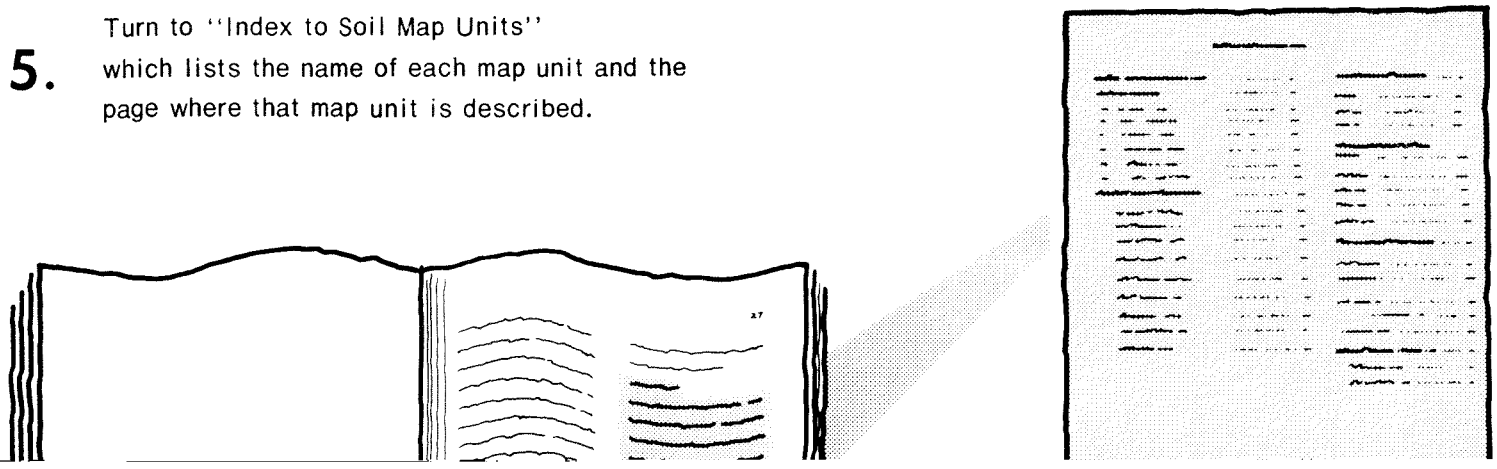
Soil Survey of

OCEAN COUNTY, NEW JERSEY

HOW TO USE

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.



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 1970-77. Soil names and descriptions were approved in 1977. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service and the New Jersey Agricultural Experiment Station, Cook College, Rutgers, the State Uni-

Contents

	Page
Index to map units	iv
Summary of tables	v
Foreword	vii
Climate	1
How this survey was made	2
General soil map for broad land use planning	2
General soil map descriptions	2
1. Lakehurst-Lakewood-Evesboro association	2
2. Downer-Evesboro association	3
3. Shrewsbury-Collington-Tinton association	3
4. Sulfaquents-Sulfihemists association	3
5. Urban land-Fripp association	3
6. Woodmansie-Downer association	4
7. Manahawkin-Atsion-Berryland association	4
Soil maps for detailed planning	4
Map unit descriptions	5
Soil properties	22
Engineering properties	22
Physical and chemical properties	23
Soil and water features	24
Use and management of the soils	25
Crops	25
Capability classes and subclasses	26
Yields per acre	27
Ornamental plantings	27
Woodland management and productivity	27
Wildlife habitat	28
Recreation	29
Engineering	30
Building site development	30
Sanitary facilities	31
Construction materials	32
Water management	33
Formation of the soils	33
Factors of soil formation	33
Parent material	34
Climate	34
Relief	34
Plant and animal life	34
Time	34
Soil horizons	34
Soil series and morphology	35
Adelphia series	35
Atsion series	36
Aura series	36
Berryland series	37
Collington series	37
Downer series	38
Evesboro series	38
Fripp series	38
Hammonton series	39
Humaquepts	39
Keyport series	40
Klej series	40
Kresson series	41
Lakehurst series	41
Lakewood series	42
Manahawkin series	42
Mullica series	43
Pemberton series	44
Phalanx series	44
Psamments	45
Sassafras series	45
Shrewsbury series	46
Sulfaquents	46
Sulfihemists	46
Tinton series	47
Woodmansie series	47
Classification of the soils	48
References	48
Glossary	49
Illustrations	55
Tables	63

Issued April 1980

Reissued Date February 1989

Index to map units

	Page
AdA—Adelphia fine sandy loam, 0 to 3 percent slopes	5
KlA—Klej loamy sand, 0 to 3 percent slopes	13
KrA—Kresson fine sandy loam, 0 to 3 percent	[illegible]

Summary of tables

Page

Acreage and proportionate extent of the soils (Table 4) 66
Acres. Percent.

Building site development (Table 14) 91
Shallow excavations. Dwellings without basements. Dwellings with basements. Small commercial buildings. Local roads and streets. Lawns and landscaping.

Capability classes and subclasses (Table 8) 77
Class. Total acreage. Major management concerns (Subclass)—Erosion (e), Wetness (w), Soil problem (s).

Classification of the soils (Table 19) 102
Soil name. Family or higher taxonomic class.

Construction materials (Table 16) 97
Roadfill. Sand. Gravel. Topsoil.

Engineering properties and classifications (Table 5) 67
Depth. USDA texture. Classification—Unified, AASHTO. Fragments greater than 3 inches. Percentage passing sieve number—4, 10, 40, 200. Liquid limit. Plasticity index.

Freeze dates in spring and fall (Table 2) 65
Probability. Minimum temperature.

Growing season length (Table 3) 65
Probability. Daily minimum temperature during growing season.

Ornamental trees and shrubs (Table 10) 80
Deciduous trees. Evergreen trees. Deciduous shrubs. Evergreen shrubs.

Physical and chemical properties of soils (Table 6) 72
Depth. Permeability. Available water capacity. Soil reaction. Shrink-swell potential. Erosion factors—K, T. Wind erodibility group.

Recreational development (Table 13) 88
Camp areas. Picnic areas. Playgrounds. Paths and trails. Golf fairways.

Sanitary facilities (Table 15) 94
Septic tank absorption fields. Sewage lagoon areas. Trench sanitary landfill. Area sanitary landfill. Daily cover for landfill.

Summary of tables—Continued

Page

Soil and water features (Table 7) 75

Hydrologic group. Flooding—Frequency, Duration, Months. High water table—Depth, Kind, Months. Potential frost action. Risk of corrosion—Uncoated steel, Concrete.

Soil series arranged according to texture of the subsoil and natural drainage (Table 18) 101

Texture of the subsoil and other soil characteristics. Excessively drained. Well drained. Moderately well drained. Somewhat poorly drained. Poorly drained. Very poorly drained.

Temperature and precipitation data (Table 1) 64

Month. Temperature—Average daily maximum, Average daily minimum, Average daily, Average number of growing degree days. Precipitation—Average, Average number of days with 0.10 inch or more, Average snowfall.

Water management (Table 17) 99

Embankments, dikes, and levees. Aquifer-fed excavated ponds. Drainage. Irrigation. Terraces and diversions. Grassed waterways.

Wildlife habitat potentials (Table 12) 86

Potential for habitat elements—Grain and seed crops, Grasses and legumes, Wild herbaceous plants, Hardwood trees, Coniferous plants, Wetland plants, Shallow water areas. Potential as habitat for—Openland wildlife, Woodland wildlife, Wetland wildlife.

Woodland management and productivity (Table 11) 84

Ordination symbol. Management concerns—Erosion hazard, Equipment limitation, Seedling mortality, Windthrow hazard. Potential productivity—Common trees, Site index. Trees to plant.

Yields per acre of crops and pasture (Table 9) 78

Corn. Soybeans. Wheat. Alfalfa hay. Tomatoes.

Foreword

The Soil Survey of Ocean County 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, 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.

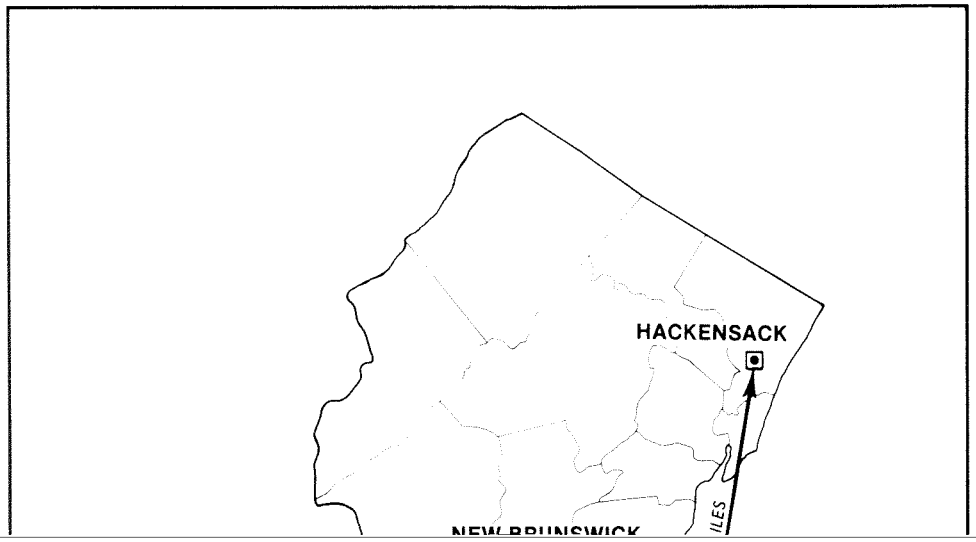
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes 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 specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

Warren J. Fitzgerald

Warren J. Fitzgerald
State Conservationist
Soil Conservation Service


HACKENSACK
NEW BRUNSWICK

SOIL SURVEY OF OCEAN COUNTY, NEW JERSEY

By Thornton J.F. Hole, Soil Conservation Service,
and Howard C. Smith, New Jersey Department of Agriculture

Fieldwork by Thomas A. Drewes, Andre Gingus, Clarence F. Jablonski, and John H. Johnson,
Soil Conservation Service, and Steven Cleck, New Jersey Department of Agriculture

21 inches. The heaviest 1-day rainfall during the period of record was 4.9 inches at Toms River on July 9, 1964. Thunderstorms occur on about 25 days each year, and most occur in summer.

Average seasonal snowfall is 17 inches. The greatest snow depth at any one time during the period of record was 13 inches. On the average, 1 day has 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 56 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The percentage of possible sunshine is 60 in summer and 45 in winter. The prevailing wind is from the south. 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.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been altered

tations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

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

The general soil map

soils, 35 percent Lakewood soils, 10 percent Evesboro soils, and 15 percent minor soils (fig. 1).

Nearly level Lakehurst soils are on broad areas adjacent to streams and depressions. The soils are moder-

This association makes up about 1 percent of the county. The association is about 30 percent Shrewsbury soils, 25 percent Collington soils, 25 percent Tinton soils, and 20 percent minor soils (fig. 3).

This association makes up about 2 percent of the county. The association is about 50 percent Urban land, 35 percent Fripp soils, and 15 percent minor soils.

Urban land in this association consists of areas of Fripp soils that have been put in residential and commer-

35 percent Atsion soils, 20 percent Berryland soils, and 10 percent minor soils (fig. 5).

Manahawkin soils are generally in submerged valleys adjacent to streams. The soils are very poorly drained.

are somewhat poorly drained or moderately well drained. The Mullica soils have more clay in the surface layer and subsoil than this Atsion soil. The Manahawkin soils have 16 to 51 inches of organic material over a sandy substratum. Included soils make up about 15 percent of this map unit.

The permeability of this soil is moderately rapid. If the soil is drained, available water capacity is low, but water is available to plants from the water table. The seasonal high water table is between the surface and a depth of 1 foot from November to June. Some areas have water ponded on the surface. In summer the water table is at a depth of 2 to 3 feet but is as deep as 5 feet in places during extended dry periods. Areas adjacent to perennial streams are subject to rare to occasional flooding. Organic matter content of the soil is moderate, and natural fertility is low. Unless the soil has been limed, the surface layer is extremely acid and the subsoil and substratum are strongly acid to very strongly acid. Runoff is very slow. Tilth is good, and the soil is easily worked when drained.

