Use and Management of the Soils

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

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

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

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

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan drainage projects, construction projects, and safe waste disposal sites.

The soils in the county are assigned to various interpretive groups at the end of each map unit description and in some of the tables. The groups for each map unit also are shown in the section "Interpretive Groups," which follows the tables at the back of this survey.

Crops and Pasture

James A. McCluskey, district conservationist, Soil Conservation Service, helped prepare this section.

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

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

In 1982, more than 205,000 acres in Licking County was used for crops and about 54,000 acres was used as pasture *(24)*. Of this total, about 112,600 acres was used for row crops, mainly corn and soybeans, 15,900 acres for close-growing crops, mainly wheat and oats, and 27,000 acres for rotation hay and pasture *(5)*.

The potential of the soils in the county for increased production of food or forage is good. About 71,100 acres of potential cropland is used as woodland, and about 45,400 acres is used as pasture. About 69,200 acres of this potential cropland, however, is in land capability class III or IV and would require good management to control water erosion if it were used as cropland. The conversion of pasture and woodland to cropland would depend on economic considerations. Crop production could also be increased considerably by applying the latest cropping techniques and by using the information in this survey.

Corn and soybeans are the main grain crops grown in Licking County, but the soils and climate also are suited to grain sorghum, sunflowers, and similar crops. Wheat and oats are the most common close-growing crops. Other crops, such as barley, rye, and buckwheat, could be grown, and grass seed could be produced

from bromegrass, timothy, fescue, redtop, and bluegrass.

The different kinds of soil in Licking County are affected by different management concerns. The main management needs are measures that control water erosion and soil blowing, minimize surface compaction, reduce seasonal wetness, maintain fertility and tilth, and reduce droughtiness.

Water erosion is a major concern on about half of the cropland and pasture in the county. It generally is a hazard where the slope is more than 2 percent. The hazard increases as the slope increases. In cultivated or overgrazed areas, it generally is moderate if the slope is 2 to 6 percent, severe if the slope is 6 to 18 percent, and very severe if the slope is more than 18 percent.

Erosion reduces natural soil fertility and productivity as the original topsoil is removed and the more acid subsoil is incorporated into the surface layer through subsequent tillage. The need for lime and fertilizer to replace lost plant nutrients and maintain productivity is thus increased. If the amount of annual soil loss exceeds the rate at which the soil rebuilds itself, long-term productivity and natural fertility will be reduced. Loss of the original topsoil is especially damaging on soils that have a high content of clay in the subsoil, such as Bennington and Guernsey soils, and on soils that have a fragipan in the subsoil that limits the depth of the root zone, such as Cincinnati and Homewood soils.

Erosion increases the cost of crop production, results in poor tilth, increases the need for tillage, and reduces the available water capacity of the soil. Tilling and preparing a good seedbed are difficult in the more eroded spots in many sloping fields where most of the original surface layer has been lost. In these spots reduced seed-soil contact and reduced available water capacity commonly result in poorer stands. These spots are common in areas of the eroded Amanda, Centerburg, Coshocton, and Homewood soils.

Eroding sediments, which include chemical fertilizer, herbicides, and pesticides, enter into waterways, streams, ponds, and lakes. The sediments can fill drainage ditches and block drainage outlets, often requiring more costly ditch maintenance for proper operation. Control of erosion protects the soil resource base, maintains productivity, minimizes the pollution of streams, and improves the quality of water for municipal and recreational uses and for fish and wildlife.

Soil management measures that control erosion include proper crop rotations, contour farming, contour stripcropping, cover crops, crop residue management, grassed waterways, terraces and diversions, conservation tillage, and spring plowing rather than fall plowing. The measures that conform to a particular cropping system can be selected to reduce soil loss to an amount that will not reduce long-term productivity.

Crop rotations that include cover crops and grasses and legumes reduce the hazard of erosion by providing a plant cover for extended periods and improve soil tilth for the following crop. They are effective on gently sloping soils and on steeper soils. The proportion of hay or pasture in the rotation should increase as slope increases.

In areas where slopes are relatively long and uniform, farming gently sloping soils on the contour and contour stripcropping the steeper soils are effective in controlling erosion. Contour stripcropping is effective in areas of the sloping Amanda, Alford, Centerburg, Cincinnati, Clarksburg, Coshocton, Hickory, Homewood, and Keene soils that have relatively long, uniform slopes (fig. 16). Many areas of sloping soils have slopes that are so short and irregular that contour stripcropping is not practical. On these soils, a cropping system that provides a substantial plant cover or a system of conservation tillage that leaves crop residue on the surface is needed to control erosion.

Terraces and diversions help to control erosion by intercepting runoff and safely diverting it across the slope. They are most effective on deep, well drained, gently sloping and sloping soils that have relatively long and uniform slopes. Other soils are less well suited to terracing because of irregular slopes, excessive wetness in the terrace channels, a clayey subsoil or fragipan that would be exposed in the terrace channels, or bedrock within a depth of 40 inches.

A system of conservation tillage, including no-till planting, that leaves crop residue on the surface can help to control erosion on most of the soils in the county (fig. 17). It is best suited to well drained and moderately well drained soils that dry and warm up early in the spring. Adequate drainage is important when conservation tillage systems are used on very poorly drained to somewhat poorly drained soils. A high level of management, including weed and insect control, is needed in areas where a system of conservation is applied. Contour farming, contour stripcropping, and grassed waterways can be used along with conservation tillage to further reduce the hazard of erosion.

Soil blowing is a hazard on Carlisle soils. It can damage these mucky soils if winds are strong and if the soils are dry and have no vegetation or surface mulch. Maintaining a plant cover, surface mulching, and roughening the surface by proper tillage methods minimize soil blowing on these soils. Windbreaks of suitable shrubs also can be effective in controlling soil blowing.

Figure 16.—Contour stripcropping in an area of Hickory silt loam, 6 to 12 percent slopes, eroded.

Information about the measures that control erosion and soil blowing on each kind of soil is available at the local office of the Soil Conservation Service.

Soil compaction is a general management concern on all of the cropland in the county. Pressure applied to the surface by farm machinery can cause compaction, especially if the soil is soft and compressible because of wetness. When the soil becomes compacted, the total porosity of the affected soil is reduced and soil structure is damaged. Compaction caused by traffic during seedbed preparation and harvesting can extend well into the subsoil, restricting air and water movement and root penetration. The factors affecting compaction on cropland include machinery size, weight, and design; the type of farm implements; the timeliness of fieldwork; soil texture; and soil moisture content. Compaction can be minimized by tilling the soil at the proper soil moisture content, by using machinery with lower axle weights, by using the most efficient implements, and by minimizing tillage.

Soil drainage is the major management concern on about half of the acreage used for crops and pasture in the county. The poorly drained and very poorly drained Carlisle, Condit, Killbuck, Luray, Melvin, Pewamo, Sebring, Sloan, Wallkill, and Westland soils are naturally so wet that crop production is generally not possible unless a drainage system is installed. These soils make up about 51,000 acres in the county,

Figure 17.—No-till corn planted in rye in an area of Centerburg silt loam, 2 to 6 percent slopes.

excluding the acreage used for urban development. Unless drained, the somewhat poorly drained Algiers, Bennington, Fitchville, Orrville, Shoals, and Sleeth soils are so wet that the crops are damaged during most years and planting or harvesting is delayed. These soils make up about 86,000 acres in the county, excluding the acreage used for urban development.

Small areas of wet soils in seepy spots, along drainageways, and in swales are commonly included with the moderately well drained soils, such as Centerburg and Titusville soils, in mapping. A drainage system is needed in these areas.

The design of surface and subsurface drainage systems varies with the kind of soil. A combination of surface and subsurface drainage is needed in most areas of the poorly drained and very poorly drained soils that are used for intensive row cropping. Drains should be more closely spaced in slowly permeable soils than in the more permeable soils. Subsurface drainage is slow in Condit and Bennington soils. Establishing adequate outlets for subsurface drainage systems can be difficult in many areas of Algiers, Carlisle, Condit, Killbuck, Luray, Melvin, Pewamo, Sebring, Sloan, Wallkill, and Westland soils.

Organic soils oxidize and subside when their pore space is filled with air; therefore, special drainage systems are needed to control the water table and the period of drainage. Keeping the water table at the level required by the crops during the growing season and raising it to the surface during other parts of the year

minimize the oxidation and subsidence of organic soils.

Periodic inspection and maintenance are needed to keep a drainage system working properly. Regularly cleaning outlet ditches helps to prevent blockage by sediments and keeps brush from restricting the flow of water. Controlling weeds and brush and maintaining a cover of grasses along the ditchbanks keep ditchbanks stable and reduce the risk of streambank erosion. Subsurface drainage outlets should be protected against erosion. Animal guards keep rodents from entering the outlets and blocking the drains. Replacing broken drains helps to prevent the accumulation of sediments, which can restrict the flow of water.

Information about the design of drainage systems for each kind of soil is given in the Technical Guide, which is available in the local office of the Soil Conservation Service.

The *fertility* of a soil depends on the natural fertility level and on past use and management, including previous applications of lime and fertilizer. As a result, fertility can vary widely from field to field, even on the same kind of soil.

About 16 chemical elements are essential to the growth of plants *(17)*. High crop yields and productive pastures require adequate levels of plant nutrients, lime, and organic matter. Maintaining these levels results in sustained high yields on all of the soils in the county.

Many nutrients are most readily available to plants where the soil is nearly neutral in reaction. They are less readily available where the soil is more acid or more alkaline. Most of the soils in Licking County, such as Amanda, Bennington, Centerburg, Coshocton, and Homewood soils, are acid in the upper part of the root zone and require periodic additions of lime to increase the availability of plant nutrients.

Soil texture, organic matter content, and the type of clay minerals influence the cation-exchange capacity of the soil, which affects the storage and availability of nutrients. The ability to store and release plant nutrients increases as the content of clay and organic matter increases. Pewamo soils have a high content of clay and organic matter and a high capacity to store and release plant nutrients. Soils that have a lower content of clay or organic matter, such as Chili and Rigley soils, have a reduced capacity to store and release nutrients and lose more nutrients through leaching. On these soils frequent applications of a small amount of fertilizer reduce the amount of nutrients lost through leaching.

On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

Organic matter influences many soil properties, including color, structure, tilth, water infiltration, available water capacity, and cation-exchange capacity. In the light colored mineral soils in Licking County, the organic matter content in the surface layer generally is moderate in uneroded areas and low in eroded areas. It generally is high in the dark mineral soils in the county. Cultivation tends to lower the organic matter content by increasing the rates of oxidation and erosion on sloping soils. Returning all crop residue to the soil helps to maintain the organic matter content. Cover crops, sod crops, green manure crops, and additions of barnyard manure increase the organic matter content.

Sewage sludge can have economic value as a source of organic matter and some plant nutrients. If the sludge is applied to land, management concerns include the application rate, the hazards associated with heavy metals, and possible odor problems and health hazards. The chemical composition of the sludge should be determined before its application on land. Additions of sludge to cropland should be based on analysis of the sludge, the results of soil tests, and the expected level of yields. The Cooperative Extension Service can provide information about the application of sewage sludge.

Soil tilth is an important factor affecting the germination of seeds and the infiltration of water into the soil. Soils that have good tilth are granular and porous. Maintaining tilth is a management concern on many of the soils in Licking County.

Most of the soils used for crops in the county have a surface layer of silt loam that is light in color and moderate or low in content of organic matter. Generally, the structure of these soils is relatively weak. During periods of heavy rainfall, a crust forms on the bare surface. The crust is hard when dry. It reduces the rate of water infiltration and impedes the movement of air. It retards seedling emergence and increases the runoff rate. Regular applications of crop residue, manure, and other organic material can improve soil structure and minimize crusting. A system of conservation tillage, including no-till planting, that leaves crop residue on the surface improves tilth by minimizing crusting and improving soil structure. If a conventional tillage system is used, shallow cultivation breaks up the crust.

Fall plowing is generally not a good practice on light colored soils that have a surface layer of silt loam because of the formation of a crust during winter and spring. If plowed in the fall, many soils are nearly as dense and hard at planting time as they were before they were plowed. Also, about half of the cropland consists of sloping soils that are subject to damaging erosion if they are plowed in the fall.

In many sloping areas, tilling and preparing a good

seedbed are difficult because erosion has removed part of the original surface layer and tillage has mixed subsoil material that has a higher content of clay into the present surface layer.

The dark Luray, Pewamo, and Westland soils have a high content of clay. Poor tilth is a problem because these soils often stay wet until late in spring. If plowed when wet, the soils tend to be very compacted and cloddy when dry. Thus, preparing a good seedbed is difficult. Fall plowing generally results in good tilth in spring.

Droughtiness is a major management concern on some soils in Licking County. The more droughty soils, such as Hazleton and Rigley soils, are used mainly as woodland. Occasional shortages of available moisture occur on many of the soils used for crops, hay, or pasture. These shortages are most common on Chili, Fox, Stonelick, and Tioga soils and on soils that have a restricted root zone, such as Homewood and Cincinnati soils.

Many of the soils in which moisture shortages occur are well suited to a system of conservation tillage, such as no-till planting, that leaves crop residue on the surface. The crop residue increases the moisture supply by increasing the rate of water infiltration and by reducing runoff and evaporation rates.

Nearly one-fourth of the acreage in the county is used as pasture. The more common pasture and hay plants are alfalfa, red clover, alsike clover, bluegrass, orchardgrass, tall fescue, timothy, and bromegrass.

The ability of a pasture to produce forage and to provide enough cover to control erosion is influenced by the number of livestock, the length of the period of grazing, the timeliness of grazing, the forage being grazed, and the availability of water. Good management measures, such as proper stocking rates, pasture rotation, timely deferment of grazing, applications of lime and fertilizer, and control of weeds and insects, help to maintain the key forage plants. Applying herbicides and mowing help to control weeds. The need for lime and fertilizer should be determined by the results of soil tests. The amount to be applied should be based on the requirements of the grasses or legumes to be grown.

Erosion control is a major management need on gently sloping to very steep soils because the hazard of erosion increases as the slope increases. Many of these soils are already eroded. Control of erosion is particularly important when the pasture is seeded. Using a no-till seeding method or growing small grain as a companion crop can help to control further erosion.

Soil compaction is caused by overgrazing or grazing when the soils are wet. It can greatly reduce the vigor of pasture plants. Also, it can increase the runoff rate and the hazard of erosion on sloping soils. Deferment of grazing during wet periods minimizes compaction. Subsurface drains can be effective in removing excess water from pastured areas.

Seeding mixtures should be selected on the basis of soil type and the desired management system. Legumes increase the nutrient value of the forage and provide nitrogen for the growth of grasses. Alfalfa should be seeded on well drained soils that have adequate levels of plant nutrients and lime. The wetter soils are better suited to alsike clover than to red clover. Information about seeding mixtures, herbicide treatment, and other management measures for specific soils can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

The specialty crops grown commercially in Licking County include vegetables, nursery stock, Christmas trees, and fruits. A small acreage throughout the county is used for melons, strawberries, raspberries, popcorn, sweet corn, tomatoes, other vegetables, and small fruits. Potatoes are grown commercially on a small acreage in the central part of the county. Apples and peaches are the most important tree fruits grown in the county.

Large areas in the county are suited to specialty crops, such as tomatoes and other vegetables. Celery, onions, lettuce, and other truck crops could be grown on organic soils that are adequately drained. Most of the well drained soils are suitable for orchards and nursery plants. In the higher areas on the landscape where cold air drainage is good, frost is less likely to damage orchards. Soils in low positions where frost is frequent generally are less well suited to early vegetables, small fruits, and orchards.

The latest information about growing specialty crops can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

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

The management needed to obtain the indicated

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

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

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit *(21)*. Only class and subclass are used in this survey.

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

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry. In class I there are no subclasses because the soils of this class have few limitations.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

R.A. Cappell, service forester, Ohio Department of Natural Resources, Division of Forestry, helped prepare this section.

Woodland is an important land use in Licking County. About 97,000 acres in the county, or 22 percent of the total acreage, is woodland *(24)*. About 73,400 acres, or about 75 percent of the woodland, is in land capability class III, IV, VI, or VII. The most extensive areas of woodland are in the eastern part of the county. The wooded acreage consists mainly of privately owned stands of timber and farm woodlots. The State of Ohio owns several wooded tracts, including Black Hand Gorge State Preserve and Flint Ridge State Memorial. In many areas farmland that has been poorly managed is idle and is reverting to woodland.

The woodland occurs mainly as areas of mixed hardwoods. The major forest types are beech-maple in the western half of the county; mixed mesophytic in the northeast corner; and oak-hickory in the southeast corner. The elm-ash forest type is in scattered areas throughout the western part of the county. Of the total

acreage of woodland, about 7,000 acres is pine, 56,000 acres is oaks, 7,000 acres is elm and ash, and 27,000 acres is northern hardwoods *(6)*.

The scattered woodlots in the western half of the county are typically small and are on short slopes along narrow stream valleys, on narrow flood plains, and in undrained areas on uplands. Most of the woodland in the eastern half of the county occurs as areas of moderately steep to very steep soils on hillsides and sloping soils on some ridgetops. Christmas trees are grown on farms throughout the county.

Many woodlots in the county have been poorly managed. Heavy selective cutting without planning for future timber crops has resulted in stands of overly mature and cull trees. High grading has continually removed the best trees and left cull trees and trees of low value to occupy valuable growing space. In many areas grazing livestock have destroyed the leaf litter and desirable young trees, damaged roots, and compacted the soil. In some areas forest fires have damaged large trees, interfered with natural seeding, and destroyed the leaf litter, which increases the supply of moisture and protects the soil against erosion.

If properly managed, the woodland can be restored to a high level of production. Good management includes measures that protect the woodland from fire and from grazing by livestock, timber stand improvement, prescribed marking, and appropriate harvesting techniques. Measures that improve the timber stands, including culling diseased and less desirable trees and cutting or spraying grapevines, increase the growth rate of valuable trees and shorten the rotation time considerably. On soils that have a high water table, the trees should be harvested during the drier periods or when the ground is frozen.

Seedling survival in newly planted areas is affected by the vigor of the planting stock, the adequacy of site preparation, applications of fertilizer, and control of competing weeds. The trees selected for planting should be those that are vigorous and are suited to the soil. Applying the necessary cultural measures after planting increases the growth rate. Competing vegetation can be controlled by disking, mowing, spraying, mulching, girdling, and cutting. The most valuable trees can be reestablished in intensively managed areas where the soils are well suited to hardwoods. Pine can be grown on soils that are poorly suited to hardwoods or in areas that are not constantly managed.

Productivity of woodland varies widely from soil to soil. The factors influencing tree growth include internal drainage, soil reaction, texture, depth, natural fertility, available water capacity, slope, aspect, and position on the landscape. Other factors include radiation, precipitation, and the movement of air *(22)*.

Aspect is the direction a slope faces. Trees grow best on north and east aspects because of less exposure to the prevailing wind and the sun and because of more abundant soil moisture. South and west aspects are less well suited to woodland because of a higher soil temperature and evaporation rate and earlier snowmelt. North aspects have an azimuth of 355 to 95 degrees, and south aspects have an azimuth of 96 to 354 degrees *(4)*.

The position of soils on long side slopes influences the amount of moisture available for tree growth. The soils in the lower positions generally receive more moisture than those in the higher positions because of downslope runoff and seepage.

The hazard of erosion and the use of equipment are influenced by the slope. As the percentage of slope increases, the runoff rate and the hazard of erosion also increase. Erosion reduces the depth of the soil and thus the amount of available water. Severe erosion commonly exposes the less porous subsoil, thus increasing the runoff rate and lowering the rate of water infiltration. The increased runoff rate and lower infiltration rate hinder tree growth and natural reseeding. Erosion can be controlled by building logging roads and skid trails on the contour and by establishing water bars where needed.

Additional information about woodland management can be obtained from the local offices of the Soil Conservation Service and the Ohio Department of Natural Resources, Division of Forestry.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator tree species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 30, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excess water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; *F*, a high content of rock fragments in the soil; and *L*, low strength. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one

limitation, the priority is as follows: R, X, W, T, D, C, S, F, and L.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 9 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 9 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from a commercial nursery or from local offices of the Soil Conservation Service; the Ohio Department of Natural Resources, Division of Forestry; and the Cooperative Extension Service.

Recreation

Licking County has many recreational areas, including Black Hand Gorge State Preserve, Dawes Arboretum, Flint Ridge State Memorial, Moundbuilders and Octagon Earthworks State Memorials, Buckeye Lake, and Camp Ohio, a 4-H camp, in the northeastern part of the county. These areas provide opportunities for fishing, swimming, boating, picnicking, camping, and hiking.

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

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

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

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

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

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

Wildlife Habitat

In Licking County a wide variety of wildlife is supported by diverse habitats, including cropland, openland, woodland, swamps, and ponds. Some of the birds that inhabit the county are mourning dove, ruffed grouse, red-tailed hawk, crow, owl, pileated woodpecker, pheasant, and songbirds. Some wild turkeys have been released in the eastern part of the county. Ducks, geese, and blue herons inhabit scattered wetlands and ponds. Some of the mammals

inhabiting the county are rabbit, squirrel, woodchuck, deer, raccoon, and fox.

In the western part of the county, cottontail rabbit, bobwhite quail, and ring-necked pheasant were once the most abundant openland game species. The populations of these species have decreased greatly because the removal of fencerows and fall plowing have reduced the extent of their habitat and the supply of winter food. Many areas in the eastern part of the county provide habitat for woodland wildlife. Squirrel, ruffed grouse, and deer are plentiful in these areas.

If properly managed, the soils in the county can provide food and shelter for wildlife. Incorporating openland, wetland, and woodland wildlife habitat into a single area attracts the greatest variety of wildlife species to the area.

Habitat for wetland wildlife can be developed in undrained depressions on uplands and in old stream meanders on flood plains. Ponds also can be used as habitat for wetland wildlife. Special plantings help to attract waterfowl.

Habitat for openland wildlife can be developed in eroded areas by planting mixtures of meadow plants and shrubs that provide food, shelter, and nesting areas. Mowing meadows after the nesting season ensures higher survival rates. A good plant cover helps to control erosion.

Woodlots can be improved as habitat for woodland wildlife by maintaining den trees and trees that produce nuts or berries. If managed properly, cropland can be a major source of food for wildlife.

Additional information about improving wildlife habitat can be obtained from the local offices of the Soil Conservation Service and the Ohio Department of Natural Resources, Division of Wildlife.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor *(1)*. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

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

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

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

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

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, beech, maple, hawthorn, dogwood, hickory, blackberry, and spicebush.

Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are shrub honeysuckle, autumn olive, and crabapple.

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

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

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

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

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

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

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

Engineering

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

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

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

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

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

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

The information in the tables, along with the soil

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

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

Building Site Development

Gordon C. Postle, district program administrator, Licking County Soil and Water Conservation District, helped prepare this section.

More than 33,000 acres in Licking County was used for urban development in 1982 *(24)*. Since then, an additional acreage of farmland has been converted to urban uses, especially in the western and central parts of the county. Many soil properties, such as depth to the seasonal high water table, slope, permeability, and depth to bedrock, can limit urban development. Wet basements, improper functioning of onsite sewage disposal systems, erosion on construction sites, and flooding are problems if soil features are ignored.

Erosion is a hazard on sloping soils during construction. This hazard increases as slope increases and the plant cover is removed. The hazards of runoff and erosion can be reduced by maintaining a plant cover wherever possible during construction.

Properly landscaping building sites and septic tank absorption fields helps to keep surface water away from foundations and absorption fields. An evaluation of the water supply on rural building sites and of the adequacy of outlets for foundation and basement drains and for perimeter drains around septic tank absorption fields is needed before construction.

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

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

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

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

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

Sanitary Facilities

Table 13 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations

are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

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

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

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

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

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

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

After soil material has been removed, the soil

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

Construction Materials

Table 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

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

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

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

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

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

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

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

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

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

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

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

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

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

Water Management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

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

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

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. Availability of drainage outlets is not considered in the ratings.

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

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

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

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

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

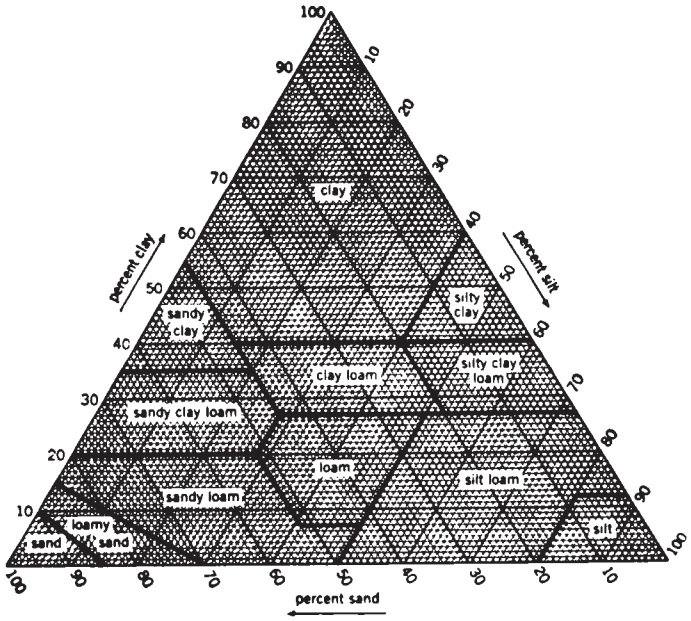

Figure 18.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 18). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(3)* and the system adopted by the American Association of State Highway and Transportation Officials *(2)*.

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested is given in table 19.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

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

Physical and Chemical Properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

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

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

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

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for

fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 17, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

Soil and Water Features

Table 18 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist

mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

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

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

If a soil is assigned to two hydrologic groups in table 18, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely.

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

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

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

One area that is subject to controlled inundation is upstream from the Dillon Lake flood-control structure in the valley of the Licking River in the eastern part of the county. The area of the flood pool is shown on the soil map. During periods of high rainfall and runoff, water is impounded behind the structure, resulting in the possibility of local flooding.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

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

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

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

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very

gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

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

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

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

Physical and Chemical Analyses of Selected Soils

Many of the soils in Licking County were sampled and analyzed by the Soil Characterization Laboratory, Department of Agronomy, Ohio State University, Columbus, Ohio. The physical and chemical data obtained from most of the samples include particle-size distribution, reaction, organic matter content, calcium carbonate equivalent, and extractable cations. These data were used in classifying the soils and evaluating their behavior under various land uses.

Nine pedons selected as representative of their respective series were sampled for analysis. They are described in the section "Soil Series and Their Morphology." These series and their laboratory identification numbers are Amanda series (LC-32), Bennington series (LC-23), Brownsville series (LC-27), Centerburg series (LC-22), Clarksburg series (LC-31), Coshocton series (LC-26), Medway series (LC-29), Mertz series (LC-28), and Pewamo series (LC-30).

In addition to the data from Licking County, laboratory data also are available from nearby counties that have many of the same soils. These data and the data from Licking County are on file at the Soil Characterization Laboratory, Department of Agronomy, Ohio State University; the Ohio Department of Natural Resources, Division of Soil and Water Conservation; and the State Office of the Soil Conservation Service, Columbus, Ohio.

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Ohio Department of Transportation, Division of Highways, Bureau of Testing, Soils and Foundation Section.

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

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(23)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

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

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

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Ochraqualfs (*Ochr*, meaning light colored surface layer, plus *aqualf*, the suborder of the Alfisols that has an aquic moisture regime).

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

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

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

Soil Series and Their Morphology

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

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(20)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(23)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

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

Alford Series

The Alford series consists of deep, well drained, moderately permeable soils on high Illinoian outwash terraces and on uplands. These soils formed in 5 to 12

feet of Wisconsinan loess. The loess overlies outwash on terraces and till or residuum on uplands. Slopes range from 0 to 12 percent.

Alford soils are similar to Mentor and Parke soils and are commonly adjacent to Brownsville, Cincinnati, and Parke soils. Brownsville soils have a higher content of coarse fragments throughout than the Alford soils. They are on hillsides and ridgetops, commonly at the higher elevations. Cincinnati soils have a fragipan. They are on side slopes and ridgetops. Mentor soils have bedding planes in the lower part. Parke soils have more sand in the lower part than the Alford soils. They are on terrace breaks.

Typical pedon of Alford silt loam, 2 to 6 percent slopes, about 3 miles northeast of Newark; in Madison Township; about 1,440 yards north and 1,610 yards west of the southeast corner of quarter township 2, T. 2 N., R. 11 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common medium and many fine roots; strongly acid; abrupt smooth boundary.

BE—8 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; few medium and common fine roots; common faint yellowish brown (10YR 5/4) silt coatings on faces of peds; strongly acid; clear wavy boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; few medium and fine roots; few faint yellowish brown (10YR 5/6) clay films on faces of peds; few distinct black (10YR 2/1) stains (iron and manganese oxide) on faces of peds; strongly acid; clear wavy boundary.

Bt2—20 to 30 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few medium and fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common distinct black (10YR 2/1) stains (iron and manganese oxide) on faces of peds; strongly acid; gradual wavy boundary.

BC—30 to 48 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate thick platy structure parting to weak fine subangular blocky; friable; few fine roots; very few faint dark yellowish brown (10YR 4/4) clay films on vertical faces of peds; few distinct black (10YR 2/1) stains (iron and manganese oxide) on vertical faces of peds; strongly acid; gradual wavy boundary.

C—48 to 60 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light yellowish brown (10YR 6/4) mottles; weak thick platy structure; friable; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The Ap horizon has chroma of 2 or 3. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The C horizon has hue of 7.5YR or 10YR and chroma of 4 to 6.

Algiers Series

The Algiers series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in recent alluvium 20 to 36 inches deep over a very poorly drained buried mineral soil. Slopes are 0 to 2 percent.

Algiers soils are similar to Killbuck soils and are commonly adjacent to Luray, Shoals, Sloan, and Wallkill soils. Killbuck soils are poorly drained. Luray and Sloan soils have a mollic epipedon. Luray soils are on broad flats on lake plains. Shoals and Sloan soils formed entirely in alluvium on flood plains. Wallkill soils formed in recent alluvium over a buried organic soil. They are in depressions.

Typical pedon of Algiers silt loam, frequently flooded, about 1 mile southwest of Luray; in Union Township; about 815 yards south and 610 yards west of the northeast corner of sec. 8, T. 17 N., R. 18 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; common fine roots; about 1 percent coarse fragments; slightly acid; abrupt smooth boundary.

C—10 to 28 inches; brown (10YR 4/3) silt loam; common medium faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few fine roots; about 1 percent coarse fragments; slightly acid; clear wavy boundary.

2Ab—28 to 44 inches; very dark gray (10YR 3/1) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; about 2 percent coarse fragments; slightly acid; clear wavy boundary.

2Btgb1—44 to 51 inches; dark gray (10YR 4/1) silty clay loam; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint very dark gray (10YR 3/1) clay films on faces of peds; about 2 percent coarse fragments; slightly acid; clear wavy boundary.

2Btgb2—51 to 60 inches; dark gray (10YR 4/1) silty

clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; few faint very dark gray (10YR 3/1) clay films on faces of peds; about 2 percent coarse fragments; slightly acid.

The thickness of the recent alluvium ranges from 20 to 36 inches. The content of coarse fragments is 0 to 5 percent in the Ap and C horizons and 0 to 15 percent in the 2Ab and 2Btgb horizons.

The Ap and C horizons have chroma of 2 or 3. In some pedons the C horizon is mottled below a depth of 20 inches. It is typically silt loam but is loam in some pedons. The 2Ab horizon has value of 2 or 3. It is silt loam or silty clay loam. The 2Btgb horizon has value of 4 or 5 and chroma of 1 or 2. It is commonly silty clay loam but is loam, clay loam, or silty clay in some pedons. Some pedons have a 2C horizon. This horizon is typically silty clay loam but in some pedons is clay loam, loam, or the gravelly analogs of those textures.

Amanda Series

The Amanda series consists of deep, well drained, moderately slowly permeable soils formed in calcareous Wisconsinan glacial till. These soils are mainly on end moraines and the dissected parts of ground moraines. In a few areas, however, they are on kames. Slopes range from 2 to 40 percent.

Amanda soils are similar to Centerburg and Hickory soils and are commonly adjacent to Bennington and Centerburg soils. Bennington soils are somewhat poorly drained, and Centerburg soils are moderately well drained. Bennington soils are on flats, slight rises, and low knolls. Centerburg soils are on knolls, on ridges, and on side slopes in dissected areas. Hickory soils have a higher content of igneous fragments and fewer sandstone fragments throughout the solum than the Amanda soils.

Typical pedon of Amanda silt loam, 6 to 12 percent slopes, eroded, about 1.3 miles southwest of Utica; in Washington Township; about 650 yards north and 270 yards east of the southwest corner of quarter township 2, T. 4 N., R. 12 W.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine and medium granular structure; friable; common fine roots; about 10 percent yellowish brown (10YR 5/6) subsoil material; about 5 percent coarse fragments; medium acid; abrupt smooth boundary.

Bt1—6 to 14 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; common distinct brown (10YR 4/3) organic coatings in old root channels; about 5 percent coarse fragments; strongly acid; clear smooth boundary.

Bt2—14 to 21 inches; yellowish brown (10YR 5/6) clay loam; moderate fine subangular blocky structure; firm; few fine roots; many distinct yellowish brown (10YR 5/4) clay films on faces of peds; about 5 percent coarse fragments; very strongly acid; clear smooth boundary.

Bt3—21 to 28 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few fine roots; many distinct yellowish brown (10YR 5/6) clay films on faces of peds; few fine yellowish red (5YR 5/8) stains (iron and manganese oxide); about 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bt4—28 to 35 inches; yellowish brown (10YR 5/4) clay loam; common medium faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; firm; few fine roots; many distinct pale brown (10YR 6/3) clay films on faces of peds; few fine yellowish red (5YR 5/8) stains (iron and manganese oxide); about 10 percent coarse fragments; medium acid; clear smooth boundary.

BC—35 to 45 inches; yellowish brown (10YR 5/4) clay loam; few medium distinct pale brown (10YR 6/3) mottles; weak coarse subangular blocky structure; firm; about 10 percent coarse fragments; few fine yellowish red (5YR 5/8) stains (iron and manganese oxide); slightly acid; clear wavy boundary.

C—45 to 60 inches; dark yellowish brown (10YR 4/4) loam; massive; firm; about 10 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 40 to 60 inches. The content of coarse fragments ranges from 0 to 10 percent in the upper part of the solum, from 2 to 15 percent in the lower part, and from 5 to 15 percent in the C horizon. These are dominantly sandstone fragments, but some are crystalline rock fragments and some limestone and shale fragments are in the C horizon.

The Ap horizon has chroma of 2 to 4. Some pedons have an A horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is dominantly clay loam or loam, but many pedons have subhorizons of silty clay loam. The C horizon has value of 4 or 5 and chroma of 3 or 4. It is dominantly loam but is silt loam in some pedons.

Amanda Variant

The Amanda Variant consists of deep, well drained, moderately permeable soils on foot slopes. These soils

formed in silty colluvium and the underlying glacial drift. Slopes range from 6 to 18 percent.

Amanda Variant soils are commonly adjacent to Brownsville, Fitchville, and Glenford soils. Brownsville soils have a higher content of coarse fragments throughout than the Amanda Variant soils. They are on hillsides and ridgetops. The somewhat poorly drained Fitchville and moderately well drained Glenford soils are on flats and low knolls on terraces and lake plains.

Typical pedon of Amanda Variant silt loam, 12 to 18 percent slopes, eroded, about 3.5 miles northwest of Newark; in Newark Township; 980 yards north and 1,980 yards east of the southwest corner of quarter township 2, T. 2 N., R. 12 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine and few medium roots; specks of Bt1 material; medium acid; abrupt smooth boundary.

Bt1—7 to 15 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct strong brown (7.5YR 5/6) clay films on horizontal and vertical faces of peds; brown (10YR 4/3) coatings along old root channels; medium acid; clear smooth boundary.

Bt2—15 to 24 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct strong brown (7.5YR 5/6) clay films on horizontal and vertical faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

Bt3—24 to 34 inches; brown (7.5YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint strong brown (7.5YR 5/6) clay films on horizontal and vertical faces of peds; strongly acid; clear smooth boundary.

Bt4—34 to 42 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; few faint strong brown (7.5YR 5/6) clay films on horizontal and vertical faces of peds; strongly acid; clear smooth boundary.

Bt5—42 to 53 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; few faint strong brown (7.5YR 5/6) clay films on horizontal and vertical faces of peds; medium acid; clear wavy boundary.

2Bt6—53 to 60 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few faint strong brown (7.5YR 5/6) clay films on vertical faces of peds; about 12 percent coarse fragments; medium acid; clear wavy boundary.

2C—60 to 80 inches; yellowish brown (10YR 5/4) loam; massive; firm; about 10 percent coarse fragments; slightly acid.

The thickness of the solum ranges from 45 to 70 inches. The thickness of the silty mantle ranges from 20 to 60 inches. The content of coarse fragments ranges from 0 to 5 percent in the A horizon, from 0 to 10 percent in the Bt horizon, from 5 to 20 percent in the 2Bt horizon, and from 5 to 15 percent in the 2C horizon. These are dominantly fine grained sandstone and siltstone fragments, but the 2C horizon also has crystalline pebbles and shale and limestone fragments.

The Ap horizon has chroma of 2 or 3. The Bt horizon is dominantly silt loam but is silty clay loam in some pedons. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loam, silt loam, clay loam, or the gravelly analogs of those textures. The 2C horizon has value of 4 or 5 and chroma of 3 or 4. It is dominantly loam but is silt loam in some pedons.

Bennington Series

The Bennington series consists of deep, somewhat poorly drained, slowly permeable soils formed in calcareous Wisconsinan glacial till on flats, low knolls, and low rises on till plains. Slopes range from 0 to 6 percent.

Bennington soils are similar to Condit soils and are commonly adjacent to Amanda, Centerburg, Condit, and Pewamo soils. The well drained Amanda and moderately well drained Centerburg soils are on knolls, ridges, and dissected side slopes. The poorly drained Condit soils are in slight depressions. Pewamo soils have a mollic epipedon. They are on flats and in depressions.

Typical pedon of Bennington silt loam, 2 to 6 percent slopes, about 3.2 miles northwest of Jersey; in Jersey Township; about 220 yards south and 770 yards east of the northwest corner of sec. 15, T. 2 N., R. 15 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; weak medium granular structure; very friable; many fine roots; about 3 percent coarse fragments; medium acid; abrupt smooth boundary.

BE—7 to 12 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; friable; common fine roots; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; about 3 percent coarse

fragments; strongly acid; clear wavy boundary.

Bt1—12 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct gray (10YR 6/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; many distinct light brownish gray (10YR 6/2) coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 3 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt2—18 to 24 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct gray (10YR 5/1) and light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots; common distinct grayish brown (10YR 5/2) and dark gray (10YR 4/1) clay films on faces of peds; many distinct grayish brown (10YR 5/2) coatings on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; slightly acid; clear wavy boundary.

