to 3 percent slopes. This deep, nearly level, somewhat excessively drained soil formed in glacial outwash. It is on outwash terraces, stream terraces, and fans. Areas vary considerably in shape and are as much as 200 acres in size.

Typically, the surface layer is dark brown, gravelly loam 8 inches thick. The subsoil extends to a depth of about 30 inches. The upper 6 inches is friable, yellowish brown gravelly loam; the next 6 inches is very friable, dark yellowish brown very gravelly sandy loam; and the lower 10 inches is very friable, dark yellowish brown very gravelly loamy sand. The underlying material to a depth of 80 inches is dark yellowish brown, crudely stratified, very gravelly sand.

Included with this soil in mapping are small areas of moderately well drained Castile soils in slight depressions; some areas of Chenango soils that are intermingled with this soil but are not extensive; some small areas of soils that have a surface layer of gravelly fine sandy loam and gravelly sandy loam; and a few unlimed areas of soils that are medium acid or slightly acid in the surface layer and upper part of the subsoil. Also included are areas of a soil that is similar to the Hoosic soil but has medium textured and moderately fine textured layers in the substratum below a depth of 3-1/2 feet. These areas and some other included areas near small streams very strongly acid or strongly acid in the surface layer and subsoil.

Most of the acreage of this soil is used for cultivated crops, fruit crops, hay, or pasture. This soil has fair potential for farming. It has good potential for housing and industrial development.

This soil is well suited to most crops and can be used intensively for row crops. Deep-rooted crops are especially suitable. This soil is not naturally a highly productive soil, but it responds well to good management. Droughtiness and gravel in the surface layer are the main limitations for crops. This soil responds well to irrigation. Applied lime and fertilizer are rapidly leached from this soil; consequently, response is generally better to smaller but more frequent or more timely applications than to one large application. Incorporating crop residue into the soil, use of cover crops, tillage at the proper moisture condition, and crop rotation help to improve tilth and maintain the content of organic matter.

This soil is suited to orchards and vineyards. These crops are deep-rooted and are not so susceptible to drought. Irrigation is necessary to maintain high production. Because the soil dries out quickly after rains, spraying operations generally can be performed without excessive soil compaction.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

This soil is one of the best soils in the county for many urban uses. Included soils in which the water table fluctuates to within 3-1/2 feet of the surface are poorly suited to buildings with basements. Gravel and cobblestones interfere with most recreational uses. In areas where the soil is used for septic tank absorption fields, rapid or very rapid permeability in the substratum can cause contamination of ground water. Sloughing is a hazard in excavations in this soil. This soil is a good source of gravel and a fair source of sand. Capability subclass IIIs.

HgB—Hoosic gravelly loam, 3 to 8 percent slopes. This deep, gently sloping, somewhat excessively drained soil formed in glacial outwash. It is on outwash terraces, stream terraces, and fans. This soil mainly is in large areas that vary in shape. Slopes are smooth, undulating, and convex.

Typically, the surface layer is dark brown gravelly loam

gled with this soil but are not extensive; and some small areas of soils that have a surface layer of gravelly fine sandy loam and gravelly sandy loam. Also included are areas of a soil that is similar to the Hoosic soil but has medium textured and moderately fine textured layers in the substratum below a depth of 3-1/2 feet.

This soil has better drainage than most other soils in the county. It dries out quickly after rains and causes shallow-rooted crops, to wilt after a few rainless days. Deep-rooted crops and tree roots penetrate the very gravelly substratum, but most crops obtain their water from the upper 22 to 35 inches of the soil. Available water capacity is very low to low. Permeability is moder-

Typically, the surface layer is dark brown gravelly loam about 8 inches thick. The subsoil extends to a depth of about 30 inches. The upper 6 inches is friable, yellowish brown gravelly loam; the next 6 inches is very friable, dark yellowish brown, very gravelly sandy loam; and the lower 10 inches is very friable, dark yellowish brown, very gravelly loamy sand. The underlying material to a depth of about 80 inches is dark yellowish brown, crudely stratified, very gravelly sand.

Included with this soil in mapping are small areas of Castile and Red Hook soils in depressions and nearly level areas that are wetter than this Hoosic soil and in most places are shown on the soil map by a wet spot

rain, spraying operations generally can be performed without excessive soil compaction.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

Even though the slope limits many urban uses of this soil, most areas are good homesites. In areas where the soil is used for septic tank absorption fields, rapid or very rapid permeability in the substratum can cause contamination of ground water. Sloughing is a hazard in excavations in this soil. This soil is a good source of gravel and a fair source of sand. Capability subclass IVs.

clude a high proportion of long-term hay or pasture. This soil is well suited to early pasture. Because of slope, use of tillage equipment is very difficult, especially for larger machines. Lack of moisture is critical in many areas. The hazard of erosion is severe if the soil is cultivated and not protected. Minumum tillage and good fertilization are important in management. Contouring to control erosion and conserve moisture generally is not feasible.

Orchards that are maintained in permanent sod cover are suited to this soil, provided driving lanes are constructed to avoid the hazard of machinery upset. Because of droughtiness, production is low in some years.

or very rapid in the substratum. Runoff is very rapid. In unlimed areas, reaction is very strongly acid or strongly acid in the surface layer and subsoil.

Slope dominates the capabilities of these soils. Most areas are used for woodland and for wildlife habitat. These soils have poor potential for farming and for urban developments. Some areas are scenic spots and have potential for recreational developments.

These soils are not suited to crops because they are

slow in the surface layer and is slow in the subsoil and substratum. This soil is puddled and becomes cloddy if it is cultivated when wet. Runoff is medium. Reaction is strongly acid to neutral in the surface layer and subsoil.

Most of the acreage of this soil is used for crops, pasture, and woodland. This soil has good potential for farming and for some recreational uses, but it has limited potential for urban developments.

This soil is suited to cultivated crops, hay, and pasture.

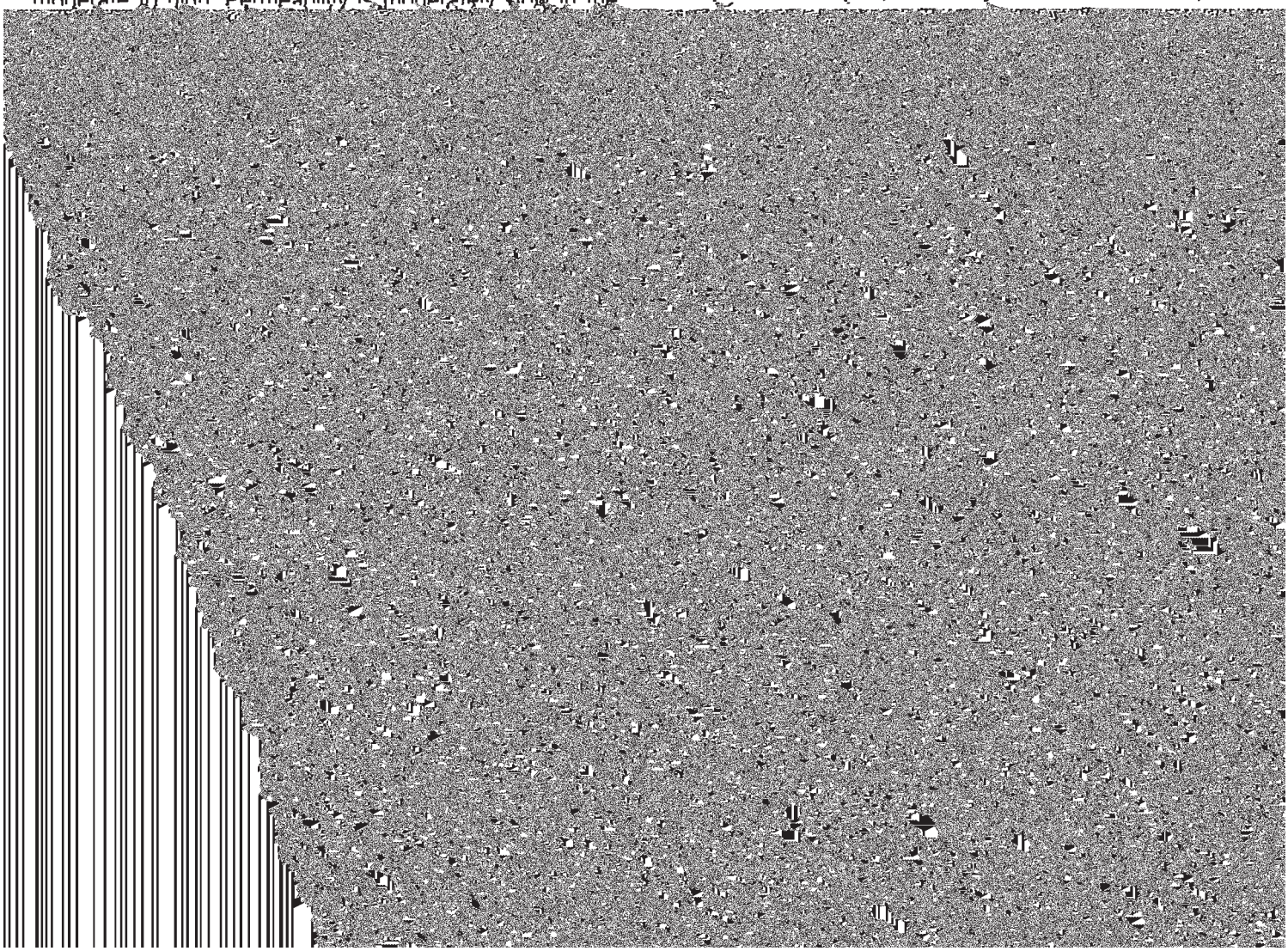
The lower part of the subsoil extends to a depth of 34 inches. It is very firm and very plastic, mottled, yellowish brown silty clay. The underlying material to a depth of about 60 inches is mottled, light olive brown, varved silty clay and silt loam.

Included with this soil in mapping are areas of Rhinebeck soils that are similar to but wetter than this Hudson soil and are in low lying positions near drainageways; a few areas of Cayuga soils that are on the upper part of slopes; and a few narrow strips of a soil that is similar to the Hudson soil but has limestone or shale bedrock at a depth of 20 to 40 inches and is mainly near rock outcrops. Also included are many small spots of an eroded soil that has a surface layer of silty clay loam.

This soil has a perched seasonal high water table at a depth of 18 to 36 inches late in winter, in spring, and in other excessively wet periods. Roots are mainly in the upper 24 inches of the soil, but a few roots extend below this depth. Available water capacity in the root zone is moderate to high. Permeability is moderately slow in the

The perched seasonal high water table, low strength, slope, and slow permeability in the subsoil and substratum limit most urban and recreational uses. Effluent from many septic tank absorption fields seeps to the surface in this soil. Therefore, the absorption field should be much larger than those commonly installed. Spread footings are needed because of low strength in the soil. Foundation drains and protective coatings on the exterior walls of basements are needed. Cut slopes are subject to slippage. The subbase of roads needs to be thicker than that commonly used. The hazard of erosion is severe during construction. A vegetative cover maintained on the site during construction helps prevent erosion. Trails in recreational areas need to be protected from erosion and established across the slope wherever possible. In some areas, this soil is a suitable site for ponds. Capability subclass IIIe.

HvC3—Hudson and Schoharie silty clay loams, 8 to 15 percent slopes, severely eroded. This map unit



Hudson and Schoharie soils have a perched seasonal high water table at a depth of 18 to 36 inches in wet periods. Roots are mainly confined to the upper 20 inches of these soils, but a few roots extend below this depth. Available water capacity in the root zone is moderate. Permeability in the subsoil and substratum is slow in the Hudson soils and is slow or very slow in the Schoharie soils. These soils have poor tilth and workability. Runoff is very rapid during intense rains. Reaction of the Hudson soil is medium acid to neutral in the surface layer and subsoil. In unlimed areas, reaction of the Schoharie soil is strongly acid to neutral in the surface layer and is medium acid to mildly alkaline in the subsoil.

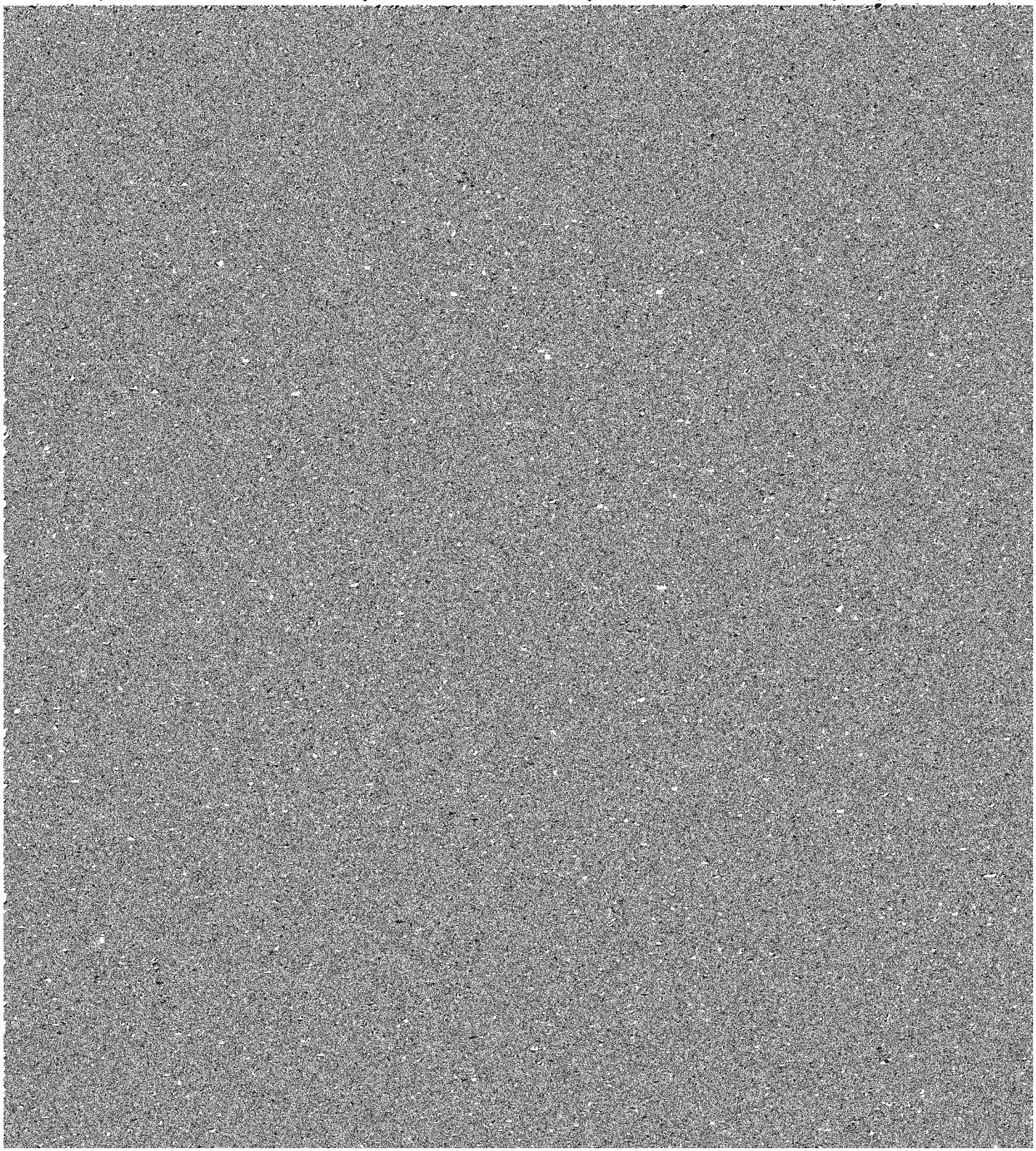
Most of the acreage of these soils is used for crops, pasture, and woodland. The soils have poor potential for farming, especially for special crops and fruit crops. Low strength, seasonal wetness, slow or very slow permeabil-

Trails in recreational areas need to be protected from erosion and established across the slope wherever possible. They are slick and sticky when wet. In some areas these soils are a suitable site for ponds. Capability subclass IVe.

HwD—Hudson and Schoharie soils, 15 to 25 percent slopes. This map unit consists of moderately well drained Hudson soils and moderately well drained and well drained Schoharie soils on dissected lake plains. These deep, moderately steep soils formed in lake-laid deposits of clay and silt. The surface layer for both soils is silt loam or silty clay loam. Many areas are severely eroded. They are cut by shallow drainage channels that carry water only during wet periods. Individual areas are mainly long and narrow in shape and are 10 to 150 acres in size. Areas of this undifferentiated group consist

Schoharie soils, reaction is medium acid to neutral in the surface layer and is medium acid to mildly alkaline in the

ing material to a depth of about 60 inches is mottled, dark yellowish brown, varved silty clay and silt loam.



lished across the slope wherever possible. Capability subclass VIIe.

LaB—Lackawanna flaggy silt loam, 3 to 8 percent slopes. This deep, gently sloping, well drained soil formed in glacial till. It is on hill crests of glaciated uplands. Areas are long and narrow in shape, and most areas are 5 to 40 acres in size.

Typically, the surface layer is dark reddish brown flaggy silt loam about 7 inches thick. The upper part of the subsoil extends to a depth of about 17 inches. It is friable, reddish brown gravelly silt loam. The lower part of the subsoil extends to a depth of 60 inches. It is a very firm and brittle, dark reddish brown gravelly loam fragipan. The substratum to a depth of about 80 inches is weak red gravelly loam.

Included with this soil in mapping are small areas of moderately well drained Wellsboro soils and spots of Morris soils in slight depressions and on foot slopes. These two included soils make up as much as 15 percent of some areas. Also included are small areas of Oquaga soils that have bedrock at a depth of 20 to 40 inches.

Free water is generally at a depth of 2 to 4 feet for short periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it, so they are mainly confined to the 17 to 36 inches of soil above the slowly permeable fragipan and substratum. Available water capacity is low to moderate. Permeability is moderate in the surface layer and upper part of the subsoil. Runoff is medium. In unlimed areas, reaction is very strongly acid or strongly acid above the fragipan and is very strongly acid to medium acid in the fragipan.

Most of the acreage of this soil is used for hay and pasture. A few areas are cultivated. This soil has good potential for farming and has desirable sites in the uplands for buildings and other nonfarm uses.

This soil is suited to crops and pasture. Crops respond well to simple practices, for example, liming and fertilization. Small stones are a limitation in cultivating some crops and cause excessive wear of machinery. Erosion is a hazard in cultivated areas, especially if slopes are long. Standard management practices, for example, minimum tillage, contour farming, use of cover crops, crop rotation, and incorporating crop residue into the soil, help to control erosion, improve tilth, and maintain the content of organic matter.

Woodland productivity is moderately high. Only a small acreage of this soil is in woodland. Machine planting of tree seedlings is practical on this soil.

The slight seasonal wetness and slow permeability in the fragipan and substratum are limitations for many urban uses. This soil is better suited to dwellings without basements than to those with basements. Foundation drains and protective coatings on the exterior walls of basements are needed. Effluent from septic tank absorption fields seeps to the surface in this soil. The absorption field should be much larger than those commonly installed because of the slow permeability in the fragipan. This soil has potential for recreational uses, even though small stones and slow permeability interfere with many of these uses. Capability subclass IIe.

LaC—Lackawanna flaggy silt loam, 8 to 15 percent slopes. This deep, sloping, well drained soil formed in glacial till. It is on valley sides or hillcrests on glaciated uplands. Areas are long and narrow in shape, and most areas are 5 to 40 acres in size.

Typically, the surface layer is dark reddish brown flaggy silt loam about 7 inches thick. The upper part of the subsoil extends to a depth of about 17 inches. It is friable, reddish brown gravelly silt loam. The lower part of the subsoil extends to a depth of 60 inches. It is a very firm and brittle, dark reddish brown gravelly loam fragipan. The substratum to a depth of about 80 inches is weak red gravelly loam.

Included with this soil in mapping are small areas of moderately well drained Wellsboro soils, which make up as much as 10 percent of some areas, and somewhat poorly drained Morris soils on foot slopes and in some drainageways. Also included are narrow strips of Oquaga soils that have bedrock at a depth of 20 to 40 inches.

Free water is generally at a depth of 2 to 4 feet for brief periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it so they are mainly confined to the 17 to 36 inches of soil above the slowly permeable fragipan and substratum. Available water capacity is low to moderate. Permeability is moderate in the surface layer and upper part of the subsoil. Runoff is rapid. In unlimed areas, reaction is very strongly acid or strongly acid above the fragipan and is very strongly acid to medium acid in the fragipan.

Most of the acreage of this soil is used for hay, pasture, and woodland. A few areas are cultivated. This soil has fair potential for farming. It furnishes better sites in uplands than many other soils for nonfarming uses, for example, dwellings and paths and trails.

This soil is suited to crops and pasture. Use is somewhat limited because slope causes some difficulty in farming operations. Flagstones hinder tillage. Good response can be expected from applications of lime and fertilizer. Prevention of erosion is a major concern, especially if slopes are long. Sod-forming crops need to make up a large proportion of the cropping system. Standard management practices, for example, contour farming, minimum tillage, use of cover crops, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation, help to control erosion, improve tilth, and maintain the content of organic matter.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

The slight seasonal wetness, slope, and slow permeability in the fragipan and substratum are limitations for many community development uses. Effluent from some septic tank absorption fields seeps to the surface in this soil. Absorption fields should be much larger than those commonly installed because of the slow permeability in the fragipan. In areas where public sewers are available, this soil is only moderately limited for residential housing. Foundation drains and exterior coatings on the walls of basements are needed. Erosion is a hazard during construction. A vegetative cover maintained on the site during construction helps prevent erosion. Capability subclass IIIe.

LCD—Lackawanna and Swartswood very bouldery soils, moderately steep. This map unit consists of deep, well drained soils on valley walls and ridgesides on glaciated uplands. These very bouldery soils formed in glacial till. Slope ranges from 15 to 25 percent. Most areas are long and narrow or irregular in shape and are about 20 to 700 acres in size.

Both soils are rarely in the same area. Areas generally consist of Lackawanna very bouldery soils or of Swartswood very bouldery soils. Lackawanna soils are mainly in the Catskill Mountains, and the Swartswood soils are in the Shawangunk Mountains and on the plateau adjacent to the Catskill Mountains. Because slopes and boulders are dominant in these soils and determine their use, these soils are not shown separately on the soil map.

nonbouldery. Also included are some areas of extremely bouldery soils that are too small to be mapped separately.

Free water is generally above the fragipan in these soils for brief periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it, so they are mainly confined to the 17- to 36-inch zone above the fragipan. Available water capacity of this zone is low to moderate in the Lackawanna soils and is very low to moderate in the Swartswood soils. Permeability is moderate above the fragipan in both soils, is slow in the fragipan and substratum of the Lackawanna soils, and is slow or moderately slow in the fragipan and substratum of the Swartswood soils. Runoff is very rapid. Boulders are dominantly 2 to 6 feet across and 1 to 2 feet thick, but many are smaller and a few are larger. Distance between boulders is quite variable, but it is generally 5 to 30 feet. Boulders cover 0.1 to 3 percent of the surface. In unlimed areas, reaction of the Lackawanna soils is very strongly acid or strongly acid in the surface layer. Reaction of the Swartswood soils is extremely acid to strongly acid in the surface layer.

Most of the acreage of these soils is used for woodland and wildlife habitat. These soils are well suited to these uses. They have poor potential for farming and for urban and most recreational uses.

A few areas of these soils are used for permanent pasture and hay. Pasture is generally unimproved and

areas are long and narrow in shape and are 10 to 100 acres in size.

Both soils are rarely in the same area. Areas generally consist of Lackawanna very bouldery soils or of Swartswood very bouldery soils. Lackawanna soils are mainly in the Catskill Mountains, and the Swartswood soils are in the Shawangunk Mountains and on the plateau adjacent to the Catskill Mountains. Because slopes and boulders are dominant in these soils and determine their use, these soils are not shown separately on the soil map.

Typically, the surface layer of the Lackawanna soil is dark reddish brown very bouldery silt loam 2 inches

and surface boulders prevent most uses other than woodland, recreation, and wildlife habitat. In some areas, these soils are scenic spots and have potential for recreational use.

Woodland productivity is moderately high. Slope and boulders present equipment limitations. Logging roads and skid trails need to be well designed and to be protected from erosion by drainage dips or water bars.

The very steep slope and surface boulders cause difficulty in construction for urban uses. The hazard of erosion is high when vegetation is removed. Trails in recreational areas need to be protected from erosion by

mapped separately, or are very bouldery, and others are rubble land. Also included are Arnot, Lordstown and Oquaga soils that have bedrock within a depth to 40 inches.

Free water is generally above the fragipan in these soils for brief periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it, so they are mostly confined to the 17- to 36-inch zone above the fragipan. Available water capacity of this zone is low to moderate in the Lackawanna soils and is very low to moderate in the Swartswood soils. Permeability is moderate above the fragipan in both soils, is slow in the fragipan and substratum of the Lackawanna soils, and is slow or moderately slow in the fragipan and substratum of the Swartswood soils. Runoff is very rapid.

Boulders cover 3 to 15 percent of the surface of these soils. They are mainly 2 to 4 feet thick, 2 to 10 feet across, and spaced about 2 1/2 to 5 feet apart in most areas. The subsoil and substratum generally contain considerably less boulders than are on the surface layer. In unlimed areas, reaction of the Lackawanna soil is very strongly acid or strongly acid in the surface layer. Reaction of the Swartswood soil is extremely acid to strongly acid in the surface layer.

Most of the acreage of these soils is used for woodland and for wildlife habitat to which they are best suited (fig. 6). Steep slopes and surface boulders prevent most other uses. These soils have poor potential for farming.

Woodland productivity is moderately high. Slopes and surface boulders present concerns in the use of large machines in logging. Woodland plantings are extremely difficult to make. Logging roads and skid trails need to be well laid out and need to be protected from erosion with drainage dips or water bars.

Steep slopes and surface boulders cause extreme difficulty in construction for urban uses. The hazard of erosion is high when vegetation and the boulders are removed. Care should be taken when hiking on these extremely bouldery soils. Capability subclass VIIs.

Lm—Lamson fine sandy loam. This deep, poorly drained and very poorly drained, nearly level soil formed in water-sorted sediment of predominantly fine and medium sand. This soil is in basinlike depressions on lake plains and deltas where it receives runoff from gray fine sandy loam and loamy fine sand to a depth of 50 inches.

Included with this soil in mapping are small areas of the poorly drained and very poorly drained Canandaigua soils that have a higher content of silt and clay than this Lamson soil; a few areas of somewhat poorly drained Walpole soils that are on slight rises; and some areas of very poorly drained Palms soils and Lamson soils that have a surface layer of mucky fine sandy loam. Also included are many areas of soils on the plateau adjacent to the Catskill Mountains that are very strongly acid or strongly acid in the surface layer. When this Lamson soil is near glacial till, small areas of Lyons and Menlo soils are included.

The seasonal high water table is at or immediately below the surface in winter, in spring, and after each rainy period, unless this soil is artificially drained. This soil receives water in surface runoff from surrounding soils and is often ponded during excessively wet periods. The depth of soil available for roots is mainly 10 to 20 inches and is related to the height of the water table. As the water table recedes, roots extend to a greater depth. Available water capacity in the root zone is low. Droughtiness is rarely a limitation in drained areas. Permeability is moderately rapid throughout the soil. Surface runoff is very slow. Reaction is medium acid to neutral in the surface layer and is slightly acid to mildly alkaline in the subsoil.

This soil is not used intensively. Most of the acreage is in woodland, is idle, or is used for pasture. This soil has fair to poor potential for farming and good potential for wetland wildlife.

Unless this soil is drained, it is too wet for cultivated crops. If adequately drained, it is suited to cultivated crops, hay, and pasture. Wetness is the main concern in management. A combination of surface and subsurface drains are needed in many areas. Drainage outlets are difficult to establish in many areas because of the basinlike topography. Filter material helps prevent subsurface drains from plugging with sand, which flows readily when the soil is saturated. Standard management practices, for example, minimum tillage, incorporating crop residue into the soil, crop rotation, use of cover crops, and tilling and harvesting at the proper moisture condition, are important.

Woodland productivity is moderate. Machine planting

LnB—Lordstown channery silt loam, 3 to 8 percent slopes. This moderately deep, well drained, gently sloping soil formed in glacial till. It is on terracelike benches and hilltops where relief is affected by bedrock. Most areas are long and narrow in shape and are 5 to 60 acres in size.

Typically, the surface layer is dark grayish brown channery silt loam about 8 inches thick. The friable, yellowish brown subsoil extends to a depth of about 34 inches. It is channery silt loam in the upper part and channery loam in the lower part. Gray sandstone bedrock is below a depth of about 34 inches.

Included with this soil in mapping are narrow strips of Tuller and Scriba soils that are wetter than this Lordstown soil and are in slight depressions and along drainageways. These wetter soils are generally indicated on the soil map by a special symbol. Also included are some large areas of a soil that is similar to the Lordstown soil but has a subsoil of gravelly fine sandy loam and are in the Ulster Heights-Sundown section of the county; a few small areas of Arnot soils that have bedrock at a depth of 10 to 20 inches; and small areas of the deeper Valois, Swartswood, and Wurtsboro soils.

Free water commonly is above the bedrock for a brief time after very rainy periods, but it is generally below a depth of 6 feet. The root zone is confined to the 20 to 40 inches of soil above the bedrock. Available water capacity is low to moderate. During dry years, droughtiness is a limitation in some areas. Permeability is moderate. Runoff is medium. In unlimed areas, reaction is very strongly acid or strongly acid in the surface layer and subsoil.

Many farms in areas of this soil have been abandoned, and this soil is used for pasture or is reverting to forest. This soil has good potential for farming and limited potential for community developments.

This soil is suited to crops and pasture. It is not a highly productive soil, but it responds well to good management. Flat stone fragments hinder some tillage and harvesting operations. During prolonged dry periods, irrigation is needed, especially for shallow-rooted crops. Erosion is a hazard if this soil is cultivated and not protected. Management practices, for example, minimum

LOC—Lordstown-Arnot-Rock outcrop complex, sloping. This map unit consists of a moderately deep, well drained Lordstown soil; a shallow, somewhat excessively drained to moderately well drained Arnot soil; and small areas of exposed bedrock. The soils formed in glacial till. They are in areas that have smooth slopes or have a stairstep appearance. The relief is affected by the underlying bedrock. The Lordstown soil is mainly on the base of slopes and on the back part of benches. The Arnot soil is intermingled with rock outcrops on slope breaks and on the front part of benches. Slope ranges from 8 to 15 percent. Areas are irregular in shape and are 15 to more than 1,000 acres in size.

This unit is made up of about 40 percent Lordstown channery silt loam, 30 percent Arnot channery silt loam, 15 percent Rock outcrop, and 15 percent other soils. These soils and the Rock outcrop form such an intricate pattern that they are not shown separately on the soil map.

Typically, the surface layer of the Lordstown soil in a wooded area is dark brown channery silt loam about 4 inches thick. The friable, yellowish brown subsoil extends to a depth of about 32 inches. It is channery silt loam in the upper part and channery loam in the lower part. Thick bedded gray sandstone and siltstone bedrock is below a depth of about 32 inches.

Typically, the surface layer of the Arnot soil in a wooded area is very dark grayish brown channery silt loam about 3 inches thick. The subsoil is friable, dark yellowish brown, very channery loam. Thick bedded gray sandstone and siltstone bedrock is at a depth of about 17 inches.

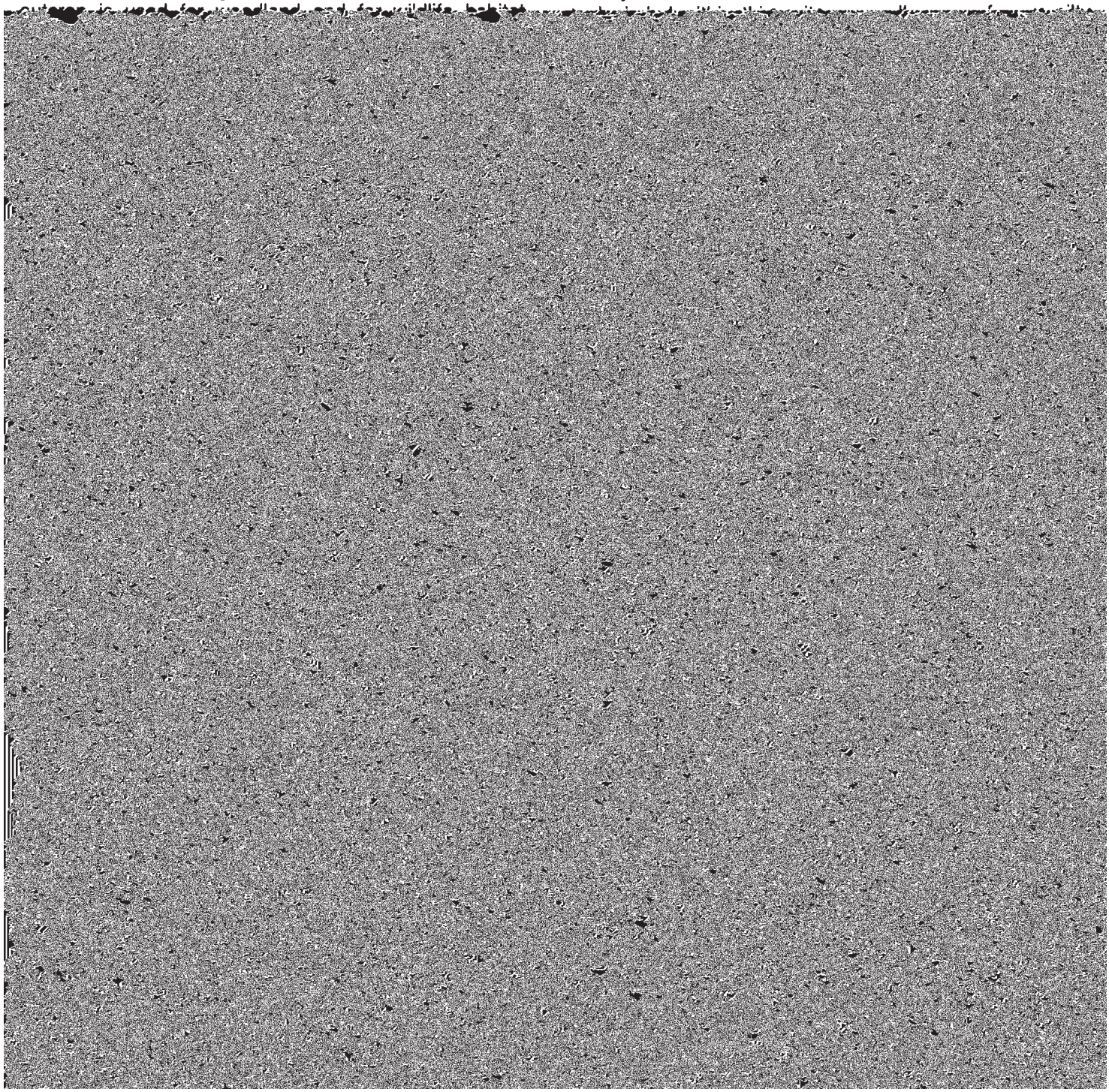
Included with these soils in mapping are Swartswood, Wurtsboro, Valois, Bath, and Mardin soils that are deep to bedrock; Tuller and Scriba soils that are along drainageways and in the flatter areas; and Schoharie and Odessa soils that are in small areas in the Alligerville section. Most areas of included soils have slopes of 2 to 8 percent, and many areas are very bouldery. Also included are small areas of Hoosic soils that are intermingled with the Arnot soils and Rock outcrop along some streams in the Napanoch and Ellenville sections. Also

the bedrock in some areas. Available water capacity is very low, and plants wilt quickly during dry periods.

Permeability is moderate in both soils. Runoff is medium to rapid. In unlimed areas, the Lordstown soil is very strongly acid or strongly acid in the surface layer and subsoil. The Arnot soil is extremely acid to medium acid in the surface layer and subsoil.

Most of the acreage of these soils and the Rock

Typically, the surface layer of Atherton soil is very dark gray, very stony silt loam about 7 inches thick. The subsoil extends to a depth of about 30 inches. It is firm, mottled, gray gravelly silty clay loam in the upper part; and friable, mottled, brown gravelly loam in the lower part. The underlying material to a depth of about 65 inches is stratified gray sand, gravel, and very gravelly sandy loam.



Ma—Madalin silty clay loam. This deep, poorly drained and very poorly drained, nearly level soil formed in lake-laid deposits of clay and silt. It is on broad flats or in narrow drainageways in basins of old glacial lakes. Slope ranges from 0 to 2 percent. Most areas are long and narrow or oblong in shape and are 5 to more than 70 acres in size.

Typically, the surface layer is black silty clay loam about 9 inches thick. The upper part of the subsoil extends to a depth of about 35 inches. It is very firm, [illegible]

crop residue into the soil, crop rotation, and good fertilization, help to improve tilth and maintain the content of organic matter.

Even though woodland productivity is poor, many areas of this soil are suited to woodland and to wetland wildlife habitat. Machine planting of tree seedlings is not practical except during the drier part of the growing season. Species that are tolerant of wetness need to be selected for reforestation.

Prolonged wetness and slow permeability in the sub- [illegible]

This soil is suited to cultivated crops. Seasonal wetness delays planting in some areas. Gravel and small stones cause concern in cultivating some crops and can cause excessive wear of machinery. Artificial drainage is needed for best crop response, especially in areas of the wetter included soils. Drainage of soils on foot slopes can be improved by diverting surface water commonly received from higher adjacent soils. Diversions and such practices as contour farming, cover crops and minimum tillage help to control erosion. Good fertilization, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation help to improve tilth and maintain the content of organic matter.

Fruit crops are suited to this soil. Soil compaction is a continuous concern because spraying operations are often performed during wet periods with heavy equipment. Artificial drainage, maintaining good sod cover, and use of lighter machinery with wider tire treads or use of specially designed machinery help prevent soil compaction.

Woodland productivity is moderately high. Only a small

depth of about 48 inches. It is a firm fragipan that is mottled, olive brown gravelly light loam. Dark gray shale bedrock is at a depth of about 48 inches.

Typically, the surface layer of the Nassau soil is brown shaly silt loam about 6 inches thick. The upper part of the subsoil extends to a depth of about 10 inches. It is very friable, yellowish brown very shaly silt loam. The lower part of the subsoil extends to a depth of 16 inches and is friable, brown, very shaly silt loam. Dark gray shale bedrock is at a depth of about 16 inches.

Included with these soils in mapping are small areas of Volusia soils that are wetter than this Mardin soil and are in slight depressions between ridges; narrow strips of moderately deep Manlius soils and deep Bath soils that are intermingled with the major soils throughout; and a few rock outcrops that are on ridges. Most of the outcrops and the wet spots are shown on the soil map by special symbols. Also included in a strip about 3 miles wide in the Wallkill and Shawangunk Kill Valleys are moderately well drained Cambridge soils in the Mardin position in the unit and few small areas of lake-deposited

ness of the Mardin soil delays planting in some areas. The included wetter soils need artificial drainage. The bedrock ridges make drainage difficult in many areas.

Fruit crops are suited to these soils if irrigation is available. During dry years, the very low available water capacity of the Nassau soils affects the size of fruit crops. Soil compaction is a continuous concern on the Mardin soil because spraying operations are often performed during wet periods with heavy equipment. Artificial drainage, maintaining good sod cover, and use of lighter machinery with wider treads or use of specially designed machinery help to prevent soil compaction.

Woodland productivity is moderately high on the Mardin soil and poor on the Nassau soil. Machine planting of tree seedlings is practical on large areas of these soils.

The variable depth to bedrock; the dense, slowly permeable fragipan; and seasonal wetness of the Mardin soil limit community development and recreational uses. The unit has potential for dwellings without basements if public sewers are available. A vegetative cover maintained on the site helps prevent erosion. Capability subclass IIIe.

Mn—Menlo silt loam. This deep, very poorly drained, nearly level soil formed in glacial till. It is in concave depressions and along drainageways on glacial till plains. This soil receives a large amount of runoff from adjacent higher areas. Slope ranges from 0 to 3 percent. Most areas are long and narrow in shape and are 5 to 25 acres in size.

Typically, the surface layer is very dark gray silt loam about 8 inches thick. The subsurface layer is leached, mottled, light gray gravelly fine sandy loam about 5 inches thick. The subsoil extends to a depth of about 45 inches. It is a very firm and brittle, mottled, dark yellowish brown gravelly fine sandy loam fragipan. The substratum is dark yellowish brown gravelly fine sandy loam that extends to a depth of 60 inches.

Included with this soil in mapping are small areas of a soil that is similar to this Menlo soil but does not have a fragipan and areas of Atherton, Canandaigua, Palms, and Lamson soils that are along drainageways and in the middle of the larger basins. Also included are Scriba and Morris soils on foot slopes, toe slopes, and low knolls.

This soil has a perched seasonal high water table that is on or just below the surface late in fall, in winter, in spring, and in other excessively wet periods. Because of wetness, this soil remains cold until late in spring, and plants grow slowly until the middle of May. Roots are confined mainly to the 12 to 25 inches of soil above the slowly or very slowly permeable fragipan and substratum. Available water capacity of this zone is low. Plants on this soil are rarely affected by lack of moisture. Permeability is moderate above the fragipan. Runoff is very slow. In unlimed areas, reaction is extremely acid to medium acid in the surface layer and is strongly acid to slightly acid in the fragipan and substratum.

This soil is not intensively used. Most of the acreage is used for pasture and woodland. This soil has poor potential for farming and for urban and recreational uses. It has good potential for wetland wildlife habitat.

Undrained areas of this soil are too wet for cultivated crops and are limited mainly to pasture or woodland. If this soil is adequately drained, it is suitable for crops. Most areas are difficult to drain. Open ditches and surface drains are the most effective practices to improve drainage because of the slow or very slow permeability in the fragipan and substratum. Subsurface drains must be closely spaced to give uniform drainage. Diversion terraces can be used in some cases to divert runoff from adjacent higher areas. Standard management practices, for example, minimum tillage, grazing at the proper moisture condition, incorporating crop residue into the soil, crop rotation, and good fertilization help to improve tilth and maintain the content of organic matter.

Woodland productivity is poor. Wetness causes difficulty in machine planting of tree seedlings. Species that are tolerant of wetness need to be selected for reforestation.

Prolonged wetness and slow or very slow permeability in the fragipan and substratum are severe limitations for community development and recreational uses. Even with artificial drainage and protective coatings on the exterior walls of basements, wet basements are common. In many areas this soil is a suitable site for dugout ponds. Capability subclass IVw.

MO—Menlo very bouldery soils. These deep, very poorly drained, nearly level soils formed in glacial till. They are in concave depressions and along drainageways on glacial till plains. These soils receive a large amount of runoff from adjacent higher areas. The surface layer is very bouldery silt loam, very bouldery loam, or very bouldery fine sandy loam. Slope ranges from 0 to 3 percent. Most areas are oblong or irregular in shape and are 10 to 60 acres in size.

Typically, the surface layer in a wooded area is black, very bouldery silt loam about 2 inches thick. The subsurface layer is leached, mottled, light gray gravelly fine sandy loam 11 inches thick. The subsoil extends to a depth of about 30 inches. It is a very firm and brittle, mottled, dark yellowish brown gravelly fine sandy loam fragipan. The substratum is dark yellowish brown gravelly fine sandy loam that extends to a depth of about 50 inches.

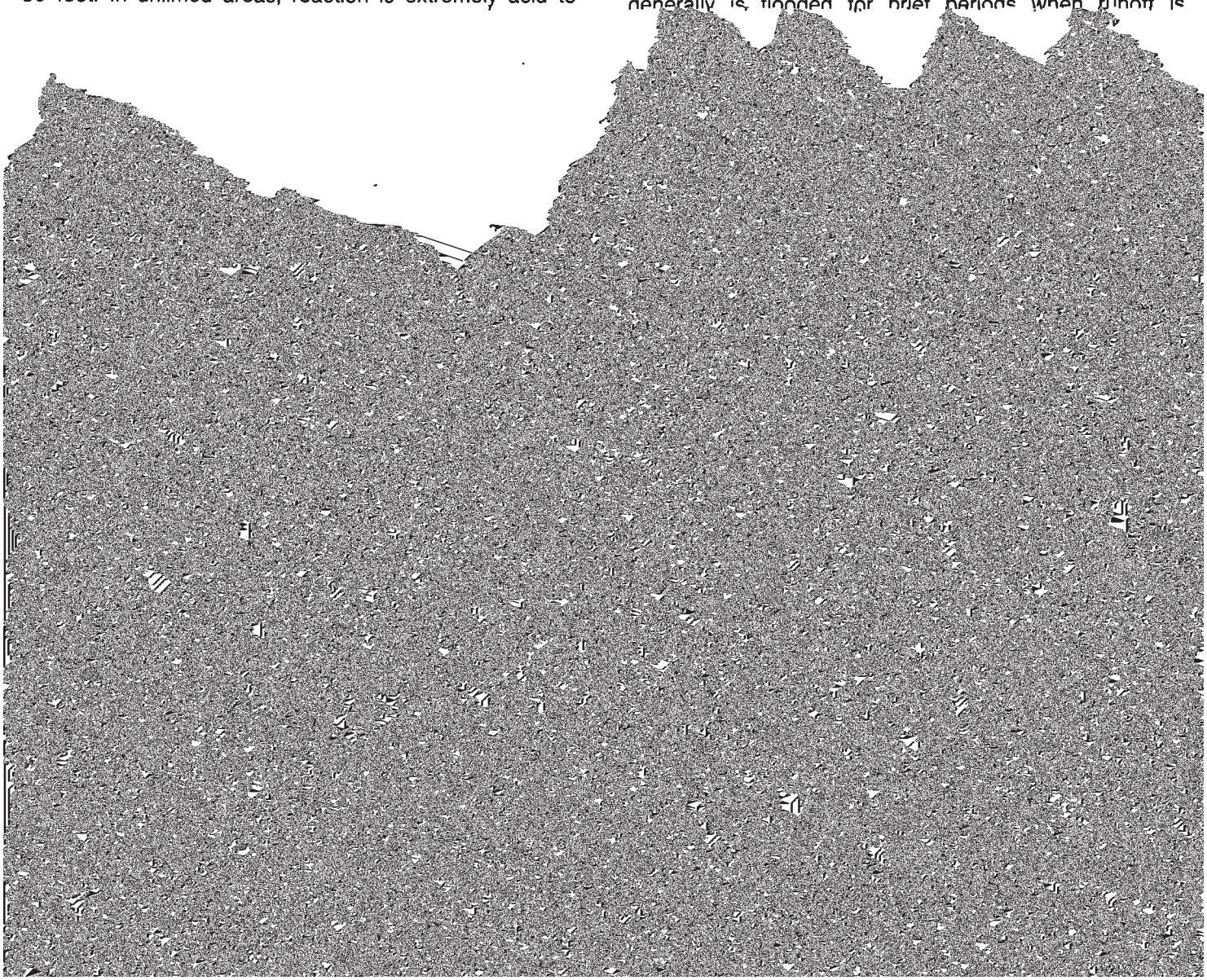
Included with these soils in mapping are small areas of Atherton, Canandaigua, Palms, and Lamson soils along drainageways and in the middle of larger basins. These included soils make up as much as 20 percent of some areas. Also included are areas of Scriba and Morris soils on foot slopes, toe slopes, and low knolls; a few small areas of nonbouldery and extremely bouldery soils; and

small areas of soil that are similar to Menlo soils but have bedrock at a depth of 20 to 40 inches.

These soils have a perched seasonal high water table that is on or just below the surface late in fall, in winter, in spring, and in other excessively wet periods. Because of wetness, these soils remain cold until late in spring, and plants grow slowly until the middle of May. Roots are mainly confined to the 12 to 25 inches of soil above the slowly or very slowly permeable fragipan and substratum. Available water capacity of this zone is low. Plants on these soils are rarely affected by lack of water. Permeability is moderate above the fragipan. Runoff is very slow. Boulders cover 0.1 to 3 percent of the surface of these soils. They are mainly 2 to 6 feet across and 1 to 2 feet thick, but some are smaller and a few larger. Distance between boulders varies but is generally 5 to 30 feet. In unlimed areas, reaction is extremely acid to tends to a depth of about 52 inches. The upper 6 inches is mottled, dark brown fine sandy loam; the next 8 inches is mottled, yellowish brown sandy loam; and the lower 9 inches is grayish brown and yellowish brown, stratified gravelly sandy loam.

Included with this soil in mapping are narrow strips of well drained Tioga soils that are in slightly higher, nearly level areas; narrow strips of Wayland soils that are wetter than this Middlebury soil and are in low areas; a few areas of soils that are in small stream valleys and that have a surface layer of gravelly silt loam or gravelly loam; and small areas of soils that have a surface layer of loam. Also included are a few small areas of more silty Teel soils on flood plains and narrow strips of Scio soils on stream terraces.

This soil may be flooded at any time of the year, but it generally is flooded for brief periods when runoff is



MTB—Morris-Tuller complex, very bouldery, gently sloping. This map unit consists of deep, somewhat poorly drained Morris soils and shallow, somewhat poorly drained to poorly drained Tuller soils. These soils formed in glacial till on glaciated uplands. Relief is affected by bedrock. Areas are in depressions or on benches on hillsides and foot slopes of mountains. The Morris soils are mainly in the middle of slight depressions and on the upper part of benches. The Tuller soils are on slope breaks on benches and the periphery of depressions. Areas are mainly long and narrow or oblong in shape and are 5 to 50 acres in size.

60 inches. Permeability is moderate above the fragipan and is slow or moderately slow in the fragipan and substratum.

The Tuller soils have a perched seasonal high water above the bedrock at a depth of 6 to 18 inches late in fall, in winter, in spring, and early in summer. Late in summer and early in fall, these soils sometimes become very dry because the root zone is confined to the 10 to 20 inches of soil above the bedrock. Available water capacity is very low to low. Permeability is moderate in the surface layer and is slow in the subsoil. Runoff is medium.

soil is on the lower part. Rock outcrop is on the hillsides, valleysides, and mountains. Slope ranges from 35 to 65 percent.

The slope, many bedrock outcrops, and variable depth to bedrock limit the use of these soils for crops and

drained and somewhat excessively drained Chenango soils along intermittent streams. Some very stony areas are shown on the soil map with stone symbols.

The root zone is confined to the 10 to 20 inches of soil above the bedrock in the Nassau soils. A few areas

such an intricate pattern that they are not shown separately on the soil map.

Typically, the surface layer of the Nassau soil is brown shaly silt loam about 3 inches thick. The upper part of the subsoil extends to a depth of 10 inches. It is very

lookout points. Trails in recreational areas need to be protected from erosion and established across the slope wherever possible. Capability subclass VIIs.

NOD—Nassau-Rock outcrop complex, hilly. This map unit consists of a shallow, somewhat excessively drained Nassau soil and Rock outcrop on ridges. The ridges are cored by folded, shale, slate, and sandstone bedrock. The Nassau soil formed in glacial till. It is on broad ridgetops and between ridges. Rock outcrop is mainly on ridgetops. Slope is mainly 10 to 25 percent, but ranges from 10 to 30 percent. Areas are mainly long and narrow or oblong in shape and are 25 to 150 acres in size.

This unit is made up of about 55 percent Nassau shaly silt loam, 20 percent Rock outcrop, and 25 percent other soils. The Nassau soil and Rock outcrop are in such an intricate pattern that they are not shown separately on the soil map.

Typically, the surface layer of the Nassau soil is brown shaly silt loam about 6 inches thick. The upper part of the subsoil extends to a depth of 10 inches. It is very friable, yellowish brown very shaly silt loam. The lower part of the subsoil extends to a depth of 16 inches and is friable brown very shaly silt loam. Dark gray shale bedrock is at a depth of about 16 inches.

Included with this unit in mapping are moderately deep, well drained and excessively drained Manlius soils

tities of fill generally are needed for disposal of septic tank effluent. In some cases, effluent from septic tanks moves over the bedrock to streams or comes to the surface at very shallow areas. A vegetative cover maintained on the site during consturction helps to prevent erosion. Capability subclass VIIs.

OdA—Odessa silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained, nearly level soil formed in lake-laid deposits of clay and silt. It is on broad flats or along drainageways on glacial lake plains. Areas along drainageways are long and narrow in shape and are 5 to 25 acres in size. These areas receive runoff from adjacent soils. Areas on broad flats are irregular in shape and are as much as 120 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of about 38 inches. The upper 9 inches of the subsoil is firm, mottled, yellowish brown and brown silty clay loam; the next 17 inches is very firm, mottled, dark brown and reddish brown silty clay; and the lower 4 inches is very firm, reddish brown and yellowish brown, varved silty clay and silty clay loam. The substratum to a depth of about 50 inches is reddish brown and yellowish brown, varved silty clay and silty clay loam.

Included with this soil in mapping are small areas of Schoharie soils that are drier than this Odessa soil and are on low knolls; long, narrow strips of wetter Medolin

for hay and pasture, but keeping soil compaction to a minimum and maintaining desirable forage stands are difficult. Planting is delayed and the choice of crops limited in these undrained areas. Wetness, slow or very slow permeability, and the high content of clay and silt in the subsoil limit the suitability of this soil for special crops and fruit crops. Surface drainage is an important practice on this soil, but establishing adequate drainage outlets is a concern in some areas. Subsurface drains must be closely spaced to give uniform drainage. Maintenance of good tilth is difficult in intensively cultivated areas. This soil needs to be cultivated at a proper moisture condition because it is sticky when wet and hard when dry. Hard clods and a crusty surface form if the soil is cultivated when wet. Planting when the soil is very dry generally results in poor seed germination. Standard management practices, for example, minimum tillage, use of cover crops, incorporating crop residue into the soil, crop rotation, good fertilization, and planting and harvesting at the proper moisture condition, help to improve tilth and maintain the content of organic matter.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil. Wetness limits the suitability of this soil for some species.