Most of the acreage of this soil is used for woodland. A few acres are in pasture.

This soil is well suited to such special crops as cranberries and blueberries. Wetness limits most other types of crop production. Land smoothing is needed for blueberries and cranberries. Controlling the level of the water table is needed for blueberry production, and cranberry production requires a carefully designed system of dikes

substratum. Fripp soils are excessively drained and are on dunes. Included soils make up about 10 percent of this map unit.

The permeability of this soil is moderately rapid. Available water capacity is low. The seasonal high water table is between the surface and a depth of 3 feet. It is at a greater depth in soils at high positions where tidal flooding occurs the least. Organic matter content of the soil is moderate, and natural fertility is low. The soil is very strongly acid or strongly acid throughout. Runoff is very slow.

Most of the acreage of this soil is used for wildlife habitat. The remaining acreage is used for salt hay production, and only grasses and shrubs with some salt tolerance will grow on this soil. The soil is poorly suited to farming, pasture, and woodland production. Tidal flooding and the high water table make the soil poorly suited to urban uses.

This soil is in capability subclass VIIIw.

AxB—Aura sandy loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on divides and side slopes. Slopes are dominantly convex and range from 100 to 300 feet in length. The areas are irregular in shape and range from about 40 to 900 acres.

Typically, the surface layer is grayish brown sandy loam about 3 inches thick. The subsurface layer is yellowish brown sandy loam 13 inches thick. The subsoil is firm, yellowish red sandy clay loam and sandy loam 34

species. Controlled burning is a major forest management practice.

This soil is generally suitable for most urban uses, but slope limits its use for playgrounds and the moderately slow permeability of the subsoil is a limitation for septic tank sewage disposal fields.

This soil is in capability subclass IIs.

Be—Berryland sand. This nearly level, very poorly drained soil is in depressional areas and on broad, low flats. The areas mainly are adjacent to tidal marshes and are generally irregular in shape. They range from about 25 to 300 acres. Some areas that are adjacent to streams are long and narrow.

Typically, the surface layer is black sand about 11 inches thick. The subsurface layer is gray sand 4 inches thick. The upper part of the subsoil is very dark brown loamy sand 9 inches thick, and the lower part is light brownish gray sand 11 inches thick. The substratum is light gray sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Berryland soils with a mucky surface layer; areas of Berryland sand, frequently flooded; and areas of Atsion, Manahawkin, Lakehurst, and Mullica soils. The Atsion soils have a thinner surface layer than this Berryland soil and are

tree species. The seasonal high water table limits the harvesting of trees during the winter and spring.

The seasonal high water table limits this soil for most urban uses.

This soil is in capability subclass Vw.

BF—Berryland sand, frequently flooded. This nearly level, very poorly drained soil is on flood plains adjacent to large streams. The areas are generally long and narrow and range from about 5 to 200 acres.

Typically, the surface layer is black sand about 12 inches thick. The subsurface layer is light gray sand 3 inches thick. The subsoil is dark reddish brown loamy sand 7 inches thick. The substratum is light gray sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of Manahawkin soils, Berryland sand, and Atsion soils. The Manahawkin soils have 16 to 51 inches of organic material over a sandy substratum. The Atsion soils are poorly drained. Included soils make up about 20 percent of this map unit.

The permeability of this soil is moderately rapid. If the soil is drained, available water capacity is low, but water is available to plants from the water table. The seasonal high water table is at the surface from November to

length. The areas are irregular in shape and range from

The permeability of this soil is moderate. Available

planting cover crops, farming on the contour, installing diversions where necessary, and using a crop rotation that includes grasses and legumes. Tilth and organic matter can be maintained by controlling erosion, planting cover crops, plowing under crop residue, and using a rotation containing sod.

The soil is well suited to pasture. Proper seeding, proper stocking rates, and rotation of pastures are the

common species. Pines are more common in abandoned fields. Prescribed burning is used to control wildfires.

This soil is generally suitable for most urban uses. The included Hammonton and Klej soils have a high water table that limits the unit as a site for houses with basements and for septic tank sewage disposal fields. The soil is limited for use as recreational areas by the loose, sandy surface.

side slopes. Slopes are dominantly convex and range from 100 to 300 feet in length. The areas are irregular in shape and range from about 50 to 400 acres.

Typically, the surface layer is grayish brown sandy loam about 4 inches thick. The subsurface layer is yellowish brown sandy loam 10 inches thick. The subsoil is brown sandy loam 14 inches thick. The substratum extum is brownish yellow gravelly sand to a depth of 60 inches and brownish yellow sand at a depth of more than 60 inches.

Included with this soil in mapping are areas of Downer sandy loam and Downer loamy sand that make up about 15 percent of this map unit.

The permeability of this soil is moderate in the subsoil

maintained by planting cover crops and plowing under crop residue. The included Klej and Lakehurst soils need to be drained in places.

Most of the acreage of this soil is in woodland, but the soil is not well suited to commercial trees. Pitch pine,

range from about 5 to 50 acres. Some small areas are round or oval.

Typically, the surface layer is grayish brown sand about 5 inches thick. The subsoil is yellowish brown sand 23 inches thick. The substratum is yellow sand to a

Flooding, low fertility, low available water capacity, erosion, and salt spray from the ocean make the soil unsuitable for most other uses. The wind erosion hazard is severe but can be controlled by maintaining the present plant cover and planting a cover such as American beachgrass on bare areas.

This soil is in capability subclass VIIs.

HaA—Hammonton loamy sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained and somewhat poorly drained soil is in slightly depressed areas and on low divides. The areas are oval and range from about 10 to 300 acres.

Typically, the surface layer is dark grayish brown loamy sand about 14 inches thick. The upper part of the subsoil is 9 inches of yellowish brown sandy loam. The lower part is 6 inches of yellowish brown loamy sand

The soil is well suited to trees. Black oak, white oak, and pitch pine are the common species. Pines are more common in abandoned fields.

The high water table limits this soil for most urban uses, including sites for houses with basements, septic disposal fields, recreation areas, and sanitary landfills.

This soil is in capability subclass IIw.

HcA—Hammonton sandy loam, 0 to 3 percent slopes. This nearly level, moderately well drained or somewhat poorly drained soil is in depressed areas and on low divides. The areas are oval and range from about 10 to 150 acres.

Typically, the surface layer is dark grayish brown sandy loam about 10 inches thick. The upper part of the subsoil is 18 inches of yellowish brown sandy loam; the lower part is 7 inches of yellowish brown loamy sand

The seasonal high water table limits this soil for most moderate, and natural fertility is medium. Unless the soil

depth of 5 feet or more by June. Organic matter content of this soil is low, and natural fertility is low. Unless the soil has been limed, the surface layer is extremely acid and the subsoil and substratum are very strongly acid.

ganic matter content of the soil is moderate, and natural fertility is high. Unless the soil has been limed, the surface layer is extremely acid and the subsoil and substratum are strongly acid. Runoff is slow. Tilth is fair, and the

and the subsoil and substratum are very strongly acid. Runoff is slow. Tilth is good, and the soil is easily worked.

Because of very low fertility, low available water capacity, and rapid permeability, this soil is not well suited to cultivated crops. If farmed, the soil needs frequent fertilizer applications. Cover crops and windbreak hedges

strongly acid or extremely acid. Runoff is slow. Tilth is good, and the soil is easily worked.

Because of the very low fertility, the low available water capacity, and the rapid permeability in the upper 40 inches, this soil is not suited to cultivated crops. Frequent applications of fertilizer are needed on the soil, and cover crops and windbreak hedges are needed to

Although most of the acreage is wooded, this soil is poorly suited to commercial trees because of low available water capacity and very low fertility. Pitch pine, blackjack oak, post oak, chestnut oak, black oak, and white oak are the common species. Growth is slow, and the

is in depressional areas, and is on broad flats. Most areas are long and narrow and range from about 40 to 1,100 acres. Some large areas are oval.

Typically, the surface layer is black muck about 39 inches thick. The substratum extends to a depth of 60

loamy fine sand with light olive brown mottles. The substratum extends to a depth of more than 60 inches. It is stratified grayish brown loamy fine sand, gray fine sandy loam, and black silt loam to a depth of 53 inches and dark gray fine sand at a depth of more than 53 inches.

Included with this soil in mapping are areas of Hammonton, Manahawkin, Klej, and Lakehurst soils and poorly drained, loamy soils. This Mullica soil has a thicker surface layer than the Klej, Lakehurst, or Hammonton soils and does not have the muck layers common to the Manahawkin soils. Included soils make

light brownish gray sand at a depth of more than 36 inches.

Included with this soil in mapping are areas of Berryland, Atsion, Manahawkin, and Hammonton soils. This Mullica soil has more clay than the Berryland or Atsion soils. It does not have the thick muck layer common to the Manahawkin soils and is not as well drained as the Hammonton soils. Included soils make up about 10 percent of this map unit.

The permeability of this soil is moderate in the subsoil and moderately rapid in the substratum. If the soil is

Included with this soil in mapping are areas of Tinton, Adelphia, and Collington soils. The Tinton and Collington

Tilth is good, and the soil is easily worked. Stones in the subsoil, which in places make up as much as 75 percent

Pm—Pits, sand and gravel. This unit consists of deep, excessively drained to very poorly drained soil material that is dominantly made up of the spoil in a borrow pit, sand pit, gravel pit, or clay pit during mining or after mining has taken place. In some pits the spoil has been smoothed to form a uniform surface. In others it occurs as scattered mounds. Slopes range from nearly level bottoms to vertical walls around the excavation.

Included with this unit in mapping are areas of Aura, Woodmansie, Downer, Evesboro, and Hammonton soils.

Areas of this unit are mostly idle, but some have been planted with trees, and some are used for sanitary landfill or as residential, industrial, or commercial sites.

The soil material in this unit is dominantly sandy and is 5 to 35 percent gravel. The material is mostly strongly acid. Permeability is variable; it is moderately rapid or rapid in borrow areas and sand and gravel pits, and it is slow in clay pits. Available water capacity is low in sandy areas and moderate in clayey areas. Organic matter content is low, and natural fertility is low. Most areas receive moderate to large amounts of water from the areas adjacent to the pits. The water table is between the surface and a depth of more than 5 feet.

Because of the variability of characteristics, these [illegible] al is rapidly permeable. Available water capacity, organic matter content, and natural fertility are low. Reaction is generally very strongly acid.

Before being filled, these sites were subject to daily tidal flooding. Sufficient fill has been added to prevent the normal tidal flooding, but the areas are subject to flooding during storms. Because of this storm flooding hazard and the variability in kinds and amounts of fill, onsite investigation of the areas is needed to make reliable interpretations for any use.

This unit is not assigned to a capability subclass.

PW—Psamments, waste substratum. This unit consists of areas where about 2 feet of sandy fill has been placed over a sanitary landfill. The surface in most places has been smoothed and compacted, and the areas are nearly level or gently sloping. The areas are generally rectangular and range from 40 to 60 acres. Included with this unit in mapping are areas used as sanitary landfills. They make up about 5 percent of the unit.

The refuse material buried in most places includes garbage, paper, plastic, glass, metal, rubber, building debris, and many other kinds of refuse. The thickness of the fill material ranges from 2 to 4 feet, and the thick-

capacity is moderate. Organic matter content is moderate, and natural fertility is medium. Unless the soil has been limed, the surface layer is extremely acid and the subsoil and substratum are very strongly acid. Runoff is medium. Tilth is good, and the soil is easily worked.

This soil is suited to cultivated crops such as soybeans, corn, vegetables, and small grain, and much of the acreage is used for crops. It has a slight water erosion hazard, which can be controlled by planting cover crops. The hazard of wind erosion is severe, and windbreak hedges are needed. Tilth and organic matter content can be maintained by planting cover crops and plowing under crop residue.

The soil is suitable for pasture. Proper seeding, proper stocking, and rotation of pastures are the major pasture management practices on this soil.