Bt3—24 to 29 inches; yellowish brown (10YR 5/4) clay loam; common medium distinct gray (10YR 5/1) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very firm; few fine roots; common distinct grayish brown (10YR 5/2) clay films on faces of peds; many distinct grayish brown (10YR 5/2) coatings on faces of peds; about 10 percent coarse fragments; neutral; clear wavy boundary.

BC—29 to 34 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; many distinct grayish brown (10YR 5/2) coatings on faces of peds; common fine prominent light gray (10YR 7/2) weathered limestone fragments; about 10 percent coarse fragments; slight effervescence in spots; mildly alkaline; clear wavy boundary.

C1—34 to 39 inches; brown (10YR 4/3) loam; common coarse distinct gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; few fine prominent light gray (10YR 7/2) weathered limestone fragments; about 10 percent coarse fragments; strong effervescence; moderately alkaline; abrupt wavy boundary.

C2—39 to 80 inches; brown (10YR 4/3) loam; common medium distinct gray (10YR 5/1) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; about 10 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 28 to 48 inches. The depth to carbonates ranges from 26 to 46 inches. The content of coarse fragments ranges from 0 to 5 percent in the upper part of the solum, from 2 to 10 percent in the lower part, and from 3 to 15 percent in the C horizon.

The Ap horizon has chroma of 1 or 2. The Bt horizon generally has chroma of 3 to 6. In some pedons, however, it has a dominant chroma of 2 within a depth of 30 inches. It is dominantly silty clay loam or clay loam, but some pedons have subhorizons of silty clay. The C horizon has value of 4 or 5 and chroma of 1 to 4. It is dominantly loam but is clay loam or silty clay loam in some pedons.

Berks Series

The Berks series consists of moderately deep, well drained, moderately permeable or moderately rapidly permeable soils, mainly on unglaciated ridgetops and hillsides. These soils formed in material weathered from shale, siltstone, and fine grained sandstone. Slopes range from 2 to 18 percent.

Berks soils are similar to Brownsville soils and are commonly adjacent to Brownsville, Coshocton, and Rigley soils. Brownsville soils are deep over bedrock. They are commonly on the steeper part of hillsides below the Berks soils on ridgetops. Coshocton soils are moderately well drained. Rigley soils have more sand throughout than the Berks soils. Coshocton and Rigley soils are on hillsides and ridgetops.

Typical pedon of Berks channery silt loam, 2 to 6 percent slopes, about 2.8 miles northeast of Jacksontown; in Licking Township; 140 yards south and 530 yards west of the northeast corner of quarter township 4, T. 1 N., R. 12 W.

Ap—0 to 7 inches; brown (10YR 4/3) channery silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots; about 25 percent coarse fragments; slightly acid; abrupt smooth boundary.

Bw—7 to 15 inches; yellowish brown (10YR 5/4) very channery silt loam; weak medium subangular blocky structure; friable; common fine roots; about 55 percent coarse fragments; medium acid; clear smooth boundary.

BC—15 to 25 inches; yellowish brown (10YR 5/4) extremely channery silt loam; weak medium subangular blocky structure; friable; few fine roots; about 75 percent coarse fragments; medium acid; gradual smooth boundary.

R—25 to 30 inches; yellowish brown (10YR 5/4) thinly bedded, rippable fine grained sandstone.

The thickness of the solum ranges from 18 to 40 inches. The depth to bedrock ranges from 20 to 40 inches. The bedrock is commonly fractured siltstone, fine grained sandstone, or shale. The content of coarse fragments ranges from 10 to 50 percent in the Ap horizon and from 15 to 75 percent in individual subhorizons of the B horizon. These are angular siltstone, fine grained sandstone, and shale fragments.

The Ap horizon has value of 4 or 5 and chroma of 3 or 4. It is typically channery silt loam but is very channery silt loam or silt loam in some pedons. The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. In the fine-earth fraction, it is typically silt loam but is loam or silty clay loam in some pedons. Some pedons have a C horizon. This horizon is very channery, extremely channery, very shaly, or extremely shaly silt loam or loam. The content of coarse fragments in this horizon ranges from 35 to 90 percent.

Brownsville Series

The Brownsville series consists of deep, well drained, moderately permeable or moderately rapidly permeable soils formed in colluvium and material weathered from siltstone and fine grained sandstone. These soils are commonly on the tops and sides of prominent unglaciated hills. Slopes range from 6 to 70 percent.

Brownsville soils are similar to Berks and Hazleton soils and are commonly adjacent to Clarksburg, Coshocton, and Orrville soils. Berks soils are moderately deep over bedrock. Clarksburg, Coshocton, and Orrville soils have a lower content of coarse fragments in the subsoil than the Brownsville soils. Clarksburg soils are on colluvial foot slopes at the lower elevations. Coshocton soils are generally on hillsides and ridgetops at the higher elevations. Orrville soils are on flood plains. Hazleton soils have more sand throughout than the Brownsville soils.

Typical pedon of Brownsville channery silt loam, 18 to 25 percent slopes, about 4.5 miles north of Brownsville; in Hopewell Township; about 1,440 yards south and 2,970 yards east of the northwest corner of quarter township 2, T. 1 N., R. 10 W.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) channery silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; many fine, common medium, and few coarse roots; about 20 percent coarse fragments; very strongly acid; abrupt smooth boundary.

E—2 to 6 inches; brown (10YR 4/3) channery silt loam, pale brown (10YR 6/3) dry; moderate medium platy structure parting to moderate fine granular; friable; common fine and few medium and coarse roots; about 20 percent coarse fragments; very strongly acid; clear smooth boundary.

Bw1—6 to 19 inches; yellowish brown (10YR 5/4) channery silt loam; weak fine subangular blocky structure; friable; common fine roots; about 30 percent coarse fragments; strongly acid; clear smooth boundary.

Bw2—19 to 30 inches; yellowish brown (10YR 5/4) very channery silt loam; weak fine subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films in old root channels; about 45 percent coarse fragments; strongly acid; clear smooth boundary.

Bw3—30 to 41 inches; yellowish brown (10YR 5/4) very channery loam; weak fine subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films in old root channels; about 55 percent coarse fragments; strongly acid; clear smooth boundary.

C—41 to 51 inches; yellowish brown (10YR 5/4) very channery silt loam; few fine distinct gray (N 6/0) and strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; about 40 percent coarse fragments; medium acid; abrupt smooth boundary.

R—51 to 53 inches; yellowish brown (10YR 5/4), fractured, hard siltstone bedrock; intervals of 4 to 10 inches between fractures; cannot be dug with a spade but can be chipped with a spud bar.

The thickness of the solum ranges from 24 to 55 inches. The depth to bedrock ranges from 40 to 72 inches. The content of coarse fragments ranges from 5 to 35 percent in the A horizon, from 15 to 70 percent in individual subhorizons of the B horizon, and from 30 to 90 percent in the C horizon. These are angular siltstone or fine grained sandstone fragments.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is dominantly the channery, flaggy, very channery, or extremely channery analogs of silt loam or loam, but some pedons have subhorizons with silty clay loam in the fine-earth fraction. The C horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. It is the channery, very channery, extremely channery, flaggy, very flaggy, or extremely flaggy analogs of silt loam or loam. The R horizon is commonly fractured siltstone or fine grained sandstone bedrock.

Carlisle Series

The Carlisle series consists of deep, very poorly drained, moderately slowly permeable to moderately rapidly permeable soils formed in organic material that

accumulated in topographically depressed kettle holes and swampy areas. These soils are on Wisconsinan lake plains, outwash terraces, and till plains. Slopes are 0 to 2 percent.

Carlisle soils are commonly adjacent to the mineral Luray, Ockley, Wallkill, and Westland soils. Luray and Westland soils are on wide, low flats and in depressions on lake plains and terraces along streams. Ockley soils are on flats, slight rises, knolls, and dissected side slopes on outwash terraces. Wallkill soils are in depressions on flood plains. Westland soils are on flats and in depressions on outwash terraces.

Typical pedon of Carlisle muck, about 3.2 miles southeast of Utica; in Washington Township; about 730 yards south and 1,700 yards east of the northwest corner of quarter township 4, T. 4 N., R. 12 W.

Op—0 to 10 inches; sapric material, black (10YR 2/1) broken face and rubbed, very dark grayish brown (10YR 3/2) dry; about 5 percent fiber, less than 2 percent rubbed; weak medium granular structure; very friable; common medium roots; medium acid; abrupt smooth boundary.

Oa1—10 to 18 inches; sapric material, dark reddish brown (5YR 2/2) broken face and rubbed; about 10 percent fiber, less than 2 percent rubbed; weak medium granular structure; very friable; few fine roots; few woody fragments; medium acid; clear smooth boundary.

Oa2—18 to 36 inches; sapric material, dark reddish brown (5YR 3/2) broken face, dark reddish brown (5YR 2/2) rubbed; about 45 percent fiber, 10 percent rubbed; weak thick platy structure; very friable; medium acid; abrupt smooth boundary.

Oa3—36 to 60 inches; sapric material, dark reddish brown (5YR 3/3) broken face, dark reddish brown (5YR 2/2) rubbed; about 5 percent fiber, less than 2 percent rubbed; weak thick platy structure; very friable; slightly acid.

The organic material is more than 51 inches thick. It is dominantly sapric, but thin layers of hemic material are in some pedons. The surface tier has hue of 5YR to 10YR or is neutral in hue. It has chroma of 0 to 2. Hue of 10YR is typical in the upper part, and hue of 5YR or 7.5YR is common in the lower part. The subsurface tier has hue of 5YR to 10YR or is neutral in hue. It has chroma of 0 to 3. Woody fragments are common in this tier. The bottom tier has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 3. The redder hues of the less decomposed material commonly become darker when the material is briefly exposed to air.

Centerburg Series

The Centerburg series consists of deep, moderately well drained, moderately slowly permeable soils formed in calcareous Wisconsinan glacial till that in places has a thin mantle of loess. These soils are on till plains. Slopes range from 2 to 12 percent.

Centerburg soils are similar to Amanda and Hickory soils and are commonly adjacent to Amanda, Bennington, and Pewamo soils. The well drained Amanda and Hickory soils are on knolls, ridges, and dissected side slopes. Bennington soils are somewhat poorly drained and are on flats and low knolls. Pewamo soils are very poorly drained and are in depressions, in swales, and on flats.

Typical pedon of Centerburg silt loam, 2 to 6 percent slopes, about 1 mile north-northeast of Alexandria; in St. Albans Township; about 1,890 yards south and 1,370 yards east of the northwest corner of quarter township 1, T. 2 N., R. 14 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; very friable; common fine roots; about 2 percent coarse fragments; medium acid; abrupt smooth boundary.

Bt1—7 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; few faint brown (10YR 5/3) clay films and silt coatings on faces of peds; few fine roots; about 2 percent coarse fragments; strongly acid; abrupt wavy boundary.

Bt2—12 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint yellowish brown (10YR 5/4) clay films and silt coatings on faces of peds; about 4 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt3—16 to 23 inches; yellowish brown (10YR 5/4) clay loam; common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; many faint yellowish brown (10YR 5/4) clay films on faces of peds; common faint brown (10YR 5/3) silt coatings on faces of peds; about 3 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt4—23 to 29 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; many faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 3

percent coarse fragments; medium acid; gradual wavy boundary.

BC—29 to 35 inches; dark yellowish brown (10YR 4/4) clay loam; common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine prominent black (10YR 2/1) stains (iron and manganese oxide); about 2 percent coarse fragments; mildly alkaline; clear wavy boundary.

C1—35 to 40 inches; brown (10YR 4/3) loam; common fine and medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; massive; firm; few fine prominent white (10YR 8/2) limestone remnants; about 8 percent coarse fragments; slight effervescence; moderately alkaline; gradual wavy boundary.

C2—40 to 80 inches; brown (10YR 4/3) loam; common medium distinct gray (10YR 5/1), grayish brown (10YR 5/2), and yellowish brown (10YR 5/6) mottles; massive; firm; about 8 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 28 to 55 inches. The depth to carbonates ranges from 26 to 55 inches. The content of coarse fragments ranges from 0 to 10 percent in the Ap horizon and the upper part of the Bt horizon, from 2 to 15 percent in the lower part of the Bt horizon, and from 3 to 15 percent in the C horizon. These are mostly sandstone fragments, but some are igneous pebbles and some are limestone fragments. Also, shale fragments are in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. Value of 5 and chroma of 4 are commonly in eroded pedons. The Bt horizon has chroma of 3 to 6. It is silty clay loam, silt loam, or clay loam in the upper part and clay loam or loam in the lower part. The C horizon has value of 4 or 5 and chroma of 3 or 4. It is dominantly loam but is silt loam in some pedons.

Chili Series

The Chili series consists of deep, well drained, moderately rapidly permeable soils formed in glacial outwash low in content of lime. These soils are on Wisconsinan outwash terraces and kames. Slopes range from 0 to 18 percent.

Chili soils are similar to Fox and Negley soils and are commonly adjacent to Brownsville, Mentor, and Tioga soils. Brownsville soils have a higher content of coarse fragments throughout the solum than the Chili soils. They are on hillsides and ridgetops at the higher elevations. Fox soils have a solum that is thinner than that of the Chili soils. They are on slope breaks. Mentor soils have a lower content of sand throughout the solum than the Chili soils. They are on low rises, knolls, and side slopes. Negley soils have a solum that is thicker than that of the Chili soils. They are on the side slopes of high terraces. Tioga soils do not have an argillic horizon. They are on flood plains.

Typical pedon of Chili loam, 0 to 2 percent slopes, about 0.3 mile east of Toboso; in Hanover Township; 800 yards south and 1,770 yards west of the northeast corner of quarter township 4, T. 2 N., R. 10 W.

Ap—0 to 10 inches; brown (10YR 4/3) loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; friable; common fine roots; about 10 percent coarse fragments; medium acid; abrupt smooth boundary.

BE—10 to 14 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) silt coatings on faces of peds; about 10 percent coarse fragments; medium acid; clear smooth boundary.

Bt1—14 to 22 inches; brown (7.5YR 4/4) gravelly sandy clay loam; moderate fine and medium subangular blocky structure; friable; few fine roots; common faint brown (7.5YR 4/4) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; clear smooth boundary.

Bt2—22 to 31 inches; strong brown (7.5YR 5/6) gravelly sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; about 15 percent coarse fragments; strongly acid; clear smooth boundary.

Bt3—31 to 40 inches; brown (7.5YR 4/4) gravelly sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; clear smooth boundary.

BC—40 to 55 inches; brown (7.5YR 4/4) gravelly sandy loam; massive; friable; about 25 percent coarse fragments; medium acid; clear smooth boundary.

C—55 to 60 inches; yellowish brown (10YR 5/4) gravelly loamy sand; single grained; loose; about 25 percent coarse fragments; medium acid.

The thickness of the solum ranges from 40 to 70 inches. The content of coarse fragments generally varies with increasing depth because of stratification. It ranges from 2 to 15 percent in the A horizon, from 15 to 35 percent in the Bt horizon, and from 25 to 60 percent in the C horizon.

The Ap horizon has chroma of 3 or 4. It is typically loam but is silt loam or gravelly loam in some pedons. The Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 6. It is typically the gravelly analogs of sandy clay loam, sandy loam, loam, or clay loam. In some pedons, however, the fine-earth fraction is silt loam within a depth of 24 inches. The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is the gravelly or very gravelly analogs of sand or loamy sand.

Cincinnati Series

The Cincinnati series consists of deep, well drained soils on ridgetops and side slopes on till plains. These soils formed in loess and in the underlying Illinoian glacial till. They have a fragipan. Permeability is moderate above the fragipan and slow or moderately slow in the fragipan. Slopes range from 2 to 12 percent.

Cincinnati soils are similar to Homewood soils and are commonly adjacent to Alford, Coshocton, and Homewood soils. The similar and adjacent soils are in positions on the landscape similar to those of the Cincinnati soils. Alford and Coshocton soils do not have a fragipan. Homewood soils have a higher content of sand and coarse fragments in the upper part than the Cincinnati soils.

Typical pedon of Cincinnati silt loam, 6 to 12 percent slopes, eroded, about 0.8 mile south of Amsterdam; in Bowling Green Township; about 1,260 yards north and 980 yards east of the southwest corner of sec. 11, T. 19 N., R. 17 W.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; weak fine granular structure; friable; many fine and common medium roots; about 5 percent strong brown (7.5YR 5/6) subsoil material; medium acid; clear smooth boundary.

BE—6 to 10 inches; strong brown (7.5YR 5/6) silt loam; weak fine subangular blocky structure; friable; few fine roots; few faint brown (10YR 5/3) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—10 to 15 inches; strong brown (7.5YR 5/6) silt loam; moderate fine subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—15 to 23 inches; strong brown (7.5YR 5/6) silt loam; moderate fine subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few medium distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear wavy boundary.

Bt3—23 to 33 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; many distinct light yellowish brown (10YR 6/4) silt coatings on vertical faces of peds; brown (10YR 5/3) zones of degradation; few medium distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear smooth boundary.

2Btx1—33 to 41 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure parting to moderate medium platy; very firm; brittle; few fine roots between prisms; few faint grayish brown (10YR 5/2) clay films on faces of peds; many distinct grayish brown (10YR 5/2) silt coatings on vertical faces of prisms; yellowish brown (10YR 5/6) zones adjacent to silt coatings; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; strongly acid; clear smooth boundary.

2Btx2—41 to 51 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent grayish brown (10YR 5/2) mottles; weak very coarse prismatic structure parting to moderate medium platy; very firm; brittle; few faint grayish brown (10YR 5/2) clay films on faces of peds; many distinct grayish brown (10YR 5/2) silt coatings on vertical faces of prisms; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; strongly acid; clear smooth boundary.

2Bt—51 to 58 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; medium acid; clear smooth boundary.

2BC—58 to 87 inches; yellowish brown (10YR 5/4) clay loam; few medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; about 5 percent coarse fragments; medium acid; gradual wavy boundary.

2C—87 to 99 inches; dark yellowish brown (10YR 4/4) loam; massive; firm; about 10 percent coarse fragments; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 60 to 100 inches. The thickness of the loess mantle ranges from

18 to 40 inches. Depth to the fragipan ranges from 18 to 38 inches. The content of coarse fragments ranges from 5 to 15 percent in the part of the solum that weathered in till.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Btx horizon has hue of 7.5YR or 10YR and value of 4 or 5. It is clay loam, loam, or silty clay loam. The 2C horizon has value of 4 or 5 and chroma of 3 or 4. It is loam or clay loam.

Clarksburg Series

The Clarksburg series consists of deep, moderately well drained soils formed in colluvium derived from fine grained sandstone, siltstone, and shale. In places loess is mixed with the colluvium. These soils are on foot slopes. They have a fragipan. Permeability is moderate above the fragipan and slow or moderately slow in and below the fragipan. Slopes range from 6 to 18 percent.

Clarksburg soils are similar to Homewood and Titusville soils and are commonly adjacent to Brownsville and Mentor soils. The well drained Brownsville soils are on ridgetops and side slopes at the higher elevations. Homewood soils have a lower content of angular coarse fragments in the lower part of the subsoil and in the substratum than the Clarksburg soils. Mentor soils are on terraces. They have a lower content of coarse fragments in the lower part than the Clarksburg soils. Titusville soils have low-chroma mottles in the upper 10 inches of the argillic horizon.

Typical pedon of Clarksburg silt loam, 12 to 18 percent slopes, eroded, about 5.6 miles north of Hanover; in Perry Township; 160 yards north and 470 yards east of the southwest corner of sec. 4, T. 3 N., R. 10 W.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; weak fine granular structure; friable; common fine roots; about 25 percent yellowish brown (10YR 5/6) subsoil material; many distinct brown (10YR 4/3) organic coatings in old root channels; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; few faint brown (10YR 5/3) silt coatings on faces of peds; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bt1—11 to 17 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bt2—17 to 24 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt3—24 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; few medium prominent gray (10YR 6/1) and few medium faint yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Btx1—31 to 37 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent gray (10YR 6/1) and common medium faint yellowish brown (10YR 5/8) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm; brittle; few fine roots between prism faces; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; many distinct light brownish gray (2.5Y 6/2) silt coatings on vertical prism faces surrounded by yellowish brown (10YR 5/8) zones; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 10 percent coarse fragments; strongly acid; gradual wavy boundary.

Btx2—37 to 52 inches; yellowish brown (10YR 5/6) channery silty clay loam; common medium prominent gray (10YR 6/1) and common medium faint yellowish brown (10YR 5/8) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm; brittle; few fine roots between prism faces; common faint brown (10YR 5/3) clay films on vertical faces of peds; many distinct light brownish gray (2.5Y 6/2) silt coatings on vertical prism faces surrounded by yellowish brown (10YR 5/8) zones; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 25 percent coarse fragments; strongly acid; gradual wavy boundary.

BC—52 to 61 inches; yellowish brown (10YR 5/4) channery silty clay loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure;

firm; few faint light brownish gray (2.5Y 6/2) clay films on vertical faces of peds; many distinct light brownish gray (2.5Y 6/2) silt coatings on vertical faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 30 percent coarse fragments; strongly acid; gradual wavy boundary.

C—61 to 80 inches; yellowish brown (10YR 5/4) channery silt loam; common fine distinct gray (10YR 6/1) and few fine distinct yellowish brown (10YR 5/8) mottles; massive; firm; about 30 percent coarse fragments; medium acid.

The thickness of the solum ranges from 50 to 70 inches. Depth to the fragipan ranges from 24 to 36 inches. The content of coarse fragments ranges from 0 to 15 percent in the A horizon, from 0 to 20 percent in the part of the Bt horizon above the fragipan, from 5 to 30 percent in the Btx horizon, and from 5 to 60 percent in the C horizon. These are fine grained sandstone or siltstone fragments.

The Ap horizon has value of 4 or 5. The A horizon is typically silt loam but is channery silt loam in some pedons. The Bt and Btx horizons are silt loam, silty clay loam, or the channery analogs of those textures. The Bt horizon has hue of 10YR or 7.5YR and chroma of 4 to 6. The Btx horizon has value of 4 or 5 and chroma of 4 to 6. The C horizon has value of 4 or 5. It is silt loam, silty clay loam, or the channery or very channery analogs of those textures.

Condit Series

The Condit series consists of deep, poorly drained, slowly permeable soils formed in calcareous Wisconsinan glacial till. These soils are in slight depressions and on flats on till plains. Slopes are 0 to 2 percent.

Condit soils are similar to Bennington soils and are commonly adjacent to Bennington and Pewamo soils. Bennington soils are somewhat poorly drained and are on slight rises and low knolls. Pewamo soils are very poorly drained and have a mollic epipedon. They are on broad flats and in depressions.

Typical pedon of Condit silt loam, about 4 miles west-northwest of Pataskala; in Lima Township; about 1,940 yards west and 490 yards south of the northeast corner of quarter township 3, T. 1 N., R. 15 W.

Ap—0 to 11 inches; grayish brown (10YR 5/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; about 2 percent coarse fragments; slightly acid; abrupt smooth boundary.

Btg1—11 to 16 inches; dark gray (10YR 4/1) silty clay loam; common medium distinct brown (10YR 4/3) and common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few faint dark gray (10YR 4/1) clay films on faces of peds; many distinct gray (10YR 5/1) silt coatings on faces of peds; about 2 percent coarse fragments; medium acid; abrupt wavy boundary.

Btg2—16 to 23 inches; dark gray (10YR 4/1) silty clay loam; common medium faint gray (10YR 5/1) and common medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; firm; few fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common distinct grayish brown (10YR 5/2) silt coatings on faces of peds; about 2 percent coarse fragments; medium acid; clear wavy boundary.

Btg3—23 to 31 inches; dark gray (10YR 4/1) clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct dark gray (10YR 4/1) and grayish brown (10YR 5/2) clay films on faces of peds; about 5 percent coarse fragments; medium acid; clear wavy boundary.

Bt—31 to 38 inches; yellowish brown (10YR 5/4) clay loam; many medium distinct gray (10YR 5/1) mottles; weak coarse subangular blocky structure; firm; few fine roots; common faint dark gray (10YR 4/1) clay films on faces of peds; about 5 percent coarse fragments; slightly acid; abrupt wavy boundary.

C1—38 to 55 inches; brown (10YR 4/3) loam; many medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; massive; firm; about 10 percent coarse fragments; slight effervescence; mildly alkaline; clear wavy boundary.

C2—55 to 80 inches; brown (10YR 4/3) loam; common medium distinct gray (10YR 5/1) mottles; massive; firm; about 10 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 35 to 55 inches. The content of coarse fragments ranges from 0 to 5 percent in the A horizon, from 2 to 10 percent in the Bt horizon, and from 3 to 15 percent in the C horizon. These are dominantly sandstone and igneous fragments, but some limestone and shale fragments are in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y or is neutral in hue. It has chroma of 0 to 6. Chromas of 3 to

6 are below a depth of 30 inches. The C horizon has value of 4 or 5 and chroma of 2 or 3. It is dominantly loam but is clay loam or silty clay loam in some pedons.

Coshocton Series

The Coshocton series consists of deep, moderately well drained, slowly permeable or moderately slowly permeable soils formed in colluvium and in material weathered from shale and siltstone. These soils are mainly on unglaciated ridgetops and hillsides. Slopes range from 2 to 25 percent.

Coshocton soils are similar to Guernsey and Keene soils and are commonly adjacent to Brownsville and Rigley soils. Brownsville soils are well drained. They have a higher content of coarse fragments throughout than the Coshocton soils. They are on hillsides, generally downslope from the Coshocton soils. Guernsey soils have more clay in the subsoil than the Coshocton soils. Keene soils have a lower content of sand and coarse fragments in the upper part than the Coshocton soils. Rigley soils are well drained. They have more sand and less clay throughout than the Coshocton soils. They generally are on knolls or broad ridgetops, but in places they are on the steeper slope breaks on hillsides between less sloping areas of the Coshocton soils.

Typical pedon of Coshocton silt loam, 6 to 12 percent slopes, eroded, about 4.9 miles northwest of Gratiot; in Hopewell Township; about 1,880 yards south and 2,230 yards east of the northwest corner of quarter township 2, T. 1 N., R. 10 W.

Ap—0 to 6 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many fine roots; about 10 percent yellowish brown (10YR 5/6) subsoil material; about 10 percent coarse fragments; medium acid; abrupt smooth boundary.

Bt1—6 to 10 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; firm; few fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; about 10 percent coarse fragments; medium acid; clear wavy boundary.

Bt2—10 to 15 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; about 10 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt3—15 to 21 inches; strong brown (7.5YR 5/6) silty clay loam; common fine prominent pale brown (10YR 6/3) and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; many distinct yellowish brown (10YR 5/4) coatings on faces of peds; about 10 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt4—21 to 26 inches; light yellowish brown (2.5Y 6/4) silty clay loam; many fine prominent gray (10YR 6/1) and many medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint light gray (10YR 7/2) clay films on faces of peds; many distinct light brownish gray (10YR 6/2) coatings on faces of peds; about 10 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt5—26 to 33 inches; light brownish gray (10YR 6/2) silty clay; few fine distinct light yellowish brown (2.5Y 6/4) and common medium prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint light gray (10YR 7/2) clay films on faces of peds; many distinct yellowish brown (10YR 5/4) coatings on faces of peds; about 2 percent coarse fragments; very strongly acid; abrupt wavy boundary.

Bt6—33 to 36 inches; brown (7.5YR 4/2) silty clay; common medium prominent yellowish red (5YR 4/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; black (10YR 2/1) seam at a depth of about 33 inches; common faint brown (7.5YR 4/2) clay films on faces of peds; about 2 percent coarse fragments; very strongly acid; clear wavy boundary.

BC—36 to 44 inches; light brownish gray (10YR 6/2) silty clay loam; many coarse prominent reddish yellow (7.5YR 6/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; about 5 percent coarse fragments; extremely acid; gradual wavy boundary.

C1—44 to 61 inches; pale brown (10YR 6/3) silty clay loam; few medium distinct gray (10YR 6/1) and many medium distinct brownish yellow (10YR 6/6) mottles; massive; firm; few fine roots; about 5 percent coarse fragments; extremely acid; clear wavy boundary.

C2—61 to 67 inches; grayish brown (10YR 5/2) silty clay loam; few fine prominent brownish yellow (10YR 6/6) mottles; massive; firm; about 5 percent coarse fragments; extremely acid; clear wavy boundary.

Cr—67 to 69 inches; dark grayish brown (10YR 4/2), weathered, soft shale bedrock.

The thickness of the solum ranges from 35 to more

than 50 inches. The depth to soft bedrock is 40 to more than 72 inches. The content of coarse fragments generally is 2 to 15 percent in the A, Bt, and C horizons but is as much as 35 percent in the lower part of the Bt horizon and as much as 60 percent in the C horizon.

The Ap horizon has chroma of 2 to 4. Some pedons in uncultivated areas have A and E horizons. The upper part of the Bt horizon has value of 4 or 5 and chroma of 4 to 6. It is typically silt loam and silty clay loam but is clay loam in some pedons. The lower part of this horizon has value of 4 to 6 and chroma of 2 to 6. It is typically silty clay loam or silty clay but is loam or channery silty clay loam in some pedons. It has thin coal blossoms in some pedons. The C horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 6. It is typically silty clay loam or silty clay but is channery or very channery loam in some pedons.

Crane Series

The Crane series consists of deep, somewhat poorly drained soils on terraces. These soils formed in Wisconsinan outwash. Permeability is moderate in the subsoil and very rapid in the substratum. Slopes are 0 to 2 percent.

Crane soils are similar to Westland soils and are commonly adjacent to Ockley, Sleeth, Sloan, and Westland soils. Ockley and Sleeth soils have an ochric epipedon. They are on flats, slight rises, and side slopes. Sloan and Westland soils are very poorly drained. Sloan soils are on flood plains. Westland soils are on flats and in depressions on outwash terraces.

Typical pedon of Crane silt loam, 0 to 2 percent slopes, about 1 mile southwest of Heath; in Newark Township; 1,780 yards east and 380 yards south of the northwest corner of quarter township 2, T. 1 N., R. 12 W.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; common fine roots; about 5 percent coarse fragments; neutral; abrupt smooth boundary.

A—8 to 13 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure parting to moderate medium granular; friable; few fine roots; about 5 percent coarse fragments; neutral; clear irregular boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/6) silty clay loam; common medium faint yellowish brown (10YR 5/4) and few fine prominent dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 10 percent coarse fragments; neutral; clear smooth boundary.

Bt2—20 to 26 inches; yellowish brown (10YR 5/4) clay loam; many medium faint yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 10 percent coarse fragments; neutral; clear smooth boundary.

Bt3—26 to 35 inches; yellowish brown (10YR 5/4) clay loam; common medium faint yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 10 percent coarse fragments; neutral; clear smooth boundary.

2Btg—35 to 40 inches; dark grayish brown (10YR 4/2) gravelly sandy clay loam; many medium prominent yellowish brown (10YR 5/6) and common medium faint brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 20 percent coarse fragments; neutral; clear smooth boundary.

2BCg—40 to 55 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; few faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; about 30 percent coarse fragments; neutral; clear smooth boundary.

2C—55 to 80 inches; brown (10YR 4/3) very gravelly loamy sand; single grained; loose; about 35 percent coarse fragments; strong effervescence; mildly alkaline.

The thickness of the solum and the depth to carbonates range from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 15 inches. The content of coarse fragments ranges from 0 to 10 percent in the A and Bt horizons and from 5 to 25 percent in the 2Bt horizon.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is loam, silt loam, clay loam, or silty clay loam. The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 6. It is loam, clay loam, sandy clay loam, sandy loam, or the gravelly analogs of those textures. The 2C horizon has value of 4 or 5 and chroma of 3 or 4. It is gravelly or very gravelly loamy sand or sand.

Fairpoint Series

The Fairpoint series consists of deep, well drained, moderately slowly permeable soils in surface-mined areas. These soils formed in a mixture of partly weathered fine-earth material and fragments of shale, sandstone, siltstone, and coal. Slopes range from 8 to 25 percent.

Fairpoint soils are commonly adjacent to Cincinnati, Coshocton, and Homewood soils in unmined areas. The adjacent soils have a lower content of coarse fragments throughout than the Fairpoint soils.

Typical pedon of Fairpoint silty clay loam, 8 to 25 percent slopes, about 1 mile southwest of Brownsville; in Bowling Green Township; 400 yards south and 758 yards west of the northeast corner of sec. 10, T. 18 N., R. 16 W.

Ap—0 to 6 inches; yellowish brown (10YR 5/4) silty clay loam; strong medium platy structure parting to weak medium subangular blocky; firm; common fine roots; about 10 percent siltstone fragments; slightly acid; abrupt smooth boundary.

C1—6 to 15 inches; very dark gray (N 3/0) very shaly silty clay loam; massive; very firm; few fine roots in the upper 6 inches; about 45 percent shale fragments; slightly acid; clear smooth boundary.

C2—15 to 60 inches; about 40 percent pale brown (10YR 6/3), 30 percent yellowish brown (10YR 5/6), and 30 percent gray (N 5/0) very gravelly silty clay loam; massive; very firm; about 30 percent sandstone fragments, 10 percent shale fragments, and a few coal fragments; slightly acid.

Generally, the coarse shale, siltstone, sandstone, and coal fragments are less than 10 inches in size. The content of these fragments ranges from 10 to 15 percent in the A horizon and from 35 to 70 percent in the C horizon.

The A horizon has hue of 7.5YR to 2.5Y, value of 4 to 6, and chroma of 1 to 6. It is typically silty clay loam but is silt loam, loam, and clay loam in some pedons. The C horizon has hue of 7.5YR to 2.5Y or is neutral in hue. It has value of 3 to 6 and chroma of 0 to 8. In the fine-earth fraction, it is silty clay loam, clay loam, or loam.

Fitchville Series

The Fitchville series consists of deep, somewhat poorly drained, moderately slowly permeable soils formed in silty Wisconsinan glaciolacustrine sediments. These soils are on slack-water terraces and on lake plains. Slopes range from 0 to 6 percent.

Fitchville soils are similar to Sebring soils and are commonly adjacent to Glenford and Luray soils. The moderately well drained Glenford soils are on flats, knolls, and foot slopes. The very poorly drained Luray soils are on flats and in depressions. Sebring soils are poorly drained.

Typical pedon of Fitchville silt loam, 0 to 2 percent slopes, about 3.5 miles northwest of Newark; in Newark Township; about 1,830 yards south and 1,650 yards west of the northeast corner of quarter township 2, T. 2 N., R. 12 W.

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

Bt1—10 to 19 inches; brown (10YR 4/3) silt loam; many medium faint dark grayish brown (10YR 4/2) and few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—19 to 27 inches; brown (10YR 4/3) silty clay loam; common medium faint dark grayish brown (10YR 4/2) and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; many faint dark grayish brown (10YR 4/2) clay films on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

Bt3—27 to 37 inches; brown (10YR 5/3) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few fine roots; many faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few faint dark grayish brown (10YR 4/2) clay films on horizontal faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

Bt4—37 to 50 inches; brown (10YR 5/3) silty clay loam; few fine distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few faint dark grayish brown (10YR 4/2) clay films on horizontal faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

Bt5—50 to 62 inches; yellowish brown (10YR 5/4) silty

clay loam; common medium distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few faint dark grayish brown (10YR 4/2) clay films on horizontal faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

C—62 to 70 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 2 percent coarse fragments; medium acid.

The thickness of the solum ranges from 40 to 65 inches. The Ap horizon has value of 4 or 5. The Bt horizon has chroma of 1 to 6. It is typically silt loam or silty clay loam, but some pedons have thin subhorizons of loam. The C horizon has value of 4 or 5 and chroma of 2 to 4. It is dominantly silt loam or silty clay loam but has thin strata of loam, fine sandy loam, fine sand, or silty clay in some pedons.

Fox Series

The Fox series consists of deep, well drained soils formed in calcareous Wisconsinan glacial outwash. These soils are on the side slopes of terraces and on a few kames. Permeability is moderate in the solum and rapid or very rapid in the substratum. Slopes range from 12 to 25 percent.

Fox soils are similar to Chili soils and are commonly adjacent to Ockley and Rush soils. The similar and adjacent soils have a solum that is thicker than that of the Fox soils. Ockley and Rush soils are commonly on the flatter parts of terraces.

Typical pedon of Fox gravelly loam, 12 to 18 percent slopes, eroded, about 1.3 miles northeast of Homer; in Burlington Township; 600 yards south and 2,020 yards west of the northeast corner of quarter township 1, T. 4 N., R. 13 W.

Ap—0 to 4 inches; brown (10YR 4/3) gravelly loam, brown (10YR 5/3) dry; weak fine granular structure; friable; many fine and few medium roots; about 15 percent coarse fragments; slightly acid; abrupt smooth boundary.

Bt1—4 to 8 inches; dark yellowish brown (10YR 4/4) gravelly clay loam; moderate medium subangular blocky structure; firm; common fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; common distinct brown (10YR 4/3) organic coatings in old root channels; about 20 percent coarse fragments; medium acid; clear smooth boundary.

Bt2—8 to 12 inches; brown (7.5YR 4/4) gravelly clay loam; moderate medium subangular blocky structure; firm; common fine roots; common faint yellowish brown (10YR 5/4) clay films on faces of peds; about 20 percent coarse fragments; medium acid; clear smooth boundary.

Bt3—12 to 20 inches; reddish brown (5YR 4/4) gravelly clay loam; moderate medium subangular blocky structure; firm; few fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; about 25 percent coarse fragments; slightly acid; clear smooth boundary.

Bt4—20 to 26 inches; brown (10YR 4/3) gravelly loam; weak medium subangular blocky structure; friable; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; about 25 percent coarse fragments; neutral; clear smooth boundary.

BC—26 to 29 inches; yellowish brown (10YR 5/4) very gravelly sandy loam; weak medium subangular blocky structure; very friable; about 40 percent coarse fragments; few fine roots; slight effervescence; mildly alkaline; abrupt irregular boundary.

C—29 to 60 inches; brown (10YR 5/3) very gravelly sand; single grained; loose; about 40 percent coarse fragments; strong effervescence; mildly alkaline.

The thickness of the solum and the depth to calcareous sand and gravel range from 24 to 40 inches. The content of coarse fragments ranges from 15 to 25 percent in the A horizon, from 15 to 30 percent in the Bt horizon, and from 30 to 60 percent in the C horizon.

The Ap horizon has value of 4 or 5. It is typically gravelly loam but is loam or silt loam in some pedons. The Bt horizon has value of 3 or 4. It is gravelly loam, gravelly clay loam, or gravelly sandy clay loam. The C horizon has value of 4 or 5 and chroma of 3 or 4. It is gravelly or very gravelly sand.