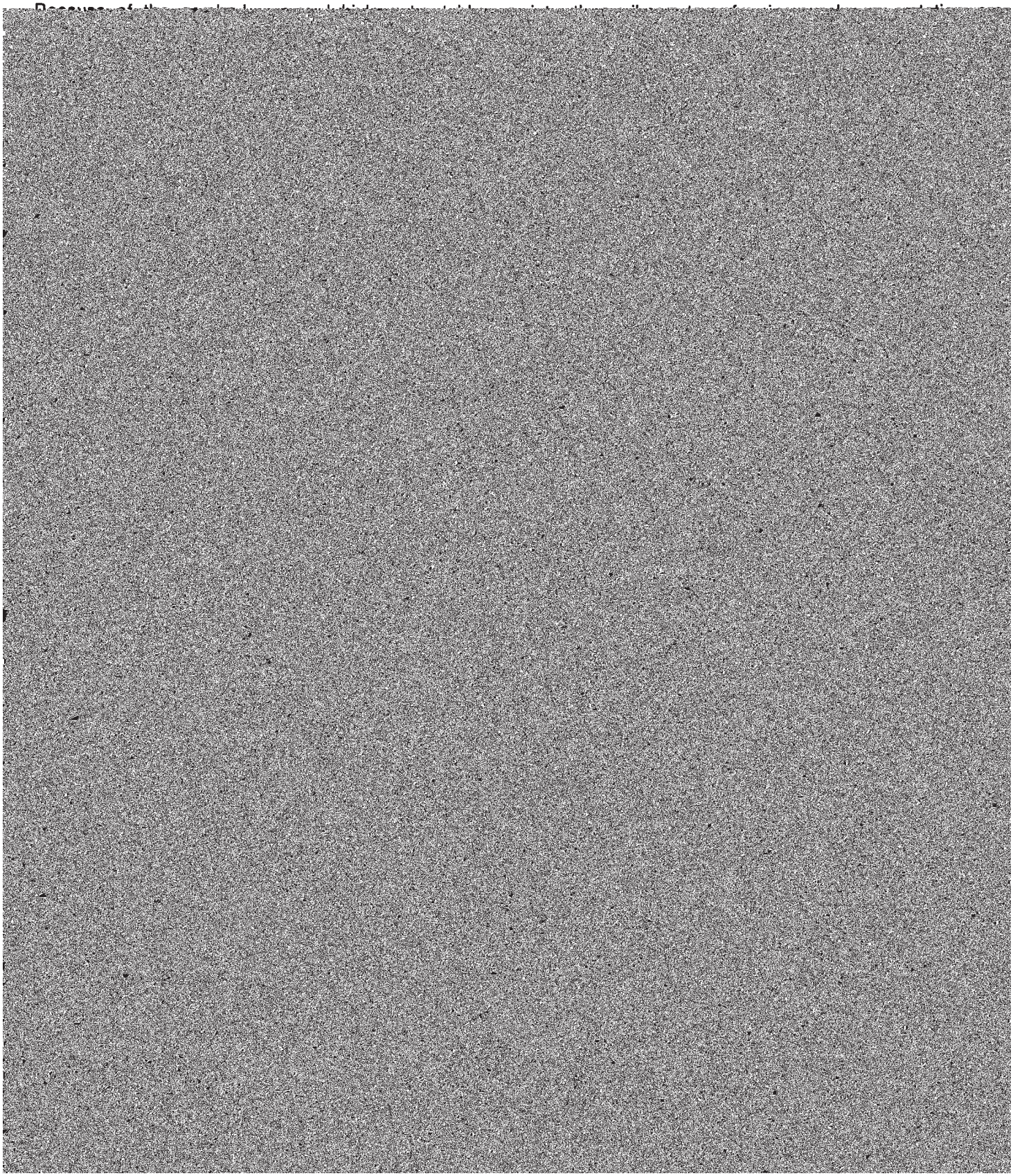
Because of the perched seasonal high water table, low strength of the soil, and very slow permeability, only a small acreage of this soil is used for urban and recreational uses. Many dwellings have wet basements. Foundation drains and protective coatings on the exterior walls of basements help prevent wet basements. Spread footings are needed because of the low strength of the soil. Specially designed septic tank absorption fields need to be installed. Roads need artificial drainage and a thick subbase. Capability subclass IIIw.

OdB—Odessa silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil formed in lake-laid deposits of clay and silt. It mainly is on very broad, low ridges with smooth slopes on glacial lake plains and other landforms that are mantled with are on the crests of low knolls; narrow strips of wetter Madalin and Canandaigua soils that are in depressions and waterways; and Churchville and Cayuga soils that are in areas where the lacustrine deposits are 20 to 40 inches thick over glacial till. Also included are a few areas of soil, between Olive Bridge and Big Indian, that have a surface layer of gravelly loam or gravelly silt loam and areas of Raynham soils that have less clay in the subsoil than this Odessa soil.

This soil has a perched seasonal high water table at a depth of 6 to 18 inches in winter, in spring, and in other excessively wet periods. The depth of soil available for rooting is related to the height of the water table and is mainly in the upper 15 to 24 inches. As the water table recedes, a few roots penetrate to a greater depth. Available water capacity is moderate in the root zone. Permeability is moderately slow in the surface layer, is slow or very slow in the subsoil, and is very slow in the substratum. This soil needs to be cultivated at a proper moisture condition because it is sticky when wet and hard when dry. Runoff is medium. Reaction is medium acid to neutral in the surface layer and is medium acid to mildly alkaline in the subsoil.

Most of the acreage of this soil is used for crops, hay, pasture, and woodland. Some areas are idle. This soil has fair potential for farming and limited potential for urban and recreational developments.

Drained areas of this soil are suited to cultivated crops, hay, and pasture. Wetness, high content of clay and silt in the subsoil, and slow or very slow permeability limit the suitability of this soil for crops planted early in spring and for special crops and fruit crops. Control of excess water is a major management need. Undrained areas can be used for hay and pasture, but keeping soil compaction to a minimum and maintaining desirable forage stands are difficult. Surface drains and diversion terraces generally are effective in removing excess surface water. For adequate drainage, subsurface drains must be closely spaced in this slowly permeable soil. Controlling erosion and maintaining good tilth are difficult in intensively cultivated areas. This soil needs to be



soil is very strongly acid or strongly acid in the surface.

Typically, the surface layer of the Oquaga soil in a

helps to prevent erosion. Most areas have potential for paths and trails even though small stones and included Rock outcrops interfere with this use. Capability subclass VIs.

ORD—Oquaga-Arnot-Rock outcrop complex, moderately steep. This map unit consists of a moderately deep, well drained and excessively drained Oquaga soil; a shallow, somewhat excessively drained and moderately well drained Arnot soil; and small areas of exposed bedrock. These very bouldery soils formed in reddish glacial till over sandstone, siltstone, and shale bedrock in the Catskill Mountains and their foothills. Relief is affected by bedrock. These soils mainly are on a series of benches that have a stairstep appearance. The Oquaga soil is on benches and at the base of slopes where the till mantle is 20 to 40 inches thick. The Arnot soil is on narrow benches, slope breaks, and mountaintops where the till mantle is 10 to 20 inches thick. The risers between benches are generally made up of sandstone and siltstone bedrock. Slope ranges from 15 to 25 percent. Areas on mountainsides and foothills are broad or irregular in shape and are 40 to 300 acres in size. Those on mountaintops are long and narrow in shape and are 40 to 150 acres in size.

This unit is made up of about 35 percent Oquaga very bouldery silt loam, 30 percent Arnot very bouldery silt loam, 15 percent Rock outcrop, and 20 percent other soils. These soils and the Rock outcrop form such an intricate pattern that they are not shown separately on the soil map.

20 to 40 inches of soil over the bedrock. Available water capacity is low to moderate.

The Arnot soil has free water above the bedrock for brief periods in spring and after heavy rain. The root zone consists of 10 to 20 inches of well aerated soil material over bedrock. A few roots penetrate fractures in the bedrock in some areas. Available water capacity is very low, and plants wilt quickly during dry periods.

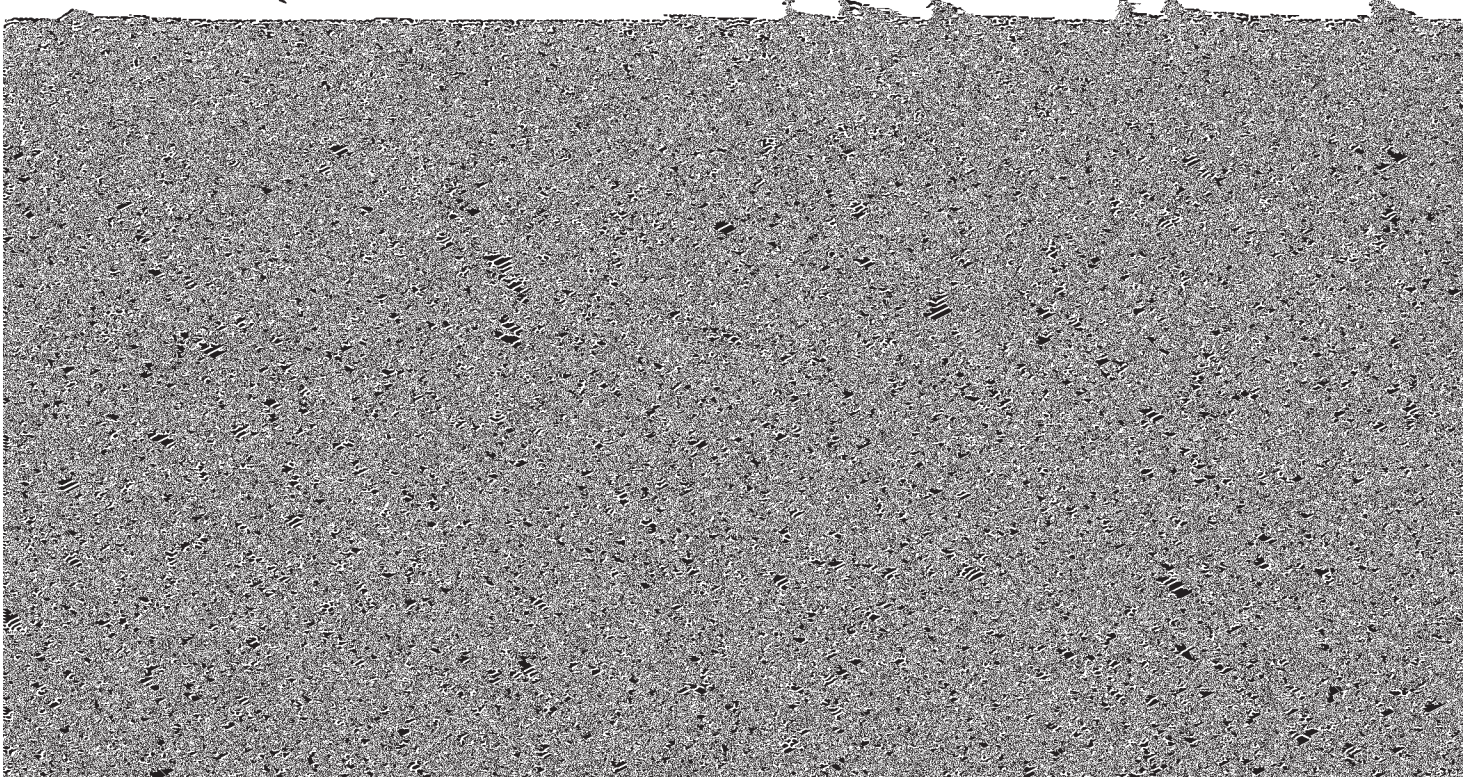
Permeability is moderate in both soils. Runoff is very rapid. Boulders are mainly 2 to 6 feet across and 1 to 2 feet thick, but many are smaller and a few are larger. Distance between boulders is quite variable, but is generally 5 to 30 feet. Boulders cover about 0.1 to 3 percent of the surface of these soils. In unlimed areas, reaction is extremely acid to medium acid throughout both soils.

Most of the acreage of these soils and the Rock outcrop is used for woodland and for wildlife habitat to which it is suited. The unit has poor potential for farming and for urban uses, but it has potential for hiking.

The slope, outcrops, boulders, and moderate and shallow depth to bedrock are very severe limitations for farming. Fertilizing and mowing pasture are difficult.

Woodland productivity is moderately high on the Oquaga soil and poor on the Arnot soil. New plantations are difficult to establish. Logging roads and skid trails need drainage dips or water bars to protect them from erosion.

The moderately deep and shallow depth to bedrock, slope, outcrops, and boulders make construction for urban and recreational uses extremely difficult. Esthetic homesites are in some areas, but sites for sewage dis-



has white to very pale brown marl at a depth of 8 to 24 inches; small areas of soil near Ulster Heights that have a mineral cap over the muck; and in the western part of the county, areas of a soil that is similar to the Palms Muck soils but has a higher content of fibers throughout.

This soil has a seasonal high water table and is ponded for long periods in undrained areas late in fall, in winter, and in spring. Roots are strongly influenced by the depth to the water table. Few roots penetrate below a depth of 12 inches. Available water capacity of this zone is moderate. Permeability is moderately rapid or rapid in the organic layers and is moderate or moderately slow in the loamy substratum. Runoff is very slow, and this soil receives runoff from adjacent areas. Reaction is very strongly acid to neutral throughout the organic deposit.

Most of the acreage of this soil is in marsh vegetation of grasses, reeds, sedges, and water-tolerant tree species. This soil has poor potential for farming and for community developments. Undrained areas have good potential for wetland wildlife habitat.

This soil must be drained if it is used for crops and pasture. If drained, it is very productive for vegetables and field crops. Drainage outlets are difficult to establish in many areas. In some areas, blasting of bedrock is required in the drainage outlet. Pumping over a dike is often the ultimate solution to maintaining an outlet. Open ditches and subsurface drains are both needed in most areas. Subsidence or shrinkage occurs after draining. Controlled drainage, whereby the water table can be raised or lowered, reduces shrinkage. Windbreaks or irrigation should be used to control soil blowing. Irrigation is also needed in drained areas during extended dry periods. Use of cover crops, good fertilization, minimum tillage, and tilling and harvesting at the proper moisture condition are important in management.

Woodland productivity is moderate. Species that are tolerant of wetness need to be selected for reforestation. Machine planting of tree seedlings generally is not practical in undrained areas.

This soil generally is not used for community and recreational developments because of prolonged wetness.

Typically, the surface layer is black muck about 8 inches thick. The subsurface layer to a depth of about 30 inches is nonsticky and slightly plastic, black and olive gray muck. The substratum to a depth of about 38 inches is dark gray, very gravelly loam over gray sandstone bedrock.

Included with this soil in mapping are small areas of Palms and Carlisle soils that are deeper than this soil and are mainly in the eastern and south-central sections of the county where bedrock is strongly folded and tilted. Also included are some areas of Lyons, Canandaigua, and Menlo soils that formed in mineral material.

This soil has a seasonal high water table and is ponded for long periods late in fall, in winter, and in spring. Roots are strongly influenced by the depth to the water table. Few roots penetrate below a depth of 12 inches. Available water capacity of this zone is moderate. Permeability is moderately rapid to rapid in the organic layers and is moderate in the mineral substratum over the bedrock. Runoff is very slow, and this soil receives runoff from adjacent areas. Reaction increases with depth from very strongly acid to neutral in the surface layer to slightly acid or neutral above the bedrock.

Most of the acreage of this soil is in marsh vegetation of grasses, reeds, and sedges, and water-tolerant trees. This soil has poor potential for farming and for community developments. It is best suited to woodland and to wetland wildlife habitat.

Drainage of this soil for farming generally is not feasible because of subsidence and bedrock at a depth of 20 to 50 inches. Blasting of bedrock is necessary for most drainage outlets. Drained areas need control of soil blowing and management of water to reduce the rate of subsidence and oxidation. Areas that can be drained are suited to crops and pasture.

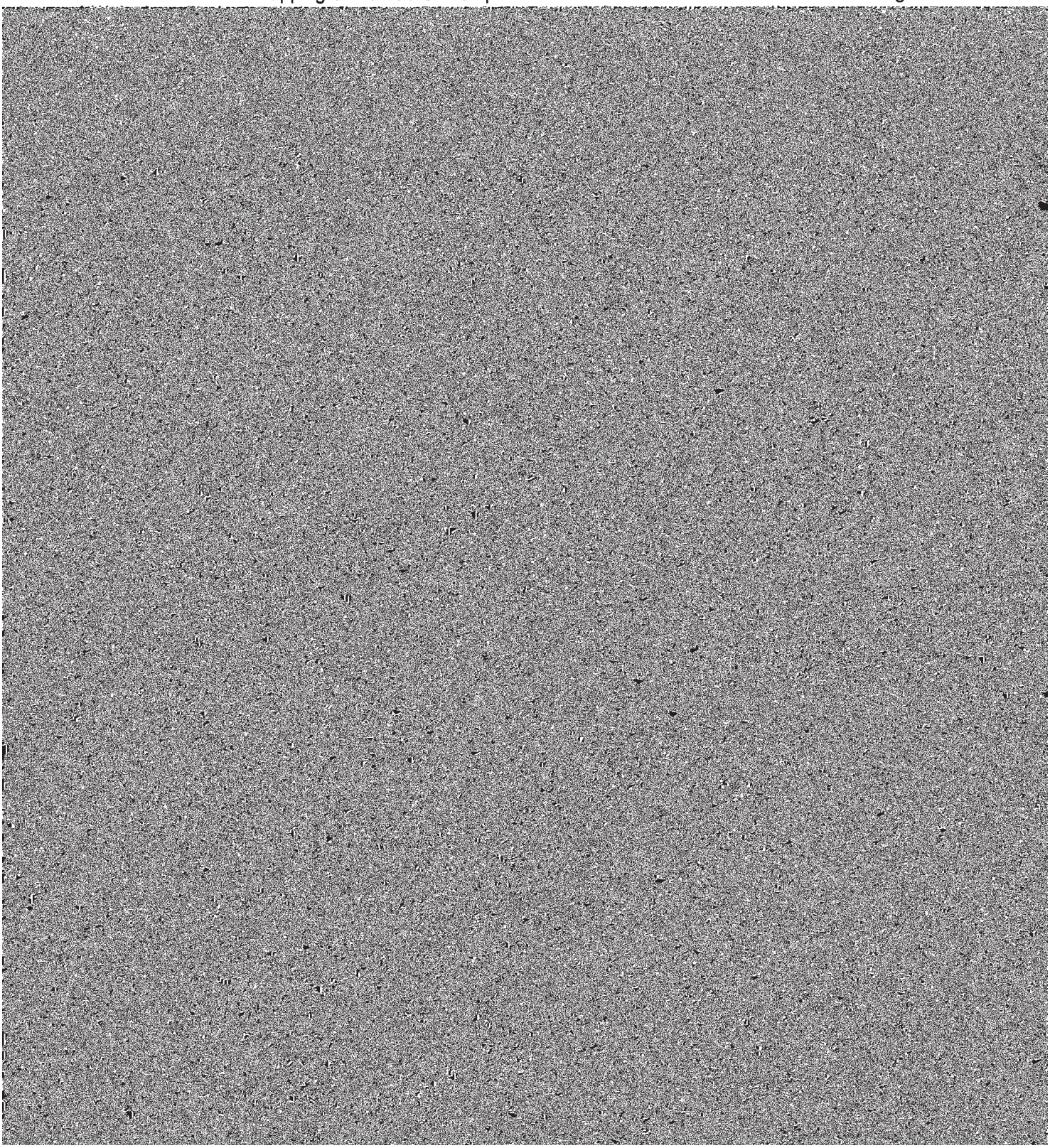
Woodland productivity is moderate. Species that are tolerant of wetness are needed for reforestation. Machine planting of tree seedlings generally is not practical.

This soil is not used for community and recreational developments because of prolonged wetness, frost damage, poor trafficability, and bedrock at a depth of 20

65 inches is brown coarse sand and is 5 percent fine gravel.

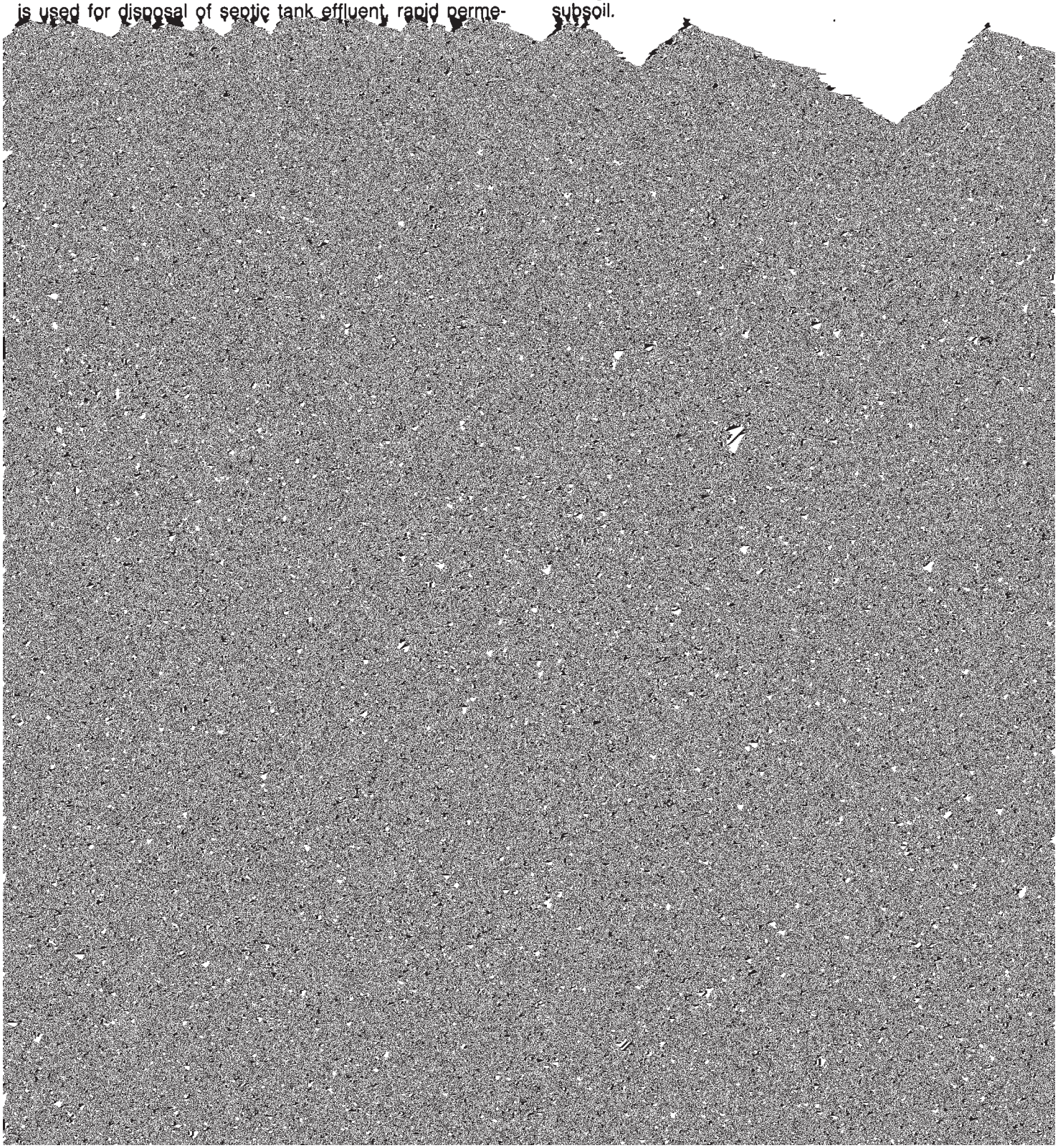
Included with this soil in mapping are areas of Pomp-

contamination of ground water. Sloughing is a hazard in excavations in this soil. The sandy surface layer limits most recreational uses. This soil is a good source of



tion. A vegetative cover maintained on the site during construction helps to prevent erosion. Sloughing is a hazard in excavations in this soil. In areas where this soil is used for disposal of septic tank effluent, rapid perme-

very strongly acid to medium acid in the surface layer and subsoil. Reaction of the Riverhead soils is very strongly acid or strongly acid in the surface layer and subsoil.



Plainfield and Riverhead soils are in such an intricate pattern that they are not shown separately on the soil map.

Typically, the surface layer of the Plainfield soil is brown loamy sand about 4 inches thick. The subsoil extends to a depth of about 24 inches. It is very friable

velopments. Trails in recreational areas need to be protected from erosion and established across the slope wherever possible. This unit is a good source of sand. Capability subclass VIIe.

PrC—Plainfield-Rock outcrop complex, rolling. This

and open areas are around the outcrops. The outcrops hinder fertilizing and mowing of pastures. Because applied nutrients are rapidly leached, response is generally better to smaller but more frequent or more timely applicaions than to one large application.

Woodland productivity is moderate on the Plainfield soil. The outcrops interfere with machine planting of tree seedlings. Seedling mortality is a hazard during dry years.

Many areas of this unit are used for housing. Houses are generally widely spaced and have outcrops in the lawn areas. Some areas are esthetic homesites, but Rock outcrops seriously limit excavations for basements, sewage disposal systems, and underground utilities. Excavations can easily be made in the Plainfield soils, but a soil investigation is needed before planning an excavation. Sloughing is a hazard in excavations in the Plainfield soil. In areas where this soil is used for disposal of septic tank effluent, rapid permeability throughout the soil can cause contamination of ground water. Lawn seedings made during the drier part of the growing season are generally a failure. Seedings need to be made early in spring or, if made during dry periods, the seedlings need to be mulched and watered. The sandy surface layer of the Plainfield soil, the outcrops, and slope are limitations for most recreational uses. Capability subclass VIIs.

Pt—Pompton fine sandy loam. This deep, nearly level, moderately well drained soil formed in water-sorted sandy sediment that was deposited as streams entered glacial lakes. It is in broad, slight depressions on outwash plains and deltas and on foot slopes of delta faces. Slope ranges from 0 to 3 percent. Areas are roughly oblong in shape and are 10 to 70 acres in size.

Typically, the surface layer is dark brown fine sandy loam 9 inches thick. The subsoil extends to a depth of 29 inches. It is very friable sandy loam that is dark brown in the upper part and mottled, yellowish brown in the lower part. The substratum to a depth of about 50 inches is mottled, gray and light brownish gray loamy sand and loamy fine sand. Stratified brown, yellowish brown, and olive gray loamy sand and sandy loam are in the substratum to a depth of about 61 inches.

Included with this soil in mapping are small areas of Riverhead and Plainfield soils that are on slight rises and make up as much as 15 percent of some areas and small areas of Walpole and Lamson soils that are wetter than this Pompton soil and are along drainageways or in small depressions. Also included are areas of a soil that is similar to the Pompton soil but has medium textured and moderately fine textured layers in the substratum below a depth of 40 inches; these layers are slightly acid to strongly acid.

This soil has a seasonal high water table at a depth of 18 to 24 inches in spring and in other excessively wet periods. Depth of rooting is related to the height of the water table and is mainly 18 to 24 inches. Available water capacity in the root zone is low to moderate. Permeability is moderate or moderately rapid in the surface layer and subsoil and is rapid or very rapid in the substratum. Surface runoff is slow. In unlimed areas, reaction is very strongly acid or strongly acid throughout the soil.

Most of the acreage of this soil is used for crops, pasture, or woodland. This soil has good potential for farming. Seasonal wetness limits urban and some recreational uses of this soil.

This soil is suited to cultivated crops, special crops, hay, and pasture. Seasonal wetness delays planting in some years. If this soil is cropped intensively, random drainage of the included wetter spots is essential. Maintaining tilth and a high level of fertility is also a main concern in management. Minimum tillage, incorporating crop residue into the soil, use of cover crops, and tilling and harvesting at the proper moisture condition are important in management. Applied lime and fertilizer are leached from this soil at a moderately rapid rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large application. Soil compaction is a concern in areas where this soil is used for vegetables and harvesting is done during wet periods. Use of lighter machinery with wider tire treads or use of specially designed machinery helps prevent soil compaction.

Fruit crops are suited to this soil. Soil compaction is a concern because spraying operations are often performed during wet periods with heavy equipment. Artificial drainage, maintaining a good sod cover, and use of lighter machinery with wider tire treads or use of specially designed machinery help to prevent soil compaction.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

The seasonal high water table is a limitation for many urban uses. Many dwellings on this soil have wet basements in spring and in other excessively wet periods. This soil is better suited to dwellings without basements than to those with basements. Foundation drains and protective coatings on the exterior walls of basements should be used. In areas where this soil is used for disposal of septic tank effluent, rapid permeability in the substratum can cause contamination of ground water. Sloughing is a hazard in excavations in this soil. This soil has potential for such recreational uses as picnic areas and paths and trails. Capability subclass IIw.

Ra—Raynham silt loam. This deep, nearly level, somewhat poorly drained soil formed in water-laid deposits of silt and very fine sand. It is on stream terraces and lake plains and in upland basins formerly occupied by glacial lakes. Slope ranges from 0 to 3 percent. Areas are broad or long and narrow in shape and are 5 to 70 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is leached, mottled, grayish brown silt loam 4 inches thick. The subsoil extends to a depth of about 37 inches. The upper 10 inches is friable, mottled, grayish brown silt loam; the next 10 inches is firm, mottled, pale olive silt loam; and the lower 5 inches is firm, mottled, reddish brown silt loam. The substratum to a depth of about 56 inches is mottled, reddish brown very fine sandy loam and silt loam.

Included with this soil in mapping on lake plains are areas that have thin layers of silty clay loam and silty clay in the substratum; small areas of moderately well drained Williamson and Scio soils that are at a slightly higher elevation; and narrow strips of Canandaigua soils that are wetter than this Raynham and are in depressions and along drainageways. Also included in the upland basins are areas of a soil that is similar to the Raynham but has a fragipan below a depth of 12 to 24 inches.

This soil receives runoff from adjacent soils. It is mainly on lake plains and in upland basins that are not subject to flooding. Some areas on low stream terraces are subject to flooding during periods of higher than normal rainfall. This soil has a seasonal high water table that rises to a depth of 6 to 18 inches below the surface in spring, early in summer, and in other excessively wet periods. A few areas are ponded for short periods. Roots are mainly confined to a depth of 15 to 24 inches, depending on the depth to the seasonal high water table and on the degree of drainage. Available water capacity is moderate. Permeability is moderate in the surface layer, is moderate or moderately slow in the subsoil, and is slow in the substratum. Runoff is slow. In unlimed areas, reaction is strongly acid to slightly acid in the surface layer and subsoil.

Most of the acreage of this soil is used for crops, hay, pasture, and woodland. This soil has fair potential for farming, but it has limited potential for urban developments because of wetness.

Drained areas of this soil are suited to cultivated crops, hay, and pasture. Wetness is the main concern in management. Undrained areas can be used for hay and pasture, but keeping soil compaction to a minimum and maintaining desirable forage stands are difficult. Planting is delayed and the choice of crops is limited in these undrained areas. A combination of surface and subsurface drains are needed in many areas. Drainage outlets may be difficult to establish. Keeping the soil from crusting after rains and maintaining tilth and a high level of fertility and organic matter are also very important. Minimum tillage, incorporating crop residue into the soil, crop rotation, use of cover crops, and tilling and harvesting at the proper moisture condition are important in management.

Drained areas of this soil have fair potential for fruit crops, and only a very small acreage is used for these crops. Rootstalk that can tolerate wetness need to be used when establishing new orchards and vineyards. Soil compaction is a continuous concern because spraying operations are commonly performed during wet periods. Artificial drainage, maintaining a good sod cover, and use of lighter machinery with wider tire treads or use of specially designed machinery help prevent soil compaction.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil. Wetness limits the suitability of this soil for some species.

The seasonal high water table, slow permeability in the substratum, and the flooding hazard in a few areas of low stream terraces are limitations for most urban and recreational developments. Many dwellings on this soil have wet basements. Foundation drains and protective coatings on the exterior walls of basements help prevent wet basements. Specially designed septic tank absorption fields are needed. Sloughing is a hazard in excavations in this soil. Roads need artificial drainage and a thick subbase. Capability subclass IIIw.

Re—Red Hook gravelly silt loam. This deep, nearly level, somewhat poorly drained soil formed in glacial outwash. It is on the lower parts of glacial outwash terraces, stream terraces, and water-sorted parts of moraines. Slopes are 0 to 3 percent. Most areas are long and narrow in shape and are 5 to 10 acres in size.

Typically, the surface layer is brown gravelly silt loam about 8 inches thick. The subsoil extends to a depth of about 30 inches and is friable, mottled, gravelly silt loam and gravelly loam. It is pale olive in the upper part and light olive gray in the lower part. The substratum is olive gray very gravelly loamy sand to a depth of about 37 inches and mottled, olive gray very gravelly sandy loam to a depth of 50 inches.

Included with this soil in mapping are small areas of Atherton and Canandaigua soils that are wetter than this Red Hook soil and are in depressions and along drainageways; a few areas of moderately well drained Castile soils that are on slight rises; and some small areas of soils that have a surface layer of gravelly loam. Also included are a few small areas of Raynham, Volusia, and Scriba soils.

This soil has a water table that rises to a depth of 6 to 18 inches below the surface in winter, in spring, and in other excessively wet periods. Roots are strongly influenced by the water table. In spring, they are confined mainly to the upper 15 to 20 inches of the soil. A few roots penetrate to a greater depth as the water table recedes. Available water capacity is low in the root zone, but the water table fluctuates and plants seldom show moisture stress during periods of normal rainfall. Permeability is moderate in the surface layer and subsoil and is moderate or moderately slow in the substratum. Runoff

and underground seepage commonly collect on this soil. In unlimed areas, reaction typically increases as depth increases from strongly acid to slightly acid in the surface layer and upper part of the subsoil to medium acid to neutral in the lower part of the subsoil.

Most of the acreage of this soil is used for crops

ish gray silty clay loam; the next 12 inches is very firm, mottled, light brownish gray silty clay; and the lower 7 inches is firm, mottled, dark yellowish brown silty clay. The substratum to a depth of about 50 inches is mottled, dark yellowish brown, varved silty clay and silt loam.

Included with this soil in mapping are areas of moder

on this soil. Wetness limits the suitability of this soil for some species.

Only a small acreage of this soil is used for urban and recreational developments because of the perched seasonal high water table, low strength, and slow permeability in the subsoil and substratum. Many dwellings have wet basements. Foundation drains and protective coatings on the exterior walls of basements help prevent this wetness. Spread footings are needed because of low strength of the soil. Specially designed septic tank absorption fields are needed. Roads need artificial drainage and a thick subbase. Capability subclass IIIw.

RhB—Rhinebeck silt loam, 3 to 8 percent slopes. This deep, somewhat poorly drained, gently sloping soil formed in lake-laid deposits of clay and silt. It is mainly on very broad, low ridges on glacial lake plains and other landforms that are mantled with lake sediment. Some areas along waterways are gently sloping. Slopes are smooth. Areas are irregular in shape and are 5 to 160 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is leached, mottled, pale brown silty clay loam about 2 inches thick. The subsoil extends to a depth of about 35 inches. The upper 6 inches is firm, mottled, light brownish gray silty clay loam; the next 12 inches is firm, mottled, light brownish gray silty clay; and the lower 7 inches is firm, mottled, dark yellowish brown silty clay. The substratum to a depth of about 50 inches is mottled, dark yellowish brown, varved silty clay and silt loam.

Included with this soil in mapping are small areas of moderately well drained Hudson soils that are on the tops of convex knolls; long, narrow strips of Madalin and Canandaigua soils that are wetter than this Rhinebeck soil and are in depressions and along waterways; and areas of Churchville and Cayuga soils that are in areas where the lacustrine deposits are 20 to 40 inches thick over glacial till. Also included are some areas of silty Raynham and Williamson soils.

This soil has a perched seasonal high water table at a depth of 6 to 18 inches in winter, in spring, and in other excessively wet periods. Roots are mainly confined between 15 and 24 inches, depending on the depth to the seasonal high water table. Available water capacity of this zone is moderate. Permeability is moderately slow in the surface layer and is slow in the subsoil and substratum. This soil becomes puddled and forms clods if it is cultivated when wet. Runoff is medium. Reaction is medium acid to neutral in the surface layer and subsoil. [illegible] suitability of this soil for crops that are planted early in spring and for special crops and fruit crops. Controlling excess water is a major management need. Undrained areas can be used for hay and pasture, but keeping soil compaction to a minimum and maintaining desirable forage stands are difficult. Surface drains and diversion terraces generally are effective in removing excess surface water. Subsurface drains must be closely spaced in this slowly permeable soil for adequate drainage. Controlling erosion and maintaining good tilth are difficult in intensively cultivated areas. This soil needs to be cultivated at the proper moisture condition because it is sticky when wet and fairly hard when dry. Hard clods and a crusty surface form if this soil is cultivated when wet. Planting when the soil is very dry generally results in poor seed germination. Standard management practices, for example, minimum tillage, contour farming, use of cover crops, incorporating crop residue into the soil, crop rotation, good fertilization, and planting and harvesting at the proper moisture condition, help to improve tilth and maintain the content of organic matter.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil. Wetness limits the suitability of this soil for some species.

Only a small acreage of this soil is used for urban and recreational developments because of the perched seasonal high water table, low strength, and slow permeability in the subsoil and substratum. Many dwellings have wet basements. Foundation drains and protective coatings on exterior walls of basements help prevent this wetness. Spread footings are needed because of low strength of the soil. Specially designed septic tank absorption fields are needed. Roads need artificial drainage and a thick subbase. Erosion is a hazard during construction. Capability subclass IIIw.

RvA—Riverhead fine sandy loam, 0 to 3 percent slopes. This deep, well drained, nearly level soil formed mainly in water-laid deltaic deposits from streams that entered glacial lakes. It is on the top of deltas, and some areas extend more than 1 mile. Most areas are irregular in shape and are 25 to 400 acres in size.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is very friable, dark yellowish brown and strong brown sandy loam that extends to a depth of about 26 inches. The substratum to a depth of about 62 inches is dark yellowish brown and brown loamy sand and sand.

[illegible]

medium textured and moderately fine textured layers in the substratum below a depth of 3-1/2 feet. Most of the included soils are in the Saugerties-Glasco and Kingston-Lake Katrine sections of the county. Some included soils have a seasonal high water table below a depth of 3-1/2 feet.

This soil warms up early in spring. After frost leaves the soil in spring, the level of free water falls rapidly. Roots are mainly confined to the upper 3 feet of the soil, but a few deep-rooted crops obtain water at a greater depth. Available water capacity is moderate. Permeability is moderately rapid in the surface layer and subsoil and is very rapid in the substratum. Runoff is slow. In unlimed areas, reaction is very strongly acid or strongly acid throughout the soil.

Most of the acreage of this soil is used for cultivated crops, fruit crops, hay, pasture, housing, industry, or recreation. This soil has good potential for all of these uses.

This soil is well suited to a wide variety of crops including special crops (fig. 7). It is especially well suited to crops that are planted early in spring. This soil is moderately susceptible to drought in midsummer, but it responds to irrigation. Under a high level of management it is very productive. Applied lime and fertilizer are leached from this soil at a moderately rapid rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large application. Standard management practices, for example, minimum tillage, use of cover crops, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation, help to conserve moisture, improve tilth and maintain the content of organic matter.

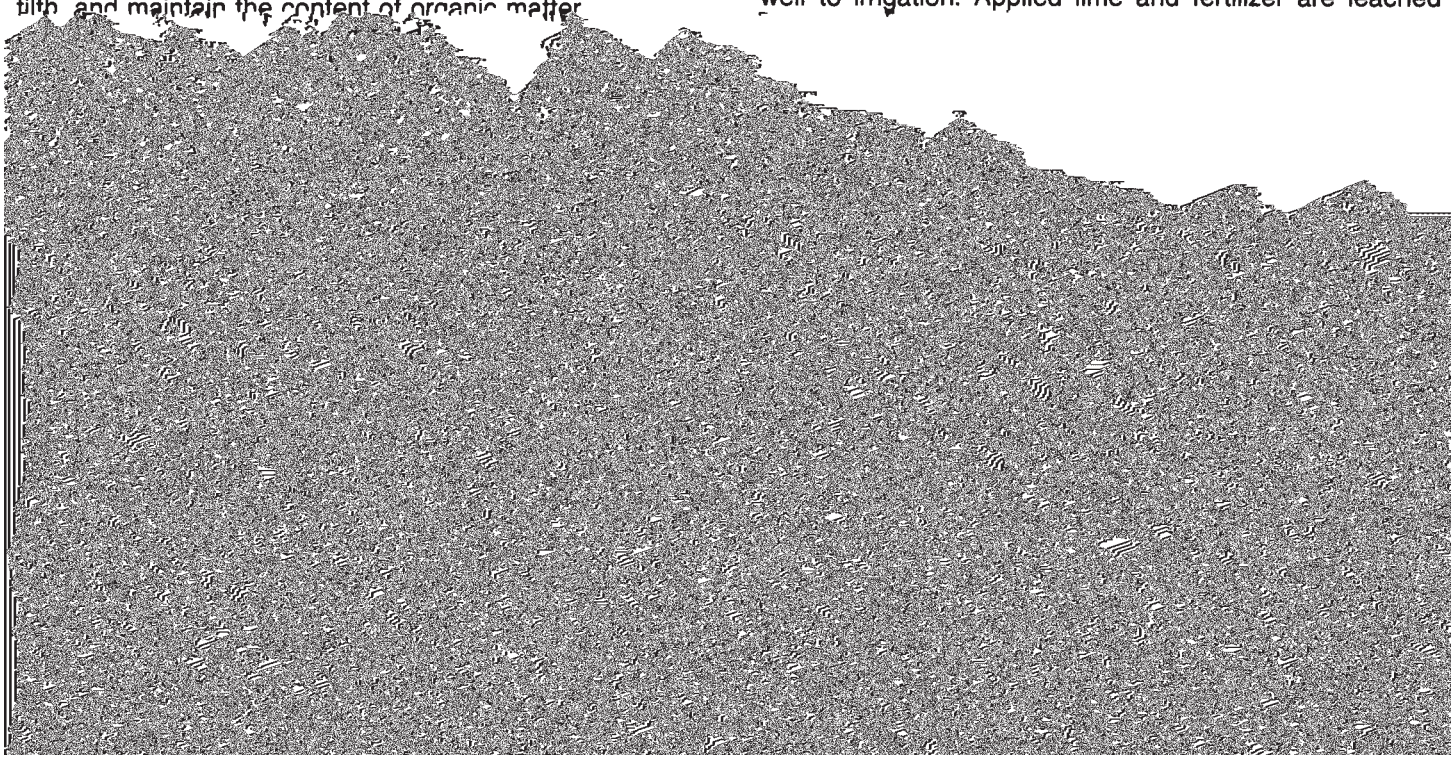
Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is very friable, dark yellowish brown and strong brown sandy loam that extends to a depth of about 26 inches. The substratum to a depth of about 62 inches is dark yellowish brown and brown loamy sand and sand.

Included with this soil in mapping are a few areas of a soil that is similar to the Riverhead soil but has medium textured and moderately fine textured layers in the substratum below a depth of 3-1/2 feet; small areas of Pompton and Walpole soils that are in depressions; and some areas of coarser textured Plainfield soils, but they are not extensive. Also included are areas of soils that have a surface layer of loam and sandy loam.

This soil warms up early in spring. Roots are mainly confined to the upper 3 feet of the soil, but a few deep-rooted crops obtain water at a greater depth. Available water capacity is moderate. Permeability is moderately rapid in the surface layer and subsoil and is very rapid in the substratum. Runoff is slow to medium. In unlimed areas, reaction is very strongly acid or strongly acid throughout the soil.

Most of the acreage of this soil is used for cultivated crops, fruit crops, hay, pasture, housing, industry, or recreation. This soil has good potential for all of these uses.

This soil is well suited to a wide variety of crops. It is especially well suited to crops that are planted early in spring. The hazard of erosion is moderate to slight. The main concerns in management are controlling runoff and erosion and providing adequate moisture. Crops respond well to irrigation. Applied lime and fertilizer are leached



RvC—Riverhead fine sandy loam, 8 to 15 percent slopes. This deep, well drained, sloping soil formed mainly in water-laid deltaic deposits that were dropped as streams entered glacial lakes. It is on the top and side of deltas. Most areas are oblong or long and narrow in shape and are 10 to 30 acres in size.

Typically, the surface layer is dark brown fine sandy loam about 8 inches thick. The subsoil is very friable, dark yellowish brown and strong brown sandy loam that extends to a depth of about 26 inches. The substratum to a depth of about 62 inches is dark yellowish brown and brown loamy sand and sand.

Included with this soil in mapping are small areas of Plainfield soils that are sandier than this Riverhead soil and are on the upper part of slopes and some spots of eroded soils. Also included are a few areas of a soil that is similar to the Riverhead soil but has medium textured and moderately fine textured layers within a depth of 40 inches that cause sidehill seep spots. The seep spots are shown on the soil map by a wet spot symbol.

This soil warms up early in spring. Roots are mainly confined to the upper 3 feet of the soil, but a few deep-rooted crops obtain water at a greater depth. Available water capacity is moderate. Permeability is moderately rapid in the surface layer and subsoil and is very rapid in the substratum. Runoff is medium. In unlimed areas, reaction is very strongly acid or strongly acid throughout the soil.

Most of the acreage of this soil is used for cultivated crops, orchards, vineyards, hay, pasture, woodland, or housing. This soil has fair potential for farming. Slope is a limitation for most urban uses.

This soil is suited to crops and pasture. It can be tilled early in spring, but it is moderately droughty. If this soil is intensively used for intertilled crops, erosion is a major hazard. The cropping system needs to include a high proportion of sod-forming crops and pasture. Contour farming is practical in some areas. Standard management practices, for example, minimum tillage, use of cover crops, incorporating crop residue into the soil, and tillage at the proper moisture condition, help to improve tilth, conserve moisture, maintain the content of organic matter, and reduce the erosion hazard. Applied lime and fertilizer are leached from this soil at a moderately rapid rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large application.

This soil is suited to orchards maintained in permanent sod cover, but it is only moderately suited to vineyards. Because vineyards are cultivated, erosion is a hazard. Spraying operations can generally be performed without excessive soil compaction.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

Even though slope limits many urban uses of this soil, most areas have potential for residential housing. Some areas are esthetic homesites. The hazard of erosion is severe during construction. A vegetative cover maintained on the site during construction helps prevent erosion. In areas where the soil is used for disposal of septic tank effluent, very rapid permeability in the substratum can result in contamination of ground water. Sloughing is a hazard in excavations in this soil. This soil is a good source of sand. Capability subclass IIIe.

RXC—Rock outcrop-Arnot complex, sloping. This map unit is made up of exposed bedrock and shallow, somewhat excessively drained to moderately well drained Arnot soils. It is mainly on the tops of the Shawangunk and Catskill Mountains. The soils formed in glacial till. The Arnot soils are intermingled with the outcrops throughout the unit, but are mainly on the lower part of slopes and on benches. Slope ranges from 8 to 15 percent. Areas in the Shawangunk Mountains are broad and irregular in shape and are 15 to more than 800 acres in size. Areas in the Catskill Mountains are mostly oval in shape and are 15 to 50 acres in size.

This unit is made up of about 45 percent Rock outcrop, 30 percent Arnot channery silt loam or channery loam, and 25 percent other soils. Areas in the Shawangunk Mountains have a higher percentage of Rock outcrop than those in the Catskill Mountains. Rock outcrop and Arnot soils form such an intricate pattern that they are not shown separately on the soil map.

Typically, the surface layer of the Arnot soil is very dark grayish brown channery loam about 3 inches thick. The subsoil is friable, dark yellowish brown, channery loam and very channery loam. Thick bedded gray sandstone and siltstone bedrock is at a depth of about 17 inches.

Included with this unit in mapping are small areas of very shallow soils that are similar to the Arnot soil but have bedrock at a depth of 5 to 10 inches. Also included are areas of Tuller, Morris, and Scriba soils that are wetter than this Arnot soil and are along small drainageways and in depressions. Many areas have slopes of 2 to 8 percent, and many areas in the Catskill Mountains are very bouldery. Also included are large areas of soils that are similar to the Arnot soil but have a surface layer of gravelly loam and a subsoil of gravelly fine sandy loam and very gravelly sandy loam. These similar soils are in the Shawangunk Mountains where bedrock is quartz pebble conglomerate and sandstone. Narrow strips of Lordstown and Oquaga soils are also included.

Arnot soils have free water above the bedrock for brief periods in spring and after heavy rain. The root zone consists of 10 to 20 inches of well aerated soil material over bedrock. In some areas, a few roots penetrate fractures in the bedrock. Available water capacity is very low, and plants wilt quickly during dry periods. Permeability is moderate. Runoff is rapid. In unlimed areas, reaction is extremely acid to medium acid throughout these soils.

This unit is used mainly for woodland and for wildlife habitat. It has poor potential for farming and for urban uses, but it has potential for some types of recreational developments. This unit is not used for crops and pasture.

Vegetation in this unit is sparse and stunted. Seedling mortality is high.

The high percentage of exposed bedrock, shallow depth to bedrock, and slope are severe limitations for community developments. This unit has potential for hiking. Capability subclass VIIIs.

RXE—Rock outcrop-Arnot complex, steep. This map unit is made up of exposed bedrock and shallow, somewhat excessively drained to moderately well drained Arnot soils mainly on the tops and sides of the Shawangunk and Catskill Mountains. The Arnot soils are mainly somewhat excessively drained. These very bouldery soils formed in glacial till. They are intermingled with outcrops throughout the unit, but are mainly [illegible] dominantly 2 to 6 feet across and 1 to 2 feet thick, but many are smaller and a few are larger. Distance between boulders is quite variable but is generally 5 to 30 feet. Reaction is extremely acid to medium acid throughout the Arnot soils.

Most of the acreage of this unit is used for wildlife habitat. Steep slopes, high percentage of exposed bedrock, boulders, and shallow depth to bedrock prevent most uses except woodland, recreation, and wildlife habitat.

Vegetation is sparse and stunted. Seedling mortality is high because of droughtiness.

This unit has potential for hiking and lookout points from the higher escarpments. Construction for urban and recreational developments is extremely difficult. Capability subclass VIIIs.

RXF—Rock outcrop-Arnot complex, very steep. This map unit is made up of exposed bedrock and shal-

low, and plants wilt quickly during dry periods. Permeability is moderate. Runoff is very rapid. Boulders are dominantly 2 to 4 feet thick and 2 to 10 feet across, but some are smaller and a few are larger. They are spaced about 2.5 to 5 feet apart. In many areas they occur as rock rubble at the base of vertical cliffs or bedrock escarpments. Reaction is extremely acid to medium acid throughout the Arnot soils.

The very steep slopes, shallow depth to bedrock, boulders, and high percentage of exposed bedrock severely affect all uses. Most of the acreage of this unit is used for wildlife habitat. Some areas have potential for lookout points from the higher escarpments.

Vegetation is very sparse. Seedling mortality is high because of droughtiness.

Construction for urban and recreational developments is extremely difficult. Capability subclass VIIIs.

SaB—Schoharie silt loam, 3 to 8 percent slopes. This deep, gently sloping moderately well drained and well drained soil formed in lake-laid deposits of clay and silt. It is mainly moderately well drained. This soil is on low knolls and on ridgetops on dissected lake plains and other landforms that are mantled with lake sediment. Slopes are slightly convex. Most areas are long and narrow or irregular in shape and are 5 to 40 acres in size.

Typically, the surface layer is brown silt loam about 8 inches thick. The subsurface layer is leached, reddish brown silty clay loam about 2 inches thick. The subsoil extends to a depth of about 36 inches. It is firm and very

substratum. This soil becomes puddled and cloddy if it is cultivated when wet. Runoff is medium. In unlimed areas, reaction is medium acid to neutral in the surface layer and is medium acid to mildly alkaline in the subsoil.

Most of the acreage of this soil is used for crops, pasture, and woodland. This soil has good potential for farming and for some recreational uses, but it has limited potential for urban development.

This soil is better suited to crops and pasture that support dairy farms and beef cattle farms than to most other uses. Seasonal wetness, slow permeability, and high content of clay and silt in the subsoil limit the suitability of this soil for special crops and fruit crops. Seasonal wetness delays planting in some years. This soil needs to be cultivated at the proper moisture condition because it is sticky when wet and hard when dry. Hard clods and a crusty surface form if the soil is cultivated when wet. Planting when this soil is very dry generally results in poor seed germination. The hazard of erosion is severe in cultivated areas that are not protected. Standard management practices, for example, contour farming, minimum tillage, use of cover crops, incorporating crop residue into the soil, crop rotation, good fertilization, and pasturing and harvesting at the proper moisture condition help to control erosion, improve tilth, and maintain the content of organic matter. Random drainage of the included wet spots is beneficial in some fields.

Woodland productivity is high. Machine planting of tree seedlings is practical on this soil.

The perched seasonal high water table, low strength,

50 inches is mottled, reddish brown, varved silty clay and silty clay loam.

Included with this soil in mapping are narrow strips of somewhat poorly drained Odessa and Raynham soils that are in low-lying areas near drainageways; small areas on the upper part of many slopes of an eroded soil that has a surface layer of silty clay loam; and a few areas between Kerhonkson and Wawarsing in the Ron-

permanent sod cover to control erosion, and others need drainage for wet spots.

Woodland productivity is high. Machine planting of tree seedlings is practical on this soil.

The perched seasonal high water table, low strength, slope, and slow or very slow permeability in the subsoil and substratum are limitations for most urban and recreational uses. Effluent from many septic tank absorption

slow in the substratum. This soil has good workability. Surface runoff is slow. In unlimed areas, reaction is very strongly acid to medium acid in the surface layer and subsoil.

Most of the acreage of this soil is used intensively for cultivated crops, special crops, hay, and pasture. This soil has good potential for farming. In some areas, seasonal wetness and the flooding limit urban uses.