This soil is suited to trees. Black oak, white oak, chestnut oak, and pitch pine are the common species. Pine is common in abandoned fields.

Most of the acreage of this soil is farmed. A few acres are in pasture, and a few are in woodland.

If drained, this soil is suited to cultivated crops such as corn, soybeans, small grain, hay, pasture, blueberries, and late-season vegetables. Tilth and organic matter content can be maintained by planting cover crops.

This soil is suited to pasture. Restricted grazing when the soil is wet, drainage, proper seeding, proper stocking, and rotation of pastures are the major pasture management practices on this soil.

This soil is suitable for marketable timber. Willow oak, pin oak, swamp white oak, ash, beech, hickories, sweetgum, blackgum, and red maple are the common species. The seasonal high water table limits harvesting during the winter and spring.

The high water table limits the soil for most urban uses, especially for making excavations. Sidewalls of excavations in this soil collapse when saturated.

This soil is in capability subclass IIIw.

Typically, the surface layer is grayish brown sand about 12 inches thick. The subsurface layer is yellowish brown sand 13 inches thick. The subsoil is dark yellowish brown fine sandy loam 17 inches thick. The substratum consists of stratified light olive brown sand and sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Collington, Evesboro, and Pemberton soils that make up about 15 percent of this map unit.

The permeability of this soil is moderate or moderately rapid in the subsoil and moderately rapid in the substratum. Available water capacity is low in the upper sandy 20 to 30 inches and moderate in the loamy subsoil. Organic matter content is low, and natural fertility is

the barrier islands. The Fripp soils have been altered by grading for housing developments, shopping centers, and recreational uses. Each of the two areas of this complex is about 2,000 acres. The areas are nearly level to gently sloping. The Urban land and Fripp soils are in such an intricate pattern that it was not practical to map them separately.

About 70 percent of the complex is Urban land, where the soils are largely covered by concrete, asphalt, and buildings.

About 20 percent of the complex is Fripp soils. Typically, these areas have a surface layer of light brownish gray fine sand 3 inches thick. The substratum is very

stratum are strongly acid to very strongly acid. Runoff is slow. Tilth is good, and the soil is easily worked.

Most of the acreage of this soil is used for woodland and wildlife habitat. A few acres are farmed.

Because of the low natural fertility, this soil is poorly suited to cultivated crops. The soil has a slight water erosion hazard, which can be controlled by planting cover crops. It has a severe wind erosion hazard, and windbreak hedges are needed. Tilth and organic matter content can be maintained by planting cover crops and plowing under crop residue. Irrigation is needed for most crops.

This soil is poorly suited to pasture. The low fertility and moderate available water capacity are the main limitations.

The soil is suited to trees. Pitch pine, black oak, white oak, and chestnut oak are the common species. Where wildfires have been severe, the vegetation is a dwarf forest of pitch pine, blackjack oak, and scrub oak. Controlling fires is the major management concern.

The soil is generally suitable for most urban uses. The loose, sandy surface is a limitation for recreational areas.

This soil is in capability subclass IVs.

WoC—Woodmansie sand, 5 to 10 percent slopes. This sloping, well drained soil is on side slopes. Slopes are convex and range from 100 to 600 feet in length. Most areas are long and narrow and range from about 10 to 250 acres.

Typically, the surface layer is black sand 1 inch thick. The subsurface layer is gray sand 8 inches thick. The upper part of the subsoil is yellowish brown sand 6 inches thick. The middle part is brown gravelly sandy loam 9 inches thick. The lower part of the subsoil is yellowish brown loamy sand 10 inches thick. The substratum is yellow sand to a depth of 60 inches or more.

Included with this soil in mapping are areas of sloping Lakewood soils and areas of Woodmansie soils that are more sloping or less sloping than this soil, or that are gravelly. Included soils make up about 10 percent of this map unit.

The permeability of this soil is moderate in the subsoil and moderately rapid to rapid in the substratum. Available water capacity is low. Organic matter content and natural fertility are low. Unless the soil has been limed, the surface layer is extremely acid and the subsoil and substratum are strongly acid to very strongly acid. Runoff is medium.

Because of low natural fertility, this soil is not suited to cultivated crops or pasture. The soil has a moderate water erosion hazard, and some areas receive runoff from adjacent higher areas.

Although much of the acreage is used for woodland, this soil is poorly suited to trees. Pitch pine, black oak, white oak, scarlet oak, and chestnut oak are the common species. Growth is slow as a result of frequent severe wildfires, and controlling fires is a major management concern.

Slope and the sandy surface limit the soil for some urban uses.

This soil is in capability subclass IVs.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many 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 properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features.

Engineering properties

Table 5 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 5 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 5 in the standard terms used by the U.S. Department of Agriculture (*10*). These terms are defined according to percentages of sand, silt,

and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering uses are the Unified soil classification classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classifi-

influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

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

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-

installations will function. Also, a seasonal high water table affects ease of excavation.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by 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. Frost action is less severe along the coast, where temperatures are moderated by the ocean.

Risk of corrosion pertains to the 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

can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties 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

The capability subclass is identified in the description of each soil map unit in the section "Soil maps for detailed planning."

The shrubs and trees listed in table 10 have been selected for their suitability to the normal available water capacity of the soils and for the tolerance of the plants to soils with a high water table. The plants selected are

seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring

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

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.

the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope sta-

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures (9). Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 14 shows, for each kind of soil, the degree and kind of limitations for building site development; table 15, for sanitary facilities; and table 17, for water management. Table 16 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

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

Building site development

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

sewage lagoons, and sanitary landfills (*9*). 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 installa-

sonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 16 by ratings of good, fair, or poor (*9*). The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction

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

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.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

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

Parent material. The high winds during the glacial retreat moved and

surface layer of accumulated organic material, known as the O horizon, overlying the mineral A horizon. In most soils the O horizon is about an inch thick; in others it is thicker, and in muck soils such as Manahawkin soils it is as much as 2 or 3 feet thick.

The A horizon is known as the zone of eluviation, where the maximum leaching and translocation of particles result in the removal of the components of the soil matrix. When a small amount of black humidified organic matter becomes incorporated at the surface of the mineral soil, it forms a dark-colored A1 horizon. The light color of the A2 horizon just beneath shows the effects of the removal of clay, iron, aluminum, and other compounds.

white oak, scarlet oak, black oak, hickories, beech, ash, yellow-poplar, sweetgum, and pin oak.

Typical pedon of Adelphia fine sandy loam, 0 to 3 percent slopes, in Plumstead Township, 0.8 mile south of the intersection of County Road 537 and Hornerstown Road, 800 feet east of Hornerstown Road:

Ap—0 to 11 inches, dark grayish brown (2.5Y 4/2) fine sandy loam; weak fine granular structure; friable; many fine roots; less than 10 percent glauconite; slightly acid; abrupt smooth boundary.

B1—11 to 22 inches, light olive brown (2.5 5/6) fine sandy loam; weak fine subangular blocky structure; friable; slightly plastic; common fine roots; less than

Atsion series

The soils of the Atsion series are sandy, siliceous, mesic Aeric Haplaquods. These poorly drained soils formed in acid, sandy Coastal Plain sediments. Atsion soils are in depressional areas and on broad flats. Slopes are less than 2 percent. The natural vegetation consists of pitch pine, red maple, blackgum, swamp white oak, sweetgum, and willow oak and a dense understory of highbush blueberry, sheep laurel, sweet pepperbush, inkberry, and greenbrier. There are a few holly plants where fires are not common.

Typical pedon of Atsion sand, in Jackson Township, 1-1/2 miles northwest of the intersection of Fish and Frank Applegate Roads, 1,500 feet southwest of Frank Applegate Road:

A1—0 to 5 inches, black (10YR 2/1) sand; very weak medium granular structure; very friable; many fine and medium roots; extremely acid; abrupt wavy boundary.

A2—5 to 18 inches, light gray (10YR 7/1) sand; single grain; loose; common fine and medium roots; extremely acid; clear smooth boundary.

B2h—18 to 24 inches, dark reddish brown (5YR 3/2) loamy sand; massive; firm; weakly cemented; few medium roots; very strongly acid; clear smooth boundary.

Cg—24 to 60 inches, light gray (10YR 6/1) sand; single grain; loose; very strongly acid.

The solum thickness ranges from 20 to 40 inches. Depth to the Bh horizon ranges from 16 to 24 inches. In

natural vegetation consists of black oak, white oak, scarlet oak, chestnut oak, and pitch pine and an understory of scrub oak, mountain laurel, and lowbush blueberry.

Typical pedon of Aura sandy loam, 2 to 5 percent slopes, in Union Township, 0.8 mile northeast of the intersection of N.J. route 72 and County route 532, 100 feet south of route 532:

A1—0 to 1 inch, dark grayish brown (10YR 4/2) sandy loam; weak medium granular structure; very friable; many fine roots; 5 percent quartzose gravel; extremely acid; abrupt smooth boundary.

A2—1 to 3 inches, grayish brown (10YR 5/2) sandy loam; weak medium granular structure; very friable; many fine and medium roots; 5 percent quartzose gravel; extremely acid; abrupt smooth boundary.

A3—3 to 16 inches, yellowish brown (10YR 4/6) sandy loam; weak medium subangular blocky structure; friable; common medium roots; 10 percent quartzose pebbles; extremely acid; clear smooth boundary.

IIB21t—16 to 21 inches, yellowish red (5YR 5/6) sandy clay loam; weak coarse subangular blocky structure; very firm; few medium roots; thick clay bridges; 5 percent quartzose pebbles; very strongly acid; gradual smooth boundary.

IIB22t—21 to 36 inches, yellowish red (5YR 5/6) sandy clay loam; massive; very firm; roots confined mainly to vertical cracks; thick clay bridges; 5 percent quartzose pebbles; very strongly acid; clear smooth boundary.

IIIB23t—36 to 50 inches, yellowish red (5YR 5/8) sandy loam; massive; firm; roots confined mainly to vertical

sandy loam, gravelly sand, gravelly loamy sand, and

The C horizon has hue of 10YR, value of 6 or 7, and

sists of strata of sand and sandy loam 1/2 inch to 2 inches thick.

Downer series

The soils of the Downer series are coarse-loamy, siliceous, mesic Typic Hapludults. These deep, well drained soils formed in acid, loamy Coastal Plain sediments. Downer soils are on divides and side slopes. Slope ranges from 0 to 5 percent but is dominantly 2 to 5 percent. The natural vegetation includes white oak, black oak, chestnut oak, and a few pitch pines, shortleaf pines, and Virginia pines. The understory is lowbush blueberry, laurel, and bracken fern.

Typical pedon of Downer loamy sand, 0 to 5 percent slopes, in Stafford Township, 200 feet southeast of the Garden State Parkway, 50 feet south of Oxycocus Road:

The C horizon has a hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. It is mainly sand, loamy sand, gravelly sand, or gravelly loamy sand. In some pedons, below a deph of 40 inches it has strata of sandy loam and sandy clay loam.

Evesboro series

The soils of the Evesboro series are mesic, coated Typic Quartzipsamments. These deep, excessively drained soils formed in acid, sandy Coastal Plain sediments. Evesboro soils are on divides and side slopes. Slope ranges from 0 to 15 percent but is dominantly 2 to 5 percent. The natural vegetation includes chestnut oak, post oak, blackjack oak, white oak, black oak, and pitch pine and an understory of lowbush blueberry and bracken fern.

on divides and side slopes. Slope ranges from 2 to 10 percent. The natural vegetation includes beach plum, wild cherry, eastern redcedar, and American holly and an understory of bayberry, smooth sumac, poison ivy, greenbrier, beach heather, and prickly-pear cactus.

Fripp soils as mapped in Ocean County are taxadjuncts to the series because soil temperature and pH value are lower than defined for the series. In Ocean County, soils in the Fripp series are mixed, mesic Typic Udipsamments.

Typical pedon of Fripp fine sand, 2 to 10 percent slopes, in Island Beach Boro, 4.1 miles south of the entrance to Island Beach State Park, 200 feet east of Central Avenue:

A1—0 to 3 inches, light brownish gray (10YR 6/2) fine sand; single grain; loose; many fine roots; 5 percent black (N 2/0) and dark brown (10YR 3/2) sand grains; strongly acid; abrupt smooth boundary.