Frankstown Variant

The Frankstown Variant consists of moderately deep, well drained, moderately permeable soils on unglaciated ridgetops. These soils formed in a mixture of loess and material weathered from flint. Slopes range from 2 to 6 percent.

Frankstown Variant soils are commonly adjacent to Guernsey and Mertz soils. The adjacent soils are deep.

They are on ridgetops and hillsides.

Typical pedon of Frankstown Variant silt loam, in an area of Frankstown Variant-Mertz complex, 2 to 6 percent slopes, very stony, about 2.9 miles north of Brownsville; in Hopewell Township; 250 yards north and 3,450 yards east of the southwest corner of quarter township 2, T. 1 N., R. 10 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many fine and common medium roots; about 5 percent coarse fragments; strongly acid; clear smooth boundary.

E—3 to 6 inches; yellowish brown (10YR 5/4) silt loam; weak medium platy structure parting to weak fine granular; friable; common fine and medium roots; about 5 percent coarse fragments; very strongly acid; clear smooth boundary.

BE—6 to 13 inches; yellowish brown (10YR 5/6) silt loam; weak fine subangular blocky structure; friable; few fine and medium roots; few distinct yellowish brown (10YR 5/4) silt coatings on faces of peds; about 5 percent coarse fragments; very strongly acid; clear smooth boundary.

Bt1—13 to 20 inches; strong brown (7.5YR 5/6) silt loam; moderate fine subangular blocky structure; firm; few fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt2—20 to 25 inches; strong brown (7.5YR 5/6) cherty silty clay loam; moderate fine subangular blocky structure; firm; few fine roots; common faint strong brown (7.5YR 5/6) clay films on faces of peds; about 25 percent coarse fragments; strongly acid; abrupt wavy boundary.

R—25 to 30 inches; flint.

The depth to flint bedrock ranges from 20 to 40 inches. The content of coarse chert fragments ranges from 5 to 15 percent in the A horizon and the upper part of the Bt horizon and from 20 to 50 percent in the lower part of the Bt horizon.

The A horizon has value of 2 or 3. The upper part of the Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 6. It is silt loam or silty clay loam. The lower part has hue of 7.5YR or 10YR. It is the cherty or very cherty analogs of silt loam or silty clay loam.

Glenford Series

The Glenford series consists of deep, moderately well drained, moderately slowly permeable soils formed in silty glaciolacustrine sediments. These soils are on slack-water terraces and on lake plains. Slopes range from 0 to 6 percent.

Glenford soils are similar to Mentor soils and are commonly adjacent to Fitchville, Luray, Mentor, and Sebring soils. The somewhat poorly drained Fitchville soils are on flats, in slight depressions, on low knolls, and on foot slopes. The very poorly drained Luray and poorly drained Sebring soils are on flats and in depressions. The well drained Mentor soils are on flats, knolls, and side slopes.

Typical pedon of Glenford silt loam, 0 to 2 percent slopes, about 3.2 miles north of Boston; in Perry Township; about 3,100 yards north and 120 yards east of the southwest corner of quarter township 4, T. 3 N., R. 10 W.

Ap—0 to 8 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; few medium and many fine roots; medium acid; abrupt smooth boundary.

BE—8 to 13 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; many fine roots; few faint yellowish brown (10YR 5/4) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—13 to 18 inches; yellowish brown (10YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; common fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—18 to 30 inches; yellowish brown (10YR 5/6) silt loam; common fine prominent light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; many faint pale brown (10YR 6/3) coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear smooth boundary.

Bt3—30 to 39 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent light brownish gray (10YR 6/2) and few medium distinct strong brown (7.5YR 5/6) mottles; weak very coarse prismatic structure parting to moderate medium subangular blocky; firm; brittle in 30 percent of matrix; few fine roots; many faint pale brown (10YR 6/3) clay films and coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear smooth boundary.

Bt4—39 to 47 inches; yellowish brown (10YR 5/6) silt loam; common medium prominent light brownish

gray (10YR 6/2) and few medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; common faint pale brown (10YR 6/3) clay films and many faint pale brown (10YR 6/3) coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

BC—47 to 52 inches; yellowish brown (10YR 5/6) silt loam; common medium prominent light brownish gray (10YR 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; many faint pale brown (10YR 6/3) coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

C—52 to 60 inches; yellowish brown (10YR 5/6) silt loam; common medium prominent light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/4) mottles; massive; firm; many faint pale brown (10YR 6/3) silt coatings on a few vertical seams; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); slightly acid.

The thickness of the solum ranges from 30 to 60 inches. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has value of 4 or 5. The C horizon has chroma of 4 to 6. It is dominantly silt loam or silty clay loam but has thin strata of loam, fine sandy loam, or silty clay in some pedons.

Guernsey Series

The Guernsey series consists of deep, moderately well drained, slowly permeable or moderately slowly permeable soils on unglaciated uplands. These soils formed in a thin mantle of loess and in the underlying material weathered from slightly acid to calcareous shale and siltstone. Slopes range from 2 to 18 percent.

Guernsey soils are similar to Coshocton soils and are commonly adjacent to Coshocton, Frankstown Variant, Keene, Mertz, and Rigley soils. The similar and adjacent soils have less clay in the subsoil than the Guernsey soils. Coshocton, Keene, and Rigley soils are in positions on the landscape similar to those of the Guernsey soils. Frankstown Variant and Mertz soils are on ridgetops.

Typical pedon of Guernsey silt loam, 2 to 6 percent slopes, about 2.8 miles northwest of Gratiot; in Hopewell Township; about 820 yards south and 210 yards west of the northeast corner of sec. 13, T. 1 N., R. 10 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots; about 2 percent coarse fragments; very strongly acid; abrupt smooth boundary.

BE—7 to 11 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; few faint yellowish brown (10YR 5/6) silt coatings on faces of peds; about 2 percent coarse fragments; strongly acid; clear smooth boundary.

Bt1—11 to 16 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; many faint yellowish brown (10YR 5/6) silt coatings on faces of peds; about 4 percent coarse fragments; strongly acid; clear wavy boundary.

2Bt2—16 to 25 inches; brownish yellow (10YR 6/6) silty clay; many medium prominent light brownish gray (10YR 6/2) and many medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint brownish yellow (10YR 6/6) clay films on faces of peds; many faint brownish yellow (10YR 6/6) silt coatings on faces of peds; about 4 percent coarse fragments; strongly acid; clear wavy boundary.

2Bt3—25 to 30 inches; brownish yellow (10YR 6/6) silty clay; common medium prominent light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few faint brownish yellow (10YR 6/6) clay films on faces of peds; many faint brownish yellow (10YR 6/6) silt coatings on faces of peds; about 4 percent coarse fragments; strongly acid; clear wavy boundary.

2Bt4—30 to 37 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; few fine roots; few faint brownish yellow (10YR 6/6) clay films on faces of peds; many faint brownish yellow (10YR 6/6) silt coatings on faces of peds; about 4 percent coarse fragments; slightly acid; clear wavy boundary.

2Bt5—37 to 42 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent light gray (10YR 7/2) mottles; weak coarse subangular blocky structure; very firm; few fine roots; few faint brownish yellow (10YR 6/6) clay films on faces of peds; many faint brownish yellow (10YR 6/6) silt coatings on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese

oxide); about 5 percent coarse fragments; slightly acid; clear wavy boundary.
2BC—42 to 51 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; very firm; few fine roots; few faint brownish yellow (10YR 6/6) silt coatings on faces of peds; about 5 percent coarse fragments; neutral; clear wavy boundary.
2C1—51 to 60 inches; gray (10YR 5/1) silty clay; massive; very firm; about 5 percent coarse fragments; neutral; diffuse wavy boundary.
2C2—60 to 71 inches; gray (10YR 5/1) silty clay; massive; very firm; about 10 percent coarse fragments; slight effervescence; mildly alkaline; gradual wavy boundary.
2Cr—71 to 73 inches; soft siltstone bedrock.

The thickness of the solum ranges from 36 to 55 inches. The depth to free carbonates is more than 30 inches. The depth to bedrock ranges from 50 to 80 inches. The content of coarse fragments ranges from 2 to 15 percent in the A and Bt horizons, from 2 to 20 percent in the 2Bt horizon, and from 5 to 20 percent in the 2C horizon.

The Ap horizon has chroma of 2 or 3. Some pedons have A and E horizons. The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Bt horizon has value of 4 to 6 and chroma of 2 to 6. It is silty clay loam, silty clay, or shaly silty clay loam. The 2C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is silty clay, silty clay loam, or the shaly analogs of those textures.

Hazleton Series

The Hazleton series consists of deep, well drained, moderately rapidly permeable or rapidly permeable soils on hillsides in the uplands. These soils formed in colluvium and material weathered from medium and coarse grained sandstone. Slopes range from 25 to 70 percent.

Hazleton soils are similar to Brownsville soils and are commonly adjacent to Brownsville and Orrville soils. Brownsville soils have more silt and less sand in the subsoil than the Hazleton soils. They are on ridgetops and hillsides. Orrville soils are somewhat poorly drained and are on flood plains.

Typical pedon of Hazleton channery sandy loam, in an area of Hazleton-Rock outcrop complex, 25 to 70 percent slopes, about 1.8 miles south-southeast of Hanover; in Hanover Township; 120 yards east and 300 yards north of the southwest corner of sec. 13, T. 2 N., R. 10 W.

Oi—1 inch to 0; dark brown (7.5YR 3/2) recent leaf litter.
A—0 to 2 inches; black (10YR 2/1) channery sandy loam, black (10YR 2/1) dry; weak fine granular structure; very friable; common fine and few medium roots; about 30 percent coarse fragments; very strongly acid; clear wavy boundary.
E—2 to 5 inches; brown (10YR 4/3) channery sandy loam; weak fine granular structure; very friable; common fine and few medium roots; about 30 percent coarse fragments; very strongly acid; clear wavy boundary.
Bw1—5 to 14 inches; yellowish brown (10YR 5/6) very channery sandy loam; weak fine subangular blocky structure; very friable; few fine and medium roots; about 35 percent coarse fragments; very strongly acid; clear smooth boundary.
Bw2—14 to 27 inches; yellowish brown (10YR 5/4) very channery sandy loam; weak fine subangular blocky structure; very friable; few fine roots; about 40 percent coarse fragments; very strongly acid; gradual wavy boundary.
C—27 to 54 inches; yellowish brown (10YR 5/4) very channery sandy loam; massive; very friable; few fine roots; about 45 percent coarse fragments; very strongly acid; abrupt wavy boundary.
R—54 to 56 inches; yellowish brown (10YR 5/4) sandstone bedrock.

The thickness of the solum ranges from 25 to 45 inches. The depth to bedrock ranges from 40 to more than 72 inches. The content of sandstone and siltstone fragments ranges from 15 to 35 percent in the A horizon, from 15 to 60 percent in the Bw horizon, and from 35 to 80 percent in the C horizon.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bw horizon has value of 5 or 6 and chroma of 4 to 6. It is channery or very channery sandy loam. The C horizon has value of 5 or 6. It is the very channery or extremely channery analogs of sandy loam or loamy sand.

Hickory Series

The Hickory series consists of deep, well drained, moderately permeable soils formed in calcareous Illinoian glacial till. These soils are on ridges, knolls, and dissected side slopes on till plains. Slopes range from 6 to 18 percent.

Hickory soils are similar to Amanda and Centerburg

soils and are commonly adjacent to Brownsville and Homewood soils. Amanda and Centerburg soils have coarse fragments that are dominantly sandstone. Centerburg soils are moderately well drained. Brownsville soils have a higher content of coarse fragments throughout than the Hickory soils. They are in unglaciated areas, generally at the higher elevations. Homewood soils have a fragipan. They are in positions on the landscape similar to those of the Hickory soils.

Typical pedon of Hickory silt loam, 6 to 12 percent slopes, eroded, about 1.5 miles north of Purity; in Eden Township; about 900 yards south and 580 yards west of the northeast corner of sec. 7, T. 4 N., R. 11 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine and common medium roots; about 5 percent yellowish brown (10YR 5/6) subsoil material; about 5 percent coarse fragments; neutral; abrupt smooth boundary.

Bt1—7 to 12 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; common fine and few medium roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; brown (10YR 4/3) organic coatings in old root channels; about 5 percent coarse fragments; slightly acid; clear smooth boundary.

Bt2—12 to 19 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; firm; common fine and few medium roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 5 percent coarse fragments; slightly acid; clear smooth boundary.

Bt3—19 to 25 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; medium acid; clear smooth boundary.

Bt4—25 to 35 inches; yellowish brown (10YR 5/4) clay loam; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; very firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 5 percent coarse fragments; medium acid; clear smooth boundary.

BC—35 to 40 inches; yellowish brown (10YR 5/4) clay loam; weak coarse prismatic structure parting to moderate coarse subangular blocky; very firm; few fine roots; about 5 percent coarse fragments; neutral; clear wavy boundary.

C—40 to 80 inches; yellowish brown (10YR 5/4) clay loam; massive; very firm; about 10 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to carbonates range from 40 to 60 inches. The content of coarse fragments ranges from 2 to 8 percent in the solum and from 5 to 15 percent in the C horizon. These are dominantly igneous pebbles in the solum, but some are sandstone fragments. Also, shale fragments and limestone pebbles are in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. The upper part of this horizon is silty clay loam or clay loam. The lower part is dominantly clay loam but has individual subhorizons of loam in some pedons. The C horizon has chroma of 3 or 4. It is dominantly clay loam but is loam in some pedons.

Homewood Series

The Homewood series consists of deep, moderately well drained and well drained soils formed in Illinoian glacial till. These soils are on knolls, ridges, and dissected hillsides on till plains. They have a fragipan. Permeability is moderate above the fragipan and slow in the fragipan. Slopes range from 2 to 25 percent.

Homewood soils are similar to Cincinnati, Clarksburg, and Titusville soils and are commonly adjacent to Brownsville and Coshocton soils. Brownsville and Coshocton soils do not have a fragipan. They are typically on the steeper parts of hillsides at the higher elevations. Cincinnati soils have more silt in the upper part than the Homewood soils. Clarksburg soils have a higher content of angular coarse fragments in the lower part of the subsoil and in the substratum than the Homewood soils. Titusville soils have low-chroma mottles in the upper 10 inches of the argillic horizon.

Typical pedon of Homewood silt loam, 2 to 6 percent slopes, about 2.5 miles east of Utica; in Washington Township; about 590 yards south and 2,390 yards east of the northwest corner of quarter township 1, T. 4 N., R. 12 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate medium granular structure; friable; common fine roots; about 2 percent coarse fragments; slightly acid; abrupt smooth boundary.

Bt1—9 to 14 inches; yellowish brown (10YR 5/4) clay loam; moderate fine subangular blocky structure; friable; common fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about

2 percent coarse fragments; very strongly acid; clear wavy boundary.

Bt2—14 to 24 inches; yellowish brown (10YR 5/6) clay loam; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots; common distinct yellowish brown (10YR 5/4) clay films on faces of peds; common distinct yellowish brown (10YR 5/6) silt coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 4 percent coarse fragments; very strongly acid; clear wavy boundary.

Btx1—24 to 38 inches; yellowish brown (10YR 5/6) clay loam; moderate very coarse prismatic structure parting to moderate thick platy; very firm; brittle; few fine roots between prisms; many distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; very strongly acid; clear wavy boundary.

Btx2—38 to 51 inches; yellowish brown (10YR 5/6) clay loam; moderate very coarse prismatic structure parting to weak coarse subangular blocky; very firm; brittle; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; very strongly acid; clear wavy boundary.

BC—51 to 65 inches; strong brown (7.5YR 5/6) clay loam; weak coarse subangular blocky structure; firm; common faint dark yellowish brown (10YR 4/4) clay films on vertical faces of peds; few medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; strongly acid; abrupt wavy boundary.

C—65 to 80 inches; yellowish brown (10YR 5/4) loam; few fine distinct gray (10YR 6/1) mottles; massive; firm; about 10 percent coarse fragments; strongly acid.

The thickness of the solum ranges from 50 to more than 90 inches. Depth to the fragipan ranges from 16 to 33 inches. Some pedons have a loess mantle, which is as much as 16 inches thick. The content of coarse fragments ranges from 0 to 5 percent in the Ap horizon, from 0 to 10 percent in the Bt horizon, and from 5 to 15 percent in the Btx and C horizons.

The Ap horizon has chroma of 2 or 3. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is dominantly clay loam, but some pedons have individual subhorizons of silty clay loam or loam. The Btx and C horizons are clay loam or loam. The Btx horizon has chroma of 4 to 6. The C horizon has value of 4 or 5 and chroma of 3 or 4.

Keene Series

The Keene series consists of deep, moderately well drained soils on unglaciated ridgetops and hillsides on uplands. These soils formed in loess and in the underlying material weathered from interbedded shale and siltstone. Permeability is moderate or moderately slow in the upper silty material and slow or moderately slow in the underlying material. Slopes range from 2 to 18 percent.

Keene soils are similar to Coshocton soils and are commonly adjacent to Coshocton, Guernsey, and Rigley soils. The similar and adjacent soils are in positions on the landscape similar to those of the Keene soils. Coshocton soils have less silt and a higher content of coarse fragments in the upper part than the Keene soils. Guernsey soils have more clay in the upper part of the subsoil than the Keene soils. The well drained Rigley soils have more sand in the subsoil than the Keene soils.

Typical pedon of Keene silt loam, 12 to 18 percent slopes, eroded, 2.2 miles south of Toboso; in Hopewell Township; about 120 yards south and 410 yards east of the northwest corner of sec. 1, T. 1 N., R. 10 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak fine granular structure; friable; few medium and fine roots; about 10 percent yellowish brown (10YR 5/4) subsoil material; strongly acid; abrupt smooth boundary.

BE—7 to 14 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; few medium and fine roots; common faint yellowish brown (10YR 5/4) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—14 to 21 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few medium and fine roots; few faint yellowish brown (10YR 5/6) clay films on faces of peds; few faint pale brown (10YR 6/3) coatings on faces of peds; few medium distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear smooth boundary.

2Bt2—21 to 33 inches; yellowish brown (10YR 5/6) silty clay loam; common medium prominent grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common faint yellowish brown (10YR 5/4) clay films on faces of peds; many distinct light brownish gray (10YR

6/2) silt coatings on faces of peds; about 5 percent coarse fragments; very strongly acid; clear wavy boundary.

2Bt3—33 to 38 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common faint yellowish brown (10YR 5/6) clay films on faces of peds; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; about 10 percent coarse fragments; very strongly acid; clear wavy boundary.

2Bt4—38 to 54 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint yellowish brown (10YR 5/6) clay films on faces of peds; about 10 percent coarse fragments; very strongly acid; clear wavy boundary.

2BC—54 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; few medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few fine roots; common faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; very strongly acid; abrupt wavy boundary.

2C1—60 to 64 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; about 5 percent coarse fragments; very strongly acid; clear wavy boundary.

2C2—64 to 72 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; massive; firm; about 10 percent coarse fragments; very strongly acid; clear smooth boundary.

2C3—72 to 76 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; firm; about 5 percent coarse fragments; very strongly acid; clear smooth boundary.

2Cr—76 to 78 inches; soft siltstone.

The thickness of the solum ranges from 35 to 60 inches. The depth to bedrock is 40 to 84 inches. The thickness of the silty mantle ranges from 20 to 36 inches. The content of coarse fragments ranges from 0 to 5 percent in the A and Bt horizons, from 5 to 15 percent in the 2Bt horizon, and from 5 to 25 percent in the 2C horizon.

The Ap horizon has chroma of 2 or 3. Some pedons have A and E horizons. The Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam or silty clay. The 2C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. It is silty clay loam, silty clay, or the shaly analogs of those textures.

Killbuck Series

The Killbuck series consists of deep, poorly drained, moderately slowly permeable soils on flood plains. These soils formed in recent alluvium underlain by a buried soil that has a dark surface layer. Slopes are 0 to 2 percent.

Killbuck soils are similar to Algiers and Melvin soils and are commonly adjacent to Chili, Glenford, and Luray soils. Algiers soils are somewhat poorly drained. Chili soils are well drained, and Glenford soils are moderately well drained. Both of these soils are on terraces. Luray soils are very poorly drained and have a mollic epipedon. They are on lake plains. Melvin soils formed entirely in alluvium.

Typical pedon of Killbuck silt loam, frequently flooded, about 5.3 miles northeast of Newark; in Mary Ann Township; about 350 yards south and 1,520 yards west of the northeast corner of sec. 16, T. 3 N., R. 11 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam, pale brown (10YR 6/3) dry; common fine distinct brown (7.5YR 4/4) mottles, mainly along root channels; weak fine granular structure; friable; many fine and medium roots; medium acid; clear smooth boundary.

Cg1—6 to 12 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and few fine prominent brown (7.5YR 4/4) mottles; massive; friable; many fine and common medium roots; slightly acid; clear smooth boundary.

Cg2—12 to 20 inches; grayish brown (10YR 5/2) silt loam; common fine faint brown (10YR 5/3) and common medium prominent brown (7.5YR 4/4) mottles; massive; friable; common fine and few medium roots; medium acid; abrupt smooth boundary.

2Ab—20 to 28 inches; black (10YR 2/1) silty clay loam; weak medium prismatic structure parting to weak medium angular blocky; firm; few fine roots; medium acid; abrupt smooth boundary.

2Bgb1—28 to 32 inches; gray (10YR 5/1) silty clay loam; few fine prominent yellowish red (5YR 4/6)

and common fine prominent brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; slightly acid; clear smooth boundary.

2Bgb2—32 to 52 inches; gray (10YR 5/1) silty clay loam; common fine prominent yellowish red (5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; slightly acid; clear smooth boundary.

2Cg—52 to 60 inches; dark gray (10YR 4/1) silty clay loam; common fine prominent brown (7.5YR 4/4) mottles; massive; firm; few fine roots; slightly acid.

The thickness of the silty alluvium ranges from 15 to 36 inches. The content of coarse fragments ranges from 0 to 2 percent in the A and Cg horizons and from 0 to 10 percent in the 2Ab, 2Bgb, and 2Cg horizons.

The Ap and Cg horizons have value of 4 or 5 and chroma of 1 or 2. The 2Ab horizon has value of 2 or 3 and chroma of 1 or 2. It is silty clay loam or silty clay. The 2Bgb and 2Cg horizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. They are dominantly silty clay loam but are silt loam in some pedons.

Luray Series

The Luray series consists of deep, very poorly drained, moderately slowly permeable soils formed in lacustrine deposits. These soils are on lake plains and on terraces along streams. Slopes are 0 to 2 percent.

Luray soils are similar to Pewamo soils and are commonly adjacent to Algiers, Fitchville, and Glenford soils. Algiers soils formed in recent alluvium underlain by a buried soil. They are on flood plains. The somewhat poorly drained Fitchville and moderately well drained Glenford soils are higher on the landscape than the Luray soils. Pewamo soils have more clay in the subsoil and a higher content of coarse fragments throughout than the Luray soils.

Typical pedon of Luray silty clay loam, about 2.3 miles southwest of Hebron; in Union Township; about 460 yards south and 30 yards east of the northwest corner of sec. 15, T. 17 N., R. 18 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; friable; common fine roots; slightly acid; abrupt smooth boundary.

A—8 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; common fine roots; medium acid; clear smooth boundary.

Btg1—12 to 22 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; common fine roots; few faint very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Btg2—22 to 33 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark gray (10YR 4/1) clay films on faces of peds; slightly acid; clear smooth boundary.

BCg—33 to 40 inches; dark grayish brown (10YR 4/2) silt loam; many medium distinct dark yellowish brown (10YR 4/4) and common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; few faint dark gray (10YR 4/1) clay films on vertical faces of peds; neutral; clear smooth boundary.

Cg—40 to 60 inches; dark grayish brown (10YR 4/2) silt loam; many medium prominent yellowish brown (10YR 5/6) and common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; friable; thin strata of loam and fine sandy loam; neutral.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 18 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is typically silty clay loam but is silt loam in some pedons. The Btg horizon has hue of 10YR to 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. Mottles that have chroma of 1 to 6 are below a depth of 30 inches. This horizon is dominantly silty clay loam or silt loam, but some pedons have subhorizons of silty clay. The C horizon has value of 4 or 5 and chroma of 1 to 6. It is dominantly silt loam or silty clay loam, but it has thin strata of loam, fine sandy loam, or sandy loam in some pedons.

Mechanicsburg Series

The Mechanicsburg series consists of deep, well drained, moderately permeable soils formed in glacial till and in the underlying material weathered from fine grained sandstone and siltstone bedrock. These soils are on the tops and sides of prominent sandstone hills that were glaciated but retained a bedrock-controlled topography. Slopes range from 2 to 25 percent.

Mechanicsburg soils are commonly adjacent to Amanda, Brownsville, and Homewood soils. Amanda

and Homewood soils formed in 60 or more inches of glacial till. They have a lower content of coarse fragments in the lower part of the subsoil and in the substratum than the Mechanicsburg soils. They are commonly on the lower parts of some hillsides. Brownsville soils have a higher content of coarse fragments in the upper part than the Mechanicsburg soils. They are in positions on the landscape similar to those of the Mechanicsburg soils.

Typical pedon of Mechanicsburg silt loam, 12 to 18 percent slopes, eroded, about 1.5 miles northwest of Granville; in Granville Township; about 900 yards north and 2,970 yards east of the southwest corner of quarter township 2, T. 2 N., R. 13 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine roots; about 10 percent yellowish brown (10YR 5/4) subsoil material; about 10 percent coarse fragments; medium acid; abrupt smooth boundary.

BE—7 to 12 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few faint brown (10YR 5/3) silt coatings on faces of peds; about 10 percent coarse fragments; medium acid; clear smooth boundary.

Bt1—12 to 19 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

Bt2—19 to 29 inches; yellowish brown (10YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

2Bt3—29 to 35 inches; yellowish brown (10YR 5/4) channery loam; moderate medium subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; clear smooth boundary.

2BC—35 to 51 inches; yellowish brown (10YR 5/4) very channery silt loam; weak coarse subangular blocky structure; friable; few fine roots; about 55 percent coarse fragments; strongly acid; gradual smooth boundary.

2C—51 to 60 inches; brown (10YR 5/3) extremely channery silt loam; massive; friable; about 85 percent coarse fragments; strongly acid; gradual smooth boundary.

2R—60 to 62 inches; brown (10YR 5/3), fractured siltstone bedrock.

The thickness of the solum ranges from 30 to more than 60 inches. The depth to material weathered from fractured bedrock ranges from 20 to 36 inches. The depth to bedrock ranges from 40 to 72 inches. The content of coarse fragments ranges from 2 to 10 percent in the Ap horizon, from 5 to 20 percent in the Bt horizon, from 15 to 50 percent in the 2Bt horizon, and from 60 to 90 percent in the 2C horizon.

The Ap horizon has chroma of 2 or 3. The Bt horizon has hue of 7.5YR or 10YR and value of 4 or 5. It is loam, silt loam, silty clay loam, clay loam, or the gravelly analogs of those textures. The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is the channery or very channery analogs of loam or silt loam. The 2C horizon has hue of 10YR or 2.5Y and chroma of 3 or 4. It is the extremely channery analogs of silt loam or loam.

Medway Series

The Medway series consists of deep, moderately well drained, moderately permeable soils on flood plains. These soils formed in recent alluvium. Slopes are 0 to 2 percent.

Medway soils are commonly adjacent to Fox, Ockley, and Shoals soils. Fox and Ockley soils have an argillic horizon. They are on Wisconsinan glacial outwash terraces and kames. The somewhat poorly drained Shoals soils are in the lower positions on flood plains.

Typical pedon of Medway silt loam, occasionally flooded, about 1 mile northwest of Alexandria; in St. Albans Township; about 1,440 yards north and 3,310 yards east of the southwest corner of quarter township 2, T. 2 N., R. 14 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots; about 4 percent coarse fragments; neutral; abrupt smooth boundary.

A—8 to 16 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; friable; common fine roots; about 4 percent coarse fragments; neutral; clear wavy boundary.

Bw1—16 to 22 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings in old root channels; about 2 percent coarse

fragments; neutral; clear wavy boundary.
Bw2—22 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; about 2 percent coarse fragments; neutral; clear smooth boundary.
Bw3—30 to 36 inches; yellowish brown (10YR 5/4) loam; common fine distinct grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; about 2 percent coarse fragments; neutral; clear smooth boundary.
BC—36 to 47 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; about 2 percent coarse fragments; neutral; abrupt smooth boundary.
C—47 to 60 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; common fine distinct yellowish brown (10YR 5/4) and dark grayish brown (10YR 4/2) mottles; massive; friable; about 30 percent coarse fragments; neutral.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches. The content of coarse fragments ranges from 0 to 15 percent in the Ap and Bw horizons and from 0 to 35 percent in the C horizon.

The A horizon has chroma of 1 to 3. It is typically silt loam but is loam in some pedons. The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is dominantly silt loam, loam, or silty clay loam, but some pedons have individual subhorizons of sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is sandy loam, loam, silt loam, or the gravelly analogs of those textures.

Melvin Series

The Melvin series consists of deep, poorly drained, moderately permeable soils on flood plains. These soils formed in recent alluvium. Slopes are 0 to 2 percent.

Melvin soils are similar to Killbuck soils and are commonly adjacent to Chili, Fitchville, and Mentor soils. The well drained Chili soils are on glacial outwash terraces and kames. The somewhat poorly drained Fitchville soils are on slack-water terraces and on lake plains. Killbuck soils formed in recent alluvium underlain by a dark buried soil. The well drained Mentor soils are on terraces and lake plains.

Typical pedon of Melvin silt loam, frequently flooded, about 2.2 miles southwest of Brownsville; in Bowling Green Township; about 750 yards north and 580 yards west of the southeast corner of sec. 15, T. 18 N., R. 16 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; few medium and many fine roots; about 1 percent coarse fragments; slightly acid; abrupt smooth boundary.
Bg—9 to 24 inches; gray (10YR 6/1) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; about 1 percent coarse fragments; slightly acid; clear smooth boundary.
Cg1—24 to 34 inches; gray (10YR 6/1) silt loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; about 1 percent coarse fragments; few thin strata of lighter colored material; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); slightly acid; clear smooth boundary.
Cg2—34 to 55 inches; gray (10YR 6/1) silt loam; common medium prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; about 1 percent coarse fragments; few thin strata of lighter colored material; slightly acid; clear smooth boundary.
Cg3—55 to 60 inches; gray (N 6/0) silt loam; many medium prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; about 1 percent coarse fragments; weakly stratified; few thin strata of lighter colored material; slightly acid.

The thickness of the solum ranges from 20 to 40 inches. The content of coarse fragments ranges from 0 to 5 percent within a depth of 40 inches and from 0 to 15 percent below a depth of 40 inches.

The Ap horizon has chroma of 1 or 2. The Bg horizon has hue of 10YR or 2.5Y and value of 4 to 6. It is silt loam or silty clay loam. The Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is dominantly silt loam but is silty clay loam in some pedons.

Mentor Series

The Mentor series consists of deep, well drained, moderately permeable soils formed in silty glaciolacustrine sediments on Wisconsinan terraces and lake plains. Slopes range from 0 to 18 percent.

Mentor soils are similar to Alford, Glenford, and Parke soils and are commonly adjacent to Clarksburg,

Fitchville, and Luray soils. Alford soils do not have bedding planes in the lower part. Clarksburg soils have a fragipan. They are on foot slopes. The somewhat poorly drained Fitchville and very poorly drained Luray soils are on flats and in depressions. Glenford soils are moderately well drained. Parke soils have a higher content of sand and coarse fragments in the lower part than the Mentor soils.

Typical pedon of Mentor silt loam, 2 to 6 percent slopes, about 4.3 miles northeast of Hanover; in Perry Township; 1,040 yards east and 260 yards south of the northwest corner of quarter township 4, T. 3 N., R. 10 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; friable; many fine and common medium roots; about 2 percent coarse fragments; slightly acid; abrupt smooth boundary.

BE—9 to 14 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine and few medium roots; few faint brown (10YR 5/3) silt coatings on faces of peds; slightly acid; clear smooth boundary.

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

Bt2—21 to 28 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm; few fine roots; common faint yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—28 to 35 inches; yellowish brown (10YR 5/6) silt loam; few medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint yellowish brown (10YR 5/4) clay films on faces of peds; strongly acid; clear smooth boundary.

BC—35 to 48 inches; yellowish brown (10YR 5/6) silt loam; few medium distinct light yellowish brown (2.5Y 6/4) mottles; weak medium subangular blocky structure parting to platy along bedding planes; friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on vertical faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear smooth boundary.

C—48 to 60 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct grayish brown (10YR 5/2) and light yellowish brown (2.5Y 6/4) mottles; massive; friable; medium acid.

The thickness of the solum ranges from 40 to 55 inches. The content of coarse fragments ranges from 0 to 2 percent in the Ap and Bt horizons and the upper part of the C horizon and from 0 to 10 percent in the part of the C horizon below a depth of 50 inches.

The Ap horizon has value of 4 or 5. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam or silty clay loam. The C horizon has value of 4 or 5 and chroma of 3 to 6. It is dominantly silt loam or silty clay loam, but some pedons have strata of loam, sandy loam, or fine sandy loam.

Mertz Series

The Mertz series consists of deep, well drained, moderately slowly permeable soils formed in material weathered from flinty limestone. Slopes range from 2 to 35 percent.

Mertz soils are commonly adjacent to Frankstown Variant and Guernsey soils. The moderately deep Frankstown Variant soils are on narrow to wide ridgetops. The moderately well drained Guernsey soils are on ridgetops and hillsides.

Typical pedon of Mertz very cherty silt loam, in an area of Frankstown Variant-Mertz complex, 2 to 6 percent slopes, very stony, about 3 miles north of Brownsville; in Hopewell Township; about 370 yards north and 3,270 yards east of the southwest corner of quarter township 2, T. 1 N., R. 10 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) very cherty silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common medium and many fine roots; about 45 percent coarse fragments; slightly acid; abrupt smooth boundary.

E—3 to 5 inches; brown (10YR 5/3) very cherty silt loam; weak medium platy structure parting to moderate fine granular; friable; common medium and many fine roots; about 45 percent coarse fragments; strongly acid; clear smooth boundary.

BE—5 to 10 inches; yellowish brown (10YR 5/4) very cherty silt loam; weak medium subangular blocky structure; friable; common medium and fine roots; about 45 percent coarse fragments; strongly acid; clear smooth boundary.

Bt1—10 to 18 inches; yellowish brown (10YR 5/6) very cherty silt loam; weak medium subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/6) clay films on faces of peds; about 45 percent coarse fragments; strongly acid; clear smooth boundary.

Bt2—18 to 28 inches; strong brown (7.5YR 5/6) very

cherty silt loam; weak medium subangular blocky structure; friable; few fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; about 40 percent coarse fragments; strongly acid; clear smooth boundary.

Bt3—28 to 40 inches; yellowish red (5YR 5/8) very cherty silty clay loam; weak medium subangular blocky structure; firm; few fine roots; few faint yellowish red (5YR 5/8) clay films on faces of peds; about 45 percent coarse fragments; strongly acid; clear smooth boundary.

Bt4—40 to 51 inches; strong brown (7.5YR 5/6) very cherty silty clay loam; weak coarse subangular blocky structure; firm; few fine roots; few faint strong brown (7.5YR 5/6) clay films on faces of peds; about 50 percent coarse fragments; strongly acid; clear smooth boundary.

C—51 to 68 inches; strong brown (7.5YR 5/6) very cherty silty clay loam; massive; firm; about 40 percent coarse fragments; very strongly acid.

The thickness of the solum ranges from 40 to 65 inches. The content of coarse fragments ranges from 35 to 50 percent in the A horizon and from 30 to 70 percent in the Bt and C horizons. These are mainly chert fragments, but some are angular sandstone fragments, particularly in the lower horizons.

The A horizon has chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 4 to 8. The C horizon has hue of 7.5YR or 10YR and chroma of 3 to 6. In the fine-earth fraction, it is silt loam or silty clay loam.

Negley Series

The Negley series consists of deep, well drained, moderately permeable or moderately rapidly permeable soils formed in Illinoian glacial outwash. These soils are on kames and high outwash terraces. Slopes range from 6 to 70 percent.

Negley soils are similar to Chili soils and are commonly adjacent to Alford and Parke soils. Alford and Parke soils have more silt in the upper part than the Negley soils. Alford soils are on wide terrace flats at the higher elevations. Parke soils are on the less sloping side slopes, commonly above the steeper areas of the Negley soils. Chili soils have a solum that is thinner than that of the Negley soils.

Typical pedon of Negley loam, 12 to 18 percent slopes, eroded, about 1 mile northeast of Marne; in Madison Township; 1,915 yards north and 750 yards west of the southeast corner of quarter township 1, T. 2 N., R. 11 W.

Ap—0 to 6 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak fine and medium granular structure; friable; many fine and common medium roots; some yellowish brown (10YR 5/6) subsoil material throughout; about 10 percent coarse fragments; neutral; abrupt smooth boundary.

BE—6 to 14 inches; yellowish brown (10YR 5/6) loam; weak fine subangular blocky structure; friable; common fine roots; few faint yellowish brown (10YR 5/4) silt coatings on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt1—14 to 20 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common faint strong brown (7.5YR 5/6) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt2—20 to 29 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; few fine roots; common faint yellowish red (5YR 5/8) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; clear wavy boundary.

Bt3—29 to 40 inches; yellowish red (5YR 5/8) gravelly clay loam; moderate medium subangular blocky structure; friable; few fine roots; common faint yellowish red (5YR 5/8) clay films on faces of peds; about 20 percent coarse fragments; strongly acid; clear wavy boundary.

Bt4—40 to 63 inches; strong brown (7.5YR 5/6) gravelly clay loam; weak medium subangular blocky structure; friable; few fine roots; common faint strong brown (7.5YR 5/6) clay films on faces of peds; about 20 percent coarse fragments; strongly acid in the upper part and medium acid in the lower part; gradual wavy boundary.

Bt5—63 to 75 inches; strong brown (7.5YR 5/6) clay loam; weak medium subangular blocky structure; friable; common faint strong brown (7.5YR 5/6) clay films on faces of peds; about 10 percent coarse fragments; medium acid; clear wavy boundary.

BC—75 to 80 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure; friable; about 5 percent coarse fragments; medium acid.

The solum is more than 80 inches thick. The content of coarse fragments ranges from 5 to 15 percent in the A horizon and from 5 to 35 percent in the Bt horizon.

The Ap horizon has chroma of 3 or 4. It is typically loam but is silt loam or gravelly loam in some pedons. Some pedons have A and E horizons. The Bt horizon has value of 4 or 5 and chroma of 4 to 8. It is dominantly clay loam, loam, sandy clay loam, or the gravelly analogs of those textures. In some pedons,

however, it has thin subhorizons of sandy loam or gravelly sandy loam.