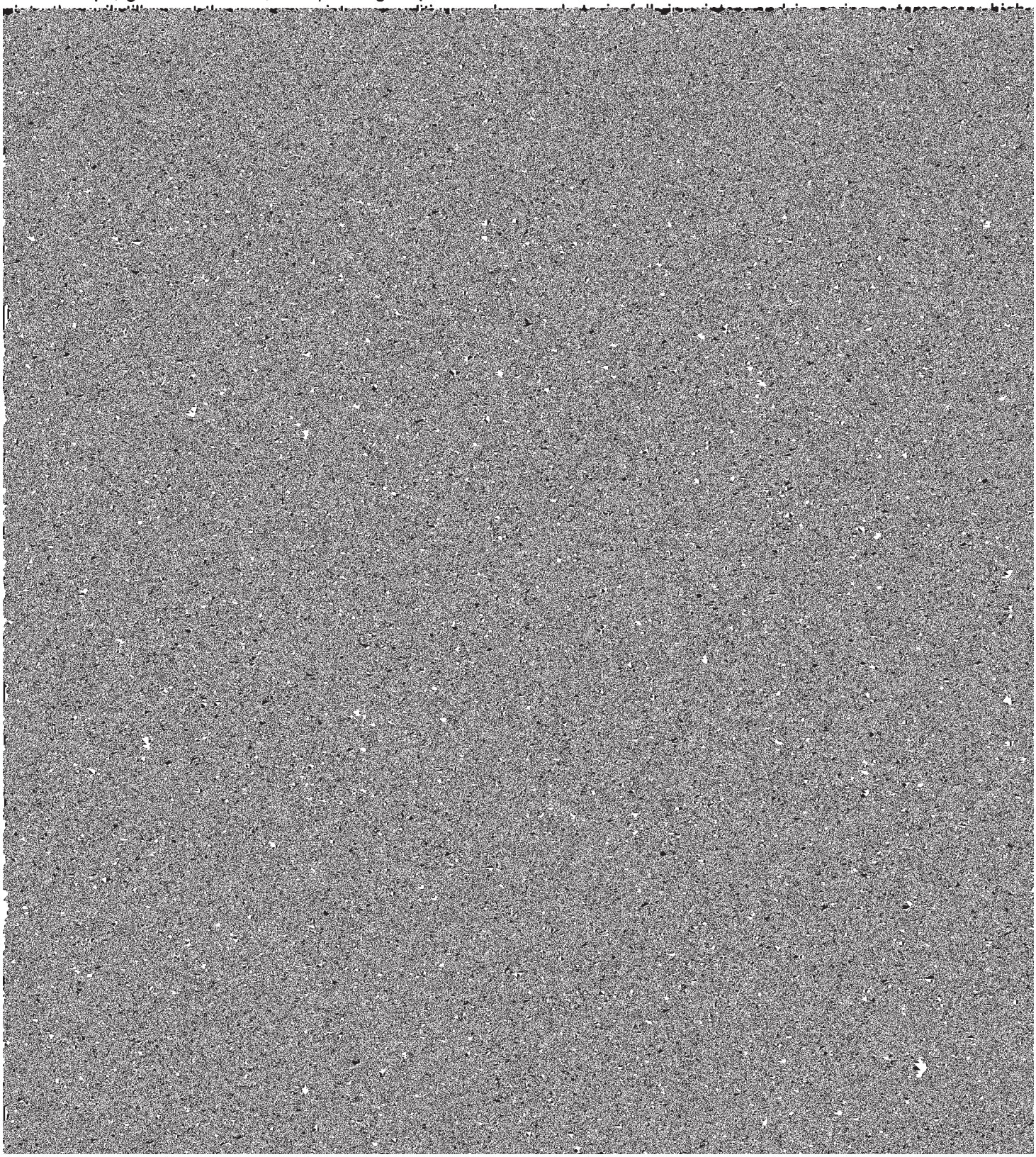
This soil is suited to cultivated crops, special crops, hay, and pasture. Many areas are used for sweet corn and field corn. Seasonal wetness delays planting in some years. Artificial drainage is needed in areas of the

Typically, the surface layer of the Morris soil is dark grayish brown flaggy silt loam about 8 inches thick. The subsoil extends to a depth of about 65 inches. The upper 4 inches of the subsoil is friable, mottled, grayish brown flaggy silt loam; the next 3 inches is firm, mottled, reddish brown gravelly loam; and the lower 50 inches is a very firm, mottled, reddish brown gravelly loam fragipan. The substratum to a depth of about 80 inches is reddish brown gravelly loam.

Included with these soils in mapping are moderately well drained Wurtsboro and Wellsboro soils that make up as much as 10 percent of some areas and are on low

agement practices, for example, minimum tillage, use of cover crops, good fertilization, incorporating crop residue

Morris soil but have bedrock within a depth of 20 to 40 inches.



tion fields moves to the surface in these soils. Therefore, specially designed absorption fields are needed. These soils are better suited to dwellings without basements than to those with basements. Foundation drains and protective coatings on the exterior walls of basements help to prevent wetness in basements. Some areas have potential for recreational uses. Capability subclass VIIs.

SGB—Scriba and Morris extremely bouldery soils, gently sloping. This map unit consists of deep, somewhat poorly drained soils that formed in glacial till on glaciated uplands. The soils are on broad flats and concave foot slopes and toe slopes. Slope ranges from 3 to 8 percent. Most areas are long and narrow or oblong in shape and are 10 to 40 acres in size.

Areas consist entirely of Scriba soils, or entirely of Morris soils, or of both of these soils. Boulders dominate the capabilities of these soils so much that the difference between the Scriba and Morris soils is relatively unimportant. Scriba soils are mainly on the foothills of the Shawangunk Mountains and on the plateau adjacent

tum of the Scriba soils, and is slow or moderately slow in the fragipan and substratum of the Morris soils. Runoff is medium. Boulders cover 3 to 15 percent of the surface of these soils. They are dominantly 2 to 4 feet thick and 2 to 10 feet across, but some are smaller and a few are larger. They are about 2.5 to 5 feet apart in most areas. The subsoil and substratum generally contain considerably less boulders than the surface layer contains. In unlimed areas reaction of the Scriba soils is acid to slightly acid in the surface layer and is strongly acid to neutral in the subsoil. Reaction of the Morris soils is very strongly acid to medium acid in the surface layer and upper part of the subsoil and is strongly acid to slightly acid in the fragipan.

Most of the acreage of these soils is used for woodland and for wildlife habitat to which they are best suited. These soils have poor potential for farming and for urban and recreational developments.

Woodland productivity is moderately high. The surface boulders are moderate limitations to use of large ma-

a depth of about 56 inches is dark brown gravelly silt loam over fractured limestone bedrock.

Typically, the surface layer of the Farmington soil is dark brown gravelly silt loam about 7 inches thick. The

maintain the content of organic matter, and reduce the hazard of erosion.

Fruit crops are suited to these soils if irrigation is available. The low or very low available water capacity of

Fractured limestone bedrock is at a depth of about 15 inches.

Included with these soils in mapping is a moderately deep, well drained soil that is intermingled with the major soils throughout the unit and is similar to the Farmington soil but has bedrock at a depth of 20 to 40 inches; narrow strips of Volusia, Lyons, Palms, Raynham, Canandaigua, Odessa, and Rhinebeck soils that are in slight depressions between the ridges; and a few areas of Farmington and Stockbridge soils that are underlain with calcareous shale bedrock. Also included are narrow strips of Bath, Mardin, Valois, Riverhead, Pompton, Plainfield, Chenango, Hudson, and Schoharie soils that are intermingled with the Stockbridge soil between ridges. Many areas of included soils have slopes of 3 to 10 percent.

The Stockbridge soil has free water in the slowly permeable substratum at a depth of 3 to 6 feet in winter, in spring, and in other excessively wet periods. Roots are generally unrestricted above the substratum, which is at a depth of 24 to 36 inches. Available water capacity of this zone is moderate to high. Depth to bedrock is more than 40 inches. Permeability is moderate in the surface layer and subsoil and is slow in the substratum.

Roots in the Farmington soil are confined mostly to the 10 to 20 inches of soil above the fractured limestone bedrock, but a few roots penetrate cracks in the bedrock. Because of shallowness to bedrock, available water capacity is low to very low. Permeability is moderate.

Runoff is medium to very rapid. In unlimed areas, reaction of the Stockbridge soil is strongly acid to slightly acid in the surface layer and is strongly acid to neutral in the subsoil. Reaction of the Farmington soil is strongly acid to slightly acid in the surface layer and is medium acid to neutral in the subsoil.

These soils and the Rock outcrop are used mainly for woodland and for wildlife habitat to which they are well suited. Some areas are in permanent pasture. Many abandoned limestone mines are in the unit. This unit has poor potential for farming, but it has potential for quarrying and for some types of recreational developments.

Farm uses are affected by the variable depth to bedrock and by slope and rock outcrops. Areas are not suited to cultivation with large machinery. Available water capacity is quite variable within short distances. The hazard of erosion is severe. Rock outcrops and slope hinder fertilizing and mowing of pasture. This unit is not used for orchards and vineyards.

Woodland productivity is moderately high on the Stockbridge soil and poor on the Farmington soil. Rock outcrops seriously interfere with machine planting of tree seedlings.

The variable depth to bedrock, slope, rock outcrops, and slight wetness of the Stockbridge soil are severe limitations for most urban uses of this unit. Esthetic homesite are in some areas, but sites for sewage disposal can be very limiting. In areas where the soils are used for disposal of septic tank effluent, fissures in the limestone bedrock can result in contamination of ground water. Dwellings with basements in the Stockbridge soil need foundation drains and coatings on the exterior walls of basements. A vegetative cover maintained on the site during construction helps prevent erosion. Most areas have potential for quarrying and for use as paths and trails. Capability subclass VIs.

Su—Suncook loamy fine sand. This deep, nearly level, excessively drained soil formed in recent sandy alluvial deposits. It is on flood plains adjacent to the streams. This soil is subject to flooding. Slope ranges from 0 to 3 percent. Areas are long and narrow in shape and are 5 to 30 acres in size.

Typically, the surface layer is very dark grayish brown loamy fine sand about 3 inches thick. The underlying layers extend to a depth of about 53 inches and are dark grayish brown loamy fine sand. One layer, between a depth of about 27 and 36 inches, is stratified with fine sand.

Included with this soil in mapping are small areas of well drained Tioga and Barbour soils; some areas in small stream valleys that have a surface layer of gravelly loamy fine sand or cobbly loamy fine sand and have stratified sand and gravel below a depth of 20 inches; and some areas of soils that have thin layers of fine sandy loam and sandy loam in the substratum. Also included are thin, narrow strips of Tunkhannock soils on glacial-stream terraces and areas of Alluvial land bordering the streams.

This soil is subject to flooding at any time of the year, but it commonly is flooded for brief periods when runoff is heavy during winter and spring. The seasonal high water table in most areas is controlled by the water level in the adjacent streams and generally is at a depth of 3 to 6 feet during winter and spring. The roots of deep-rooted plants extend to 4 or 5 feet, but most roots are within the upper 30 or 40 inches of the soil. This soil dries quickly after rain, and shallow-rooted plants wilt after a few rainless days. Available water capacity is very low to low. Permeability is rapid or very rapid. Runoff is very slow or slow. In unlimed areas, reaction is very strongly acid to slightly acid throughout the soil.

The flooding hazard limits the use of this soil. Areas in the larger stream valleys are mainly used for crops, hay, and pasture; whereas those in the small stream valleys are used for pasture, for woodland, and for wildlife habitat. This soil has fair potential for farming and poor potential for most community developments.

This is an early soil for cropping. Crops that require large quantities of water late in the growing season are not well suited to this soil, unless irrigation is provided. When this soil is irrigated, it is suited to most crops, including special crops. The surface layer of loamy fine sand is a concern in tilling because some tillage equip-

ment, such as a disk harrow, cuts too deep. This soil responds well to good management. Because applied nutrients are rapidly leached from this soil, response is generally better to smaller but more frequent or more timely applications than to one large application. In some places, gouging by floodwaters and the undercutting of stream banks are concerns. Standard management practices, for example, incorporating crop residue into the soil, use of cover crops, tillage at the proper moisture condition, and crop rotation, help to improve tilth and maintain the content of organic matter.

Woodland productivity is poor. Machine planting of tree seedlings is practical on this soil. Seedling mortality is a hazard during dry years.

The hazard of flooding is a severe limitation for community developments. Facilities for such recreational uses as picnicking, golfing, and boating are moderately suited to this soil. If recreational buildings are constructed on the flood plain, they need to be anchored. Caving is a hazard in excavations in this soil. Capability subclass IIIs.

SwB—Swartswood stony fine sandy loam, 3 to 8 percent slopes. This deep, stony, gently sloping, well drained soil formed in glacial till. It is on uplands and receives little or no runoff from adjacent soils. Slopes are convex and smooth or gently undulating. Most areas are oblong in shape and are 5 to 35 acres in size.

Typically, the surface layer is brown stony fine sandy loam about 7 inches thick. The upper part of the subsoil extends to a depth of about 24 inches. It is friable, strong brown gravelly sandy loam. A firm and brittle, thin, leached layer of mottled, yellowish brown gravelly sandy loam about 5 inches thick separates the upper part of the subsoil from the lower part. The lower part of the subsoil extends to a depth of about 60 inches. It is a very firm and brittle, olive brown gravelly sandy loam fragipan.

Included with this soil in mapping are small areas of Wurtsboro and Scriba soils that are wetter than this Swartswood soil and are on slightly concave foot slopes, in seep spots, and in depressions; a few small areas of Valois soils that intermingled with the Swartswood soil but are not extensive; and narrow strips of Lordstown soils that have bedrock at a depth of 20 to 40 inches. Most of the included Scriba soils are shown on the soil map with the wet spot or intermittent stream symbol.

Free water is generally above the fragipan for brief periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it, so they are mostly confined to the 20- to 36-inch zone above the fragipan. Available water capacity of this zone is very low to moderate. Permeability is moderate above the fragipan and is slow or moderately slow in the fragipan and substratum. Runoff is medium. Approximately 0.01 to 0.1 percent of the surface is covered with large flat stones about 1 foot thick and 1 to 5 feet across. Stones are spaced about 30 to 100 feet apart. In unlimed areas, reaction is extremely acid to strongly acid throughout the soil.

Most of the acreage of this soil is used for pasture, long-term hay, and woodland. A few areas are cultivated. This soil has good potential for farming and for many recreational uses. It is more desirable than many other soils in the uplands as a site for buildings and other nonfarm uses.

Many areas of this soil, formerly used as cropland, are reverting to forest. Tillage of intertilled crops with large machinery is impractical because of the large stones. After stones are removed, this soil is suited to crops and pasture. Crops respond well to liming and fertilization. Erosion is a hazard in cultivated areas, especially if slopes are long. Standard management practices, for example, minimum tillage, contour farming, use of cover crops, crop rotation, and incorporating crop residue into the soil, help to control erosion, improve tilth, and maintain the content of organic matter.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

Because of slight seasonal wetness and slow or moderately slow permeability in the fragipan and substratum, this soil has limitations for many urban uses. This soil is better suited to dwellings without basements than to those with basements. Foundation drains and protective coatings on the exterior walls of basements are needed. Effluent from some septic tank absorption fields seeps to the surface in this soil. Effluent fields need to be much larger than those commonly installed because of the slow or moderately slow permeability in the fragipan and substratum. Capability subclass IIe.

SwC—Swartswood stony fine sandy loam, 8 to 15 percent slopes. This deep, stony, well drained, sloping soil formed in glacial till. It is on glaciated uplands where water does not accumulate. Slopes are convex. Most areas are irregular in shape and are 10 to 20 acres in size.

Typically, the surface layer is brown stony fine sandy loam about 7 inches thick. The upper part of the subsoil extends to a depth of about 24 inches. It is friable, strong brown gravelly sandy loam. A leached layer of mottled, yellowish brown, firm and brittle gravelly sandy loam about 5 inches thick separates the upper part of the subsoil from the lower part. The lower part of the subsoil extends to a depth of about 60 inches. It is a very firm and brittle, olive brown gravelly sandy loam fragipan.

Included with this soil in mapping are small areas of Lordstown soils that have bedrock at a depth of 20 to 40 inches; some areas of Wurtsboro soils that are at the base of slopes; a few small areas of Valois soils that are intermingled with the Swartswood soil, but not extensively; and narrow strips of Hoosic soils that formed in water-sorted glacial outwash. Also included are a few hillside

seeps that are shown on the soil map with the wet spot symbol.

Free water is generally above the fragipan for brief periods late in fall, in winter, and early in spring. Because the fragipan is so dense, roots cannot easily penetrate it, so they are mostly confined to the 20- to 36-inch zone above the fragipan. Available water capacity of this zone is very low to moderate. Permeability is moderate above the fragipan and is slow or moderately slow in the fragipan and substratum. Runoff is rapid. Approximately 0.01 to 0.1 percent of the surface is covered with large flat stones more than 1 foot thick and 1 to 5 feet across. Stones are spaced about 30 to 100 feet apart. In unlimed areas, reaction is extremely acid to strongly acid throughout the soil.

Most of the acreage of this soil is used for pasture, long-term hay, and forest. This soil has fair potential for farming. It is better than many soils on the uplands for many nonfarming uses, such as homesites and paths and trails.

Many areas of this soil that were formerly cropland are reverting to forest. There is a sufficient number of large stones. Because of large stones, tillage of intertilled crops by large machinery is impractical. After stones are removed, this soil is suited to crops and pasture. Crops respond well to liming and fertilization. Prevention of erosion is a major concern, especially if slopes are long. A large proportion of sod farming crops are needed in the cropping system. Standard management practices, for example, contour farming, minimum tillage, use of cover crops, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation help to control erosion, improve tilth, and maintain the content of organic matter.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

Because of the slight seasonal wetness, slope, and slow or moderately slow permeability in the fragipan and substratum, this soil has limitations for many urban uses. Effluent from some septic tank absorption fields seeps to the surface in this soil. Absorption fields need to be much larger than those commonly installed because of the slowly permeable fragipan. In areas where public sewers are available, the soil is only moderately limited for residential housing. Foundation drains and exterior coatings on the walls of basements are needed. Erosion is a hazard during construction. A vegetative cover maintained on the site during construction helps prevent erosion. Capability subclass IIIe.

Te—Teel silt loam. This deep, nearly level, moderately well drained to somewhat poorly drained soil formed in silty alluvium derived from limestone, shale, and fine grained sandstone. It is mainly in long, narrow strips on first bottoms and is subject to flooding. Slope ranges from 0 to 2 percent. Areas range from 5 to 75 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 10 inches thick. The upper part of the subsoil extends to a depth of about 16 inches and is friable, brown silt loam. The lower part of the subsoil extends to a depth of about 38 inches and is friable, mottled, dark yellowish brown silt loam. The substratum to a depth of about 50 inches is mottled, dark yellowish brown silt loam.

Included with this soil in mapping are a few narrow strips of well drained Hamlin soils in slightly higher, nearly level areas; areas of poorly drained and very poorly drained Wayland soils in depressions and low areas; and thin strips of the Scio soils on stream terraces. Also included are a few small areas of Middlebury soils that are more sandy than this Teel soil and are on flood plains.

This soil is subject to flooding at any time of the year, but it commonly is flooded for brief periods when runoff is heavy late in fall, in winter, and in spring. A seasonal high water table is at a depth of 6 to 24 inches in winter, in spring, and in other excessively wet periods. Roots are controlled by the water table and are mainly confined to the upper 24 inches of the soil. Available water capacity of this zone is moderate. Permeability is moderate throughout the soil. Runoff is slow or very slow. In unlimed areas, reaction is strongly acid or medium acid in the surface layer and is medium acid to neutral in the subsoil.

Most of the acreage of this soil is used for crops, pasture, and woodland. This soil has good potential for farming and poor potential for most community developments.

This soil is suited to crops, hay, and pasture. Special crops can be grown, but flooding in some years can cause crop loss. Flooding and seasonal wetness are the main limitations. Spring planting is delayed because of wetness. Artificial surface and subsurface drains are needed in intensively cultivated areas for high production. Because of the hazards of frost and flooding, this soil is not suited to orchards and vineyards. Keeping the soil from crusting after rains and maintaining tilth and a high level of fertility are also main management concerns. Minimum tillage, incorporating crop residue into the soil, use of cover crops, and tilling and harvesting at the proper moisture condition are important in management. Soil compaction is a hazard in areas where this soil is used for vegetables because harvesting is sometimes performed during wet periods. Use of lighter machinery with wider tire treads or use of specially designed machinery helps to prevent soil compaction.

Woodland productivity is high. Machine planting of tree seedlings is practical on this soil.

The flooding hazard and seasonal wetness are severe limitations for community developments. This soil has potential for such recreational uses as paths and trails, golfing, and boating. If recreational buildings are constructed on the flood plain, they need to be anchored.

This soil is one of the best sources of topsoil in the county. Capability subclass IIw.

Tg—Tioga fine sandy loam. This deep, nearly level, well drained soil formed in alluvium derived from sandstone, siltstone, and shale. It is on first bottoms adjacent to the streams and is subject to flooding. Slope ranges from 0 to 3 percent. Areas are long and narrow in shape and are 5 to 45 acres in size.

Typically, the surface layer is dark brown fine sandy loam about 10 inches thick. The very friable subsoil extends to a depth of about 34 inches. It is dark brown fine sandy loam in the upper part and dark yellowish brown very fine sandy loam in the lower part. The substratum to a depth of about 65 inches has three layers

tire treads or use of specially designed machinery helps to prevent soil compaction.

Woodland productivity is high. Only a very small acreage of this soil is wooded. Machine planting of tree seedlings is practical on this soil.

The hazard of flooding is a severe limitation for community developments. This soil has potential for such recreational uses as picnicking, golfing, and boating. If recreational buildings are constructed on the flood plain, they need to be anchored. This soil is a good source of topsoil. Capability subclass IIw.

TkA—Tunkhannock gravelly loam, 0 to 3 percent slopes. This deep, well drained to somewhat excessively drained, nearly level soil formed in glacial outwash. It is

shallow-rooted crops, during prolonged dry periods. Coarse gravel and cobblestones interfere with cultivation. Applied lime and fertilizer are leached from this soil at a moderate rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large application. Minimum tillage, incorporating crop residue into the soil, tillage at the proper moisture condition, and crop rotation help to improve tilth and maintain the content of organic matter.

Woodland productivity is moderately high. Only a small acreage of this soil is wooded. Machine planting of tree seedlings is practical on this soil.

This soil is well suited to many urban uses. It has potential for recreational uses, even though gravel and cobblestones interfere with many of these uses. In a few places, streambank erosion is serious, and flooding is a hazard on some of the included soils. The included areas where the water table fluctuates to within 3 1/2 feet of the surface are not suited to buildings with basements. In areas where this soil is used for disposal of septic tank effluent, moderately rapid or rapid permeability in the substratum can result in contamination of ground water. Sloughing is a hazard in excavations in this soil. This soil is a good source of gravel in most areas. Capability subclass IIs.

TkB—Tunkhannock gravelly loam, 3 to 8 percent slopes. This deep, well drained to somewhat excessively

tum. Runoff is slow to medium. In unlimed areas, reaction is extremely acid to medium acid in the surface layer and subsoil.

Most of the acreage of this soil is used for cultivated crops, hay, pasture, woodland, or homesites. This soil is suited to a wide variety of uses and has good potential for farming.

This soil is well suited to crops and pasture. It is not naturally a highly productive soil, but it responds well to good management. Erosion is a hazard on long slopes. Coarse gravel and cobblestones interfere with cultivation. Irrigation is needed, especially for shallow-rooted crops, during prolonged dry periods. Applied lime and fertilizer are leached from this soil at a moderate rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large applciation. Practices such as minimum tillage, cover crops, incorporating crop residue into the soil, crop rotation, and tillage at the proper moisture condition conserve moisture, improve tilth, and maintain the content of organic matter. These measures and contour cultivation in areas that have simple slopes generally provide adequate water control.

Woodland productivity is moderately high. Only a small acreage of this soil is wooded. Machine planting of tree seedlings is practical on this soil.

This soil is well suited to a wide variety of urban uses. It has potential for recreational uses, even though gravel

sandy loam; and narrow strips of well drained Valois soils that are at the base of some hillocks and formed in glacial till.

This soil warms up early in spring. Roots of deep-rooted crops and trees penetrate the gravelly substratum, but most roots are confined to the upper 22 to 35 inches of the soil. Available water capacity of this zone is low to moderate. Droughtiness is a hazard in drier periods during the growing season. Permeability is moderately rapid in the surface layer and subsoil and is moderately rapid or rapid in the substratum. Runoff is medium.

dish brown very gravelly loamy sand to a depth of about 40 inches, and the lower part is silty clay to a depth of about 80 inches.

Included with this soil in mapping are small areas of Odessa and Schoharie soils that formed in lake deposits; areas of Castile and Red Hook soils that are wetter than this Tunkhannock soil and are in low areas and seep spots; and small areas of Tunkhannock soils that do not have a clayey substratum or that have a glacial till substratum.

This soil warms up early in spring. Free water is above

Areas are long and narrow in shape and are 5 to 50 acres in size.

Typically, the surface layer is dark reddish brown gravelly loam about 7 inches thick. The friable, reddish brown subsoil extends to a depth of 30 inches. It is gravelly loam in the upper part and very gravelly loam in the lower part. The upper part of the substratum is reddish brown very gravelly loamy sand to a depth of about 42 inches, and the lower part is silty clay to a depth of about 80 inches.

Included with this soil in mapping are small areas of Odessa and Schoharie soils that formed in lake deposits; areas of Castile soils that are wetter than this Tunkhannock soil and are in seep spots; and a few areas of Tunkhannock soils that do not have a clayey substratum. Also included are narrow strips of Lackawanna and Wellsboro soils that formed in glacial till and are near breaks to the uplands.

This soil warms up early in spring. Free water is above the clayey substratum for brief periods at a depth of 2 1/2 to 3 1/2 feet in spring and in other excessively wet periods. Lateral movement of water occurs above the clayey substratum and causes seep spots in some areas. Roots of deep-rooted crops and trees penetrate the clayey substratum, but most roots are confined to the upper 22 to 35 inches of the soil. Available water capacity is low to moderate. Droughtiness is a hazard in drier periods during the growing season for shallow-rooted plants. Permeability is moderately rapid in the surface layer and subsoil, is moderately rapid or rapid in the upper part of the substratum, and is very slow in the lower part of the substratum. Runoff is medium to rapid. In unlimed areas, reaction is very strongly acid or strongly acid in the surface layer and subsoil.

Most of the acreage of this soil is used for pasture or forest. This soil has fair potential for farming, but it has

ational uses, such as paths and trails. It is a poor source of sand or gravel. Capability subclass IIIe.

TuD—Tunkhannock gravelly loam, clayey substratum, 15 to 25 percent slopes. This deep, well drained to somewhat excessively drained, moderately steep soil formed in water-sorted glacial outwash material that overlies lake-deposited clay and silt at a depth of 3 1/2 to 6 feet. It is mainly on the upper terracelike landforms in valleys. Seep spots are in most areas. Areas are long and narrow in shape and 5 to 25 acres in size.

Typically, the surface layer is dark reddish brown gravelly loam about 7 inches thick. The friable, reddish brown subsoil extends to a depth of about 30 inches. It is gravelly loam in the upper part and very gravelly loam in the lower part. The upper part of the substratum is reddish brown very gravelly loamy sand to a depth of about 42 inches, and the lower part is silty clay to a depth of about 80 inches.

Included with this soil in mapping are narrow strips of Schoharie soils that formed in fine textured and moderately fine textured lake deposits. Also included are a few areas of Hoosic soils, and narrow strips of Lackawanna soils are near breaks to the upland.

This soil warms up early in spring. Free water is above the clayey substratum at a depth of 2 1/2 to 3 1/2 feet for brief periods in spring and in other excessively wet periods. Lateral movement of water occurs above the clayey substratum and causes seep spots in most areas. Roots of deep-rooted crops and trees penetrate the clayey substratum, but most roots are confined to the upper 22 to 35 inches of the soil. Available water capacity is low to moderate. Droughtiness is a hazard in drier periods during the growing season for shallow-rooted plants. Permeability is moderately rapid in the surface layer and subsoil, is moderately rapid or rapid in the

tions for most urban uses. Cut slopes are subject to slippage. Special engineering consideration is needed for any type of construction because of the limited strength and the possibility of slippage. Trench absorption fields are difficult to construct. Controlling the downhill flow of effluent is a serious concern. The hazard of erosion is severe during construction. Trails in recreational areas need to be protected from erosion and established across the slope wherever possible. Capability subclass IVe.

Un—Unadilla silt loam. This deep, nearly level, well drained soil formed in gravel-free, water-deposited material that is high in content of silt and very fine sand. It is mainly on stream terraces above the flood plains. A few areas are on outwash terraces. Slope ranges from 0 to 3 percent. Along the lower reaches of Esopus and Rondout Creeks, areas are long and wide and are as much as 1,000 acres in size. In small stream valleys and on glacial outwash terraces, areas are long and narrow in shape and are considerably smaller in size.

Typically, the surface layer is dark yellowish brown silt loam about 10 inches thick. The subsoil extends to a depth of about 40 inches and is friable silt loam. It is dark yellowish brown in the upper 7 inches and brown in the lower 23 inches. The underlying material to a depth of about 60 inches is dark brown silt loam.

Included with this soil in mapping are small areas of Scio and Raynham soils that are wetter than this Unadilla soil and are in depressions; narrow strips of Tioga and Suncook soils that are on flood plains; and in the small stream valleys; narrow strips of a soil that is similar to the Unadilla soil but has sand and gravel or loamy sand in the substratum below a depth of 40 inches; and some areas of soils that are on short terrace faces and have slopes of 3 to 25 percent. Also included are a few areas that are near small streams of the wetter associated soils and have a water table which fluctuates to within 3 1/2 feet of the surface; some small areas of Riverhead soils; and areas of soils that have a surface layer of fine sandy loam.

This soil mainly is on glacial outwash and stream terraces that are not subject to flooding. Some areas on low stream terraces are subject to flooding during periods of above average rainfall. The water table is generally grown in the county. Because of the frost hazard, this soil is not suited to orchards and vineyards. Farm machinery is easy to use. The main management concerns are keeping the soil from crusting after rain and maintaining tilth and a high level of fertility. Minimum tillage, incorporating crop residue into the soil, use of cover crops, and tilling and harvesting at the proper moisture condition are important in management. Soil compaction is a concern because harvesting of sweet corn sometimes is performed during wet periods. Use of lighter machinery with wider tire treads or use of specially designed machinery helps to prevent soil compaction. The hazard of erosion is slight, except on the included gently sloping to moderately steep terrace faces that are highly susceptible to erosion when the soil is used for cultivated crops.

Woodland productivity is high. Only a very small acreage of this soil is wooded. Machine planting of tree seedlings is practical on this soil.

Most areas of this soil are well suited to urban and recreational uses. Some areas on low stream terraces are poorly suited to buildings because of the flooding hazard. A thicker subbase for roads than that commonly used is needed because of the lack of strength of this silty soil. This soil is a good source of topsoil. Capability class I.

VAB—Valois very bouldery soils, gently sloping. These deep, well drained soils formed in glacial till. They are on knolls and on the lower parts of valleysides. Slope is generally complex and ranges from 3 to 8 percent. Most areas are irregular in shape and are 5 to 50 acres in size.

Typically, the surface layer in a wooded area is very bouldery loam about 2 inches thick. The subsoil extends to a depth of about 40 inches. The upper 9 inches of the subsoil is very friable, strong brown gravelly silt loam; the next 18 inches is friable, strong brown gravelly loam; and the lower 11 inches is friable, brown gravelly loam. The substratum to a depth of about 65 inches is dark brown very gravelly sandy loam.

Included with these soils in mapping are small areas of Lackawanna soils that have a fragipan; a few areas of Tunkhannock, Hoosic, and Chenango soils that are adjacent to glacial outwash terraces; and a few areas of

inches of the soil. Available water capacity of this zone is moderate to high. Permeability is moderate in the surface layer and subsoil and is moderate or moderately rapid in the substratum. Runoff is medium to rapid. Boulders cover 0.1 to 3 percent of the surface of these soils. They are dominantly 1 to 2 feet thick and 2 to 6 feet across, but some are smaller and a few are larger. Distance between boulders is quite variable but is generally 5 to 30 feet. In unlimed areas, reaction is very strongly acid or strongly acid in the surface layer and is very strongly acid to medium acid in the subsoil.

Most of the acreage of these soils is used for woodland and for wildlife habitat. Many areas are being developed for homesites. These soils have poor potential for farming. The potential for farming and for urban and recreational developments is greatly increased by removing boulders.

A few areas of these soils are used for hay and permanent pasture, but the boulders hinder fertilizing and mowing. Surface boulders need to be removed before the soils can be cultivated with large machines. These soils have good to fair potential for farming after boulders are removed. They are particularly well suited to deep-rooted legumes. Erosion is a hazard. The use of cover crops, contour farming, incorporating crop residue into the soil, crop rotation, and minimum tillage help to control erosion, conserve moisture, and promote good soil tilth.

Wodland productivity is moderately high. Surface boulders present some difficulty in machine planting of tree seedlings.

Boulders limit most urban and recreational uses. Some urban uses are also limited by slight seasonal wetness. These soils have potential for dwellings without basements, picnic areas, and paths and trails. Dwellings with basements need foundation drains and protective coatings on exterior walls of basements. Erosion is a hazard during construction. A vegetative cover maintained on the site helps prevent erosion. Capability subclass VIs.

VAD—Valois very bouldery soils, moderately steep. These deep, well drained soils formed in glacial till. They are mainly on the lower part of valley walls. Slope ranges from 15 to 25 percent. Areas are long and narrow or irregular in shape and are 10 to 60 acres in size.

Typically, the surface layer in a wooded area is dark brown very bouldery loam about 2 inches thick. The subsoil extends to a depth of about 40 inches. The upper 9 inches of the subsoil is very friable, strong brown gravelly silt loam; the next 18 inches is friable, strong brown gravelly loam; and the lower 11 inches is friable, brown gravelly loam. The substratum to a depth of about 65 inches is dark brown very gravelly sandy loam.

Included with these soils in mapping are small areas of Lackawanna, Swartswood, and Bath soils that have a fragipan; a few areas of Tunkhannock, Chenango, and Hoosic soils that are on the lower part of slopes; and some areas of moderately deep Oquaga and Lordstown soils that are on the upper part of slopes. Also included are a few hillside seeps and small nonbouldery areas. Many areas of included soils have slopes of 15 to 25 percent.

Free water is generally at a depth of 3 to 6 feet for periods in winter, in spring, and in other excessively wet periods. Roots are generally unrestricted, but most roots are confined to the upper 30 to 40 inches of the soil. Available water capacity in this zone is moderate to high. Permeability is moderate in the surface layer and subsoil and is moderate or moderately rapid in the substratum. Runoff is very rapid. Boulders cover 0.1 to 3 percent of the surface of these soils. They are dominantly 1 to 2 feet thick and 2 to 6 feet across, but some are smaller and a few are larger. Distance between boulders is quite variable but is generally 5 to 30 feet. In unlimed areas, reaction is very strongly acid or strongly acid in the surface layer and very strongly acid to medium acid in the subsoil.

Most of the acreage of these soils is used for woodland and for wildlife habitat. The best potential of these soils is for these uses. These soils have poor potential for farming and for urban and most recreational uses.

Slope and surface boulders are severe limitations for crops and pasture. After boulders are removed, the use of tillage equipment is very difficult, especially for large machines. The hazard of erosion is severe. Contour farming, minimum tillage, and good fertilization are important in management.

Woodland productivity is moderately high. Slope and surface boulders present difficulty in machine planting of tree seedlings.

Boulders and slope are severe limitations for most urban and recreational uses. The hazard of erosion is severe during construction. Trench absorption fields are difficult to layout and construct. Controlling the downhill flow of effluent is a serious concern. Most areas have potential for use as paths and trails. Capability subclass VIIs.

VoA—Volusia gravelly silt loam, 0 to 3 percent slopes. This deep, nearly level, somewhat poorly drained soil formed in glacial till. It is on foot slopes and broad hilltops and in drainageways. Most areas are long and narrow or irregular in shape and are 15 to 30 acres in size.

Typically, the surface layer is dark grayish brown gravelly silt loam about 8 inches thick. The upper part of the subsoil to a depth of about 15 inches is friable, mottled, yellowish brown gravelly silt loam. A firm, thin, leached layer of mottled, light brownish gray gravelly silt loam about 4 inches thick separates the upper part of the subsoil from the lower part. The lower part of the subsoil extends to a depth of about 58 inches and is a very firm

and brittle, olive brown gravelly silt loam fragipan. The substratum is olive brown gravelly silt loam that extends to a depth of about 70 inches.

Included with this soil in mapping are long, narrow areas of Lyons, Atherton, and Canandaigua soils that are wetter than this Volusia soil and are in depressions and along drainageways. Also included are a few small areas of Mardin soils that are on slight rises and areas that have as much as 20 inches of local silty sediment over the weathered glacial till.

This soil has a temporary water table within a few inches of the surface in winter, in spring, and in other excessively wet periods. Roots are mainly confined to the 15- to 20-inch zone above the fragipan. Available water capacity of this zone is low to very low. In periods of average rainfall, plants seldom are affected by lack of water, but during extended dry periods this soil is droughty. Permeability is moderate above the fragipan and is slow in the fragipan and substratum. Runoff is slow. In unlimed areas, reaction generally increases with depth from very strongly acid or strongly acid in the surface layer to very strongly acid to medium acid in the subsoil above the fragipan.

Most of the acreage of this soil is idle or is used for crops, hay, pasture, orchards, or woodland. This soil has fair potential for farming. Artificial drainage increases the potential for many uses.

Controlling excess water is a major management need. Wetness limits the suitability of this soil for crops that are planted early in spring. Drained areas are suited this soil. Wetness limits the suitability of this soil for some species.

The seasonal high water table and slow permeability are limitations for most urban uses. Effluent from many septic tank absorption fields moves to the surface in this soil. Specially designed absorption fields are needed. Some areas of this soil have potential for recreational uses. Capability subclass IIIw.

VoB—Volusia gravelly silt loam, 3 to 8 percent slopes. This deep, gently sloping, somewhat poorly drained soil formed in glacial till. It is on foot slopes and undulating hilltops. Slopes are concave and uniform. Most areas are long and irregular in shape and are 15 to 30 acres in size.

Typically, the surface layer is dark grayish brown gravelly silt loam about 8 inches thick. The upper part of the subsoil extends to a depth of about 15 inches. It is friable, mottled, yellowish brown gravelly silt loam. A firm, leached layer of mottled, light brownish gray gravelly silt loam about 4 inches thick separates the upper part of the subsoil from the lower part. The lower part of the subsoil to a depth of about 58 inches is a very firm and brittle, olive brown very gravelly silt loam fragipan. The substratum is olive brown gravelly silt loam that extends to a depth of about 70 inches.

Included with this soil in mapping are small areas of Mardin soils that are better drained than this Volusia soil and narrow strips of Lyons, Atherton, and Canandaigua soils that are wetter and are in depressions and along

keeping soil compaction to a minimum and maintaining desirable forage stands are difficult. Diversion terraces can be used in many cases to divert runoff from adja-

inches. The moderately deep included soils are mainly in the towns of Marlboro and Plattekill.

This soil has a temporary water table within a few

VSB—Volusia very stony soils, gently sloping. These deep, very stony, somewhat poorly drained soils formed in glacial till. They are on foot slopes and on undulating hilltops and plains. Slopes are concave and uniform. They range from 3 to 8 percent. Areas are long and narrow or irregular in shape and are 10 to 150 acres in size.

Typically, the surface layer is dark grayish brown very stony silt loam about 6 inches thick. The upper part of the subsoil extends to a depth of about 15 inches. It is friable, mottled, yellowish brown gravelly silt loam. A firm, thin, leached layer of mottled, light brownish gray gravelly silt loam about 4 inches thick separates the upper part of the subsoil from the lower part. The lower part of the subsoil to a depth of about 58 inches is a very firm and brittle, olive brown very gravelly silt loam fragipan. The substratum is olive brown gravelly silt loam that extends to a depth of about 70 inches.

Included with these very stony soils in mapping are small areas of Mardin and Bath soils that are better drained than these Volusia soils and are in slightly higher positions; areas of Lyons, Atherton, and Canandaigua soils that are wetter and are in depressions and along drainageways; many areas of soils that have slopes of 0 to 3 percent and 8 to 15 percent; and some nearly level areas of soil that have as much as 20 inches of local silty sediment over the weathered glacial till. Also included are somewhat poorly drained Churchville soils in the Wallkill and Shawangunk Kill Valleys; a few small areas of soils that are nonstony; and narrow strips of a soil that is similar to the Volusia soils but have bedrock at a depth of 20 to 40 inches.

These soils have a temporary water table within a few inches of the surface in spring and during wet periods. Many areas receive runoff and seepage from adjacent soils. Roots are confined mainly to the 15- to 20-inch zone above the fragipan. Available water capacity of this zone is low to very low. In periods of average rainfall, plants seldom are affected by lack of water, but during extended dry periods these soils are droughty. Permeability is moderate above the fragipan and is slow in the fragipan and substratum. The stones are subrounded or angular and range from 10 inches to almost 4 feet across. They are spaced about 5 to 30 feet apart on the surface. Runoff ranges from slow to rapid depending on the slope. In unlimed areas, reaction generally increases with depth from very strongly acid or strongly acid in the surface layer to very strongly acid to medium acid in the subsoil above the fragipan.

Most of the acreage of these soils is used for woodland and for wildlife habitat. These soils have poor potential for farming. The potential for many uses can be increased by the removal of surface stones and by drain- stones are removed, these soils can be managed like other Volusia soils. Contour farming, use of cover crops, and minimum tillage help to control erosion. These measures and tillage at the proper moisture condition help to promote good tilth.

Woodland productivity is moderately high. Surface stones present some difficulty in machine planting of tree seedlings. Wetness limits the suitability of these soils for some species.

Slow permeability in the fragipan, seasonal wetness, and stoniness are limitations for urban and recreational developments. Effluent from many septic tank absorption fields moves to the surface in these soils. Therefore, specially designed absorption fields are needed. These soils are better suited to dwellings without basements than to those with basements. Some areas have potential for recreational uses. Capability subclass VIIs.

Wa—Walpole fine sandy loam. This deep, somewhat poorly drained, nearly level soil formed in deltaic and outwash deposits. It is in low-lying wet areas on deltas and outwash terraces where it receives runoff from surrounding soils. Slope ranges from 0 to 2 percent. Most areas are long and narrow or irregular in shape and are 5 to 40 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 10 inches thick. The subsoil extends to a depth of 27 inches. It is friable and very friable, mottled, brown and dark grayish brown fine sandy loam, sandy loam, and loamy fine sand. The substratum to a depth of 60 inches is mottled, gray loamy sand.

Included with this soil in mapping are small areas of Lamson and Canandaigua soils that are wetter than this Walpole soil and are in depressions; small areas of Pompton, Riverhead, and Plainfield soils that are better drained and are on slight rises; and a few areas of Raynham soils. Also included are areas of a soil that is similar to the Walpole soil but has slightly acid or neutral, medium textured and moderately fine textured layers in the substratum below a depth of 40 inches.

This soil has a seasonal high water table that rises to within 6 to 18 inches of the surface in winter, in spring, and in other excessively wet periods. Depth of rooting is strongly influenced by the water table. Roots are confined mainly to the upper 15 to 24 inches of the soil. Available water capacity of this zone is low to moderate. Droughtiness is rarely a concern in drained areas. Permeability is moderately rapid in the surface layer and subsoil and is rapid in the substratum. Runoff is slow. In unlimed areas, reaction is very strongly acid to medium acid throughout the soil.

Most of the acreage of this soil is used for woodland, hay, or pasture. This soil has fair potential for farming.

good management, it is suited to cultivated crops. Keeping soil compaction to a minimum and maintaining desirable forage stands are difficult in undrained areas that are used for hay and pasture. Planting is delayed and the choice of crops is limited in these undrained areas. A combination of surface and subsurface drains are needed in many areas. Drainage outlets are difficult to locate in places. Special measures, such as using graded sand and gravel filters or prefabricated filter materials, are needed to prevent subsurface drains from plugging with sand, which flows readily when the soil is saturated. Applied lime and fertilizer are leached from this soil at a moderately rapid rate; consequently, response is generally better to smaller but more frequent or timely applications than to one large application. Minimum tillage, incorporating crop residue into the soil, crop rotation, use of cover crops, and tilling and harvesting at the proper moisture condition are important in management.

Drained areas of this soil have fair potential for fruit crops, and only a very small acreage is used for these crops. Rootstalk that can tolerate wetness need to be used when establishing new orchards and vineyards. Soil compaction is a continuous hazard because spraying operations are often performed during wet periods. Artificial drainage, maintaining good sod, and use of lighter machinery with wider tire treads or use of specially designed machinery help prevent soil compaction.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil. Wetness limits the suitability of this soil for some species.

The seasonal high water table is a limitation for most urban and recreational uses. This soil is better suited to dwellings without basements than to those with basements. Many homes have wet basements. Foundation drains and exterior coatings on walls of basements help prevent wetness in basements. Specially designed septic tank absorption fields are needed. Sloughing is a hazard in excavations in this soil. Roads need artificial drainage and a thick subbase. Capability subclass IIIw.

Wb—Wayland silt loam. This deep, nearly level, poorly drained soil formed in alluvium. It is on flood plains and is subject to flooding. In narrow valleys this soil adjoins the stream, but in wider valleys it is in low areas away from the stream. Slope is mainly less than 1 percent. Areas are long and narrow in shape and are 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The next layer is mottled, dark grayish brown silt loam 7 inches thick. The subsoil extends to a depth of about 26 inches. It is slightly sticky and plastic, mottled, olive gray light silty clay loam. The substratum to a depth of about 50 inches is mottled, gray silt loam.

Included with this soil in mapping are narrow strips of Middlebury, Teel, and Basher soils that are drier than this Wayland soil and are in slightly higher areas; small spots of soils that have a surface layer of mucky silt loam; and some areas of soils that are in the small stream valleys and have a surface layer of gravelly silt loam. Also included are narrow strips of Canandaigua and Madalin soils along drainageways.

This soil is frequently flooded for long periods. Flooding may occur at any time of the year, but it commonly occurs late in fall, in winter, and in spring. During this and other excessively wet periods a seasonal high water table is at or near the surface. Depth of rooting is limited by the water table, and roots are confined mainly to the upper 14 to 20 inches of the soil. Available water capacity of this zone is low to moderate. Permeability is moderately slow or moderate in the surface layer and is slow in the subsoil and substratum. Runoff is very slow. Reaction generally increases with depth and ranges from strongly acid to neutral in the surface layer and from strongly acid to mildly alkaline in the subsoil.

This soil is used for crops, pasture, woodland, and wildlife habitat. It has fair potential for farming and poor potential for community and recreational developments. It has potential for wetland wildlife habitat.

This soil is suited to crops and pasture. Row crops are not highly productive unless drainage is improved. A combination of surface and subsurface drains are needed. Drainage outlets are difficult to locate because of the low position of this soil on the landscape. Keeping soil compaction to a minimum and maintaining desirable forage stands are difficult in undrained areas that are used for hay and pasture. Planting is delayed and the choice of crops is limited in these undrained areas. Keeping the soil from crusting after rains and maintaining tilth, a high level of fertility, and content of organic matter are very important. Standard management practices, for example, minimum tillage, incorporating crop residue into the soil, crop rotation, use of cover crops, and tilling and harvesting at the proper moisture condition, are important in management.

Undrained areas of this soil are suited to woodland and to wildlife habitat. Woodland productivity is moderate. Machine planting of tree seedlings is practical during the drier part of the growing season. Species that are tolerant of wetness need to be selected for reforestation.

This soil is generally not used for urban and recreational developments because of the flooding hazard, slow permeability, and prolonged wetness. These limitations are very difficult to overcome. Capability subclass IIIw.

Wc—Wayland mucky silt loam. This deep, nearly level, very poorly drained soil formed in alluvium. It is in the lowest areas on first bottoms or in old oxbows or on flood plains. This soil is subject to frequent flooding and is ponded after the floodwater recedes. Slope is mainly

less than 1 percent. Areas are generally long and narrow in shape and are 5 to 30 acres in size.

Typically, the surface layer is mottled, black mucky silty loam about 5 inches thick. The next layer is mottled, dark gray silt loam 7 inches thick. The subsoil extends to a depth of 24 inches. It is slightly sticky and plastic, mottled, olive gray light silty clay loam. The substratum to a depth of about 50 inches is mottled, gray silt loam.

Included with this soil in mapping are a few narrow strips of Madalin and Canandaigua soils in old oxbows on stream terraces. Also included are small areas of soils that have a surface layer of silt loam and silty clay loam; narrow strips of Teel and Middlebury soils that are drier than this Wayland soil and in slightly higher areas; and small areas of Palms soils that are in depressions.

This soil is frequently flooded for long periods. Flooding may occur at any time of the year, but it commonly occurs late in fall, in winter, and in spring. During this and other excessively wet periods a seasonal high water table is at or near the surface. Depth of rooting is limited by the water table, and roots are confined mainly to the upper 10 to 15 inches of the soil. Available water capacity of this zone is low to moderate. Permeability is moderately slow or moderate in the surface layer and is slow in the subsoil and substratum. Runoff is very slow. Reaction generally increases with depth and is strongly acid to neutral in the surface layer and strongly acid to mildly alkaline in the subsoil.

This soil is not used intensively. Most of the acreage is used for woodland and for wetland wildlife habitat. This soil has poor to fair potential for farming, but it has poor potential for community and recreational developments. It has good potential for wetland wildlife habitat.

Unless this soil is drained, it is too wet for cultivated crops. If it is adequately drained, it is suited to cultivated crops, hay, and pasture. Wetness is the main concern in management. Most areas are difficult to drain because of their low position on the landscape. A combination of surface and subsurface drains is needed. Keeping the soil from crusting after rains and maintaining tilth and a high level of fertility are very important. Standard management practices, for example, minimum tillage, incorporating crop residue into the soil, crop rotation, use of cover crops, and tilling and harvesting at the proper moisture condition, are also important.

Undrained areas of this soil are suited to woodland and to wetland wildlife habitat. Woodland productivity is

drained soil formed in glacial till. It is on glaciated uplands. Slopes are slightly convex and uniform. Most areas are irregular in shape and are 5 to 40 acres in size.

Typically, the surface layer is dark brown flaggy silt loam about 9 inches thick. The upper part of the subsoil extends to a depth of about 18 inches. It is friable, reddish brown flaggy silt loam and has mottles below a depth of 15 inches. A firm, leached layer of mottled, pale brown gravelly loam about 3 inches thick separates the upper part of the subsoil from the lower part. The lower part of the subsoil extends to a depth of 50 inches. It is a firm and brittle, mottled, reddish brown gravelly loam fragipan. The substratum is mottled, reddish brown gravelly loam that extends to a depth of about 60 inches.

Included with this soil in mapping are small areas of Morris and Menlo soils that are wetter than this Wellsboro soil and are in slight depressions and along drainageways. Also included are areas of well drained Lackawanna soils that are on hilltops and small areas of Oquaga soils that have bedrock at a depth of 20 to 40 inches.

Late in fall, in winter, and early in spring a temporary seasonal high water is perched above the slowly permeable fragipan and substratum. Roots are confined to the 15 to 25 inches of soil above the fragipan. Available water capacity of this zone is low to moderate. Permeability is moderate above the fragipan and is slow in the fragipan and substratum. Runoff is medium. In unlimed areas, reaction is very strongly acid to medium acid thoughout the soil.

Most of the acreage of this soil is used for hay and pasture. This soil has good potential for farming, but it has limited potential for community developments.

This soil is suited to crops and pasture. Seasonal wetness delays planting for short periods. Random subsurface drains are needed in the wetter included soils so crops can be planted early in spring. Drainage of areas on foot slopes can be improved by diverting surface water that would commonly flow over this soil from higher adjacent areas. Diversion terraces and such practices as contour farming, use of cover crops, crop rotation, incorporating crop residue into the soil, and minimum tillage, help to control erosion, improve tilth, and maintain the content of organic matter. Crops respond well to liming and fertilization. Small, flat stones hinder tillage and cause excessive wear of machinery.

potential for recreational uses even though small stones limitations for many urban uses. This soil is better suited

pan is so dense, roots cannot easily penetrate it, and so they are mostly confined to the 15- to 28-inch zone above the fragipan. Available water capacity of this zone is low to moderate in the Wellsboro soils and is low in the Wurtsboro soils. Permeability is moderate above the fragipan and is slow in the fragipan and substratum in

tween the Wellsboro soils and the Wurtsboro soils is relatively unimportant. Wellsboro soils are mainly in the Catskill Mountains, and Wurtsboro soils are in the Shawangunk Mountains and on the plateau adjacent to the Catskill Mountains.

Typically, the surface layer of the Wellsboro soil is

ly contain considerably less boulders than the surface layer contains. In unlimed areas, reaction is very strongly acid to medium acid in the Wellsboro soils and extremely acid to medium acid in the Wurtsboro soils.

Most of the acreage of these soils is used for woodland and for wildlife habitat to which they are best suited. These soils have poor potential for farming and for urban and recreational uses.

Woodland productivity is moderately high. Surface boulders limit the use of large machines in logging. Woodland plantings are extremely difficult. Logging roads and skid trails need to be well laid out and need drainage dips or water bars to protect them from erosion.

Boulders cause difficulty in construction for urban de-

the surface layer and upper part of the subsoil. The surface crusts easily when the soil is intensively cultivated. Runoff is slow. In unlimed areas, reaction is very strongly acid to medium acid in the surface layer, is very strongly acid to slightly acid in the upper part of the subsoil, and is strongly acid or medium acid in the fragipan.

Most of the acreage of this soil is used for crops, hay, and pasture. Some areas are idle. This soil has good potential for farming. Urban uses are limited by seasonal wetness and slow permeability in the fragipan. This soil has potential for some recreational uses.