C1—3 to 10 inches, very pale brown (10YR 8/3) fine sand; single grain; loose; common medium roots; 5 percent black and dark brown sand grains; strongly acid; clear smooth boundary.

C2—10 to 46 inches, very pale brown (10YR 7/3) fine sand; single grain; loose; few medium roots; 5 percent black and dark brown sand grains; medium acid; gradual smooth boundary.

C3—46 to 60 inches, white (10YR 8/2) fine sand; single grain; loose; 5 percent black and dark brown sand grains; slightly acid.

The depth to the underlying white sand ranges from 36 to 50 inches. The reaction of the profile ranges from strongly acid to slightly acid.

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

The C horizon has hue of 10YR or 2.5Y. The upper part of the C horizon has value of 7 or 8 and chroma of 3 or 4. The lower part has value of 7 or 8 and chroma of 1 or 2. The C horizon is fine sand and sand.

Hammonton series

The soils of the Hammonton series are coarse-loamy, siliceous, mesic Aquic Hapludults. These deep, moderately well drained or somewhat poorly drained soils formed in acid, loamy Coastal Plain sediments. Hammonton soils are in depressional areas and on low divides and side slopes. Slope ranges from 0 to 5 percent but is dominantly 0 to 2 percent. The natural vegetation consists of white oak, southern red oak, and black oak and an understory of lowbush blueberry, greenbrier, mountain laurel, sheep laurel, inkberry, and holly.

Typical pedon of Hammonton sandy loam, 0 to 3 percent slopes, in Manchester Township, 500 feet south of the intersection of County road 571 and Alligator Road, 50 feet west of Alligator Road:

Ap—0 to 10 inches, dark grayish brown (10YR 4/2) sandy loam; moderate fine granular structure; very friable; many fine roots; 1 percent quartzose pebbles; slightly acid; gradual wavy boundary.

B2t—10 to 28 inches, yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; common fine roots; 10 percent quartzose pebbles; sand grains bridged with clay; very strongly acid; clear smooth boundary.

B3—28 to 35 inches, yellowish brown (10YR 5/6) loamy sand; common medium distinct light brownish gray (10YR 6/2) mottles; weak fine granular structure; very friable; few fine roots; very strongly acid; clear smooth boundary.

C1—35 to 48 inches, brownish yellow (10YR 6/8) sand; common medium distinct light gray (10YR 7/2) mottles; single grain; loose; very strongly acid; gradual wavy boundary.

C2—48 to 60 inches, light gray (10YR 7/2) sand; common coarse prominent brownish yellow (10YR 6/8) mottles; single grain; loose; very strongly acid.

The solum thickness ranges from 20 to 35 inches. Coarse fragments of quartzose gravel make up less than 10 percent of the solum and less than 30 percent of the C horizon. Unless the soil has been limed, reaction is extremely acid in the A horizon and very strongly acid in the B and C horizons.

All parts of the A horizon have hue of 10YR or 2.5Y. The A1 horizon has value of 3 or 4 and chroma of 2. Where present, the Ap horizon has value of 3 or 4 and chroma of 2 and the A2 horizon has value of 4 to 6 and chroma of 4 to 6. The A horizon is loamy sand or sandy loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 or 6. The lower part of the B horizon has mottles with value of 5 or 6 and chroma of 2. The B horizon mainly is sandy loam. Some pedons have a B3 horizon of loamy sand.

The C horizon has hue of 10YR or 2.5Y. The upper part of the C horizon has value of 6 or 7 and chroma of 6 or 8 and has mottles with value of 6 or 7 and chroma of 2. The lower part of the C horizon has value of 6 or 7 and chroma of 2 and has mottles with value of 5 or 6 and chroma of 6 or 8. The stratified horizons are dominantly loamy sand, sand, gravelly loamy sand, and gravelly sand. Below a depth of 40 inches, some pedons are sandy loam or sandy clay loam stratified with coarser textures.

Humaquepts

Humaquepts in Ocean County consist of deep, very poorly drained to somewhat poorly drained soils on flood plains that are flooded several times each year. The soils formed in stratified sandy or loamy sediments of fluvial origin. Slopes range from 0 to 2 percent.

Because of the variability of these soils, a typical pedon is not given. The solum ranges from 20 to 60 inches thick. Pebbles make up 0 to 30 percent of some lower parts of the soil. The soils are extremely acid to strongly acid.

The A horizon dominantly has hue of 7.5YR to 2.5Y, value of 2 or 3, and chroma of 1 or 2. It ranges from loamy sand to loam and their gravelly analogues. It is 4 to 20 inches thick.

mottles; massive; very firm; very strongly acid; gradual wavy boundary.

C2—62 to 81 inches, brownish yellow (10YR 6/8) silty clay loam; many coarse prominent light gray (10YR 7/1) mottles; massive; firm; very strongly acid.

The solum thickness ranges from 40 to 60 inches. Coarse fragments of rounded quartzose pebbles make up less than 3 percent of the profile. Unless the soil has

tles; single grain; loose; few medium roots; very strongly acid; gradual smooth boundary.

C—38 to 60 inches, light gray (10YR 7/2) sand; common medium prominent yellowish brown (10YR 5/6) mottles; single grain; loose; very strongly acid; gradual smooth boundary.

The solum thickness ranges from 20 to 40 inches. Depth to low-chroma mottles ranges from 18 to 36 inches and averages about 30 inches. Coarse fragments of rounded quartzose gravel make up less than 5 percent of the solum and less than 10 percent of the C horizon. Unless the soil has been limed, reaction is ex-

B22t—18 to 32 inches, grayish green (5G 4/2) sandy clay; common medium distinct olive (5Y 5/6) mottles; strong medium prismatic structure parting to strong medium angular blocky; very firm, slightly sticky and plastic when wet; few medium roots; thin continuous clay films on faces of peds; more than 40 percent glauconite; very strongly acid; clear smooth boundary.

C1—32 to 43 inches, stratified grayish green (5G 4/2) sandy clay and olive (5Y 4/4) fine sandy loam; common medium prominent dark reddish brown (5YR 3/4) mottles; massive; friable when moist, sticky and plastic when wet; 40 to 60 percent glau-

Typical pedon of Lakehurst sand, 0 to 3 percent slopes, in Manchester Township, 1/2 mile west of Pasedena, 40 feet northeast of North Branch Road:

O1—1 inch to 0, partly decomposed leaf litter, many fine roots; extremely acid; abrupt smooth boundary.

A1—0 to 2 inches, very dark gray (10YR 3/2) sand; single grain; loose; many fine roots; extremely acid; clear wavy boundary.

A2—2 to 12 inches, gray (10YR 6/1) sand; single grain; loose; common medium roots; extremely acid; abrupt irregular boundary.

B21h—12 to 14 inches, dark brown (7.5YR 4/2) sand; massive; firm; common medium roots; very strongly

black oak and an understory of lowbush blueberry and scrub oak.

Typical pedon of Lakewood sand, 0 to 5 percent slopes, in Lakewood Township, 0.9 mile west of the Garden State Parkway on N.J. Highway 70, 150 feet west of Beth Am Cemetery, 30 feet north of N.J. Highway 70:

A1—0 to 1 inch, black (10YR 2/1) sand; single grain; loose; common fine roots; extremely acid; clear broken boundary.

A2—1 to 10 inches, light brownish gray (10YR 6/2) sand; single grain; loose; few medium roots; extremely acid; gradual irregular boundary.

Double Trouble and Keswick Roads, on an unnamed dirt road, 50 feet southeast of the dirt road:

Oa1—0 to 8 inches, black (5YR 2/1) muck (sapric material); about 10 percent fibers, less than 2 percent rubbed; moderate medium granular structure; many fine roots; primarily herbaceous material, trace of woody fragments; about 85 percent organic material;

The IIC horizon has hue of 10YR or is neutral. The IIC1 horizon has value of 2 to 5 and chroma of 0 or 1. IIC2 horizon has value of 5 or 6 and chroma of 0 or 1.

Mullica series

The soils of the Mullica series are coarse-loamy, sili-

The C horizon has hue of 10YR to 5Y, value of 5 or 6, and chroma of 1 or 2. The C horizon is stratified and

The C horizon has hue of 5Y, value of 6, and chroma of 4 or 6. It consists of strata of sand and sandy loam of

fractured layers of iron-cemented sandstone fragments up to 6 inches long and less than 1 inch thick; weakly cemented; very strongly acid; gradual wavy boundary.

C—46 to 72 inches; yellowish red (5YR 5/6) sand; single grain; loose; very strongly acid.

The solum thickness ranges from 30 to 60 inches. Depth to the first petroferric contact consisting of an indurated iron-cemented sandstone layer ranges from 12 to 30 inches. Alternating layers of friable or firm soil and thin to thick (1/8 inch to several feet) continuous sheets of fractured iron-cemented sandstone are in the B horizon. Thick massive beds with fragments larger than small stones are in the C horizon of some pedons at depths greater than 4 feet in places. Coarse fragments consisting primarily of ironstone fragments but including some quartzose pebbles make up 0 to 15 percent of the A horizon and upper part of the B horizon and 20 to 75 percent of layers within the C horizon. Unless the soils have been limed, reaction is extremely acid in the A1 horizon and strongly acid to very strongly acid in the B

soils formed in acid, loamy Coastal Plain sediments. Sassafras soils are on divides and side slopes. Slope ranges from 2 to 5 percent. The natural vegetation includes white oak, black oak, scarlet oak, hickories, and a few pitch pines, shortleaf pines, and Virginia pines. The understory is laurel, scrub oak, and lowbush blueberry.

Typical pedon of Sassafras sandy loam, 2 to 5 percent slopes, in Union Township, 1.6 miles north of the intersection of N.J. highway 72 and County road 539, 100 feet west of 539:

A1—0 to 3 inches, very dark grayish brown (10YR 3/1) sandy loam; weak fine granular structure; very friable; many fine and medium roots; extremely acid; abrupt smooth boundary.

A2—3 to 6 inches, yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; very friable; 5 percent quartzose pebbles; many fine and medium roots; extremely acid; clear smooth boundary.

B1—6 to 12 inches, brown (10YR 5/3) sandy loam; weak fine subangular blocky structure; 5 percent

clay loam or gravelly sandy loam in subhorizons of some pedons.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. The C horizon normally is stratified and includes strata of loamy sand, sand, and sandy loam or their gravelly analogues.

Shrewsbury series

The soils of the Shrewsbury series are fine-loamy, mixed, mesic Typic Ochraquults. These poorly drained soils formed in acid, loamy Coastal Plain sediments containing 5 to 40 percent glauconite. Shrewsbury soils are in wide depressional areas and on broad flats that are at the lowest position on the landscape. Slope is less than 2 percent. The native vegetation includes willow oak, pin oak, swamp white oak, ash, beech, hickory, sweetgum, blackgum, and red maple and an undergrowth of viburnum, spicebush, elderberry, greenbriar, highbush blueberry, and sweet pepperbush.

Typical pedon of Shrewsbury fine sandy loam, in Plumstead Township, 0.9 mile north of New Egypt on New Egypt-Allentown Road, 100 feet west of the road:

Ap—0 to 10 inches, very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable, slightly plastic when wet; many fine roots; less than 10 percent glauconite; slightly acid; abrupt smooth boundary.

A2g—10 to 13 inches, olive gray (5Y 4/2) fine sandy loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium granular structure and very weak medium subangular blocky; very fri-

The solum thickness ranges from 25 to 36 inches. Coarse fragments of rounded quartzose gravel make up less than 5 percent of the profile. Unless the soil has been limed, reaction is extremely acid in the A horizon and very strongly acid in the B and C horizons.

The A horizon has hue of 10YR or 5Y. The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The A2 horizon has value of 4 or 5 and chroma of 1 or 2.