Ockley Series

The Ockley series consists of deep, well drained soils formed in a thin mantle of loess and in the underlying Wisconsinan glacial outwash (fig. 19). These soils generally are on outwash terraces. In a few areas, however, they are on kames. Permeability is moderate in the subsoil and very rapid in the substratum. Slopes range from 0 to 12 percent.

Ockley soils are similar to Rush soils and are commonly adjacent to Fox and Sleeth soils. Fox soils have a solum that is thinner than that of the Ockley soils. They are on slope breaks between different terrace levels. Rush soils have a silty mantle that is thicker than that of the Ockley soils. The somewhat poorly drained Sleeth soils are on flats and slight rises.

Typical pedon of Ockley silt loam, 0 to 2 percent slopes, about 1.5 miles east of Granville; in Granville Township; 1,170 yards south and 1,160 yards west of the northeast corner of quarter township 4, T. 2 N., R. 13 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; very friable; common fine roots; about 2 percent coarse fragments; neutral; abrupt smooth boundary.

BE—10 to 14 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; few fine roots; common faint brown (10YR 5/3) silt coatings on faces of peds; about 2 percent coarse fragments; slightly acid; clear wavy boundary.

Bt1—14 to 19 inches; yellowish brown (10YR 5/6) silty clay loam; moderate fine and medium subangular blocky structure; firm; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 2 percent coarse fragments; medium acid; clear wavy boundary.

2Bt2—19 to 32 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 2 percent coarse fragments; medium acid; clear wavy boundary.

2Bt3—32 to 37 inches; brown (7.5YR 4/4) clay loam; moderate coarse subangular blocky structure; firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 4 percent coarse fragments; medium acid; clear wavy boundary.

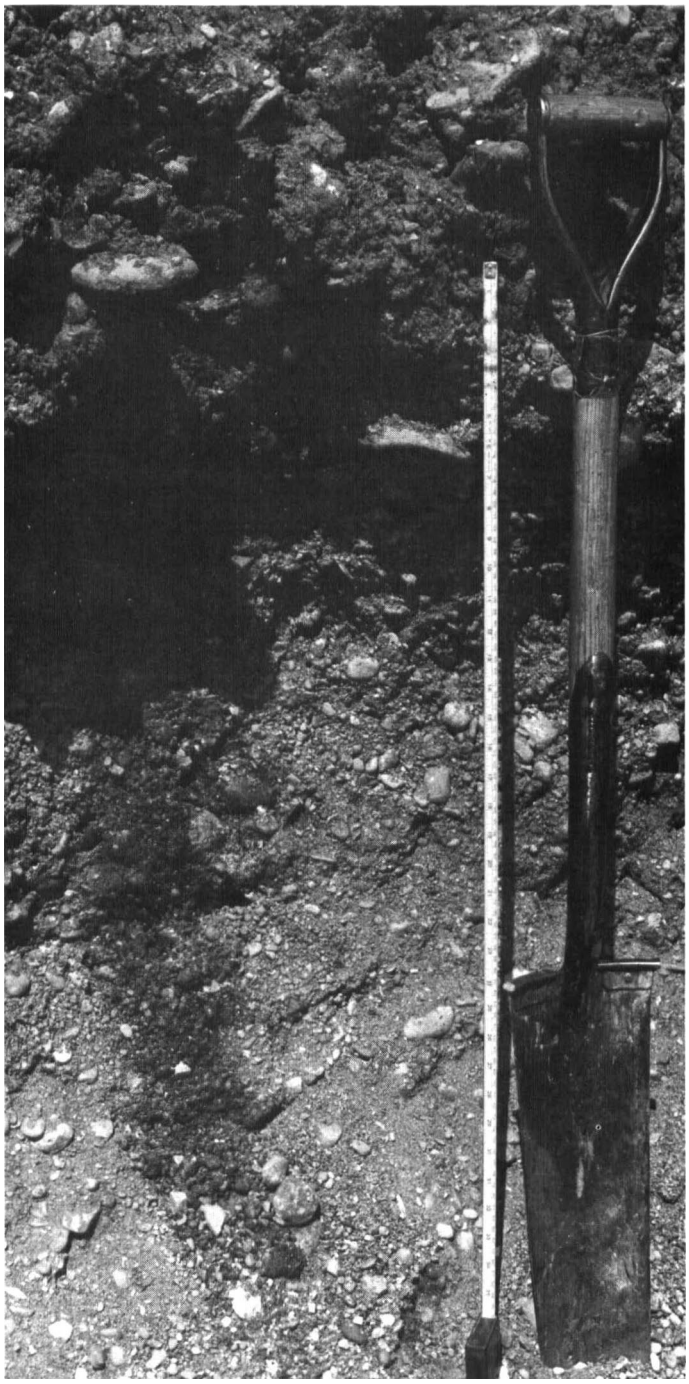

Figure 19.—Profile of Ockley soils, which formed in glacial outwash. Dark tongues of weathered soil material are in the outwash sand and gravel.

2Bt4—37 to 49 inches; dark yellowish brown (10YR 4/4) sandy clay loam; weak coarse subangular blocky structure; friable; few fine roots; clay bridges between sand grains; about 10 percent coarse fragments; neutral; clear wavy boundary.

2Bt5—49 to 56 inches; brown (10YR 4/3) gravelly clay loam; massive; friable; clay bridges between sand grains; about 30 percent coarse fragments; slight effervescence in spots; mildly alkaline; abrupt irregular boundary.
2C—56 to 80 inches; brown (10YR 5/3) very gravelly sand; single grained; loose; common light gray (10YR 7/2) coatings on weathered limestone pebbles; about 40 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to calcareous sand and gravel range from 40 to 70 inches. The thickness of the loess mantle ranges from 0 to 20 inches. The content of coarse fragments ranges from 0 to 10 percent in the A and Bt horizons and the upper part of the 2Bt horizon, from 10 to 35 percent in the lower part of the 2Bt horizon, and from 30 to 60 percent in the 2C horizon.

The Ap horizon has chroma of 2 or 3. It is typically silt loam but is loam in some pedons. The Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Bt horizon is clay loam, sandy clay loam, or the gravelly analogs of those textures. The 2C horizon has value of 4 or 5 and chroma of 3 or 4. It is the gravelly or very gravelly analogs of sand or loamy sand.

Orrville Series

The Orrville series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in strongly acid to slightly acid recent alluvium. Slopes are 0 to 2 percent.

Orrville soils are similar to Shoals soils and are commonly adjacent to Chili, Glenford, and Tioga soils. The well drained Chili and moderately well drained Glenford soils are on terraces. Shoals soils are less acid throughout than the Orrville soils. The well drained Tioga soils are on the wider flood plains.

Typical pedon of Orrville silt loam, occasionally flooded, about 1.4 miles northeast of Purity; in Eden Township; about 210 yards south and 190 yards east of the northwest corner of sec. 12, T. 4 N., R. 11 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak fine granular structure; friable; common medium and many fine roots; about 1 percent coarse fragments; medium acid; clear smooth boundary.
Bg—7 to 13 inches; dark gray (10YR 4/1) silt loam; common medium distinct grayish brown (10YR 5/2) and common fine prominent reddish brown (5YR 4/4) mottles; weak fine subangular blocky structure parting to weak fine granular; friable; few medium and common fine roots; about 1 percent coarse fragments; medium acid; clear smooth boundary.
Bw1—13 to 17 inches; brown (10YR 5/3) silt loam; common medium faint grayish brown (10YR 5/2) and few fine prominent reddish brown (5YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; many distinct dark grayish brown (10YR 4/2) organic coatings in old root channels; about 2 percent coarse fragments; strongly acid; clear smooth boundary.
Bw2—17 to 25 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; many distinct dark grayish brown (10YR 4/2) organic coatings in old root channels; about 2 percent coarse fragments; strongly acid; clear smooth boundary.
Bw3—25 to 37 inches; brown (10YR 5/3) loam; common medium faint grayish brown (10YR 5/2) and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; friable; about 4 percent coarse fragments; strongly acid; clear smooth boundary.
C1—37 to 44 inches; brown (10YR 5/3) sandy loam; common medium distinct grayish brown (10YR 5/2) and few medium distinct yellowish brown (10YR 5/6) mottles; massive; very friable; about 4 percent coarse fragments; strongly acid; clear smooth boundary.
C2—44 to 48 inches; brown (10YR 5/3) sandy loam; many medium distinct gray (10YR 5/1) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; very friable; about 2 percent coarse fragments; strongly acid; abrupt smooth boundary.
C3—48 to 60 inches; dark yellowish brown (10YR 4/4) loamy sand; massive; very friable; about 10 percent coarse fragments; medium acid.

The thickness of the solum ranges from 24 to 45 inches. The content of coarse fragments ranges from 0 to 5 percent in the A horizon, from 0 to 15 percent in the B horizon, and from 0 to 25 percent in the C horizon.

The Ap horizon has hue of 10YR or 2.5Y. The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is dominantly loam or silt loam but has thin subhorizons of sandy loam in some pedons. The C horizon has hue of 10YR or 2.5Y and chroma of 1 to 4. It is sandy loam, loamy sand, loam, silt loam, or the gravelly analogs of those textures.

Parke Series

The Parke series consists of deep, well drained, moderately permeable soils on high outwash terraces. These soils formed in loess and the underlying Illinoian glacial outwash. Slopes range from 6 to 12 percent.

Parke soils are similar to Mentor soils and are commonly adjacent to Alford and Negley soils. Alford and Mentor soils have a lower content of sand and coarse fragments in the lower part than the Parke soils. Alford soils are commonly on terrace flats above the Parke soils. Negley soils have a higher content of sand and coarse fragments in the upper part of the solum than the Parke soils. They are on the steeper parts of side slopes, commonly downslope from the Parke soils.

Typical pedon of Parke silt loam, 6 to 12 percent slopes, eroded, about 0.5 mile west of Marne; in Madison Township; about 590 yards east and 1,060 yards north of the southwest corner of quarter township 1, T. 2 N., R. 11 W.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate fine granular structure; friable; common medium and many fine roots; some strong brown (7.5YR 5/6) subsoil material throughout; strongly acid; abrupt smooth boundary.

Bt1—7 to 16 inches; strong brown (7.5YR 5/6) silty clay loam; moderate fine subangular blocky structure; friable; few medium and many fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—16 to 26 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 2 percent coarse fragments; strongly acid; clear wavy boundary.

Bt3—26 to 35 inches; strong brown (7.5YR 5/6) silt loam; weak coarse subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 3 percent coarse fragments; strongly acid; clear wavy boundary.

2Bt4—35 to 48 inches; strong brown (7.5YR 5/6) loam; weak coarse subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; gradual wavy boundary.

2Bt5—48 to 60 inches; reddish brown (5YR 4/4) gravelly sandy loam; weak coarse subangular blocky structure; very friable; clay bridges between sand grains; about 20 percent coarse fragments; strongly acid.

The thickness of the solum ranges from 60 to more than 120 inches. The thickness of the silty mantle ranges from 20 to 40 inches. The content of coarse fragments ranges from 0 to 3 percent in the Bt horizon and from 5 to 20 percent in the 2Bt horizon.

The Bt horizon has hue of 7.5YR or 10YR and chroma of 4 to 6. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is loam, clay loam, sandy clay loam, sandy loam, or the gravelly analogs of those textures.

Pewamo Series

The Pewamo series consists of deep, very poorly drained, moderately slowly permeable soils formed in Wisconsinan glacial till. These soils are in depressions, on broad flats, and in small drainageways on till plains. Slopes are 0 to 2 percent.

Pewamo soils are similar to Luray soils and are commonly adjacent to Bennington and Centerburg soils. Bennington soils are somewhat poorly drained, and Centerburg soils are moderately well drained. Both of these soils are on slight rises and low knolls. Luray soils have less clay in the subsoil and a lower content of coarse fragments throughout than the Pewamo soils.

Typical pedon of Pewamo silty clay loam, about 3.5 miles northwest of Johnstown; in Monroe Township; about 160 yards south and 120 yards west of the northeast corner of sec. 6, T. 3 N., R. 15 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; firm; many fine roots; about 2 percent coarse fragments; slightly acid; abrupt smooth boundary.

A—8 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; firm; common fine roots; about 2 percent coarse fragments; slightly acid; clear smooth boundary.

Btg1—12 to 18 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; few fine roots; few faint dark gray (10YR 4/1) clay films on faces of peds; common faint very dark gray (10YR 3/1) organic coatings on horizontal faces of peds and many faint very dark gray (10YR 3/1) organic coatings on vertical faces; about 2 percent coarse fragments; neutral; clear smooth boundary.

Btg2—18 to 27 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate

medium subangular blocky structure; firm; few fine roots; few faint dark gray (10YR 4/1) clay films on horizontal faces of peds and many faint dark gray (10YR 4/1) clay films on vertical faces; common faint very dark gray (10YR 3/1) organic coatings on vertical faces of peds; about 2 percent coarse fragments; neutral; clear smooth boundary.

Btg3—27 to 36 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint dark gray (10YR 4/1) clay films on horizontal faces of peds and patchy clay films on vertical faces; about 4 percent coarse fragments; neutral; clear wavy boundary.

Bt1—36 to 49 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct gray (10YR 5/1) and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint dark gray (10YR 4/1) clay films on faces of peds; about 4 percent coarse fragments; neutral; clear wavy boundary.

Bt2—49 to 55 inches; dark yellowish brown (10YR 4/4) silty clay loam; many medium distinct gray (10YR 5/1) and common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; few faint gray (10YR 5/1) clay films on faces of peds; about 4 percent coarse fragments; neutral; clear wavy boundary.

BC—55 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam; many medium distinct gray (10YR 5/1) mottles; weak coarse subangular blocky structure; firm; few fine roots; about 4 percent coarse fragments; neutral.

The thickness of the solum ranges from 46 to 70 inches. The thickness of the mollic epipedon ranges from 10 to 15 inches. The content of coarse fragments ranges from 0 to 5 percent in the A horizon and from 0 to 10 percent in the Bt horizon.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silty clay loam but is silt loam in some pedons. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 4. It is dominantly silty clay loam but is clay loam or silty clay in some pedons.

Rigley Series

The Rigley series consists of deep, well drained, moderately rapidly permeable soils on unglaciated ridgetops and hillsides. These soils formed in colluvium and residuum derived from weakly consolidated sandstone. Slopes range from 6 to 35 percent.

Rigley soils are commonly adjacent to Coshocton and Guernsey soils. The adjacent soils are moderately well drained. They are in positions on the landscape similar to those of the Rigley soils.

Typical pedon of Rigley fine sandy loam, 18 to 25 percent slopes, about 3.5 miles north of Brownsville; in Hopewell Township; about 1,240 yards north and 2,170 yards east of the southwest corner of quarter township 2, T. 1 N., R. 10 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; very friable; many fine and common medium roots; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

E—3 to 8 inches; brown (10YR 4/3) fine sandy loam; weak medium platy structure parting to weak fine granular; very friable; common fine and medium roots; about 10 percent coarse fragments; strongly acid; clear smooth boundary.

BE—8 to 13 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few fine and common medium roots; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt1—13 to 20 inches; yellowish brown (10YR 5/4) sandy loam; weak medium subangular blocky structure; very friable; few fine and medium roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt2—20 to 31 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt3—31 to 43 inches; yellowish brown (10YR 5/6) sandy loam; weak coarse subangular blocky structure; very friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

Bt4—43 to 50 inches; brownish yellow (10YR 6/6) sandy loam; weak coarse subangular blocky structure; very friable; few fine roots; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; strongly acid; clear wavy boundary.

C—50 to 70 inches; brownish yellow (10YR 6/6) channery sandy loam; massive; very friable; about 20 percent coarse fragments; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. The depth to bedrock is more than 60 inches. The content of sandstone fragments ranges from 5 to 35 percent in the A and Bt horizons and from 10 to 60 percent in the C horizon.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is typically fine sandy loam but is sandy loam or channery sandy loam in some pedons. The Bt horizon is dominantly sandy loam but is loam, channery sandy loam, or channery loam in some pedons. The C horizon has value of 5 or 6 and chroma of 4 to 6. It is dominantly channery sandy loam but is sandy loam, very channery sandy loam, or channery loamy sand in some pedons.

Rush Series

The Rush series consists of deep, well drained soils on terraces. These soils formed in a mantle of loess and in the underlying Wisconsinan outwash. Permeability is moderate in the subsoil and very rapid in the substratum. Slopes are 0 to 2 percent.

Rush soils are similar to Ockley soils and are commonly adjacent to Fox soils. The mantle of loess in Ockley soils is thinner than that in the Rush soils. Fox soils are on slope breaks between different terrace levels. Their solum is thinner than that of the Rush soils.

Typical pedon of Rush silt loam, 0 to 2 percent slopes, about 1.5 miles south of Vanatta; in Newark Township; 300 yards south and 3,470 yards east of the northwest corner of quarter township 2, T. 2 N., R. 12 W.

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

BE—10 to 14 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; few fine roots; few faint yellowish brown (10YR 5/4) silt coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—14 to 20 inches; strong brown (7.5YR 5/6) silt loam; moderate fine and medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear smooth boundary.

Bt2—20 to 28 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; clear smooth boundary.

Bt3—28 to 38 inches; strong brown (7.5YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint brown (7.5YR 4/4) clay films on faces of peds; strongly acid; abrupt smooth boundary.

2Bt4—38 to 48 inches; brown (7.5YR 4/4) gravelly clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 30 percent coarse fragments; strongly acid; clear smooth boundary.

2Bt5—48 to 57 inches; brown (7.5YR 4/4) gravelly clay loam; moderate medium subangular blocky structure; firm; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 30 percent coarse fragments; medium acid; clear smooth boundary.

2Bt6—57 to 68 inches; brown (10YR 4/3) very gravelly sandy clay loam; weak coarse subangular blocky structure; friable; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 45 percent coarse fragments; slightly acid; clear irregular boundary.

2C—68 to 80 inches; brown (10YR 5/3) very gravelly loamy sand; single grained; loose; about 55 percent coarse fragments; strong effervescence; moderately alkaline.

The thickness of the solum and the depth to calcareous sand and gravel range from 48 to 70 inches. The thickness of the loess mantle ranges from 27 to 45 inches. The content of coarse fragments ranges from 10 to 45 percent in the 2Bt horizon and from 30 to 60 percent in the 2C horizon.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The 2Bt and 2C horizons have value of 4 or 5. The 2Bt horizon is clay loam, sandy clay loam, or the gravelly or very gravelly analogs of those textures. The 2C horizon is the gravelly or very gravelly analogs of sand or loamy sand.

Sebring Series

The Sebring series consists of deep, poorly drained, moderately slowly permeable soils formed in Wisconsinan slack-water deposits. These soils are on lake plains and on terraces along streams. Slopes are 0 to 2 percent.

The Sebring soils in this county do not have the increase in content of clay in the subsoil that is

definitive for the series. This difference, however, does not affect the use or behavior of the soils.

Sebring soils are similar to Fitchville soils and are commonly adjacent to Fitchville, Glenford, and Luray soils. The somewhat poorly drained Fitchville and moderately well drained Glenford soils are in the higher positions on the landscape. The very poorly drained Luray soils are in positions on the landscape similar to those of the Sebring soils.

Typical pedon of Sebring silt loam, about 4.5 miles north of Gratiot; in Hopewell Township; about 590 yards south and 380 yards west of the northeast corner of sec. 2, T. 1 N., R. 10 W.

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

Bg1—8 to 12 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common fine roots; common distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few medium distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; abrupt wavy boundary.

Bg2—12 to 18 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct light yellowish brown (10YR 6/4) and gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; abrupt wavy boundary.

Bg3—18 to 23 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) and light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; abrupt wavy boundary.

Btg1—23 to 32 inches; gray (10YR 6/1) silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few faint gray (10YR 6/1) clay films on vertical faces of peds and lining root channels; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); strongly acid; abrupt wavy boundary.

Btg2—32 to 37 inches; gray (10YR 5/1) silty clay loam; many medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few faint gray (10YR 6/1) clay films on vertical faces of peds and lining root channels; many distinct light brownish gray (10YR 6/2) silt coatings on faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); medium acid; clear wavy boundary.

Btg3—37 to 50 inches; gray (10YR 6/1) silty clay loam; many medium prominent strong brown (7.5YR 5/6) and many medium distinct dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; few faint gray (10YR 6/1) clay films and many distinct gray (10YR 6/1) silt coatings on vertical faces of peds; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); neutral; clear wavy boundary.

Cg—50 to 80 inches; gray (10YR 6/1) silt loam; many medium prominent strong brown (7.5YR 5/6) and many medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm; few fine distinct black (10YR 2/1) stains (iron and manganese oxide); neutral.

The thickness of the solum ranges from 35 to 55 inches. The content of coarse fragments ranges from 0 to 3 percent in the Bg and Btg horizons and from 0 to 5 percent in the C horizon.

The Ap horizon has value of 4 or 5 and chroma of 1 or 2. The Bg and Btg horizons have hue of 10YR or 2.5Y and value of 4 to 6. They have chroma of 1 or 2 within a depth of 30 inches and chroma of 1 to 6 below a depth of 30 inches. They are typically silt loam or silty clay loam, but some pedons have thin strata of loam. The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 6. It is stratified. It is dominantly silt loam, but some pedons have strata of silty clay loam, loam, or sandy loam.

Shoals Series

The Shoals series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in slightly acid to mildly alkaline recent alluvium. Slopes are 0 to 2 percent.

Shoals soils are similar to Orrville soils and are commonly adjacent to Sloan and Stonelick soils. Orrville soils are more acid throughout than the Shoals soils. The very poorly drained Sloan soils are commonly in high water channels and other low areas. The well drained Stonelick soils are commonly adjacent to stream channels.

Typical pedon of Shoals silt loam, occasionally flooded, about 6 miles north of Johnstown; in Hartford Township; about 610 yards north and 1,960 yards west of the southeast corner of quarter township 1, T. 4 N., R. 15 W.

Ap—0 to 13 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many fine roots; about 1 percent coarse fragments; neutral; abrupt smooth boundary.

C1—13 to 20 inches; grayish brown (10YR 5/2) silt loam; many medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm; few fine roots; many distinct gray (10YR 5/1) silt coatings on faces of peds; about 1 percent coarse fragments; neutral; clear wavy boundary.

C2—20 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; many medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm; few fine roots; many distinct gray (10YR 5/1) silt coatings on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 1 percent coarse fragments; neutral; clear wavy boundary.

C3—28 to 36 inches; yellowish brown (10YR 5/4) loam; many medium distinct gray (10YR 5/1) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; many distinct grayish brown (10YR 5/2) silt coatings on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 2 percent coarse fragments; neutral; gradual wavy boundary.

C4—36 to 47 inches; yellowish brown (10YR 5/4) loam; many medium distinct gray (10YR 5/1) mottles; massive; friable; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 2 percent coarse fragments; mildly alkaline; clear wavy boundary.

C5—47 to 56 inches; gray (10YR 5/1) loam; many medium distinct yellowish brown (10YR 5/4) mottles; massive; friable; common coarse distinct black (10YR 2/1) stains (iron and manganese oxide); about 4 percent coarse fragments; mildly alkaline; clear wavy boundary.

C6—56 to 60 inches; gray (10YR 5/1) gravelly loam; many medium distinct yellowish brown (10YR 5/4) mottles; massive; friable; about 20 percent coarse fragments; mildly alkaline.

The Ap horizon has value of 4 or 5. The part of the C horizon within a depth of 40 inches has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam, silty clay loam, loam, or clay loam. The part of the C horizon below a depth of 40 inches has chroma of 1 to 4. It is loam, silt loam, sandy loam, or the gravelly analogs of those textures.

Sleeth Series

The Sleeth series consists of deep, somewhat poorly drained soils on terraces. These soils formed in Wisconsinan glacial outwash. Permeability is moderate in the solum and very rapid in the substratum. Slopes are 0 to 2 percent.

Sleeth soils are commonly adjacent to Algiers, Ockley, and Westland soils. Algiers soils formed in recent alluvium underlain by a buried soil. They are on flood plains. The well drained Ockley soils are on slight rises, knolls, and side slopes. The very poorly drained Westland soils are on flats and in depressions.

Typical pedon of Sleeth silt loam, 0 to 2 percent slopes, about 0.6 mile southwest of Luray; in Union Township; about 400 yards south and 100 yards west of the northeast corner of sec. 8, T. 17 N., R. 18 W.

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; common fine roots; about 5 percent coarse fragments; medium acid; abrupt smooth boundary.

BE—9 to 12 inches; brown (10YR 5/3) silt loam; common medium faint grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common faint grayish brown (10YR 5/2) silt coatings on faces of peds; about 10 percent coarse fragments; medium acid; abrupt smooth boundary.

Bt1—12 to 15 inches; yellowish brown (10YR 5/4) loam; common medium distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; many distinct grayish brown (10YR 5/2) coatings on faces of peds; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 10 percent coarse fragments; slightly acid; clear smooth boundary.

Bt2—15 to 24 inches; yellowish brown (10YR 5/4) clay loam; many medium distinct yellowish brown (10YR 5/6) and common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; few faint grayish brown (10YR 5/2) clay films on faces of peds; many distinct grayish brown (10YR 5/2) coatings on faces of peds; about 10 percent coarse

fragments; slightly acid; clear smooth boundary.
Btg1—24 to 32 inches; dark grayish brown (10YR 4/2) gravelly clay loam; common medium distinct yellowish brown (10YR 5/6) and common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 20 percent coarse fragments; slightly acid; clear smooth boundary.
Btg2—32 to 42 inches; dark grayish brown (10YR 4/2) gravelly sandy clay loam; common fine distinct yellowish brown (10YR 5/6) and common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; about 20 percent coarse fragments; slightly acid; gradual smooth boundary.
BCg—42 to 55 inches; grayish brown (10YR 5/2) gravelly sandy clay loam; common fine distinct yellowish brown (10YR 5/4) and many fine faint dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; very few faint dark grayish brown (10YR 4/2) clay films on vertical faces of peds; about 20 percent coarse fragments; neutral; abrupt wavy boundary.
Cg—55 to 60 inches; grayish brown (10YR 5/2) gravelly sand; single grained; loose; about 20 percent coarse fragments; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. It is generally the same as the depth to calcareous sand and gravel. The content of coarse fragments ranges from 2 to 7 percent in the Ap horizon, from 5 to 10 percent in the upper part of the Bt horizon, from 10 to 30 percent in the lower part of the Bt horizon, and from 20 to 40 percent in the C horizon.

The Ap horizon has chroma of 2 or 3. The Bt horizon has chroma of 1 to 4. It is clay loam, loam, or silty clay loam in the upper part and clay loam, loam, sandy clay loam, or the gravelly analogs of those textures in the lower part. The C horizon has value of 4 or 5 and chroma of 2 or 3. It is sand, loamy coarse sand, or the gravelly or very gravelly analogs of those textures.

Sloan Series

The Sloan series consists of deep, very poorly drained, moderately permeable or moderately slowly permeable soils on flood plains. These soils formed in recent alluvium. Slopes are 0 to 2 percent.

Sloan soils are commonly adjacent to Medway and Shoals soils. The adjacent soils are in the slightly higher positions on flood plains. Medway soils are moderately well drained, and Shoals soils are somewhat poorly drained.

Typical pedon of Sloan silt loam, frequently flooded, about 2.1 miles east of Alexandria; in St. Albans Township; 850 yards north and 210 yards west of the southeast corner of quarter township 1, T. 2 N., R. 14 W.

Ap—0 to 9 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common fine roots; about 2 percent coarse fragments; slightly acid; abrupt smooth boundary.
A1—9 to 14 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; friable; few fine roots; about 2 percent coarse fragments; slightly acid; clear smooth boundary.
A2—14 to 19 inches; very dark gray (10YR 3/1) clay loam, grayish brown (10YR 5/2) dry; few medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; about 4 percent coarse fragments; slightly acid; clear smooth boundary.
Bg1—19 to 24 inches; dark gray (10YR 4/1) loam; common medium distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common faint very dark gray (10YR 3/1) organic coatings on vertical faces of peds; common fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; slightly acid; clear smooth boundary.
Bg2—24 to 31 inches; dark grayish brown (10YR 4/2) loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; slightly acid; clear smooth boundary.
Bg3—31 to 36 inches; dark grayish brown (10YR 4/2) loam; many medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; common fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 5 percent coarse fragments; neutral; abrupt smooth boundary.
Cg1—36 to 42 inches; dark grayish brown (10YR 4/2) gravelly loam; many medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; common fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 20 percent coarse

fragments; neutral; abrupt smooth boundary.
Cg2—42 to 60 inches; gray (10YR 5/1) silt loam; common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; common fine distinct black (10YR 2/1) stains (iron and manganese oxide); about 1 percent coarse fragments; neutral.

The thickness of the solum ranges from 30 to 50 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches. The content of coarse fragments ranges from 0 to 5 percent in the Ap and Bg horizons and from 0 to 20 percent in the Cg horizon.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is typically silt loam but is silty clay loam in some pedons. The B horizon has hue of 10YR or 2.5Y and value of 4 or 5. It is loam, silty clay loam, clay loam, or silt loam. The C horizon has hue of 10YR or 2.5Y. It is stratified silt loam, loam, clay loam, silty clay loam, sandy loam, or the gravelly analogs of those textures.

Stonelick Series

The Stonelick series consists of deep, well drained, moderately rapidly permeable soils on flood plains. These soils formed in stratified, calcareous recent alluvium. Slopes are 0 to 2 percent.

Stonelick soils are similar to Tioga soils and are commonly adjacent to Shoals and Sloan soils. Shoals soils are somewhat poorly drained, and Sloan soils are very poorly drained. Both of these soils are commonly on narrow flood plains and in low areas on wide flood plains. Tioga soils are more acid throughout than the Stonelick soils.

Typical pedon of Stonelick loam, occasionally flooded, about 1 mile southwest of Marne; in Madison Township; 640 yards south and 1,030 yards east of the northwest corner of quarter township 4, T. 2 N., R. 11 W.

Ap—0 to 9 inches; brown (10YR 4/3) loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common fine and medium roots; about 5 percent coarse fragments; slight effervescence; mildly alkaline; abrupt smooth boundary.
A—9 to 14 inches; brown (10YR 4/3) loam; massive; friable; common fine and few medium roots; about 5 percent coarse fragments; slight effervescence; mildly alkaline; clear smooth boundary.
C1—14 to 26 inches; dark yellowish brown (10YR 4/4) fine sandy loam; massive; friable; few fine roots; about 5 percent coarse fragments; thin strata of loam; slight effervescence; mildly alkaline; clear smooth boundary.
C2—26 to 43 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; very friable; few fine roots; about 2 percent coarse fragments; thin strata of loam; strong effervescence; moderately alkaline; abrupt smooth boundary.
C3—43 to 60 inches; dark yellowish brown (10YR 4/4), stratified silt loam, fine sandy loam, and loamy sand; generally massive but single grained in the loamy sand; generally very friable but loose in the loamy sand; about 2 percent coarse fragments; strong effervescence; moderately alkaline.

The content of coarse fragments ranges from 0 to 10 percent in the Ap horizon, from 0 to 20 percent in the part of the C horizon within a depth of 40 inches, and from 0 to 60 percent below a depth of 40 inches. The Ap and A horizons have chroma of 2 or 3. They are typically loam but are silt loam or sandy loam in some pedons. The C horizon has chroma of 2 to 4. It is stratified loam, silt loam, fine sandy loam, sandy loam, sand, loamy sand, or the gravelly or very gravelly analogs of those textures.

Tioga Series

The Tioga series consists of deep, well drained soils on flood plains. These soils formed in loamy and sandy recent alluvium. Permeability is moderate or moderately rapid in the subsoil and rapid in the substratum. Slopes are 0 to 2 percent.

Tioga soils are similar to Stonelick soils and are commonly adjacent to Chili and Orrville soils. Chili soils have an argillic horizon. They are on terraces at the higher elevations. The somewhat poorly drained Orrville soils are on narrow flood plains and in the slightly lower positions on wide flood plains. Stonelick soils are calcareous throughout.

Typical pedon of Tioga fine sandy loam, occasionally flooded, about 1.8 miles northwest of Hanover; in Perry Township; 460 yards north and 850 yards east of the southwest corner of sec. 25, T. 3 N., R. 10 W.

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common medium and few fine roots; about 2 percent coarse fragments; medium acid; abrupt smooth boundary.
Bw1—8 to 17 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; about 2 percent coarse fragments; thin strata of sandy loam; medium acid; clear smooth boundary.
Bw2—17 to 23 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky

structure; very friable; few fine roots; about 2 percent coarse fragments; thin strata of sandy loam; medium acid; abrupt smooth boundary.

C—23 to 60 inches; yellowish brown (10YR 5/4) very gravelly loamy sand; single grained; loose; few fine roots; about 45 percent coarse fragments; medium acid.

The thickness of the solum ranges from 20 to 40 inches. The content of coarse fragments ranges from 0 to 15 percent in the Ap and B horizons and from 0 to 60 percent in the C horizon.

The Ap horizon has chroma of 2 or 3. It is typically fine sandy loam but is silt loam in some pedons. The B horizon has hue of 7.5YR or 10YR and chroma of 2 to 4. It is dominantly fine sandy loam, loam, or silt loam, but some pedons have individual subhorizons of loamy sand or sandy loam. The C horizon has value of 4 or 5 and chroma of 2 to 4. It is stratified loam, silt loam, sandy loam, loamy sand, or the gravelly or very gravelly analogs of those textures.

Titusville Series

The Titusville series consists of deep, moderately well drained, slowly permeable soils on till plains. These soils have a fragipan. They formed in Illinoian glacial till. Slopes range from 2 to 12 percent.

Titusville soils are similar to Clarksburg and Homewood soils and are commonly adjacent to Brownsville and Homewood soils. Brownsville soils have a higher content of coarse fragments throughout than the Titusville soils. They are on hillsides and ridgetops, commonly at the higher elevations. Clarksburg and Homewood soils do not have low-chroma mottles within the upper 10 inches of the argillic horizon. Clarksburg soils typically have a higher content of coarse fragments in the lower part of the subsoil and in the substratum than the Titusville soils. Homewood soils are on ridgetops and dissected hillsides.

Typical pedon of Titusville silt loam, 2 to 6 percent slopes, about 4.5 miles northeast of St. Louisville; in Eden Township; about 110 yards south and 730 yards west of the northeast corner of sec. 17, T. 4 N., R. 11 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; many fine and common medium roots; about 5 percent coarse fragments; slightly acid; abrupt smooth boundary.

BE—9 to 14 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; few faint brown (10YR 5/3) silt coatings on vertical faces of peds; about 5 percent coarse fragments; medium acid; clear smooth boundary.

Bt1—14 to 18 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 5 percent coarse fragments; medium acid; clear smooth boundary.

Bt2—18 to 23 inches; yellowish brown (10YR 5/6) silt loam; few fine prominent grayish brown (10YR 5/2) and few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint dark yellowish brown (10YR 4/4) clay films on faces of peds; about 5 percent coarse fragments; medium acid; clear smooth boundary.

Bt3—23 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (2.5Y 6/2) and many medium distinct strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many faint light brownish gray (10YR 6/2) clay films and silt coatings on vertical prism faces; few faint yellowish brown (10YR 5/4) clay films on faces of peds; about 10 percent coarse fragments; medium acid; abrupt smooth boundary.

Btx1—28 to 35 inches; yellowish brown (10YR 5/6) gravelly loam; common medium prominent light brownish gray (2.5Y 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm; brittle; few fine roots between vertical prism faces; many faint light brownish gray (10YR 6/2) clay films along vertical prism faces; many medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 20 percent coarse fragments; strongly acid; clear smooth boundary.

Btx2—35 to 48 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent light brownish gray (2.5Y 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; moderate very coarse prismatic structure parting to moderate medium platy; very firm; brittle; few fine roots between vertical prism faces; many faint light brownish gray (10YR 6/2) clay films along vertical prism faces; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 10 percent coarse fragments; strongly acid; clear smooth boundary.

BC—48 to 54 inches; yellowish brown (10YR 5/6) loam; common medium prominent light brownish gray

(2.5Y 6/2) and common medium distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm; common medium distinct black (10YR 2/1) stains (iron and manganese oxide); about 10 percent coarse fragments; medium acid; gradual wavy boundary.

C—54 to 80 inches; yellowish brown (10YR 5/6) loam; few medium prominent light brownish gray (2.5Y 6/2) and few medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; about 10 percent coarse fragments; slightly acid.

The thickness of the solum ranges from 50 to 90 inches. Depth to the fragipan ranges from 18 to 28 inches. The content of coarse fragments ranges from 5 to 10 percent in the Bt horizon and from 5 to 20 percent in the Btx and C horizons.

The Ap horizon has chroma of 2 or 3. The Bt and Btx horizons have value of 4 to 6 and chroma of 3 to 6. The Bt horizon is silt loam, silty clay loam, loam, or clay loam. The Btx horizon is loam, clay loam, or the gravelly analogs of those textures. The C horizon has value of 4 or 5 and chroma of 3 to 6. It is dominantly loam or clay loam but in some pedons is the gravelly analogs of those textures.

Wallkill Series

The Wallkill series consists of deep, very poorly drained soils on flood plains. These soils formed in recent alluvium and in the underlying organic material over lacustrine clay. Permeability is moderate in the upper silty material and slow in the underlying clay. Slopes are 0 to 2 percent.

The Wallkill soils in this county have a lower content of sand in the subsoil than is definitive for the series. This difference, however, does not affect the use or behavior of the soils.

Wallkill soils are commonly adjacent to Algiers and Carlisle soils. Algiers soils formed in recent alluvium over a buried mineral soil. They are on broad flats. Carlisle soils are organic throughout. They are on till plains, outwash terraces, and lake plains.

Typical pedon of Wallkill silt loam, clayey substratum, frequently flooded, about 1.5 miles southwest of Luray; in Union Township; about 130 yards east and 475 yards north of the southwest corner of sec. 8, T. 17 N., R. 18 W.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, brown (10YR 5/3) dry; weak fine granular structure; friable; common fine and medium roots; about 1 percent coarse fragments; slightly acid; clear smooth boundary.

Bg—7 to 15 inches; dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; friable; common fine and few medium roots; about 1 percent coarse fragments; neutral; clear smooth boundary.

Cg—15 to 24 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent yellowish red (5YR 4/6) and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; about 1 percent coarse fragments; neutral; abrupt irregular boundary.

2Oa—24 to 42 inches; sapric material, black (10YR 2/1) broken face and rubbed; about 5 percent fiber when broken, 2 percent rubbed and pressed; moderate medium platy structure; friable, slightly sticky; few fine roots; neutral; clear smooth boundary.

3C—42 to 50 inches; organic-rich clay, black (10YR 2/1) broken face and rubbed; about 1 percent fiber when broken; massive; slightly sticky; slightly acid; clear smooth boundary.