This stone-free, silty soil is suited to cultivated crops, special crops, hay, and pasture. Wetness delays planting

loam and has mottles below a depth of 14 inches. The lower part of the subsoil is a firm, mottled, brown silt loam and very fine sandy loam fragipan that extends to a depth of about 42 inches. The substratum to a depth of about 52 inches is layered yellowish brown silt loam and reddish brown silty clay loam, dominantly silt loam.

sod, and use of lighter machinery with wider tire treads or use of special machinery help prevent soil compaction.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

The seasonal high water table and slow permeability in

Tillage of crops by large machinery is not practical because of large stones on the surface. After stones are removed, this soil is suited to crops and pasture. Crops respond well to simple practices, such as liming and fertilization. Planting is delayed early in spring for short periods. Drainage of areas on foot slopes can be improved by diverting the surface water from higher adjacent areas. Diversion terraces, contour farming, cover crops, crop rotation, minimum tillage, and incorporating crop residue into the soil, help to control erosion, improve tilth, and maintain the content of organic matter.

Woodland productivity is moderately high. Machine planting of tree seedlings is practical on this soil.

The seasonal high water table and slow permeability in the fragipan and substratum are limitations for many urban uses. This soil is better suited to dwellings without basements than to those with basements. Foundation drains and protective coatings on the exterior walls of basements are needed. Effluent from many septic tank absorption fields seeps to the surface in this soil. Because of the slow permeability in the fragipan and substratum, absorption fields need to be much larger than those commonly installed. This soil has potential for recreational uses even though small stones, slow permeability, and wetness are limitations for many of these uses. Capability subclass IIe.

are favorable can be selected, or practices that will overcome the soil limitations can be planned.

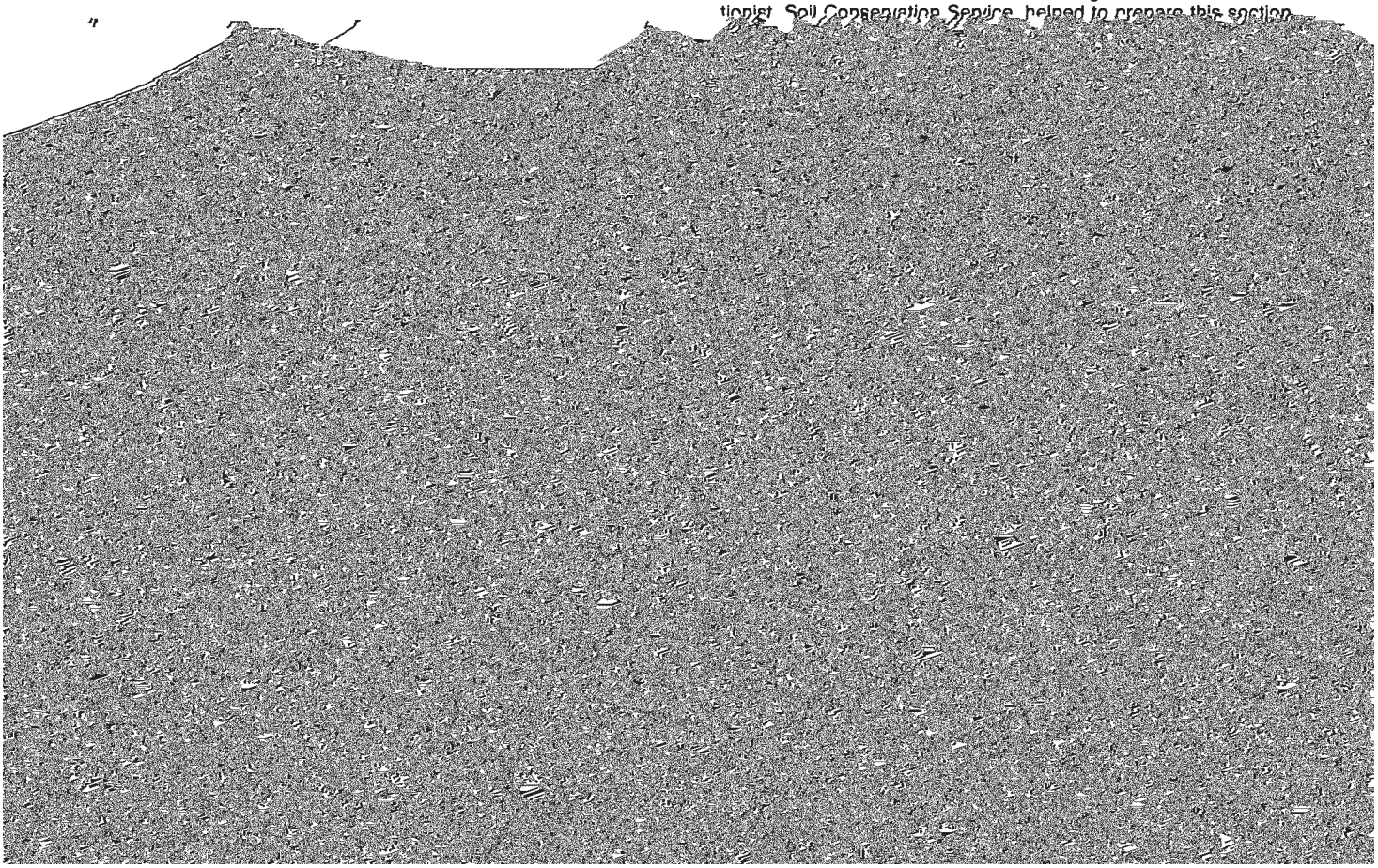
Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

William H. Palmer and Harold J. Hogan, cooperative extension agents; Warren H. Smith, fruit specialist, Cooperative Extension Service; David M. Squires, county executive director, Agricultural Stabilization and Conservation Service; and George A. Sisco, district conservationist, Soil Conservation Service, helped to prepare this section.



considerably through the application of appropriate conservation practices and the use of latest crop production technology. This survey can help facilitate the application of conservation practices and the use of new technology.

The acreage in crops and pasture has gradually been decreasing because more land is used for urban development or for speculation, or has soil limitations that are too costly to overcome in farming. The use of this survey to help make land use decisions that will influence farming is discussed in the section "Soil maps for detailed planning."

Some general principles of soil management related to crop production in the survey area are discussed on the following pages.

Soil erosion is a major concern on about half of the cropland in Ulster County (*9*). The hazard of erosion is related to slope of the land, erodibility of the soil, rainfall, and amount and type of vegetative cover.

The loss of soil through erosion is damaging for several reasons. Erosion causes loss of nutrients and water, formation of gullies on hillsides, deterioration of soil tilth, detrimental sedimentation downslope, and pollution of streams and water reservoirs. Soil productivity generally is reduced as the surface layer is lost, and increasing amounts of the subsoil are incorporated into the plow layer. This is especially true of soils that have a fine textured or moderately fine textured subsoil, such as Hudson and Schoharie soils, and soils that have a compact subsoil that restricts the depth of rooting, such as Mardin and Lackawanna soils. Erosion also reduces productivity on soils that tend to be droughty, such as Plainfield and Chenango soils through the loss of organic matter. Soils that are shallow or moderately deep to bedrock, such as Arnot, Nassau, and Lordstown soils, are permanently damaged by erosion.

Erosion control practices provide protective cover, reduce runoff, and increase infiltration. Many tillage and conservation practices aid in erosion control. Minimum tillage, no-tillage, cover crops, leaving crop residue on the surface, and a high proportion of sod-forming crops in the cropping system are suitable management practices on soils that have short, irregular slopes, such as rolling Hoosic and Tunkhannock soils. Practices, such as contour farming, stripcropping, terracing, and constructing diversions, are more suitable on soils that have smooth, long, uniform slopes such as the sloping Bath, Cambridge, Swartswood, and Wellsboro soils.

Most soils that have slopes of more than 3 percent require some type of measures to control water erosion. Soils that are high in silt and low in coarse fragments, such as Williamson, Unadilla, and Hudson soils, are the most susceptible to erosion.

Soil blowing is a concern on some soils, such as the sandy Plainfield soils and cleared areas of the organic Carlisle and Palms soils, especially when the surface is dry. Windbreaks, regulating the water table, and irrigation are effective in reducing soil blowing.

The effectiveness of a particular combination of conservation practices differs from one soil to another; also, different combinations can be equally effective on the same soil. The local representative of the Soil Conservation Service is available to assist in planning an effective combination of practices to reduce erosion.

Soil drainage is a major management need on about one-third of the acreage used for crops and pasture in the survey area. Some soils are so wet that the production of crops common to the area generally is not possible without the installation of extensive drainage systems. These are, for example, the poorly drained and very poorly drained Atherton, Canandaigua, Carlisle, Lamson, Lyons, Madalin, Menlo, Palms, Tuller, and Wayland soils.

Seasonal wetness interferes with early planting, growth, and harvesting of most crops on the somewhat poorly drained soils. In this category are the Churchville, Morris, Odessa, Raynham, Red Hook, Rhinebeck, Scriba, and Volusia soils. Crops grown on these soils respond well to improved drainage. Crop production on the drained soils is commonly as high as production on soils that are naturally better drained.

Some well drained and moderately well drained soils, such as Bath, Valois, Riverhead, and Mardin soils, contain small inclusions of wetter soils that require random subsurface drainage to make management of fields more uniform.

The design of drainage systems varies with the kind of soil. A combination of surface drainage and subsurface drainage is needed in most areas of poorly drained and very poorly drained soils. Establishing drainage outlets in these soils can be difficult and expensive. Surface drainage can include such practices as constructing open ditches and grassed waterways, land smoothing, and using a bedding system. Subsurface drainage mainly consists of tile or plastic drains.

Drains must be more closely spaced in soils that have slow permeability than in more permeable soils. Subsurface drainage is slow in Churchville, Madalin, Odessa, Rhinebeck, Scriba, and Volusia soils. These soils also require surface drainage in places. Soils that have rapid permeability, such as Red Hook and Atherton soils, respond well to subsurface drainage if adequate outlets are available. Some wet, sloping soils respond well to interceptor drains that divert surface runoff and subsurface seepage away from the area. The sloping Volusia and Scriba soils are examples.

Information on drainage design and costs is available at the Ulster County Soil and Water Conservation District Office.

Surface stones, boulders, and rock outcrops severely limit the use of the soils for cropland and pasture in many areas of the county. These limiting features interfere with the use of modern agricultural machinery.

Some areas of very stony and very bouldery soils can only be used for hay and permanent pasture. Even then fertilizing, reseeding, and mowing are difficult. Examples are the very stony and sloping phases of Bath and Mardin soils and very bouldery and gently sloping Scriba and Morris soils. Extremely bouldery phases such as in Wellsboro and Wurtsboro soils are too bouldery for farming uses.

Map units, such as Bath-Nassau-Rock outcrop complex, hilly, where more than 10 percent of the surface is occupied by rock outcrops are generally unsuited to cultivation. Use is largely limited to pasture, to orchards maintained in permanent sod, and to woodland and wildlife habitat. Map units that have more than 40 percent rock outcrop cannot be used for commercial crop production.

Removal of the larger stones and boulders from soils that have few limitations can be feasible in places. Limitations of rock outcrops in soils generally are not feasible to overcome.

Available water capacity is important in growing crops. Some soils in the county tend to be droughty. Sandy and gravelly soils, soils that have a restricting layer such as a fragipan, soils that are shallow or moderately deep to bedrock, and soils that have an excessive amount of coarse fragments tend to have relatively low capacity to store moisture. The gravelly Hoosic soils, sandy Plainfield soils, Scriba soils that have a fragipan, extremely bouldery Wurtsboro soils, and shallow Nassau soils have low available water capacity. Maintaining or increasing the content of organic matter and improving soil structure help increase the available water capacity of these droughty soils. Use of green manure crops, return of crop residue, and addition of animal wastes are practices that build up organic matter levels and improve soil structure.

Soil tilth is important in the emergence of seedlings, the infiltration of water into the soil, and the ease of cultivation. Soils that have good tilth generally have granular structure and are porous.

Tillage practices have a strong influence on soil tilth. Excessive tillage tends to reduce organic matter content and to break down soil structure. Some soils that are deep, well drained or excessively drained, and coarse textured or moderately coarse textured, such as Plainfield and Hoosic soils, can be tilled with little concern for damaging soil tilth. However, wetter and finer textured soils, such as Hudson, Rhinebeck, and Odessa soils, must be tilled at the proper moisture condition to prevent deterioration of the natural soil structure. Plowing or cultivating when these kinds of soils are wet causes puddling and results in hard surface crusts and clods when the soils dry. Cultivation at proper moisture condition, inclusion of sod crops, green manure crops, and cover crops in the crop rotation, return of crop residue, and addition of animal manure help keep the soil granular and porous and in good tilth.

Soil fertility is critical in crop production. All of the soils in the county need lime or fertilizer, or both, for optimum crop production. The amounts needed depend on the natural content of lime and plant nutrients in the soil, on the needs of the particular crop, and on the level of yield desired.

Organic matter content is important in assessing soil fertility. The average organic matter content is about 3.5 percent in the surface layer of the soils in Ulster County. Poorly drained and very poorly drained soils, such as Madalin and Lyons soils, generally have a somewhat higher content of organic matter. Nitrogen in the organic matter is in complex organic forms and is unusable by plants until the organic matter is slowly decomposed by soil micro-organisms. It is necessary to apply nitrogen fertilizer to supplement the nitrogen made available from the organic matter. Management practices that tend to build up organic matter levels, such as use of green manure crops and sod crops and return of crop residue, help to improve the natural nitrogen content.

Timeliness of nitrogen fertilization is important for maximum use by plants. Nitrogen can be lost by either leaching from rapidly permeable soils such as Hoosic soils, or by denitrification on the wetter and less permeable soils, such as Schoharie soils. Small amounts of nitrogen applied at timely intervals, such as at planting and as side dressings while the crop is growing, can give the best results.

Soils of Ulster County generally are low in natural phosphorus. Coarse textured soils, such as Plainfield soils, tend to be very low in natural phosphorus. The additions of appropriate amounts of phosphate in the form of commercial fertilizers is essential for good crop growth.

Most of the soils are low to medium in potassium-supplying power. However, such soils as Rhinebeck and Schoharie soils that have a clayey subsoil are somewhat higher in potassium content. Even soils with a relatively high content of potassium require additional potassium fertilizer for optimum yields of most crops.

Additions of lime and fertilizer should be based on results of soil tests. For assistance in obtaining soil tests and in the kind and amount of fertilizer to use, farmers and others should consult their local Cooperative Extension Agent. New research and fertilizer recommendations also can be found in current additions of "Cornell Recommends for Field Crops" and "Vegetable Production Recommendations", both prepared by the staff of the New York State College of Agriculture, Cornell University, Ithaca, New York. In the absence of soil tests, these references along with this publication can be used as a guide in determining lime and fertility needs.

Special crops are extensive in Ulster County. Orchards and vineyards are common in the southeastern part of the county. In 1969, 14,947 acres were in orchards in Ulster County. Common fruits are apples, grapes, pears, peaches, and plums. Soils well suited to orchards are

deep, well drained, free of impervious layers that restrict root development, moderate to high in available water capacity, and slightly acid or medium acid. Unadilla and Valois soils are examples of soils that are well suited to fruit crops. Grapes are better suited to droughty soils than orchard crops because of their deeper root penetration. Yields can be increased on most soils that have limitations through the proper selection of root stock for planting. Even though soil considerations are very important in the selection of orchard sites, locations with good

and the soil. A few farmers may be obtaining average yields higher than those shown in table 5.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases,

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 landforms 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 too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the

Table 7 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland 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*, excessive water in or on the soil; *d*, restricted root depth; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, d, s, and r.

In table 7 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

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 some 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.

severe, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *important*

preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4)

increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, (fig. 9) or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 8 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also consid-

Lawns and landscaping require soils that are suitable for the establishment and maintenance of turf for lawns and ornamental trees and shrubs for landscaping. The best soils are firm after rains, are not dusty when dry, and absorb water readily and hold sufficient moisture for plant growth. The surface layer should be free of stones. If shaping is required, the soils should be thick enough over bedrock or hardpan to allow for necessary grading. In rating the soils, the availability of water for sprinkling is assumed.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 9 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if severe, soil properties or site

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid

soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area, or trench-type landfill, stockpil-

guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 14.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of good is not based entirely on high

survey. In table 11 soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 11 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

The soils of the survey area are rated in table 12 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or ca-

rock or hardpan should be enough to allow necessary grading.

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

Golf fairways are subject to heavy foot traffic and

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils

and suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, and cordgrass and rushes, sedges, and reeds.

data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

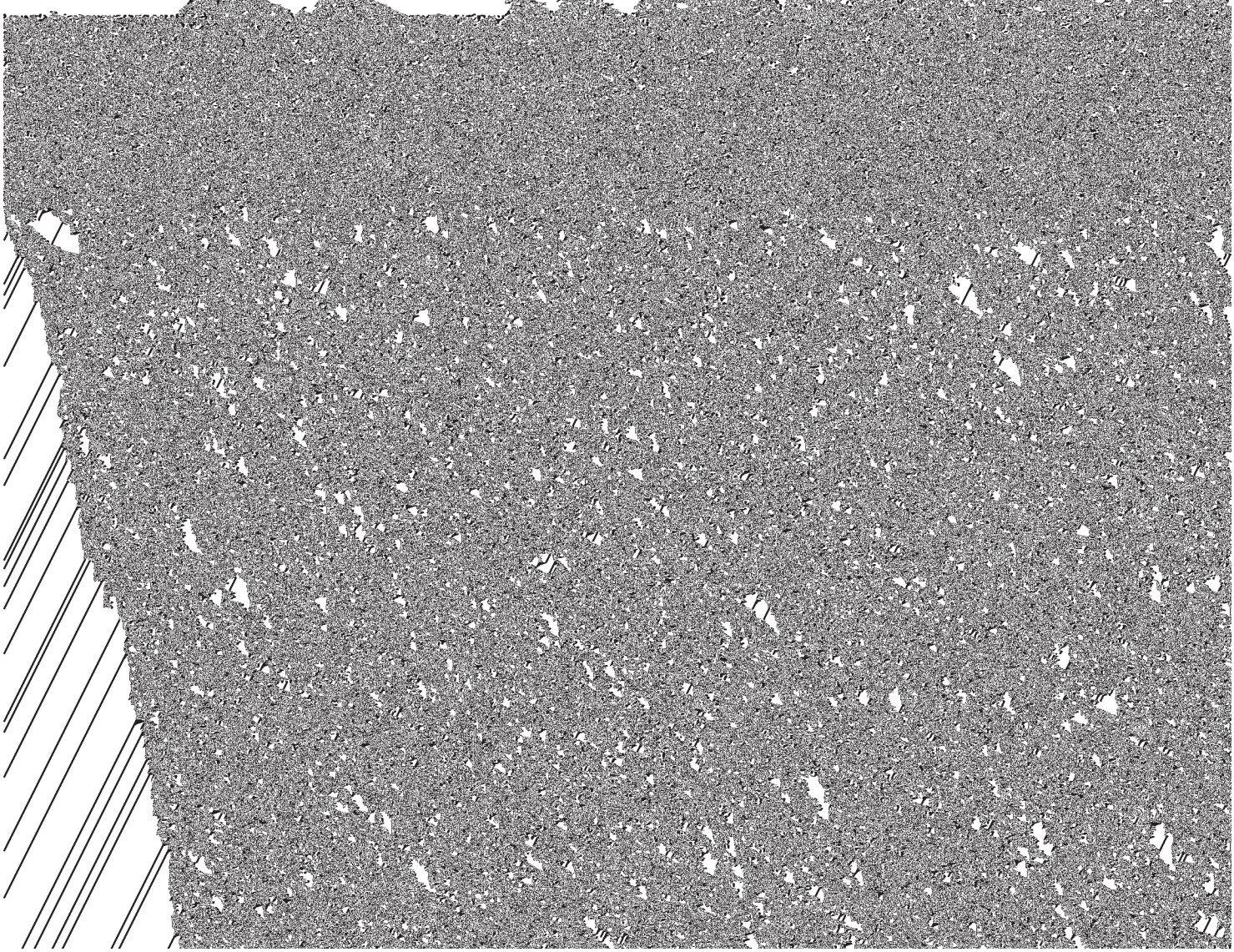
In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially

System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*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, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil



In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 15 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on mea-

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 16 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received 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 chiefly of deep, well drained to excessively drained sands or gravels. 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 that have a layer that impedes the downward movement of water or soils that have 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 clay soils 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 transmis-

profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or

Deep till deposits.—Deep till deposits are unstratified, highly variable mixtures of all particle sizes from rock fragments to clay. This material was scoured and transported from nearby sources by glacial ice and then deposited as a general ground cover either as till plains or as a moraine. Isolated lenses or pockets of sorted material can occur, especially in the morainic areas. Bedrock is generally more than 5 feet below the surface, but in areas of folded bedrock this depth can vary or some rock outcrop can occur. The individual rock and mineral fragments in the soil generally reflect the kind of bedrock in the area.

Soils formed in mixed deep till deposits are Bath, Cambridge, Lackawanna, Lyons, Mardin, Menlo, Morris, Scriba, Stockbridge, Swartswood, Valois, Volusia, Wellsboro, and Wurtsboro soils. The Cayuga; Canandaigua, till substratum; and Churchville soils formed in fine grained material over glacial till.

These deposits are the most dense and compact of the unconsolidated deposits in the county because they have been subjected to the compactive weight of overriding ice. Deep till soils are gently sloping to very steep and many landscapes are such that extensive cut and fill earthwork is involved for most construction projects. The soils generally provide stable, relatively incompressible

outwash plains and terraces, kames, and the coarser parts of deltas and other lacustrine shore deposits. The strata within these deposits can be well sorted or poorly sorted and have particle sizes ranging from cobblestones to silt. The deposits generally are loose and porous.

The Atherton, Castile, Chenango, Haven, Hoosic, Red Hook, and Tunkhannock soils formed in gravelly deposits on outwash plains, terraces, or kames. Sandy deposits of deltaic origin are Lamson, Plainfield, Pompton, Riverhead, and Walpole soils. The Barber, Basher, Suncook, and Tioga soils formed in alluvial deposits of sand with silt.

Coarse grained deposits generally have high bearing capacity. Because they are loose and porous, most of these deposits are not highly erodible but are subject to settlement when they are vibrated. However, Plainfield soils are subject to soil blowing when topsoil is removed. Lamson, Pompton, Red Hook, and Walpole soils, which have high content of fine sand and silt and a seasonal high water table, are highly susceptible to frost action. The poorly drained and very poorly drained Lamson soils are subject to ponding after heavy rain, and the Barber, Basher, Suncook, and Tioga soils are subject to flooding.

These deposits of gravel and sand have many uses as

Middlebury, Teel, and Wayland soils are prone to inundation.

The fine grained deposits are difficult to use for engineering works, especially on the flat, wet soils that are subject to ponding, such as Canandaigua and Madalin soils. Sites for embankments and heavy structures or buildings on all soils formed in these finer sediments must be investigated for strength, settlement characteristics, and effects of ground water.

Organic deposits.—Organic deposits are mostly an accumulation of plant material in varying states of decomposition. In places, they include a minimal amount of inwashed mineral soil. They are in very poorly drained depressions.

Carlisle and Palms soils are over mineral soil at varying depths. The soils in organic deposits are entirely unsuitable for foundations because they are very weak and highly compressible. Generally, the organic material should be removed to suitable underlying material and replaced with suitable backfill. Filling over organic deposits without first removing the unsuitable material causes long-term settlement.

Soil series and morphology

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

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*8*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Arnot series

The Arnot series consists of loamy-skeletal, mixed, mesic Lithic Dystrochrepts. These soils are shallow, somewhat excessively drained to moderately well drained, and nearly level to very steep. They are on glacially modified, bedrock controlled landforms. These soils formed in a thin mantle of glacial till derived mainly from sandstone, siltstone, and shale. They have a medium textured subsoil. Slope ranges from 0 to 70 percent, but is dominantly 3 to 70 percent.

Arnot soils are commonly associated with the well drained Lordstown soils and the well drained to excessively drained Oquaga soils where bedrock is at a depth of 20 to 40 inches. They are also closely associated with the shallow, somewhat poorly drained to poorly drained Tuller soils. Arnot soils have a lower base status and more coarse fragments in the solum than Farmington soils, which are shallow to limestone bedrock. They do not have the coarse fragments dominated by shale and slate that Nassau soils have.

Typical pedon of Arnot channery silt loam, in an area of Oquaga-Arnot-Rock outcrop complex, moderately steep, in the town of Olive, 0.2 mile northeast of the intersection of Ridge and Whittle Roads, in wooded area.

O1—1 to 1/2 inch; litter of leaves and twigs,

O2—1/2 inch to 0; black (10YR 2/1) partially decomposed leaves and twigs; extremely acid; abrupt wavy boundary.

B21—0 to 3 inches; brown (7.5YR 4/4) channery silt loam; moderate fine granular structure; friable; many fine and few coarse roots; many fine pores; 25 percent coarse fragments; very strongly acid; clear smooth boundary.

B22—3 to 13 inches; reddish brown (5YR 4/4) very channery silt loam; weak fine subangular blocky structure; friable; many fine and few coarse roots; many fine pores; 40 percent coarse fragments; very strongly acid; gradual wavy boundary.

B23—13 to 17 inches; reddish brown (2.5YR 4/4) very channery silt loam; weak fine subangular blocky structure; friable; many fine roots; many fine pores; 50 percent coarse fragments; very strongly acid; abrupt wavy boundary.

IIR—17 inches; dusky red (2.5YR 3/2) fractured shale bedrock.

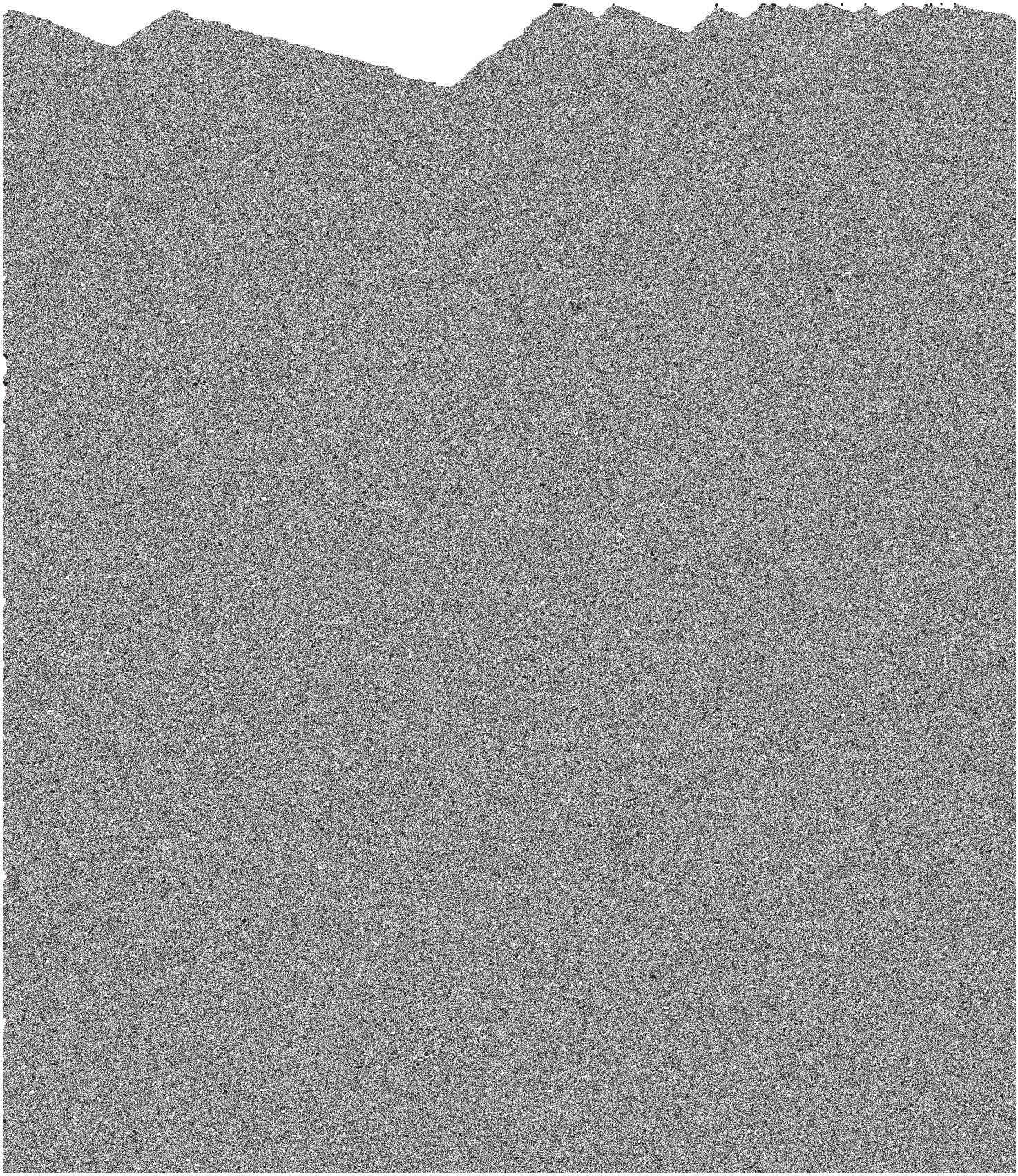
The thickness of the solum ranges from 10 to 20 inches, which coincides with the depth to bedrock. Rock fragments, dominantly flat stones, range from 20 to 35 percent, by volume, in the A horizon and from 25 to 50 percent in the B horizon. Reaction in the solum in unlimed areas is medium acid to extremely acid.

In many undisturbed pedons, an O2 horizon, 1/2 to 2 inches thick, is directly above the B horizon; and in others, thin A1 and A2 horizons are between the O2 and B horizons. The A1 horizon, where present, has hue of 5YR to 2.5Y, value of 3 or 4, and chroma of 2 or 3. The fine earth is silt loam or loam. The A2 horizon has hue of 5YR to 10YR, value of 6 or 7, and chroma of 2.

The B horizon has hue of 2.5YR to 2.5Y, value of 3 to 6, and chroma of 3 to 6. The fine earth is silt loam or loam. Structure is very weak to moderate, fine or medium subangular blocky or granular.

Some of the deeper pedons have a very thin C horizon. Few to common mottles of high chroma are above the bedrock in places.

Bedrock ranges from massive sandstone to interbedded sandstone, siltstone, and shale. It is reddish, olive, or gray.



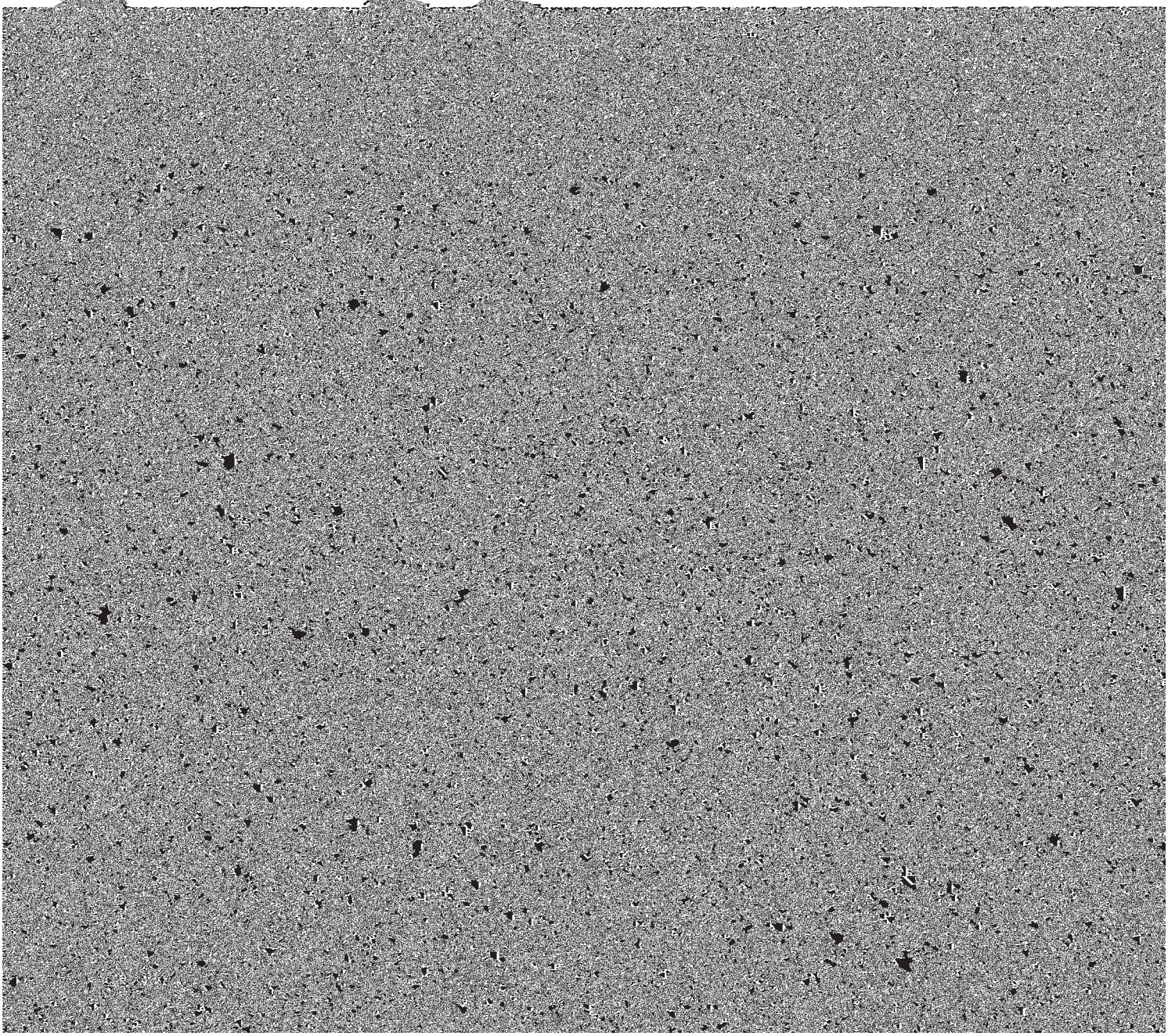
fine roots; 10 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—6 to 15 inches; reddish brown (5YR 4/3) gravelly loam; weak medium subangular blocky structure parting to weak medium granular very friable; many fine roots; few fine pores; 15 percent coarse fragments; strongly acid; clear wavy boundary.

B22—15 to 25 inches; reddish brown (5YR 4/4) gravelly fine sandy loam; weak medium subangular blocky structure parting to single grain; very friable; many fine roots; many fine and few medium pores; 20 percent coarse fragments; strongly acid; clear wavy

to that in which those soils formed. They are in positions on flood plains similar to those of the moderately well drained to somewhat poorly drained Middlebury and Teel soils that have a higher base status and are not so red as Basher soils. In addition, Basher soils contain less silt and very fine sand between a depth of 10 and 40 inches than Teel soils.

Typical pedon of Basher silt loam in the town of Saugerties, 0.85 mile south on Cotton Road from its intersection with N.Y. Route 32 and about 270 feet south, in meadow:



The C horizon has hue of 5YR to 10YR, value of 3 to 5, and chroma of 1 or 2. The fine earth fraction above a

along faces of prisms; thin clay films in many fine pores; yellowish brown (10YR 5/4) streaks between

and Churchville soils have. Cambridge soils are geographically associated with Bath and Mardin soils, which have a lower content of clay above the fragipan than Cambridge soils.

Typical pedon of Cambridge gravelly silt loam, 8 to 15 percent slopes, in the town of New Paltz, 4 miles southwest of New Paltz, 0.56 mile southwest on Albany Post Road from its intersection with Decker Road and 738 feet west, in brushy area:

Ap—0 to 6 inches; brown (10YR 4/3) gravelly silt loam; moderate medium and coarse granular structure; friable; many fine roots; 20 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—6 to 20 inches; yellowish brown (10YR 5/4) gravelly loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B22—20 to 23 inches; dark yellowish bown (10YR 4/4) gravelly clay loam; many medium and fine distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; firm; few fine roots; common fine pores; 25 percent coarse fragments; strongly acid; clear wavy boundary.

Bxt—23 to 64 inches; brown (10YR 4/3) gravelly clay loam; weak very coarse prismatic structure parting to weak medium platy; firm, slightly brittle; few fine roots along faces of prisms; clay linings in common fine pores; prisms are separated by light brownish gray (2.5Y 6/2) streaks with yellowish brown (10YR 5/6) borders; thin patchy light brownish gray (2.5Y subangular blocky. Consistence is friable or firm, and brittle or slightly brittle.

The Bx horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The fine earth is heavy loam to silty clay loam. Structure is very coarse prismatic parting to very weak or weak angular blocky or platy. Consistence is firm or very firm, and brittle.

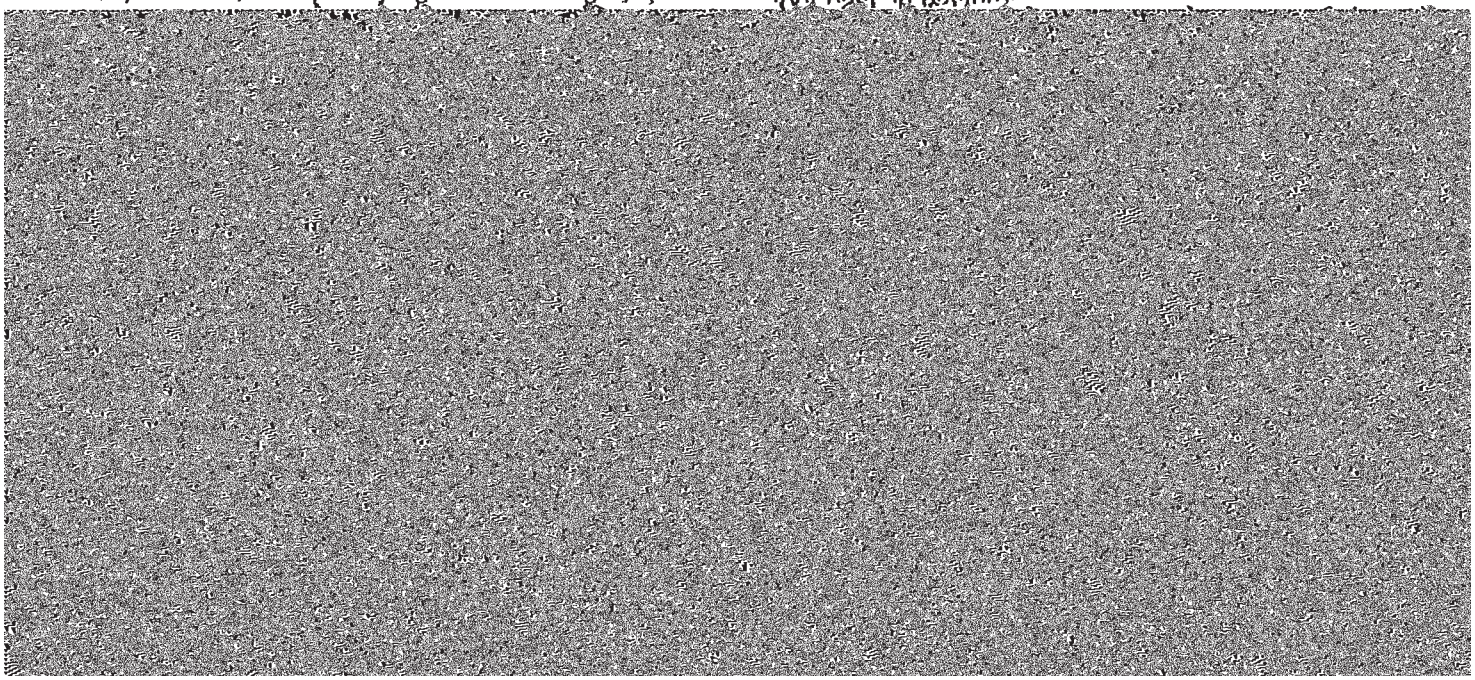
A C horizon is below the Bx horizon in most pedons. It has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. Texture is gravelly loam or gravelly silt loam. Structure is weak platy or is massive.

Canandaigua series

The Canandaigua series consists of fine-silty, mixed, nonacid, mesic Mollic Haplaquepts. These soils are deep, poorly drained and very poorly drained, and nearly level to depressional. They are on glacial-stream terraces and lake plains and in upland basins formerly occupied by glacial lakes. These soils formed in lacustrine deposits of silt, very fine sand, and clay. They dominantly have a medium textured and moderately fine textured subsoil. Slope is mainly less than 1 percent.

Canandaigua soils are in a drainage sequence with the well drained Unadilla soils, the moderately well drained Scio soils, and the somewhat poorly drained Raynham soils. They are also associated with the moderately well drained Williamson soils that have a fragipan. Canandaigua soils are similar in texture to the Wayland soils that are on flood plains and have an irregular distribution of organic matter as depth increases.

Typical pedon of Canandaigua silt loam, in the town of Shawangunk, 0.35 mile northeast on New Prospect Road from its intersection with Wallkill Avenue and 740 feet east, in pasture:



moderate coarse prismatic structure parting to weak

fiber; 30 percent silt content; medium acid; gradual

on Orchard Drive from its intersection with Anderson Road and 565 feet east, in cropland:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly silt loam; moderate fine granular structure; friable; many fine roots; 20 percent coarse fragments;

Cayuga series

The Cayuga series consists of fine, illitic, mesic Glossoboric Hapludalfs. These soils are deep, well drained and moderately well drained, and gently sloping and sloping. They are adjacent to or in old glacial lakebeds

oxide stains; 20 percent gravel; neutral; clear, wavy boundary.

IIB3—34 to 39 inches; olive brown (2.5Y 4/4) gravelly clay loam; common fine faint light olive brown (2.5Y 5/6) mottles; very weak very coarse subangular blocky structure; very firm; few fine pores; thin continuous light olive gray (5Y 6/2) clay films on faces of peds and in pores; 25 percent gravel; calcareous; mildly alkaline.

IIC—39 to 50 inches; olive brown (2.5Y 4/4) gravelly clay

lower than Tunkhannock soils. They have more coarse fragments between a depth of 10 and 40 inches than Haven soils and do not have the contrasting textures that these soils have.

Typical pedon of Chenango gravelly silt loam, 3 to 8 percent slopes, in the town of Lloyd, about 500 feet southeast on old N.Y. Route 299 from its intersection with Pancake Hollow Road and 105 feet east, in idle area near a gravel pit:

Churchville series

The Churchville series consists of fine, illitic, mesic Aeric Ochraqualfs. These soils are deep, somewhat poorly drained, and nearly level and gently sloping. They are adjacent to or within old glacial lakebeds. These soils formed in relatively thin lacustrine deposits of clay and silt over glacial till. They have a fine textured and moderately fine textured subsoil. Slope ranges from 0 to 8 percent.

Churchville soils are in a drainage sequence with the well drained and moderately well drained Cayuga soils and the poorly drained and very poorly drained Madalin soils. They are similar in texture and drainage to Rhinebeck and Odessa soils that formed in deeper lacustrine deposits. In addition, Churchville soils are not so red as Odessa soils. They have a finer textured solum than Raynham soils.

Typical pedon of Churchville silt loam, 3 to 8 percent slopes, in the town of New Paltz, about 660 feet west on Gatehouse Road from its intersection with N.Y. Route 299 and 1,980 feet north, in cropland:

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam; light gray (2.5Y 7/2) dry; moderate fine granular structure; friable; many fine roots; 5 percent coarse fragments; neutral; abrupt smooth boundary.

IIC—39 to 54 inches; olive brown (2.5Y 4/4) gravelly clay loam; massive; very firm; common oxide concretions and stains; 20 percent coarse fragments; calcareous; moderately alkaline.

The thickness of the solum ranges from 20 to 40 inches, which coincides with the depth to contrasting material. Depth to bedrock is more than 5 feet. Rock fragments increase as depth increases and range from 0 to 10 percent, by volume, in the solum and from 10 to 35 percent in the C horizon.

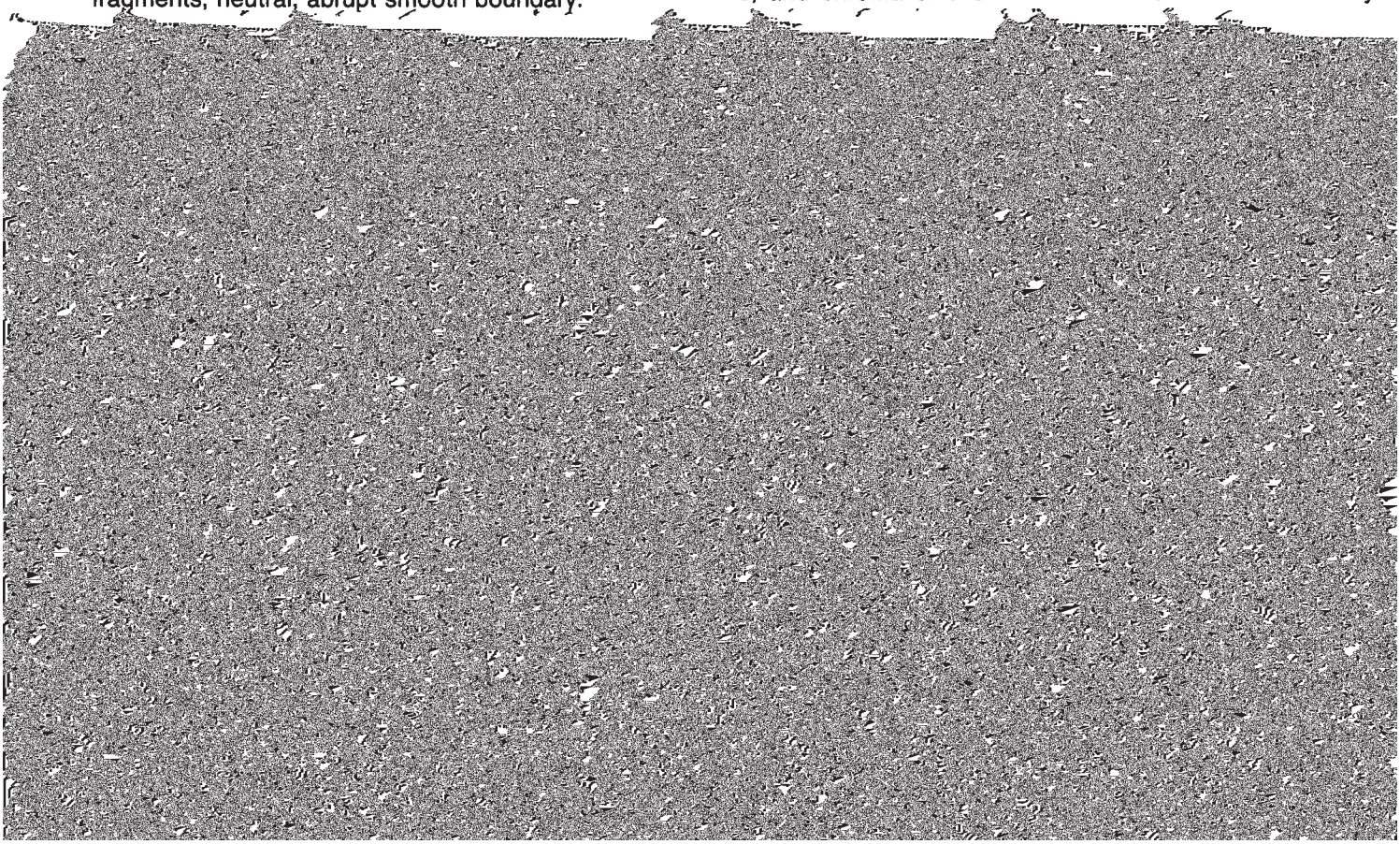
The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Reaction is medium acid to neutral.

An A2 horizon, 1 to 5 inches thick, is present in undisturbed areas.

The B&A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Texture is clay loam to silty clay loam. Structure is weak or moderate subangular blocky. Reaction is slightly acid or neutral.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. Clay films have chroma of 2 or less. Texture is silty clay loam, silty clay, or clay loam. Structure is subangular blocky, or weak or moderate prismatic. Consistence is firm or very firm. Reaction is slightly acid to mildly alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 or 4. The fine earth is loam to silty



coarse fragments; medium acid; clear smooth boundary.

B21—5 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak thin platy structure; friable; many fine and few coarse roots; common fine pores; 10 percent coarse fragments; slightly acid; clear wavy boundary.

B22—10 to 15 inches; yellowish brown (10YR 5/6) gravelly silt loam; weak medium and fine subangular blocky structure; friable; common fine and few coarse roots; common fine pores; 25 to 30 percent coarse fragments; neutral; abrupt irregular boundary.

IIR—15 inches; fractured limestone bedrock.

The thickness of the solum ranges from 10 to 20 inches, which coincides with the depth to bedrock. Rock fragments range from 5 to 35 percent, by volume, in the solum. Reaction, in unlimed areas, is strongly acid to slightly acid in the A horizon and upper part of the B horizon. It increases as depth increases to slightly acid or neutral above the bedrock.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. The fine earth is fine sandy loam to silt loam.

B21—8 to 18 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium and coarse granular structure; friable; common fine roots; many fine pores; neutral; clear smooth boundary.

B22—18 to 26 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; friable; common fine roots; many fine pores; neutral; clear smooth boundary.

B23—26 to 38 inches; dark yellowish brown (10YR 3/4) silt loam; moderate medium subangular blocky structure parting to moderate medium granular; friable; common fine roots; many fine pores; neutral; clear smooth boundary.

C—38 to 58 inches; dark grayish brown (10YR 4/2) silt loam; massive; friable, few fine roots; many fine pores; neutral.

The solum ranges from 28 to 40 inches in thickness. Depth to bedrock is more than 5 feet. Strongly contrasting layers are at a depth of more than 40 inches. Coarse fragments are absent or few above a depth of 40 inches. Reaction is slightly acid or neutral in the A and B horizons and neutral or mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3.

The B horizon has hue of 10YR or 7.5YR, value of 3

Typical pedon of Haven loam, in the town of New Paltz, 250 feet north on Springtown Road from its intersection with Dug Road and 300 feet west, in cropland:

Ap—0 to 11 inches; dark brown (10YR 3/3) loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots; 2 percent coarse fragments; strongly acid; abrupt smooth boundary.

B21—11 to 22 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 10 percent coarse fragments; medium acid; clear wavy boundary.

IIB22—22 to 25 inches; dark brown (7.5YR 4/4) gravelly loam; weak medium subangular blocky structure; friable; common fine roots; common fine pores; 15 percent coarse fragments; medium acid; clear wavy boundary.

IIIC—25 to 60 inches; dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) very gravelly sand; single grain; loose; few fine roots in upper 5 inches; 30 percent coarse fragments; strongly acid.

The solum ranges from 18 to 34 inches in thickness. Depth to bedrock is more than 5 feet. Coarse fragments range from 2 to 15 percent, by volume, in the A and B2 horizons, as much as 35 percent in the B3 horizon, and from 10 to 50 percent in the C horizon. Reaction, in unlimed areas, is very strongly acid in the A horizon and very strongly acid or strongly acid in the B and C horizons.

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

The B2 horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. The fine earth is silt loam, loam, or very fine sandy loam. Structure is weak fine or medium subangular blocky. Consistence is friable or very friable.

Some profiles have a thin B3 horizon that has colors similar to those of the B2 horizon. The fine earth is sandy loam to loam.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is stratified sand and gravel or very gravelly sand.

Hoosic series

The Hoosic series consists of sandy-skeletal, mixed, mesic Typic Dystrochrepts. These soils are deep, somewhat excessively drained, and nearly level to very steep. They are on glacial outwash plains, fans, valley trains and related kames, and water-sorted moraines. These soils formed in glacial outwash derived from sandstone, shale, and slate. They have a medium textured to coarse textured subsoil. Slope ranges from 0 to 55 percent, but is dominantly 3 to 16 percent.

Hoosic soils are in a drainage sequence with the moderately well drained Castile soils, the somewhat poorly drained Red Hook soils, and the poorly drained to very poorly drained Atherton soils. They formed in outwash material similar to that in which Chenango, Tunkhannock, and Haven soils formed but contain more sand and less silt in the solum than these soils. Hoosic soils are yellower than Tunkhannock soils and do not have contrast in texture that Haven soils have. They also have more coarse fragments in the surface layer and subsoil than Haven soils.

Typical pedon of Hoosic gravelly loam, 0 to 3 percent slopes, in the town of Rochester, 1 mile northwest of Mettacahonks and 20 feet west of a gravel pit, in cropland:

Ap—0 to 8 inches; dark brown (10YR 3/3) gravelly loam; moderate fine and medium granular structure; friable; many fine roots; common fine pores; 30 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—8 to 14 inches; yellowish brown (10YR 5/6) gravelly loam; weak fine subangular blocky structure; friable; common fine roots; common fine pores; 30 percent coarse fragments; strongly acid; clear wavy boundary.

IIB22—14 to 20 inches; yellowish brown (10YR 5/6) very gravelly sandy loam; weak fine subangular blocky structure; very friable; common fine roots; common fine pores; 40 percent coarse fragments; strongly acid; gradual wavy boundary.

IIIB3—20 to 30 inches; dark yellowish brown (10YR 4/4) very gravelly loamy sand; very weak fine granular structure; very friable; few fine roots; common fine pores; 50 percent coarse fragments; strongly acid; gradual wavy boundary.

IIIC—30 to 80 inches; dark yellowish brown (10YR 4/4) crudely stratified very gravelly sand; single grain; loose; 45 percent gravel and 20 percent cobblestones; strongly acid.

The solum ranges from 22 to 35 inches in thickness. Depth to bedrock is more than 5 feet. Rock fragments, mainly gravel and cobblestones, range from 15 to 35 percent, by volume, in the A horizon, from 25 to 50 percent in the B horizon, and 35 to 70 percent in the C horizon. The C horizon contains 5 to 15 percent, by volume, cobblestones and stones. Reaction, in unlimed areas, is very strongly acid or strongly acid above a depth of 30 inches. Below 30 inches, it is strongly acid or medium acid.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 or 3. The fine earth is sandy loam to loam.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The fine earth in the B horizon above a depth of 22 inches is loam, sandy loam,

or fine sandy loam. It grades to loamy sand or coarser as depth increases in the B horizon. Structure is weak granular or subangular blocky. Consistence is very friable or friable.