The Bt horizon has hue of 5Y, value of 5 or 6, and chroma of 1 or 2. Mottles have hue of 7.5YR or 10YR, value of 4 or 6, and chroma of 4 or 6. The horizon is sandy clay loam and fine sandy loam. Consistence is friable when moist and slightly plastic when wet.

The C horizon has hue of 5Y, value of 5 or 6, and chroma of 2 or 4. Mottles have hue of 10YR, value of 4 or 5, and chroma of 4 or 6. In most places the C horizon consists of thin strata of sand, loamy sand, and fine sandy loam. A few thin strata of sandy clay loam are in some pedons.

Sulfaquents

Sulfaquents in Ocean County consist of deep, poorly drained or very poorly drained, nearly level mineral soils subject to tidal flooding. The soils formed over stratified sandy sediments of fluviomarine origin. The soils are on tidal flats adjacent to bays and tidal streams.

Because of the variability of these soils, a typical pedon is not given. The solum ranges in thickness from 20 to 50 inches or more. The soils are nearly neutral in reaction when wet and become more acid when dry.

The surface horizon dominantly is neutral or has hue

Tinton series

The soils of the Tinton series are loamy, mixed, mesic Arenic Hapludults. These deep, well drained soils formed

pitch pine, white oak, black oak, blackjack oak, scarlet oak, and chestnut oak and an understory of scrub oak and lowbush blueberry.

Typical pedon of Woodmansie sand, 0 to 5 percent

The C horizon has hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 2 to 8. It is sand, loamy sand, sandy loam, sandy clay loam, and their gravelly analogues. Thickness of the strata is variable.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965 (*8*). Readers interested in further details about the system should refer to "Soil taxonomy" (*13*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil

thought to typify the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, mixed, nonacid, mesic, Typic Haplaquents.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these charac-

(10) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173–188 issued May 1962]

(11) United States Department of Agriculture. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210, 21 pp.

(12) United States Department of Agriculture. 1974. Soil survey laboratory data and descriptions for some soils of New Jersey.

(13) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv. U.S. Dep. Agric. Handbk. 436. 754pp., illus.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Complex, soil. A map unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms

regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

sults 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

commonly covering swamps and marshes is not considered flooding.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Furrow.—Water is applied in small ditches made by

trast—*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.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essen-

Plasticity index. The numerical difference between the lar in all profile characteristics and in arrangement in

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates 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).

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

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.

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.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

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

ILLUSTRATIONS

TABLES

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

[Data were recorded in the period 1960-75 at Toms River, N.J.]

Month	Temperature						Precipitation				
	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[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1960-75 at Toms River, N.J.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 15	May 3	May 14
2 years in 10 later than--	April 10	April 28	May 9
5 years in 10 later than--	April 1	April 19	April 29
First freezing temperature in fall:			
1 year in 10 earlier than--	October 19	October 18	September 29
2 years in 10 earlier than--	October 26	October 21	October 4
5 years in 10 earlier than--	November 9	October 28	October 15

TABLE 3.--GROWING SEASON LENGTH

[Data were recorded in the period 1960-75 at Toms River, N.J.]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	197	175	141
8 years in 10	205	181	150
5 years in 10	221	191	168
2 years in 10	238	201	186
1 year in 10	246	207	195

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AdA	Adelphia fine sandy loam, 0 to 3 percent slopes	410	0.1
At	Atsion sand	26,200	6.4
Aw	Atsion sand, tide flooded	740	0.2
AxB	Aura sandy loam, 2 to 5 percent slopes	2,100	0.5
Be	Berryland sand	14,100	3.4
BF	Berryland sand, frequently flooded	2,550	0.6
CoA	Collington fine sandy loam, 0 to 2 percent slopes	560	0.1
CoB	Collington fine sandy loam, 2 to 5 percent slopes	380	0.1
CoC	Collington fine sandy loam, 5 to 10 percent slopes	190	*
DoA	Downer loamy sand, 0 to 5 percent slopes	53,900	13.2
DpA	Downer sandy loam, 0 to 2 percent slopes	6,450	1.6
DpB	Downer sandy loam, 2 to 5 percent slopes	20,900	5.1
DrB	Downer gravelly sandy loam, gravelly substratum, 2 to 5 percent slopes	4,000	1.0
EvB	Evesboro sand, 0 to 5 percent slopes	21,400	5.2
EvC	Evesboro sand, 5 to 10 percent slopes	4,500	1.1
EvD	Evesboro sand, 10 to 15 percent slopes	1,050	0.3
FtB	Fripp fine sand, 2 to 10 percent slopes	2,500	0.6
HaA	Hammonton loamy sand, 0 to 5 percent slopes	5,950	1.4
HcA	Hammonton sandy loam, 0 to 3 percent slopes	2,750	0.7

TABLE 5.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. NP means nonplastic]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AdA---------- Adelphia	0-22	Fine sandy loam	SM, SC	A-2, A-4	0	95-100	95-100	60-95	30-40	---	---
	22-34	Sandy clay loam, loam.	SC, CL	A-4, A-6	0	95-100	95-100	70-95	35-65	20-40	8-18
	34-60	Stratified loamy sand to sandy loam.	SM, SC	A-2, A-4	0	95-100	95-100	50-75	10-40	<30	NP-10
At---------- Atsion	0-18	Sand----------	SP, SP-SM	A-3	0	95-100	90-100	55-90	0-10	---	---
	18-24	Loamy sand, sand.	SP, SP-SM	A-2, A-3	0	95-100	90-100	55-90	0-20	---	NP
	24-60	Stratified sand to sandy loam.	SP, SM, SM-SC, SP-SM	A-1, A-2, A-3	0	95-100	85-100	40-90	2-35	<25	NP-7
Aw---------- Atsion	0-13	Sand----------	SM, SP-SM	A-3	0	95-100	90-100	55-90	0-10	---	---
	13-28	Sand, loamy sand	SP, SM, SP-SM	A-2, A-3	0	95-100	90-100	55-90	0-20	---	NP
	28-60	Stratified sand to loamy sand.	SP, SM, SM-SC, SP-SM	A-1, A-2, A-3	0	95-100	85-100	40-90	2-35	<25	NP-7
AxB---------- Aura	0-16	Sandy loam------	SM, SC	A-2, A-4	0	95-100	80-100	30-90	30-40	---	---
	16-50	Gravelly sandy loam, sandy clay loam, gravelly sandy clay loam.	SM, SC, GM, GC	A-2, A-4, A-6	0	55-100	45-100	35-85	25-50	20-45	5-15
	50-72	Sand, gravelly sand, sandy clay loam.	SM, SC, GM, GC	A-1, A-2, A-4	0	70-100	60-100	35-85	10-50	<40	NP-15
Be, BF---------- Berryland	0-15	Sand----------	SP, SP-SM	A-3	0	95-100	90-100	55-90	2-10	---	---
	15-24	Sand, loamy sand	SP, SP-SM	A-2, A-3	0	95-100	90-100	55-90	2-10	---	NP
	24-35	Sand----------	SP, SP-SM	A-3	0	95-100	90-100	55-90	2-10	---	NP
	35-60	Stratified sand to sandy loam.	SP, SM, SM-SC, SP-SM	A-1, A-2, A-3	0	95-100	80-100	40-90	2-35	<25	NP-8
CoA, CoB, CoC------ Collington	0-15	Fine sandy loam	SM-SC	A-2, A-4	0	95-100	95-100	60-90	30-50	---	---
	15-42	Sandy loam, sandy clay loam, clay	SM, SC, ML, CL	A-4, A-6	0	95-100	95-100	60-90	30-70	25-45	5-25

TABLE 5.--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	
DpA, DpB---------- Downer	0-10	Sandy loam------	SM, SC	A-2	0	80-100	75-100	40-90	25-35	---	---
	10-31	Sandy loam, gravelly sandy loam.	SM, SC	A-2, A-4	0	80-100	55-100	40-90	20-40	<35	NP-10
	31-60	Stratified sand to gravelly loamy sand.	SP, SM, GM	A-2, A-3	0	45-100	35-100	20-90	0-35	<30	NP-10
DrB---------- Downer	0-10	Gravelly sandy loam.	GM, SM	A-2, A-1	---	60-80	55-75	30-50	20-35	---	---
	10-26	Gravelly sandy loam.	GM, GC, SM, SC	A-2, A-1, A-4	---	60-80	55-75	40-65	25-40	10-25	NP-10
	26-40	Gravelly loamy sand.	GM, GC, SM, SC	A-2, A-1	---	45-80	35-75	20-55	10-20	10-20	NP-12
	40-60	Stratified gravelly sand.	GP-GM, SP-SM	A-1	---	40-80	30-75	20-50	2-10	<20	NP
EvB, EvC, EvD------ Evesboro	0-10	Sand----------	SP, SP-SM	A-1, A-2, A-3	0	90-100	85-100	40-90	0-12	---	---
	10-33	Sand, loamy sand	SP, SP-SM	A-1, A-2, A-3	0	90-100	85-100	40-90	0-12	---	NP
	33-60	Sand to sandy loam.	SP, SM, SC	A-1, A-2	0	80-100	80-100	45-90	0-35	---	NP-10
FtB---------- Fripp	0-3	Fine sand-------	SP	A-3	0	100	98-100	85-99	0-5	---	---
	3-60	Fine sand, sand	SP	A-3	0	100	98-100	85-99	0-5	---	NP
HaA---------- Hammonton	0-14	Loamy sand------	SM	A-2, A-1	0	80-100	75-100	50-90	15-30	---	---
	14-23	Sandy loam, gravelly sandy loam.	SM, SC	A-2, A-1, A-4	0	80-100	70-100	40-70	20-40	10-35	NP-10
	23-60	Stratified gravelly sand to sandy loam.	SP, SM, GM	A-2, A-3, A-1, A-4	0	60-100	45-100	20-70	0-45	<30	NP-10
HcA---------- Hammonton	0-10	Sandy loam------	SM	A-2	0	80-100	75-100	50-90	25-35	---	---
	10-28	Sandy loam, gravelly sandy loam.	SM, SC	A-2, A-1, A-4	0	80-100	70-100	40-70	20-40	10-35	NP-10
	28-60	Stratified gravelly sand to sandy loam.	SP, SM, GM	A-2, A-3, A-1, A-4	0	60-100	45-100	20-70	0-45	<30	NP-10
HU*. Humaquepts											
KeA---------- Keyport	0-9	Sandy loam------	SM, SC	A-2, A-4	0	85-100	85-100	60-95	30-40	---	---
	9-60	Silty clay loam, clay loam, clay.	ML, CL, MH, CH	A-4, A-6, A-7	0	90-100	90-100	75-100	60-90	25-85	10-40
KlA---------- Klej	0-30	Loamy sand------	SM	A-2, A-4	0	100	95-100	50-95	15-30	<20	NP
	30-60	Sand, fine sand	SP, SP-SM, SM	A-1, A-2	0	90-100	75-100	40-80	4-35	<20	NP

See footnote at end of table.