3Cg—50 to 80 inches; gray (10YR 5/1) clay; massive; very sticky; slightly acid.

The thickness of the recent alluvium ranges from 16 to 40 inches. The Ap horizon has chroma of 1 or 2. The Bg and Cg horizons have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. They are silt loam or silty clay loam. The 2Oa horizon has hue of 7.5YR or 10YR or is neutral in hue. It has chroma of 0 to 2.

Westland Series

The Westland series consists of deep, very poorly drained soils formed in Wisconsinan glacial outwash. These soils are on outwash terraces. Permeability is moderate in the solum and very rapid in the substratum. Slopes are 0 to 2 percent.

Westland soils are similar to Crane soils and are commonly adjacent to Crane, Ockley, and Sleeth soils. The somewhat poorly drained Crane soils are on broad flats and in depressions. The well drained Ockley soils are on flats, slight rises, knolls, and side slopes. The somewhat poorly drained Sleeth soils are on flats and slight rises.

Typical pedon of Westland silty clay loam, about 0.7 mile south of Hebron; in Union Township; about 860 yards south and 60 yards east of the northwest corner of sec. 11, T. 17 N., R. 18 W.

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; many fine roots; about 3 percent coarse fragments; medium acid; abrupt smooth boundary.

A—8 to 15 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate fine granular; firm; common fine roots; about 5 percent coarse fragments; slightly acid; clear wavy boundary.

Btg1—15 to 19 inches; dark gray (10YR 4/1) clay loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; common fine roots; few distinct very dark gray (10YR 3/1) clay films on faces of peds; many distinct black (10YR 2/1) organic coatings on vertical faces of peds; about 5 percent coarse fragments; neutral; clear wavy boundary.

Btg2—19 to 24 inches; gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; many distinct black (10YR 2/1) organic coatings on vertical faces of peds; about 10 percent coarse fragments; neutral; clear wavy boundary.

Btg3—24 to 29 inches; gray (10YR 5/1) clay loam; many medium prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few faint dark gray (10YR 4/1) clay films on faces of peds; few distinct black (10YR 2/1) organic coatings on vertical faces of peds; about 10 percent coarse fragments; neutral; clear wavy boundary.

Btg4—29 to 42 inches; gray (10YR 5/1) loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; few fine roots; few faint gray (10YR 5/1) clay films on faces of peds; about 10 percent coarse fragments; neutral; clear smooth boundary.

BCg—42 to 55 inches; dark gray (10YR 4/1) gravelly sandy loam; weak coarse subangular blocky structure; very friable; about 30 percent coarse fragments; neutral; gradual smooth boundary.

Cg—55 to 60 inches; dark gray (10YR 4/1) very gravelly loamy coarse sand; single grained; loose; about 40 percent coarse fragments; strong effervescence; mildly alkaline.

The thickness of the solum and the depth to calcareous sand and gravel range from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches. The content of coarse fragments ranges from 0 to 3 percent in the Ap horizon, from 0 to 5 percent in the upper part of the Btg horizon, from 5 to 15 percent in the lower part of the Btg horizon, and from 30 to 50 percent in the C horizon.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is typically silty clay loam but is silt loam in some pedons. The Btg horizon has hue of 10YR or 2.5Y and chroma of 1 or 2. The upper part of this horizon is dominantly clay loam, but in some pedons it is loam or silty clay loam. The lower part is dominantly loam or clay loam, but in some pedons it is sandy clay loam. The C horizon has value of 4 or 5 and chroma of 1 to 4. It is the gravelly or very gravelly analogs of loamy coarse sand or coarse sand.

Formation of the Soils

This section relates the factors of soil formation to the soils in Licking County and explains the processes of soil formation.

Factors of Soil Formation

A soil is a three-dimensional natural body consisting of mineral and organic material that can support plant growth. The nature of any soil at a given site is the result of the interaction of five general factors—parent material, climate, plants and animals, relief, and time. Climate and plants and animals have an effect on parent material that is modified by relief over time. Theoretically, if all these factors were identical at different sites, the soils at these sites would be identical. Differences among the soils are caused by variations in one or more of these factors.

Parent Material

Parent material is the raw material acted on by the soil-forming processes. It largely determines soil texture, which, in turn, affects other properties, such as natural soil drainage and permeability. The physical and chemical composition of parent material has an important effect on the kind of soil that forms.

The soils in Licking County formed in many different kinds of parent material. Many of the soils formed in material deposited by the glaciers that covered much of the survey area thousands of years ago or by the meltwater from these glaciers. Other soils formed in loess, or silty windblown material, or in alluvium, which is material recently deposited by streams. In unglaciated areas, the soils formed in material that was either weathered from bedrock in place or moved by gravity. A few soils formed in organic material that resulted from the slow accumulation of plant residue in marshes or ponds over thousands of years.

Glacial till is material that was deposited directly by glacial ice with little or no water action. It typically has particles that vary in size, including sand, silt, clay, and some pebbles, cobblestones, and larger coarse fragments. The smaller coarse fragments generally are angular. The composition of the till depends on the nature of the area over which the ice passed before the till was deposited. Some of the material was transported great distances by the ice, but most of the till was of local origin. Most of the till in the western and west-central parts of the county was deposited during the latest major glaciation, the Wisconsinan Glaciation. Most of the till in the east-central and eastern parts of the county was deposited during an earlier major glaciation, the Illinoian Glaciation.

The glacial till plains in Licking County are either ground moraines or end moraines. The soils that formed in these two types of deposits have different properties, reflecting variations in the method and rate of till deposition.

Till deposits on ground moraines generally are massive, compact, and dense. They make up the nearly level and gently undulating till plains in Licking County. The soils that formed in this kind of till generally are compact and are slowly or moderately slowly permeable. Bennington, Condit, and Pewamo soils typically formed in ground moraine till of Wisconsinan age. Homewood and Titusville soils formed in ground moraine till of Illinoian age.

Till deposits on end moraines can vary more in texture than those on ground moraines. In some areas they are stratified and tend to be less dense. They make up the moderately rolling bands of ridges that trend in a roughly north-south direction through the central part of the county. The soils that formed in this kind of till generally are less compact and more permeable than the soils on ground moraines. Amanda and Centerburg soils typically formed in till of Wisconsinan age on end moraines. Homewood soils and, in some areas, Negley soils formed in till of Illinoian age on end moraines.

Outwash deposits, laid down by moving water, and lacustrine deposits, laid down in still water, are two general kinds of meltwater deposits. The size of the particles that can be carried suspended in water depends on the speed of the moving water. When the water slows to a given speed, the suspended particles that are larger than a given size will settle in the water. Water slows wherever a stream loses grade or flows

into a body of still water. At that time, the coarser sand and gravel particles settle near the mouth of the stream and the silt and fine clay particles are carried farther into the lake, where they slowly settle.

The soils that formed in outwash deposits are of moderate extent in Licking County. They formed in deposits laid down as surging meltwater poured from the glacier, depositing sand and gravel as outwash terraces, deltas, kames, and kame terraces. The meltwater washed away the smaller particles of silt and clay, leaving behind sand and gravel. The soils that formed in outwash generally are permeable. Outwash of both Wisconsinan age and Illinoian age is deposited in Licking County.

The amount of natural lime and the proportion of shale, sandstone, limestone, and igneous pebbles in the glacial outwash are determined by the source of the outwash. The Wisconsinan outwash deposits along the major terraces in Licking County were derived from limestone-influenced glacial drift. Ockley and Westland soils formed in limy glacial outwash of Wisconsinan age. Some Wisconsinan outwash deposits along terraces in the eastern part of the county were derived from drift that was influenced very little by limestone. Chili soils typically formed in the more acid Wisconsinan outwash that was significantly influenced by sandstone and was influenced very little by limestone.

The older Illinoian outwash is deposited at higher elevations than the Wisconsinan outwash. The outwash deposits generally have a mantle of loess. The thickness of the loess on the outwash terraces varies inversely with the slope. The nearly level to sloping Alford soils formed in a thick deposit of loess. The sloping Parke soils formed in thinner deposits of loess, partly because of erosion. The sloping to very steep Negley soils formed in sandy or gravelly deposits in areas where the loess mantle is very thin or does not occur.

Soils that formed in lacustrine deposits are of relatively minor extent throughout Licking County, although they are locally extensive in places. They formed in deposits laid down in scattered old glacial or post-glacial lakes. Fitchville, Glenford, Luray, Mentor, and Sebring soils formed in these silty deposits.

Loess is wind-deposited soil material. Soils that formed in loess are of minor extent throughout Licking County, although they are locally extensive in the east-central and southeastern parts. The loess was deposited as the outwash terraces were forming. Strong winds swept across these open, level terraces, picked up silt particles, and later deposited them, commonly on landforms at higher elevations. Alford and Parke soils formed mainly in loess that was deposited on high Illinoian outwash terraces. In the southeastern part of the county, Alford soils also formed in thick deposits of loess deposited over till or residuum. Cincinnati soils formed in thinner deposits of loess and in Illinoian till.

Soils that formed in colluvium and in material weathered from sedimentary rocks are extensive in the central and eastern parts of the county. Generally, coarse grained sandstone weathers to coarse sand or medium sand, the finer grained sandstone or siltstone weathers to material that ranges from fine sand or very fine sand to silt, and shale weathers to clay. The degree of cementation of individual rock fragments affects the content of coarse fragments in the soils. Brownsville soils formed in material weathered from strongly cemented, fine grained sandstone or siltstone of the Logan Formation. These soils generally have a silty fine-earth texture and a high content of channers.

Some areas in the central part of the county were glaciated, but the glacier had little or no influence on soil morphology, especially on the steeper slopes. Coshocton soils formed in material weathered from interbedded acid shale and siltstone of the Pottsville Formation. Rigley soils formed in material weathered from weakly cemented, coarse grained sandstone of the Pottsville Formation. Hazleton soils generally formed in material weathered from Blackhand Sandstone of the Cuyahoga Formation. In areas on Flint Ridge, Guernsey soils formed in material weathered from limestone-influenced clay shale and Frankstown Variant soils formed in material weathered partly from flint.

Recent alluvium is soil material deposited by floodwater along streams. The texture of the soil material varies, depending on the speed of the floodwater, the duration of flooding, and the distance from the streambank. Soils that formed in recent alluvium can be highly stratified. The soil horizons are weakly expressed because the soil-forming processes are interrupted with each new deposition. The source of the alluvium generally is material eroded from other soils farther upstream in the watershed. Medway, Shoals, Sloan, and Stonelick soils formed in slightly acid to calcareous recent alluvium derived from soils that formed in limy Wisconsinan glacial till and outwash. Orrville and Tioga soils formed in more acid alluvium derived from soils that formed in colluvium and residuum and in Illinoian till and outwash. Algiers, Killbuck, and Wallkill soils formed in recent alluvium over an older dark soil that was buried by the alluvium.

Organic soils formed in decomposed plant material that accumulated under water when ponds were filling with water. Ponds and marshes naturally age as they fill with organic material derived from algae, sedges, rushes, and other water-tolerant plants. The plant residue accumulates because the permanently wet condition of the soils prevents oxidation and slows

decomposition. Freshly exposed organic material commonly has a reddish brown color that rapidly turns black when the material is exposed to the air. Carlisle soils and the lower part of Wallkill soils formed in decomposed plant material.

Climate

The climate in Licking County has significantly affected the soil-forming processes. Climatic factors, such as precipitation and temperature, have influenced the existing plant and animal communities and the physical and chemical weathering of the parent material.

During the colder glacial epoch, the advancing glaciers spread over the glaciated part of the county and buried the boreal forest and the underlying soils. The cold temperatures in the soil reduced the rate of chemical reactions in the existing soils and in the raw parent material *(27)*. Increased frost action, resulting from a periglacial climate, caused frost churning in some soils *(8)*. Strong winds swept across the recently deposited glacial parent material, which was largely devoid of vegetation, and carried away large amounts of silt-sized particles, which were later deposited as loess. When the glacial ice retreated and the climate gradually warmed, deciduous forests eventually succeeded the boreal vegetation. The vegetation of Cranberry Island is a relict of this age.

The county currently has a humid, temperate climate, which has persisted for thousands of years. In this climatic environment, physical and chemical weathering of the parent material can occur along with the accumulation of organic matter, the decomposition of minerals, the formation and translocation of clay, the leaching of soluble compounds, and alternating periods of freezing and thawing.

The microclimate in a given area can affect soil formation. Pewamo soils, which are in depressional or low lying areas, receive runoff from the higher adjacent slopes. The runoff creates a wet microclimate that results in prolonged saturation, the reduction of iron, and a gray subsoil. Sloping soils, such as Amanda soils, formed under a drier microclimate because of runoff. This better external drainage results in better aeration, the oxidation of iron, and a yellowish brown subsoil. Through its effect on the amount of sunlight and heat energy reaching the soil, the trees that grow on the soil, and the accumulation of organic matter in the soil, aspect also affects the microclimate.

Plants and Animals

The vegetation under which a soil forms influences soil properties, such as color, structure, reaction, and content and distribution of organic matter. Vegetation extracts water from the soil, recycles nutrients, and adds organic matter to the soil. Gases derived from root respiration combine with water to form acids that influence the weathering of minerals. Because of a lower content of organic matter, soils that formed under forest vegetation are generally lighter colored than those that formed under grasses.

At the time Licking County was settled, the native vegetation consisted mainly of hardwood forests. Red oak, white oak, sugar maple, and American beech commonly grew on the better drained soils on the Wisconsinan till plains. Pin oak, shagbark hickory, red maple, American elm, and white ash were common on the wetter soils on these till plains. White oak, red oak, hickory, and dogwood were common on the Illinoian till plains and in unglaciated areas. Water-tolerant reeds and sedges, willow, tamarack, and alder grew in scattered small fens or marshes.

Bacteria, fungi, and many other micro-organisms decompose organic matter and release nutrients to growing plants. They influence the formation of peds. Soil properties, such as drainage, temperature, and reaction, influence the type of micro-organisms that live in the soil. Fungi are generally more active in the more acid soils, while bacteria are more active in the less acid soils.

Earthworms, insects, and small burrowing animals mix the soil and create small channels that influence soil aeration and the percolation of water. Earthworms help to incorporate crop residue or other organic material into the soil. The organic material improves tilth. In areas that are well populated with earthworms, the leaf litter that accumulates on the soil in the fall is generally incorporated into the soil by the following spring. If the earthworm population is low, part of the leaf fall can remain on the surface of the soil for several years.

Human activities have significantly influenced soil formation. Native forests have been cleared and developed for farming and other uses. Cultivation has accelerated erosion on sloping soils, wet soils have been drained, and manure, lime, chemical fertilizer, and pesticides have been applied in cultivated areas. Cultivation has affected soil structure and compaction and lowered the content of organic matter. The development of land for urban uses or for mining has significantly influenced the soils in some areas.

Relief

Relief influences soil formation mainly through its effect on runoff and erosion. To a lesser extent, it also influences soil temperature, the plant cover, depth to

the water table, and the accumulation and removal of organic matter.

Because it causes differences in external soil drainage, relief can differentiate soils that formed in the same kind of parent material. Water that runs off the more sloping soils can collect in depressions or swales. Amanda and Pewamo soils both formed in loamy till. The sloping to steep Amanda soils on knolls and side slopes are well drained. They are in areas where external drainage is good. The nearly level Pewamo soils are very poorly drained. They are in swales or depressions that receive runoff from the higher adjacent soils, such as Amanda soils.

Relief varies greatly in Licking County. On the ground moraines in the western part of the county, the soils generally are nearly level to gently undulating. Relief becomes more pronounced in the central part of the county, where undulating to rolling, dissected end moraines grade to the western edge of the Allegheny Plateau. Relief becomes even more pronounced in the eastern part of the county, in the unglaciated section of the Allegheny Plateau, where relief from the ridgetops to the flood plains can be about 250 to 300 feet.

Time

The length of time that the parent material has been exposed to soil-forming processes influences the nature of the soil that forms. The youngest soils in Licking County, such as Melvin, Orrville, Shoals, Stonelick, and Tioga soils, formed in recent alluvium. These soils can be stratified and have weakly expressed horizons because the soil-forming processes are interrupted with each new deposition.

Glaciers advanced over much of Licking County during the Wisconsinan Glaciation and the Illinoian Glaciation, possibly as much as 100,000 years apart. Glacial deposits of Wisconsinan age are geologically young, yet enough time has elapsed for the initially raw parent material to weather into soils that have distinct horizons. In most of the soils, including Amanda, Bennington, and Centerburg soils, carbonates have been leached to a depth of about 3 to 5 feet, clay has been translocated from the A horizon to the B horizon, and organic matter has accumulated in the A horizon.

Glacial deposits of Illinoian age are significantly older than those of Wisconsinan age. The soils that formed in Illinoian glacial drift, such as Cincinnati, Homewood, and Titusville soils, typically are more highly weathered or leached than the soils that formed in Wisconsinan till. Also, they have a thicker solum.

The residuum and some of the colluvium associated with the Allegheny Plateau are among the oldest of the parent materials in the county. Soils that formed in these parent materials have weakly expressed to well expressed horizons, depending on the nature of the parent material. Brownsville soils formed in colluvium and material weathered from resistant siltstone or fine grained sandstone. They have weakly expressed horizons. Coshocton soils formed in colluvium and residuum derived from softer shale and siltstone. They have well expressed horizons.

Processes of Soil Formation

Soil forms through complex processes that are grouped into four general categories. These are additions, removals, transfers, and transformations *(18)*. These processes affect soil formation, although in differing degrees.

The accumulation of organic matter in the A horizon of the mineral soils in Licking County is an example of an addition. This accumulation is the main reason for the dark color of the A horizon. The color of the raw parent material is uniform with increasing depth.

The leaching of lime from the upper 2 to 4 feet or more in many of the soils in Licking County that formed in till is an example of a removal. The parent material of these soils was initially limy, but the lime has been leached from the upper part of the profile by percolating water.

The translocation of clay from the A horizon to the B horizon in many soils on uplands in the county is an example of a transfer. The A horizon or an E horizon is a zone of eluviation, or loss. The B horizon is a zone of illuviation, or gain. In Bennington, Centerburg, and other soils, the B horizon has more clay than the parent material and the A horizon has less clay. In the B horizon of some soils, thin clay films are in pores and on faces of peds. This clay has been transferred from the A horizon.

An example of a tranformation is the reduction and solubilization of ferrous iron. This process takes place under wet, saturated conditions in which there is no molecular oxygen. Gleying, or the reduction of iron, is evident in Condit, Luray, and Pewamo soils, which have a dominantly gray subsoil. The gray color indicates the presence of reduced ferrous iron, which, in turn, implies wetness. Reduced iron is soluble, but it commonly has been moved short distances in the soils in Licking County, stopping either in the horizon where it originated or in an underlying horizon. Part of this iron can be reoxidized and segregated in the form of stains, concretions, or bright yellow and red mottles.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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

less than 45 percent sand, and less than 40 percent silt.

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

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

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

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. The depth of the soil over bedrock. Deep soils are more than 40 inches deep over bedrock; moderately deep soils, 20 to 40 inches; and shallow soils, 10 to 20 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dissected. Cut up by valleys and ravines.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of

natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

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.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam,

sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

North aspects. North- and east-facing slopes, ranging from 355 to 95 degrees azimuth.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Periglacial climate. The climate in areas adjacent to the border of the Pleistocene ice sheet, characterized by low temperatures, many fluctuations above and below the freezing point, and strong winds during certain periods.

Perimeter drain. A drain installed around the perimeter of a septic tank absorption field. The drain lowers the water table. Also called curtain drain.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability,

the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner,

and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slack-water deposits (geologic). Material that was deposited in still water and exposed when the water level was lowered or when the elevation of the land was raised.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the substratum. The living roots and plant and animal activities are largely confined to the solum.

South aspects. South- and west-facing slopes, ranging from 96 to 354 degrees azimuth.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

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

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that

generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

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

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer of a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bar. A shallow trench and a mound of earth constructed at an angle across a road or trail to intercept and divert surface runoff and control erosion.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-81 at Newark, Ohio)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	35.9	18.5	27.2	64	-11	8	2.93	1.55	4.13	8	8.7
February	39.6	20.9	30.3	67	-8	7	2.35	1.10	3.42	6	5.9
March	50.5	29.6	40.1	78	5	32	3.51	1.91	4.91	8	4.5
April	63.6	39.6	51.6	84	20	114	3.99	2.33	5.46	9	.4
May	74.0	48.6	61.3	90	29	359	4.09	2.54	5.48	9	.0
June	82.3	57.2	69.8	95	40	594	4.31	2.57	5.86	8	.0
July	85.4	60.9	73.2	97	45	719	4.25	2.53	5.78	8	.0
August	83.9	59.5	71.7	95	42	673	3.86	1.81	5.61	7	.0
September	77.6	52.5	65.1	94	32	453	3.04	1.48	4.39	6	.0
October	65.8	40.7	53.3	84	21	156	2.44	1.17	3.55	6	.0
November	51.8	32.0	41.9	75	10	11	2.83	1.68	3.84	8	1.3
December	40.1	23.3	31.7	66	-4	10	2.83	1.49	3.99	7	4.7
Yearly:											
Average	62.5	40.3	51.4	---	---	---	---	---	---	---	---
Extreme	---	---	---	98	-13	---	---	---	---	---	---
Total	---	---	---	---	---	3,136	40.43	35.54	45.13	90	25.5

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-81 at Newark, Ohio)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than-----	Apr. 21	May 2	May 20
2 years in 10 later than-----	Apr. 16	Apr. 27	May 14
5 years in 10 later than----	Apr. 6	Apr. 18	May 4
First freezing temperature in fall:			
1 year in 10 earlier than---	Oct. 17	Oct. 3	Sept. 23
2 years in 10 earlier than---	Oct. 22	Oct. 9	Sept. 28
5 years in 10 earlier than---	Nov. 1	Oct. 19	Oct. 8

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-81 at Newark, Ohio)

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	185	162	132
8 years in 10	193	170	141
5 years in 10	209	184	157
2 years in 10	224	198	173
1 year in 10	232	205	182

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

Map symbol	Soil name	Acres	Percent
AfA	Alford silt loam, 0 to 2 percent slopes	610	0.1
AfB	Alford silt loam, 2 to 6 percent slopes	3,105	0.7
AfC2	Alford silt loam, 6 to 12 percent slopes, eroded	705	0.2
AhB	Alford-Urban land complex, 2 to 6 percent slopes	500	0.1
Ak	Algiers silt loam, frequently flooded	2,930	0.7
AmB2	Amanda silt loam, 2 to 6 percent slopes, eroded	3,565	0.8
AmC2	Amanda silt loam, 6 to 12 percent slopes, eroded	12,450	2.8
AmD2	Amanda silt loam, 12 to 18 percent slopes, eroded	9,945	2.3
AmE	Amanda silt loam, 18 to 25 percent slopes	2,415	0.5
AmF	Amanda silt loam, 25 to 50 percent slopes	3,835	0.9
AvC2	Amanda Variant silt loam, 6 to 12 percent slopes, eroded	1,455	0.3
AvD2	Amanda Variant silt loam, 12 to 18 percent slopes, eroded	525	0.1
BeA	Bennington silt loam, 0 to 2 percent slopes	25,265	5.8
BeB	Bennington silt loam, 2 to 6 percent slopes	37,830	8.6
BfA	Bennington-Urban land complex, 0 to 3 percent slopes	1,480	0.3
BgB	Berks channery silt loam, 2 to 6 percent slopes	445	0.1
BgD	Berks channery silt loam, 12 to 18 percent slopes	370	0.1
BrC	Brownsville channery silt loam, 6 to 12 percent slopes	7,065	1.6
BrD	Brownsville channery silt loam, 12 to 18 percent slopes	11,170	2.5
BrE	Brownsville channery silt loam, 18 to 25 percent slopes	22,825	5.2
BrF	Brownsville channery silt loam, 25 to 35 percent slopes	11,030	2.5
BrG	Brownsville channery silt loam, 35 to 70 percent slopes	1,810	0.4
Ca	Carlisle muck	280	0.1
CeB	Centerburg silt loam, 2 to 6 percent slopes	53,035	12.1
CeC2	Centerburg silt loam, 6 to 12 percent slopes, eroded	20,395	4.6
CfB	Centerburg-Urban land complex, 2 to 6 percent slopes	1,245	0.3
CfC	Centerburg-Urban land complex, 6 to 12 percent slopes	420	0.1
ChA	Chili loam, 0 to 2 percent slopes	660	0.1
ChB	Chili loam, 2 to 6 percent slopes	1,225	0.3
ChC2	Chili loam, 6 to 12 percent slopes, eroded	770	0.2
ChD2	Chili loam, 12 to 18 percent slopes, eroded	285	0.1
ChE2	Chili loam, 18 to 25 percent slopes, eroded	370	0.1
CkB	Cincinnati silt loam, 2 to 6 percent slopes	345	0.1
CkC2	Cincinnati silt loam, 6 to 12 percent slopes, eroded	2,025	0.5
CmC2	Clarksburg silt loam, 6 to 12 percent slopes, eroded	1,370	0.3
CmD2	Clarksburg silt loam, 12 to 18 percent slopes, eroded	1,145	0.3
Cn	Condit silt loam	2,590	0.6
CoB	Coshocton silt loam, 2 to 6 percent slopes	880	0.2
CoC2	Coshocton silt loam, 6 to 12 percent slopes, eroded	10,630	2.4
CoD2	Coshocton silt loam, 12 to 18 percent slopes, eroded	13,755	3.1
CoE2	Coshocton silt loam, 18 to 25 percent slopes, eroded	2,455	0.6
CrA	Crane silt loam, 0 to 2 percent slopes	745	0.2
FaD	Fairpoint silty clay loam, 8 to 25 percent slopes	245	0.1
FcA	Fitchville silt loam, 0 to 2 percent slopes	3,755	0.9
FcB	Fitchville silt loam, 2 to 6 percent slopes	220	0.1
FoD2	Fox gravelly loam, 12 to 18 percent slopes, eroded	1,090	0.2
FoE2	Fox gravelly loam, 18 to 25 percent slopes, eroded	535	0.1
FrB	Frankstown Variant-Mertz complex, 2 to 6 percent slopes, very stony	485	0.1
GfA	Glenford silt loam, 0 to 2 percent slopes	1,685	0.4
GfB	Glenford silt loam, 2 to 6 percent slopes	4,225	1.0
GnB	Guernsey silt loam, 2 to 6 percent slopes	330	0.1
GnC2	Guernsey silt loam, 6 to 12 percent slopes, eroded	345	0.1
GnD	Guernsey silt loam, 12 to 18 percent slopes	560	0.1
HeF	Hazleton-Rock outcrop complex, 25 to 70 percent slopes	550	0.1
HkC2	Hickory silt loam, 6 to 12 percent slopes, eroded	490	0.1
HkD2	Hickory silt loam, 12 to 18 percent slopes, eroded	265	0.1
HoB	Homewood silt loam, 2 to 6 percent slopes	2,075	0.5
HoC2	Homewood silt loam, 6 to 12 percent slopes, eroded	7,630	1.7
HoD2	Homewood silt loam, 12 to 18 percent slopes, eroded	5,190	1.2
HoE2	Homewood silt loam, 18 to 25 percent slopes, eroded	660	0.1
KeB	Keene silt loam, 2 to 6 percent slopes	205	*
KeC2	Keene silt loam, 6 to 12 percent slopes, eroded	515	0.1
KeD2	Keene silt loam, 12 to 18 percent slopes, eroded	350	0.1

See footnote at end of table.

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

Map symbol	Soil name	Acres	Percent
Kk	Killbuck silt loam, frequently flooded	1,910	0.4
Lu	Luray silty clay loam	5,165	1.2
McB	Mechanicsburg silt loam, 2 to 6 percent slopes	705	0.2
McC2	Mechanicsburg silt loam, 6 to 12 percent slopes, eroded	1,740	0.4
McD2	Mechanicsburg silt loam, 12 to 18 percent slopes, eroded	2,015	0.5
McE	Mechanicsburg silt loam, 18 to 25 percent slopes	270	0.1
Md	Medway silt loam, occasionally flooded	1,230	0.3
Me	Melvin silt loam, frequently flooded	755	0.2
MnA	Mentor silt loam, 0 to 2 percent slopes	520	0.1
MnB	Mentor silt loam, 2 to 6 percent slopes	3,405	0.8
MnC2	Mentor silt loam, 6 to 12 percent slopes, eroded	4,080	0.9
MnD2	Mentor silt loam, 12 to 18 percent slopes, eroded	370	0.1
MrE	Mertz very cherty silt loam, 18 to 35 percent slopes, very stony	605	0.1
NeC2	Negley loam, 6 to 12 percent slopes, eroded	610	0.1
NeD2	Negley loam, 12 to 18 percent slopes, eroded	2,060	0.5
NeE	Negley loam, 18 to 25 percent slopes	670	0.2
NeF	Negley loam, 25 to 70 percent slopes	570	0.1
OcA	Ockley silt loam, 0 to 2 percent slopes	7,225	1.6
OcB	Ockley silt loam, 2 to 6 percent slopes	6,530	1.5
OcC2	Ockley silt loam, 6 to 12 percent slopes, eroded	1,385	0.3
OeA	Ockley-Urban land complex, 0 to 3 percent slopes	7,115	1.6
OeC	Ockley-Urban land complex, 6 to 12 percent slopes	330	0.1
Or	Orrville silt loam, occasionally flooded	6,965	1.6
PaC2	Parke silt loam, 6 to 12 percent slopes, eroded	2,250	0.5
Pe	Pewamo silty clay loam	31,330	7.1
Pf	Pewamo-Urban land complex	350	0.1
Pg	Pits, gravel	550	0.1
RgC	Rigley fine sandy loam, 6 to 12 percent slopes	1,285	0.3
RgD	Rigley fine sandy loam, 12 to 18 percent slopes	1,555	0.4
RgE	Rigley fine sandy loam, 18 to 25 percent slopes	1,430	0.3
RgF	Rigley fine sandy loam, 25 to 35 percent slopes	860	0.2
RhE	Rigley-Coshocton complex, 18 to 25 percent slopes	1,765	0.4
RsA	Rush silt loam, 0 to 2 percent slopes	975	0.2
Se	Sebring silt loam	1,485	0.3
Sh	Shoals silt loam, occasionally flooded	7,670	1.7
SkA	Sleeth silt loam, 0 to 2 percent slopes	1,480	0.3
So	Sloan silt loam, frequently flooded	3,900	0.9
St	Stonelick loam, occasionally flooded	8,975	2.0
Su	Stonelick-Urban land complex, occasionally flooded	1,010	0.2
Tg	Tioga fine sandy loam, occasionally flooded	1,650	0.4
TsB	Titusville silt loam, 2 to 6 percent slopes	600	0.1
TsC2	Titusville silt loam, 6 to 12 percent slopes, eroded	350	0.1
Uf	Udorthents, loamy	255	0.1
Wa	Wallkill silt loam, clayey substratum, frequently flooded	355	0.1
Ws	Westland silty clay loam	3,195	0.7
Wt	Westland-Urban land complex	315	0.1
	Water	1,796	0.4
	Total	438,976	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
AfA	Alford silt loam, 0 to 2 percent slopes
AfB	Alford silt loam, 2 to 6 percent slopes
Ak	Algiers silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
AmB2	Amanda silt loam, 2 to 6 percent slopes, eroded
BeA	Bennington silt loam, 0 to 2 percent slopes (where drained)
BeB	Bennington silt loam, 2 to 6 percent slopes (where drained)
CeB	Centerburg silt loam, 2 to 6 percent slopes
ChA	Chili loam, 0 to 2 percent slopes
ChB	Chili loam, 2 to 6 percent slopes
CkB	Cincinnati silt loam, 2 to 6 percent slopes
Cn	Condit silt loam (where drained)
CoB	Coshocton silt loam, 2 to 6 percent slopes
CrA	Crane silt loam, 0 to 2 percent slopes (where drained)
FcA	Fitchville silt loam, 0 to 2 percent slopes (where drained)
FcB	Fitchville silt loam, 2 to 6 percent slopes (where drained)
GfA	Glenford silt loam, 0 to 2 percent slopes
GfB	Glenford silt loam, 2 to 6 percent slopes
GnB	Guernsey silt loam, 2 to 6 percent slopes
HoB	Homewood silt loam, 2 to 6 percent slopes
KeB	Keene silt loam, 2 to 6 percent slopes
Kk	Killbuck silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
Lu	Luray silty clay loam (where drained)
McB	Mechanicsburg silt loam, 2 to 6 percent slopes
Md	Medway silt loam, occasionally flooded
Me	Melvin silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
MnA	Mentor silt loam, 0 to 2 percent slopes
MnB	Mentor silt loam, 2 to 6 percent slopes
OcA	Ockley silt loam, 0 to 2 percent slopes
OcB	Ockley silt loam, 2 to 6 percent slopes
Or	Orrville silt loam, occasionally flooded (where drained)
Pe	Pewamo silty clay loam (where drained)
RsA	Rush silt loam, 0 to 2 percent slopes
Se	Sebring silt loam (where drained)
Sh	Shoals silt loam, occasionally flooded (where drained)
SkA	Sleeth silt loam, 0 to 2 percent slopes (where drained)
So	Sloan silt loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
St	Stonelick loam, occasionally flooded
Tg	Tioga fine sandy loam, occasionally flooded
TsB	Titusville silt loam, 2 to 6 percent slopes
Ws	Westland silty clay loam (where drained)

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Timothy-red clover hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
AfA---------- Alford	I	120	42	50	3.8	6.0	7.0
AfB---------- Alford	IIe	115	40	48	3.8	6.0	7.0
AfC2---------- Alford	IIIe	110	38	44	---	6.0	6.4
AhB. Alford-Urban land							
Ak---------- Algiers	IIw	110	35	---	3.8	---	6.0
AmB2---------- Amanda	IIe	105	35	40	3.8	7.0	7.0
AmC2---------- Amanda	IIIe	100	30	35	3.5	6.0	6.4
AmD2---------- Amanda	IVe	85	---	30	3.3	5.8	6.2
AmE---------- Amanda	VIe	---	---	---	---	---	6.0
AmF---------- Amanda	VIIe	---	---	---	---	---	---
AvC2---------- Amanda Variant	IIIe	105	33	38	3.7	6.0	6.4
AvD2---------- Amanda Variant	IVe	90	---	33	3.4	5.8	6.2
BeA---------- Bennington	IIw	110	36	40	4.0	6.0	6.3
BeB---------- Bennington	IIe	105	33	40	4.0	6.0	6.3
BfA. Bennington-Urban land							
BgB---------- Berks	IIe	80	---	32	2.5	3.5	3.7
BgD---------- Berks	IVe	65	---	26	2.0	3.2	3.4
BrC---------- Brownsville	IIIe	80	---	32	3.0	4.5	4.8

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Timothy-red clover hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
BrD---------- Brownsville	IVe	75	---	30	2.5	3.8	4.2
BrE---------- Brownsville	IVe	70	---	25	2.3	3.6	4.0
BrF---------- Brownsville	VIe	---	---	---	---	---	4.0
BrG---------- Brownsville	VIIe	---	---	---	---	---	---
Ca---------- Carlisle	IIIw	120	40	---	---	---	---
CeB---------- Centerburg	IIe	105	35	40	3.8	6.2	6.6
CeC2---------- Centerburg	IIIe	100	30	35	3.5	5.8	6.2
CfB, CfC. Centerburg-Urban land							
ChA---------- Chili	IIs	105	35	40	3.5	6.5	6.9
ChB---------- Chili	IIe	95	33	38	3.4	6.5	6.4
ChC2---------- Chili	IIIe	85	30	32	3.2	6.0	6.0
ChD2---------- Chili	IVe	75	---	28	3.0	5.5	5.5
ChE2---------- Chili	VIe	---	---	---	---	---	4.5
CkB---------- Cincinnati	IIe	105	35	40	3.8	6.0	6.4
CkC2---------- Cincinnati	IIIe	100	30	38	3.5	5.5	5.8
CmC2---------- Clarksburg	IIIe	95	---	---	3.5	5.0	5.3
CmD2---------- Clarksburg	IVe	85	---	---	3.1	4.0	4.2
Cn---------- Condit	IIIw	90	30	32	3.5	---	5.8
CoB---------- Coshocton	IIe	100	---	40	3.6	5.2	5.5
CoC2---------- Coshocton	IIIe	90	---	33	3.2	4.8	5.1

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Timothy-red clover hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
CoD2---------- Coshocton	IVe	80	---	30	3.0	4.0	4.2
CoE2---------- Coshocton	IVe	---	---	---	2.8	---	4.0
CrA---------- Crane	IIw	120	42	50	4.3	6.2	6.6
FaD---------- Fairpoint	IVs	---	---	20	2.0	---	4.5
FcA---------- Fitchville	IIw	110	35	38	4.0	5.8	6.2
FcB---------- Fitchville	IIe	105	33	36	4.0	5.8	6.2
FoD2---------- Fox	IVe	65	---	25	2.9	3.8	4.5
FoE2---------- Fox	VIe	---	---	---	2.5	---	4.0
FrB---------- Frankstown Variant-Mertz	VIs	---	---	---	---	---	---
GfA---------- Glenford	I	115	40	45	3.8	5.8	6.6
GfB---------- Glenford	IIe	110	35	40	3.8	5.8	6.6
GnB---------- Guernsey	IIe	100	---	40	3.8	5.2	5.5
GnC2---------- Guernsey	IIIe	95	---	30	3.5	5.0	5.3
GnD---------- Guernsey	IVe	85	---	25	3.2	4.8	5.1
HeF---------- Hazleton-Rock outcrop	VIIe	---	---	---	---	---	---
HkC2---------- Hickory	IIIe	95	30	35	3.5	6.0	6.4
HkD2---------- Hickory	IVe	85	---	30	3.2	5.8	6.2
HoB---------- Homewood	IIe	100	35	40	3.5	6.0	6.4
HoC2---------- Homewood	IIIe	95	30	35	3.3	5.5	5.8
HoD2---------- Homewood	IVe	85	---	30	3.0	5.0	5.3

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Timothy-red clover hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
HoE2---------- Homewood	VIe	---	---	---	---	---	4.5
KeB---------- Keene	IIe	105	---	40	3.8	6.0	6.4
KeC2---------- Keene	IIIe	95	---	35	3.5	5.5	5.8
KeD2---------- Keene	IVe	90	---	33	3.2	5.0	5.3
Kk---------- Killbuck	IIIw	100	---	---	3.5	---	6.0
Lu---------- Luray	IIw	125	44	50	4.3	---	7.0
McB---------- Mechanicsburg	IIe	105	35	40	3.5	6.0	6.4
McC2---------- Mechanicsburg	IIIe	95	30	36	3.3	5.5	5.8
McD2---------- Mechanicsburg	IVe	80	---	30	3.0	4.5	4.8
McE---------- Mechanicsburg	VIe	---	---	---	---	---	4.5
Md---------- Medway	IIw	120	40	44	4.3	6.5	6.9
Me---------- Melvin	IIIw	85	28	---	3.5	---	6.0
MnA---------- Mentor	I	120	40	45	4.0	6.5	6.9
MnB---------- Mentor	IIe	115	40	45	4.0	6.5	6.9
MnC2---------- Mentor	IIIe	105	35	40	3.7	6.0	6.4
MnD2---------- Mentor	IVe	90	---	36	3.4	5.8	6.2
MrE---------- Mertz	VIIe	---	---	---	---	---	---
NeC2---------- Negley	IIIe	90	28	35	3.2	6.0	6.4
NeD2---------- Negley	IVe	80	---	30	3.0	5.8	6.2

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Timothy-red clover hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
NeE--Negley	VIe	---	---	---	---	---	---
NeF--Negley	VIIe	---	---	---	---	---	---
OcA--Ockley	I	120	42	45	3.8	7.0	7.5
OcB--Ockley	IIe	115	40	45	3.8	7.0	7.5
OcC2--Ockley	IIIe	95	33	38	3.3	6.0	6.2
OeA, OeC. Ockley-Urban land							
Or--Orrville	IIw	100	35	38	3.6	5.5	5.8
PaC2--Parke	IIIe	100	35	40	3.4	6.0	6.4
Pe--Pewamo	IIw	125	44	50	4.3	---	7.2
Pf. Pewamo-Urban land							
Pg. Pits							
RgC--Rigley	IIIe	95	28	38	3.0	4.8	5.1
RgD--Rigley	IVe	80	---	32	2.5	4.2	4.5
RgE--Rigley	VIe	---	---	---	---	---	4.0
RgF--Rigley	VIIe	---	---	---	---	---	---
RhE--Rigley-Coshocton	VIe	---	---	---	---	---	4.5
RsA--Rush	I	125	44	48	4.0	6.8	7.2
Se--Sebring	IIIw	90	30	32	3.5	---	6.0
Sh--Shoals	IIw	110	35	40	3.7	5.8	6.2

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Timothy-red clover hay	Alfalfa hay	Kentucky bluegrass
		Bu	Bu	Bu	Tons	Tons	AUM*
SkA--Sleeth	IIw	110	35	40	4.0	6.0	6.4
So--Sloan	IIIw	110	38	---	4.0	---	6.0
St--Stonelick	IIw	100	28	40	3.5	6.0	6.4
Su. Stonelick-Urban land							
Tg--Tioga	IIw	105	30	40	3.5	6.0	6.2
TsB--Titusville	IIe	100	33	40	3.6	5.5	6.4
TsC2--Titusville	IIIe	95	30	35	3.3	5.0	5.3
Uf. Udorthents							
Wa--Wallkill	IIIw	100	---	---	3.5	---	4.9
Ws--Westland	IIw	130	45	52	4.3	---	7.2
Wt. Westland-Urban land							

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--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	11,015	---	---	---
II	219,740	118,725	100,355	660
III	88,820	77,545	11,275	---
IV	76,175	75,930	---	245
V	---	---	---	---
VI	19,630	19,145	---	485
VII	8,230	8,230	---	---
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

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

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
AfA, AfB, AfC2-- Alford	5A	Slight	Slight	Slight	Slight	White oak Yellow poplar	90 98	72 104	Eastern white pine, red pine, black walnut, yellow poplar, white ash, black locust, black cherry, northern red oak, white oak.
Ak Algiers	4A	Slight	Slight	Slight	Slight	Northern red oak White oak Yellow poplar Green ash Red maple American sycamore American elm	76 --- --- --- --- --- ---	58 --- --- --- --- --- ---	Eastern white pine, yellow poplar, white oak, northern red oak, green ash, American sycamore, eastern cottonwood.
AmB2, AmC2 Amanda	5A	Slight	Slight	Slight	Slight	Northern red oak Yellow poplar White oak Black walnut Black cherry Sugar maple White ash American beech	87 --- --- --- --- --- --- ---	69 --- --- --- --- --- --- ---	Black walnut, white oak, yellow poplar, northern red oak, white ash, eastern white pine, sugar maple.
AmD2, AmE Amanda	5R	Moderate	Moderate	Slight	Slight	Northern red oak Yellow poplar White oak Black walnut Black cherry Sugar maple White ash American beech	87 --- --- --- --- --- --- ---	69 --- --- --- --- --- --- ---	Black walnut, white oak, yellow poplar, northern red oak, white ash, eastern white pine, sugar maple.
AmF Amanda	5R	Severe	Severe	Slight	Slight	Northern red oak Yellow poplar White oak Black walnut Black cherry Sugar maple White ash American beech	87 --- --- --- --- --- --- ---	69 --- --- --- --- --- --- ---	Black walnut, white oak, yellow poplar, northern red oak, white ash, eastern white pine, sugar maple.
AvC2 Amanda Variant	5A	Slight	Slight	Slight	Slight	White oak Northern red oak Sugar maple Black walnut Black cherry White ash Yellow poplar	90 --- --- --- --- --- ---	72 --- --- --- --- --- ---	Northern red oak, white oak, black walnut, yellow poplar, white ash, eastern white pine, sugar maple.