The C horizon is stratified gravel and sand to very gravelly loamy sand.

Hudson series

The Hudson series consists of fine, illitic, mesic Glossaquic Hapludalfs. These soils are deep, moderately well drained and gently sloping to steep. They are in dissected lake plains and other glacial landforms that are mantled with lake sediment. These soils formed in calcareous lacustrine deposits of clay and silt. They have a fine textured and moderately fine textured subsoil. Slope ranges from 3 to 35 percent.

Hudson soils are in a drainage sequence with the somewhat poorly drained Rhinebeck soils and the poorly drained and very poorly drained Madalin soils. They formed in material similar to that in which those soils formed. They are similar in texture to Cayuga and Schoharie soils, but they do not have glacial till below a depth of 20 to 40 inches, which Cayuga soils have. Hudson soils are not so red as Schoharie soils. They have a finer textured subsoil than the more silty Williamson soils that have a fragipan.

Typical pedon of Hudson silt loam, 3 to 8 percent [illegible]

in pores; many oxide stains; slightly acid; gradual wavy boundary.

C—38 to 60 inches; dark yellowish brown (10YR 4/4) varved silty clay and silt loam; many medium and coarse distinct grayish brown (10YR 5/2) and many medium and coarse faint yellowish brown (10YR 5/4) mottles; strong inherited platy structure; very firm; few fine pores; calcareous; mildly alkaline.

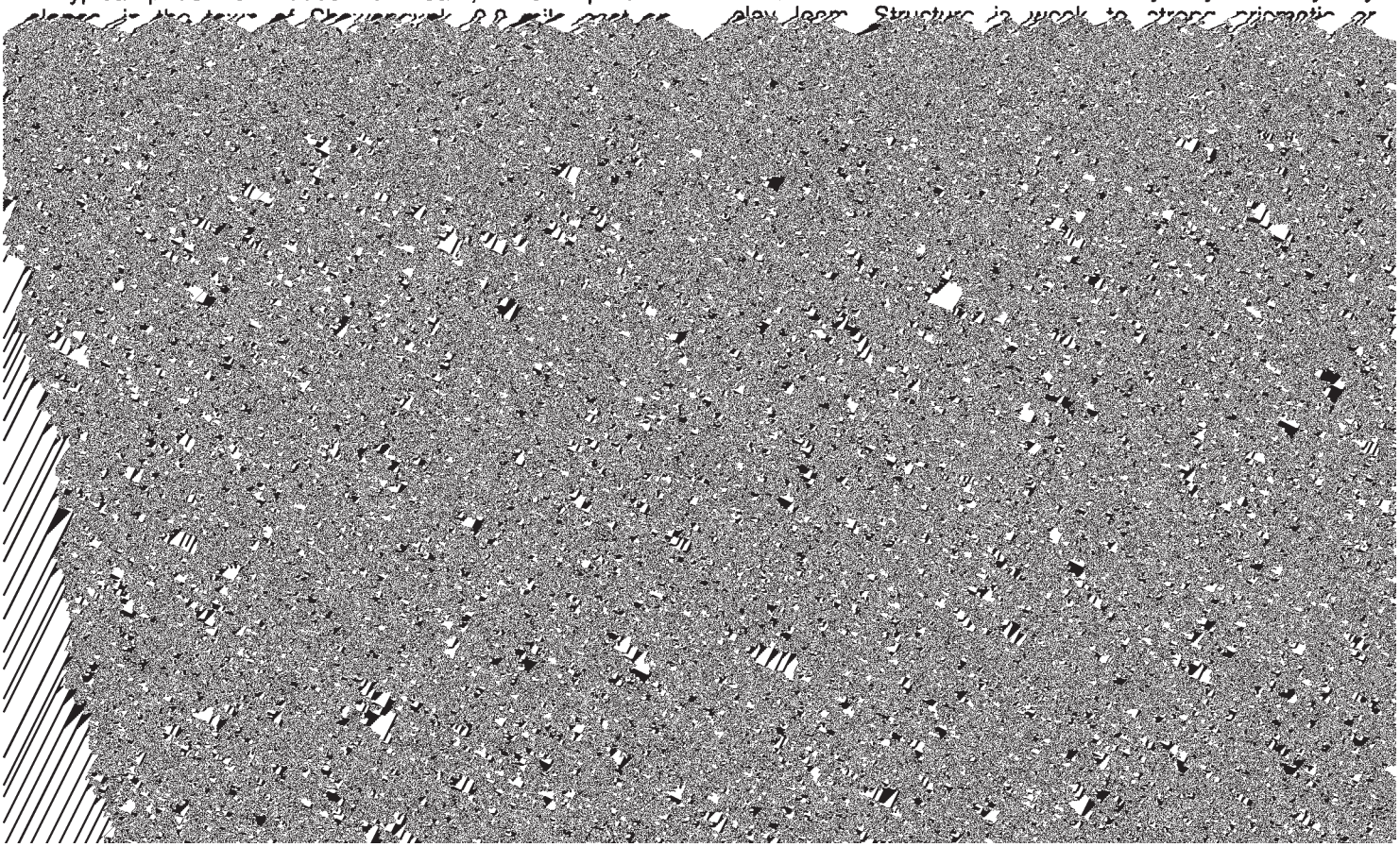
The solum ranges from 25 to 40 inches in thickness. Depth to carbonates is generally about 34 inches but ranges from 20 to 48 inches. Depth to bedrock is more than 5 feet. Coarse fragments are generally absent, but in some areas they make up as much as 3 percent, by volume, of the solum.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture is silt loam or silty clay loam. Reaction is strongly acid to neutral.

The A2 horizon has hue of 10YR or 2.5Y, value of 6, and chroma of 3 or 4. Texture is silt loam or silty clay loam. Structure is weak or very weak platy or subangular blocky. Reaction is strongly acid to neutral.

The B&A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Degraded surfaces on peds have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. Reaction is strongly acid to neutral.

The B2t horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4. Texture is silty clay or heavy silty [illegible]



soils, moderately steep, in the town of Woodstock, 2.5 miles north of Lake Hill on Mink Hollow Road and 0.4 mile east, in wooded area:

O1—2 inches to 1 inch; litter of leaves and twigs.

O2—1 inch to 0; very dark grayish brown (10YR 3/2) partly decomposed leaves and twigs; extremely acid; abrupt smooth boundary.

A1—0 to 3 inches; dark reddish brown (5YR 3/3) flaggy silt loam; moderate fine and medium granular structure; very friable; many fine and few medium roots; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B21—3 to 9 inches; reddish brown (2.5YR 4/4) gravelly silt loam; moderate fine granular structure; friable; many fine and few medium roots; many fine pores; 25 percent coarse fragments; very strongly acid; clear wavy boundary.

B22—9 to 17 inches; reddish brown (2.5YR 4/4) gravelly silt loam; weak medium subangular blocky structure; friable; many fine and few medium roots; many fine pores; 30 percent coarse fragments; strongly acid; clear wavy boundary.

Bx—17 to 49 inches; dark reddish brown (2.5YR 3/4) gravelly loam; weak very coarse prismatic structure parting to weak medium and coarse subangular blocky; very firm, brittle; few fine roots along faces

Some pedons have a thin, A'2 horizon that is not mottled immediately above the fragipan.

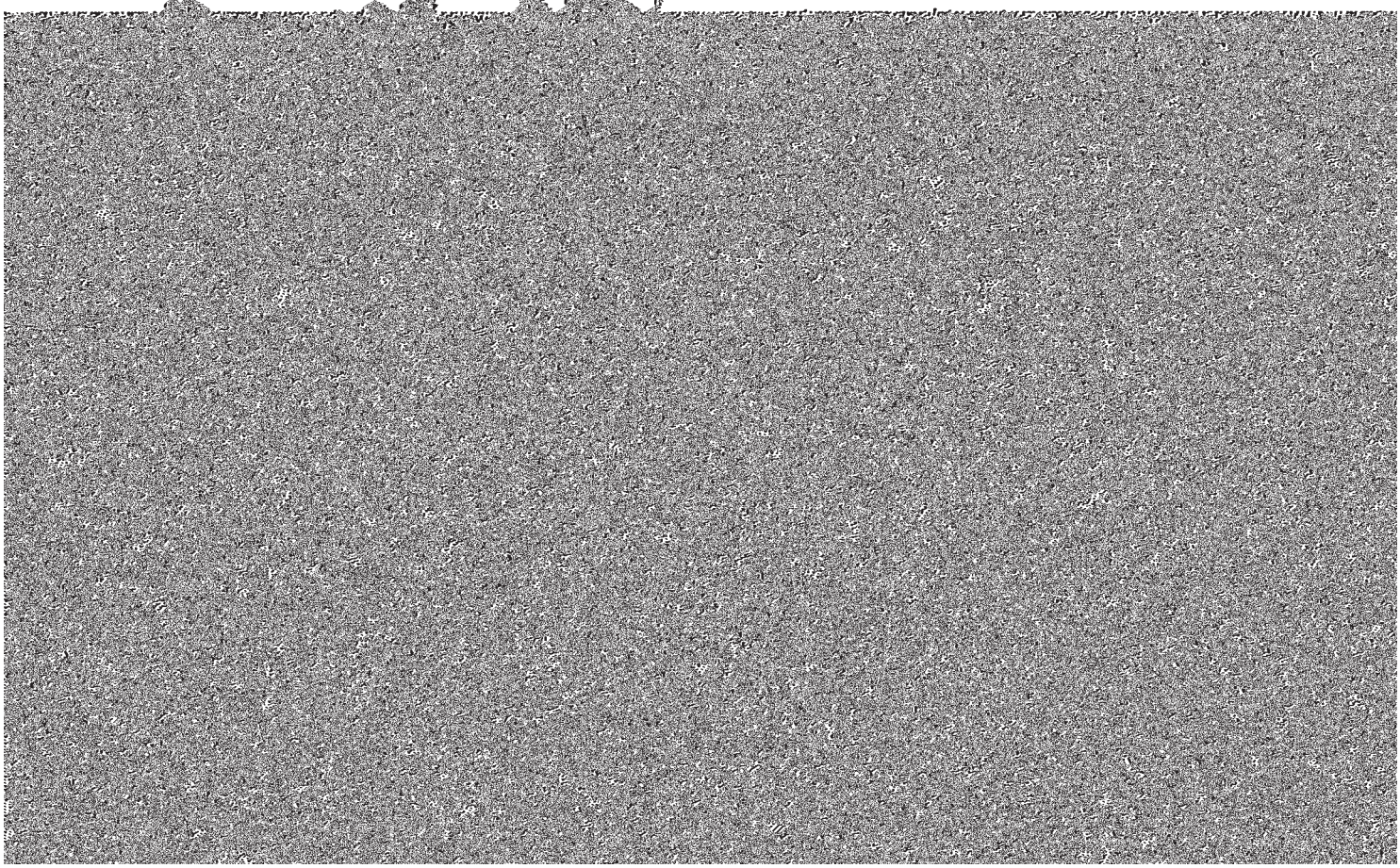
The Bx horizon has hue of 10R to 5YR, value of 3 to 5, and chroma of 2 to 4. Prisms are generally separated by streaks with brighter colored borders. The fine earth is silt loam to sandy loam. Prisms have platy, subangular blocky, or massive interiors.

The C horizon is similar to the Bx horizon in color and texture.

Lamson series

The Lamson series consists of coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts. These soils are deep, poorly drained and very poorly drained, and nearly level. They are on lake plains and deltas, and in depressions that have restricted outlets for surface water. They formed in water-sorted sediments of predominantly fine and medium sand. These soils dominantly have a moderately coarse textured subsoil. Slope is mainly less than 1 percent.

Lamson soils are in a drainage sequence with the somewhat poorly drained Walpole soils, the moderately well drained Pompton soils, and the well drained Riverhead soils. They formed in material similar to that in which these soils formed. They are similar to Atherton



brown (10YR 5/6) mottles; single grain; loose; neutral gradual boundary.

C2g—44 to 50 inches; stratified gray (10YR 5/1) fine sandy loam and loamy fine sand; massive; friable; neutral.

The solum ranges from 30 to 40 inches in thickness. Depth to bedrock is more than 5 feet. Coarse fragments are less than 5 percent by volume. Reaction increases

and common medium roots; 20 percent coarse fragments; strongly acid; abrupt wavy boundary.

B21—4 to 12 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine subangular blocky structure; friable; common fine and medium roots; common fine pores; 25 percent coarse fragments; strongly acid; gradual wavy boundary.

B22—12 to 26 inches; yellowish brown (10YR 5/6) channery silt loam; weak fine and medium subangular

ton soils. Lyons soils formed in glacial till, and Atherton soils formed in glacial outwash. Lyons soils have more sand and less silt than Canandaigua soils that formed in lacustrine deposits of silt, very fine sand, and clay.

Typical pedon of Lyons silt loam, in an area of Lyons

Madalin series

The Madalin series consists of fine, illitic, mesic Mollic Ochraqualfs. These soils are deep, poorly drained and very poorly drained, and nearly level. They are within the

alkaline in the B horizon, and mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1.

The B horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2. Some pedons have chroma of 3 in the B3 horizon. Texture is silty clay or heavy silty clay loam. Structure is moderate angular or subangular blocky to moderate or strong coarse prismatic. Many pedons have weak structure in the B3 horizon. Consistence is firm or very firm.

The C horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 to 4. Texture is varied silty clay and

B22—15 to 22 inches; dark yellowish brown (10YR 4/4) very shaly silt loam; weak very fine granular structure; very friable; common fine roots; 70 percent shale fragments; strongly acid; gradual wavy boundary.

C—22 to 32 inches; a mass of fine shale fragments with thin brown (10YR 4/3) silt loam coatings; few fine roots; 95 percent shale fragments; medium acid; gradual wavy boundary.

IIR—32 inches; dark grayish brown (10YR 4/2) fractured rippable shale bedrock; beds tilted to nearly vertical.

Depth to bedrock ranges from 20 to 40 inches. The

Typical pedon of Mardin gravelly silt loam, 3 to 8 percent slopes, in the town of Plattekill, 700 feet east on Barclay Road from its intersection with Plattekill Road and 1,150 feet north, in meadow:

Ap—0 to 10 inches; dark brown (10YR 4/3) gravelly silt loam; moderate fine granular structure; friable; many fine roots; 20 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—10 to 14 inches; yellowish brown (10YR 5/6) gravelly silt loam; moderate fine and medium subangular blocky structure; friable; common fine roots; common fine pores; 15 percent coarse fragments; medium acid; clear wavy boundary.

B22—14 to 17 inches; yellowish brown (10YR 5/6) gravelly silt loam; common medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; 15 percent coarse fragments; medium acid; clear wavy boundary.

A'2—17 to 21 inches; pale brown (10YR 6/3) gravelly loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; common fine pores; this horizon forms the tops of very coarse prisms; 15 percent coarse fragments; medium acid; clear broken boundary.

B'x—21 to 46 inches; olive brown (2.5Y 4/4) gravelly light loam; many medium distinct light brownish gray (2.5Y 6/2) mottles; weak very coarse prismatic structure; firm, brittle; few fine roots along faces of prisms; many vesicular pores with clay linings; prisms are separated by light yellowish brown (2.5Y 6/4) streaks with common fine distinct yellowish brown (10YR 5/6) borders; many oxide stains and concretions; 25 percent coarse fragments; slightly acid; gradual boundary.

C—46 to 56 inches; yellowish brown (10YR 5/4) gravelly loam; many medium faint light olive brown (2.5Y 5/6) and many medium prominent light brownish gray (2.5Y 6/2) mottles; massive; firm; 25 percent coarse fragments; neutral.

The solum ranges from 40 to 70 inches in thickness. Depth to the top of the fragipan ranges from 14 to 26 inches. Bedrock is at a depth of more than 60 inches, except it is more than 40 inches where these soils are in a complex pattern with Nassau soils. Rock fragments are mainly gravel, cobblestones, and stones; some flagstones are present and some fragments are angular. They range from 15 to 35 percent by volume in individual horizons above the fragipan and from 20 to 50 percent in the fragipan and C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 or 3. Structure is weak or moderate, fine or medium granular. Reaction, in unlimed areas, is very strongly acid to medium acid.

The B2 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is mottled between depths of 12 and 26 inches. The fine earth is loam or silt loam. Structure is weak or moderate, fine or medium subangular blocky or granular. Consistence is very friable to firm. Reaction is very strongly acid to medium acid.

The A'2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 or 3. The fine earth is loam or silt loam. Structure is weak or very weak platy or subangular blocky. Consistence is friable or firm. Reaction is very strongly acid to medium acid.

The Bx horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. The fine earth is loam or silt loam. The prisms have massive interiors, or they part to subangular blocky or platy structure. Consistence is firm or very firm, and brittle. Reaction is very strongly acid to slightly acid.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. Texture of the fine earth is loam or silt loam. This horizon is massive or has weak platy structure. Reaction is strongly acid to moderately alkaline.

Menlo series

The Menlo series consists of coarse-loamy, mixed, mesic Aeric Fragiaquepts. These soils are deep, very poorly drained, and nearly level to depressional. They are in concave depressions on glaciated uplands. These soils formed in glacial till derived mainly from sandstone, conglomerate, and siltstone with a small amount of red shale. They are taxadjuncts to the Menlo series in this survey area because they have a yellower hue below the A horizon and have a Bx horizon instead of a Cx horizon. A dense fragipan that restricts root and water penetration is at a depth of 12 to 25 inches. These soils have a moderately coarse textured and medium textured subsoil. Slope ranges from 0 to 3 percent, but is dominantly 0 to 2 percent.

Menlo soils are in a drainage sequence with the well drained Swartswood soils, the moderately well drained Wurtsboro soils, and the somewhat poorly drained Scriba soils. Menlo soils formed in material similar to that in which those soils formed. They are also near Lackawanna, Wellsboro, and Morris soils in a few areas. Menlo soils are more acid and have a fragipan that is not present in the very poorly drained and poorly drained Lyons soils which formed in calcareous glacial till.

Typical pedon of Menlo silt loam, in an area of Menlo very bouldery soils, in the town of Denning, 1.1 miles northeast of Greenville School, in wooded area:

O1—3 to 2 inches; litter of leaves, needles, and twigs.

O2—2 inches to 0; black (N 2/0) partly decomposed leaves, needles, and twigs; many fine and few medium roots; extremely acid; abrupt wavy boundary.

A1—0 to 2 inches; black (N 2/0) silt loam; moderate fine granular structure; very friable; few medium and many fine roots; high organic matter content; 10 percent coarse fragments; extremely acid; abrupt wavy boundary.

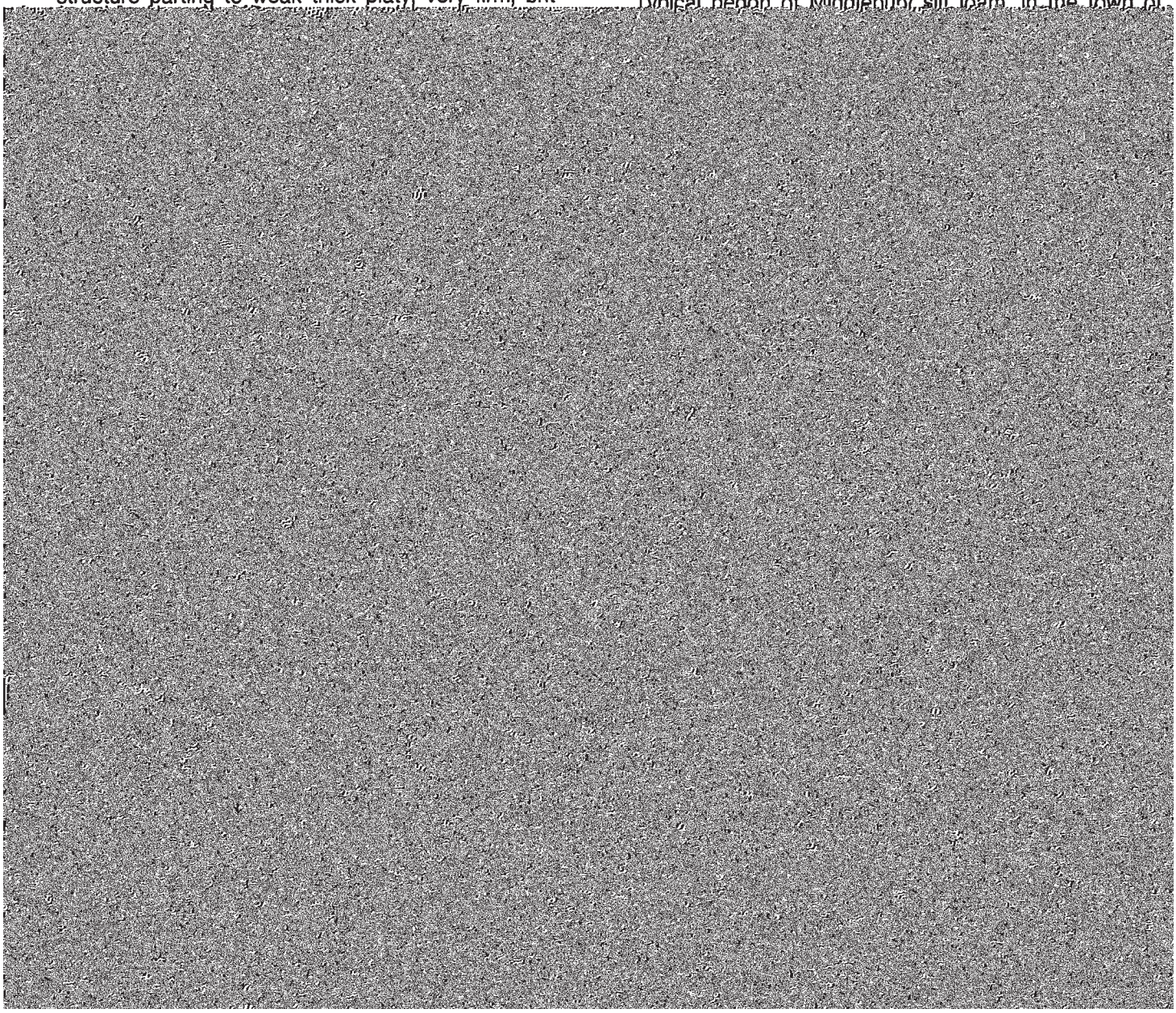
A2g—2 to 13 inches; light gray (10YR 7/1) gravelly fine sandy loam; many fine and medium distinct yellowish brown (10YR 5/6) and common fine distinct brownish yellow (10YR 6/6) mottles; weak thick platy structure; friable; few fine roots; few fine pores; 15 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx—13 to 30 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam; many medium faint brown (10YR 5/3) mottles; weak very coarse prismatic structure parting to weak thick platy; very firm, brit-

These soils formed in alluvium derived from shale and sandstone with some lime-bearing materials. These soils have a medium textured and moderately coarse textured subsoil. Slope ranges from 0 to 2 percent, but is dominantly 0 to 1 percent.

Middlebury soils are in a drainage sequence with the well drained Tioga soils and the poorly drained and very poorly drained Wayland soils. Middlebury soils are in positions on flood plains similar to those of the moderately well drained to somewhat poorly drained Teel and Basher soils. They contain less silt and very fine sand between a depth of 10 and 40 inches than Teel soils. Middlebury soils do not have the red colors that Basher soils have, and they have a higher base status than these soils.

Typical pedon of Middlebury silt loam, in the town of



horizon and medium acid to neutral within 40 inches of the surface.

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

[illegible]

B22—10 to 13 inches; reddish brown (5YR 4/4) gravelly loam; many medium and coarse prominent grayish brown (10YR 5/2) and common medium distinct dark red (2.5YR 3/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few fine

11) and somewhat excessively drained. They formed in glacial till derived mainly from shale and slate. These soils are on bedrock controlled, glacially modified landforms. The bedrock is folded and tilted at various angles, and bedrock outcrops are common. These soils have a medium textured subsoil. Slope ranges from 3 to 65 percent, but is dominantly 8 to 60 percent.

Nassau soils are closely associated with the moderately deep, well drained to excessively drained Manlius soils and the deep, well drained Bath soils and moderately well drained Mardin soils. Nassau soils do not have the angular fragments and flagstones derived mainly from siltstone and sandstone that Arnot soils have. They have a lower base status and more coarse fragments in the solum than Farmington soils that are shallow to limestone bedrock.

Typical pedon of Nassau shaly silt loam, in an area of Bath-Nassau complex, 8 to 25 percent slopes, in the town of New Paltz, 2,300 feet northwest on Jansen

Odessa series

The Odessa series consists of fine, illitic, mesic Aeric Ochraqualfs. These soils are deep, somewhat poorly drained, and nearly level and gently sloping. They are on glacial lake plains. These soils formed in calcareous lacustrine deposits of clay and silt. They have a fine textured and moderately fine textured subsoil. Slope ranges from 0 to 8 percent.

Odessa soils are closely associated with the moderately well drained to well drained Schoharie soils, and in some areas, with the poorly drained and very poorly drained Madalin soils. They are similar in texture and drainage to Rhinebeck and Churchville soils, but are redder than Rhinebeck soils and do not have glacial till below a depth of 20 to 40 inches, which Churchville soils have. Odessa soils have a finer textured solum than Raynham soils that formed in water-laid deposits of coarse silt and very fine sand.

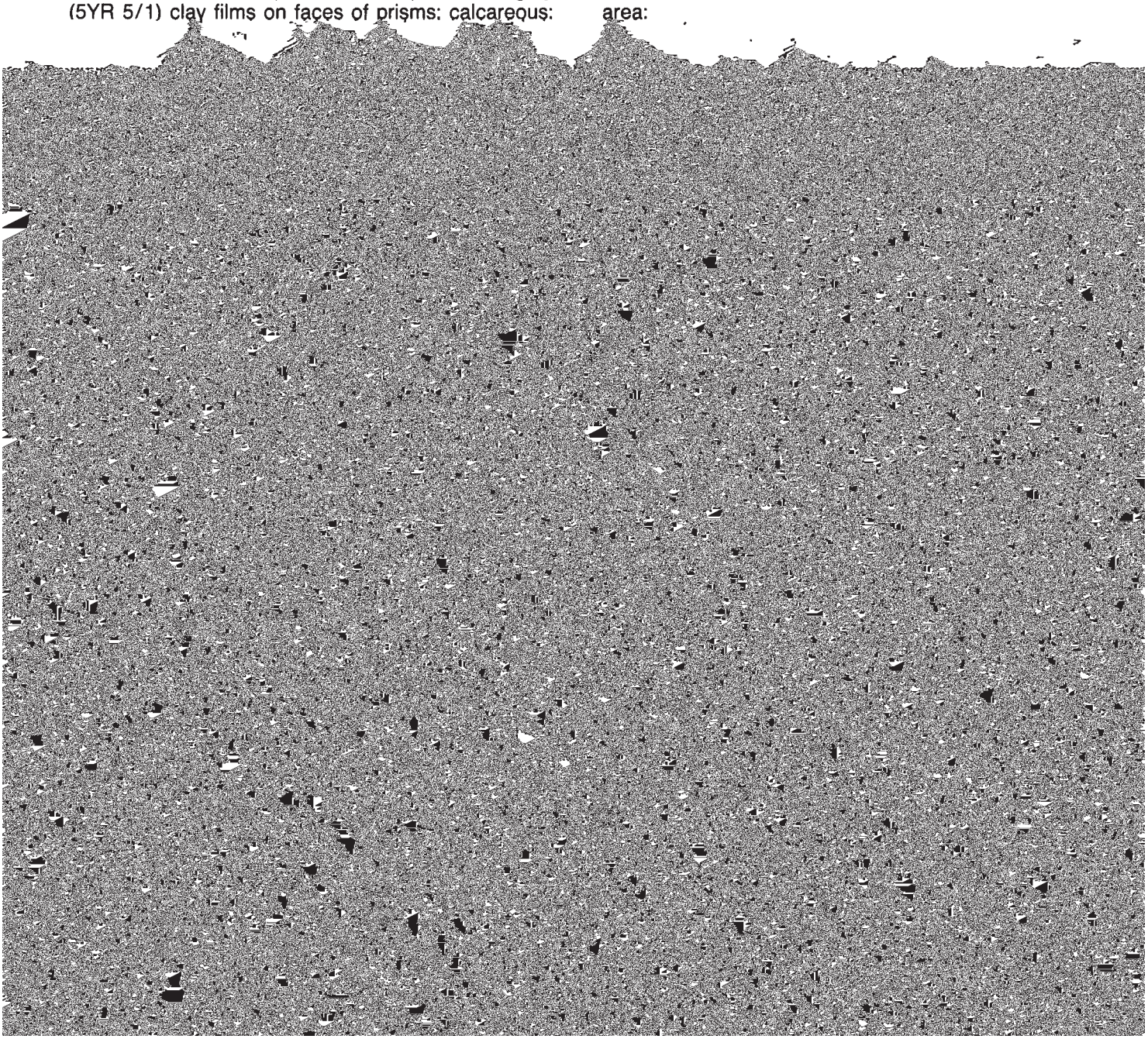
Typical pedon of Odessa silt loam, 0 to 2 percent

B24t—26 to 34 inches; dark brown (7.5YR 4/4) silty clay; many fine distinct reddish gray (5YR 5/2) mottles; weak coarse prismatic structure parting to weak coarse angular blocky; very firm; few fine roots mainly on faces of peds; many fine pores; continuous thin gray (5YR 5/1) clay films on faces of peds and in pores; common very dark gray (10YR 3/1) oxide stains; neutral; clear wavy boundary.

B3—34 to 38 inches; varved reddish brown (2.5YR 4/4) silty clay and yellowish brown (10YR 5/4) silty clay loam; weak coarse prismatic structure; very firm; few fine roots on faces of peds; few fine pores; thin gray (5YR 5/1) clay films on faces of prisms; calcareous;

drained Arnot soils and the shallow, somewhat poorly drained to poorly drained Tuller soils. They are similar to Lordstown and Manlius soils in depth to bedrock. Oquaga soils are redder and contain a higher content of coarse fragments than Lordstown soils. They do not have the coarse fragments dominated by shale that Manlius soils have.

Typical pedon of Oquaga channery silt loam, in an area of Oquaga-Arnot-Rock outcrop complex, moderately steep, in the town of Woodstock, about 1.35 miles north on Meads Mountain Road from its intersection with California Quarry Road and 990 feet northeast, in wooded area:



loam. Structure is weak or very weak granular or subangular blocky.

The C horizon has colors similar to the B horizon. Some pedons have mottles directly above the bedrock. The fine earth is silt loam to fine sandy loam.

Palms series

The Palms series consists of loamy, mixed, euic, mesic Terric Medisaprists. These soils are deep, very poorly drained, nearly level to depressional, and organic. They are in basins that were formerly glacial lakes or ponds. These soils formed in 16 to 50 inches of well decomposed organic material over loamy mineral material. The prolonged high water table has inhibited the oxidation of remnants of such plants as mosses, sedges, and some woody plants. Slope is generally less than 2 percent.

Palms soils are on landscapes similar to those of Carlisle soils that formed in organic deposits more than 51 inches thick. They are associated with Canandaigua, Lyons, Menlo, Wayland, Lamson, Madalin, and Atherton soils that formed in mineral materials at the margin of

subangular blocky structure. Reaction is very strongly acid to neutral.

The Oa2 and Oa3 horizons have hue of 10YR to 5YR, value of 2 or 3, and chroma of 0 to 2. Chroma and value can vary 1 or 2 units when the soil is rubbed. These horizons are massive or have weak granular or subangular blocky structure. Mineral material increases as depth increases and ranges from 30 to 50 percent in the Oa3 horizon. Reaction increases as depth increases and is strongly acid to neutral.

The C horizon has hue of 10YR or 2.5Y, value of 3 or 5, and chroma of 1 or 2. Texture is variable; it is fine sandy loam to clay loam. Reaction is slightly acid to moderately alkaline.

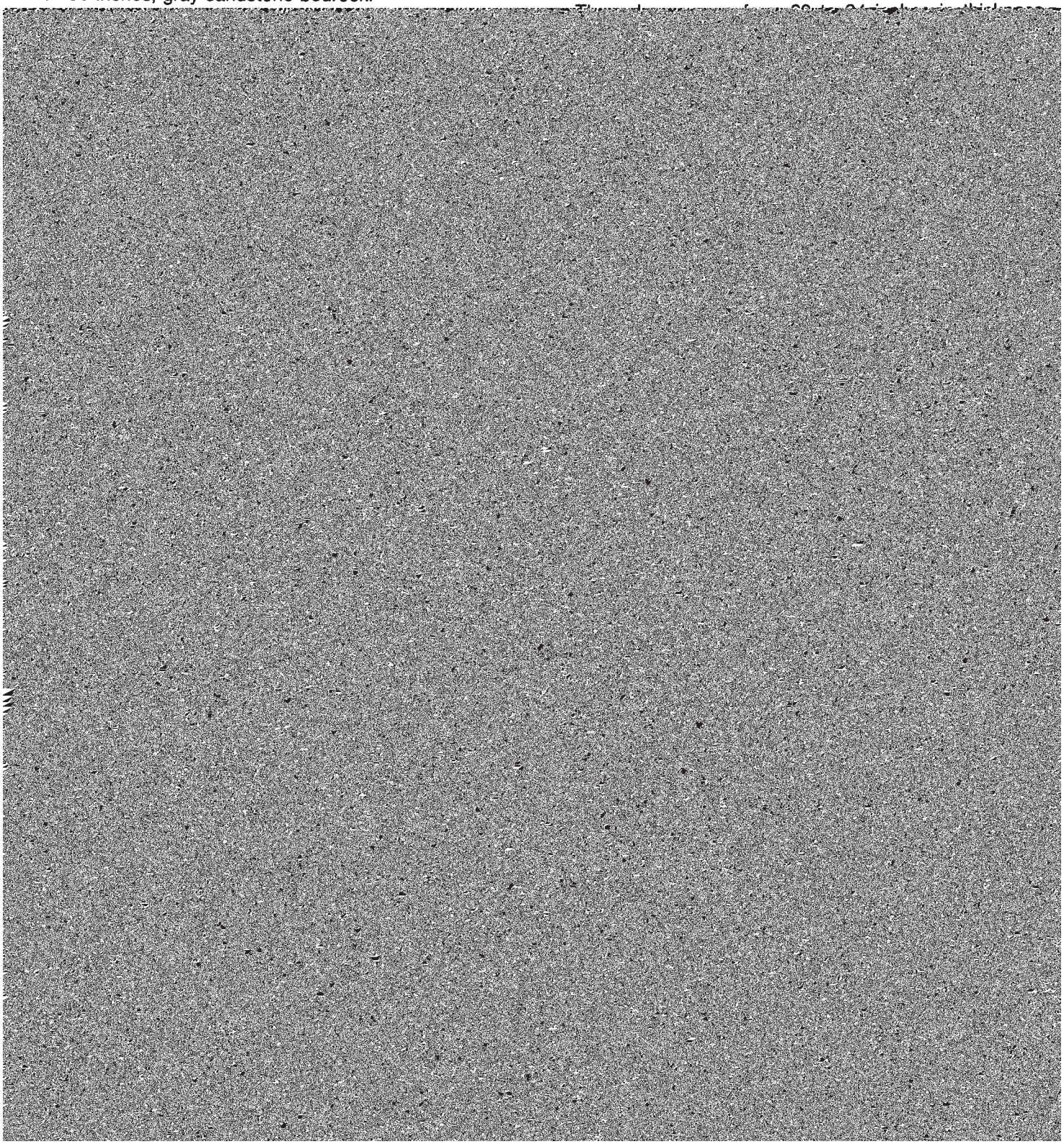
Palms, Bedrock Variant

The Palms, bedrock Variant, consists of euic, mesic Lithic Medisaprists. These soils are nearly level to depressional, very poorly drained, and organic. They are in basins on bedrock controlled landforms where bedrock is at a depth of 20 to 50 inches. These soils formed

IICg—30 to 38 inches; dark gray (5Y 4/1) very gravelly loam; massive; friable; 60 percent gravel; neutral; abrupt smooth boundary.

IIIR—38 inches; gray sandstone bedrock.

IIC—32 to 65 inches; brown (10YR 4/3) coarse sand; single grain; loose; few fine roots in upper 5 inches; 5 percent fine gravel; strongly acid.



roots; many fine pores; strongly acid; clear wavy boundary.

B22—10 to 29 inches; yellowish brown (10YR 5/4)

drained Canandaigua soils. They are also associated with the moderately well drained Williamson soils that have a fragipan. Raynham soils are similar to Rhinebeck

strongly acid to slightly acid in the A and B horizons and

B22—18 to 23 inches; light olive gray (5Y 6/2) gravelly

ranges from 0 to 8 percent, but is dominantly 0 to 5 percent.

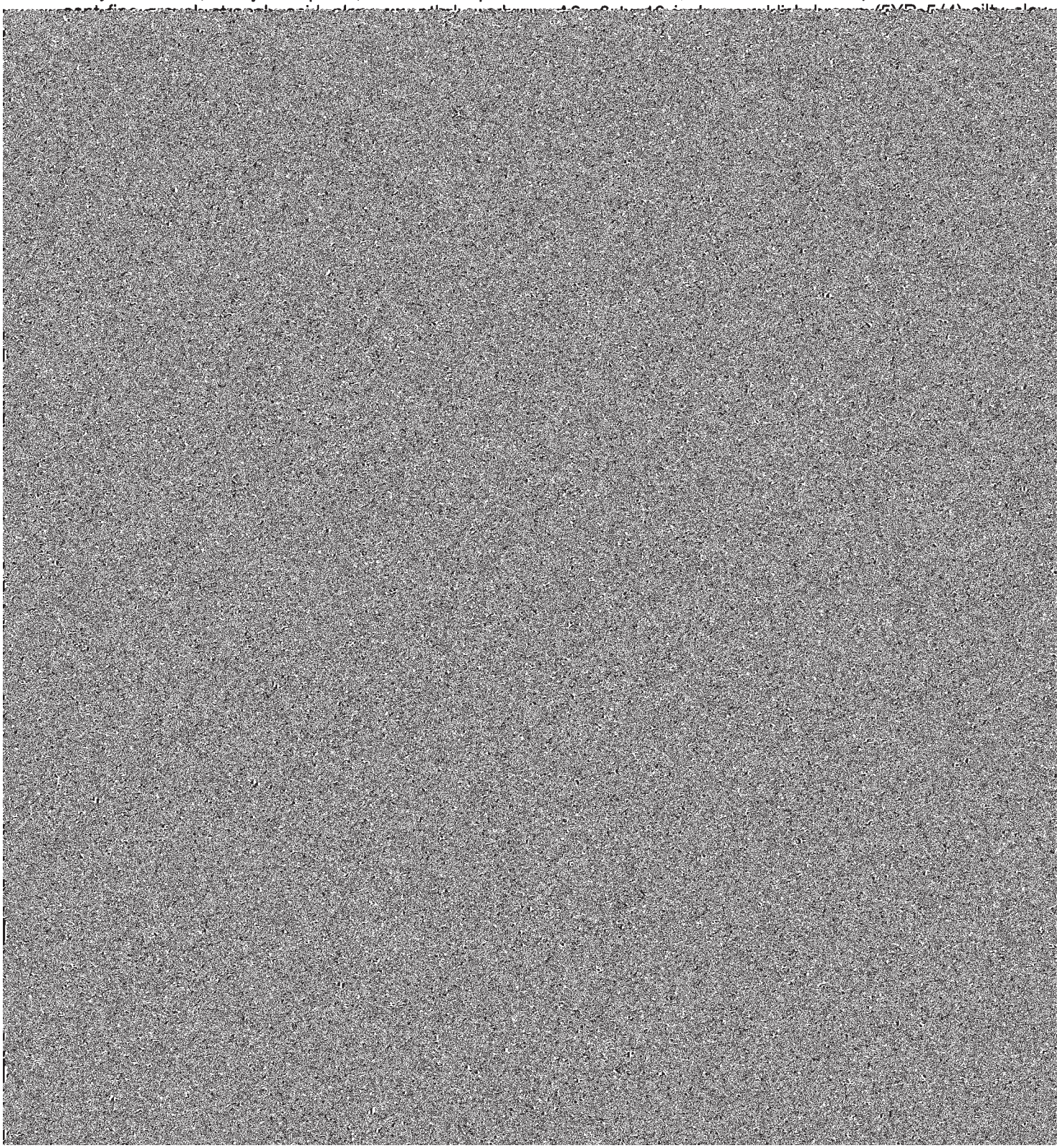
Rhinebeck soils are in a drainage sequence with the moderately well drained Hudson soils and the poorly drained and very poorly drained Madalin soils that formed in similar material. Rhinebeck soils are similar to

The solum ranges from 25 to 48 inches in thickness and corresponds with the depth to carbonates. Depth to bedrock is more than 5 feet. Coarse fragments are typically absent, but any horizon can be as much as 5 percent, by volume, coarse fragments.

The Ap horizon has hue of 10YR, value of 3 or 4, and

B21—10 to 21 inches; strong brown (7.5YR 5/6) sandy loam; weak very fine granular structure; very friable; many fine roots; many fine pores; less than 3 per-

Ap—0 to 8 inches; brown (7.5YR 5/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.



sticky to very plastic. Reaction generally increases as depth increases and is medium acid to mildly alkaline.

The B3 horizon is similar to the B2 horizon in color and texture, but it has a weaker structure.

The C horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 2 to 4. Reaction is mildly alkaline or moderately alkaline.

Scio series

The Scio series consists of coarse-silty, mixed, mesic Aquic Dystrochrepts. These soils are deep, moderately well drained, and nearly level. They are predominantly on glacial-stream terraces above the present flood plains, but a few areas are on glacial outwash terraces. These soils formed in gravel-free, water-deposited material high in content of silt and very fine sand. They have a medium textured subsoil. Slope ranges from 0 to 2 percent, but is dominantly 0 to 1 percent.

Scio soils are in a drainage sequence with the well drained Unadilla soils, the somewhat poorly drained Raynham soils, and the poorly drained and very poorly drained Canandaigua soils. They are also associated with Tioga and Hamlin soils and their wetter associates on flood plains. Scio soils are similar in texture and drainage to the Williamson soils but do not have the fragipan that Williamson soils have.

Typical pedon of Scio silt loam, in the town of Ulster, about 0.55 mile west on Esopus Avenue from its intersection with Albany Avenue and 1,800 feet north, in cropland:

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam, light gray (10YR 7/2) dry; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

B21—10 to 14 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; many fine roots; many fine and few medium pores; few old root and worm channels filled with brown (10YR 4/3) silt loam; medium acid; clear wavy boundary.

B22—14 to 19 inches; yellowish brown (10YR 5/4) silt loam; common fine faint light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; many fine pores; few old root and worm channels filled with brown (10YR 4/3) silt loam; strongly acid; clear wavy boundary.

B23—19 to 25 inches; brown (7.5YR 5/4) silt loam; common fine faint yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to weak coarse subangular blocky; friable; common fine roots; many fine pores; very thin yellowish brown (10YR 5/4) silt coatings on faces of prisms; strongly acid; clear wavy boundary.

B24—25 to 35 inches; strong brown (7.5YR 5/6) silt loam; many medium distinct pinkish gray (7.5YR 6/2) mottles; weak coarse prismatic structure; friable; few fine roots; many fine pores; thin yellowish brown (10YR 5/4) silt coatings on faces of prisms; strongly acid; clear wavy boundary.

C1—35 to 47 inches; brown (7.5YR 5/2) silt loam; many medium distinct strong brown (7.5YR 5/6) mottles; massive; friable; many fine pores; medium acid; gradual wavy boundary.

IIC2—47 to 55 inches; reddish brown (7.5YR 4/3) fine sandy loam; many medium distinct light brownish gray (10YR 6/2) mottles; massive; very friable; 5 percent gravel; neutral.

Depth to bedrock is more than 5 feet. The solum ranges from 22 to 36 inches in thickness. It is typically free of coarse fragments, but individual horizons contain as much as 5 percent gravel, by volume. The C horizon contains 5 to 50 percent coarse fragments. Reaction, in unlimed areas, is very strongly acid to medium acid in the A and B horizons. It increases as depth increases from strongly acid to mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. Structure is weak or moderate granular.

The B horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. Texture is silt loam or very fine sandy loam. Structure is weak or moderate prismatic or subangular blocky.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 or 3. Texture is silt loam to stratified very gravelly sand. Consistence is very friable to firm.

Scriba series

The Scriba series consists of coarse-loamy, mixed, mesic Aeric Fragiaquepts. These soils are deep, somewhat poorly drained, and nearly level and gently sloping. They are on glaciated uplands. These soils formed in glacial till derived mainly from sandstone, quartzite, and conglomerate. They have a dense fragipan at a depth of 12 to 18 inches below the surface that restricts water and root penetrations. These soils have a moderately coarse textured and medium textured subsoil. Slope ranges from 0 to 8 percent.

Scriba soils are in a drainage sequence with the well drained Swartswood soils, the moderately well drained Wurtsboro soils, and the very poorly drained Menlo soils. Scriba soils formed in material similar to that in which these soils formed. They are similar to the somewhat poorly drained Volusia and Morris soils that also formed in glacial till. Scriba soils have a higher content of sand and less silt and clay above the fragipan than Volusia soils. They have more sand in the subsoil and are not so red in the fragipan as Morris soils.

Typical pedon of Scriba gravelly fine sandy loam, in an area of Scriba and Morris very bouldery soils, gently sloping, in the town of Wawarsing, 4 miles west-southwest of Merriman Dam of the Rondout Reservoir, 1.6 miles south on East South Road from its intersection with N.Y. Route 55 and 1,000 feet west, in idle area:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam, light brownish gray (10YR 6/2) dry; moderate fine and very fine granular structure; friable; many fine roots; 25 percent coarse fragments; extremely acid; clear smooth boundary.

A2g—9 to 13 inches; grayish brown (2.5Y 5/2) gravelly fine sandy loam; many fine distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm; common fine roots; few fine pores; 30 percent coarse fragments; very strongly acid; clear wavy boundary.

Bx1—13 to 19 inches; brown (7.5YR 5/4) gravelly fine sandy loam; many medium distinct brown (10YR 5/3) mottles; moderate very coarse prismatic structure with massive interiors; firm, brittle; few fine roots along faces of prisms; many fine vesicular pores; prisms are separated by gray (5Y 6/1) streaks with light olive brown (2.5Y 5/6) borders; 30 percent

lar blocky interiors. Consistence is firm or very firm, and brittle.

A C horizon is below the Bx horizon in most pedons. Consistence is firm or very firm. This horizon is massive or platy.

Stockbridge series

The Stockbridge series consists of coarse-loamy, mixed, mesic Dystric Eutrochrepts. These soils are deep, well drained, and gently sloping to hilly. They are on till plains. These soils formed in glacial till derived principally from limestone with a small amount of siltstone, sandstone, and shale. They have a medium textured subsoil. Slope ranges from 3 to 30 percent, but is dominantly 3 to 25 percent.

Stockbridge soils are in a complex pattern with the shallow, well drained and somewhat excessively drained Farmington soils that formed in material similar to that in which Stockbridge soils formed. Stockbridge soils have a higher base status, and do not have the fragipan that the well drained Bath, Swartswood, and Lackawanna soils have. Bath, Swartswood, and Lackawanna soils also formed in glacial till. Stockbridge soils have a higher base status than Valois soils.

in few pores; many oxide stains; 20 percent coarse fragments; neutral.

IIR—56 inches; fractured limestone bedrock.

The solum ranges from 24 to 36 inches in thickness. Bedrock is at a depth of more than 40 inches. Rock fragments are mainly gravel with a few cobblestones and stones. They range from 5 to 30 percent, by volume, throughout the subsoil and substratum.

C4—36 to 40 inches; dark grayish brown (10YR 4/2) loamy fine sand; massive; very friable; many fine roots; slightly acid; clear wavy boundary.

C5—40 to 53 inches; dark grayish brown (10YR 4/2) loamy fine sand; single grain; loose; many fine roots; slightly acid.

Coarse fragments are generally absent to a depth of 40 inches, but in some pedons coarse fragments range

cent coarse fragments; very strongly acid; clear wavy boundary.

A'2—24 to 29 inches; yellowish brown (10YR 5/6) gravelly sandy loam; many medium and coarse distinct grayish brown (10YR 5/2) mottles; very weak medium subangular blocky structure; firm brittle; few fine roots; many fine pores; 30 percent coarse fragments; very strongly acid; clear broken boundary.

B'x—29 to 60 inches; olive brown (2.5Y 4/4) gravelly sandy loam; weak very coarse prismatic structure parting to weak thick platy; very firm, brittle; thin clay films in many fine vesicular pores; 35 percent coarse fragments; very strongly acid.

The solum ranges from 40 to 70 inches in thickness. Depth to bedrock is more than 5 feet. Depth to the fragipan ranges from 20 to 36 inches. Rock fragments are angular or subrounded sandstone, conglomerate, or quartzite. They range from 10 to 40 percent, by volume, in individual horizons above the fragipan and from 20 to 60 percent in the Bx and C horizons. Reaction, in unlimed areas, is extremely acid to strongly acid throughout.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A1 horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The fine earth is fine sandy loam or loam.

A thin A2 horizon is in some undisturbed pedons. It has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 3.

The B2 horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. The fine earth is fine sandy loam, sandy loam, or loam. Structure is weak or moderate subangular blocky, platy, or granular. Consistence is friable or firm.

The A'2 horizon, if present, is generally thin and not more than 6 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. The fine earth is fine sandy loam, sandy loam, or loam.

The Bx horizon has hue of 5YR to 2.5Y, value of 4 or

Teel soils are in a drainage sequence with the well drained Hamlin soils and the poorly drained and very poorly drained Wayland soils that formed in material similar to that in which Teel soils formed. They are in positions on flood plains similar to those of the moderately well drained to somewhat poorly drained Middlebury and Basher soils, but have a higher proportion of silt and very fine sand than these soils. In addition, Teel soils have a higher base status than Basher soils and do not have the red colors that these soils have.

Typical pedon of Teel silt loam, in the town of Gardiner, 0.5 mile north-northeast on Bruynswick Road from its intersection with Tillson Lake Road and about 660 feet east, in cropland:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam pale brown (10YR 6/3) dry; moderate fine and medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

B21—10 to 16 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many fine pores; dark grayish brown (10YR 4/2) fillings in old root and worm channels; medium acid; clear smooth boundary.

B22—16 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; common fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; many fine pores; dark grayish brown (10YR 4/2) fillings in old root and worm channels; medium acid; clear smooth boundary.

B23—22 to 28 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct light brownish gray (2.5Y 6/2) and common fine faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; few fine roots; many fine pores; dark grayish brown (10YR 4/2) fillings in old root and worm channels; slightly acid; gradual wavy boundary.

B3—28 to 38 inches; dark yellowish brown (10YR 4/4) silt loam; common fine faint yellowish brown (10YR

acid or medium acid in the A horizon, medium acid to neutral in the B horizon, and slightly acid to mildly alkaline in the C horizon.

The Ap horizon has hue of 10YR, value of 2 to 4, and chroma of 2. Structure is weak or moderate, fine or medium granular.

The B horizon has hue of 2.5Y or 10YR, value of 3 or 4, and chroma of 2 to 4. Depth to mottles with chroma of 2 or less ranges from 12 to 24 inches. Texture is very fine sandy loam or silt loam. Structure is weak or moderate, medium or coarse subangular blocky or prismatic. Consistence is friable or very friable.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. Texture is fine sandy loam to silt loam. This horizon is massive or has platy structure from fine stratification. Consistence is very friable to firm.

Tioga series

The Tioga series consists of coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts. These soils are deep, well drained, and nearly level. They are on flood plains. These soils formed in alluvium derived from sandstone, siltstone, and shale. They have a medium textured and moderately coarse textured subsoil. Slope ranges from 0 to 3 percent.

Tioga soils are in a drainage sequence with the moderately well drained to somewhat poorly drained Middlebury soils and the poorly drained and very poorly drained Wayland soils. They are also associated with Suncook soils on flood plains and Unadilla soils and their wetter associates on glacial stream terraces. Tioga soils are in positions on flood plains similar to those of the well

IIC1—34 to 40 inches; brown (10YR 5/3) loamy fine sand; massive; very friable; few fine roots; neutral; abrupt wavy boundary.

IIIC2—40 to 53 inches; dark yellowish brown (10YR 4/4) silt loam; common fine distinct brown (10YR 5/3) mottles; massive; very friable; few fine roots; common fine pores; neutral; abrupt wavy boundary.

IIIC3—53 to 65 inches; dark yellowish brown (10YR 4/4) fine sandy loam; many fine distinct grayish brown (10YR 5/2) and common fine faint dark yellowish brown (10YR 3/4) mottles; massive; very friable; few fine pores; slightly acid.

The solum ranges from 18 to 38 inches in thickness. Bedrock is at a depth of more than 5 feet. Strongly contrasting sand and gravel layers are deeper than 40 inches. Coarse fragments are generally absent or few between a depth of 10 and 40 inches. Reaction, in unlimed areas, is strongly acid or medium acid in the A horizon, strongly acid to neutral in the B horizon, and slightly acid or neutral in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3. Consistence is friable or very friable.

The B horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. It has no mottles above a depth of 24 inches. Texture is mainly silt loam to fine sandy loam; individual subhorizons can be loamy sand. Structure is weak or moderate granular or subangular blocky. Some pedons have weak or very weak platy or prismatic structure. Consistence is friable or very friable.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. Texture is stratified to

dam at Kenozia Lake on an unnamed road and 175 feet east, in wooded area:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) flaggy silt loam; strong medium granular structure; friable; many fine and few medium roots; 20 percent coarse fragments; medium acid; abrupt smooth boundary.

B21—7 to 13 inches; light brownish gray (10YR 6/2) flaggy silt loam; many fine distinct strong brown

textured subsoil. Slope ranges from 0 to 25 percent, but is dominantly 0 to 16 percent.