TABLE 5.--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	
KrA---------- Kresson	0-11	Fine sandy loam	SM, SC	A-2, A-4	0	95-100	85-100	50-95	30-40	---	---
	11-32	Clay, clay loam, sandy clay.	ML, CL, MH, CH	A-6, A-7	0	95-100	90-100	70-95	55-90	35-60	10-25
	32-60	Stratified sandy loam to clay.	SM, SC, CL	A-4, A-6, A-7	0	95-100	90-100	70-90	35-80	30-50	10-20
LhA---------- Lakehurst	0-12	Sand----------	SP, SM, SP-SM	A-1, A-2, A-3	0	85-100	80-100	40-80	0-20	---	---
	12-46	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	85-100	80-100	40-80	0-30	---	NP
	46-60	Sand, gravelly sand, sandy loam.	SP, SM, SC, SM-SC	A-1, A-2, A-3	0	80-100	70-100	40-80	0-35	<15	NP-8
LmA---------- Lakehurst	0-16	Sand----------	SP, SM, SP-SM	A-1, A-2, A-3	0	85-100	80-100	40-80	0-20	---	---
	16-41	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	85-100	80-100	40-80	0-30	---	NP
	41-60	Sandy clay loam, sandy clay.	SC, CL	A-4, A-6, A-7	0	90-100	85-100	80-100	45-70	20-50	10-25
LwB---------- Lakewood	0-10	Sand----------	SP, SP-SM	A-1, A-2, A-3	0	95-100	90-100	40-90	0-12	---	---
	10-36	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	85-100	80-100	40-85	0-30	---	NP
	36-60	Sand, gravelly sand, sandy loam.	SP, SM	A-1, A-2, A-3	0	85-100	75-100	40-90	0-35	<20	NP-5
LwC---------- Lakewood	0-11	Sand----------	SP, SP-SM	A-1, A-2, A-3	0	95-100	90-100	40-90	0-12	---	---
	11-28	Sand, fine sand, loamy sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	85-100	80-100	40-85	0-30	---	NP
	28-60	Sand, gravelly sand, sandy loam.	SP, SM	A-1, A-2, A-3	0	85-100	75-100	40-90	0-35	<20	NP-5
Ma---------- Manahawkin	0-39	Sapric material	Pt	A-8	---	---	---	---	---	---	---
	39-60	Sand, gravelly sand.	SP-SM, SP	A-1	0	80-100	70-100	35-45	4-10	---	NP
Mr---------- Mullica	0-11	Fine sandy loam	SM, SC, CL-ML	A-2, A-1, A-4	0	85-100	75-100	40-85	15-55	---	---
	11-25	Loamy sand, sand	SM, SP-SM	A-1, A-2, A-3	0	80-100	65-100	30-75	4-30	<22	NP-8
	25-60	Sandy clay loam, sandy loam, sand.	SM, SC, CL	A-1, A-2, A-4, A-6	0	80-100	65-100	30-90	4-55	<38	NP-15

See footnote at end of table.

TABLE 5.--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	
Mu---------- Mullica	0-12	Sandy loam------	SM, SC, CL-ML	A-2, A-1, A-4	0	85-100	75-100	40-85	15-55	---	---
	12-25	Loamy sand, sand	SM, SP-SM	A-2, A-1, A-3	0	80-100	65-100	30-75	4-30	<22	NP-8
	25-60	Sandy clay loam, sandy loam, sand.	SM, SC, CL	A-1, A-2, A-4, A-6	0	80-100	65-100	30-90	4-55	<38	NP-15
PeA---------- Pemberton	0-22	Sand----------	SM, SP-SM	A-2, A-3	0	100	100	80-100	5-20	---	---
	22-36	Sandy loam, fine sandy loam, sandy clay loam.	SM, SC	A-2, A-4, A-6	0	100	100	90-100	25-50	25-40	3-15
	36-60	Stratified sand to sandy loam.	SM, SC	A-2, A-4, A-6	0	100	95-100	70-95	10-40	<50	NP-10
PhB---------- Phalanx	0-6	Loamy sand------	SM	A-1, A-2	0	90-100	85-95	40-70	15-30	---	---
	6-22	Sandy loam, loamy sand, channery sandy loam.	SM, GM	A-1, A-2, A-4	0-15	40-95	35-85	20-75	15-40	<25	NP-10
	22-46	Channery sandy loam, flaggy loamy sand, sandy clay loam.	SM, SC, GC, GM	A-1, A-2, A-4	5-30	40-95	35-85	20-75	15-45	<30	NP-10
	46-60	Sand, loamy sand, flaggy sand.	SP, SM, GP, GM	A-1, A-2, A-3	0-30	35-100	30-100	15-75	2-25	<20	NP
PhC---------- Phalanx	0-12	Loamy sand------	SM	A-1, A-2	0	90-100	85-95	40-70	15-30	---	---
	12-26	Sandy loam	SM, GM	A-1	0-15	40-95	35-85	20-75	15-40	<25	NP-10

TABLE 5.--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	
Sh---------- Shrewsbury	0-13	Fine sandy loam	SM, SC	A-2, A-4, A-6, A-7	0	98-100	95-100	75-90	25-50	---	---
	13-35	Sandy loam, sandy clay loam, loam.	SM, SC, ML, CL	A-2, A-4, A-6	0	98-100	95-100	85-100	30-70	25-40	5-15
	35-60	Stratified loamy sand to sandy loam.	SM, SC	A-2, A-4, A-6, A-7	0	98-100	95-100	75-95	20-45	<45	NP-15
SS*: Sulfaquents.											
Sulfihemists.											
TnB---------- Tinton	0-25	Sand----------	SM, SP-SM	A-2, A-3	0	100	100	70-100	5-20	---	---
	25-42	Fine sandy loam, sandy loam, sandy clay loam.	SM, SC	A-2, A-4, A-6	0	100	100	80-100	25-50	20-40	3-15
	42-60	Stratified sand to sandy loam.	SM, SP-SM	A-2, A-4	0	100	98-100	70-100	10-40	---	NP-6
UL*. Urban land											
UP*: Urban land.											
Fripp----------	0-3	Sand----------	SP	A-3	0	100	98-100	85-99	0-5	---	---
	3-60	Fine sand, sand	SP	A-3	0	100	98-100	85-99	0-5	---	NP
WoB---------- Woodmansie	0-20	Sand----------	SP, SP-SM, SM	A-1, A-2, A-3	0	85-100	85-100	40-90	2-15	---	---
	20-42	Sandy loam, gravelly sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	70-100	60-100	50-90	30-50	20-30	5-10
	42-60	Stratified gravelly sand to sandy clay loam.	SM, SP-SM, SC, GM	A-1, A-2, A-3, A-4	0	50-100	40-100	30-70	5-50	<30	NP-8
WoC---------- Woodmansie	0-15	Sand----------	SP, SP-SM, SM	A-1, A-2, A-3	0	85-100	85-100	40-90	2-15	---	---
	15-26	Sandy loam, gravelly sandy loam, sandy clay loam.	SM, SC, SM-SC	A-2, A-4	0	70-100	60-100	50-90	30-50	20-30	5-10
	26-60	Stratified gravelly sand to sandy clay loam.	SM, SP-SM, SC, GM	A-1, A-2, A-3, A-4	0	50-100	40-100	30-70	5-50	<30	NP-8

* See the description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group
						K	T	
	In	In/hr	In/in	pH				
AdA---------- Adelphia	0-22	0.2-6.0	0.16-0.24	3.6-5.0	Low----------	0.32	3	---
	22-34	0.2-2.0	0.16-0.22	3.6-5.0	Moderate------	0.43		
	34-60	0.6-6.0	0.10-0.18	3.6-5.0	Low----------	0.20		
At---------- Atsion	0-18	6.0-20	0.06-0.08	3.6-4.4	Low----------	0.17	3	---
	18-24	2.0-6.0	0.08-0.12	4.5-5.0	Low----------	0.20		
	24-60	2.0-20	0.04-0.14	4.5-5.5	Low----------	0.20		
Aw---------- Atsion	0-13	6.0-20	0.06-0.08	4.5-5.0	Low----------	0.17	3	---
	13-28	2.0-6.0	0.08-0.12	4.5-5.0	Low----------	0.20		
	28-60	>6.0	0.04-0.14	4.5-5.0	Low----------	0.20		
AxB---------- Aura	0-16	0.2-6.0	0.10-0.18	3.6-4.4	Low----------	0.43	3	---
	16-50	0.2-2.0	0.12-0.14	4.1-5.0	Low----------	0.43		
	50-72	0.2-6.0	0.04-0.12	4.1-5.0	Low----------	0.43		
Be, BF---------- Berryland	0-15	6.0-20	0.06-0.08	3.6-4.4	Low----------	0.17	2	---
	15-24	2.0-6.0	0.08-0.12	4.5-5.0	Low----------	0.20		
	24-35	2.0-6.0	0.04-0.08	4.5-5.0	Low----------	0.20		
	35-60	0.6-2.0	0.04-0.14	4.5-5.0	Low----------	0.20		
CoA, CoB, CoC---- Collington	0-15	0.6-2.0	0.14-0.20	3.6-4.4	Low----------	0.28	4	
	15-42	0.2-2.0	0.16-0.22	4.5-5.0	Moderate------	0.32		
	42-60	0.2-6.0	0.03-0.16	4.5-5.0	Low----------	0.24		

TABLE 6.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group
						K	T	

TABLE 6.--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	Wind erodibility group
	In	In/hr	In/in	pH				
UP*: Urban land.								
Fripp----------	0-3	6.0-20	0.02-0.08	5.1-7.8	Low----------	0.10	5	---
	3-60	6.0-20	0.02-0.06	5.6-7.8	Low----------	0.10		
WoB---------- Woodmansie	0-20	6.0-20	0.06-0.08	3.6-4.4	Low----------	0.20	4	1
	20-42	0.6-6.0	0.10-0.13	3.6-5.5	Low----------	0.24		
	42-60	0.6-20	0.08-0.12	3.6-5.5	Low----------	0.20		
WoC---------- Woodmansie	0-15	6.0-20	0.06-0.08	3.6-4.4	Low----------	0.20	4	1
	15-26	0.6-6.0	0.10-0.13	3.6-5.5	Low----------	0.24		
	26-60	0.6-20	0.08-0.12	3.6-5.5	Low----------	0.20		

* See the description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
AdA---------- Adelphia	C	None--------	---	---	1.5-4.0	Apparent	Jan-Apr	High-----	Moderate	High.
At---------- Atsion	D	None--------	---	---	0-1.0	Apparent	Nov-Jun	Low------	High-----	High.
Aw---------- Atsion	D	Frequent----	Very brief	Jan-Dec	0-1.0	Apparent	Jan-Dec	Low------	High-----	High.
AxB---------- Aura	B	None--------	---	---	>6.0	---	---	Low------	Low------	High.
Be---------- Berryland	D	Rare--------	Brief to long.	Mar-Jun	0-0.5	Apparent	Oct-Jun	Low------	High-----	High.
BF---------- Berryland	D	Frequent----	Brief to long.	Mar-Jun	0-0.5	Apparent	Oct-Jun	Low------	High-----	High.
CoA, CoB, CoC----- Collington	B	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
DoA, DpA, DpB----- Downer	B	None--------	---	---	>6.0	---	---	Low------	Low------	High.
DrB---------- Downer	B	None--------	---	---	>6.0	---	---	Moderate	Low------	High.
EvB, EvC, EvD----- Evesboro	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
FtB---------- Fripp	A	Rare--------	---	---	>6.0	---	---	---	Low------	Low.
HaA, HcA---------- Hammonton	B	None--------	---	---	1.5-4.0	Apparent	Jan-Apr	High-----	Moderate	High.
HU*. Humaquepts										
KeA---------- Keyport	C	None--------	---	---	1.5-4.0	Perched	Nov-May	High-----	High-----	High.
KlA---------- Klej	B	None--------	---	---	1.5-2.0	Apparent	Dec-Apr	Moderate	Low------	High.
KrA---------- Kresson	C	None--------	---	---	1.0-1.5	Perched	Dec-May	High-----	High-----	High.
LhA---------- Lakehurst	A	None--------	---	---	1.5-3.5	Apparent	Jan-Apr	Low------	Low------	High.
LmA---------- Lakehurst	A	None--------	---	---	1.5-2.5	Perched	Jan-Apr	Low------	Low------	High.
LwB, LwC---------- Lakewood	A	None--------	---	---	>6.0	---	---	Low------	Low------	High.
Ma---------- Manahawkin	D	Frequent----	Long------	Jan-Mar	+1-0	Apparent	Oct-Jul	High-----	High-----	High.
Mr, Mu---------- Mullica	D	None--------	---	---	0-0.5	Apparent	Dec-May	---	High-----	High.

See footnote at end of table.

TABLE 7.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
PeA---------- Pemberton	A	None---------	---	---	1.0-4.0	Apparent	Dec-May	Moderate	Low-------	Low.
PhB, PhC---------- Phalanx	B	None---------	---	---	>6.0	---	---	Low-------	Low-------	Moderate.
Pm*. Pits, sand and gravel										
PN*, PO*, PW*. Psamments										
SaB---------- Sassafras	B	None---------	---	---	>6.0	---	---	Moderate	Low-------	High.
Sh---------- Shrewsbury	D	None---------	---	---	0-1.0	Apparent	Oct-Jun	High------	High------	High.
SS*: Sulfaquents.										
Sulfihemists.										
TnB---------- Tinton	A	None---------	---	---	>6.0	---	---	Moderate	Low-------	High.
UL*. Urban land										
UP*: Urban land.										
Fripp----------	A	Rare---------	---	---	>6.0	---	---	---	Low-------	Low.
WoB, WoC---------- Woodmansie	B	None---------	---	---	>6.0	---	---	Low-------	Low-------	High.