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
AvD2---------- Amanda Variant	5R	Moderate	Moderate	Slight	Slight	White oak----------	90	72	Northern red oak, white oak, black walnut, yellow poplar, white ash, eastern white pine, sugar maple.
						Northern red oak----	---	---	
						Sugar maple---------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						White ash----------	---	---	
						Yellow poplar-------	---	---	
BeA, BeB-------- Bennington	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	62	Eastern white pine, yellow poplar, white ash, northern red oak, white oak, green ash, American sycamore, eastern cottonwood.
						Yellow poplar-------	90	90	
						Red maple----------	---	---	
						American beech------	---	---	
						White oak----------	---	---	
						White ash----------	---	---	
BgB---------- Berks	4F	Slight	Slight	Moderate	Slight	Northern red oak----	70	52	Eastern white pine.
						Black oak----------	70	52	
BgD---------- Berks (north aspect)	4R	Slight	Moderate	Moderate	Slight	Northern red oak----	70	52	Eastern white pine, red pine.
						Black oak----------	70	52	
BgD---------- Berks (south aspect)	3R	Slight	Moderate	Moderate	Slight	Northern red oak----	60	43	Eastern white pine, red pine.
						Black oak----------	60	43	
BrC---------- Brownsville	4F	Slight	Moderate	Moderate	Slight	Northern red oak----	75	57	Eastern white pine, northern red oak, yellow poplar, white ash, black oak, white oak, black cherry.
						Yellow poplar-------	85	81	
						White oak----------	---	---	
						Sugar maple---------	---	---	
BrD, BrE, BrF--- Brownsville (north aspect)	4R	Slight	Moderate	Moderate	Slight	Northern red oak----	75	57	Eastern white pine, yellow poplar, white ash, black oak, white oak, black cherry.
						Yellow poplar-------	85	81	
						White oak----------	---	---	
						Sugar maple---------	---	---	
BrD, BrE, BrF--- Brownsville (south aspect)	3R	Slight	Moderate	Moderate	Slight	Northern red oak----	65	48	Eastern white pine, yellow poplar, black oak, white oak, black cherry.
						Yellow poplar-------	75	62	
						White oak----------	---	---	
						Sugar maple---------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
BrG---------- Brownsville (north aspect)	4R	Moderate	Severe	Moderate	Slight	Northern red oak----	75	57	Eastern white pine, northern red oak, yellow poplar, white ash, black oak, white oak, black cherry.
						Yellow poplar-------	85	81	
						White oak-----------	---	---	
						Sugar maple---------	---	---	
BrG---------- Brownsville (south aspect)	3R	Moderate	Severe	Severe	Slight	Northern red oak----	65	48	Eastern white pine, yellow poplar, white ash, black oak, white oak, black cherry.
						Yellow poplar-------	75	62	
						White oak-----------	---	---	
						Sugar maple---------	---	---	
Ca---------- Carlisle	6W	Slight	Severe	Severe	Severe	Eastern cottonwood--	80	78	Eastern cottonwood, black willow, American sycamore, baldcypress, swamp white oak, silver maple.
						Black willow--------	---	---	
						Black ash-----------	---	---	
						Swamp white oak-----	---	---	
						Red maple-----------	---	---	
						Silver maple--------	---	---	
CeB, CeC2------- Centerburg	5A	Slight	Slight	Slight	Slight	Northern red oak----	89	71	Eastern white pine, northern red oak, yellow poplar, white ash, white oak, green ash, black cherry, black locust, eastern cottonwood, sugar maple.
						White oak-----------	---	---	
						Sugar maple---------	---	---	
						Yellow poplar-------	---	---	
						White ash-----------	---	---	
						Black cherry--------	---	---	
						American beech------	---	---	
ChA, ChB, ChC2-- Chili	4A	Slight	Slight	Slight	Slight	White oak-----------	80	62	Eastern white pine, black walnut, yellow poplar, white ash, northern red oak, white oak, green ash, black cherry, black locust.
						Northern red oak----	85	67	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash-----------	---	---	
						Yellow poplar-------	---	---	

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
ChD2, ChE2---- Chili	4R	Moderate	Moderate	Slight	Slight	White oak	80	62	Eastern white pine, red pine, black walnut, yellow poplar, white ash, northern red oak, white oak, green ash, black cherry, black locust.
						Northern red oak	85	67	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	
CkB, CkC2---- Cincinnati	4A	Slight	Slight	Slight	Slight	Northern red oak	80	62	Eastern white pine, yellow poplar, white ash, northern red oak, white oak, black cherry.
						White oak	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	
CmC2---- Clarksburg	4A	Slight	Slight	Slight	Slight	Northern red oak	75	57	Eastern white pine, yellow poplar, white oak.
						Yellow poplar	85	81	
CmD2---- Clarksburg	4R	Moderate	Moderate	Slight	Slight	Northern red oak	75	57	Eastern white pine, yellow poplar, white oak.
						Yellow poplar	85	81	
Cn---- Condit	5W	Slight	Severe	Severe	Severe	Pin oak	90	72	Pin oak, American sycamore, red maple, eastern cottonwood, sweetgum, baldcypress, swamp white oak.
						Eastern cottonwood	---	---	
						Red maple	---	---	
						Swamp white oak	---	---	
						Black ash	---	---	
CoB, CoC2---- Coshocton	4A	Slight	Slight	Slight	Slight	Northern red oak	80	62	Eastern white pine, yellow poplar, northern red oak, white oak, white ash, black cherry.
						White oak	75	57	
						Yellow poplar	90	90	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	
CoD2, CoE2---- Coshocton (north aspect)	4R	Moderate	Moderate	Slight	Slight	White oak	75	57	Eastern white pine, yellow poplar, northern red oak, white oak, white ash, black cherry.
						Northern red oak	80	62	
						Yellow poplar	90	90	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
CoD2, CoE2----- Coshocton (south aspect)	3R	Moderate	Moderate	Moderate	Slight	White oak----------	65	48	Eastern white pine, yellow poplar, white oak, white ash, black cherry.
						Northern red oak----	80	62	
						Yellow poplar-------	---	---	
						White ash----------	---	---	
						Red maple----------	---	---	
						Black cherry--------	---	---	
FaD---------- Fairpoint	---	---	---	---	---	----------	---	---	Eastern white pine, black locust, yellow poplar.
FcA, FcB-------- Fitchville	5A	Slight	Slight	Slight	Slight	Pin oak----------	90	72	Eastern white pine, white ash, yellow poplar, white oak, northern red oak, American sycamore, eastern cottonwood.
						Northern red oak----	80	62	
						Yellow poplar-------	---	---	
						Red maple----------	---	---	
FoD2, FoE2------ Fox	4R	Moderate	Moderate	Moderate	Slight	Northern red oak----	80	62	White oak, yellow poplar, northern red oak, white ash, eastern white pine, red pine.
						White oak----------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
						Yellow poplar-------	---	---	
FrB: Frankstown Variant-------	4D	Slight	Slight	Slight	Moderate	Northern red oak----	80	62	Eastern white pine, yellow poplar, white oak, white ash, sugar maple, black oak, northern red oak.
						White oak----------	---	---	
						Shagbark hickory----	---	---	
						American beech------	---	---	
						Chestnut oak--------	---	---	
Mertz----------	4F	Slight	Slight	Moderate	Slight	Northern red oak----	80	62	Yellow poplar, eastern white pine, northern red oak, white oak, sugar maple, white ash.
						Yellow poplar-------	90	90	
						White oak----------	---	---	
						White ash----------	---	---	
						American beech------	---	---	
						Sugar maple---------	---	---	

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
GfA, GfB-------- Glenford	5A	Slight	Slight	Slight	Slight	Northern red oak---- Yellow poplar------- White oak----------- White ash----------- Black cherry-------- Sugar maple--------- 	86 96 --- --- --- --- 	68 100 --- --- --- --- 	Eastern white pine, yellow poplar, green ash, white ash, white oak, northern red oak, black cherry, black locust, American sycamore, eastern cottonwood.
GnB, GnC2------- Guernsey	4A	Slight	Slight	Slight	Slight	Northern red oak---- Yellow poplar------- Sugar maple--------- White ash----------- White oak----------- Black cherry-------- 	78 95 --- --- --- --- 	60 98 --- --- --- --- 	Eastern white pine, yellow poplar, green ash, white ash, white oak, northern red oak, black cherry.
GnD------------- Guernsey (north aspect)	4R	Moderate	Moderate	Slight	Slight	Northern red oak---- Yellow poplar------- Sugar maple--------- White ash----------- White oak----------- Black cherry-------- 	78 95 --- --- --- --- 	60 98 --- --- --- --- 	Eastern white pine, yellow poplar, green ash, white ash, white oak, northern red oak, black cherry.
GnD------------- Guernsey (south aspect)	4R	Moderate	Moderate	Moderate	Slight	Northern red oak---- White oak----------- Black cherry-------- Sugar maple--------- White ash----------- Yellow poplar------- 	70 65 --- --- --- --- 	52 48 --- --- --- --- 	White oak, yellow poplar, white ash, northern red oak, eastern white pine, black cherry.
HeF: Hazleton------- (north aspect) Rock outcrop.	4R	Moderate	Severe	Slight	Slight	Northern red oak---- Yellow poplar------- Black oak----------- 	70 80 --- 	52 71 --- 	Eastern white pine, black cherry, red pine, white oak.
HeF: Hazleton------- (south aspect) Rock outcrop.	3R	Moderate	Severe	Severe	Slight	Northern red oak---- Black oak----------- 	60 60 	43 43 	Eastern white pine, black cherry, red pine, white oak.

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
HkC2---------- Hickory	5A	Slight	Slight	Slight	Slight	White oak----------	85	67	Eastern white pine, yellow poplar, sugar maple, white oak, black walnut, northern red oak.
						Northern red oak----	85	67	
						Black oak----------	---	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						Yellow poplar-------	95	98	
HkD2---------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak----------	85	67	Eastern white pine, yellow poplar, sugar maple, white oak, black walnut, northern red oak.
						Northern red oak----	85	67	
						Black oak----------	---	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						Yellow poplar-------	95	98	
HoB, HoC2------- Homewood	5A	Slight	Slight	Slight	Slight	Northern red oak----	93	75	White oak, yellow poplar, white ash, eastern white pine, northern red oak, black cherry, sugar maple.
						White oak----------	---	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
HoD2, HoE2------ Homewood (north aspect)	5R	Moderate	Moderate	Slight	Slight	Northern red oak----	93	75	White oak, yellow poplar, white ash, eastern white pine, northern red oak, black cherry, sugar maple.
						White oak----------	---	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
HoD2, HoE2------ Homewood (south aspect)	5R	Moderate	Moderate	Moderate	Slight	Northern red oak----	84	66	White oak, yellow poplar, white ash, eastern white pine, black cherry, sugar maple.
						White oak----------	---	---	
						American beech------	---	---	
						Sugar maple---------	---	---	
						White ash----------	---	---	
KeB, KeC2------- Keene	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	62	Eastern white pine, yellow poplar, black walnut, white ash, oak, northern red oak, sugar maple.
						White oak----------	75	57	
						Yellow poplar-------	90	90	
						White ash----------	---	---	
						Black walnut--------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	
KeD2---------- Keene	4R	Moderate	Moderate	Slight	Slight	Northern red oak----	80	62	Eastern white pine, yellow poplar, white ash, oak, northern red oak, sugar maple.
						White oak----------	75	57	
						Yellow poplar-------	90	90	
						White ash----------	---	---	
						Black cherry--------	---	---	
						Sugar maple---------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
Kk---------- Killbuck	5W	Slight	Severe	Moderate	Moderate	Pin oak----------	86	68	Red maple,
						Black ash----------	---	---	silver maple,
						Eastern cottonwood--	---	---	American
						Red maple----------	---	---	sycamore,
						Swamp white oak-----	---	---	eastern
									cottonwood,
									pin oak, swamp
									white oak,
									sweetgum,
									baldcypress.
Lu---------- Luray	5W	Slight	Severe	Severe	Severe	Pin oak----------	86	68	Red maple,
						Swamp white oak-----	---	---	silver maple,
						Green ash----------	---	---	American
						Red maple----------	---	---	sycamore,
						Eastern cottonwood--	---	---	eastern
									cottonwood,
									pin oak, swamp
									white oak,
									sweetgum,
									baldcypress.
McB, McC2------- Mechanicsburg	4A	Slight	Slight	Slight	Slight	Northern red oak----	80	62	Eastern white
						White oak----------	75	57	pine, yellow
						Black walnut--------	---	---	poplar, white
						Black cherry--------	---	---	ash, white
						Sugar maple---------	---	---	oak, black
						White ash----------	---	---	walnut, northern
						Yellow poplar-------	---	---	red oak, black
									cherry.
McD2, McE------- Mechanicsburg	4R	Moderate	Moderate	Slight	Slight	Northern red oak----	80	62	Eastern white
						White oak----------	75	57	pine, yellow
						Black walnut--------	---	---	poplar, white
						Black cherry--------	---	---	ash, white
						Sugar maple---------	---	---	oak, northern
						White ash----------	---	---	red oak,
						Yellow poplar-------	---	---	black cherry,
									black walnut.
Md---------- Medway	5A	Slight	Slight	Slight	Slight	Northern red oak----	86	68	Eastern white
						Yellow poplar-------	96	100	pine, yellow
						Sugar maple---------	---	---	poplar, black
						White oak----------	---	---	walnut, green
						Black walnut--------	---	---	ash, northern
						Black cherry--------	---	---	red oak, white
						Green ash----------	---	---	oak, black
									cherry.
Me---------- Melvin	6W	Slight	Severe	Moderate	Moderate	Pin oak----------	100	82	Pin oak,
						Eastern cottonwood--	101	130	American
						Black ash----------	---	---	sycamore,
						Hackberry----------	---	---	sweetgum,
						Hickory----------	---	---	eastern
						Red maple----------	---	---	cottonwood,
						American elm--------	---	---	baldcypress.

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
MnA, MnB, MnC2--Mentor	5A	Slight	Slight	Slight	Slight	Northern red oak	86	68	Eastern white pine, black walnut, yellow poplar, white ash, northern red oak, white oak, black cherry.
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	
MnD2--Mentor	5R	Moderate	Moderate	Slight	Slight	Northern red oak	86	68	Eastern white pine, black walnut, yellow poplar, white ash, northern red oak, white oak, black cherry.
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Yellow poplar	---	---	
MrE--Mertz	4F	Slight	Moderate	Moderate	Slight	Northern red oak	80	62	Yellow poplar, eastern white pine, white oak, black oak.
						Yellow poplar	90	90	
						White oak	---	---	
						American beech	---	---	
						Shagbark hickory	---	---	
NeC2--Negley	5A	Slight	Slight	Slight	Slight	Northern red oak	94	76	Eastern white pine, black walnut, yellow poplar, red pine, white ash, white oak, northern red oak, black cherry, sugar maple.
						Yellow poplar	99	105	
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
NeD2, NeE--Negley	5R	Moderate	Moderate	Slight	Slight	Northern red oak	94	76	Eastern white pine, yellow poplar, white ash, oak, northern red oak, black walnut, black cherry, sugar maple.
						Yellow poplar	99	105	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Black walnut	---	---	
						White oak	---	---	
NeF--Negley	5R	Severe	Severe	Slight	Slight	Northern red oak	94	76	Eastern white pine, yellow poplar, white ash, oak, northern red oak, black cherry, sugar maple, black walnut.
						Yellow poplar	99	105	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						Black walnut	---	---	
						White oak	---	---	

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
OcA, OcB, OcC2--Ockley	5A	Slight	Slight	Slight	Slight	White oak	90	72	Eastern white pine, white ash, yellow poplar, black walnut, white oak, northern red oak, black cherry, sugar maple.
						Northern red oak	90	72	
						Yellow poplar	98	104	
						Sugar maple	---	---	
						Black cherry	---	---	
Or--Orrville	5A	Slight	Slight	Slight	Slight	Pin oak	85	67	Eastern white pine, yellow poplar, green ash, white ash, white oak, northern red oak, American sycamore.
						Northern red oak	80	62	
						Yellow poplar	90	90	
						Red maple	80	50	
						White oak	---	---	
						Green ash	---	---	
PaC2--Parke	5A	Slight	Slight	Slight	Slight	White oak	90	72	Eastern white pine, black walnut, yellow poplar, white ash, northern red oak, green ash, black cherry, eastern cottonwood, white oak, sugar maple.
						Yellow poplar	98	104	
Pe--Pewamo	5W	Slight	Severe	Severe	Severe	Pin oak	90	72	Eastern white pine, red maple, green ash, pin oak, silver maple, American sycamore.
						Swamp white oak	---	---	
						Red maple	71	44	
						Eastern cottonwood	98	123	
						Green ash	---	---	
						American sycamore	---	---	
RgC--Rigley	4A	Slight	Slight	Slight	Slight	White oak	75	57	White oak, northern red oak, yellow poplar, eastern white pine, black cherry, red pine.
						Black oak	78	60	
						Northern red oak	---	---	
						Yellow poplar	94	97	
						American beech	---	---	
						Hickory	---	---	
						Bigtooth aspen	---	---	
						Red maple	---	---	
RgD, RgE, RgF--Rigley (north aspect)	4R	Moderate	Moderate	Slight	Slight	White oak	75	57	White oak, northern red oak, yellow poplar, eastern white pine, black cherry.
						Black oak	78	60	
						Northern red oak	---	---	
						Yellow poplar	94	97	
						American beech	---	---	
						Hickory	---	---	
						Bigtooth aspen	---	---	
						Red maple	---	---	

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
RgD, RgE, RgF---Rigley (south aspect)	3R	Moderate	Moderate	Moderate	Slight	White oak	65	48	Eastern white pine, white oak, black cherry, red pine, black oak.
						Black oak	---	---	
						Hickory	---	---	
						Scarlet oak	---	---	
						American beech	---	---	
						Bigtooth aspen	---	---	
						Red maple	---	---	
RhE:									
Rigley (north aspect)	4R	Moderate	Moderate	Slight	Slight	White oak	75	57	White oak, northern red oak, yellow poplar, eastern white pine, black cherry.
						Black oak	78	60	
						Northern red oak	---	---	
						Yellow poplar	94	97	
						American beech	---	---	
						Hickory	---	---	
						Bigtooth aspen	---	---	
						Red maple	---	---	
Coshocton (north aspect)	4R	Moderate	Moderate	Slight	Slight	White oak	75	57	Eastern white pine, yellow poplar, northern red oak, white oak, white ash.
						Northern red oak	80	62	
						Yellow poplar	90	90	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	
RhE:									
Rigley (south aspect)	3R	Moderate	Moderate	Moderate	Slight	White oak	65	48	Eastern white pine, white oak, black cherry, black oak, red pine.
						Black oak	---	---	
						Hickory	---	---	
						Scarlet oak	---	---	
						American beech	---	---	
						Bigtooth aspen	---	---	
						Red maple	---	---	
Coshocton (south aspect)	3R	Moderate	Moderate	Moderate	Slight	White oak	65	48	Eastern white pine, yellow poplar, white oak, white ash, red pine, black cherry.
						Northern red oak	80	62	
						Yellow poplar	90	90	
						White ash	---	---	
						Red maple	---	---	
						Black cherry	---	---	
RsA---Rush	5A	Slight	Slight	Slight	Slight	White oak	90	72	Eastern white pine, white ash, yellow poplar, black walnut, black locust, white oak, black cherry, sugar maple.
						Northern red oak	90	72	
						Yellow poplar	98	104	

See footnote at end of table.

TABLE 8.--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	Volume*	Trees to plant
Se---Sebring	5W	Slight	Severe	Severe	Severe	Pin oak	90	72	Red maple, pin oak, swamp white oak, white oak, American sycamore, eastern cottonwood, sweetgum, eastern white pine, silver maple.
						Swamp white oak	---	---	
						Red maple	---	---	
						Eastern cottonwood	---	---	
						American sycamore	---	---	
Sh---Shoals	5W	Slight	Moderate	Moderate	Slight	Pin oak	90	72	Sweetgum, red maple, swamp white oak, pin oak, yellow poplar, eastern cottonwood, silver maple.
						Yellow poplar	90	90	
						Eastern cottonwood	---	---	
						White ash	---	---	
						American sycamore	---	---	
						Red maple	---	---	
SkA---Sleeth	5A	Slight	Slight	Slight	Slight	Pin oak	85	67	Eastern white pine, white ash, red maple, yellow poplar, American sycamore, eastern cottonwood, silver maple.
						Yellow poplar	85	81	
						White oak	70	52	
So---Sloan	5W	Slight	Severe	Severe	Severe	Pin oak	86	68	Red maple, green ash, eastern cottonwood, sweetgum, pin oak, swamp white oak, silver maple, American sycamore.
						Swamp white oak	---	---	
						Red maple	---	---	
						Green ash	---	---	
						Eastern cottonwood	---	---	
						American sycamore	---	---	
St---Stonelick	4A	Slight	Slight	Slight	Slight	Northern red oak	80	62	Eastern white pine, black walnut, yellow poplar, white ash, white oak.
						Yellow poplar	95	98	
						White oak	---	---	
						Black cherry	---	---	
						Sugar maple	---	---	
						White ash	---	---	
						American sycamore	---	---	
						Eastern cottonwood	---	---	
Tg---Tioga	4A	Slight	Slight	Slight	Slight	Northern red oak	75	57	Eastern white pine, yellow poplar, black walnut, white ash, green ash.
						Yellow poplar	85	81	
						Sugar maple	67	41	
						American sycamore	---	---	
						Eastern cottonwood	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
TsB, TsC2---- Titusville	5D	Slight	Slight	Moderate	Moderate	Northern red oak----	86	68	Green ash, yellow poplar, white oak, northern red oak, white ash, black cherry.
						Sugar maple----------	85	52	
						White oak----------	---	---	
						White ash----------	---	---	
						Slippery elm--------	---	---	
						American beech------	---	---	
						American sycamore---	---	---	
						Red maple----------	---	---	
Wa---------- Wallkill	4W	Slight	Severe	Severe	Severe	Pin oak----------	70	52	Red maple, American sycamore, swamp white oak, silver maple.
						Red maple----------	65	40	
						American sycamore---	---	---	
						Black willow--------	---	---	
						Swamp white oak-----	---	---	
Ws---------- Westland	5W	Slight	Severe	Severe	Severe	Pin oak----------	85	67	Eastern white pine, baldcypress, sweetgum, red maple, white ash, silver maple, swamp white oak, eastern cottonwood.
						White oak----------	75	57	
						Red maple----------	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
AfA, AfB, AfC2---- Alford	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
AhB: Alford----------	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Urban land.					
Ak---------- Algiers	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
AmB2, AmC2, AmD2, AmE, AmF--------- Amanda	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
AvC2, AvD2-------- Amanda Variant	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
BeA, BeB---------- Bennington	---	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
BfA: Bennington-------	---	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, American cranberrybush.	Austrian pine, green ash, Osageorange.	Eastern white pine, pin oak.	---
Urban land.					

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
BgB, BgD---------- Berks	Siberian peashrub	Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
BrC, BrD, BrE, BrF, BrG--------- Brownsville	Siberian peashrub	Lilac, Amur honeysuckle, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
Ca---------- Carlisle	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
CeB, CeC2--------- Centerburg	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
CfB, CfC: Centerburg-------	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
Urban land.					
ChA, ChB, ChC2, ChD2, ChE2------- Chili	Siberian peashrub	Lilac, Amur honeysuckle, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
CkB, CkC2--------- Cincinnati	---	Eastern redcedar, Washington hawthorn, Amur privet, Amur honeysuckle, arrowwood, American cranberrybush.	Green ash, Austrian pine, Osageorange.	Pin oak, eastern white pine.	---

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
CmC2, CmD2-------- Clarksburg	---	American cranberrybush, Amur honeysuckle, Amur privet, arrowwood, Washington hawthorn, eastern redcedar.	Hackberry, Osageorange, Austrian pine.	Pin oak, eastern white pine.	---
Cn---------- Condit	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
CoB, CoC2, CoD2, CoE2---------- Coshocton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce-----	Pin oak, eastern white pine.
CrA---------- Crane	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
FaD. Fairpoint					
FcA, FcB---------- Fitchville	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Northern white-cedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Pin oak, eastern white pine.
FoD2, FoE2-------- Fox	Siberian peashrub	Lilac, Amur honeysuckle, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
GfA, GfB---------- Glenford	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
GnB, GnC2, GnD---- Guernsey	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
HeF: Hazleton--------- Rock outcrop.	Siberian peashrub	Amur honeysuckle, lilac, autumn olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---
HkC2, HkD2-------- Hickory	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
HoB, HoC2, HoD2, HoE2---------- Homewood	---	American cranberrybush, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
KeB, KeC2, KeD2--- Keene	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern white-cedar, Austrian pine, Washington hawthorn, white fir, blue spruce.	Norway spruce-----	Eastern white pine, pin oak.
Kk---------- Killbuck	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
Lu---------- Luray	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
McB, McC2, McD2, McE---------- Mechanicsburg	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern white-cedar, Osageorange.	Eastern white pine, Norway spruce, red pine.	---
Md---------- Medway	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine.
Me---------- Melvin	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Northern white-cedar, blue spruce, Norway spruce, white fir, Austrian pine, Washington hawthorn.	Eastern white pine	Pin oak.
MnA, MnB, MnC2, MnD2---------- Mentor	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
NeC2, NeD2, NeE, NeF---------- Negley	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
OcA, OcB, OcC2---- Ockley	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
OeA, OeC: Ockley----------	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Urban land.					
Or---------- Orrville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
PaC2--Parke	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
Pe--Pewamo	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
Pf:					
Pewamo	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
Urban land.					
Pg. Pits					
RgC, RgD, RgE, RgF--Rigley	---	American cranberrybush, Amur honeysuckle, Amur privet, Washington hawthorn.	Eastern redcedar, Osageorange, northern white-cedar, Austrian pine.	Red pine, Norway spruce, eastern white pine.	---
RhE:					
Rigley	---	American cranberrybush, Amur honeysuckle, Amur privet, Washington hawthorn.	Eastern redcedar, Osageorange, northern white-cedar, Austrian pine.	Red pine, Norway spruce, eastern white pine.	---
Coshocton	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, blue spruce, Washington hawthorn, Austrian pine, white fir.	Norway spruce	Pin oak, eastern white pine.
RsA--Rush	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
Se---- Sebring	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern white-cedar, Austrian pine, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
Sh---- Shoals	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
SkA---- Sleeth	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
So---- Sloan	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
St---- Stonelick	---	Siberian peashrub	Green ash, eastern redcedar, Osageorange, northern white-cedar, nannyberry viburnum, white spruce, Washington hawthorn.	Black willow------	---
Su: Stonelick--------	---	Siberian peashrub	Green ash, eastern redcedar, Osageorange, northern white-cedar, nannyberry viburnum, white spruce, Washington hawthorn.	Black willow------	---
Urban land.					
Tg---- Tioga	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, northern white-cedar, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
TsB, TsC2--------- Titusville	Tatarian honeysuckle.	Amur honeysuckle, Washington hawthorn, Amur privet, arrowwood, eastern redcedar, American cranberrybush.	Austrian pine, green ash, Osageorange.	Pin oak, eastern white pine.	---
Uf. Udorthents					
Wa---------- Wallkill	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, blue spruce, white fir, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
Ws---------- Westland	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
Wt: Westland--------- Urban land.	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Northern white-cedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 10.--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
AfA Alford	Slight	Slight	Slight	Slight	Slight.
AfB Alford	Slight	Slight	Moderate: slope.	Slight	Slight.
AfC2 Alford	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
AhB: Alford	Slight	Slight	Slight	Slight	Slight.
Urban land.					
Ak Algiers	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: flooding, wetness.	Severe: flooding.
AmB2 Amanda	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
AmC2 Amanda	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
AmD2, AmE Amanda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
AmF Amanda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
AvC2 Amanda Variant	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
AvD2 Amanda Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
BeA, BeB Bennington	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
BfA: Bennington	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
BgB Berks	Severe: small stones.	Severe: small stones.	Severe: small stones.	Slight	Severe: small stones.
BgD Berks	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
BrC---------- Brownsville	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Slight----------	Severe: small stones.
BrD, BrE---------- Brownsville	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Moderate: slope.	Severe: small stones, slope.
BrF, BrG---------- Brownsville	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Ca---------- Carlisle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
CeB---------- Centerburg	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
CeC2---------- Centerburg	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CfB:					
Centerburg----------	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Moderate: wetness.
Urban land.					
CfC:					
Centerburg----------	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Urban land.					
ChA---------- Chili	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Moderate: droughty.
ChB---------- Chili	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Moderate: droughty.
ChC2---------- Chili	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: droughty, slope.
ChD2, ChE2---------- Chili	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
CkB---------- Cincinnati	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----------	Slight.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
CkC2---------- Cincinnati	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
CmC2---------- Clarksburg	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CmD2---------- Clarksburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Cn---------- Condit	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
CoB---------- Coshocton	Moderate: wetness.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Severe: erodes easily.	Moderate: wetness.
CoC2---------- Coshocton	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
CoD2, CoE2---------- Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
CrA---------- Crane	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
FaD---------- Fairpoint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: droughty, slope.
FcA, FcB---------- Fitchville	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
FoD2, FoE2---------- Fox	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
FrB: Frankstown Variant---	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones, thin layer, area reclaim.
Mertz----------	Severe: small stones.	Severe: small stones.	Severe: large stones, small stones.	Slight----------	Severe: small stones.
GfA---------- Glenford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Slight.
GfB---------- Glenford	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Slight.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
GnB Guernsey	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, wetness.	Moderate: wetness.	Slight.
GnC2 Guernsey	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
GnD Guernsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
HeF: Hazleton	Severe: slope.	Severe: slope.	Severe: small stones, slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
HkC2 Hickory	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
HkD2 Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
HoB Homewood	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
HoC2 Homewood	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
HoD2, HoE2 Homewood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
KeB Keene	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
KeC2 Keene	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
KeD2 Keene	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Kk Killbuck	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Lu Luray	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
McB Mechanicsburg	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
McC2---- Mechanicsburg	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
McD2, McE---- Mechanicsburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Md---- Medway	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Moderate: wetness.	Moderate: flooding, wetness.
Me---- Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MnA---- Mentor	Slight----	Slight----	Slight----	Slight----	Slight.
MnB---- Mentor	Slight----	Slight----	Moderate: slope.	Slight----	Slight.
MnC2---- Mentor	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MnD2---- Mentor	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MrE---- Mertz	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: small stones, slope.
NeC2---- Negley	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----	Moderate: slope.
NeD2, NeE---- Negley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
NeF---- Negley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
OcA---- Ockley	Slight----	Slight----	Moderate: small stones.	Slight----	Slight.
OcB---- Ockley	Slight----	Slight----	Moderate: slope, small stones.	Slight----	Slight.
OcC2---- Ockley	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
OeA: Ockley----	Slight----	Slight----	Moderate: small stones.	Slight----	Slight.
Urban land.					
OeC: Ockley----	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Urban land.					

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Or Orrville	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
PaC2 Parke	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Pe Pewamo	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Pf: Pewamo	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Urban land.					
Pg. Pits					
RgC Rigley	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
RgD, RgE Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
RgF Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RhE: Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Coshocton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
RsA Rush	Slight	Slight	Slight	Slight	Slight.
Se Sebring	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Sh Shoals	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
SkA Sleeth	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
So Sloan	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
St Stonelick	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Su: Stonelick	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Su: Urban land.					
Tg Tioga	Severe: flooding.	Slight	Moderate: flooding.	Severe: erodes easily.	Moderate: flooding.
TsB Titusville	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
TsC2 Titusville	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Uf. Udorthents					
Wa Wallkill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Ws Westland	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Wt: Westland	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Urban land.					

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AfA, AfB---------- Alford	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AfC2---------- Alford	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AhB: Alford----------	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
Ak---------- Algiers	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
AmB2---------- Amanda	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AmC2---------- Amanda	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AmD2, AmE---------- Amanda	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
AmF---------- Amanda	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
AvC2---------- Amanda Variant	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
AvD2---------- Amanda Variant	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
BeA---------- Bennington	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
BeB---------- Bennington	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BfA: Bennington--------	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Urban land.										
BgB---------- Berks	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
BgD---------- Berks	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
BrC---------- Brownsville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BrD, BrE---------- Brownsville	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
BrF---------- Brownsville	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
BrG---- Brownsville	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Ca---- Carlisle	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
CeB---- Centerburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CeC2---- Centerburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CfB: Centerburg----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
CfC: Centerburg----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
ChA, ChB---- Chili	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChC2---- Chili	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
ChD2, ChE2---- Chili	Poor	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
CkB---- Cincinnati	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CkC2---- Cincinnati	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CmC2---- Clarksburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CmD2---- Clarksburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Cn---- Condit	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
CoB---- Coshocton	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CoC2---- Coshocton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
CoD2, CoE2---- Coshocton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
CrA---- Crane	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
FaD---------- Fairpoint	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
FcA---------- Fitchville	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
FcB---------- Fitchville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FoD2--------- Fox	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
FoE2--------- Fox	Fair	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
FrB:										
Frankstown Variant	Very poor.	Poor	Good	Good	Good	Poor	Very poor.	Poor	Good	Very poor.
Mertz----------	Very poor.	Poor	Good	Fair	Fair	Poor	Very poor.	Poor	Fair	Very poor.
GfA---------- Glenford	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
GfB---------- Glenford	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GnB---------- Guernsey	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GnC2--------- Guernsey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
GnD---------- Guernsey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HeF:										
Hazleton----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.										
HkC2--------- Hickory	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HkD2--------- Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
HoB---------- Homewood	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HoC2--------- Homewood	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HoD2--------- Homewood	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HoE2--------- Homewood	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
KeB---- Keene	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KeC2---- Keene	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
KeD2---- Keene	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Kk---- Killbuck	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Lu---- Luray	Fair	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
McB---- Mechanicsburg	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
McC2---- Mechanicsburg	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
McD2, McE---- Mechanicsburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Md---- Medway	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Me---- Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MnA, MnB---- Mentor	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MnC2---- Mentor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MnD2---- Mentor	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MrE---- Mertz	Very poor.	Poor	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
NeC2---- Negley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NeD2---- Negley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NeE---- Negley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
NeF---- Negley	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
OcA, OcB---- Ockley	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OcC2---- Ockley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
OeA:										
Ockley	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
OeC:										
Ockley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.										
Or	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Orrville										
PaC2	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Parke										
Pe	Good	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Pewamo										
Pf:										
Pewamo	Good	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good.
Urban land.										
Pg.										
Pits										
RgC	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rigley										
RgD, RgE	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rigley										
RgF	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rigley										
RhE:										
Rigley	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Coshocton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
RsA	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Rush										
Se	Fair	Fair	Good	Good	Good	Good	Good	Fair	Good	Good.
Sebring										
Sh	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Shoals										
SkA	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Sleeth										
So	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
Sloan										

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
St---------- Stonelick	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Su: Stonelick----------	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Urban land.										
Tg---------- Tioga	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TsB---------- Titusville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TsC2---------- Titusville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Uf. Udorthents										
Wa---------- Wallkill	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Ws---------- Westland	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Wt: Westland----------	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Urban land.										