Tunkhannock soils are in a drainage sequence with the moderately well drained Castile soils, the somewhat poorly drained Red Hook soils, and the poorly drained to very poorly drained Atherton soils. They are redder than Chenango, Hoosic, and Haven soils that also formed in outwash deposits. Tunkhannock soils contain more silt and less sand in the solum than Hoosic soils. They have more coarse fragments in the solum than Haven soils

The C horizon is stratified gravel and sand to very gravelly loamy sand and gravelly sandy loam. Silty clay loam or silty clay is below a depth of 3-1/2 to 6 feet in some pedons.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. Structure is weak or moderate granular.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Texture is silt loam or very fine sandy loam. This horizon has weak or moderate

B23—29 to 40 inches; brown (7.5YR 5/4) gravelly loam; weak fine and medium subangular blocky structure; friable; common fine roots; common fine and medium pores; 35 percent coarse fragments; strongly acid; gradual wavy boundary.

IIC—40 to 65 inches; dark brown (7.5YR 4/4) very gravelly sandy loam; massive; firm; few fine roots; many fine pores; 50 percent gravel; strongly acid.

The solum ranges from 32 to 65 inches in thickness. Depth to bedrock is more than 5 feet and commonly 10 to 30 feet. Rock fragments range from 15 to 35 percent, by volume, in the A horizon and upper part of the B2 horizon and from 20 to 35 percent in the lower part of the B horizon. Layers that have 35 to 70 percent rock fragments, by volume, are common in the C horizon.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma 2 or 3. The fine earth is loam or silt loam. Reaction, in unlimed areas, is very strongly acid or strongly acid.

The B horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 3 to 6. The fine earth is fine sandy loam to silt loam. Structure is weak or moderate granular or subangular blocky. Consistence is very friable or friable. Reaction is very strongly acid to medium acid.

The C horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 2 to 4. The fine earth is fine sandy loam to loam, but pockets or thin layers of loamy sand are in this horizon in a few pedons. This horizon is massive or has platy structure. Consistence is friable or firm. Reaction is strongly acid to neutral.

Volusia series

The Volusia series consists of fine-loamy, mixed, mesic Aeric Fragiaquepts. These soils are deep, somewhat poorly drained, and nearly level to sloping. They are on glacial till plains. These soils formed in glacial till derived mainly from shale, siltstone, and sandstone. A dense fragipan that restricts rooting is at a depth of 15 to 20 inches. These soils have a medium textured subsoil. Slope ranges from 0 to 15 percent, but is dominantly 0 to 8 percent.

Volusia soils are in a drainage sequence with the well drained Bath soils, the moderately well drained Mardin soils, and the poorly drained and very poorly drained Lyons soils. They are similar in drainage to Morris and Scriba soils that formed in glacial till, but have a higher clay content above the fragipan than these soils. Volusia soils are not so red as Morris soils.

Typical pedon of Volusia gravelly silt loam, 3 to 8 percent slopes, in the town of Marlboro, 660 feet north along Lattintown Road from its intersection with Mt. Zion Road and 2,560 feet west, in apple orchard:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly silt loam; moderate fine and medium granular structure; friable; many fine roots; 20 percent coarse fragments; slightly acid; abrupt smooth boundary.

B2—8 to 15 inches; yellowish brown (10YR 5/4) gravelly silt loam; many medium distinct light brownish gray (2.5Y 6/2) and common fine faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; 20 percent coarse fragments; medium acid; clear smooth boundary.

A'2—15 to 19 inches; light brownish gray (2.5Y 6/2) gravelly silt loam; many medium distinct light olive brown (2.5Y 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine pores; 20 percent coarse fragments; medium acid; clear broken boundary.

B'x—19 to 58 inches; olive brown (2.5Y 4/4) gravelly silt loam; moderate very coarse prismatic structure parting to weak medium and coarse subangular blocky; very firm, brittle; thin clay films in common fine vesicular pores; prisms are separated by light brownish gray (10YR 6/2) streaks with strong brown (7.5YR 5/8) borders; many dark brown (10YR 3/3) oxide stains; 30 percent coarse fragments; slightly acid; diffuse boundary.

C—58 to 70 inches; olive brown (2.5Y 4/4) gravelly silt loam; massive; firm; many dark brown (10YR 3/3) oxide stains; many fine vesicular pores; 30 percent fragments; neutral.

Depth to bedrock is more than 5 feet. The solum ranges from 40 to 72 inches in thickness. Depth to the top of the fragipan ranges from 15 to 20 inches. Rock fragments, mainly gravel, range from 10 to 30 percent, by volume, above the fragipan and from 20 to 45 percent in the fragipan and C horizon. Reaction, in unlimed areas, generally increases as depth increases. It is very strongly acid or strongly acid in the Ap horizon, very strongly acid to medium acid in the B2 horizon, and strongly acid to mildly alkaline in the fragipan and C horizon.

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. Structure is weak or moderate, fine or medium granular.

The B2 horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 2 to 4. The fine earth is loam or silt loam. Structure is weak or moderate, fine to coarse subangular blocky. Consistence is friable or firm.

The A'2 horizon is absent in some profiles. It has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2. The fine earth is loam or silt loam. Structure is weak platy or subangular blocky. Consistence is friable or firm.

The Bx horizon has hue of 10YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4 and has few to many mottles in some pedons. The fine earth is loam or silt loam. Consistence is very firm or firm, and brittle.

The C horizon has hue of 10YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4. It has platy structure or is massive.

Walpole series

The Walpole series consists of sandy, mixed, mesic Aeric Haplaquepts. These soils are deep, somewhat poorly drained, and nearly level. They are on deltas and outwash terraces. These soils formed in water-sorted sandy sediment. They dominantly have a moderately coarse textured subsoil. Slope ranges from 0 to 2 per-

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2. A thin A2 horizon is below the A1 horizon in some undisturbed areas.

The B2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3 and has distinct or prominent mottles. Texture is fine sandy loam or sandy loam and thin individual subhorizons of loam. Structure is weak or very weak granular, or subangular blocky. Some subhorizons are massive. Consistence is very friable or friable.

The B3 horizon has colors similar to the B2 horizon. Texture is fine sandy loam to sandy loam with occasional lenses of loamy fine sand. This horizon is massive or

blocky; slightly sticky, plastic; few fine roots; few fine pores; strongly acid; clear wavy boundary.

Cg—24 to 50 inches; gray (5Y 5/1) silt loam; many medium and fine prominent yellowish brown (10YR 5/4) mottles, few below 40 inches; massive; slightly sticky; few fine pores; medium acid in the upper 6 inches, slightly acid at 40 inches.

The solum ranges from 20 to 29 inches in thickness. [illegible] few fine roots; few fine pores; 25 percent coarse

B21—9 to 16 inches; yellowish red (5YR 4/6) flaggy silt loam; moderate fine and medium subangular blocky structure; friable; common fine roots; common fine pores; 20 percent coarse fragments; strongly acid; clear wavy boundary.

B22—16 to 21 inches; brown (7.5YR 5/4) gravelly loam; many medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; firm;

is at a depth of 15 to 24 inches. These soils have a medium textured subsoil. Slope ranges from 0 to 8 percent, but is dominantly 2 to 8 percent.

Williamson soils are closely associated with the somewhat poorly drained Bayboro soils and the poorly

The Ap horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. Reaction, in unlimed areas, is very strongly acid to medium acid.

The B2 horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 3 to 6. Texture is silt loam or very fine

friable; few fine roots; common fine pores; 20 percent coarse fragments; medium acid; clear wavy boundary.

B'x1—19 to 36 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam with pockets of gravelly loam; many medium and coarse faint brown (10YR 5/3) mottles; moderate very coarse prismatic structure parting to thick platy; very firm, brittle; very few fine roots along faces of prisms; thin clay films in many fine vesicular pores; prisms are separated by light brownish gray (2.5Y 6/2) streaks with brown (10YR 4/3) borders; 25 percent coarse fragments; medium acid; diffuse wavy boundary.

B'x2—36 to 56 inches; dark brown (7.5YR 4/4) gravelly loam; massive; very firm, brittle; thin continuous clay films in many fine vesicular pores; 25 percent coarse fragments; medium acid.

The solum ranges from 40 to 70 inches in thickness. Depth to bedrock is more than 5 feet. Depth to fragipan ranges from 17 to 28 inches. Rock fragments are angular or subrounded sandstone, conglomerate, or quartzite. They range from 10 to 35 percent, by volume, in individual horizons above the fragipan and from 15 to 60 percent in the Bx and C horizons. Reaction, in unlimed areas, is very strongly acid to medium acid.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A1 horizon has hue of 10YR, value of 2 to 4, and chroma of 1 to 3. A thin A2 horizon is present in some undisturbed pedons.

The B2 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6 and has mottles in the lower part of some pedons. The fine earth is fine sandy loam, sandy loam, or loam. Structure is weak or moderate granular or blocky.

The A'2 horizon is absent in some pedons. It has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The fine earth is fine sandy loam, sandy loam, or loam.

The B'x horizon has hue of 5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 6. The fine earth is fine sandy loam, sandy loam, or loam. It has weak or moderate, very coarse prismatic structure with platy, subangular blocky, or massive interiors. Consistence is firm or very firm and slightly brittle to very brittle.

Formation and classification of the soils

The first part of this section discusses the factors of soil formation, relates them to the formation of soils in the survey area, and explains the processes of soil formation. The second part defines the categories in the system of soil classification and shows where the soils in Ulster County are placed in the system.

Factors of soil formation

Soils formed through the interaction of five major factors. They are parent material, climate, plant and animal life, relief, and time. The relative influence of each factor generally varies from place to place. Local variations in soils are largely due to differences in kind of parent material, relief, and drainage. Although these factors are interrelated, in places one factor can be dominant in the formation of a soil and determine most of the properties of that soil.

Parent material

Parent material is the unconsolidated mass in which soils formed or are forming. It determines the mineralogical composition and contributes largely to the chemical composition of the soil. It also greatly influences the soil colors and rate at which soil-forming processes take place.

In Ulster County, soils formed in glacial till, glaciofluvial deposits (outwash), glaciolacustrine sediment, recent stream alluvium, and organic materials. Table 18 shows the relationship between soil series and their position, parent material, and drainage. Most of the soil materials were left after the glaciers melted about 14,000 years ago. Alluvial and organic materials are of recent origin and currently are being deposited.

Soils that formed in glacial till are the most extensive and have a wide range in characteristics. Much mixing of these soil-forming materials has taken place as a result of glaciation. Most of the till deposits have as a dominant component the fragments and soil material of the bedrock that underlies the till mass (fig. 12). Firm substrata and a fragipan in the subsoil are common in the deeper soils. Bath, Mardin, and Volusia soils formed in deep glacial till.

Soils that formed in glaciofluvial outwash deposits and other water-sorted sediments are generally loamy or sandy. They commonly are underlain by stratified sand and gravel or by sand with some gravel. Chenango, Hoosic, and Tunkhannock soils are examples of those soils underlain by stratified sand and gravel. Plainfield and Riverhead soils are dominantly underlain by sand.

Soils that formed in glaciolacustrine sediment have a medium textured or moderately fine textured and fine textured subsoil. Hudson and Schoharie soils are examples of soils that have a moderately fine textured and fine textured subsoil. Unadilla, Williamson, Scio, Raynham, and Canandaigua soils have a medium textured subsoil.

Soils on flood plains formed in water-laid materials called recent alluvium. They are medium textured, moderately coarse textured, or coarse textured and show little profile development. Examples are Tioga and Middlebury soils.

Soils that formed in organic materials are Carlisle, Palms, and Palms, bedrock variant, soils.

Though most of the soils in the county formed in just one type of glacial deposit, two soils formed in contrasting layers of lakebed (lacustrine) sediment and till. These are the Cayuga and Churchville soils that formed in la-

microbiology of the soil is often changed by continued use of lime, fertilizer, and pesticides.

Relief

The shape of the land surface, the slope, and the position of the land surface to the underlying water table

These soils are deep to bedrock and have distinct hori-

FAMILY. Families are established within a subgroup on

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.

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 40 or 80 inches (1 or 2 meters).

Cutbanks cave. Unstable walls of cuts made by earthmoving equipment. The soil sloughs easily.

Depth to rock. Bedrock at a depth that adversely affects 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 for 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, as for example in "hillpeats" and "climatic moors."

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by running 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 a bare surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake. The rapid movement of water into the soil.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable ac-

Glacial till (geology). Unassorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks 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 from which the solum is presumed to have 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.

Hummocky. Refers to a landscape of hillocks, separated by low sags, having sharply rounded tops and steep sides. Hummocky relief resembles rolling or undulating relief, but the tops of ridges are narrower and the sides are shorter and less even.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material dominantly of silt-sized

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Munsell notation. A designation of color by degrees of the three single 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.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by water that originated mainly from the melting of glacial ice. Glacial outwash is commonly in valleys on landforms known as valley trains, outwash terraces, eskers, kame terraces, kames, outwash fans, or deltas.

Outwash plain. A land form of mainly sandy or coarse

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture.

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.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the 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 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characteristic that affects management. These differences are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can

cause it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can

the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining 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, to provide protection from soil blowing 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 soil. 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 or management.

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 it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage does [illegible]

loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

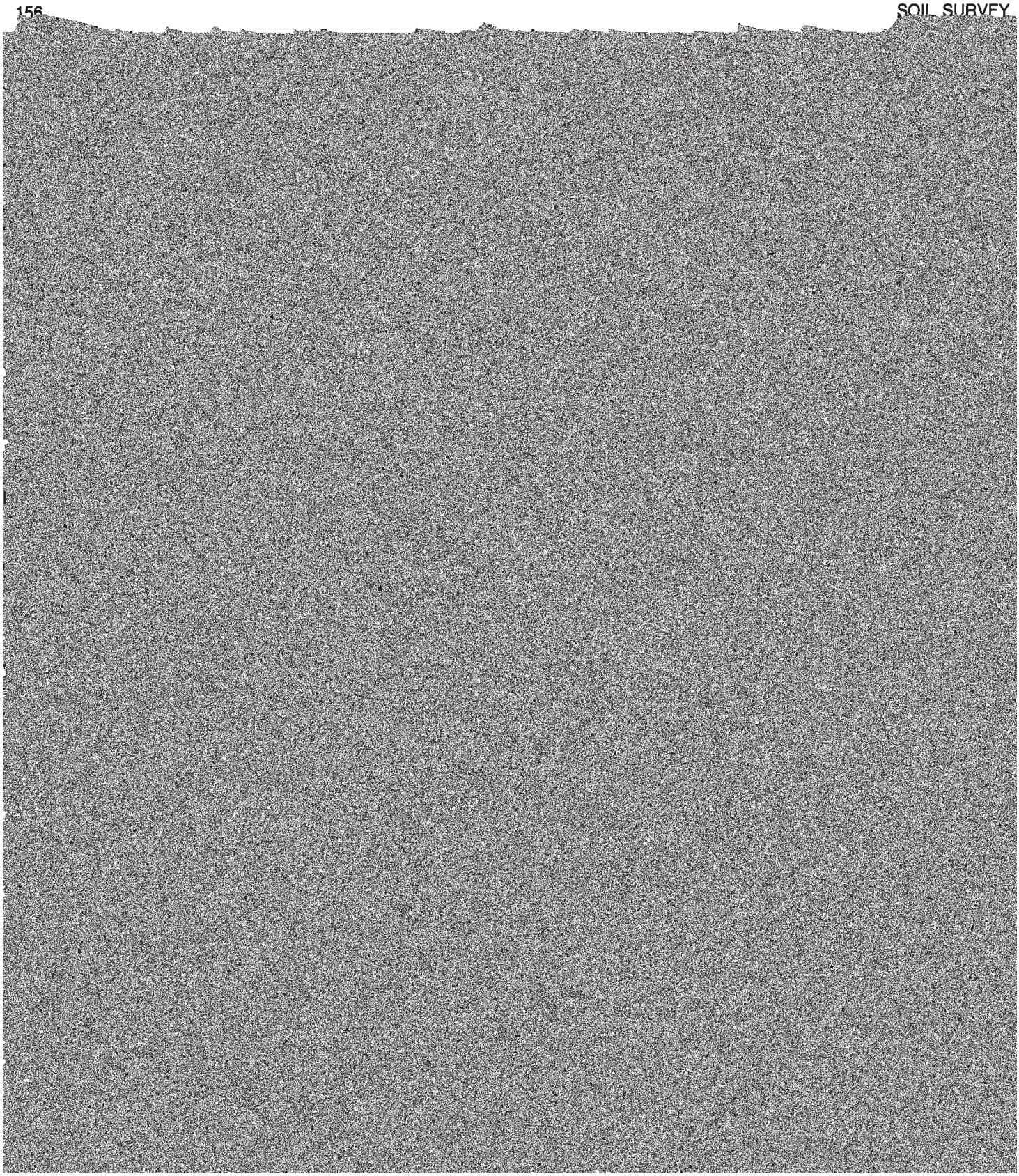
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the

ILLUSTRATIONS



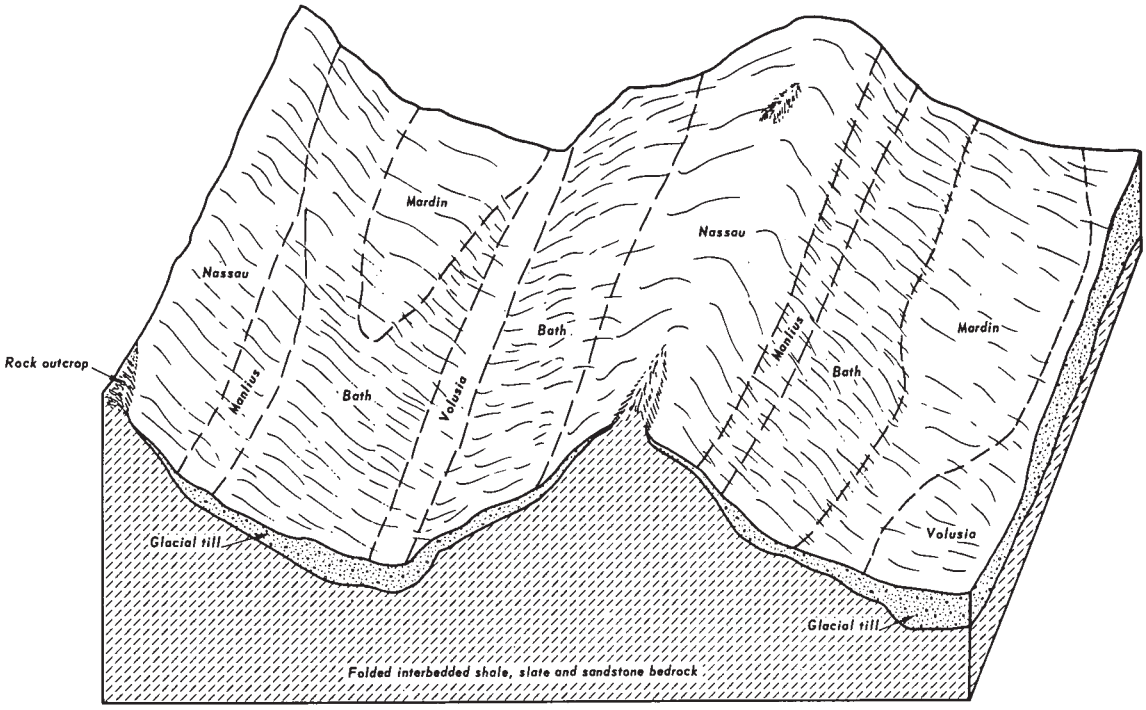


Figure 2.—Typical relationship of soils and underlying material in Bath-Nassau map unit.

Figure 3.—Undercutting of streambanks in Barbour loam is a hazard and produces a large volume of sediment.

Figure 4.—An abandoned asphalt road on Carlisle muck. This soil has low strength. Adequate precautions should be taken in road construction.

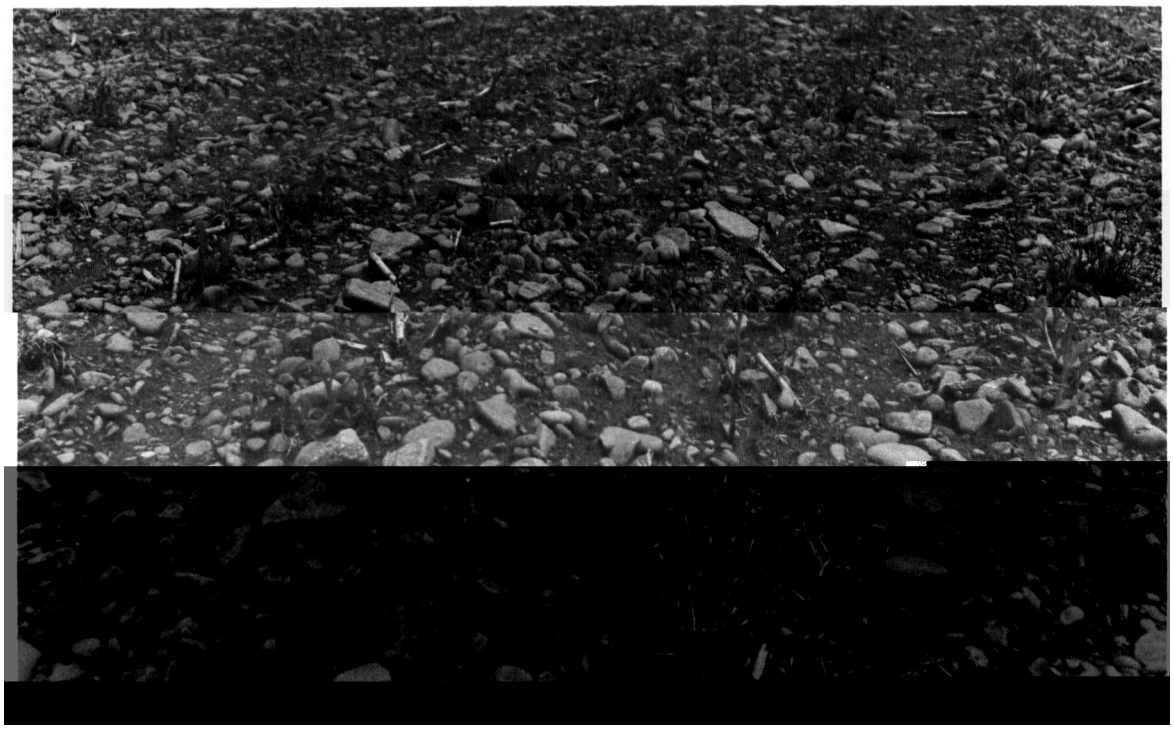


Figure 5.—An area of Hoosic cobbly loam, 0 to 3 percent slopes, showing cobblestones that make cultivation difficult.

Figure 6.—An area of extremely bouldery Lackawanna and Swartswood soils. These soils are suited to woodland and wildlife habitat.

Figure 7.—Corn on Riverhead fine sandy loam, 0 to 3 percent slopes. This soil is well suited to the production of corn.

Figure 8.—Floodwater damage on Tioga fine sandy loam.

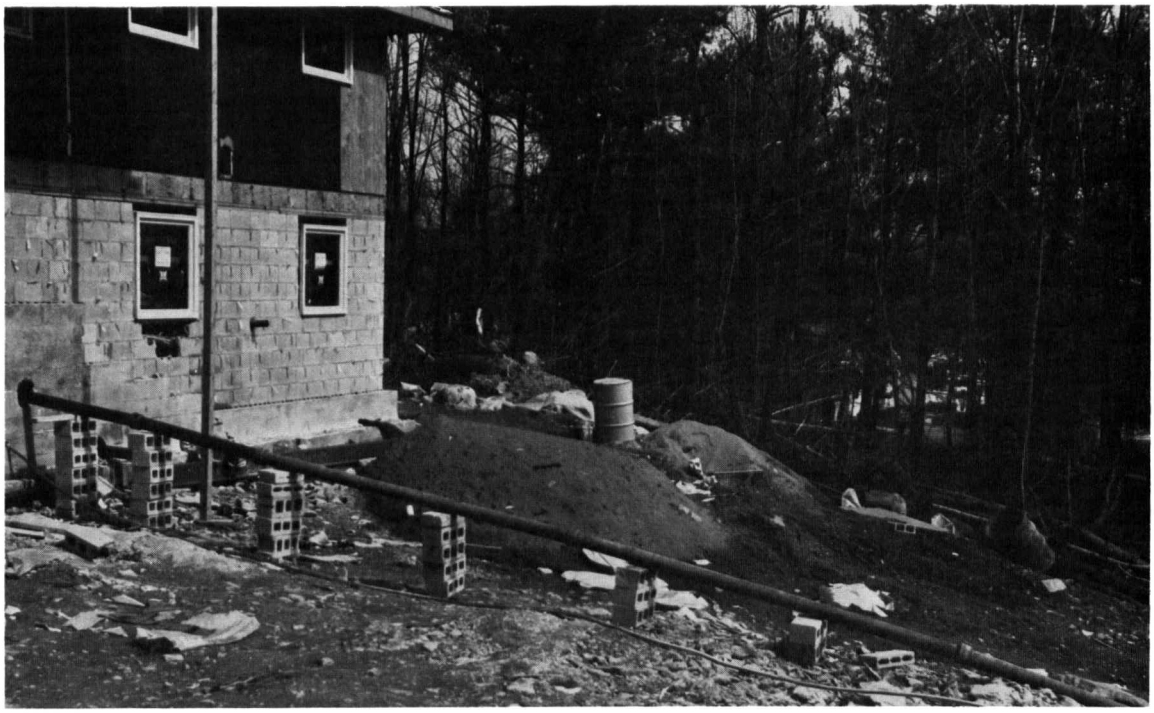


Figure 9.—A dwelling constructed on a Farmington soil. Where bedrock is shallow, a large amount of fill is required to cover utility lines.

Figure 10.—Dwellings constructed on Tioga soils are subject to occasional flooding.

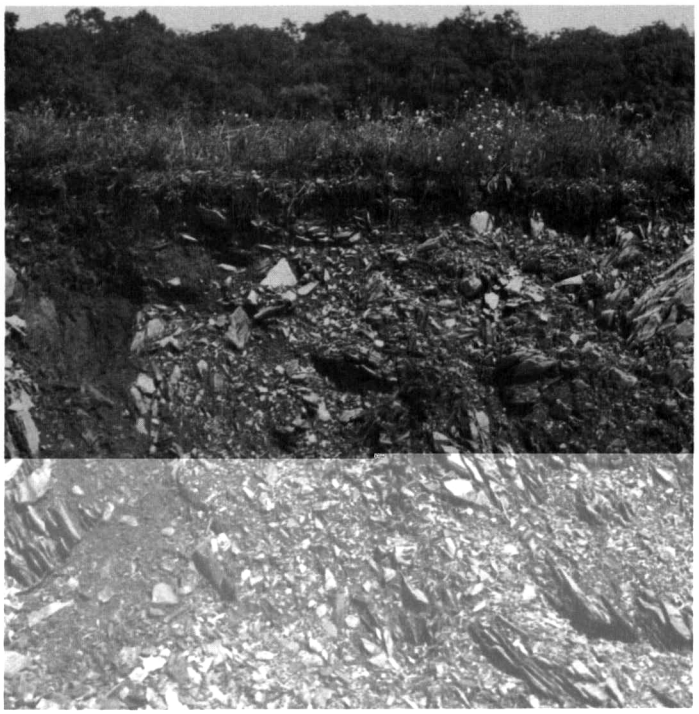


Figure 11.—Nassau soils have tilted bedrock at a shallow depth.

Figure 12.—Rock fragments are common in soils formed in glacial till.

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation[1]				
	Average daily maximum	Average daily minimum	Average	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[2]	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----	31.6	17.3	24.4	55	-7	6	3.11	1.74	4.22	7	14.3
February---	34.1	18.3	26.2	54	-7	0	3.40	2.24	4.45	6	16.0
March------	42.1	26.0	34.1	66	6	24	3.79	2.57	4.90	8	14.5
April------	56.6	37.1	46.9	81	20	229	4.39	2.81	5.82	8	4.5
May--------	67.1	47.8	57.5	86	31	543	3.95	1.98	5.56	8	.1
June-------	74.6	57.6	66.1	89	44	783	3.76	2.02	5.17	7	.0
July-------	78.8	62.7	70.7	91	50	952	4.18	1.80	6.11	7	.0
August-----	77.0	61.1	69.1	89	48	902	4.12	1.87	5.94	7	.0
September--	70.0	54.2	62.1	87	37	663	4.00	2.12	5.53	6	.0
October----	60.3	44.6	52.5	79	26	388	3.85	1.52	5.73	5	.4
November---	47.2	33.7	40.4	68	12	100	4.19	2.75	5.50	8	4.3
December---	34.8	22.2	28.5	59	-2	17	4.24	2.50	5.79	8	13.9
Year-----	56.2	40.2	48.2	93	-10	4,607	46.98	39.52	54.11	85	68.0

[1]Recorded in the period 1951-75 at Mohonk Lake, N.Y.

[2]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 (40°F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24°F or lower	28°F or lower	32°F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 15	April 29	May 11
2 years in 10 later than--	April 11	April 24	May 5
5 years in 10 later than--	April 3	April 13	April 24
First freezing temperature in fall:			
1 year in 10 earlier than--	October 28	October 16	October 6
2 years in 10 earlier than--	November 2	October 21	October 11
5 years in 10 earlier than--	November 13	October 31	October 21

[1]Recorded in the period 1951-75 at Mohonk Lake, N.Y.

TABLE 3.--GROWING SEASON LENGTH

Probability	Daily minimum temperature during growing season[1]		
	Higher than 24°F	Higher than 28°F	Higher than 32°F
	Days	Days	Days
9 years in 10	204	179	155
8 years in 10	211	186	163
5 years in 10	223	201	179
2 years in 10	236	215	194
1 year in 10	243	222	202

[1]Recorded in the period 1951-75 at Mohonk Lake, N.Y.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AA	Alluvial land	5,246	0.7
AcB	Arnot channery silt loam, 0 to 8 percent slopes	4,556	0.6
ARD	Arnot-Lordstown-Rock outcrop complex, moderately steep	23,639	3.2
ARF	Arnot-Oquaga-Rock outcrop complex, very steep	100,698	13.8
At	Atherton silt loam	3,605	0.5
[illegible]	[illegible]	1,401	0.2

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
PlB	Plainfield loamy sand, 0 to 8 percent slopes	2,727	0.4
PlC	Plainfield loamy sand, 8 to 15 percent slopes	805	0.1
PmD	Plainfield-Riverhead complex, moderately steep	1,012	0.1
PmF	Plainfield-Riverhead complex, very steep	1,179	0.2
PrC	Plainfield-Rock outcrop complex, rolling	3,271	0.4
Pt	Pompton fine sandy loam	863	0.1
Ra	Raynham silt loam	4,598	0.6
Re	Red Hook gravelly silt loam	2,587	0.4
RhA	Rhinebeck silt loam, 0 to 3 percent slopes	4,130	0.6
RhB	Rhinebeck silt loam, 3 to 8 percent slopes	2,090	0.3
RvA	Riverhead fine sandy loam, 0 to 3 percent slopes	3,114	0.4
RvB	Riverhead fine sandy loam, 3 to 8 percent slopes	2,675	0.4
RvC	Riverhead fine sandy loam, 8 to 15 percent slopes	798	0.1
RXC	Rock outcrop-Arnot complex, sloping	8,867	1.2
RXE	Rock outcrop-Arnot complex, steep	11,187	1.5
RXF	Rock outcrop-Arnot complex, very steep	31,258	4.3
SaB	Schoharie silt loam, 3 to 8 percent slopes	2,145	0.3
SaC	Schoharie silt loam, 8 to 15 percent slopes	2,013	0.3
Sc	Scio silt loam	1,034	0.1
SdB	Scriba and Morris soils, 0 to 8 percent slopes	439	0.1
SEB	Scriba and Morris very bouldery soils, gently sloping	8,927	1.2
SGB	Scriba and Morris extremely bouldery soils, gently sloping	2,720	0.4
SmB	Stockbridge-Farmington gravelly silt loams, 3 to 8 percent slope	1,441	0.2
SmC	Stockbridge-Farmington gravelly silt loams, 8 to 15 percent slopes	693	0.1
STD	Stockbridge-Farmington-Rock outcrop complex, hilly	5,916	0.8
Su	Suncook loamy fine sand	2,531	0.3
SwB	Swartswood stony fine sandy loam, 3 to 8 percent slopes	424	0.1
SwC	Swartswood stony fine sandy loam, 8 to 15 percent slopes	238	(1)
Te	Teel silt loam	1,093	0.2
Tg	Tioga fine sandy loam	1,695	0.2
TkA	Tunkhannock gravelly loam, 0 to 3 percent slopes	951	0.1
TkB	Tunkhannock gravelly loam, 3 to 8 percent slopes	1,927	0.3
TkC	Tunkhannock gravelly loam, rolling	1,251	0.2
TuB	Tunkhannock gravelly loam, clayey substratum, 3 to 8 percent slopes	165	(1)
TuC	Tunkhannock gravelly loam, clayey substratum, 8 to 15 percent slopes	229	(1)
TuD	Tunkhannock gravelly loam, clayey substratum, 15 to 25 percent slopes	118	(1)
Un	Unadilla silt loam	4,944	0.7
VAB	Valois very bouldery soils, gently sloping	8,566	1.2

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 is generally not grown on the soil]

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

[illegible]

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Corn	Corn silage	Sweet corn	Grass-legume hay	Pasture	Apples
	Ton	Bu	Ton	Ton	Ton	AUM[1]	Box
Lm---------- Lamson	---	---	17	---	2.5	5.5	---
LnB---------- Lordstown	3.5	85	17	---	3.0	6.0	---
[2]LOC---------- Lordstown-Arnot-Rock outcrop	---	---	---	---	---	3.0	---
[2]LY---------- Lyons-Atherton	---	---	---	---	---	---	---
Ma---------- Madalin	---	---	12	---	2.5	5.0	---
MdB---------- Mardin	2.5	85	18	3.5	3.0	6.5	400
[2]MgB---------- Mardin-Nassau	2.0	---	16	---	3.0	6.0	350
Mn, MO---------- Menlo	---	---	---	---	---	3.0	---
Mr---------- Middlebury	4.0	100	20	5.0	4.0	7.5	---
[2]MTB---------- Morris-Tuller	---	---	---	---	---	2.0	---
[2]NBF---------- Nassau-Bath-Rock outcrop	---	---	---	---	---	---	---
[2]NMC---------- Nassau-Manlius	---	---	---	---	2.5	5.0	---
[2]NNF---------- Nassau-Manlius	---	---	---	---	---	---	---
[2]NOD---------- Nassau-Rock outcrop	---	---	---	---	---	2.0	---
OdA---------- Odessa	---	---	17	---	3.0	5.5	---
OdB---------- Odessa	---	---	17	---	3.0	5.5	---
OgB---------- Oquaga	3.5	---	17	---	3.0	6.0	---
[2]OlC---------- Oquaga and Lordstown	3.5	---	15	---	3.0	6.0	---
[2]ORC---------- Oquaga-Arnot-Rock outcrop	---	---	---	---	---	---	---
[2]ORD---------- Oquaga-Arnot-Rock outcrop	---	---	---	---	---	---	---
Pa---------- Palms	---	---	---	---	---	---	---
Pb---------- Palms bedrock Variant	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Corn	Corn silage	Sweet corn	Grass-legume hay	Pasture	Apples
	Ton	Bu	Ton	Ton	Ton	AUM[1]	Box
PlB---------- Plainfield	3.5	---	10	3.5	2.5	3.5	---
PlC---------- Plainfield	3.0	---	---	---	1.7	3.0	---
[2]PmD---------- Plainfield-Riverhead	---	---	---	---	1.5	3.0	---
[2]PmF---------- Plainfield-Riverhead	---	---	---	---	---	---	---
[2]PrC---------- Plainfield-Rock outcrop	---	---	---	---	---	2.5	---
Pt---------- Pompton	3.0	100	20	4.5	3.0	6.0	350
Ra---------- Raynham	---	90	18	5.0	3.0	5.5	200
Re---------- Red Hook	---	85	17	---	3.0	5.5	200
RhA, RhB---------- Rhinebeck	---	---	17	---	3.0	5.5	---
RvA, RvB---------- Riverhead	4.0	105	20	4.5	3.0	5.5	350
RvC---------- Riverhead	4.0	95	18	4.0	3.0	5.5	350
[2]RXC---------- Rock outcrop-Arnot	---	---	---	---	---	1.5	---
[2]RxE, [2]RxF---------- Rock outcrop-Arnot	---	---	---	---	---	---	---
SaB---------- Schoharie	3.0	85	20	---	3.5	6.5	---
SaC---------- Schoharie	3.0	75	18	---	3.5	6.0	---
Sc---------- Scio	4.0	110	22	5.0	4.0	7.5	---
[2]SdB---------- Scriba and Morris	---	---	---	---	3.0	5.5	---
[2]SEB---------- Scriba and Morris	---	---	---	---	---	---	---
[2]SGB---------- Scriba and Morris	---	---	---	---	---	---	---
[2]SmB---------- Stockbridge-Farmington	4.0	---	18	---	3.5	6.5	400
[2]SmC---------- Stockbridge-Farmington	4.0	---	16	---	3.0	6.0	400
[2]STD---------- Stockbridge-Farmington-Rock outcrop	---	---	---	---	---	4.0	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Corn	Corn silage	Sweet corn	Grass-legume hay	Pasture	Apples
	Ton	Bu	Ton	Ton	Ton	AUM[1]	Box
Su---------- Suncook	3.5	---	10	3.5	2.5	3.5	---
SwB---------- Swartswood	---	---	19	---	3.5	6.5	---
SwC---------- Swartswood	---	---	17	---	3.5	6.0	---
Te---------- Teel	4.0	100	20	5.0	4.0	7.5	---
Tg---------- Tioga	5.0	130	26	6.0	4.5	8.5	---
TkA, TkB---------- Tunkhannock	4.0	90	18	---	3.5	6.0	---
TkC---------- Tunkhannock	3.5	75	15	---	3.0	5.5	---
TuB---------- Tunkhannock	4.0	90	18	---	3.5	6.0	---
TuC---------- Tunkhannock	3.5	75	15	---	3.0	5.5	---
TuD---------- Tunkhannock	---	---	---	---	2.5	5.0	---
Un---------- Unadilla	5.5	150	30	7.0	4.5	8.5	---
[2]VAB, [2]VAD---------- Valois	---	---	---	---	---	2.0	---
VoA---------- Volusia	---	75	15	---	3.0	5.5	200
VoB---------- Volusia	---	80	16	---	3.0	5.5	200
VoC---------- Volusia	---	70	14	---	3.0	5.5	250
VSB---------- Volusia	---	---	---	---	---	2.0	---
Wa---------- Walpole	---	85	17	---	3.0	5.5	200
Wb---------- Wayland	---	85	17	---	3.0	5.5	---
Wc---------- Wayland	---	---	---	---	---	3.0	---
WeB---------- Wellsboro	---	---	---	---	3.0	6.5	---
WeC---------- Wellsboro	---	---	---	---	3.0	6.5	---
[2]WLB---------- Wellsboro and Wurtsboro	---	---	---	---	---	2.0	---
[2]WOB---------- Wellsboro and Wurtsboro	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Alfalfa hay	Corn	Corn silage	Sweet corn	Grass-legume hay	Pasture	Apples
	Ton	Bu	Ton	Ton	Ton	AUM[1]	Box
WsA---------- Williamson	3.0	95	19	5.0	3.0	7.0	300
WsB---------- Williamson	3.0	95	19	5.0	3.0	7.0	350
WuB---------- Wurtsboro	---	---	17	---	3.0	6.5	---

[1]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 a period of 30 days.

[2]This map unit is made up of two or more dominant kinds of soil. See description of the map unit for

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	6,446	---	---	---
II	45,290	20,103	10,304	14,883
III	103,526	35,030	52,621	15,875
IV	49,947	30,284	10,154	9,509
V	5,246	---	5,246	---
VI	156,981	---	---	156,981
VII	300,462	5,185	270	295,007
VIII	51,942	---	630	51,312

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Areas of Rock outcrop are too variable to be estimated]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
AcB---------- Arnot	5d	Slight	Slight	Severe	Moderate	Northern red oak----	55	Eastern white pine, red pine, Scotch pine, European larch.
						Sugar maple---------	50	
						Eastern white pine--	55	
						White ash----------	60	
[1]ARD:								
Arnot----------	5d	Slight	Moderate	Severe	Moderate	Northern red oak----	55	Eastern white pine, red pine, Scotch pine, European larch.
						Sugar maple---------	50	
						Eastern white pine--	55	
						White ash----------	60	
Lordstown---------	3r	Slight	Moderate	Slight	Slight	Northern red oak----	65	Eastern white pine, European larch, black cherry, red pine, Norway spruce.
						Sugar maple---------	60	
						White ash----------	60	
Rock outcrop.								
[1]ARF:								
Arnot----------	5d	Moderate	Severe	Severe	Moderate	Northern red oak----	55	Eastern white pine, red pine, Scotch pine, European larch.
						Sugar maple---------	50	
						Eastern white pine--	55	
						White ash----------	60	
Oquaga----------	3r	Moderate	Severe	Slight	Slight	Sugar maple---------	65	Eastern white pine, red pine, European larch, Norway spruce, black cherry.
						Northern red oak----	71	
						Black cherry--------	72	
						Eastern white pine--	75	
Rock outcrop.								
At---------- Atherton	4w	Slight	Severe	Severe	Severe	Eastern white pine--	65	Northern white-cedar.
Ba---------- Barbour	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, Norway spruce, black walnut.
						Northern red oak----	80	
Be---------- Basher	2o	Slight	Slight	Slight	Slight	Sugar maple---------	70	Eastern white pine, black walnut, Norway spruce, European larch.
						Northern red oak----	80	
						American basswood---	80	
BgC---------- Bath	3o	Slight	Slight	Slight	Slight	Northern red oak----	65	Eastern white pine, red pine, Norway spruce, European larch.
						Black cherry--------	75	
						Sugar maple---------	70	
BgD---------- Bath	3r	Slight	Moderate	Slight	Slight	Northern red oak----	61	Eastern white pine, red pine, Norway spruce, European larch.
						Black cherry--------	75	
						Sugar maple---------	70	
[1]BHE---------- Bath	3r	Moderate	Severe	Slight	Slight	Northern red oak----	65	Eastern white pine, red pine,
						Black cherry--------	75	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
[1]BnC:								
Bath	3r	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Sugar maple	65 75 70	Eastern white pine, red pine, Norway spruce, European larch.
Nassau	5d	Slight	Moderate	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	Eastern white pine, red pine, European larch.
[1]BOD:								
Bath	3r	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Sugar maple	65 75 70	Eastern white pine, red pine, Norway spruce, European larch.
Nassau	5d	Slight	Moderate	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	Eastern white pine, red pine, European larch.
Rock outcrop.								
[1]BRC:								
Bath	3o	Slight	Slight	Slight	Slight	Northern red oak Black cherry Sugar maple	65 75 70	Eastern white pine, red pine, Norway spruce, European larch.
Mardin	3o	Slight	Slight	Slight	Slight	Sugar maple Northern red oak Black cherry	60 63 75	Red pine, European larch, Norway spruce, eastern white pine.
CaB, CaC Cambridge	2o	Slight	Slight	Slight	Slight	Northern red oak White ash Sugar maple Yellow-poplar	85 82 70 85	Eastern white pine, yellow-poplar, black cherry, European larch, Norway spruce.
Cc, Cd Canandaigua	4w	Slight	Severe	Severe	Severe	Red maple Eastern white pine	65 65	Northern white-cedar, white spruce.
Ce	5w	Slight	Severe	Severe	Severe	Red maple	46	Northern white-cedar,

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
CvA, CvB---------- Churchville	3w	Slight	Moderate	Slight	Moderate	Sugar maple--------- Eastern white pine-- Northern red oak----	60 75 70	Eastern white pine, Norway spruce.
[1]FAE:								
Farmington--------	5d	Severe	Severe	Severe	Moderate	Sugar maple--------- Northern red oak---- Eastern white pine--	50 50 55	Eastern white pine, red pine, European larch.
Rock outcrop.								
Ha---------- Hamlin	2o	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple---------	80 70	Eastern white pine, black locust, Norway spruce, black walnut, European larch.
He---------- Haven	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---- Sugar maple--------- Red pine----------	75 55 65 75	Eastern white pine, red pine, Norway spruce, European larch.
HfA, HgA, HgB, HgC- Hoosic	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak----	65 75	Eastern white pine, red pine, European larch.
HgD---------- Hoosic	3r	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak----	65 75	Eastern white pine, red pine, European larch.
[1]HSF---------- Hoosic	3r	Moderate	Severe	Slight	Slight	Sugar maple--------- Northern red oak----	65 75	Eastern white pine, red pine, European larch.
HuB---------- Hudson	20	Slight	Slight	Slight	Slight	Northern red oak---- Sugar maple---------	80 70	Eastern white pine, yellow-poplar, black cherry, black walnut.
HuC---------- Hudson	2r	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple---------	80 70	Eastern white pine, yellow-poplar, black cherry, black walnut.
[1]HvC3:								
Hudson----------	2r	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple---------	80 70	Eastern white pine, yellow-poplar, black cherry, black walnut.
Schoharie---------	2r	Moderate	Slight	Slight	Slight	Northern red oak---- Sugar maple---------	70 80	Eastern white pine, yellow-poplar, black cherry, black walnut.
[1]HwD:								
Hudson----------	2r	Severe	Moderate	Slight	Slight	Northern red oak---- Sugar maple---------	80 70	Eastern white pine, yellow-poplar, black cherry, black walnut.
Schoharie---------	2r	Severe	Moderate	Slight	Slight	Northern red oak---- Sugar maple---------	70 80	Eastern white pine, yellow-poplar, black cherry, black walnut.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
[1]HXE:								
Hudson	2r	Severe	Severe	Slight	Slight	Northern red oak Sugar maple	80 70	Eastern white pine, yellow-poplar, black cherry, black walnut.
Schoharie	2r	Severe	Severe	Slight	Slight	Northern red oak Sugar maple	70 80	Eastern white pine, yellow-poplar, black cherry, black walnut.
LaB, LaC Lackawanna	3o	Slight	Slight	Slight	Slight	Northern red oak Black cherry Sugar maple White ash	70 75 70 70	Eastern white pine, red pine, Norway spruce, European larch.
[1]LCD:								
Lackawanna	3r	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Sugar maple White ash	70 75 70 70	Eastern white pine, red pine, Norway spruce, European larch.
Swartswood	3r	Slight	Moderate	Slight	Slight	Northern red oak Sugar maple White ash	70 70 70	Red pine, eastern white pine, European larch, Norway spruce.
[1]LCF:								
Lackawanna	3r	Moderate	Severe	Slight	Slight	Northern red oak Black cherry Sugar maple White ash	70 75 70 70	Eastern white pine, red pine, Norway spruce, European larch.
Swartswood.								
[1]LEE:								
Lackawanna	3x	Slight	Moderate	Slight	Slight	Northern red oak Black cherry Sugar maple White ash	70 75 70 70	Eastern white pine, red pine, Norway spruce, European larch.
Swartswood	3x	Slight	Moderate	Slight	Slight	Northern red oak Sugar maple White ash	70 70 70	Red pine, eastern white pine, European larch, Norway spruce.
Lm Lamson	4w	Slight	Severe	Severe	Severe	Eastern white pine Red maple Pin oak Swamp white oak	65 50 70 ---	Northern white-cedar, white spruce.
LnB Lordstown	3o	Slight	Slight	Slight	Slight	Northern red oak Sugar maple White ash	65 60 60	Eastern white pine, European larch, black cherry, red pine, Norway spruce.
[1]LOC:								
Lordstown	3o	Slight	Slight	Slight	Slight	Northern red oak Sugar maple White ash	65 60 60	Eastern white pine, European larch, black cherry, red pine, Norway spruce.
Arnot	5d	Slight	Slight	Severe	Moderate	Northern red oak Sugar maple Eastern white pine White ash	55 50 55 60	Eastern white pine, red pine, Scotch pine, European larch.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limita-	Seedling mortal-	Windthrow	Common trees	Site index	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination	Management concerns				Potential productivity		
		Erosion	Equipment	Seedling	Wind	Common trees	Site	Trees to plant

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
[1]ORD:								
Arnot	5d	Slight	Moderate	Severe	Moderate	Northern red oak	55	Eastern white pine, red pine, Scotch pine, European larch.
						Sugar maple	50	
						Eastern white pine	55	
						White ash	60	
Rock outcrop.								
Pa Palms	5w	Slight	Severe	Severe	Severe	Red maple	51	
						Silver maple	76	
						White ash	51	
						Quaking aspen	56	
						Northern white-cedar	27	
						Tamarack	45	
						Black ash	---	
Pb Palms bedrock Variant	4w	Slight	Severe	Severe	Severe	Red maple	46	
PlB, PlC Plainfield	4s	Slight	Slight	Severe	Slight	Red pine	55	Red pine, eastern white pine.
						Eastern white pine	65	
						Northern pin oak	60	
[1]PmD:								
Plainfield	4s	Moderate	Severe	Moderate	Slight	Red pine	55	Red pine, eastern white pine.
						Eastern white pine	65	
						Northern pin oak	60	
Riverhead	3r	Slight	Moderate	Slight	Slight	Sugar maple	63	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	
						Black cherry	70	
						Eastern white pine	75	
[1]PmF:								
Plainfield	4s	Moderate	Severe	Moderate	Slight	Red pine	55	Red pine, eastern white pine.
						Eastern white pine	65	
						Northern pin oak	60	
Riverhead	3r	Moderate	Severe	Slight	Slight	Sugar maple	63	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	
						Black cherry	---	
[1]PrC:								
Plainfield	4s	Moderate	Severe	Moderate	Slight	Red pine	55	Red pine, eastern white pine.
						Eastern white pine	65	
						Northern pin oak	60	
Rock outcrop.								
Pt Pompton	3o	Slight	Slight	Slight	Slight	White ash	70	Eastern white pine, red pine, European larch.
						White oak	70	
						Northern red oak	70	
Ra Raynham	3w	Slight	Severe	Severe	Severe	Eastern white pine	65	Eastern white pine, white spruce, northern white-cedar.
						White spruce	55	
						Red spruce	45	
Re Red Hook	3w	Slight	Moderate	Moderate	Moderate	Red maple	70	Eastern white pine, Norway spruce.
						Eastern white pine	70	
RhA, RhB Rhinebeck	3w	Slight	Moderate	Slight	Slight	Sugar maple	65	Eastern white pine, Norway spruce, European larch.
						Northern red oak	70	

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
RvA, RvB, RvC------ Riverhead	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak---- Black cherry-------- Eastern white pine--	63 70 70 75	Eastern white pine, Norway spruce, European larch.
[1]RXC: Rock outcrop.								
Arnot----------	5d	Slight	Slight	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash----------	55 50 55 60	Eastern white pine, red pine, Scotch pine, European larch.
[1]RXE: Rock outcrop.								
Arnot----------	5d	Slight	Moderate	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine-- White ash----------	55 50 55 60	Eastern white pine, red pine, Scotch pine, European larch.
[1]RXF: Rock outcrop.								
Arnot----------	5x	Moderate	Severe	Severe	Moderate	Northern red oak---- Sugar maple--------- Eastern white pine--	55 50 55	Eastern white pine, red pine, Scotch pine,

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
Morris	3x	Slight	Moderate	Moderate	Moderate	White ash	71	European larch.
[1]SmB, [1]SmC:								
Stockbridge	3o	Slight	Slight	Slight	Slight	Northern red oak Sugar maple Eastern white pine	70 60 75	Eastern white pine, white spruce, Norway spruce, European larch.
Farmington	5d	Slight	Slight	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	Eastern white pine, red pine, European larch.
[1]STD:								
Stockbridge	3r	Slight	Moderate	Slight	Slight	Northern red oak Sugar maple Eastern white pine	70 60 75	Eastern white pine, white spruce, Norway spruce, European larch.
Farmington	5d	Moderate	Moderate	Severe	Moderate	Sugar maple Northern red oak Eastern white pine	50 50 55	Eastern white pine, red pine, European larch.
Rock outcrop.								
Su Suncook	5s	Slight	Slight	Severe	Slight	Eastern white pine Black oak Northern red oak Red maple	55 50 50 50	Eastern white pine, red pine.
SwB, SwC Swartswood	3o	Slight	Slight	Slight	Slight	Northern red oak Sugar maple White ash	70 70 70	Red pine, eastern white pine, European larch, Norway spruce.
Te Teel	2o	Slight	Slight	Slight	Slight	Sugar maple White ash Eastern white pine American basswood	70 85 85 85	Eastern white pine, Norway spruce, black walnut, European larch.
Tg Tioga	2o	Slight	Slight	Slight	Slight	Northern red oak Yellow poplar	75 85	Eastern white pine, yellow poplar

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
[1]VAB---------- Valois	3o	Slight	Slight	Slight	Slight	Sugar maple--------- Northern red oak----	61 70	Eastern white pine, white spruce, Norway spruce, red pine.
[1]VAD---------- Valois	3r	Slight	Moderate	Slight	Slight	Sugar maple--------- Northern red oak----	61 70	Eastern white pine, white spruce, Norway spruce, red pine.
VoA, VoB, VoC, [1]VoD	3r	Slight	Moderate	Moderate	Moderate	Northern red oak	63	Eastern white pine

TABLE 8.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Areas of Rock outcrop, Alluvial land, and Fresh water marsh are too variable to be estimated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 8.--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
[1]BOD: Rock outcrop.						
[1]BRC:						
Bath	Moderate: slope, large stones, wetness.	Moderate: slope, large stones, frost action.	Moderate: slope, large stones, wetness.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, large stones.
Mardin	Moderate: slope, wetness.	Severe: frost action.	Moderate: wetness, frost action.	Severe: slope, frost action.	Moderate: frost action, slope.	Moderate: large stones.
CaB Cambridge	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Slight.
CaC Cambridge	Severe: slope, wetness.	Moderate: slope, wetness.	Severe: wetness.	Severe: slope.	Moderate: frost action, slope.	Moderate: slope.
[2]Cc, [2]Cd Canandaigua	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness, frost action.	Severe: wetness.
Ce Carlisle	Severe: floods, wetness, excess humus.	Severe: wetness, subsides, floods.	Severe: wetness, subsides, floods.	Severe: wetness, subsides, floods.	Severe: low strength, wetness, floods.	Severe: excess humus, wetness, floods.
CgA Castile	Severe: wetness, small stones.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: frost action.	Moderate: small stones.
CgB Castile	Severe: wetness, small stones.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action.	Moderate: small stones.
CkB Cayuga	Moderate: wetness, too clayey.	Moderate: frost action.	Severe: wetness.	Moderate: slope, frost action.	Moderate: frost action, low strength.	Slight.
CkC Cayuga	Moderate: slope, wetness, too clayey.	Moderate: slope, frost action.	Severe: wetness.	Severe: slope.	Moderate: slope, frost action, low strength.	Moderate: slope.
CnA Chenango	Severe: small stones.	Moderate: frost action.	Slight	Moderate: frost action.	Moderate: frost action.	Moderate: small stones.
CnB Chenango	Severe: small stones.	Moderate: frost action.	Slight	Moderate: slope, frost action.	Moderate: frost action.	Moderate: small stones.
CnC Chenango	Severe: small stones.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, small stones.
CvA, CvB Churchville	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness.
[1]FAE:						
Farmington	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Rock outcrop.						