* See the description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--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	6,450	---	---	---
II	94,190	28,380	9,810	55,000
III	9,990	190	8,700	1,100
IV	84,480	540	55,230	28,710
V	42,850	---	42,850	---
VI	---	---	---	---
VII	104,900	---	27,540	77,360
VIII	---	---	---	---

TABLE 9.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. The estimates were made in 1977. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn	Soybeans	Wheat	Alfalfa hay	Tomatoes
	Bu	Bu	Bu	Ton	Ton
AdA---------- Adelphia	130	50	50	5.0	24
At, Aw---------- Atsion	---	---	---	---	---
AxB---------- Aura	100	35	45	---	20
Be, BF---------- Berryland	---	---	---	---	---
CoA---------- Collington	130	50	50	5.5	26
CoB---------- Collington	130	50	50	5.5	26
CoC---------- Collington	120	45	45	5.5	24
DoA, DrB---------- Downer	80	25	35	---	16
DpA, DpB---------- Downer	100	30	35	---	20
EvB, EvC, EvD---------- Evesboro	---	---	---	---	---
FtB---------- Fripp	---	---	---	---	---
HaA---------- Hammonton	90	30	35	---	20
HcA---------- Hammonton	100	35	35	---	25
HU*. Humaquepts					
KeA---------- Keyport	100	---	40	---	---

TABLE 9.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Wheat	Alfalfa hay	Tomatoes
	Bu	Bu	Bu	Ton	Ton
PeA---------- Pemberton	70	30	35	3.5	16
PhB---------- Phalanx	---	---	---	---	---
PhC---------- Phalanx	---	---	---	---	---
Pm*. Pits, sand and gravel					
PN*, PO*, PW*. Psamments					
SaB---------- Sassafras	130	45	50	5.0	24
Sh---------- Shrewsbury	120	35	---	---	---
SS---------- Sulfaquents	---	---	---	---	---
TnB---------- Tinton	---	30	30	---	16
UL*. Urban land					
UP---------- Urban land	---	---	---	---	---
WoB, WoC---------- Woodmansie	---	---	---	---	---

* See the description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--ORNAMENTAL TREES AND SHRUBS

[Soils not listed are generally unsuitable for ornamental plantings. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs	Evergreen shrubs
AdA---------- Adelphia	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, ginkgo, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, plums and cherries, golden-rain-tree, shadbush, sweetgum, yellow-wood, zelkova.	Atlas cedar, cryptomeria, white fir, eastern hemlock, American holly, Austrian pine, white pine, Colorado blue spruce, Norway spruce, northern white-cedar.	Arrowwood, flame azalea, bayberry, blackhaw, red-osier dogwood, Laland firethorn, forsythia, Franklinia tree, hawthorns, amur honeysuckle, maple species, autumn-olive, winterberry, white fringe tree, chokeberry.	Azalea, Japanese holly, Juniper species, mountain laurel, Mugo pine, rhododendron, Japanese yew.
At---------- Atsion	Pin oak, willow oak, white oak, sweetgum.	Atlantic white-cedar	Arrowwood, red-osier dogwood, winterberry, white fringe tree, chokeberry.	
AxB---------- Aura	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, ginkgo, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, plums and cherries, golden-rain-tree, shadbush, sweetgum, yellow-wood, zelkova.	Atlas cedar, cryptomeria, white fir, eastern hemlock, American holly, Austrian pine, white pine, Colorado blue spruce, Norway spruce, northern white-cedar.	Arrowwood, flame azalea, bayberry, blackhaw, red-osier dogwood, Laland firethorn, forsythia, Franklinia tree, hawthorns, amur honeysuckle, maple species, autumn-olive, winterberry, white fringe tree, chokeberry.	Azalea, Japanese holly, Juniper species, mountain laurel, Mugo pine, rhododendron, Japanese yew.
Be, BF---------- Berryland	Pin oak, willow oak, white oak, sweetgum.	Atlantic white-cedar	Arrowwood, red-osier dogwood, winterberry, white fringe tree, chokeberry.	
CoA, CoB, CoC--------- Collington	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, ginkgo, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, plums and cherries, golden-rain-tree, shadbush, sweetgum, yellow-wood, zelkova.	Atlas cedar, cryptomeria, white fir, eastern hemlock, American holly, Austrian pine, white pine, Colorado blue spruce, Norway spruce, northern white-cedar.	Arrowwood, flame azalea, bayberry, blackhaw, red-osier dogwood, Laland firethorn, forsythia, Franklinia tree, hawthorns, amur honeysuckle, maple species, autumn-olive, winterberry, white fringe tree, chokeberry.	Azalea, Japanese holly, Juniper species, mountain laurel, Mugo pine, rhododendron, Japanese yew.

TABLE 10.--ORNAMENTAL TREES AND SHRUBS--Continued

Soil name and map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs	Evergreen shrubs
DoA, DpA, DpB, DrB---- Downer	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, ginkgo, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, plums and cherries, golden-rain-tree, shadbush, sweetgum, yellow-wood, zelkova.	Atlas cedar, cryptomeria, white fir, eastern hemlock, American holly, Austrian pine, white pine, Colorado blue spruce, Norway spruce, northern white-cedar.	Arrowwood, flame azalea, bayberry, blackhaw, red-osier dogwood, Laland firethorn, forsythia, Franklinia tree, hawthorns, amur honeysuckle, maple species, autumn-olive, winterberry, white fringe tree, chokeberry.	Azalea, Japanese holly, Juniper species, mountain laurel, Mugo pine, rhododendron, Japanese yew.
EvB, EvC, EvD--------- Evesboro	American hornbeam, ironwood, zelkova.	Austrian pine, white pine.	Bayberry, amur honeysuckle, autumn olive.	
FtB---------- Fripp	Live oak, white oak.	Arborvitae, American holly, Austrian pine, balsam fir, blue spruce, Douglas fir, Eastern red cedar, Japanese black pine, white spruce.	Beach plum, bayberry, rugosa rose, wax myrtel.	Pfitzer juniper, shore juniper, spreading juniper.
HaA, HcA---------- Hammonton	White ash, European beech, gray birch, flowering	Eastern hemlock, American holly, Austrian pine, white	Arrowwood, bayberry, blackhaw, red-osier dogwood,	Juniper species, mountain laurel, rhododendron.

TABLE 10.--ORNAMENTAL TREES AND SHRUBS--Continued

Soil name and map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs	Evergreen shrubs
KlA---------- Klej	American hornbeam, ironwood, zelkova.	Austrian pine, white pine.	Bayberry, amur honeysuckle, autumn-olive.	
KrA---------- Kresson	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, shadbush, sweetgum.	Eastern hemlock, American holly, Austrian pine, white pine, Norway spruce, northern white-cedar.	Arrowwood, bayberry, blackhaw, red-osier dogwood, maple species, winterberry, white fringe tree, chokeberry.	Juniper species, mountain laurel, rhododendron.
LhA, LmA---------- Lakehurst	American hornbeam, ironwood, zelkova.	Austrian pine, white pine.	Bayberry, amur honeysuckle, autumn-olive.	
LwB, LwC---------- Lakewood	American hornbeam, ironwood, zelkova.	Austrian pine, white pine.	Bayberry, amur honeysuckle, autumn-olive.	
Ma---------- Manahawkin	Pin oak, willow oak, white oak, sweetgum.	Atlantic white-cedar	Arrowwood, red-osier dogwood, winterberry, white fringe tree, chokeberry.	
Mr, Mu---------- Mullica	Pin oak, willow oak, white oak, sweetgum.	Atlantic white-cedar	Arrowwood, red-osier dogwood, winterberry, white fringe tree, chokeberry.	
PeA---------- Pemberton	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, shadbush, sweetgum.	Eastern hemlock, American holly, Austrian pine, white pine, Norway spruce, northern white-cedar.	Arrowwood, bayberry, blackhaw, red-osier dogwood, maple species, winterberry, white fringe tree, chokeberry.	Juniper species, mountain laurel, rhododendron.
PhB, PhC---------- Phalanx	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, ginkgo, American hornbeam, ironwood, littleleaf linden, sugar maple, northern red oak, pin oak, scarlet oak, willow oak, white oak, Japanese pagoda tree, Bradford pear, plums and cherries, goldenrain-tree, shadbush, sweetgum, yellowwood, zelkova.	Atlas cedar, cryptomeria, white fir, eastern hemlock, American holly, Austrian pine, white pine, Colorado blue spruce, Norway spruce, northern white-cedar.	Arrowwood, flame azalea, bayberry, blackhaw, red-osier dogwood, Laland firethorn, forsythia, Franklinia tree, hawthorns, amur honeysuckle, maple species, autumn-olive, winterberry, white fringe tree, chokeberry.	Azalea, Japanese holly, Juniper species, mountain laurel, Mugo pine, rhododendron, Japanese yew.

TABLE 10.--ORNAMENTAL TREES AND SHRUBS--Continued

Soil name and map symbol	Deciduous trees	Evergreen trees	Deciduous shrubs	Evergreen shrubs
SaB---------- Sassafras	White ash, European beech, gray birch, flowering crabapple, flowering dogwood, ginkgo, American hornbeam, ironwood, littleleaf linden, sugar maple	Atlas cedar, cryptomeria, white fir, eastern hemlock, American holly, Austrian pine, white pine, Colorado blue spruce, Norway	Arrowwood, flame azalea, bayberry, blackhaw, red-osier dogwood, Laland firethorn, forsythia, Franklinia tree, hawthorns, amur honey-	Azalea, Japanese holly, Juniper species, mountain laurel, Mugo pine, rhododendron, Japanese yew.

TABLE 11.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Trees to plant
AdA---------- Adelphia	2o	Slight	Slight	Slight	Slight	Northern red oak----	---	Northern red oak, sweetgum, yellow-poplar, black walnut.
						White oak----------	---	
						Black oak----------	---	
						Sweetgum----------	82	
						Yellow-poplar-------	95	
At---------- Atsion	3w	Slight	Severe	Severe	Severe	Pitch pine----------	65	Pitch pine.
AxB---------- Aura	3o	Slight	Slight	Slight	Slight	Black oak----------	70	Virginia pine.
						White oak----------	70	
						Scarlet oak---------	70	
						Virginia pine-------	70	
Be, BF----------	4w	Slight	Severe	Severe	Severe	Pitch pine----------	60	

TABLE 11.--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
LhA---------- Lakehurst	5s	Slight	Moderate	Moderate	Slight	Pitch pine----------	30	Virginia pine.
LmA---------- Lakehurst	5s	Slight	Moderate	Moderate	Slight	Pitch pine----------	30	Virginia pine.
						Black oak----------	45	
						White oak----------	45	
						Blackgum----------	45	
LwB, LwC---------- Lakewood	5s	Slight	Slight	Moderate	Slight	Pitch pine----------	50	Pitch pine, shortleaf pine.
						Shortleaf pine------	50	
						Virginia pine-------	60	
Ma---------- Manahawkin	4w	Slight	Severe	Severe	Severe	Atlantic white-cedar	50	
						Red maple----------	---	
						Sweetbay----------	---	
						Blackgum----------	---	
Mr, Mu---------- Mullica	2w	Slight	Severe	Severe	Slight	Pitch pine----------	80	Sweetgum.
						Pin oak----------	85	
						Sweetgum----------	90	
PeA---------- Pemberton	2s	Slight	Slight	Moderate	Slight	Sweetgum----------	80	Sweetgum, shortleaf pine.
						Northern red oak----	80	
						Pin oak----------	80	
PhB, PhC---------- Phalanx	3o	Slight	Slight	Slight	Slight	Chestnut oak--------	70	Pitch pine.
						Black oak----------	70	
						White oak----------	70	
						Virginia pine-------	70	
						Pitch pine----------	---	
SaB---------- Sassafras	2o	Slight	Slight	Slight	Slight	White oak----------	80	Eastern white pine, yellow-poplar.
						Yellow-poplar-------	90	
						Virginia pine-------	80	
Sh---------- Shrewsbury	2w	Slight	Severe	Severe	Moderate	Pin oak----------	80	Eastern white pine, sweetgum.
						Sweetgum----------	90	