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AfA---------- Alford	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
AfB---------- Alford	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
AfC2---------- Alford	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
AhB: Alford----------	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
Urban land.						
Ak---------- Algiers	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Severe: flooding.
AmB2---------- Amanda	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.
AmC2---------- Amanda	Moderate: dense layer, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
AmD2, AmE, AmF---- Amanda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
AvC2---------- Amanda Variant	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action.	Moderate: slope.
AvD2---------- Amanda Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
BeA, BeB---------- Bennington	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
BfA: Bennington-------	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, low strength.	Moderate: wetness.
Urban land.						

TABLE 12.--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
BgB---- Berks	Moderate: depth to rock.	Slight----	Moderate: depth to rock.	Moderate: slope.	Slight----	Severe: small stones.
BgD---- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
BrC---- Brownsville	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Severe: small stones.
BrD, BrE, BrF, BrG---- Brownsville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Ca---- Carlisle	Severe: excess humus, ponding.	Severe: ponding, low strength, subsides.	Severe: ponding, low strength, subsides.	Severe: ponding, low strength, subsides.	Severe: ponding, frost action, subsides.	Severe: ponding, excess humus.
CeB---- Centerburg	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action.	Moderate: wetness.
CeC2---- Centerburg	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
CfB: Centerburg-------	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: frost action.	Moderate: wetness.
Urban land.						
CfC: Centerburg-------	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
Urban land.						
ChA---- Chili	Severe: cutbanks cave.	Slight----	Slight----	Slight----	Moderate: frost action.	Moderate: droughty.
ChB---- Chili	Severe: cutbanks cave.	Slight----	Slight----	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
ChC2---- Chili	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
ChD2, ChE2-------- Chili	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 12.--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
CkB---------- Cincinnati	Moderate: dense layer, wetness.	Slight---------	Moderate: wetness.	Moderate: slope.	Severe: low strength, frost action.	Slight.
CkC2---------- Cincinnati	Moderate: dense layer, wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
CmC2---------- Clarksburg	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness, slope.	Moderate: wetness, slope.
CmD2---------- Clarksburg	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cn---------- Condit	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
CoB---------- Coshocton	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.
CoC2---------- Coshocton	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
CoD2, CoE2-------- Coshocton	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
CrA---------- Crane	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
FaD---------- Fairpoint	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: droughty, slope.
FcA, FcB---------- Fitchville	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
FoD2, FoE2-------- Fox	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
FrB: Frankstown Variant---------	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock, low strength, frost action.	Moderate: large stones, thin layer, area reclaim.

TABLE 12.--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
FrB: Mertz	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Severe: small stones.
GfA Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
GfB Glenford	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Slight.
GnB Guernsey	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
GnC2 Guernsey	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: slope, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: slope.
GnD Guernsey	Severe: wetness, slope, slippage.	Severe: slope, slippage, shrink-swell.	Severe: wetness, slope, shrink-swell.	Severe: slope, slippage, shrink-swell.	Severe: shrink-swell, low strength, slope.	Severe: slope.
HeF: Hazleton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
HkC2 Hickory	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
HkD2 Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
HoB Homewood	Moderate: dense layer, wetness.	Slight	Moderate: wetness.	Moderate: slope.	Moderate: low strength, frost action.	Slight.
HoC2 Homewood	Moderate: dense layer, wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
HoD2, HoE2 Homewood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
KeB Keene	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength, frost action.	Moderate: wetness.

TABLE 12.--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
KeC2 Keene	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: wetness, slope.
KeD2 Keene	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Kk Killbuck	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.
Lu Luray	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
McB Mechanicsburg	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, shrink-swell.	Slight.
McC2 Mechanicsburg	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, shrink-swell.	Moderate: slope.
McD2, McE Mechanicsburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Md Medway	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action, low strength.	Moderate: flooding, wetness.
Me Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
MnA Mentor	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: low strength, frost action.	Slight.
MnB Mentor	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Severe: low strength, frost action.	Slight.
MnC2 Mentor	Moderate: slope, wetness.	Moderate: slope.	Moderate: slope, wetness.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
MnD2 Mentor	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength, frost action.	Severe: slope.

TABLE 12.--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
MrE---------- Mertz	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
NeC2---------- Negley	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
NeD2, NeE, NeF---- Negley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
OcA---------- Ockley	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
OcB---------- Ockley	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
OcC2---------- Ockley	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
OeA: Ockley----------	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
Urban land.						
OeC: Ockley----------	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
Urban land.						
Or---------- Orrville	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
PaC2---------- Parke	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
Pe---------- Pewamo	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Pf: Pewamo----------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Urban land.						

TABLE 12.--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
Pg. Pits						
RgC---------- Rigley	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
RgD, RgE, RgF----- Rigley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
RhE:						
Rigley----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Coshocton--------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
RsA---------- Rush	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
Se---------- Sebring	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Sh---------- Shoals	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
SkA---------- Sleeth	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
So---------- Sloan	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
St---------- Stonelick	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Su:						
Stonelick--------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Urban land.						
Tg---------- Tioga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
TsB---------- Titusville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
TsC2---------- Titusville	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.

TABLE 12.--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
Uf. Udorthents						
Wa Wallkill	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.
Ws Westland	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
Wt: Westland	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
Urban land.						

TABLE 13.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AfA Alford	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
AfB Alford	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
AfC2 Alford	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AhB: Alford	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
Urban land.					
Ak Algiers	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
AmB2 Amanda	Severe: percs slowly.	Moderate: seepage, slope, wetness.	Moderate: too clayey.	Slight	Fair: too clayey.
AmC2 Amanda	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AmD2, AmE, AmF Amanda	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
AvC2 Amanda Variant	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
AvD2 Amanda Variant	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
BeA Bennington	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
BeB Bennington	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.

TABLE 13.--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
BfA:					
Bennington	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
Urban land.					
BgB--- Berks	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: small stones, area reclaim.
BgD--- Berks	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, small stones, area reclaim.
BrC--- Brownsville	Moderate: depth to rock, percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: small stones.
BrD, BrE, BrF, BrG-- Brownsville	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
Ca--- Carlisle	Severe: ponding, percs slowly, subsides.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
CeB--- Centerburg	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
CeC2--- Centerburg	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
CfB:					
Centerburg	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
Urban land.					
CfC:					
Centerburg	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
Urban land.					
ChA, ChB--- Chili	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones.

TABLE 13.--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
ChC2---------- Chili	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
ChD2, ChE2---------- Chili	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
CkB---------- Cincinnati	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
CkC2---------- Cincinnati	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
CmC2---------- Clarksburg	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: slope, small stones.
CmD2---------- Clarksburg	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
Cn---------- Condit	Severe: percs slowly, ponding.	Severe: ponding.	Severe: too clayey, ponding.	Severe: ponding.	Poor: ponding, too clayey, hard to pack.
CoB---------- Coshocton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Moderate: wetness.	Poor: too clayey, hard to pack.
CoC2---------- Coshocton	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
CoD2, CoE2---------- Coshocton	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
CrA---------- Crane	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
FaD---------- Fairpoint	Severe: percs slowly, slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Poor: small stones, slope.
FcA, FcB---------- Fitchville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 13.--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
FoD2, FoE2---------- Fox	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
FrB:					
Frankstown Variant-	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, thin layer.
Mertz----------	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight----------	Poor: small stones.
GfA, GfB---------- Glenford	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
GnB---------- Guernsey	Severe: wetness, percs slowly.	Moderate: slope.	Severe: seepage, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
GnC2---------- Guernsey	Severe: wetness, percs slowly.	Severe: slope.	Severe: seepage, too clayey.	Moderate: wetness, slope.	Poor: too clayey, hard to pack.
GnD---------- Guernsey	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: seepage, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
HeF:					
Hazleton----------	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope, small stones.
Rock outcrop.					
HkC2---------- Hickory	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
HkD2---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
HoB---------- Homewood	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, small stones.
HoC2---------- Homewood	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
HoD2, HoE2---------- Homewood	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 13.--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
KeB Keene	Severe: wetness, percs slowly.	Severe: wetness.	Severe: seepage, wetness.	Moderate: wetness.	Poor: too clayey, hard to pack, small stones.
KeC2 Keene	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: too clayey, hard to pack, small stones.
KeD2 Keene	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
Kk Killbuck	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Lu Luray	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
McB Mechanicsburg	Moderate: depth to rock, percs slowly.	Severe: seepage.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: seepage, small stones.
McC2 Mechanicsburg	Moderate: depth to rock, percs slowly.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: seepage.	Poor: seepage, small stones.
McD2, McE Mechanicsburg	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
Md Medway	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Fair: wetness.
Me Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MnA Mentor	Moderate: wetness.	Moderate: seepage, wetness.	Severe: wetness.	Moderate: wetness.	Good.
MnB Mentor	Moderate: wetness.	Moderate: slope, seepage, wetness.	Severe: wetness.	Moderate: wetness.	Good.
MnC2 Mentor	Moderate: slope, wetness.	Severe: slope.	Severe: wetness.	Moderate: slope, wetness.	Fair: slope.

TABLE 13.--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
MnD2---------- Mentor	Severe: slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Poor: slope.
MrE---------- Mertz	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
NeC2---------- Negley	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, small stones, slope.
NeD2, NeE, NeF------ Negley	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
OcA, OcB---------- Ockley	Slight----------	Severe: seepage.	Severe: seepage.	Slight----------	Poor: small stones.
OcC2---------- Ockley	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Poor: small stones.
OeA: Ockley----------	Slight----------	Severe: seepage.	Severe: seepage.	Slight----------	Poor: small stones.
Urban land.					
OeC: Ockley----------	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Poor: small stones.
Urban land.					
Or---------- Orrville	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.
PaC2---------- Parke	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Pe---------- Pewamo	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, ponding, hard to pack.
Pf: Pewamo----------	Severe: percs slowly, ponding.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, ponding, hard to pack.
Urban land.					
Pg. Pits					

TABLE 13.--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
RgC---------- Rigley	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: small stones, slope.
RgD, RgE, RgF------- Rigley	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
RhE:					
Rigley----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Coshocton----------	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: seepage, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.
RsA---------- Rush	Slight----------	Moderate: seepage.	Severe: seepage.	Slight----------	Fair: too clayey.
Se---------- Sebring	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Sh---------- Shoals	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
SkA---------- Sleeth	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
So---------- Sloan	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
St---------- Stonelick	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage.
Su:					
Stonelick----------	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Poor: seepage.
Urban land.					
Tg---------- Tioga	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: thin layer.
TsB---------- Titusville	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, small stones.

TABLE 13.--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
TsC2---------- Titusville	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, small stones, slope.
Uf. Udorthents					
Wa---------- Wallkill	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, wetness, excess humus.	Severe: flooding, seepage, wetness.	Poor: wetness, excess humus.
Ws---------- Westland	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
Wt: Westland---------- Urban land.	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AfA, AfB Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
AfC2 Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
AhB: Alford	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Urban land.				
Ak Algiers	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AmB2 Amanda	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
AmC2 Amanda	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
AmD2, AmE Amanda	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AmF Amanda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
AvC2 Amanda Variant	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
AvD2 Amanda Variant	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
BeA, BeB Bennington	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
BfA: Bennington	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land.				
BgB Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
BgD Berks	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
BrC Brownsville	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
BrD, BrE---------- Brownsville	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BrF, BrG---------- Brownsville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Ca---------- Carlisle	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
CeB, CeC2---------- Centerburg	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
CfB, CfC: Centerburg----------	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Urban land.				
ChA, ChB, ChC2-------- Chili	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
ChD2, ChE2---------- Chili	Fair: slope.	Probable----------	Probable----------	Poor: small stones, area reclaim, slope.
CkB---------- Cincinnati	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
CkC2---------- Cincinnati	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
CmC2---------- Clarksburg	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CmD2---------- Clarksburg	Fair: wetness, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Cn---------- Condit	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, thin layer.
CoB, CoC2---------- Coshocton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CoD2, CoE2---------- Coshocton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CrA---------- Crane	Fair: wetness.	Probable----------	Probable----------	Poor: area reclaim.
FaD---------- Fairpoint	Fair: shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
FcA, FcB---------- Fitchville	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
FoD2, FoE2---------- Fox	Fair: slope.	Probable----------	Probable----------	Poor: small stones, area reclaim, slope.
FrB:				
Frankstown Variant---	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Mertz----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
GfA, GfB---------- Glenford	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
GnB, GnC2---------- Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, too clayey.
GnD---------- Guernsey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope, too clayey.
HeF:				
Hazleton----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Rock outcrop.				
HkC2---------- Hickory	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
HkD2---------- Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
HoB---------- Homewood	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HoC2---------- Homewood	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
HoD2, HoE2---------- Homewood	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
KeB, KeC2---------- Keene	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
KeD2---------- Keene	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Kk---------- Killbuck	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Lu---------- Luray	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
McB, McC2---------- Mechanicsburg	Fair: area reclaim.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
McD2, McE---------- Mechanicsburg	Fair: area reclaim, slope.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
Md---------- Medway	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Me---------- Melvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MnA, MnB---------- Mentor	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
MnC2---------- Mentor	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
MnD2---------- Mentor	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MrE---------- Mertz	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
NeC2---------- Negley	Good----------	Probable----------	Probable----------	Poor: small stones.
NeD2, NeE---------- Negley	Fair: slope.	Probable----------	Probable----------	Poor: small stones, slope.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NeF---- Negley	Poor: slope.	Probable	Probable	Poor: small stones, slope.
OcA, OcB, OcC2---- Ockley	Good	Probable	Probable	Poor: small stones, area reclaim.
OeA, OeC: Ockley----	Good	Probable	Probable	Poor: small stones, area reclaim.
Urban land.				
Or---- Orrville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
PaC2---- Parke	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Pe---- Pewamo	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Pf: Pewamo----	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Urban land.				
Pg. Pits				
RgC---- Rigley	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
RgD, RgE---- Rigley	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RgF---- Rigley	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
RhE: Rigley----	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Coshocton----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
RsA---- Rush	Good	Probable	Probable	Poor: area reclaim.
Se---- Sebring	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Sh---------- Shoals	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
SkA---------- Sleeth	Fair: wetness.	Probable----------	Probable----------	Poor: area reclaim.
So---------- Sloan	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
St---------- Stonelick	Good----------	Probable----------	Improbable: too sandy.	Fair: small stones.
Su: Stonelick----------	Good----------	Probable----------	Improbable: too sandy.	Fair: small stones.
Urban land.				
Tg---------- Tioga	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
TsB---------- Titusville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
TsC2---------- Titusville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Uf. Udorthents				
Wa---------- Wallkill	Poor: thin layer, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness.
Ws---------- Westland	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, area reclaim.
Wt: Westland----------	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, area reclaim.
Urban land.				

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
AfA---------- Alford	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
AfB---------- Alford	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
AfC2---------- Alford	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
AhB: Alford----------	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Urban land.						
Ak---------- Algiers	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
AmB2---------- Amanda	Moderate: seepage, slope.	Slight---------	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
AmC2, AmD2, AmE, AmF---------- Amanda	Severe: slope.	Slight---------	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
AvC2, AvD2-------- Amanda Variant	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
BeA---------- Bennington	Slight---------	Moderate: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, erodes easily, percs slowly.	Wetness, percs slowly, erodes easily.
BeB---------- Bennington	Moderate: slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Wetness, erodes easily, percs slowly.	Wetness, percs slowly, erodes easily.
BfA: Bennington-------	Slight---------	Moderate: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, erodes easily, percs slowly.	Wetness, percs slowly, erodes easily.
Urban land.						
BgB---------- Berks	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Area reclaim, large stones.	Droughty, area reclaim, large stones.
BgD---------- Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Area reclaim, slope, large stones.	Droughty, area reclaim, slope.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
BrC, BrD, BrE, BrF, BrG--------- Brownsville	Severe: seepage, slope.	Severe: piping, large stones.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
Ca---------- Carlisle	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.
CeB---------- Centerburg	Moderate: slope.	Slight---------	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CeC2---------- Centerburg	Severe: slope.	Slight---------	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
CfB: Centerburg------- Urban land.	Moderate: slope.	Slight---------	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CfC: Centerburg------- Urban land.	Severe: slope.	Slight---------	Severe: no water.	Frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
ChA, ChB---------- Chili	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Droughty.
ChC2, ChD2, ChE2-- Chili	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope, droughty.
CkB---------- Cincinnati	Moderate: seepage, slope.	Severe: thin layer.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
CkC2---------- Cincinnati	Severe: slope.	Severe: thin layer.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
CmC2, CmD2-------- Clarksburg	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Slope, wetness, erodes easily.	Slope, erodes easily, rooting depth.
Cn---------- Condit	Slight---------	Severe: ponding.	Severe: slow refill.	Percs slowly, frost action, ponding.	Ponding, erodes easily, percs slowly.	Wetness, percs slowly, erodes easily.
CoB---------- Coshocton	Moderate: seepage, slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
CoC2, CoD2, CoE2-- Coshocton	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
CrA---------- Crane	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Wetness--------	Wetness.
FaD---------- Fairpoint	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
FcA---------- Fitchville	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
FcB---------- Fitchville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
FoD2, FoE2-------- Fox	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, erodes easily, too sandy.	Slope, erodes easily.
FrB: Frankstown Variant---------	Moderate: seepage, depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Depth to rock, erodes easily, area reclaim.	Erodes easily, depth to rock, area reclaim.
Mertz----------	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Large stones---	Large stones, droughty.
GfA---------- Glenford	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action---	Erodes easily, wetness.	Erodes easily.
GfB---------- Glenford	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
GnB---------- Guernsey	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Erodes easily	Erodes easily, percs slowly.
GnC2---------- Guernsey	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
GnD---------- Guernsey	Severe: slope, slippage.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope, frost action.	Slope, erodes easily, slippage.	Slope, erodes easily, percs slowly.
HeF: Hazleton---------	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Slope, large stones, too sandy.	Large stones, slope, droughty.
Rock outcrop.						
HkC2, HkD2-------- Hickory	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
HoB---------- Homewood	Moderate: seepage, slope.	Slight---------	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
HoC2, HoD2, HoE2--Homewood	Severe: slope.	Slight	Severe: no water.	Percs slowly, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
KeB--Keene	Moderate: seepage, slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, percs slowly.
KeC2, KeD2--Keene	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
Kk--Killbuck	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Lu--Luray	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Wetness.
McB--Mechanicsburg	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, erodes easily.	Large stones, erodes easily.
McC2, McD2, McE--Mechanicsburg	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
Md--Medway	Severe: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action, flooding.	Wetness	Favorable.
Me--Melvin	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
MnA--Mentor	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
MnB--Mentor	Moderate: seepage, slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily.
MnC2, MnD2--Mentor	Severe: slope.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
MrE--Mertz	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, large stones.	Large stones, slope, droughty.
NeC2, NeD2, NeE, NeF--Negley	Severe: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope	Slope.
OcA, OcB--Ockley	Severe: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
OcC2 Ockley	Severe: seepage, slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
OeA: Ockley	Severe: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Urban land.						
OeC: Ockley	Severe: seepage, slope.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Urban land.						
Or Orrville	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
PaC2 Parke	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Pe Pewamo	Slight	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Wetness.
Pf: Pewamo	Slight	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Wetness.
Urban land.						
Pg. Pits						
RgC, RgD Rigley	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
RgE, RgF Rigley	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
RhE: Rigley	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Coshocton	Severe: slope.	Moderate: thin layer, hard to pack, wetness.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
RsA Rush	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
Se Sebring	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Sh Shoals	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
SkA Sleeth	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action	Wetness	Wetness.
So Sloan	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
St Stonelick	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Favorable.
Su: Stonelick	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy	Favorable.
Urban land.						
Tg Tioga	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily, droughty.
TsB Titusville	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Erodes easily, rooting depth.
TsC2 Titusville	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Uf. Udorthents						
Wa Wallkill	Severe: seepage.	Severe: excess humus, wetness.	Severe: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Ws Westland	Severe: seepage.	Severe: ponding, thin layer.	Severe: cutbanks cave.	Ponding, frost action.	Ponding	Wetness.
Wt: Westland	Severe: seepage.	Severe: ponding, thin layer.	Severe: cutbanks cave.	Ponding, frost action.	Ponding	Wetness.
Urban land.						

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
AfA, AfB---------	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	20-30	5-15
Alford	8-48	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	100	90-100	80-100	25-35	8-15
	48-60	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	90-100	70-100	<25	NP-10
AfC2----------	0-5	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	20-30	5-15
Alford	5-40	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	100	90-100	80-100	25-35	8-15
	40-60	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	90-100	70-100	<25	NP-10
AhB:											
Alford----------	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	20-30	5-15
	8-48	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	100	90-100	80-100	25-35	8-15
	48-60	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	90-100	70-100	<25	NP-10
Urban land.											
Ak----------	0-28	Silt loam--------	ML	A-4	0	100	90-100	80-95	70-85	30-40	4-10
Algiers	28-60	Silty clay loam, silt loam, clay loam.	CL, ML	A-6, A-7, A-4	0	100	90-100	80-95	70-85	30-45	7-19
AmB2, AmC2, AmD2,											
AmE, AmF--------	0-6	Silt loam--------	ML, CL-ML, CL	A-4	0-5	90-100	85-100	75-100	55-90	20-35	3-10
Amanda	6-28	Clay loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	80-100	60-95	25-40	5-18
	28-45	Clay loam, loam	CL, CL-ML, ML	A-4, A-6	0-5	85-100	75-95	70-95	55-75	25-40	3-18
	45-60	Loam, silt loam	ML, CL-ML, CL	A-4	0-5	85-100	75-95	65-95	50-85	20-35	3-10
AvC2, AvD2-------	0-7	Silt loam--------	ML	A-4	0	100	95-100	85-100	70-95	25-35	3-10
Amanda Variant	7-53	Silt loam, silty clay loam.	CL-ML, ML, CL	A-4, A-6	0	95-100	85-100	80-100	65-95	25-40	5-15
	53-60	Clay loam, gravelly loam, silt loam.	CL	A-6	0-2	95-100	70-90	65-90	55-70	25-40	10-20
	60-80	Loam, silt loam	CL, CL-ML	A-6, A-4	0-5	90-100	75-95	70-90	50-70	25-35	5-15
BeA, BeB---------	0-12	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	65-90	22-38	3-14
Bennington	12-29	Silty clay loam, silty clay, clay loam.	CL, CH	A-6, A-7	0-2	85-100	80-100	75-100	70-95	30-52	12-30
	29-80	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-2	80-100	75-100	70-100	60-90	25-40	6-18
BfA:											
Bennington------	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-2	95-100	90-100	85-100	65-90	22-38	3-14
	7-29	Silty clay loam, silty clay, clay loam.	CL, CH	A-6, A-7	0-2	85-100	80-100	75-100	70-95	30-52	12-30
	29-80	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-2	80-100	75-100	70-100	60-90	25-40	6-18

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
BfA:											
Urban land.											
BgB, BgD----------	0-7	Channery silt loam.	GM, ML, GC, SC	A-2, A-4	0-20	50-80	45-70	40-60	30-55	25-36	5-10
Berks	7-15	Channery loam, very channery silt loam, channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-36	5-10
	15-25	Channery loam, very channery silt loam, extremely channery silt loam.	GM, SM	A-1, A-2	0-40	35-65	25-55	20-40	15-35	24-38	2-10
	25-30	Weathered bedrock	---	---	---	---	---	---	---	---	---
BrC, BrD, BrE, BrF, BrG--------	0-6	Channery silt loam.	ML, CL-ML, GM, GM-GC	A-4	0-15	50-80	45-70	40-70	35-60	25-35	5-10
Brownsville	6-41	Channery silt loam, very channery loam, very channery silt loam.	ML, CL-ML, GM, GM-GC	A-1, A-2, A-4	5-40	35-80	30-70	25-70	20-60	25-35	5-10
	41-51	Very channery silt loam, extremely channery loam, very flaggy silt loam.	GM, GP-GM, SM, SP-SM	A-1, A-2, A-4	15-60	25-65	20-55	15-50	10-45	20-35	2-10
	51-53	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ca----------	0-60	Sapric material	PT	A-8	---	---	---	---	---	---	---
Carlisle											
CeB, CeC2--------	0-7	Silt loam--------	ML, CL-ML, CL	A-4	0-5	90-100	85-100	80-100	65-90	20-30	3-10
Centerburg	7-23	Clay loam, silty clay loam, silt loam.	ML, CL, CL-ML	A-6, A-4	0-5	90-100	75-100	70-100	55-90	25-40	5-18
	23-35	Clay loam, loam	ML, CL-ML, CL	A-4, A-6	0-5	85-100	75-95	70-95	55-85	25-40	5-18
	35-80	Loam, silt loam	ML, CL-ML, CL	A-4	0-5	85-100	75-95	65-90	50-80	20-30	3-10
CfB, CfC:											
Centerburg------	0-7	Silt loam--------	ML, CL-ML, CL	A-4	0-5	90-100	85-100	80-100	65-90	20-30	3-10
	7-23	Clay loam, silty clay loam, silt loam.	ML, CL, CL-ML	A-6, A-4	0-5	90-100	75-100	70-100	55-90	25-40	5-18
	23-35	Clay loam, loam	ML, CL-ML, CL	A-4, A-6	0-5	85-100	75-95	70-95	55-85	25-40	5-18
	35-80	Loam, silt loam	ML, CL-ML, CL	A-4	0-5	85-100	75-95	65-90	50-80	20-30	3-10
Urban land.											

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
ChA, ChB--------- Chili	0-10	Loam----------	ML, CL-ML	A-4	0	85-100	75-100	65-85	55-75	25-35	4-10
	10-55	Loam, gravelly sandy clay loam, gravelly sandy loam.	ML, SM, GM, CL	A-4, A-2, A-6, A-1-b	0	65-100	50-80	35-70	20-65	<30	NP-12
	55-60	Stratified gravelly loamy sand to very gravelly sand.	GW, GM, SP, SM	A-1	5-10	30-70	25-65	10-45	2-20	---	NP
ChC2, ChD2, ChE2- Chili	0-6	Loam----------	ML, CL-ML	A-4	0	85-100	75-100	65-85	55-75	25-35	4-10
	6-40	Loam, gravelly sandy clay loam, gravelly sandy loam.	ML, SM, GM, CL	A-4, A-2, A-6, A-1-b	0	65-100	50-80	35-70	20-65	<30	NP-12
	40-50	Very gravelly sandy loam, very gravelly loam, gravelly sandy loam.	SM, GM, GM-GC, SM-SC	A-1, A-2	0-5	45-80	35-75	25-55	15-35	<30	NP-8
	50-60	Stratified gravelly loamy sand to very gravelly sand.	GW, GM, SP, SM	A-1	5-10	30-70	25-65	10-45	2-20	---	NP
CkB, CkC2-------- Cincinnati	0-6	Silt loam--------	ML, CL	A-4, A-6	0	100	95-100	90-100	80-100	25-40	3-16
	6-33	Silty clay loam, silt loam.	CL	A-6, A-4	0	95-100	90-100	85-100	70-100	25-40	8-15
	33-51	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	51-87	Clay loam, loam	CL, ML, CL-ML	A-6, A-4	0	85-100	75-95	70-90	55-80	25-40	5-20
	87-99	Clay loam, loam	CL, CL-ML	A-6, A-4	0	90-100	80-95	70-90	55-80	25-40	5-20
CmC2, CmD2------- Clarksburg	0-6	Silt loam--------	CL, ML	A-4, A-6	0-5	90-100	85-100	75-95	70-90	25-35	2-11
	6-31	Silty clay loam, channery silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-10	80-100	65-100	60-95	55-85	25-45	6-20
	31-52	Silty clay loam, channery silty clay loam, silt loam.	CL-ML, CL, SM-SC, SC	A-4, A-6, A-7	0-15	70-100	55-100	50-95	45-90	20-45	4-20
	52-80	Silt loam, channery silt loam, channery silty clay loam.	CL, CH, SM-SC, GC	A-4, A-6, A-7, A-2	0-20	50-100	20-100	15-95	15-90	20-52	4-25
Cn--------------- Condit	0-11	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-2	95-100	95-100	90-100	80-90	22-40	3-16
	11-38	Silty clay loam, silty clay, clay loam.	CL, CH	A-6, A-7	0-2	95-100	85-100	80-100	70-90	35-55	12-28
	38-80	Clay loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-2	90-100	80-100	70-95	65-85	25-40	6-18

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
CoB, CoC2, CoD2, CoE2---------- Coshocton	0-6	Silt loam--------	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	6-26	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	26-44	Silty clay loam, silty clay, channery silty clay loam.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	44-67	Silty clay loam, silty clay, very channery loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35
	67-69	Weathered bedrock	---	---	---	---	---	---	---	---	---
CrA---------- Crane	0-13	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	95-100	80-100	70-90	20-30	5-15
	13-35	Clay loam, loam, silty clay loam.	CL	A-6	0	95-100	75-100	60-100	60-100	30-40	10-15
	35-55	Gravelly sandy clay loam, gravelly sandy loam.	SC, SM-SC, GC, GM-GC	A-6, A-4, A-2-4, A-2-6	0-5	60-80	55-75	40-70	15-45	20-35	5-15
	55-80	Very gravelly loamy sand, gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-7	50-80	35-75	10-50	2-20	---	NP
FaD---------- Fairpoint	0-6	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	70-95	60-95	35-50	12-24
	6-60	Very gravelly silty clay loam, very shaly silty clay loam.	GC, CL, CL-ML, SC	A-4, A-6, A-7, A-2	15-30	55-75	25-65	20-65	15-60	25-50	4-24
FcA, FcB---------- Fitchville	0-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	24-40	4-16
	10-62	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7	0	100	100	90-100	80-100	28-50	5-23
	62-70	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	60-100	20-40	3-18
FoD2, FoE2------- Fox	0-4	Gravelly loam----	ML, CL, SM, SC	A-4	0-3	75-85	65-75	55-75	40-65	<25	3-8
	4-26	Gravelly loam, gravelly clay loam, gravelly sandy clay loam.	CL, SC, GC	A-2, A-6, A-7	0-5	55-100	55-100	40-100	30-90	25-50	10-25
	26-29	Very gravelly sandy loam, loam, sandy clay loam.	CL, SC	A-2, A-6, A-7	0-5	55-100	55-100	30-95	15-80	25-45	10-25
	29-60	Very gravelly sand, sand.	SP, SM, GP, GM	A-1, A-2, A-3	0-10	30-100	30-100	15-95	2-20	---	NP
FrB: Frankstown Variant--------	0-6	Very stony silt loam.	ML, CL-ML	A-4	5-15	80-100	80-95	75-95	60-80	20-30	3-10
	6-20	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0-10	90-100	80-95	75-95	60-90	20-35	5-15
	20-25	Very cherty silt loam, cherty silty clay loam.	CL, GM-GC, GC, CL-ML	A-2, A-4, A-6	5-20	50-90	35-70	35-70	25-60	25-40	5-15
	25-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
FrB:											
Mertz	0-5	Very stony silt loam.	ML, GM	A-4	5-15	60-95	45-85	45-85	40-75	25-40	4-12
	5-51	Very cherty silt loam, very cherty silty clay loam, extremely cherty silt loam.	ML, CL, GM, GC	A-4, A-6, A-7	5-20	55-95	45-85	45-85	40-75	30-45	7-20
	51-68	Cherty silt loam, very cherty silty clay loam, extremely cherty silt loam.	ML, CL, GC, GM	A-6, A-7	5-20	55-80	30-75	30-70	25-55	30-45	10-20
GfA, GfB	0-8	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	80-100	25-40	4-14
Glenford	8-39	Silty clay loam, silt loam.	CL, CL-ML, ML	A-6, A-7, A-4	0	100	100	95-100	80-100	25-45	5-18
	39-52	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-4	0	100	95-100	90-100	75-100	20-40	3-18
	52-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	85-100	70-100	20-40	3-15
GnB, GnC2, GnD	0-11	Silt loam	ML, CL-ML, CL	A-4, A-6	0-2	90-100	80-100	75-100	70-90	25-40	4-14
Guernsey	11-16	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7, A-6	0-2	90-100	80-100	75-100	70-100	30-55	10-30
	16-51	Silty clay, shaly silty clay loam, silty clay loam.	CH, CL, ML, MH	A-7	0-10	75-100	65-100	60-100	55-100	45-65	15-35
	51-71	Silty clay loam, silty clay, shaly silty clay loam.	CH, MH, ML, CL	A-7	0-20	70-100	60-90	55-90	55-90	40-70	15-40
	71-73	Weathered bedrock	---	---	---	---	---	---	---	---	---
HeF:											
Hazleton	0-5	Channery sandy loam.	ML, GM, SM	A-2, A-4	0-15	60-85	60-80	60-75	35-55	---	---
	5-27	Channery sandy loam, very channery sandy loam.	GM, SM, ML, SC	A-2, A-4, A-1	0-50	60-95	45-90	35-70	20-55	<30	NP-8
	27-54	Extremely channery sandy loam, very channery sandy loam, very channery loamy sand.	GM, SM, SC, GC	A-2, A-1, A-4	0-60	55-80	35-75	25-65	15-50	<30	NP-8
	54-56	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
HkC2, HkD2	0-7	Silt loam	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
Hickory	7-35	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0-5	95-100	75-100	70-95	65-80	30-50	15-30
	35-80	Loam, clay loam	CL-ML, CL	A-4, A-6	0-5	85-100	75-95	70-95	60-80	20-40	5-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HoB---------- Homewood	0-9	Silt loam--------	ML	A-4	0	95-100	90-100	85-100	75-100	25-35	NP-10
	9-24	Loam, silty clay loam, clay loam.	ML, CL	A-4, A-6	0-2	90-100	85-100	75-100	55-80	30-40	5-15
	24-51	Loam, clay loam	CL-ML, CL, ML	A-4, A-6	0-5	70-100	75-95	65-90	55-80	25-40	5-15
	51-80	Loam, clay loam	CL, CL-ML	A-4, A-6	0-10	70-100	75-95	60-90	50-80	20-35	5-15
HoC2, HoD2, HoE2- Homewood	0-6	Silt loam--------	ML	A-4	0	95-100	90-100	85-100	75-100	25-35	NP-10
	6-30	Loam, silty clay loam, clay loam.	ML, CL	A-4, A-6	0-2	90-100	85-100	75-100	55-80	30-40	5-15
	30-52	Loam, clay loam	CL-ML, CL, ML	A-4, A-6	0-5	70-100	75-95	65-90	55-80	25-40	5-15
	52-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0-10	70-100	75-95	60-90	50-80	20-35	5-15
KeB, KeC2, KeD2-- Keene	0-7	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	95-100	90-100	85-100	70-90	25-36	4-12
	7-21	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	95-100	90-100	85-100	75-95	25-40	6-18
	21-60	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0-5	95-100	75-95	70-95	65-90	35-55	20-35
	60-76	Shaly silty clay loam, shaly silty clay, silty clay loam.	CL, CH	A-6, A-7	5-20	65-95	55-95	55-85	50-80	30-55	16-35
	76-78	Weathered bedrock	---	---	---	---	---	---	---	---	---
Kk---------- Killbuck	0-6	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	90-100	65-90	25-35	4-10
	6-20	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-95	25-40	4-15
	20-28	Silty clay loam, silt loam.	CL	A-6, A-7	0	90-100	85-100	80-100	70-95	30-50	12-30
	28-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	90-100	85-100	80-100	70-95	25-45	11-28
Lu---------- Luray	0-12	Silty clay loam	CL, CH, MH, ML	A-6, A-7	0	100	100	95-100	85-95	35-55	10-25
	12-40	Silty clay loam, silt loam.	CL, CH, MH, ML	A-6, A-7	0	100	100	95-100	80-95	35-60	15-30
	40-60	Stratified fine sandy loam to silty clay loam.	CL, ML, CL-ML	A-6, A-4, A-7	0	100	95-100	80-100	55-100	25-50	5-20
McB, McC2, McD2, McE---------- Mechanicsburg	0-7	Silt loam--------	ML, CL, CL-ML	A-4, A-6	0-2	90-100	85-100	80-100	60-90	20-35	2-12
	7-29	Loam, silt loam, silty clay loam.	CL, CL-ML, ML	A-4, A-6, A-7	0-5	75-100	65-100	60-95	50-90	25-45	6-20
	29-35	Very channery silt loam, channery loam, channery silty clay loam.	ML, GM, CL-ML, SM	A-4, A-2	5-40	50-100	35-95	30-90	25-85	20-35	NP-10
	35-60	Channery loam, very channery silt loam, extremely channery silt loam.	SM, GM, GP-GM, SP-SM	A-1, A-2	30-60	35-60	10-50	6-45	3-35	<30	NP-8
	60-62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Md Medway	0-16	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	70-80	20-40	3-15
	16-30	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	80-95	75-90	70-90	20-45	4-20
	30-47	Stratified sandy loam to silty clay loam.	ML, CL, SM-SC, SM	A-4, A-2, A-6	0	90-100	75-100	45-95	25-75	15-30	NP-15
	47-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL, SM, SC	A-2, A-4, A-6, A-1-b	0-5	65-100	50-100	30-95	15-75	15-30	NP-15
Me Melvin	0-9	Silt loam	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	9-24	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-95	25-40	5-20
	24-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-95	25-40	5-20
MnA, MnB Mentor	0-9	Silt loam	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-90	20-35	3-14
	9-48	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-95	20-40	4-18
	48-60	Stratified silty clay loam to sandy loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	90-100	80-95	45-85	20-40	2-15
MnC2, MnD2 Mentor	0-6	Silt loam	ML, CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	70-90	20-35	3-14
	6-45	Silty clay loam, silt loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	90-100	80-95	20-40	4-18
	45-60	Stratified silty clay loam to sandy loam.	ML, CL, SM, SC	A-4, A-6	0	90-100	90-100	80-95	45-85	20-40	2-15
MrE Mertz	0-5	Very stony silt loam.	ML, GM	A-4	5-15	60-95	45-85	45-85	40-75	25-40	4-12
	5-37	Very cherty silt loam, very cherty silty clay loam, extremely cherty silt loam.	ML, CL, GM, GC	A-4, A-6, A-7	5-20	55-95	45-85	45-85	40-75	30-45	7-20
	37-60	Cherty silt loam, very cherty silty clay loam, extremely cherty silt loam.	ML, CL, GC, GM	A-6, A-7	5-20	55-80	30-75	30-70	25-55	30-45	10-20
NeC2, NeD2, NeE, NeF Negley	0-6	Loam	ML, CL-ML, CL	A-4, A-6	0	85-100	75-100	70-90	55-85	25-40	4-15
	6-20	Loam, clay loam, gravelly clay loam.	SM, ML	A-4, A-2, A-6, A-7	0-5	70-95	50-90	35-80	20-60	25-45	3-17
	20-80	Gravelly clay loam, sandy clay loam, clay loam.	SM-SC, SC	A-2, A-4, A-7, A-6	0-5	70-95	50-90	40-80	25-50	20-50	5-24