See footnotes at end of table.

TABLE 8.--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
FW. Fresh water marsh						
Ha---------- Hamlin	Severe: floods.	Severe: floods, frost action.	Severe: floods.	Severe: floods, frost action.	Severe: floods, frost action.	Slight.
[illegible]	Moderate: [illegible]	Moderate: [illegible]	Slight [illegible]	Moderate: [illegible]	Moderate: [illegible]	Slight [illegible]

TABLE 8.--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
[1]LEE:						
Lackawanna-------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.
Swartswood-------	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, wetness, large stones.	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.

TABLE 8.--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
[1]MTB:						
Tuller	Severe: depth to rock, wetness.	Severe: wetness, depth to rock, frost action.	Severe: wetness, depth to rock.	Severe: wetness, depth to rock, frost action.	Severe: depth to rock, wetness, frost action.	Severe: depth to rock, wetness, large stones.
[1]NBF:						
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Bath	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
[1]NMC:						
Nassau	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Manlius	Severe: depth to rock.	Moderate: slope, depth to rock, frost action.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: slope, depth to rock, small stones.
[1]NNF:						
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Manlius	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
[1]NOD:						
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Rock outcrop.						
OdA, OdB Odessa	Severe: wetness, too clayey.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: low strength.	Moderate: wetness.
OgB Oquaga	Severe: depth to rock, small stones.	Moderate: depth to rock, frost action.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, frost action.	Moderate: depth to rock.
[1]OlC:						
Oquaga	Severe: depth to rock, small stones.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, depth to rock.
Lordstown	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, depth to rock, small stones.
[1]ORC:						
Oquaga	Severe: depth to rock, small stones.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock.	Moderate: slope, depth to rock.
Arnot	Severe: depth to rock, small stones.	Severe: depth to rock.	Severe: depth to rock, wetness.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Rock outcrop.						

See footnotes at end of table.

TABLE 8.--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
[1]ORD:						
Oquaga	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
Arnot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.

TABLE 8.--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
RvC---------- Riverhead	Severe: cutbanks cave.	Moderate: slope, frost action.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
[1]RXC: Rock outcrop.						
[illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]

TABLE 8.--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
[1]SmB:						
Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
[1]SmC:						
Stockbridge	Moderate: slope, depth to rock.	Moderate: slope, frost action.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Farmington	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]	Severe: [illegible]

TABLE 8.--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
[1]VAB---------- Valois	Moderate: large stones.	Moderate: large stones, frost action.	Moderate: large stones, wetness.	Moderate: large stones, slope.	Moderate: frost action.	Moderate: large stones.
[1]VAD---------- Valois	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
VoA, VoB---------- Volusia	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: small stones, wetness.
VoC---------- Volusia	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: slope, wetness, frost action.	Severe: frost action.	Moderate: slope, small stones, wetness.
[1]VSB---------- Volusia	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.	Severe: wetness, frost action.	Severe: frost action.	Moderate: wetness, large stones.
Wa---------- Walpole	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.
Wb, Wc---------- Wayland	Severe: wetness, floods.	Severe: floods, wetness, frost action.	Severe: floods, wetness.	Severe: floods, wetness, frost action.	Severe: wetness, floods, frost action.	Severe: wetness, floods.
WeB---------- Wellsboro	Severe: wetness.	Moderate: wetness, frost action.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action.	Slight.
WeC---------- Wellsboro	Severe: wetness.	Moderate: slope, wetness, frost action.	Severe: wetness.	Severe: slope.	Moderate: frost action, slope.	Moderate: slope.
[1]WLB:						
Wellsboro---------	Severe: wetness.	Moderate: wetness, large stones, frost action.	Severe: wetness.	Moderate: slope, wetness, large stones.	Moderate: frost action.	Moderate: large stones.
Wurtsboro---------	Severe: wetness.	Moderate: frost action, wetness, large stones.	Severe: wetness.	Moderate: slope, wetness, large stones.	Moderate: frost action.	Moderate: slope, large stones.
[1]WOB:						
Wellsboro---------	Severe: wetness, large stones.	Severe: large stones.	Severe: wetness, large stones.	Severe: large stones.	Moderate: frost action, large stones.	Moderate: large stones.
Wurtsboro---------	Severe: wetness, large stones.	Severe: large stones.	Severe: wetness, large stones.	Severe: large stones.	Moderate: frost action, large stones.	Severe: large stones.
WsA, WsB---------- Williamson	Severe: wetness.	Severe: frost action.	Severe: wetness.	Severe: frost action.	Severe: frost action.	Slight.
WuB---------- Wurtsboro	Severe: wetness.	Moderate: frost action, wetness.	Severe: wetness.	Moderate: slope, frost action, wetness.	Moderate: frost action.	Slight.

[1]This map unit is made up of two or more dominant kinds of soil. See description of the map unit for composition and behavior characteristics of the whole map unit.
[2]These soils on low stream terraces are subject to rare flooding or ponding.

TABLE 9.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of

TABLE 9.--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
[1] [2]BnC:					
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
[1] [2]BOD:					
Bath	Severe: slope, percs slowly.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Rock outcrop.					
[2]BRC:					
Bath	Severe: percs slowly.	Severe: slope.	Moderate: large stones, wetness.	Moderate: slope, wetness.	Fair: slope, large stones.
Mardin	Severe: percs slowly.	Severe: slope.	Severe: wetness.	Moderate: slope.	Fair: slope.

TABLE 9.--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
CvA---------- Churchville	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Fair: too clayey, thin layer.
CvB---------- Churchville	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: too clayey, thin layer.
[1] [2]FAE:					
Farmington---------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Rock outcrop.					
FW. Fresh water marsh					
Ha---------- Hamlin	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
[1]He----------	Moderate:	Severe:	Severe:	Severe:	Fair:

TABLE 9.--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
[2]HXE:					
Hudson	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, too clayey, wetness.	Severe: slope, wetness.	Poor: slope, too clayey, thin layer.
Schoharie	Severe: slope, percs slowly, wetness.	Severe: slope.	Severe: slope, wetness, too clayey.	Severe: slope, wetness.	Poor: slope, too clayey.
LaB Lackawanna	Severe: percs slowly.	Moderate: slope, small stones.	Moderate: wetness.	Moderate: wetness.	Fair: small stones.
LaC Lackawanna	Severe: percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.	Fair: slope, small stones.
[2]LCD:					
Lackawanna	Severe: slope, percs slowly.	Severe: slope.	Moderate: slope, large stones.	Severe: slope.	Poor: slope.
Swartswood	Severe: slope, percs slowly.	Severe: slope.	Moderate: slope, large stones.	Severe: slope.	Poor: slope.
[2]LCF:					
Lackawanna	Severe: slope, percs slowly.	Severe: slope.	Severe: slope.	Severe slope.	Poor: slope.
Swartswood	Severe:	Severe:	Severe:	Severe:	Poor:

TABLE 9.--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
[2]LY:					
Lyons	Severe: wetness, percs slowly.	Moderate: small stones.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Atherton	Severe: wetness.	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
Ma Madalin	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
MdB Mardin	Severe: percs slowly, wetness.	Moderate: small stones, slope.	Severe: wetness.	Slight	Fair: small stones.
[1 2]MgB:					
Mardin	Severe: percs slowly, wetness.	Moderate: small stones, slope, depth to rock.	Severe: wetness, depth to rock.	Severe: wetness.	Fair: small stones.
Nassau	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: thin layer, area reclaim.
Mn Menlo	Severe: wetness, percs slowly.	Moderate: small stones.	Severe: wetness.	Severe: wetness.	Poor: wetness.
MO Menlo	Severe: wetness, percs slowly.	Moderate: large stones.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Mr Middlebury	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
[1 2]MTB:					
Morris	Severe: percs slowly, wetness.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: large stones.
Tuller	Severe: depth to rock, wetness, percs slowly.	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: thin layer, area reclaim, wetness.
[1 2]NBF:					
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Bath	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope.
Rock outcrop.					
[1 2]NMC:					
Nassau	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer, area reclaim.
Manlius	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: small stones, thin layer.

See footnotes at end of table.

TABLE 9.--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
1 2NNF:					
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Manlius	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope, thin layer.
1 2NOD:					
Nassau	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Rock outcrop.					
Odal	Severe:	Slight	Severe:	Severe:	Poor:

TABLE 9.--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
[1]PlB---------- Plainfield	Slight----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
[1]PlC---------- Plainfield	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
[1 2]PmD:					
Plainfield---------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage, slope.	Poor: too sandy, slope, seepage.
Riverhead----------	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
[1 2]PmF:					
Plainfield---------	Severe: slope.	Severe: seepage,	Severe: seepage,	Severe: seepage,	Poor: too sandy.

TABLE 9.--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
[1] [2]RXE, [1] [2]RXF: Rock outcrop.					
Arnot	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer.
SaB: Schoharie	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
SaC: Schoharie	Severe: percs slowly, wetness.	Severe: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.
Sc: Scio	Severe: wetness.	Moderate: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Good.
[2]SdB:					
Scriba	Severe: wetness, percs slowly.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones.
Morris	Severe: percs slowly, wetness.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: small stones.
[2]SEB:					
Scriba	Severe: wetness, percs slowly.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: large stones.
Morris	Severe: percs slowly, wetness.	Moderate: slope, small stones.	Severe: wetness.	Severe: wetness.	Fair: large stones.
[2]SGB:					
Scriba	Severe: wetness, percs slowly, large stones.	Moderate: large stones, slope.	Severe: wetness.	Severe: wetness.	Poor: large stones.
Morris	Severe: large stones, percs slowly, wetness.	Severe: large stones, slope.	Severe: large stones, wetness.	Severe: wetness.	Poor: large stones.
[1] [2]SmB:					
Stockbridge	Severe: percs slowly.	Moderate: slope, depth to rock.	Severe: depth to rock.	Moderate: wetness.	Fair: small stones.
Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: thin layer, area reclaim.
[1] [2]SmC:					
Stockbridge	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: slope, wetness.	Fair: slope, small stones.
Farmington	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Moderate: slope.	Poor: thin layer, area reclaim.
[1] [2]STD:					
Stockbridge	Severe: slope, percs slowly.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.

See footnotes at end of table.

TABLE 9.--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
[2]STD:					
Farmington	Severe: depth to rock.	Severe: depth to rock.	Severe:	Severe:	Poor: thin layer, area reclaim.
Rock outcrop.					
Su: Suncook	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Poor: area reclaim, too sandy.
SwB: Swartswood	Severe: percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones.
SwC: Swartswood	Severe: percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope.
Te: Teel	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Tg: Tioga	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Good.
[1]TkA, [1]TkB: Tunkhannock	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones, thin layer.
[1]TkC: Tunkhannock	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones, thin layer, slope.
TuB: Tunkhannock	Severe: percs slowly.	Severe: seepage.	Severe: too clayey, seepage.	Severe: seepage.	Fair: small stones, thin layer.
TuC: Tunkhannock	Severe: percs slowly.	Severe: slope, seepage.	Severe: too clayey, seepage.	Severe: seepage.	Fair: slope, small stones, thin layer.
TuD: Tunkhannock	Severe: slope, percs slowly.	Severe: slope, seepage.	Severe: too clayey, seepage.	Severe: slope, seepage.	Poor: slope.
Un: Unadilla	Slight	Moderate: seepage.	Slight	Slight	Good.
[2]VAB: Valois	Moderate: large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: large stones.
[2]VAD: Valois	Severe: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage, slope.	Poor: slope.

TABLE 9.--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
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 10.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AA. Alluvial land				
AcB---------- Arnot	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: small stones, area reclaim.
[1]ARD:				
Arnot----------	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: slope, large stones, area reclaim.
Lordstown----------	Poor: slope, thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.
Rock outcrop.				
[1]ARF:				
Arnot----------	Poor: slope, thin layer, area reclaim.	Poor: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: slope, large stones, area reclaim.
Oquaga----------	Poor: slope, thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.
Rock outcrop.				
At---------- Atherton	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
Ba---------- Barbour	Fair: frost action.	Fair: excess fines.	Fair: excess fines.	Fair: thin layer.
Be---------- Basher	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
BgC---------- Bath	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
BgD---------- Bath	Fair: slope, frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]BOD:				
Bath	Fair: slope, frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Nassau	Poor: thin layer, area reclaim.	Unsuited: thin layer, excess fines.	Poor: thin layer, excess fines.	Poor: slope, area reclaim, small stones.
Rock outcrop.				
[1]BRC:				
Bath	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: large stones.
Mardin	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
CaB Cambridge	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
CaC Cambridge	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Cc, Cd	Poor:	Unsuited:	Unsuited:	Poor:

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HgD---------- Hoosic	Fair: slope.	Fair: excess fines.	Good----------	Poor: slope, small stones.
[1]HSF---------- Hoosic	Poor: slope.	Fair: excess fines.	Good----------	Poor: slope, small stones.
HuB---------- Hudson	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
HuC---------- Hudson	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, thin layer.
[1]HvC3:				
Hudson----------	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
Schoharie----------	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
[1]HwD:				
Hudson----------	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Schoharie----------	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
[1]HXE:				
Hudson----------	Poor: slope, frost action, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
Schoharie----------	Poor: slope, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
LaB, LaC---------- Lackawanna	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
[1]LCD:				
Lackawanna----------	Fair: slope, frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.
Swartswood----------	Fair: slope, frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.
[1]LCF:				
Lackawanna----------	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.
Swartswood----------	Poor: slope.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]LEE:				
Lackawanna	Poor: slope.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones.
Swartswood	Poor: slope.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones.
Lm Lamson	Poor: wetness, frost action.	Poor: excess fines.	Unsuited: excess fines.	Poor: wetness.
LnB Lordstown	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines, large stones.	Poor: small stones.
[1]LOC:				
Lordstown	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
Arnot	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: small stones, area reclaim.
Rock outcrop.				
[1]LY:				
Lyons	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
Atherton	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
Ma Madalin	Poor: low strength, wetness, area reclaim.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, area reclaim.
MdB Mardin	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]MgB:				
Mardin	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Nassau	Poor: thin layer, area reclaim.	Unsuited: thin layer, excess fines.	Poor: thin layer, excess fines.	Poor: area reclaim, small stones.
Mn Menlo	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
MO Menlo	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, large stones.
Mr Middlebury	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
[1]MTB:				
Morris	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Tuller	Poor: thin layer, frost action.	Unsuited: excess fines, thin layer.	Unsuited: excess fines, thin layer.	Poor: large stones, wetness.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]NBF:				
Nassau	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer, excess fines.	Poor: thin layer, excess fines.	Poor: slope, area reclaim, small stones.
Bath	Poor: slope.	Unsuited: excess fines, small stones.	Poor: excess fines.	Poor: slope, small stones.
Rock outcrop.				
[1]NMC:				
Nassau	Poor: thin layer, area reclaim.	Unsuited: thin layer, excess fines.	Poor: thin layer, excess fines.	Poor: area reclaim, small stones.
Manlius	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
[1]NNF:				
Nassau	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer, excess fines.	Poor: thin layer, excess fines.	Poor: slope, area reclaim, small stones.
Manlius	Poor: slope, thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones, slope.
[1]NOD:				
Nassau	Poor: thin layer, area reclaim.	Unsuited: thin layer, excess fines.	Poor: thin layer, excess fines.	Poor: slope, area reclaim, small stones.
Rock outcrop.				
OdA, OdB Odessa	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, thin layer.
OgB Oquaga	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
[1]OlC:				
Oquaga	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
Lordstown	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
[1]ORC:				
Oquaga	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
Arnot	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: small stones, area reclaim.
Rock outcrop.				
[1]ORD:				
Oquaga	Poor: thin layer.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, large stones.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]ORD:				
Arnot	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: slope, large stones, area reclaim.
Rock outcrop.				
Pa: Palms	Poor: wetness, excess humus.	Unsuited: excess humus, excess fines.	Unsuited: excess humus, excess fines.	Poor: wetness, excess humus.
Pb: Palms bedrock Variant	Poor: excess humus, wetness.	Unsuited: excess humus.	Unsuited: excess humus.	Poor: wetness.
PlB: Plainfield	Good	Good	Unsuited: excess fines.	Fair: too sandy.
PlC: Plainfield	Good	Good	Unsuited: excess fines.	Fair: too sandy, slope.
[1]PmD:				
Plainfield	Fair: slope.	Good	Unsuited: excess fines.	Poor: slope.
Riverhead	Fair: slope, frost action.	Good	Poor: excess fines.	Poor: slope.
[1]PmF:				
Plainfield	Poor: slope.	Good	Unsuited: excess fines.	Poor: slope.
Riverhead	Poor: slope.	Good	Poor: excess fines.	Poor: slope.
[1]PrC:				
Plainfield	Good	Good	Unsuited: excess fines.	Poor: too sandy, slope.
Rock outcrop.				
Pt: Pompton	Fair: frost action.	Fair: excess fines.	Unsuited: excess fines.	Good.
Ra: Raynham	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good:
Re: Red Hook	Poor: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
RhA, RhB: Rhinebeck	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, thin layer.
RvA, RvB: Riverhead	Fair: frost action.	Good	Fair: excess fines.	Good.
RvC: Riverhead	Fair: frost action.	Good	Fair: excess fines.	Fair: slope.
[1]RXC:				
Rock outcrop.				
Arnot	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
[1]RXE: Rock outcrop.				
Arnot	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones, area reclaim.
[1]RXF: Rock outcrop.				
Arnot	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines, large stones.	Unsuited: excess fines, large stones.	Poor: slope, large stones, area reclaim.
SaB, SaC: Schoharie	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Sc: Scio	Poor: frost action.	Poor: excess fines.	Poor: excess fines.	Good.
[1]SdB:				
Scriba	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
Morris	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]SEB, [1]SGB:				
Scriba	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Morris	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
[1]SmB, [1]SmC:				
Stockbridge	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
Farmington	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Unsuited: thin layer, excess fines.	Poor: area reclaim, small stones.
[1]STD:				
Stockbridge	Fair: slope, frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope, small stones.
Farmington	Poor: thin layer, area reclaim.	Unsuited: excess fines, thin layer.	Unsuited: thin layer, excess fines.	Poor: slope, small stones.
Rock outcrop.				
Su: Suncook	Good	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy.
SwB, SwC: Swartswood	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: small stones.
Te: Teel	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
Tg: [illegible]	Fair: [illegible]	Unsuited: [illegible]	Poor: [illegible]	Good.

TABLE 10.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TuD---------- Tunkhannock	Fair: slope, thin layer, frost action.	Poor: excess fines, thin layer.	Poor: excess fines, thin layer.	Poor: slope, small stones.
Un---------- Unadilla	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
[1]VAB---------- Valois	Fair: frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: large stones.
[1]VAD---------- Valois	Fair: slope, frost action.	Unsuited: excess fines.	Poor: excess fines.	Poor: large stones, slope.
VoA, VoB, VoC--------- Volusia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones, thin layer.
[1]VSB---------- Volusia	Poor: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Wa---------- Walpole	Fair: wetness, frost action.	Fair: excess fines.	Unsuited: excess fines.	Good.
Wb, Wc---------- Wayland	Poor: wetness, frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
WeB, WeC---------- Wellsboro	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: small stones.
[1]WLB, [1]WOB:				
Wellsboro----------	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
Wurtsboro----------	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: large stones.
WsA, WsB---------- Williamson	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
WuB---------- Wurtsboro	Fair: frost action.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: small stones.

[1]This map unit is made up of two or more dominant kinds of soil. See description of the map unit for composition and behavior characteristics of the whole map unit.

TABLE 11.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AA. Alluvial land						
AcB: Arnot	Depth to rock, seepage.	Thin layer, depth to rock.	Depth to rock	Not needed	Depth to rock, rooting depth.	Droughty, rooting depth
[1]ARD:						
Arnot	Depth to rock, slope, seepage.	Thin layer, depth to rock, large stones.	Depth to rock, large stones.	Not needed	Depth to rock, slope.	Droughty, rooting depth slope.
Lordstown	Depth to rock, slope.	Thin layer, large stones.	No water, large stones.	Not needed	Depth to rock, slope.	Droughty, slope.
Rock outcrop.						
[1]ARF:						
Arnot	Depth to rock, slope, seepage.	Thin layer, depth to rock, large stones.	Depth to rock, large stones.	Not needed	Depth to rock, slope, large stones.	Droughty, rooting depth slope.
Oquaga	Depth to rock, slope.	Thin layer, large stones.	No water, large stones.	Not needed	Depth to rock, slope.	Droughty, slope.
Rock outcrop.						
At: Atherton	Seepage	Piping, seepage.	Favorable	Wetness, poor outlets.	Not needed	Wetness.
Ba: Barbour	Seepage	Piping, seepage.	No water	Not needed	Not needed	Erodes easily, piping.
Be: Basher	Favorable	Piping, low strength.	Deep to water	Floods, wetness.	Not needed	Erodes easily, piping.
BgC, BgD: Bath	Slope	Favorable	No water	Not needed	Slope	Slope.
[1]BHE: Bath	Slope	Large stones	Large stones, no water.	Not needed	Large stones, slope.	Large stones, slope.
[1]BnC:						
Bath	Slope	Favorable	No water	Not needed	Slope	Slope.
Nassau	Slope, depth to rock, seepage.	Depth to rock, thin layer.	Depth to rock, no water.	Not needed	Slope, depth to rock, complex slope.	Slope, rooting depth droughty.
[1]BOD:						
Bath	Slope	Favorable	No water	Not needed	Slope	Slope.
Nassau	Slope, depth to rock, seepage.	Depth to rock, thin layer.	Depth to rock, no water.	Not needed	Depth to rock, droughty.	Slope, rooting depth droughty.
Rock outcrop.						
[1]BRC:						
Bath	Slope	Large stones	Large stones, no water.	Not needed	Slope, percs slowly.	Slope, percs slowly.

See footnote at end of table.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir	Embankments, dikes, and	Aquifer-fed excavated	Drainage	Terraces and	Grassed waterways

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
[1]LCD, [1]LCF, [1]LEE:						
Lackawanna	Slope	Large stones	No water	Not needed	Large stones	Large stones

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
[1]NBF:						
Nassau	Slope, depth to rock, seepage.	Depth to rock, thin layer.	Depth to rock, no water.	Not needed	Slope, depth to rock, droughty.	Slope, rooting depth, droughty.
Bath	Slope	Favorable	No water	Not needed	Slope, percs slowly, erodes easily.	Slope. percs slowly, erodes easily.
Rock outcrop.						
[1]NMC, [1]NNF:						
Nassau	Slope, depth to rock, seepage.	Depth to rock, thin layer.	Depth to rock, no water.	Not needed	Slope, depth to rock, droughty.	Slope, rooting depth, droughty.
Manlius	Depth to rock	Thin layer, piping, depth to rock.	No water	Not needed	Depth to rock, slope.	Droughty, slope, rooting depth.
[1]NOD:						
Nassau	Slope, depth to rock, seepage.	Depth to rock, thin layer.	Depth to rock, no water.	Not needed	Slope, depth to rock, droughty.	Slope, rooting depth, droughty.
Rock outcrop.						
OdA, OdB Odessa	Favorable	Low strength	Slow refill	Percs slowly	Wetness, erodes easily.	Wetness, erodes easily.
OgB Oquaga	Depth to rock	Thin layer, depth to rock.	No water	Not needed	Depth to rock, rooting depth.	Droughty, rooting depth.
[1]OlC:						
Oquaga	Depth to rock, slope.	Thin layer, depth to rock.	No water	Not needed	Depth to rock, slope, rooting depth.	Droughty, rooting depth, slope.
Lordstown	Depth to rock, slope.	Thin layer, depth to rock.	No water	Not needed	Depth to rock, rooting depth, slope.	Droughty, slope, rooting depth.
[1]ORC, [1]ORD:						
Oquaga	Depth to rock, slope.	Thin layer, depth to rock.	No water	Not needed	Depth to rock, slope, rooting depth.	Droughty, rooting depth, slope.
Arnot	Depth to rock, slope, seepage.	Depth to rock	Depth to rock	Not needed	Depth to rock, slope, rooting depth.	Droughty, rooting depth, slope.
Rock outcrop.						
Pa Palms	Seepage, excess humus.	Low strength, unstable fill.	Subsides	Wetness, poor outlets.	Not needed	Wetness.
Pb Palms bedrock Variant	Depth to rock, seepage, excess humus.	Seepage, hard to pack, unstable fill.	Depth to rock	Depth to rock, wetness, poor outlets.	Not needed	Not needed.
PlB Plainfield	Seepage	Seepage	No water	Not needed	Too sandy, soil blowing.	Droughty, rooting depth.
PlC Plainfield	Seepage, slope.	Seepage	No water	Not needed	Too sandy, soil blowing.	Droughty, slope.
[1]PmD, [1]PmF:						

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
[1]PmD, [1]PmF: Riverhead	Seepage, slope.	Seepage, piping.	No water	Not needed	Piping, slope.	Slope, droughty.
[1]PrC: Plainfield	Seepage, slope.	Seepage	No water	Not needed	Slope, too sandy, soil blowing.	Droughty, slope.
Rock outcrop.						
Pt Pompton	Seepage	Seepage, piping.	Deep to water	Cutbanks cave	Piping, erodes easily.	Erodes easily.
Ra Raynham	Favorable	Piping, low strength, erodes easily.	Cutbanks cave	Percs slowly, cutbanks cave.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
Re Red Hook	Seepage	Thin layer	Favorable	Wetness	Wetness	Wetness.
RhA, RhB Rhinebeck	Favorable	Low strength, erodes easily.	Slow refill	Percs slowly	Wetness, erodes easily.	Wetness, erodes easily.
RvA, RvB, RvC Riverhead	Seepage, slope.	Seepage, piping.	No water	Not needed	Piping, slope.	Slope, droughty.
[1]RXC, [1]RXE, [1]RXF: Rock outcrop.						
Arnot	Depth to rock, slope, seepage.	Thin layer, depth to rock.	Depth to rock, no water.	Not needed	Depth to rock, slope.	Droughty, rooting depth, slope.
SaB, SaC Schoharie	Slope	Low strength	Deep to water	Percs slowly	Slope, percs slowly, erodes easily.	Slope, percs slowly, erodes easily.

TABLE 11.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
[1]STD:						
Farmington	Slope, depth to rock, seepage.	Depth to rock, thin layer.	Depth to rock, no water.	Not needed	Complex slope, depth to rock, rooting depth.	Slope, rooting depth, droughty.
Rock outcrop.						
Su Suncook	Seepage	Seepage, erodes easily.	Deep to water	Not needed	Not needed	Erodes easily, piping.
SwB, SwC Swartswood	Slope	Favorable	No water	Not needed	Percs slowly, erodes easily.	Percs slowly, erodes easily.
Te Teel	Favorable	Piping, low strength.	Deep to water, cutbanks cave.	Floods, wetness, poor outlets.	Not needed	Piping, erodes easily.
Tg Tioga	Seepage	Piping, low strength, seepage.	Deep to water	Not needed	Not needed	Erodes easily, piping.
TkA, TkB, TkC Tunkhannock	Seepage	Seepage, piping.	No water	Not needed	Complex slope, piping.	Droughty, slope.
TuB, TuC, TuD Tunkhannock	Seepage, slope.	Seepage, piping.	No water	Not needed	Piping, slope.	Droughty, slope.
Un Unadilla	Seepage	Low strength, piping, seepage.	No water	Not needed	Not needed	Erodes easily.
[1]VAB, [1]VAD Valois	Seepage, slope.	Seepage, large stones.	Deep to water, large stones.	Not needed	Large stones, slope.	Large stones, slope.
VoA, VoB, VoC Volusia	Favorable	Favorable	Slow refill	Percs slowly	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, slope.
[1]VSB Volusia	Favorable	Large stones	Large stones, slow refill.	Percs slowly, large stones.	Wetness, large stones.	Wetness, large stones.

TABLE 12.--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
AA. Alluvial land					
AcB: Arnot	Moderate: small stones.	Moderate: small stones.	Severe: depth to rock, small stones.	Moderate: small stones.	Severe: depth to rock.
[1]ARD:					
Arnot	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock.
Lordstown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
Rock outcrop.					
[1]ARF:					
Arnot	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Severe: slope.	Severe: slope, depth to rock.
Oquaga	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
At: Atherton	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ba: Barbour	Moderate: floods.	Moderate: floods.	Moderate: floods,	Slight	Moderate: floods.
Be: Basher	Moderate: floods.	Moderate: floods.	Moderate: floods, wetness.	Slight	Moderate: floods.
BgC: Bath	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
BgD: Bath	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
[1]BHE: Bath	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
[1]BnC:					
Bath	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
Nassau	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]BOD:					
Bath	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
Nassau	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Moderate: slope, small stones.	Severe: slope, depth to rock.
Rock outcrop.					
[1]BRC:					
Bath	Moderate: slope, large stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: large stones.	Moderate: slope, large stones.
Mardin	Moderate: slope, large stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: large stones.	Moderate: large stones.
CaB Cambridge	Moderate: percs slowly.	Slight	Moderate: small stones, wetness, percs slowly.	Slight	Slight.
CaC Cambridge	Moderate: slope, percs slowly.	Moderate: slope, wetness.	Severe: slope.	Slight	Moderate: slope.
Cc, Cd Canandaigua	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ce Carlisle	Severe: floods, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness, floods.	Severe: wetness, excess humus.	Severe: excess humus, wetness, floods.
CgA, CgB Castile	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
CkB Cayuga	Moderate: percs slowly.	Slight	Moderate: slope, wetness, percs slowly.	Slight	Slight.
CkC Cayuga	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CnA, CnB Chenango	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Moderate: small stones.
CnC Chenango	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, small stones.
CvA Churchville	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CvB Churchville	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
[1]FAE:					
Farmington	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop.					

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FW. Fresh water marsh					
Ha---------- Hamlin	Moderate: floods.	Moderate: floods.	Moderate: floods.	Slight----------	Slight.
He---------- Haven	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
HfA, HgA, HgB--------- Hoosic	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.	Severe: small stones.
HgC---------- Hoosic	Moderate: small stones, slope.	Moderate: small stones, slope.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
HgD---------- Hoosic	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: small stones, slope.	Severe: slope, small stones.
[1]HSF---------- Hoosic	Severe: slope.	Severe: slope.	Severe: slope,	Severe: slope.	Severe: slope,

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]LCD, [1]LCF:					
Swartswood	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, large stones.	Severe: slope.
[1]LEE:					
Lackawanna	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Swartswood	Severe:	Severe:	Severe:	Severe:	Severe:

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]MTB:					
Morris	Moderate: percs slowly, wetness, large stones.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness, large stones.	Severe: wetness.
Tuller	Severe: wetness.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Severe: depth to rock, wetness, large stones.
[1]NBF:					
Nassau	Severe: slope.	Severe: slope.	Severe: slope, depth to rock	Severe: slope.	Severe: slope, depth to rock

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]ORC:					
Oquaga	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Moderate: slope, depth to rock.
Arnot	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock, small stones.	Moderate: small stones.	Severe: depth to rock.
Rock outcrop.					
[1]ORD:					
Oquaga	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, small stones.	Severe: slope.
Arnot	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock.
Rock outcrop.					
Pa Palms	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, excess humus.	Severe: wetness, floods, excess humus.
Pb Palms bedrock Variant	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness.
PlB Plainfield	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: too sandy.
PlC Plainfield	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: too sandy, slope.
[1]PmD:					
Plainfield	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too sandy.	Severe: slope.
Riverhead	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
[1]PmF:					
Plainfield	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Riverhead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]PrC:					
Plainfield	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: too sandy, slope.
Rock outcrop.					
Pt Pompton	Slight	Slight	Moderate: wetness.	Slight	Moderate: wetness.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ra---------- Raynham	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Re---------- Red Hook		Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.
RhA, RhB---------- Rhinebeck	Moderate: wetness, percs slowly.	Moderate: wetness, small stones.	Severe: wetness, small stones.	Moderate: wetness.	Moderate: wetness.
RvA---------- Riverhead	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
RvB---------- Riverhead	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
RvC---------- Riverhead	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
[1]RXC: Rock outcrop.					
Arnot----------	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, depth to rock, small stones.	Moderate: small stones.	Severe: depth to rock.
[1]RXE, [1]RXF: Rock outcrop.					
Arnot----------	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
SaB---------- Schoharie	Moderate: percs slowly.	Slight----------	Moderate: percs slowly, slope.	Slight----------	Moderate: too clayey.
SaC---------- Schoharie	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: too clayey.
Sc---------- Scio	Slight----------	Slight----------	Moderate: wetness.	Slight----------	Slight.
[1]SdB:					
Scriba----------	Moderate: wetness, small stones.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness, small stones.	Moderate: wetness.
Morris----------	Moderate: wetness, small stones.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness, small stones.	Moderate: wetness.
[1]SEB:					
Scriba----------	Moderate: wetness, large stones.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness, large stones.	Moderate: wetness.
Morris----------	Moderate: wetness, large stones.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness, large stones.	Severe: wetness.
[1]SGB:					
Scriba----------	Severe: large stones.	Moderate: wetness, large stones.	Severe: large stones, wetness.	Severe: large stones, wetness.	Severe: large stones.

See footnote at end of table.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
[1]SGB: Morris	Severe: large stones.	Moderate: large stones, wetness.	Severe: large stones, wetness.	Severe: large stones, wetness.	Severe: large stones.

TABLE 12.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Un---------- Unadilla	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
[1]VAB---------- Valois	Moderate: large stones.	Moderate: small stones.	Severe: small stones.	Moderate: large stones.	Moderate: large stones.
[1]VAD---------- Valois	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones.	Severe: slope.
VoA, VoB---------- Volusia	Moderate: wetness,	Moderate: wetness,	Severe: small stones,	Moderate: wetness,	Moderate: small stones,

TABLE 13.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Areas of Rock outcrop, Alluvial land, and Fresh water marsh are too variable to be 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
AA. Alluvial land										
AcB: Arnot	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
[1]ARD:										
Arnot	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Lordstown	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Rock outcrop.										
[1]ARF:										
Arnot	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Oquaga	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Rock outcrop.										
At: Atherton	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
Ba: Barbour	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Be: Basher	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
BgC: Bath	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
BgD: Bath	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
[1]BHE: Bath	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
[1]BnC:										
Bath	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Nassau	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
[1]BOD:										
Bath	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Nassau	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Rock outcrop.										
[1]BRC:										
Bath	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--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
[1]BRC:										
Mardin	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
CaB Cambridge	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
CaC Cambridge	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Cc, Cd Canandaigua	Very poor	Poor	Poor	Poor	Poor	Good	Good	Very poor	Poor	Good
Ce Carlisle	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
CgA Castile	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
CgB Castile	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
CkB Cayuga	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
CkC Cayuga	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
CnA, CnB, CnC Chenango	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
CvA Churchville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
CvB Churchville	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
[1]FAE:										
Farmington	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Rock outcrop.										
FW. Fresh water marsh										
Ha Hamlin	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
He Haven	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
HfA, HgA, HgB, HgC, HgD Hoosic	Poor	Fair	Fair	Poor	Poor	Very poor	Very poor	Fair	Poor	Very poor
[1]HSF Hoosic	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
HuB Hudson	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
HuC Hudson	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--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
[1]HvC3:										
Hudson	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Schoharie	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
[1]HwD:										
Hudson	Poor	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor
Schoharie	Poor	Fair	Good	Good	Good	Very	Very	Fair	Good	Very

TABLE 13.--WILDLIFE HABITAT POTENTIALS--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
[1]LY:										
Atherton	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
Ma Madalin	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
MdB Mardin	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor
[1]MgB:										
Mardin	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor
Nassau	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Mn Menlo	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
MO Menlo	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
Mr Middlebury	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
[1]MTB:										
Morris	Very poor	Poor	Fair	Poor	Poor	Poor	Very poor	Poor	Poor	Very poor
Tuller	Very poor	Poor	Poor	Poor	Poor	Poor	Very poor	Poor	Poor	Very poor
[1]NBF:										
Nassau	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Bath	Very poor	Poor	Good	Good	Good	Very poor	Very poor	Poor	Good	Very poor
Rock outcrop.										
[1]NMC:										
Nassau	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Manlius	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
[1]NNF:										
Nassau	Very poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Manlius	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
[1]NOD:										
Nassau	Poor	Poor	Fair	Poor	Poor	Very poor	Very poor	Poor	Poor	Very poor
Rock outcrop.										
OdA Odessa	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
OdB Odessa	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor

See footnote at end of table.

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

TABLE 13.--WILDLIFE HABITAT POTENTIALS--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
Re---------- Red Hook	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
RhA---------- Rhinebeck	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
RhB---------- Rhinebeck	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
RvA----------	Good	Good	Good	Good	Good	Poor	Very	Good	Good	Very

TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

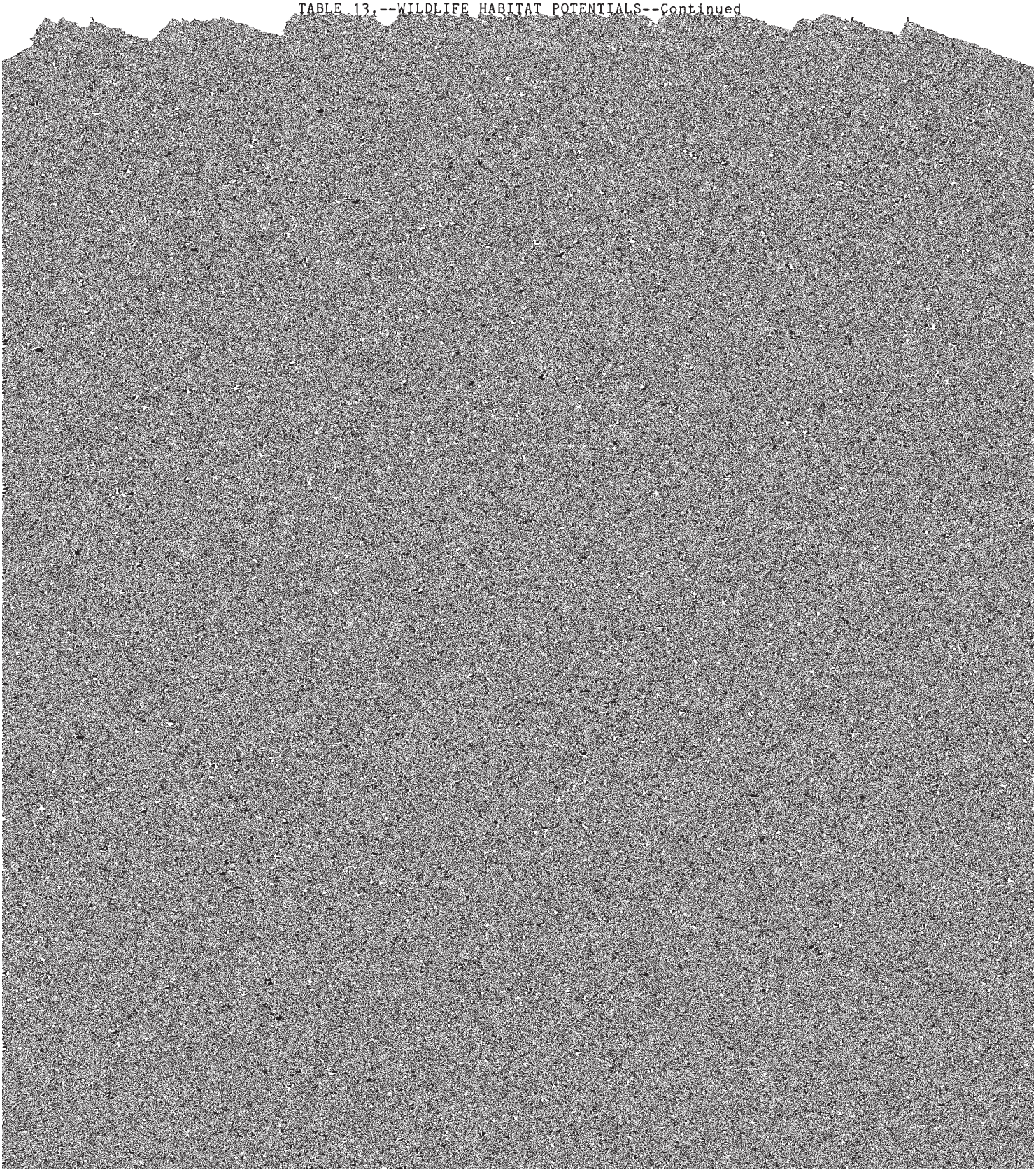


TABLE 13.--WILDLIFE HABITAT POTENTIALS--Continued

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
WeB---------- Wellsboro	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor
WeC---------- Wellsboro	Fair	Good	Good	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor
[1]WLB:										
Wellsboro---------	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Wurtsboro---------	Very poor	Poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
[1]WOB:										
Wellsboro---------	Very poor	Very poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Wurtsboro---------	Very poor	Very poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
WsA---------- Williamson	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
WsB---------- Williamson	Fair	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
WuB---------- Wurtsboro	Fair	Good	Good	Fair	Fair	Poor	Very poor	Good	Fair	Very poor

[1]This map unit is made up of two or more dominant kinds of soil. See description of the map unit for composition and behavior characteristics of the whole map unit.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[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: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AA. Alluvial land											
AcB---------- Arnot	0-7	Channery silt loam.	ML, GM, SM	A-2, A-4	5-10	60-85	55-80	45-80	30-70	<30	NP-5
	7-17	Very channery silt loam, very channery loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]ARD:											
Arnot----------	0-2	Very bouldery silt loam, very bouldery loam.	ML, GM, SM	A-2, A-4	10-20	60-85	55-80	45-80	30-70	<30	NP-5
	2-14	Very channery silt loam, very channery loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lordstown---------	0-4	Very bouldery silt loam, very bouldery loam.	ML, GM	A-4	10-20	65-85	50-75	50-75	40-65	<30	NP-4
	4-32	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
[1]ARF:											
Arnot----------	0-3	Very bouldery silt loam.	ML, GM, SM	A-2, A-4	10-20	60-85	55-80	45-80	30-70	<30	NP-5
	3-14	Very channery silt loam, very channery loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	14	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Oquaga----------	0-5	Very bouldery silt loam.	ML, GM	A-4, A-2	5-20	50-85	40-70	35-70	25-65	<25	NP-5
	5-26	Very channery loam, very channery silt loam, channery silt loam.	GM, ML	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	<25	NP-5
	26	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
At---------- Atherton	0-7	Silt loam--------	ML, OL, CL	A-4, A-7, A-5, A-6	0-5	95-100	90-100	75-95	55-85	25-50	5-20
	7-28	Silt loam, silty clay loam, gravelly loam.	GM-GC, CL, ML, CL-ML	A-4, A-6	0-5	65-95	60-95	50-90	40-80	25-40	5-20
	28-65	Stratified sand and gravel to silty clay.	GM, GM-GC, CL-ML, ML, GC	A-1, A-2, A-4	0-5	50-80	45-75	25-70	20-60	5-15	NP-5

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Ba---------- Barbour	0-6	Loam----------	ML, CL-ML, SM, SM-SC	A-4, A-2	0	80-100	75-100	50-95	30-90	15-25	2-7
	6-28	Silt loam, sandy loam, gravelly loam.	ML, SM, CL-ML, SM-SC	A-4, A-2, A-1	0	50-100	45-95	25-95	15-85	15-25	2-7
	28-50	Very gravelly sand, gravelly loamy fine sand.	SM, SP, GM, GP	A-1, A-2, A-3	0-15	35-95	30-95	20-80	2-40	---	NP
Be---------- Basher	0-9	Silt loam-------	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	85-100	60-95	40-90	15-25	2-7

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
[1]BnC:											
Bath	0-6	Gravelly silt loam.	ML, GM, SM, OL	A-2, A-4	5-10	60-95	50-95	40-85	30-80	30-40	5-10
	6-28	Channery loam, gravelly silt loam.	SM, GM, ML	A-2, A-4	5-10	65-95	50-90	40-85	20-80	20-35	NP-7
	28-48	Gravelly sandy loam, very channery silt loam.	GM, SM, GM-GC, ML	A-1, A-2, A-4	10-15	40-90	30-85	30-85	20-75	20-25	3-6
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nassau	0-6	Shaly silt loam	ML, GM	A-2, A-4	5-20	50-85	45-80	40-75	25-70	10-20	1-6
	6-16	Very shaly silt loam, very shaly loam.	GM	A-2, A-4	10-25	45-70	25-55	20-55	15-50	10-20	1-6
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]BOD:											
Bath	0-6	Gravelly silt loam.	ML, GM, SM, OL	A-2, A-4	5-10	60-95	50-95	40-85	30-80	30-40	5-10
	6-28	Channery loam, gravelly silt loam.	SM, GM, ML	A-2, A-4	5-10	65-95	50-90	40-85	20-80	20-35	NP-7
	28-48	Very gravelly sandy loam, channery silt loam.	GM, SM, GM-GC, ML	A-1, A-2, A-4	10-15	40-90	30-85	30-85	20-75	20-25	3-6
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Nassau	0-6	Shaly silt loam	ML, GM	A-2, A-4	5-20	50-85	45-80	40-75	25-70	10-20	1-6
	6-16	Very shaly silt loam, very shaly loam.	GM	A-2, A-4	10-25	45-70	25-55	20-55	15-50	10-20	1-6
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
[1]BRC:											
Bath	0-5	Very stony silt loam.	ML, GM, SM, OL	A-2, A-4	10-15	60-95	50-90	40-85	30-80	30-40	5-10
	5-28	Channery loam, channery silt loam, gravelly loam.	SM, GM, ML	A-2, A-4	5-10	65-95	50-90	40-85	20-80	20-35	NP-7
	28-55	Channery loam, very channery silt loam, gravelly sandy loam.	SM, GM-GC, ML, GM	A-1, A-2, A-4	10-15	40-90	30-85	30-85	20-75	20-25	3-6
	55-65	Flaggy loam, gravelly silt loam, very channery sandy loam.	GM-GC, CL-ML, GM, SM	A-1, A-2, A-4	10-15	40-90	25-85	20-80	10-75	<25	NP-6

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
[1]BRC:											
Mardin----------	0-6	Very stony silt loam.	GM, ML, CL, GC	A-4	5-15	65-75	60-70	50-70	35-60	25-35	5-10
	6-21	Channery silt loam, channery loam, gravelly loam.	CL, GC, SC, CL-ML	A-4	5-10	60-75	55-70	45-70	35-65	15-25	5-10
	21-46	Gravelly loam, channery silt loam, very channery loam.	CL, GC, SC, CL-ML	A-2, A-4	10-25	55-75	50-70	40-70	30-65	20-30	5-10
	46-56	Gravelly loam, channery silt loam, very channery silt loam.	CL, GC, SC, CL-ML	A-2, A-4	10-25	55-75	50-70	40-70	30-65	20-30	5-10
CaB, CaC---------- Cambridge	0-6	Gravelly silt loam.	ML, CL-ML, CL	A-4, A-6	0-5	90-100	85-100	75-100	65-90	25-40	4-13
	6-64	Silt loam, gravelly loam, silty clay loam, gravelly clay loam.	CL, SC, SM-SC, CL-ML	A-4, A-6	0-5	70-95	60-90	55-85	45-75	20-35	5-14
Cc---------- Canandaigua	0-9	Silt loam-------	ML, OL, MH, OH	A-4, A-5, A-6, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	9-37	Silt loam, very fine sandy loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-95	20-40	5-15
	37-60	Silt loam, very fine sandy loam.	ML, CL	A-4	0	95-100	95-100	90-100	70-95	20-30	3-10
Cd---------- Canandaigua	0-9	Silt loam-------	ML, OL, MH, OH	A-4, A-5, A-6, A-7	0	95-100	95-100	90-100	85-100	35-55	5-15
	9-37	Silt loam, silty	ML	A-4, A-7	0	95-100	95-100	90-100	70-95	20-40	5-15

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
CkB, CkC---------- Cayuga	0-8	Silt loam--------	ML, CL-ML	A-4	0-5	95-100	90-100	85-95	65-90	15-30	4-10
	8-29	Silty clay, clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	85-100	80-100	70-95	20-35	5-15
	29-50	Loam, gravelly fine sandy loam, silty clay loam.	ML, SM, GM, CL	A-2, A-4	0-5	55-90	40-90	30-90	20-85	5-20	2-4
CnA, CnB, CnC------ Chenango	0-9	Gravelly silt loam.	ML, SM, GM	A-2, A-4, A-1	5-10	55-85	55-80	35-80	15-70	<40	NP-10
	9-35	Gravelly silt loam, gravelly loam, very gravelly fine sandy loam.	ML, GM, SM	A-2, A-4, A-1	5-10	35-80	30-75	25-75	15-65	<35	NP-10
	35-80	Very gravelly loamy coarse sand, very gravelly sand.	GW, GM, GW-GM, GP	A-1	5-10	25-65	20-60	10-50	1-20	---	NP
CvA, CvB---------- Churchville	0-10	Silt loam--------	ML, CL, MH, OL	A-7	0	95-100	90-100	80-100	75-90	40-55	15-25
	10-34	Silty clay loam, silty clay, clay loam.	CL	A-7	0	95-100	95-100	90-100	75-95	40-50	25-35
	34-54	Gravelly loam, silt loam, silty clay loam.	ML, GM, CL, GC	A-2, A-4	0-5	60-90	55-85	45-80	30-75	10-20	1-8
[1]FAE: Farmington---------	0-3	Very stony silt loam.	ML, CL, GM, GM-GC	A-4, A-6	5-15	55-80	50-75	35-70	45-65	20-35	3-15
	3-12	Silt loam, loam, gravelly fine sandy loam.	ML, CL, GM, GM-GC	A-2, A-4, A-6, A-1	0-5	60-95	55-90	35-85	20-80	20-35	3-15
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
FW. Fresh water marsh											
Ha---------- Hamlin	0-8	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	8-38	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	38-58	Silt loam, very fine sandy loam, fine sandy loam.	ML, SM, CL, SM-SC	A-4, A-6	0	90-100	90-100	75-100	45-90	<25	NP-15
He---------- Haven	0-11	Loam----------	ML	A-4	0	90-100	90-100	85-95	70-90	20-25	1-4
	11-25	Gravelly loam, silt loam, gravelly very fine sandy loam.	ML, SM, ML-CL	A-4, A-2	0	85-95	70-90	50-80	30-65	20-25	1-5
	25-60	Stratified sand and gravel, very gravelly sand.	SP, SW, GP	A-1	0	40-95	30-85	5-35	0-5	<10	NP

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HfA, HgA, HgB, HgC, HgD, [1]HSF---------- Hoosic	0-8	Gravelly loam, cobbly loam.	GM, SM, GP-GM, SP-SM	A-1, A-2, A-4	5-20	40-80	35-70	20-65	10-50	30-45	2-10
	8-20	Gravelly sandy loam, very gravelly sandy loam, cobbly loam.	GM, SM, GP-GM, SP-SM	A-1, A-2, A-4	5-20	40-75	35-65	20-60	10-45	20-30	2-8
	20-80	Very cobbly sand, very gravelly loamy sand.	GM, GP, SP, SM	A-1	10-25	35-65	30-50	15-40	2-20	---	NP
HuB, HuC---------- Hudson	0-7	Silt loam-------	ML, CL-ML	A-4, A-5, A-6, A-7	0	95-100	95-100	85-100	65-95	25-48	5-19
	7-38	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	38-60	Stratified silty clay to silt.	CL, CL-ML	A-7, A-6	0	95-100	90-100	80-100	60-100	35-65	15-35
[1]HvC3, [1]HwD, [1]HXE: Hudson----------	0-6	Silty clay loam	ML, CL, CL-ML	A-4, A-5, A-6, A-7	0	95-100	95-100	85-100	65-95	25-48	5-19
	6-27	Silty clay, silty clay loam.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	80-100	35-65	15-35
	27-60	Stratified silty clay to silt.	CL, CH	A-7, A-6	0	95-100	90-100	80-100	60-100	35-65	15-35
Schoharie---------	0-7	Silty clay loam	ML, CL	A-6, A-7	0	100	95-100	80-100	65-95	35-50	12-20