TABLE 12.--WILDLIFE HABITAT POTENTIALS

TABLE 12.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and	Potential for habitat elements						Potential as habitat for--		
			Wild						

TABLE 13.--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
AdA---------- Adelphia	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Slight.
At---------- Atsion	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Severe: wetness, too sandy.
Aw---------- Atsion	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods, too sandy.	Severe: wetness, floods.	Severe: wetness, floods, too sandy.
AxB---------- Aura	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HcA---------- Hammonton	Slight----------	Slight----------	Moderate: wetness.	Slight----------	Slight.
HU*. Humaquepts					
KeA---------- Keyport	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly.	Slight----------	Severe: percs slowly.
KlA---------- Klej	Moderate: too sandy, wetness.	Moderate: too sandy.	Severe: too sandy, wetness.	Moderate: too sandy.	Severe: too sandy.
KrA----------	Severe:	Moderate:	Severe:	Moderate:	Severe:

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
TnB---------- Tinton	Severe: too sandy.	Severe: too sandy.	Severe: soil blowing, too sandy.	Severe: too sandy.	Severe: too sandy.
UL*. Urban land					
UP*: Urban land.					
Fripp----------	Severe: too sandy, floods.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
WoB---------- Woodmansie	Severe: too sandy, dusty.	Severe: too sandy, dusty.	Severe: too sandy, dusty.	Severe: too sandy, dusty.	Severe: too sandy, droughty.
WoC---------- Woodmansie	Severe: too sandy, dusty.	Severe: too sandy, dusty.	Severe: slope, too sandy, dusty.	Severe: too sandy, dusty.	Severe: too sandy, droughty.

* See the description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and	Shallow	Dwellings	Dwellings	Small	Local roads	Lawns and

TABLE 14.--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
WoC---------- Woodmansie	Slight---------	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: too sandy, droughty.

*. See the description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AdA---------- Adelphia	Moderate: wetness.	Severe: seepage, wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Good.
At---------- Atsion	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, too sandy.
Aw---------- Atsion	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness, too sandy.
AxB---------- Aura	Moderate: percs slowly.	Moderate: slope, seepage.	Slight----------	Slight----------	Good.
Be---------- Berryland	Severe: wetness.	Severe: wetness, seepage, floods.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness, too sandy.
BF---------- Berryland	Severe: wetness, floods.	Severe: wetness, seepage, floods.	Severe: floods, seepage, wetness.	Severe: floods, wetness, seepage.	Poor: wetness, too sandy.
CoA---------- Collington	Slight----------	Moderate: seepage.	Severe: seepage.	Severe: seepage.	Good.
CoB---------- Collington	Slight----------	Moderate: slope, seepage.	Severe: seepage.	Severe: seepage.	Good.
CoC---------- Collington	Slight----------	Severe: slope.	Severe: seepage.	Severe: seepage.	Good.
DoA---------- Downer	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
DpA, DpB---------- Downer	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
DrB---------- Downer	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: small stones.
EvB---------- Evesboro	Slight*----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
EvC---------- Evesboro	Slight*----------	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
EvD---------- Evesboro	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
FtB---------- Fripp	Moderate: floods.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
HaA, HcA---------- Hammonton	Moderate: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Good.

TABLE 15.--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
HU**. Humaquepts					
KeA---------- Keyport	Severe: percs slowly.	Slight----------	Moderate: too clayey.	Slight----------	Poor: area reclaim.
KlA---------- Klej	Moderate*: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Fair: too sandy.
KrA---------- Kresson	Severe: percs slowly, wetness.	Slight----------	Severe: wetness.	Severe: wetness.	Fair: wetness, too clayey.
LhA---------- Lakehurst	Moderate*: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy.
LmA---------- Lakehurst	Severe: percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: too sandy.
LwB---------- Lakewood	Slight*----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
LwC---------- Lakewood	Slight*----------	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
Ma---------- Manahawkin	Severe: wetness, floods.	Severe: excess humus, seepage, wetness.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: excess humus, wetness, hard to pack.
Mr, Mu---------- Mullica	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
PeA---------- Pemberton	Moderate: wetness.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: too sandy, seepage.
PhB---------- Phalanx	Moderate: large stones.	Severe: seepage.	Severe: seepage, large stones.	Severe: seepage.	Fair: large stones.
PhC---------- Phalanx	Moderate: large stones.	Severe: slope, seepage.	Severe: seepage, large stones.	Severe: seepage.	Fair: large stones.
Pm**. Pits, sand and gravel					
PN**, PO**, PW**. Psamments					
SaB---------- Sassafras	Slight----------	Moderate: slope, seepage.	Severe: seepage.	Slight----------	Good.
Sh---------- Shrewsbury	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Poor: wetness.
SS**: Sulfaquents.					
Sulfihemists.					

See footnotes at end of table.

TABLE 15.--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
TnB---------- Tinton	Slight----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too sandy.
UL**. Urban land					
UP**: Urban land.					
Enipp----	Moderate:	Severe:	Severe:	Severe:	Poor:

TABLE 16.--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
AdA---------- Adelphia	Fair: wetness.	Poor: excess fines.	Unsuited: excess fines.	Good.
At---------- Atsion	Poor: wetness.	Fair: excess fines.	Unsuited: excess fines.	Poor: wetness, too sandy.
Aw---------- Atsion	Poor: wetness.	Poor: excess fines.	Unsuited: excess fines.	Poor: wetness, too sandy.
AxB---------- Aura	Fair: low strength.	Poor: excess fines.	Poor: excess fines.	Fair: small stones.
Be, BF---------- Berryland	Poor: wetness.	Fair: excess fines.	Unsuited: excess fines.	Poor: wetness, too sandy.
CoA, CoB, CoC--------- Collington	Fair: low strength, frost action.	Poor: excess fines.	Unsuited: excess fines.	Good.
DoA---------- Downer	Good----------	Fair: excess fines.	Poor: excess fines.	Poor: too sandy, droughty.
DpA, DpB---------- Downer	Good----------	Fair: excess fines.	Poor: excess fines.	Fair: small stones.
DrB----------	Good----------	Good----------	Fair:	Poor:

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
mA	Good	Poor:	Unsuited:	Poor:

TABLE 17.--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	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AdA: Adelphia	Seepage, piping.	Deep to water	Favorable	Favorable	Piping	Favorable.
At: Atsion	Piping, seepage.	Favorable	Wetness, cutbanks cave.	Wetness, droughty, fast intake.	Not needed	Not needed.
Aw: Atsion	Piping, seepage, floods.	Floods	Wetness, floods.	Wetness, floods.	Not needed	Not needed.
AxB: Aura	Favorable	No water	Not needed	Percs slowly, rooting depth.	Favorable	Favorable.
Be, BF: Berryland	Piping, seepage.	Favorable	Wetness, cutbanks cave.	Wetness, droughty.	Not needed	Not needed.
CoA, CoB, CoC: Collington	Low strength	No water	Not needed	Favorable	Favorable	Favorable.
DoA, DpA, DpB, DrB: Downer	Seepage	No water	Not needed	Favorable	Favorable	Favorable.
EvB, EvC, EvD: Evesboro	Seepage, piping.	No water	Not needed	Soil blowing	Too sandy, soil blowing.	Droughty.
FtB: Fripp	Seepage, piping.	No water	Not needed	Droughty, fast intake, slope.	Too sandy, slope.	Droughty, slope.
HaA, HcA: Hammonton	Seepage	Deep to water	Cutbanks cave	Favorable	Not needed	Favorable.
HU*. Humaquepts						
KeA: Keyport	Low strength	Slow refill	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.	Percs slowly, slope.
KlA: Klej	Piping, low strength, unstable fill.	Cutbanks cave	Cutbanks cave, frost action.	Wetness, fast intake, seepage.	Not needed	Not needed.
KrA: Kresson	Low strength	Slow refill	Percs slowly, wetness.	Wetness	Percs slowly, wetness, erodes easily.	Percs slowly, wetness.
LhA, LmA: Lakehurst	Seepage, piping, hard to pack.	Deep to water	Cutbanks cave	Droughty, fast intake, seepage.	Not needed	Not needed.
LwB, LwC: Lakewood	Seepage, piping, hard to pack.	No water	Not needed	Fast intake, seepage, droughty.	Too sandy	Droughty.
Ma: Manahawkin	Seepage	Favorable	Floods, cutbanks cave, excess humus.	Floods, wetness.	Not needed	Not needed.
Mr, Mu: Mullica	Seepage, piping.	Favorable	Wetness, cutbanks cave.	Wetness, fast intake.	Not needed	Wetness.
PeA: Pemberton	Seepage, piping.	Deep to water	Cutbanks cave	Droughty, fast intake.	Piping	Not needed.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
PhB, PhC---------- Phalanx	Seepage, large stones.	No water-------	Not needed-----	Favorable------	Favorable, large stones.	Favorable.
Pm*. Pits, sand and gravel.						
PN*, PO*, PW*. Psamments						
SaB---------- Sassafras	Piping---------	Deep to water	Not needed-----	Slope----------	Slope----------	Slope.
Sh---------- Shrewsbury	Piping, unstable fill.	Favorable------	Wetness--------	Wetness, seepage.	Wetness--------	Wetness.
SS*: Sulfaquents.						
Sulfihemists.						
TnB---------- Tinton	Seepage, piping.	No water-------	Not needed-----	Slope, droughty, fast intake.	Piping---------	Droughty.
UL*. Urban land						
UP*: Urban land.						
Fripp----------	Seepage,	No water-------	Not needed-----	Droughty,	Too sandy,	Droughty,

TABLE 18.--SOIL SERIES ARRANGED ACCORDING TO TEXTURE OF THE SUBSOIL AND NATURAL DRAINAGE

Texture of the subsoil[1] and other soil characteristics	Excessively drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained	Very poorly drained
Mineral soils:						
Sand or loamy sand subsoil[2]--						
Base of albic horizon more than 4 inches below the surface.	Lakewood	----------	Lakehurst	Lakehurst	Atsion	Berryland
Albic horizon lacking or base of albic horizon less than 4 inches below the surface--						
Extremely acid to very strongly acid.	Evesboro	----------	Klej	Klej	----------	----------
Strongly acid to slightly acid	Fripp	----------	----------	----------	----------	----------
Sandy loam subsoil[2]--						
Subsoil with ironstone	----------	Phalanx	----------	----------	----------	----------
Subsoil without ironstone	----------	Downer	Hammonton	Hammonton	----------	Mullica
Sandy clay loam subsoil[2]--						
Nonglauconitic material--						
Base of albic horizon more than 4 inches below the surface.	----------	Woodmansie	----------	----------	----------	----------
Albic horizon lacking or base of albic horizon less than 4 inches below the surface--						
Very firm subsoil	----------	Aura	----------	----------	----------	----------
Friable or firm subsoil	----------	Sassafras	----------	----------	----------	----------
Glauconitic material--						
Sandy surface layer more than 20 inches thick.	----------	Tinton	Pemberton	Pemberton	----------	----------
Sandy surface layer lacking or less than 20 inches thick.	----------	Collington	Adelphia	Adelphia	Shrewsbury	----------
Clayey subsoil[2]--						
Nonglauconitic material	----------	----------	Keyport	----------	----------	----------
Glauconitic material	----------	----------	----------	Kresson	----------	----------
Organic soils:	----------	----------	----------	----------	----------	Manahawkin

[1]Subsoil texture listed in order of increasing clay content. [2]Dominant texture of finest horizon.

TABLE 19.--CLASSIFICATION OF THE SOILS