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
[1]LCD, [1]LCF:											
Swartswood	0-4	Very bouldery fine sandy loam.	SM, GM	A-2, A-4, A-1	3-15	60-90	50-85	30-80	15-45	---	---
	4-33	Channery loam, gravelly sandy loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4, A-1	0-25	60-90	50-90	30-85	15-65	<25	NP-3
	33-60	Gravelly fine sandy loam, very gravelly sandy loam, gravelly loam.	GM, SM, ML, GW-GM	A-2, A-1, A-4	5-25	50-80	35-80	20-70	10-60	<20	NP-3
[1]LEE:											
Lackawanna	0-3	Extremely bouldery silt loam, extremely bouldery loam.	ML, CL, GM, SM	A-4	5-25	40-100	40-95	35-90	40-85	---	---
	3-23	Channery loam, gravelly silt loam, flaggy loam.	GM, ML, CL, SM	A-2, A-4, A-6	0-20	40-80	40-75	35-70	20-60	20-35	1-14
	23-80	Channery loam, gravelly silt loam, flaggy sandy loam.	GM, SM, ML, CL	A-2, A-4, A-6	0-20	50-85	40-80	35-75	20-55	15-35	<12
Swartswood	0-4	Extremely bouldery sandy loam, extremely bouldery loam.	SM, ML	A-2, A-4, A-1	5-20	60-90	50-85	30-80	15-65	---	---
	4-29	Channery loam, flaggy sandy loam, gravelly fine sandy loam.	SM, ML, GM	A-2, A-4, A-1	0-25	60-90	50-90	30-85	15-65	<25	NP-3
	29-60	Gravelly fine sandy loam, very gravelly sandy loam, gravelly loam.	GM, SM, ML, GW-GM	A-2, A-1, A-4	5-25	50-80	35-80	20-70	10-60	<20	NP-3
Lm Lamson	0-10	Fine sandy loam	SM, ML, OL	A-4	0	95-100	90-100	70-90	40-85	<20	NP-4
	10-32	Fine sandy loam, sandy loam.	SM, ML	A-4, A-2	0	95-100	80-100	52-90	25-55	<20	NP-4
	32-50	Stratified fine sand to very fine sandy loam.	SM, ML	A-2, A-4	0	95-100	80-100	60-90	20-60	---	NP
LnB Lordstown	0-8	Channery silt loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	8-34	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]LOC:											
Lordstown	0-4	Channery silt loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	4-32	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[1]LOC:											
Arnot	0-3	Channery silt loam.	ML, GM, SM	A-2, A-4	5-10	60-85	55-80	45-80	30-70	<30	NP-5
	3-17	Very channery silt loam, very channery loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
[1]LY:											
Lyons	0-9	Very stony silt loam.	ML, OL, SM	A-2, A-4, A-6	2-10	60-75	55-70	50-90	30-85	30-40	5-15
	9-32	Silt loam.	CL, GC,	A-4, A-6	0-15	60-95	55-90	45-85	25-80	20-35	5-15

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
[1]NBF:											
Nassau	0-3	Very shaly silt loam, shaly silt loam.	ML, GM, SM	A-2, A-4	5-20	50-85	45-80	40-75	25-70	10-20	1-6
	3-16	Very shaly silt loam, very shaly loam.	GM	A-2, A-4	10-25	45-70	25-55	20-55	15-50	10-20	1-6
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Bath	0-4	Gravelly loam, gravelly silt loam.	ML, GM, SM, OL	A-2, A-4	5-15	60-95	50-95	40-85	30-80	30-40	5-10
	4-26	Channery loam, gravelly silt loam.	SM, GM, ML	A-2, A-4	5-10	65-95	50-90	40-85	20-80	20-35	NP-7
	26-48	Channery silt loam, very gravelly sandy loam.	GM, SM, GM-GC, ML	A-1, A-2, A-4	10-15	40-90	30-85	30-85	20-75	20-25	3-6
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
[1]NMC, [1]NNF:											
Nassau	0-3	Shaly silt loam	ML, GM	A-2, A-4	5-20	50-85	45-80	40-75	25-70	10-20	1-6
	3-16	Very shaly silt loam, very shaly loam.	GM	A-2, A-4	10-25	45-70	25-55	20-55	15-50	10-20	1-6
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Manlius	0-15	Shaly silt loam	ML, GM, SM, CL-ML	A-4	5-10	60-90	55-85	45-85	30-75	<25	NP-5
	15-32	Very shaly silt loam, very shaly loam.	GM, ML, GM-GC, CL-ML	A-2, A-4, A-1	10-25	25-70	20-65	20-65	15-60	<25	NP-5
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]NOD:											
Nassau	0-6	Shaly silt loam	ML, GM, SM	A-2, A-4	5-20	50-85	45-80	40-75	25-70	10-20	1-6
	6-16	Very shaly silt loam, very shaly loam.	GM	A-2, A-4	10-25	45-70	25-55	20-55	15-50	10-20	1-6

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
OgB---------- Oquaga	0-7	Channery silt loam.	ML, GM, SM	A-4	5-10	60-85	55-80	50-80	35-65	<25	NP-5
	7-32	Very channery loam, very channery silt loam, channery silt loam.	GM, ML	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	<25	NP-5
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]OlC:											
Oquaga----------	0-7	Channery silt loam.	ML, GM, SM	A-4	5-20	60-85	55-80	50-80	35-65	<25	NP-5
	7-32	Very channery loam, very channery silt loam, channery silt loam.	GM, ML	A-1, A-2, A-4	10-25	35-70	25-60	20-60	15-55	<25	NP-5
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Lordstown---------	0-8	Channery silt loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	8-32	Channery silt loam, channery loam.	ML, GM, SM	A-4	5-10	65-85	50-75	50-75	40-65	<30	NP-4
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]ORC, [1]ORD:											

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
PlB, PlC---------- Plainfield	0-9	Loamy sand------	SM	A-2, A-4	0	100	100	55-95	15-40	---	NP
	9-32	Sand, loamy sand	SP, SM	A-3, A-1, A-2	0	75-100	75-100	45-85	4-30	---	NP
	32-65	Sand----------	SW-SP	A-3	0	95-100	90-100	45-70	0-10	---	NP
[1]PmD, [1]PmF: Plainfield--------	0-5	Loamy sand, loamy fine sand.	SM	A-2, A-4	0	100	100	55-95	15-40	---	NP
	5-28	Sand, loamy sand.	SP, SM	A-3, A-1, A-2	0	75-100	75-100	45-85	4-30	---	NP
	28-65	Sand----------	SW, SP	A-3	0	95-100	90-100	45-70	0-10	---	NP
Riverhead---------	0-6	Fine sandy loam, loam.	SM, ML	A-4	0-5	95-100	90-100	55-95	30-75	14-18	1-3
	6-23	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4, A-1	0-5	65-100	60-95	40-80	20-45	14-18	1-3
	23-62	Loamy sand, gravelly loamy sand.	SM, GM, SP-SM, GP-GM	A-1, A-2, A-4	0-5	75-100	70-95	30-70	5-30	---	NP
[1]PrC: Plainfield--------	0-9	Loamy sand------	SM	A-2, A-4	0	100	100	55-95	15-40	---	NP
	9-32	Sand, loamy sand, loamy coarse sand.	SP, SM	A-3, A-1, A-2	0	75-100	75-100	45-70	4-30	---	NP
	32-65	Sand----------	SW-SP	A-3	0	95-100	95-100	45-70	0-10	---	NP
Rock outcrop.											
Pt---------- Pompton	0-9	Fine sandy loam	SM, SC, SM-SC	A-4	0	85-100	85-100	65-85	35-50	20-30	3-10
	9-29	Fine sandy loam, sandy loam.	SM, SC, SM-SC	A-2, A-4, A-6	0	95-100	95-100	45-75	30-50	20-30	3-10
	29-61	Stratified sandy loam to sand.	SM, SP, SP-SM	A-1, A-2, A-6	0	90-100	90-100	45-75	5-45	<20	NP
Ra---------- Raynham	0-8	Silt loam-------	ML	A-4	0	100	95-100	80-100	55-95	<20	NP
	8-37	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	80-100	55-95	<20	NP
	37-56	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	80-100	55-95	<20	NP
Re---------- Red Hook	0-8	Gravelly silt loam.	ML, SM, GM, OL	A-4	0-5	60-80	55-75	50-75	40-65	20-30	2-4
	8-30	Silt loam, loam, very gravelly sandy loam.	ML, SM, GM, GP-GM	A-1, A-2, A-4	0-5	30-90	25-85	15-80	10-70	20-30	2-4
	30-50	Gravelly silt loam, very gravelly sandy loam.	GM, GP-GM	A-1, A-2, A-4	5-10	30-65	25-60	15-55	10-50	20-30	2-4
RhA, RhB---------- Rhinebeck	0-8	Silt loam-------	ML, MH, OL	A-6, A-7	0	90-100	85-100	70-100	60-90	30-55	10-25
	8-35	Silty clay loam, silty clay.	CH, CL	A-7	0	90-100	85-100	80-100	70-95	45-65	25-35
	35-50	Stratified silty clay to silt loam.	CL, CL-ML	A-7, A-6, A-4	0	90-100	85-100	80-100	70-95	45-65	25-35

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RvA, RvB, RvC------ Riverhead	0-8	Fine sandy loam	SM, ML	A-2, A-4	0-5	95-100	90-100	55-95	30-75	14-18	1-3
	8-26	Sandy loam, fine sandy loam, gravelly sandy loam.	SM, GM	A-2, A-4, A-1	0-5	65-100	60-95	40-80	20-45	14-18	1-3
	26-62	Loamy sand, gravelly loamy sand.	SM, GM, SP-SM, GP-GM	A-1, A-2, A-4	0-5	75-100	70-95	30-70	5-30	---	NP
[1]RXC: Rock outcrop.											
Arnot----------	0-3	Channery silt loam, channery loam.	ML, GM, SM	A-2, A-4	5-10	60-85	55-80	45-80	30-70	<30	NP-5
	3-17	Very channery silt loam, very gravelly loam.	GM, GM-GC	A-2, A-4, A-1	10-25	30-60	25-55	20-55	15-50	<30	NP-5
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]RXE: Rock outcrop.											
Arnot	0-3	Very bouldery	ML, GM	A-2, A-4	10-20	60-85	50-80	50-80	30-70	<30	NP-5

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--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	
[1]SdB:											
Scriba	0-13	Gravelly fine sandy loam, gravelly loam.	SM, GM, ML	A-2, A-4, A-1	0-5	55-80	50-75	40-65	20-55	<15	NP-4
	13-50	Gravelly fine sandy loam, very gravelly sandy loam, gravelly loam.	GM, ML, SM	A-2, A-4, A-1	0-5	35-75	30-70	20-65	15-60	<15	NP-4
Morris	0-13	Flaggy silt loam	GM, ML, SM	A-4, A-2	0-10	60-95	55-75	45-75	30-65	20-30	1-10
	13-80	Channery silt loam, channery loam, channery silty clay loam.	GM, ML, SM	A-2, A-4	0-10	60-95	45-80	40-80	25-75	15-25	NP-9
[1]SEB:											
Scriba	0-13	Very bouldery fine sandy loam.	SM, GM, ML	A-2, A-4, A-1	3-10	55-90	55-80	40-70	20-60	<15	NP-4
	13-50	Gravelly fine sandy loam, very gravelly sandy loam, gravelly loam, very bouldery loam.	GM, ML, SM	A-2, A-4, A-1	0-5	35-70	30-70	20-65	15-60	<15	NP-4
Morris	0-13	Very stony silt loam.	GM, ML, SM	A-4, A-2	3-10	60-95	55-80	40-80	30-70	20-30	1-10
	13-80	Channery loam, channery silt loam, channery silty clay loam.	GM, ML, SM	A-2, A-4	0-10	60-95	45-80	40-80	25-75	15-25	NP-9
[1]SGB:											
Scriba	0-13	Extremely bouldery fine sandy loam, extremely bouldery loam.	GM, ML, SM	A-2, A-4, A-1	5-20	65-90	50-80	40-75	20-60	<15	NP-4
	13-50	Gravelly fine sandy loam, very gravelly sandy loam, gravelly silt loam.	GM, ML, SM	A-2, A-4, A-1	0-10	35-70	30-70	20-65	15-60	<15	NP-4
Morris	0-17	Extremely bouldery silt loam, extremely bouldery loam.	GM, ML, CL, SM	A-4, A-2	5-25	60-95	55-80	40-80	30-70	20-30	1-10
	17-80	Gravelly loam, flaggy silt loam, very channery silty clay loam.	GM, ML, SM	A-2, A-4	0-20	60-95	45-80	40-80	25-75	15-25	NP-9

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
[1]SmB, [1]SmC:											
Stockbridge-------	0-7	Gravelly silt loam.	ML, GM, SM	A-4	0-5	65-80	60-75	55-75	45-75	25-35	3-8
	7-34	Loam, silt loam, gravelly silt loam.	ML, SM, CL-ML, GM-GC	A-4	0-5	65-95	60-90	60-85	40-75	20-30	3-8
	34-56	Loam, silt loam, gravelly loam.	ML, SM, CL-ML, GM-GC	A-4	0-5	60-95	55-90	50-80	35-75	<30	NP-8
	56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Farmington--------	0-7	Gravelly silt loam.	ML, CL, GM, GC	A-2, A-4, A-6, A-1	0-5	55-80	50-75	35-70	20-65	20-35	3-15
	7-15	Silt loam, loam, gravelly fine sandy loam.	ML, CL, GM, GC	A-2, A-4, A-6, A-1	0-5	60-95	55-90	35-85	20-80	20-35	3-15
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
[1]STD:											
Stockbridge-------	0-5	Gravelly silt loam.	ML, GM-SM	A-4	0-5	60-80	60-75	55-75	45-75	25-35	3-8
	5-29	Loam, silt loam, gravelly silt loam.	ML, SM, CL-ML, GM-GC	A-4	0-5	65-95	60-90	60-85	40-75	20-30	3-8
	29-48	Loam, silt loam, gravelly loam.	ML, SM, CL-ML, GM-GC	A-4	0-5	60-95	55-90	50-80	35-75	<30	NP-8
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Farmington--------	0-5	Gravelly silt loam.	ML, CL, GM-GC, GM	A-2, A-4, A-6, A-1	0-5	55-80	50-75	45-70	35-65	20-35	3-15
	5-15	Silt loam, loam, gravelly fine sandy loam.	ML, CL, GM-GC, GM	A-2, A-4, A-6, A-1	0-5	60-95	55-90	35-85	20-80	20-35	3-15
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Su---------- Suncook	0-3	Loamy fine sand	SM	A-2	0	95-100	85-100	65-70	15-35	---	NP
	3-53	Stratified loamy fine sand to gravelly coarse sand.	SP, SM, SW	A-1, A-2, A-3	0	60-100	45-100	20-95	0-35	---	NP
SwB, SwC---------- Swartswood	0-7	Stony fine sandy loam.	SM, ML	A-1, A-2, A-4	0-20	60-90	50-85	30-80	15-65	---	---
	7-29	Gravelly fine sandy loam, very gravelly sandy loam, gravelly loam.	SM, ML, GM	A-1, A-2, A-4, A-3	0-25	60-90	50-90	30-85	15-65	<25	NP-3
	29-60	Gravelly fine sandy loam, very gravelly sandy loam, gravelly loam.	GM, SM, ML, GW-GM	A-1, A-2, A-4, A-3	5-25	50-85	35-80	20-75	10-60	<20	NP-3

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
Te---------- Teel	0-10	Silt loam-------	ML, CL, CL-ML,	A-4, A-6	0	100	95-100	90-100	60-90	15-35	2-15
	10-38	Silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	0	100	95-100	80-100	50-90	15-35	2-15
	38-50	Silt loam, fine sandy loam, gravelly very fine sandy loam.	ML, SM, CL, SM-SC	A-4, A-6	0-5	75-100	70-100	50-100	30-90	<25	NP-15
Tg---------- Tioga	0-10	Fine sandy loam	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
	10-34	Silt loam, loam, gravelly fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-100	20-90	<15	NP-2
	34-65	Silt loam, gravelly sandy loam, very gravelly loamy sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-100	5-90	<15	NP-2
TkA, TkB, TkC------ Tunkhannock	0-7	Gravelly loam---	SM, GM, ML	A-2, A-4	0-15	50-90	55-70	45-60	30-55	---	---
	7-30	Gravelly silt loam, cobbly loam, very gravelly sandy loam.	SM, GM, ML, GP-GM	A-2, A-1, A-4	0-25	40-80	25-75	20-70	10-65	<25	NP-3
	30-80	Gravelly sandy loam, very gravelly loamy sand, very cobbly sand.	SM, GM, GP, SP	A-1, A-2	5-25	30-80	25-70	15-55	5-15	<20	NP-2
TuB, TuC, TuD------ Tunkhannock	0-7	Gravelly loam---	ML, SM, GM	A-2, A-4	0-15	60-80	55-75	45-70	30-55	---	NP
	7-30	Gravelly loam, gravelly silt loam, very gravelly sandy loam.	SM, GM, ML, GP-GM	A-1, A-2, A-4	0-25	40-80	25-75	20-70	10-65	<25	NP-3
	30-42	Very cobbly sand, very gravelly loamy sand, gravelly sandy loam.	SM, GM, SP-SM, GP-GM	A-1, A-2, A-3	5-25	30-80	25-70	15-55	5-15	<20	NP-2
	42-80	Silty clay, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	95-100	80-95	25-35	5-15
Un---------- Unadilla	0-10	Silt loam-------	ML	A-4	0	100	95-100	90-100	60-90	15-20	2-4
	10-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	60-90	15-20	2-4
	42-50	Stratified very gravelly sand to silty clay loam.	GM, GC, ML, CL	A-4, A-2, A-1, A-6	0-10	35-100	25-95	15-90	5-85	15-40	NP-15

See footnote at end of table.

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[illegible]	0-2	Very bouldery [illegible]	ML, SM	A-4, A-2	5-10	70-95	60-90	50-90	20-80	<25	NP-5

TABLE 14.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[1]WLB:											
Wellsboro---------	0-9	Very bouldery silt loam.	ML, CL, SM	A-4	3-20	70-90	65-80	60-80	45-75	---	---
	9-21	Flaggy loam, channery silt loam, gravelly loam.	ML, GM, SM	A-4	0-15	70-90	60-80	55-80	40-70	15-40	NP-10
	21-50	Flaggy loam, channery silt loam, very channery sandy loam.	GM, ML, CL, SM	A-2, A-4	0-20	55-90	45-90	35-80	25-60	15-30	NP-10
Wurtsboro---------	0-6	Very bouldery	SM, GM	A-2, A-4	3-15	60-85	55-80	40-70	30-45	---	---

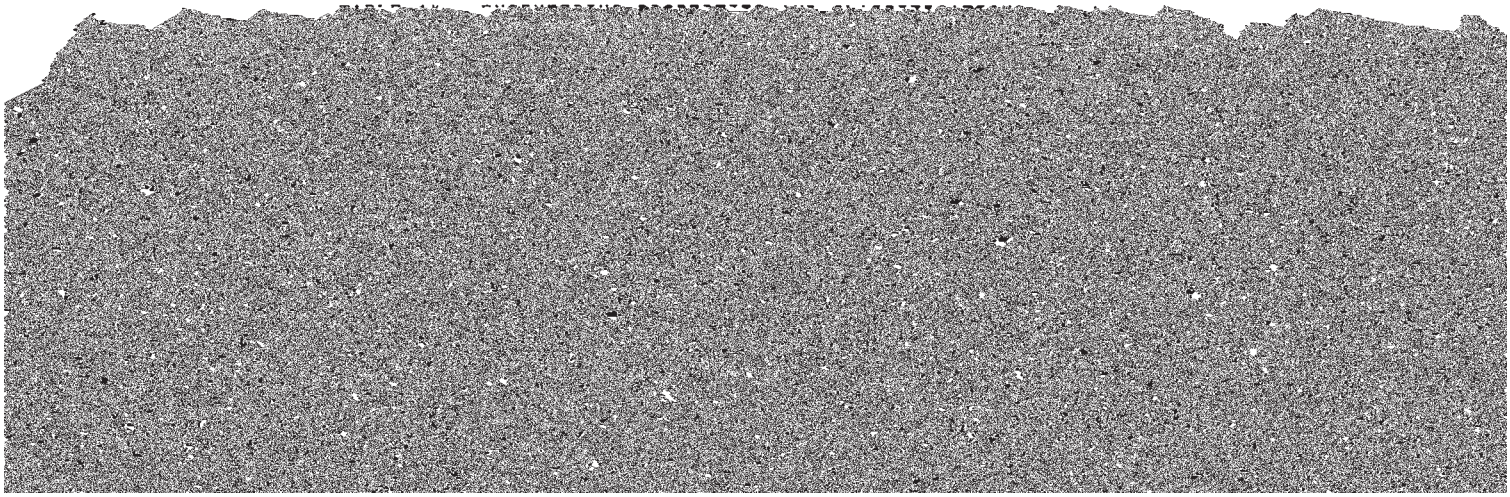


TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
AA. Alluvial land							
AcB---------- Arnot	0-7	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.24	2-1
	7-17	0.6-2.0	0.08-0.12	3.6-6.0	Low----------	0.17	
	17	---	---	---	----------	---	
[1]ARD:							
Arnot----------	0-2	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.24	2-1
	2-14	0.6-2.0	0.08-0.12	3.6-6.0	Low----------	0.17	
	14	---	---	---	----------	---	
Lordstown-------	0-4	0.6-2.0	0.11-0.17	4.5-5.5	Low----------	0.20	3
	4-32	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	32	---	---	---	----------	---	
Rock outcrop.	---	---	---	---	----------	---	
[1]ARF:							
Arnot----------	0-3	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.24	2-1
	3-14	0.6-2.0	0.08-0.12	3.6-6.0	Low----------	0.17	
	14	---	---	---	----------	---	
Oquaga----------	0-5	0.6-2.0	0.08-0.17	3.6-6.0	Low----------	0.24	3
	5-26	0.6-2.0	0.04-0.12	3.6-6.0	Low----------	0.28	
	26	---	---	---	----------	---	
Rock outcrop.							
At---------- Atherton	0-7	0.6-2.0	0.16-0.21	5.1-7.3	Low----------	---	---
	7-28	0.6-2.0	0.10-0.19	5.6-7.8	Low----------	---	

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
[1]BOD:							
Bath----------	0-6	0.6-2.0	0.10-0.20	4.5-6.0	Low----------	0.24	3
	6-28	0.6-2.0	0.08-0.18	4.5-6.0	Low----------	0.28	
	28-48	<0.2	0.01-0.06	4.5-6.5	Low----------	0.28	
	48	---	---	---	----------	---	
Nassau----------	0-6	0.6-2.0	0.08-0.16	4.5-5.5	Low----------	0.20	2
	6-16	0.6-2.0	0.07-0.12	4.5-5.5	Low----------	0.20	
	16	---	---	---	----------	---	
Rock outcrop							

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
Ha---------- Hamlin	0-8	0.6-2.0	0.18-0.21	6.1-7.3	Low----------	---	---
	8-38	0.6-2.0	0.17-0.19	6.1-7.3	Low----------	---	
	38-58	0.6-2.0	0.17-0.19	6.6-7.8	Low----------	---	
He---------- Haven	0-11	0.6-2.0	0.15-0.19	4.5-5.0	Low----------	0.43	3
	11-25	0.6-6.0	0.08-0.12	4.5-5.5	Low----------	0.24	
	25-60	>20	0.01-0.03	4.5-5.5	Low----------	0.17	
HfA, HgA, HgB, HgC, HgD, [1]HSF-- Hoosic	0-8	2.0-6.0	0.05-0.12	4.5-5.5	Low----------	0.17	3-2
	8-20	2.0-6.0	0.05-0.11	4.5-5.5	Low----------	0.17	
	20-80	>6.0	0.01-0.05	5.1-6.0	Low----------	0.17	
HuB, HuC--------- Hudson	0-7	0.2-2.0	0.16-0.21	5.1-7.3	Moderate-------	0.49	3
	7-38	<0.2	0.13-0.17	5.1-7.3	Moderate-------	0.28	
	38-60	<0.2	0.12-0.20	6.6-8.4	Moderate-------	0.28	
[1]HvC3, [1]HwD, [1]HXE:							
Hudson---------	0-6	0.2-2.0	0.16-0.21	5.1-7.3	Moderate-------	0.49	2
	6-27	<0.2	0.13-0.17	5.1-7.3	Moderate-------	0.28	
	27-60	<0.2	0.12-0.20	6.6-8.4	Moderate-------	0.28	
Schoharie------	0-7	0.2-0.6	0.17-0.21	5.6-7.3	Moderate-------	0.49	2
	7-29	<0.2	0.12-0.17	5.6-7.8	Moderate-------	0.28	
	29-50	<0.2	0.12-0.14	7.4-8.4	Moderate-------	0.28	
LaB, LaC--------- Lackawanna	0-7	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.24	3
	7-17	0.6-2.0	0.10-0.14	4.5-5.5	Low----------	0.28	
	17-80	0.06-0.2	0.01-0.06	4.5-6.0	Low----------	0.28	
[1]LCD, [1]LCF:							
Lackawanna------	0-3	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.24	3
	3-17	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	17-80	0.06-0.2	0.01-0.06	4.5-6.0	Low----------	0.28	
Swartswood------	0-4	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.20	3
	4-33	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.28	
	33-60	0.06-0.6	0.01-0.06	3.6-5.5	Low----------	0.28	
[1]LEE:							
Lackawanna------	0-3	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.24	3
	3-23	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	23-80	0.06-0.2	0.01-0.06	4.5-6.0	Low----------	0.28	
Swartswood------	0-4	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.20	3
	4-29	0.6-2.0	0.08-0.12	3.6-5.5	Low----------	0.28	
	29-60	0.06-0.6	0.01-0.06	3.6-5.5	Low----------	0.28	
Lm---------- Lamson	0-10	2.0-6.0	0.12-0.16	5.6-7.3	Low----------	---	---
	10-32	2.0-6.0	0.11-0.13	6.1-7.8	Low----------	---	
	32-50	2.0-6.0	0.02-0.04	6.6-7.8	Low----------	---	
LnB---------- Lordstown	0-8	0.6-2.0	0.11-0.17	4.5-5.5	Low----------	0.20	3
	8-34	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	34	---	---	---	----------	---	
[1]LOC:							
Lordstown-------	0-4	0.6-2.0	0.11-0.17	4.5-5.5	Low----------	0.20	3
	4-32	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	32	---	---	---	----------	---	
Arnot----------	0-3	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.24	2-1
	3-17	0.6-2.0	0.08-0.12	3.6-6.0	Low----------	0.17	
	17	---	---	---	----------	---	
Rock outcrop.	---	---	---	---	----------	---	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
[1]LY:							
Lyons----------	0-9	0.6-2.0	0.11-0.16	5.6-7.3	Low----------	---	---
	9-32	0.2-2.0	0.08-0.18	6.1-7.8	Low----------	---	
	32-50	<0.2	0.06-0.15	7.4-8.4	Low----------	---	
Atherton--------	0-7	0.6-2.0	0.16-0.21	5.1-7.3	Low----------	---	---
	7-28	0.6-2.0	0.10-0.19	5.6-7.8	Low----------	---	
	28-65	0.6-6.0	0.05-0.12	6.1-7.8	Low----------	---	
Ma---------- Madalin	0-8	0.2-0.6	0.16-0.21	5.6-7.4	Moderate-------	---	---
	8-45	0.06-0.2	0.12-0.13	5.6-7.8	Moderate-------	---	
	45-50	<0.2	0.12-0.13	7.4-7.8	Moderate-------	---	
MdB---------- Mardin	0-10	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.24	3
	10-21	0.6-2.0	0.09-0.16	4.5-6.0	Low----------	0.28	
	21-46	<0.2	0.01-0.03	4.5-6.5	Low----------	0.28	

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
[1]NOD:							
Nassau----------	0-6	0.6-2.0	0.08-0.16	4.5-5.5	Low----------	0.20	2
	6-16	0.6-2.0	0.07-0.12	4.5-5.5	Low----------	0.20	
	16	---	---	---	----------	---	
Rock outcrop.							
OdA, OdB---------	0-8	0.2-0.6	0.17-0.21	5.6-7.3	Moderate-------	0.49	3
Odessa	8-38	<0.2	0.12-0.17	5.6-7.8	Moderate-------	0.28	
	38-50	<0.06	0.12-0.14	7.4-8.4	Moderate-------	0.28	
OgB----------	0-7	0.6-2.0	0.08-0.17	3.6-6.0	Low----------	0.24	3
Oquaga	7-32	0.6-2.0	0.04-0.12	3.6-6.0	Low----------	0.20	
	32	---	---	---	----------	---	
[1]OlC:							
Oquaga----------	0-7	0.6-2.0	0.08-0.17	3.6-6.0	Low----------	0.24	3
	7-32	0.6-2.0	0.04-0.12	3.6-6.0	Low----------	0.20	
	32	---	---	---	----------	---	
Lordstown-------	0-8	0.6-2.0	0.11-0.17	4.5-5.5	Low----------	0.20	3
	8-32	0.6-2.0	0.10-0.16	4.5-5.5	Low----------	0.28	
	32	---	---	---	----------	---	
[1]ORC, [1]ORD:							
Oquaga----------	0-5	0.6-2.0	0.08-0.17	3.6-6.0	Low----------	0.24	3
	5-32	0.6-2.0	0.04-0.12	3.6-6.0	Low----------	0.20	
	32	---	---	---	----------	---	
Arnot----------	0-3	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.24	2-1
	3-17	0.6-2.0	0.08-0.12	3.6-6.0	Low----------	0.17	
	17	---	---	---	----------	---	
Rock outcrop.							
Pa----------	0-44	2.0-20	0.35-0.45	4.5-7.3	----------	---	---
Palms	44-56	0.2-2.0	0.14-0.22	6.1-8.4	Low----------	---	
Pb----------	0-30	2.0-20	0.35-0.45	4.5-7.3	----------	---	---
Palms bedrock	30-38	0.6-2.0	0.04-0.17	6.1-7.3	Low----------	0.28	
Variant	38	---	---	---	----------	---	
PlB, PlC---------	0-9	2.0-6.0	0.10-0.12	4.5-7.3	Low----------	0.17	5
Plainfield	9-65	6.0-20	0.03-0.07	4.5-6.0	Low----------	0.17	
[1]PmD, [1]PmF:							
Plainfield------	0-5	2.0-6.0	0.10-0.12	4.5-6.0	Low----------	0.17	5
	5-28	6.0-20	0.03-0.07	4.5-6.0	Low----------	0.17	
	28-65	6.0-20	0.05-0.07	4.5-6.0	Low----------	---	
Riverhead-------	0-6	2.0-6.0	0.16-0.18	4.5-5.5	Low----------	0.28	3
	6-23	2.0-6.0	0.09-0.13	4.5-5.5	Low----------	0.24	
	23-62	>20	0.02-0.04	4.5-7.3	Low----------	0.17	
[1]PrC:							
Plainfield------	0-9	2.0-6.0	0.10-0.12	4.5-6.0	Low----------	0.17	5
	9-65	6.0-20	0.03-0.07	4.5-6.0	Low----------	0.17	
Rock outcrop.							
Pt----------	0-9	0.6-6.0	0.14-0.18	4.5-5.5	Low----------	0.24	3
Pompton	9-29	0.6-6.0	0.12-0.16	4.5-5.5	Low----------	0.24	
	29-61	>6.0	0.05-0.10	4.5-5.5	Low----------	0.20	
Ra----------	0-8	0.6-2.0	0.20-0.25	5.1-7.3	Low----------	0.49	3
Raynham	8-37	0.2-2.0	0.18-0.22	5.1-7.3	Low----------	0.64	
	37-56	0.06-0.2	0.18-0.22	5.6-7.8	Low----------	0.64	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
Re---------- Red Hook	0-8	0.6-2.0	0.09-0.12	5.1-6.5	Low----------	0.20	3
	8-30	0.6-2.0	0.04-0.17	5.6-7.3	Low----------	0.20	
	30-50	0.2-2.0	0.04-0.11	5.6-7.3	Low----------	0.20	
RhA, RhB--------- Rhinebeck	0-8	0.2-0.6	0.16-0.21	5.1-7.3	Moderate-------	0.49	3
	8-35	0.06-0.2	0.12-0.14	5.1-7.8	Moderate-------	0.28	
	35-50	0.06-0.2	0.12-0.14	7.4-7.8	Moderate-------	0.28	
RvA, RvB, RvC---- Riverhead	0-8	2.0-6.0	0.16-0.18	4.5-5.5	Low----------	0.28	3
	8-26	2.0-6.0	0.09-0.13	4.5-5.5	Low----------	0.24	
	26-62	>20	0.02-0.04	4.5-7.3	Low----------	0.17	
[1]RXC, [1]RXE, [1]RXF: Rock outcrop.							
Arnot----------	0-3	0.6-2.0	0.10-0.15	3.6-6.0	Low----------	0.24	2-1
	3-17	0.6-2.0	0.08-0.12	3.6-6.0	Low----------	0.17	
	17	---	---	---	----------	---	
SaB, SaC--------- Schoharie	0-10	0.2-0.6	0.17-0.21	5.6-7.3	Moderate-------	0.49	3
	10-36	<0.2	0.12-0.17	5.6-7.8	Moderate-------	0.28	
	36-50	<0.2	0.12-0.14	7.4-8.4	Moderate-------	0.28	
Sc---------- Scio	0-10	0.6-2.0	0.18-0.21	4.5-6.0	Low----------	0.49	3
	10-47	0.6-2.0	0.17-0.20	4.5-6.0	Low----------	0.64	
	47-55	0.06-20	0.02-0.19	5.1-7.8	Low----------	0.17	
[1]SdB:							
Scriba----------	0-13	0.6-2.0	0.08-0.16	3.6-6.5	Low----------	0.24	3
	13-50	0.06-0.2	0.00-0.04	5.1-7.3	Low----------	0.24	
Morris----------	0-13	0.6-2.0	0.10-0.16	4.5-6.0	Low----------	0.24	3
	13-80	0.06-0.6	0.06-0.08	5.1-6.5	Low----------	0.28	
[1]SEB:							
Scriba----------	0-13	0.6-2.0	0.10-0.16	3.6-6.5	Low----------	0.24	3
	13-50	0.06-0.2	0.00-0.04	5.1-7.3	Low----------	0.24	
Morris----------	0-13	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	3
	13-80	0.06-0.6	0.06-0.08	5.1-6.5	Low----------	0.28	
[1]SGB:							
Scriba----------	0-13	0.6-2.0	0.10-0.16	3.6-6.6	Low----------	0.24	3
	13-50	0.06-0.2	0.00-0.04	5.1-7.3	Low----------	0.24	
Morris----------	0-17	0.6-2.0	0.12-0.16	4.5-6.0	Low----------	0.24	3
	17-62	0.06-0.6	0.06-0.08	5.1-6.5	Low----------	0.28	
[1]SmB, [1]SmC:							
Stockbridge-----	0-7	0.6-2.0	0.11-0.28	5.1-6.5	Low----------	0.24	3
	7-34	0.6-2.0	0.08-0.24	5.1-7.3	Low----------	0.43	
	34-56	0.06-0.2	0.10-0.14	6.6-7.8	Low----------	0.17	
	56	---	---	---	----------	---	
Farmington------	0-7	0.6-2.0	0.12-0.15	5.1-6.5	Low----------	0.28	2
	7-15	0.6-2.0	0.07-0.18	5.6-7.8	Low----------	0.28	
	15	---	---	---	----------	---	

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
[1]STD:							
Stockbridge-----	0-5	0.6-2.0	0.11-0.28	5.1-6.5	Low----------	0.28	3
	5-29	0.6-2.0	0.08-0.24	5.1-7.3	Low----------	0.43	
	29-48	0.06-0.2	0.10-0.14	6.6-7.3	Low----------	0.17	
	48	---	---	---	----------	---	
Farmington-----	0-5	0.6-2.0	0.12-0.15	5.1-6.5	Low----------	0.28	2

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors	
						K	T
	In	In/hr	In/in	pH			
[1]WLB:							
Wellsboro-------	0-9	0.6-2.0	0.10-0.16	4.5-6.0	Low----------	0.20	3
	9-21	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.28	
	21-50	0.06-0.2	0.01-0.06	4.5-6.0	Low----------	0.28	
Wurtsboro-------	0-6	0.6-2.0	0.10-0.16	3.6-6.0	Low----------	0.24	3
	6-19	0.6-2.0	0.10-0.14	3.6-6.0	Low----------	0.28	
	19-56	0.06-0.2	0.01-0.06	3.6-6.0	Low----------	---	
[1]WOB:							
Wellsboro-------	0-7	0.6-2.0	0.10-0.16	4.5-6.0	Low----------	0.20	3
	7-21	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.28	
	21-60	0.06-0.2	0.01-0.06	4.5-6.0	Low----------	0.28	
Wurtsboro-------	0-6	0.6-2.0	0.10-0.16	3.6-6.0	Low----------	0.24	3
	6-19	0.6-2.0	0.10-0.14	3.6-6.0	Low----------	0.28	
	19-56	0.06-0.2	0.01-0.06	3.6-6.0	Low----------	---	
WsA, WsB---------	0-8	0.6-2.0	0.18-0.20	4.5-6.0	Low----------	0.49	3
Williamson	8-18	0.6-2.0	0.18-0.20	4.5-6.5	Low----------	0.64	
	18-42	0.06-0.2	0.10-0.14	5.1-6.0	Low----------	0.64	
	42-52	0.06-0.2	0.10-0.14	5.1-7.3	Low----------	0.43	
WuB----------	0-6	0.6-2.0	0.10-0.17	4.5-6.0	Low----------	0.24	3
Wurtsboro	6-19	0.6-2.0	0.10-0.14	4.5-6.0	Low----------	0.28	
	19-56	0.06-0.2	0.01-0.06	4.5-6.0	Low----------	0.28	

[1]This map unit is made up of two or more dominant kinds of soil. See description of the map unit for composition and behavior characteristics of the whole map unit.

TABLE 16.--SOIL AND WATER FEATURES

d "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." . Absence of an entry indicates that the feature is not a concern. Areas of Alluvial land and riable to be estimated]

Flooding			High water table			Bedrock			Risk of corrosion	
ncy	Duration	Months	Depth	Kind	Months	Depth	Hardness[1]	Potential frost action	Uncoated steel	Concrete
			Ft			In				
-----	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
-----	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
-----	---	---	>6.0	---	---	20-40	Hard	Low------	Low------	High.
-----	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
-----	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
-----	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
nal	Brief-----	Dec-Apr	3.0-6.0	Apparent	Nov-Apr	>60	---	Moderate	Low------	Moderate.
nal	Brief-----	Dec-Apr	0.5-2.0	Apparent	Nov-May	>60	---	High-----	Moderate	Moderate.
-----	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
-----	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
-----	---	---	2.0-4.0	Perched	Nov-Mar	40	Hard	Moderate	Moderate	Moderate.
-----	---	---	>6.0	---	---	10-20	Rippable	Moderate	Low------	High.
-----	---	---	2.0-4.0	Perched	Nov-Mar	40	Hard	Moderate	Moderate	Moderate.
-----	---	---	>6.0	---	---	10-20	Rippable	Moderate	Low------	High.
-----	---	---	20-40	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.

.

RES--Continued

table	Months	Bedrock Depth	Bedrock Hardness[1]	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
	Nov-Apr	>60	---	Moderate	Moderate	Moderate.
	Jan-Apr	>60	---	High-----	Moderate	Moderate.
t	Nov-May	>60	---	High-----	High-----	Low.
t	Sep-Jun	>60	---	High-----	High-----	Low.
t	Mar-May	>60	---	Moderate	Moderate	Moderate.
	Apr-May	>60	---	Moderate	High-----	Low.
	---	>60	---	Moderate	Low------	Moderate.
	Dec-May	>60	---	Moderate	High-----	Low.
	---	10-20	Hard	Moderate	Low------	Moderate.
	Nov-May	>60	---	High-----	Low------	Low.
	Mar-Apr	>60	---	Moderate	Low------	High.
	---	>60	---	Low------	Low------	High.
	Feb-Apr	>60	---	High-----	High-----	Low.
	Feb-Apr	>60	---	High-----	High-----	Low.
	Feb-Apr	>60	---	Moderate	High-----	Low.
	Nov-Mar	>60	---	Moderate	Low------	Moderate.

Corrosion
Concrete
Moderate.
High.
Low.
High.
High.
High.
Low.
Low.
Low.
Moderate.
Moderate.
High.
High.
Moderate.
Moderate.
Moderate.
High.
Moderate.
High.

ed

Bedrock		Potential frost action	Risk of corrosion	
epth	Hardness		Uncoated steel	Concrete
In				
0-40	Rippable	Moderate	Low------	Moderate.
0-20	Rippable	Moderate	Low------	High.
>60	---	Moderate	High-----	Low.
0-40	Hard	Moderate	Low------	High.
0-40	Hard	Moderate	Low------	High.
0-40	Hard	Low------	Low------	High.
0-40	Hard	Moderate	Low------	High.
0-20	Hard	Moderate	Low------	High.
>60	---	High-----	High-----	Moderate.
0-50	Hard	High-----	High-----	Moderate.
>60	---	Low------	Low------	High.
>60	---	Low------	Low------	High.
>60	---	Moderate	Low------	High.
>60	---	Low------	Low------	High.
>60	---	Moderate	Moderate	High.
>60	---	High-----	High-----	Moderate.
>60	---	High-----	High-----	Moderate.

TABLE 16.--SOIL AND WATER FEATURES--Continued

ame and ymbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness[1]		Uncoated steel	Concrete
					Ft			In				
---------- ck	D	None--------	---	---	0.5-1.5	Perched	Jan-May	>60	---	Moderate	High-----	Low.
, RvC----- ad	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
XE, [2]RXF: tcrop.												
----------	C/D	None--------	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
---------- ie	C	None--------	---	---	1.5-3.0	Perched	Feb-Apr	>60	---	Moderate	High-----	Low.
----------	B	None to rare	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Moderate.
----------	C	None--------	---	---	0.5-1.5	Perched	Nov-May	>60	---	High-----	Moderate	Moderate.
----------	C	None--------	---	---	0.5-1.5	Perched	Nov-May	>60	---	High-----	High-----	Moderate.
GB:												
----------	C	None--------	---	---	0.5-1.5	Perched	Nov-May	>60	---	High-----	Moderate	Moderate.
----------	C	None--------	---	---	0.5-1.5	Perched	Nov-May	>60	---	High-----	High-----	Moderate.
mC:												
idge------	B	None--------	---	---	3.0-6.0	Perched	Dec-Apr	>40	Hard	Moderate	Moderate	Low.
ton-------	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	Moderate.
idge------	B	None--------	---	---	3.0-6.0	Perched	Dec-Apr	>40	Hard	Moderate	Moderate	Low.
ton-------	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	Moderate.
utcrop.												
----------	A	Common------	Very brief or brief.	Jan-Apr	3.0-6.0	Apparent	Jan-Apr	>60	---	Low------	Low------	High.
---------- ood	C	None--------	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Low------	High.
----------	B	Common------	Brief-----	Nov-May	0.5-2.0	Apparent	Jan-May	>60	---	High-----	Moderate	Low.
----------	B	Common------	Very brief or brief.	Jan-Apr	3.0-6.0	Apparent	Jan-Apr	>60	---	Moderate	Low------	Moderate.
, TkC----- nock	A	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.

footnotes at end of table.

URES--Continued

table	Months	Bedrock Depth	Bedrock Hardness[1]	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In				
d	Mar-May	>60	---	Moderate	Low------	High.
	---	>60	---	High-----	Low------	Low.
d	Feb-Apr	>60	---	Moderate	Low------	High.
d	Dec-May	>60	---	High-----	High-----	Moderate.
nt	Dec-Apr	>60	---	Moderate	Moderate	High.
nt	Nov-Jun	>60	---	High-----	High-----	Low.
d	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
d	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
d	Nov-Mar	>60	---	Moderate	Moderate	High.
d	Feb-Apr	>60	---	High-----	Moderate	Moderate.
d	Nov-Mar	>60	---	Moderate	Moderate	High.

cavations can be made by ripping. Blasting is generally

e description of the map unit for composition and

TABLE 17.--ENGINEERING TEST DATA

Absence of an entry indicates that data were not available. NP means nonplastic]

Classification		Grain size distribution											Liquid limit	Plasticity index	Moisture density		Linear shrinkage
		Larger than 3 inches	Percentage passing sieve							Percentage smaller than--							
AASHTO	Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	
		Pct											Pct		Lb/ft^3	Pct	Pct
A-4 (01)	SM	10	100	94	89	84	77	64	50	24	7	3	40	5	93	24	4.8
A-4 (00)	SM	10	100	96	92	87	79	66	49	26	14	6	23	3	114	15	2.4
A-4 (00)	SM-SC	10	97	91	87	82	73	60	44	24	13	8	23	5	122	12	4.0
A-4 (00)	SM-SC	10	100	91	85	78	68	54	38	22	12	7	20	4	121	12	3.0
A-2-4(00)	SM	15	91	81	75	70	63	51	33	16	9	5	18	3	129	9	3.2
A-4 (00)	SM	15	99	94	90	88	85	79	42	20	10	7	17	1	124	11	1.6
A-4 (03)	ML	5	100	95	89	83	75	64	54	35	16	7	37	8	108	16	5.8
A-4 (00)	SC	5	98	88	81	73	62	48	37	25	14	9	25	8	120	13	4.4
A-2-4(00)	SM-SC	5	100	89	92	75	64	45	33	14	9	--	24	7	121	12	5.0
A-4 (01)	SC	5	95	89	84	78	69	57	43	26	17	11	26	9	121	12	5.6
A-4 (00)	ML	0	100	100	100	99	97	90	60	27	15	15	24	3	109	16	3.6
A-4 (00)	CL-ML	0	100	98	95	92	87	77	53	28	16	16	23	4	123	12	3.8
A-1-b(01)	SW	0	100	96	88	77	57	17	2	1	1	--	--	NP	120	10	0.4
A-7-5(11)	ML	0	100	98	97	96	94	87	73	56	28	12	45	14	95	24	6.8
A-6 (14)	CL	0	100	100	100	100	99	94	88	74	47	28	38	16	100	23	3.0
A-7-6(17)	CL	0	100	100	100	99	98	95	92	80	57	37	42	17	99	24	8.0
A-7-6(25)	CL	0	100	100	100	100	100	99	98	88	67	45	49	22	99	23	9.6
A-6 (18)	CL	0	100	100	100	99	98	97	95	88	59	38	39	18	105	21	0.0

end of table.

TABLE 17.--ENGINEERING TEST DATA--Continued

cation	Grain size distribution											Liquid limit	Plasticity index	Moisture density		Linear shrinkage
	Larger than 3 inches	Percentage passing sieve							Percentage smaller than--							
Unified		2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200	.02 mm	.005 mm	.002 mm			Max. dry density	Optimum moisture	
	Pct											Pct		Lb/ft³	Pct	Pct
SM	0	100	100	100	100	100	79	17	9	5	4	--	NP	113	13	0.0
SM	0	100	100	100	99	99	79	19	11	8	5	--	NP	118	10	0.0
SM	0	100	100	100	97	95	71	17	9	6	4	--	NP	117	10	0.0
SP	0	100	100	100	99	98	55	2	--	--	--	--	NP	102	15	0.0
SM	10	84	73	72	71	70	57	27	14	6	4	--	NP	94	2	0.0
SM	10	100	95	92	86	75	59	31	9	6	3	--	NP	121	11	1.8
SM	10	98	88	82	76	69	55	26	13	4	2	--	NP	130	8	0.0
SM	10	87	74	69	65	61	51	26	11	3	1	--	NP	129	8	0.0
SM	5	94	85	82	77	73	61	33	26	13	8	--	NP	105	14	3.4
SM	5	100	94	90	83	76	58	32	17	10	7	18	2	129	7	2.4
SM	15	98	92	87	80	74	57	30	17	10	7	15	2	131	7	2.0
SM	0	100	100	100	100	100	100	44	15	8	6	--	NP	112	14	0.4
SM	0	100	100	100	100	100	100	44	16	8	5	--	NP	113	13	0.8
CL-ML	0	100	100	100	100	100	100	77	29	12	7	22	4	110	15	4.0
SM	0	100	100	100	100	100	100	41	16	7	4	--	NP	113	13	1.2
SM	0	100	100	100	100	100	100	37	29	12	7	20	2	110	15	2.0
SM	0	100	100	100	100	100	100	44	15	7	4	--	NP	111	15	0.6
ML	0	100	100	100	100	100	99	96	63	27	14	33	6	98	23	5.0
CL	0	100	100	100	100	100	100	90	32	19	--	32	9	101	22	4.0
CL	0	100	100	100	100	100	100	100	71	31	18	32	10	102	21	6.0
CL-ML	0	100	100	100	100	100	100	87	49	22	13	23	5	112	14	2.0

le.

oisture density		
Max. dry density	Optimum moisture	Linear shrinkage
b/ ft	Pct	Pct
70	39	5.6
89	29	5.6
06	19	4.0
10	17	4.0
98	21	5.2
20	12	1.0
27	10	2.0
32	9	2.0
30	9	1.4

bany Road.

t South Road.

of Rt-52.

TABLE 18.--RELATIONSHIP BETWEEN PARENT MATERIAL, POSITION, AND DRAINAGE OF SOIL SERIES

Parent material	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON TILL PLAINS AND MOUNTAINS					
Deep, dominantly medium textured, brownish glacial till with a compact fragipan.	----------	Bath-------	Mardin------	Volusia----	----------	----------
Deep, dominantly moderately coarse textured, brownish glacial till with a compact fragipan.	----------	Swartswood-	Wurtsboro---	Scriba-----	----------	Menlo------
Deep, dominantly medium textured, reddish glacial till with a compact fragipan.	----------	Lackawanna-	Wellsboro---	Morris-----	----------	----------
Deep, medium textured, brownish glacial till with clay accumulation in a compact fragipan.	----------	----------	Cambridge---	----------	----------	----------
Deep, medium textured, brownish, medium lime glacial till.	----------	Stockbridge	----------	----------	Lyons------	Lyons-----
Deep, medium or moderately coarse textured, reddish to brownish, low lime glacial till.	----------	Valois-----	----------	----------	----------	----------
Deep, dominantly moderately fine textured glacial till mantled with 20 to 40 inches of lacustrine clay and silt.	----------	Cayuga-----	Cayuga------	Churchville	----------	----------
Moderately deep, medium textured, brownish glacial till over sandstone.	----------	Lordstown--	----------	----------	----------	----------
Moderately deep, medium textured, reddish glacial till over sandstone.	Oquaga[1] -----	Oquaga-----	----------	----------	----------	----------
Moderately deep, medium textured, brownish glacial till over tilted shale.	Manlius[1] ----	Manlius----	----------	----------	----------	----------
Shallow, medium textured, reddish on brownish glacial till over sandstone or shale.	Arnot--------	Arnot------	Arnot-------	Tuller-----	Tuller-----	----------
Shallow, medium textured, brownish glacial till over tilted shale.	Nassau-------	----------	----------	----------	----------	----------
Shallow, medium textured, brownish glacial till over limestone.	Farmington---	Farmington-	----------	----------	----------	----------
	SOILS ON LACUSTRINE PLAINS AND TERRACES					
Clayey, brownish glaciolacustrine deposits.	----------	----------	Hudson------	Rhinebeck--	Madalin----	Madalin---
Clayey, reddish glaciolacustrine deposits.	----------	Schoharie--	Schoharie---	Odessa-----	----------	----------
Silty, brownish glaciolacustrine deposits with a compact fragipan.	----------	----------	Williamson--	----------	----------	----------
Silty, brownish glaciolacustrine and glaciofluvial deposits without a fragipan.	----------	Unadilla---	Scio--------	Raynham----	Canandaigua	Canandaigua

See footnotes at end of table.

-RELATIONSHIP BETWEEN PARENT MATERIAL, POSITION, AND DRAINAGE OF SOIL SERIES--Continued

material	Somewhat excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
	SOILS ON OUTWASH PLAINS, DELTAS, TERRACES, AND KAMES					
brownish, medium textured	Chenango	Chenango	Castile	Red Hook	Atherton	Atherton
reddish, medium or d glaciofluvial material.	Tunkhannock	Tunkhannock	----------	----------	----------	----------
brownish, moderately vial material.	Hoosic	----------	----------	----------	----------	----------
brownish, medium to d glaciofluvial material gravelly medium textured	----------	Haven	----------	----------	----------	----------
oarse textured	----------	Riverhead	Pompton	Walpole	Lamson	Lamson
red glaciofluvial	Plainfield[2]	----------	----------	----------	----------	----------
	SOILS ON FLOOD PLAINS					
moderately coarse textured	----------	Tioga	Middlebury	Middlebury	----------	----------
xtured alluvial sediment.	----------	Hamlin	Teel	Teel	Wayland	Wayland
moderately coarse textured and and gravel.	----------	Barbour	Basher	Basher	----------	----------
xtured alluvial sediment.	Suncook[2]	----------	----------	----------	----------	----------
	SOILS ON SWAMPS OR BOGS					
e than 51 inches thick.	----------	----------	----------	----------	----------	Carlisle
terial, 16 to 50 inches l soil.	----------	----------	----------	----------	----------	Palms
terial, 20 to 50 inches	----------	----------	----------	----------	----------	Palms, bedrock variant

sively drained in some places.
sively drained instead of somewhat excessively drained.

TABLE 19.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Arnot	Loamy-skeletal, mixed, mesic Lithic Dystrochrepts
Atherton	Fine-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Barbour	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Dystrochrepts
Basher	Coarse-loamy, mixed, mesic Fluvaquentic Dystrochrepts
Bath	Coarse-loamy, mixed, mesic Typic Fragiochrepts
Cambridge	Fine-loamy, mixed, mesic Aqueptic Fragiudalfs
Canandaigua	Fine-silty, mixed, nonacid, mesic Mollic Haplaquepts
Carlisle	Euic, mesic Typic Medisaprists
Castile	Loamy-skeletal, mixed, mesic Aquic Dystrochrepts
Cayuga	Fine, illitic, mesic Glossoboric Hapludalfs
Chenango	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Churchville	Fine, illitic, mesic Aeric Ochraqualfs
Farmington	Loamy, mixed, mesic Lithic Eutrochrepts
Hamlin	Coarse-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Haven	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Hoosic	Sandy-skeletal, mixed, mesic Typic Dystrochrepts
Hudson	Fine, illitic, mesic Glossaquic Hapludalfs

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