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
OcA, OcB---------- Ockley	0-10	Silt loam--------	CL, ML, CL-ML	A-4	0	95-100	85-100	70-100	50-90	15-30	3-10
	10-19	Silty clay loam, silt loam.	CL	A-6, A-4	0	90-100	80-100	70-90	55-90	25-40	8-15
	19-56	Clay loam, gravelly clay loam, sandy clay loam.	CL, SC	A-6, A-4, A-2	0-2	70-85	45-85	40-70	25-55	25-40	8-15
	56-80	Stratified sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	10-40	2-10	---	NP
OcC2---------- Ockley	0-6	Silt loam--------	CL, ML, CL-ML	A-4	0	95-100	85-100	70-100	50-90	15-30	3-10
	6-50	Clay loam, gravelly clay loam, sandy clay loam.	CL, SC	A-6, A-4, A-2	0-2	70-85	45-85	40-70	25-55	25-40	8-15
	50-60	Stratified sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	10-40	2-10	---	NP
OeA: Ockley----------	0-10	Silt loam--------	CL, ML, CL-ML	A-4	0	95-100	85-100	70-100	50-90	15-30	3-10
	10-19	Silty clay loam, silt loam.	CL	A-6, A-4	0	90-100	80-100	70-90	55-90	25-40	8-15
	19-56	Clay loam, gravelly clay loam, sandy clay loam.	CL, SC	A-6, A-4, A-2	0-2	70-85	45-85	40-70	25-55	25-40	8-15
	56-80	Stratified sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	10-40	2-10	---	NP
Urban land.											
OeC: Ockley----------	0-6	Silt loam--------	CL, ML, CL-ML	A-4	0	95-100	85-100	70-100	50-90	15-30	3-10
	6-50	Clay loam, gravelly clay loam, sandy clay loam.	CL, SC	A-6, A-4, A-2	0-2	70-85	45-85	40-70	25-55	25-40	8-15
	50-60	Stratified sand to very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	10-40	2-10	---	NP
Urban land.											
Or---------- Orrville	0-7	Silt loam--------	ML, CL-ML, CL	A-4	0	100	90-100	85-100	60-80	20-35	3-10
	7-37	Silt loam, loam, sandy loam.	CL, CL-ML, ML	A-4, A-6	0-2	95-100	75-100	70-95	50-90	20-40	2-16
	37-60	Stratified gravelly loamy sand to silt loam.	ML, CL, SM, SC	A-4, A-2, A-1	0-2	95-100	65-100	40-85	15-75	15-35	NP-10

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
PaC2----------	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	90-100	70-100	20-35	7-15
Parke	7-35	Silty clay loam, silt loam.	CL	A-6, A-4	0	95-100	95-100	90-100	80-100	25-40	7-15
	35-60	Sandy clay loam, loam, gravelly sandy loam.	SC, CL	A-2, A-6, A-4	0-3	90-100	80-95	55-90	30-60	25-35	7-15
Pe----------	0-12	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	80-100	70-95	35-50	15-25
Pewamo	12-60	Clay loam, silty clay loam, silty clay.	CL, CH	A-7, A-6	0-5	95-100	90-100	90-100	75-95	35-55	15-30
Pf:											
Pewamo----------	0-12	Silty clay loam	CL	A-6, A-7	0-5	90-100	80-100	80-100	70-95	35-50	15-25
	12-60	Clay loam, silty clay loam, silty clay.	CL, CH	A-7, A-6	0-5	95-100	90-100	90-100	75-95	35-55	15-30
Urban land.											
Pg.											
Pits											
RgC, RgD, RgE, RgF----------	0-8	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0-10	80-95	75-90	55-80	25-65	<30	NP-7
Rigley	8-50	Channery sandy loam, channery loam, sandy loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	50-70	Channery sandy loam, very channery sandy loam, channery loamy sand.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
RhE:											
Rigley----------	0-8	Fine sandy loam	SM, ML, SM-SC, CL-ML	A-2, A-4	0-10	80-95	75-90	55-80	25-65	<30	NP-7
	8-50	Channery sandy loam, channery loam, sandy loam.	SM, ML, GM, GM-GC	A-2, A-4, A-1	0-10	65-95	60-90	40-75	20-60	<30	NP-7
	50-70	Channery sandy loam, very channery sandy loam, channery loamy sand.	GM, GC, SM, SC	A-2, A-1, A-4, A-6	0-20	55-80	45-70	30-60	15-50	<35	NP-15
Coshocton-------	0-6	Silt loam--------	ML, CL-ML	A-4, A-6	0-5	85-100	80-100	70-95	60-90	25-40	4-12
	6-26	Silt loam, silty clay loam, clay loam.	CL, CL-ML	A-6, A-4	0-5	85-100	80-100	70-95	60-90	25-40	6-18
	26-44	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0-10	70-100	60-95	55-90	50-85	35-55	20-35
	44-67	Silty clay loam, silty clay, very channery loam.	CL, CH, GC, SC	A-7, A-6, A-2	0-20	40-100	30-95	30-85	30-80	30-55	16-35
	67-69	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
RsA---------- Rush	0-10	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	20-30	5-15
	10-38	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	70-100	30-40	10-20
	38-57	Gravelly clay loam, gravelly sandy clay loam.	CL-ML, CL, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	1-5	65-80	55-75	40-75	15-60	25-35	5-15
	57-68	Very gravelly sandy clay loam.	SM-SC, SC, SP-SC, GC	A-2-4, A-2-6, A-4, A-6	1-5	65-85	25-65	25-65	10-50	20-30	5-15
	68-80	Stratified loamy sand to extremely gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	5-45	2-15	---	NP
Se---------- Sebring	0-8	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	95-100	85-95	20-35	3-10
	8-37	Silty clay loam, silt loam.	CL, ML	A-4, A-6, A-7	0	100	95-100	90-100	80-100	30-50	7-22
	37-50	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	100	95-100	90-100	80-100	30-50	7-22
	50-80	Stratified sandy loam to silty clay loam.	ML, CL, CL-ML, SC	A-2, A-4, A-6, A-7	0	90-100	85-100	55-100	30-95	20-45	3-20
Sh---------- Shoals	0-13	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-90	20-35	6-15
	13-47	Silt loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-85	25-40	5-15
	47-60	Stratified silt loam to gravelly sandy loam.	ML, CL, CL-ML, SM	A-4	0-3	80-100	70-100	45-80	35-70	<30	4-10
SkA---------- Sleeth	0-12	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	90-100	75-95	50-85	20-35	3-15
	12-24	Clay loam, silty clay loam, loam.	CL	A-6	0	85-95	85-95	80-90	65-75	30-40	15-25
	24-55	Gravelly clay loam, gravelly sandy clay loam, gravelly loam.	CL	A-6	0-3	65-95	60-85	55-70	50-70	30-40	15-25
	55-60	Stratified sand to gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP
So---------- Sloan	0-14	Silt loam--------	CL, ML, CL-ML	A-6, A-4	0	100	95-100	85-100	70-95	20-40	3-15
	14-36	Silty clay loam, clay loam, loam.	CL, ML	A-6, A-7, A-4	0	100	90-100	85-100	75-95	30-45	8-18
	36-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL	A-4, A-6	0	95-100	70-100	60-95	50-90	25-40	3-15
St---------- Stonelick	0-14	Loam----------	ML, CL, SM, CL-ML	A-4	0	85-100	75-100	60-95	45-90	20-32	2-10
	14-60	Stratified silt loam to gravelly loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1-b	0	85-100	75-100	40-60	5-40	<15	NP

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Su:											
Stonelick	0-14	Loam	ML, CL, SM, CL-ML	A-4	0	85-100	75-100	60-95	45-90	20-32	2-10
	14-60	Stratified silt loam to gravelly loamy sand.	SM, SP-SM	A-2, A-4, A-3, A-1-b	0	85-100	75-100	40-60	5-40	<15	NP
Urban land.											
Tg	0-8	Fine sandy loam	ML, SM	A-4	0	100	95-100	65-95	40-85	<15	NP-4
Tioga	8-23	Silt loam, gravelly loam, fine sandy loam.	SM, GM, ML	A-1, A-2, A-4	0	55-100	50-100	35-90	20-80	<15	NP-2
	23-60	Sandy loam, gravelly loam, very gravelly loamy sand.	GW-GM, GM, SM, ML	A-1, A-2, A-4, A-3	0-10	35-100	30-100	15-90	5-80	<15	NP-2
TsB, TsC2	0-9	Silt loam	ML, CL, CL-ML	A-4	0-1	95-100	95-100	80-95	75-90	20-35	2-10
Titusville	9-28	Loam, silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7	0-2	95-100	95-100	80-95	70-85	30-45	8-20
	28-48	Loam, clay loam, gravelly loam.	CL, CL-ML	A-6, A-4	0-5	75-100	70-95	65-80	55-70	20-35	6-18
	48-54	Loam, silt loam, gravelly loam.	CL, CL-ML	A-4, A-6	0-5	75-100	70-95	65-80	55-75	20-35	5-15
	54-80	Loam, clay loam, gravelly loam.	CL, CL-ML, GC, SC	A-4, A-6	0-5	60-100	50-95	45-80	35-70	20-35	4-15
Uf.											
Udorthents											
Wa	0-24	Silt loam	CL	A-4, A-6	0	100	95-100	90-100	80-95	24-34	8-15
Wallkill	24-42	Sapric material	PT	A-8	0	---	---	---	---	---	---
	42-80	Clay	CL, CH	A-7	0	100	95-100	90-100	85-95	40-55	20-30
Ws	0-15	Silty clay loam	CL	A-6	0	100	100	75-100	55-90	30-40	11-16
Westland	15-42	Clay loam, loam, silty clay loam.	CL, SC	A-6, A-4	0	85-100	85-100	50-100	40-80	25-40	8-16
	42-55	Gravelly sandy clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6	0-3	70-95	70-95	50-70	40-70	<35	NP-15
	55-60	Gravelly coarse sand, very gravelly loamy coarse sand, very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-5	40-80	35-80	10-40	1-10	---	NP-3

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	> 3 inches	4	10	40	200		
	In				Pct					Pct	
Wt:											
Westland--------	0-15	Silty clay loam	CL	A-6	0	100	100	75-100	55-90	30-40	11-16
	15-42	Clay loam, loam, silty clay loam.	CL, SC	A-6, A-4	0	85-100	85-100	50-100	40-80	25-40	8-16
	42-55	Gravelly sandy clay loam, sandy loam, gravelly sandy loam.	SM, SC, ML, CL	A-4, A-6	0-3	70-95	70-95	50-70	40-70	<35	NP-15
	55-60	Gravelly coarse sand, very gravelly loamy coarse sand, very gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-5	40-80	35-80	10-40	1-10	---	NP-3
Urban land.											

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
AfA, AfB	0-8	12-26	1.25-1.40	0.6-2.0	0.22-0.24	3.6-7.3	Low	0.37	5	5	.5-2
Alford	8-48	22-30	1.35-1.50	0.6-2.0	0.18-0.20	3.6-6.0	Moderate	0.37			
	48-60	8-20	1.30-1.45	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37			
AfC2	0-5	12-26	1.25-1.40	0.6-2.0	0.22-0.24	3.6-7.3	Low	0.37	5	5	.5-2
Alford	5-40	22-30	1.35-1.50	0.6-2.0	0.18-0.20	3.6-6.0	Moderate	0.37			
	40-60	8-20	1.30-1.45	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37			
AhB:											
Alford	0-8	12-26	1.25-1.40	0.6-2.0	0.22-0.24	3.6-7.3	Low	0.37	5	5	.5-2
	8-48	22-30	1.35-1.50	0.6-2.0	0.18-0.20	3.6-6.0	Moderate	0.37			
	48-60	8-20	1.30-1.45	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37			
Urban land.											
Ak	0-28	15-27	1.20-1.45	0.6-2.0	0.16-0.20	6.1-7.3	Low	0.37	5	6	2-4
Algiers	28-60	20-35	1.25-1.65	0.6-2.0	0.16-0.20	6.1-7.8	Low	0.37			
AmB2, AmC2, AmD2,											
AmE, AmF	0-6	12-27	1.25-1.45	0.6-2.0	0.18-0.24	5.1-7.3	Low	0.37	5	6	1-3
Amanda	6-28	23-35	1.45-1.65	0.6-2.0	0.15-0.20	4.5-5.5	Moderate	0.37			
	28-45	23-35	1.45-1.70	0.2-0.6	0.13-0.19	5.6-7.8	Moderate	0.37			
	45-60	15-25	1.50-1.85	0.2-0.6	0.08-0.12	7.4-8.4	Low	0.37			
AvC2, AvD2	0-7	15-20	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5	5	.5-2
Amanda Variant	7-53	18-30	1.35-1.50	0.6-2.0	0.18-0.20	4.5-6.0	Moderate	0.37			
	53-60	25-35	1.45-1.70	0.6-2.0	0.12-0.19	5.1-6.5	Moderate	0.37			
	60-80	20-27	1.55-1.85	0.2-0.6	0.09-0.13	6.1-7.8	Low	0.37			
BeA, BeB	0-12	15-25	1.30-1.50	0.6-2.0	0.17-0.21	4.5-7.3	Low	0.43	3	6	2-4
Bennington	12-29	35-42	1.40-1.70	0.06-0.6	0.10-0.17	4.5-7.8	Moderate	0.32			
	29-80	24-33	1.65-1.82	0.06-0.2	0.07-0.12	7.4-8.4	Low	0.32			
BfA:											
Bennington	0-7	15-25	1.30-1.50	0.6-2.0	0.17-0.21	4.5-7.3	Low	0.43	3	6	2-4
	7-29	35-42	1.40-1.70	0.06-0.6	0.10-0.17	4.5-7.8	Moderate	0.32			
	29-80	24-33	1.65-1.82	0.06-0.2	0.07-0.12	7.4-8.4	Low	0.32			
Urban land.											
BgB, BgD	0-7	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low	0.17	3	8	.5-3
Berks	7-15	5-32	1.20-1.60	0.6-6.0	0.04-0.10	3.6-6.5	Low	0.17			
	15-25	5-20	1.20-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low	0.17			
	25-30	---	---	---	---	---	---	---			
BrC, BrD, BrE,											
BrF, BrG	0-6	8-18	1.20-1.45	0.6-6.0	0.09-0.17	3.6-6.5	Low	0.20	5	8	1-3
Brownsville	6-41	8-18	1.30-1.60	0.6-6.0	0.07-0.14	3.6-5.5	Low	0.17			
	41-51	8-18	1.30-1.60	2.0-6.0	0.03-0.12	3.6-6.0	Low	0.17			
	51-53	---	---	---	---	---	---	---			
Ca	0-60	---	0.13-0.23	0.2-6.0	0.35-0.45	4.5-7.3	---	---	---	3	>70
Carlisle											

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
CeB, CeC2--------	0-7	10-22	1.25-1.45	0.6-2.0	0.18-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
Centerburg	7-23	20-35	1.40-1.70	0.6-2.0	0.15-0.22	4.5-6.0	Moderate-----	0.37			
	23-35	25-35	1.45-1.70	0.2-0.6	0.15-0.19	5.1-7.8	Moderate-----	0.37			
	35-80	15-25	1.55-1.85	0.2-0.6	0.09-0.13	6.6-8.4	Low----------	0.37			
CfB, CfC:											
Centerburg------	0-7	10-22	1.25-1.45	0.6-2.0	0.18-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
	7-23	20-35	1.40-1.70	0.6-2.0	0.15-0.22	4.5-6.0	Moderate-----	0.37			
	23-35	25-35	1.45-1.70	0.2-0.6	0.15-0.19	5.1-7.8	Moderate-----	0.37			
	35-80	15-25	1.55-1.85	0.2-0.6	0.09-0.13	6.6-8.4	Low----------	0.37			
Urban land.											
ChA, ChB---------	0-10	5-18	1.30-1.50	0.6-2.0	0.14-0.18	4.5-7.3	Low----------	0.32	4	5	1-3
Chili	10-55	18-27	1.30-1.55	2.0-6.0	0.09-0.16	4.5-6.5	Low----------	0.32			
	55-60	1-10	1.25-1.50	6.0-20	0.02-0.08	5.1-7.8	Low----------	0.10			
ChC2, ChD2, ChE2-	0-6	5-18	1.30-1.50	0.6-2.0	0.14-0.18	4.5-7.3	Low----------	0.32	4	5	1-3
Chili	6-40	18-27	1.30-1.55	2.0-6.0	0.09-0.16	4.5-6.5	Low----------	0.32			
	40-50	5-18	1.30-1.55	2.0-6.0	0.06-0.12	5.1-6.5	Low----------	0.17			
	50-60	1-10	1.25-1.50	6.0-20	0.02-0.08	5.1-7.8	Low----------	0.10			
CkB, CkC2--------	0-6	15-25	1.30-1.50	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.43	4	6	1-3
Cincinnati	6-33	22-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-5.5	Low----------	0.37			
	33-51	25-35	1.60-1.85	0.06-0.6	0.08-0.12	4.5-6.5	Moderate-----	0.37			
	51-87	25-40	1.55-1.75	0.06-0.6	0.08-0.12	4.5-6.5	Moderate-----	0.37			
	87-99	25-40	1.55-1.75	0.06-0.6	0.08-0.12	6.1-8.4	Moderate-----	0.37			
CmC2, CmD2-------	0-6	10-27	1.20-1.40	0.6-2.0	0.14-0.20	5.1-6.5	Low----------	0.37	3	5	1-3
Clarksburg	6-31	22-35	1.30-1.50	0.6-2.0	0.12-0.18	5.1-6.5	Moderate-----	0.28			
	31-52	22-35	1.40-1.70	0.06-0.6	0.06-0.12	5.1-6.5	Moderate-----	0.28			
	52-80	22-40	1.20-1.60	0.06-0.6	0.06-0.16	5.1-6.5	Moderate-----	0.28			
Cn----------	0-11	18-27	1.30-1.50	0.6-2.0	0.19-0.23	4.5-7.3	Low----------	0.37	5	6	2-4
Condit	11-38	35-45	1.45-1.75	0.06-0.2	0.08-0.16	4.5-7.8	Moderate-----	0.37			
	38-80	23-36	1.65-1.82	0.06-0.6	0.07-0.12	7.4-8.4	Moderate-----	0.37			
CoB, CoC2, CoD2,											
CoE2----------	0-6	15-23	1.30-1.50	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.37	5	5	1-3
Coshocton	6-26	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-6.0	Moderate-----	0.37			
	26-44	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate-----	0.37			
	44-67	24-36	1.45-1.70	0.06-0.6	0.08-0.12	3.6-6.0	Moderate-----	0.28			
	67-69	---	---	---	---	---	----------	----			
CrA----------	0-13	15-27	1.30-1.40	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.28	5	5	2-3
Crane	13-35	25-35	1.40-1.65	0.6-2.0	0.15-0.19	5.6-7.3	Low----------	0.28			
	35-55	18-30	1.50-1.65	0.6-2.0	0.08-0.16	5.6-7.3	Low----------	0.28			
	55-80	1-10	1.60-1.70	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
FaD----------	0-6	27-40	1.40-1.65	0.2-0.6	0.12-0.18	5.6-7.3	Moderate-----	0.43	3	7	.5-2
Fairpoint	6-60	18-35	1.60-1.80	0.2-0.6	0.03-0.10	5.6-7.3	Moderate-----	0.32			
FcA, FcB---------	0-10	16-27	1.30-1.45	0.6-2.0	0.17-0.21	4.5-7.3	Low----------	0.37	5	6	2-3
Fitchville	10-62	20-35	1.45-1.70	0.2-0.6	0.15-0.19	4.5-7.3	Moderate-----	0.37			
	62-70	16-30	1.40-1.65	0.2-2.0	0.14-0.18	5.6-7.8	Low----------	0.37			
FoD2, FoE2-------	0-4	10-17	1.35-1.55	0.6-2.0	0.15-0.21	5.1-7.3	Low----------	0.28	4	8	1-3
Fox	4-26	18-35	1.55-1.65	0.6-2.0	0.10-0.22	5.1-7.3	Moderate-----	0.43			
	26-29	18-35	1.55-1.65	0.6-2.0	0.10-0.19	5.1-8.4	Moderate-----	0.32			
	29-60	0-2	1.30-1.80	>6.0	0.02-0.07	7.4-8.4	Low----------	0.10			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
FrB:											
Frankstown Variant	0-6	10-20	1.30-1.45	0.6-2.0	0.16-0.20	4.5-6.5	Low	0.28	4	8	1-3
	6-20	20-30	1.30-1.45	0.6-2.0	0.16-0.20	4.5-6.0	Low	0.37			
	20-25	25-35	1.30-1.45	0.6-2.0	0.09-0.18	4.5-6.0	Moderate	0.28			
	25-30	---	---	---	---	---	---	---			
Mertz	0-5	10-18	1.20-1.40	0.6-2.0	0.08-0.11	5.1-7.3	Low	0.28	4	8	1-3
	5-51	15-35	1.40-1.60	0.2-0.6	0.07-0.12	5.1-6.0	Low	0.17			
	51-68	15-35	1.40-1.60	0.2-0.6	0.07-0.12	4.5-5.5	Low	0.17			
GfA, GfB	0-8	15-27	1.30-1.45	0.6-2.0	0.16-0.20	4.5-7.3	Low	0.37	5	6	1-3
Glenford	8-39	18-35	1.45-1.65	0.2-2.0	0.14-0.18	4.5-6.0	Moderate	0.37			
	39-52	18-35	1.45-1.65	0.2-0.6	0.13-0.17	5.6-7.3	Low	0.37			
	52-60	15-30	1.40-1.60	0.2-2.0	0.12-0.17	5.6-7.8	Low	0.37			
GnB, GnC2, GnD	0-11	13-27	1.30-1.50	0.6-2.0	0.19-0.24	4.5-7.3	Low	0.43	3	6	1-3
Guernsey	11-16	22-38	1.35-1.55	0.2-2.0	0.15-0.21	4.5-6.0	Moderate	0.43			
	16-51	35-60	1.40-1.60	0.06-0.6	0.10-0.15	4.5-7.8	High	0.32			
	51-71	35-60	1.40-1.60	0.06-0.6	0.06-0.10	5.1-8.4	High	0.32			
	71-73	---	---	---	---	---	---	---			
HeF:											
Hazleton	0-5	7-18	1.20-1.40	2.0-6.0	0.10-0.14	3.6-5.5	Low	0.17	3	8	2-4
	5-27	7-18	1.20-1.40	2.0-20	0.08-0.12	3.6-5.5	Low	0.15			
	27-54	5-15	1.20-1.40	2.0-20	0.06-0.12	3.6-5.5	Low	0.15			
	54-56	---	---	---	---	---	---	---			
Rock outcrop.											
HkC2, HkD2	0-7	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low	0.37	5	6	1-2
Hickory	7-35	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.5	Moderate	0.37			
	35-80	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low	0.37			
HoB	0-9	13-25	1.30-1.50	0.6-2.0	0.20-0.23	5.1-7.3	Low	0.37	4	5	1-3
Homewood	9-24	24-32	1.40-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.37			
	24-51	24-32	1.60-1.90	0.06-0.2	0.06-0.10	4.5-5.5	Low	0.37			
	51-80	16-30	1.55-1.85	0.06-0.2	0.06-0.10	4.5-7.8	Low	0.37			
HoC2, HoD2, HoE2-	0-6	13-25	1.30-1.50	0.6-2.0	0.20-0.23	5.1-7.3	Low	0.37	4	5	1-3
Homewood	6-30	24-32	1.40-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.37			
	30-52	24-32	1.60-1.90	0.06-0.2	0.06-0.10	4.5-5.5	Low	0.37			
	52-60	16-30	1.55-1.85	0.06-0.2	0.06-0.10	4.5-7.8	Low	0.37			
KeB, KeC2, KeD2-	0-7	12-25	1.30-1.45	0.6-2.0	0.21-0.24	4.5-7.3	Low	0.37	4	5	1-3
Keene	7-21	18-33	1.30-1.55	0.2-2.0	0.18-0.22	4.5-5.5	Moderate	0.37			
	21-60	30-45	1.40-1.60	0.06-0.6	0.10-0.15	4.5-5.5	Moderate	0.37			
	60-76	27-45	1.40-1.60	0.06-0.6	0.08-0.13	4.5-6.5	Moderate	0.37			
	76-78	---	---	---	---	---	---	---			
Kk	0-6	15-25	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.3	Low	0.37	5	6	2-4
Killbuck	6-20	18-32	1.25-1.55	0.2-2.0	0.17-0.22	5.6-7.3	Low	0.37			
	20-28	25-45	1.3[illegible]-1.60	0.2-0.6	0.16-0.22	5.6-7.8	Moderate	0.37			
	28-60	22-40	1.35-1.60	0.2-2.0	0.15-0.20	5.6-7.8	Moderate	0.37			
Lu	0-12	27-40	1.30-1.55	0.2-0.6	0.21-0.23	5.6-7.3	Moderate	0.32	5	7	4-8
Luray	12-40	25-35	1.45-1.65	0.2-0.6	0.18-0.22	5.6-7.3	Moderate	0.32			
	40-60	15-30	1.45-1.60	0.2-2.0	0.14-0.18	6.1-8.4	Low	0.32			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
McB, McC2, McD2, McE---------- Mechanicsburg	0-7	15-27	1.30-1.50	0.6-2.0	0.19-0.24	4.5-7.3	Low----------	0.37	5	5	1-3
	7-29	20-35	1.40-1.60	0.6-2.0	0.11-0.22	4.5-6.0	Moderate-----	0.37			
	29-35	15-35	1.30-1.50	2.0-6.0	0.06-0.20	4.5-6.0	Low----------	0.37			
	35-60	10-20	1.30-1.50	2.0-6.0	0.03-0.11	4.5-6.0	Low----------	0.10			
	60-62	---	---	---	---	---	----------	----			
Md---------- Medway	0-16	18-27	1.20-1.45	0.6-2.0	0.17-0.22	6.1-7.8	Low----------	0.32	5	6	3-6
	16-30	18-32	1.20-1.50	0.6-2.0	0.14-0.18	6.1-8.4	Low----------	0.32			
	30-47	5-30	1.20-1.60	0.6-6.0	0.11-0.15	6.1-8.4	Low----------	0.32			
	47-60	5-30	1.20-1.60	0.6-6.0	0.08-0.15	6.1-8.4	Low----------	0.32			
Me---------- Melvin	0-9	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43	5	5	.5-3
	9-24	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low----------	0.43			
	24-60	7-35	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low----------	0.43			
MnA, MnB---------- Mentor	0-9	16-24	1.30-1.50	0.6-2.0	0.20-0.24	4.5-6.5	Low----------	0.37	5	5	1-3
	9-48	16-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Low----------	0.37			
	48-60	13-30	1.20-1.50	0.6-2.0	0.12-0.18	5.1-7.8	Low----------	0.37			
MnC2, MnD2------- Mentor	0-6	16-24	1.30-1.50	0.6-2.0	0.20-0.24	4.5-6.5	Low----------	0.37	5	5	1-3
	6-45	16-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Low----------	0.37			
	45-60	13-30	1.20-1.50	0.6-2.0	0.12-0.18	5.1-7.8	Low----------	0.37			
MrE---------- Mertz	0-5	10-18	1.20-1.40	0.6-2.0	0.08-0.11	5.1-7.3	Low----------	0.28	4	8	1-3
	5-37	15-35	1.40-1.60	0.2-0.6	0.07-0.12	5.1-6.0	Low----------	0.17			
	37-60	15-35	1.40-1.60	0.2-0.6	0.07-0.12	4.5-5.5	Low----------	0.17			
NeC2, NeD2, NeE, NeF---------- Negley	0-6	12-27	1.30-1.50	2.0-6.0	0.16-0.22	4.5-7.3	Low----------	0.32	3	5	1-3
	6-20	18-35	1.30-1.60	0.6-6.0	0.10-0.16	4.5-6.5	Low----------	0.32			
	20-80	22-38	1.20-1.60	0.6-6.0	0.06-0.14	4.5-6.0	Low----------	0.32			
OcA, OcB---------- Ockley	0-10	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	.5-3
	10-19	20-35	1.45-1.60	0.6-2.0	0.15-0.22	4.5-6.5	Moderate-----	0.37			
	19-56	20-35	1.40-1.55	0.6-2.0	0.06-0.11	5.6-7.8	Moderate-----	0.24			
	56-80	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
OcC2---------- Ockley	0-6	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	.5-3
	6-50	20-35	1.40-1.55	0.6-2.0	0.06-0.11	4.5-7.8	Moderate-----	0.24			
	50-60	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
OeA: Ockley----------	0-10	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	.5-3
	10-19	20-35	1.45-1.60	0.6-2.0	0.15-0.22	4.5-6.5	Moderate-----	0.37			
	19-56	20-35	1.40-1.55	0.6-2.0	0.06-0.11	5.6-7.8	Moderate-----	0.24			
	56-80	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
Urban land.											
OeC: Ockley----------	0-6	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	.5-3
	6-50	20-35	1.40-1.55	0.6-2.0	0.06-0.11	4.5-7.8	Moderate-----	0.24			
	50-60	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
Urban land.											
Or---------- Orrville	0-7	12-27	1.25-1.45	0.6-2.0	0.18-0.22	5.1-7.3	Low----------	0.37	5	6	2-4
	7-37	18-30	1.30-1.50	0.6-2.0	0.15-0.19	5.1-6.5	Low----------	0.37			
	37-60	10-25	1.20-1.40	0.6-6.0	0.08-0.15	5.1-7.3	Low----------	0.37			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
PaC2----------	0-7	18-27	1.25-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.37	5	6	.5-2
Parke	7-35	22-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	35-60	18-30	1.55-1.65	0.6-2.0	0.16-0.18	4.5-5.5	Low----------	0.28			
Pe----------	0-12	27-40	1.35-1.55	0.6-2.0	0.17-0.22	6.1-7.3	Moderate-----	0.28	5	6	3-10
Pewamo	12-60	35-50	1.40-1.70	0.2-0.6	0.12-0.20	5.6-7.8	Moderate-----	0.28			
Pf:											
Pewamo----------	0-12	27-40	1.35-1.55	0.6-2.0	0.17-0.22	6.1-7.3	Moderate-----	0.28	5	6	3-10
	12-60	35-50	1.40-1.70	0.2-0.6	0.12-0.20	5.6-7.8	Moderate-----	0.28			
Urban land.											
Pg.											
Pits											
RgC, RgD, RgE, RgF----------	0-8	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low----------	0.24	4	3	.5-3
Rigley	8-50	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low----------	0.17			
	50-70	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low----------	0.17			
RhE:											
Rigley----------	0-8	7-18	1.20-1.40	2.0-6.0	0.09-0.15	4.5-7.3	Low----------	0.24	4	3	.5-3
	8-50	7-18	1.30-1.60	2.0-6.0	0.09-0.15	3.6-5.5	Low----------	0.17			
	50-70	7-40	1.30-1.60	2.0-6.0	0.07-0.15	3.6-5.5	Low----------	0.17			
Coshocton-------	0-6	15-23	1.30-1.50	0.6-2.0	0.18-0.23	4.5-7.3	Low----------	0.37	5	5	1-3
	6-26	18-30	1.35-1.55	0.2-2.0	0.14-0.20	3.6-6.0	Moderate-----	0.37			
	26-44	24-35	1.40-1.65	0.06-0.6	0.10-0.17	3.6-5.5	Moderate-----	0.37			
	44-67	24-36	1.45-1.70	0.06-0.6	0.08-0.12	3.6-6.0	Moderate-----	0.28			
	67-69	---	---	---	---	---	----------	----			
RsA----------	0-10	10-20	1.25-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	5	.5-2
Rush	10-38	22-30	1.35-1.50	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.37			
	38-57	15-25	1.40-1.55	0.6-2.0	0.10-0.16	5.1-7.3	Low----------	0.24			
	57-68	8-10	1.40-1.55	0.6-2.0	0.04-0.10	6.6-7.8	Low----------	0.24			
	68-80	2-6	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
Se----------	0-8	18-27	1.30-1.45	0.6-2.0	0.18-0.22	4.5-7.3	Low----------	0.37	5	6	3-5
Sebring	8-37	22-35	1.45-1.65	0.2-0.6	0.14-0.18	4.5-6.0	Moderate-----	0.37			
	37-50	22-35	1.45-1.65	0.2-0.6	0.14-0.18	6.1-8.4	Moderate-----	0.37			
	50-80	15-30	1.40-1.60	0.2-2.0	0.12-0.16	6.1-8.4	Moderate-----	0.37			
Sh----------	0-13	18-27	1.30-1.50	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.37	5	5	2-5
Shoals	13-47	18-33	1.35-1.55	0.6-2.0	0.17-0.22	6.1-7.8	Low----------	0.37			
	47-60	12-25	1.35-1.60	0.6-2.0	0.12-0.21	6.1-8.4	Low----------	0.37			
SkA----------	0-12	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	5	5	.5-3
Sleeth	12-24	20-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-6.5	Moderate-----	0.32			
	24-55	20-35	1.40-1.60	0.6-2.0	0.14-0.16	6.1-8.4	Moderate-----	0.32			
	55-60	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
So----------	0-14	15-27	1.20-1.40	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.37	5	6	3-6
Sloan	14-36	22-35	1.25-1.55	0.2-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.37			
	36-60	10-30	1.20-1.50	0.2-2.0	0.13-0.18	6.6-8.4	Low----------	0.37			
St----------	0-14	10-22	1.20-1.45	0.6-2.0	0.15-0.20	7.4-8.4	Low----------	0.32	5	5	1-3
Stonelick	14-60	5-18	1.30-1.55	2.0-6.0	0.08-0.14	7.4-8.4	Low----------	0.24			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
Su:											
Stonelick	0-14	10-22	1.20-1.45	0.6-2.0	0.15-0.20	7.4-8.4	Low	0.32	5	5	1-3
	14-60	5-18	1.30-1.55	2.0-6.0	0.08-0.14	7.4-8.4	Low	0.24			
Urban land.											
Tg	0-8	5-18	1.15-1.40	0.6-6.0	0.15-0.21	5.1-7.3	Low	0.37	5	3	2-6
Tioga	8-23	5-18	1.15-1.45	0.6-6.0	0.07-0.20	5.1-7.3	Low	0.28			
	23-60	3-15	1.25-1.55	0.6-20	0.02-0.20	5.6-7.8	Low	0.28			
TsB, TsC2	0-9	13-25	1.30-1.50	0.6-2.0	0.18-0.23	3.6-6.5	Low	0.37	4	5	1-3
Titusville	9-28	20-35	1.40-1.70	0.2-0.6	0.14-0.18	3.6-6.0	Moderate	0.37			
	28-48	20-30	1.60-1.88	0.06-0.2	0.06-0.10	3.6-5.5	Low	0.37			
	48-54	18-27	1.55-1.82	0.2-0.6	0.06-0.10	4.5-6.0	Low	0.37			
	54-80	20-28	1.55-1.82	0.2-2.0	0.06-0.10	5.1-7.8	Low	0.37			
Uf.											
Udorthents											
Wa	0-24	12-25	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.37	5	6	1-3
Wallkill	24-42	---	0.35-0.55	2.0-6.0	0.35-0.45	5.1-7.3		----			
	42-80	40-50	1.45-1.60	0.06-0.2	0.10-0.12	6.1-7.8	High	0.32			
Ws	0-15	27-29	1.45-1.55	0.6-2.0	0.17-0.23	5.6-7.3	Moderate	0.28	5	6	2-6
Westland	15-42	20-35	1.40-1.65	0.6-2.0	0.15-0.20	6.1-7.3	Moderate	0.28			
	42-55	5-30	1.55-1.70	0.6-2.0	0.04-0.13	6.6-7.8	Low	0.28			
	55-60	1-10	1.65-1.95	>20	0.01-0.04	7.4-8.4	Low	0.10			
Wt:											
Westland	0-15	27-29	1.45-1.55	0.6-2.0	0.17-0.23	5.6-7.3	Moderate	0.28	5	6	2-6
	15-42	20-35	1.40-1.65	0.6-2.0	0.15-0.20	6.1-7.3	Moderate	0.28			
	42-55	5-30	1.55-1.70	0.6-2.0	0.04-0.13	6.6-7.8	Low	0.28			
	55-60	1-10	1.65-1.95	>20	0.01-0.04	7.4-8.4	Low	0.10			
Urban land.											

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AfA, AfB, AfC2---- Alford	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	High.
AhB: Alford----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	High.
Urban land.												
Ak----------	C/D	Frequent----	Very brief	Dec-Jun	1.0-2.0	Apparent	Jan-Jun	>60	---	High-----	High-----	Low.
Algiers												
AmB2, AmC2, AmD2, AmE, AmF--------- Amanda	C	None--------	---	---	>4.0	Perched	Dec-May	>60	---	Moderate	Moderate	Moderate.
AvC2, AvD2-------- Amanda Variant	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
BeA, BeB---------- Bennington	C	None--------	---	---	1.0-2.5	Perched	Nov-May	>60	---	High-----	High-----	Moderate.
BfA: Bennington-------	C	None--------	---	---	1.0-2.5	Perched	Nov-May	>60	---	High-----	High-----	Moderate.
Urban land.												
BgB, BgD---------- Berks	C	None--------	---	---	>6.0	---	---	20-40	Soft	Low------	Low------	High.
BrC, BrD, BrE, BrF, BrG--------- Brownsville	C	None--------	---	---	>6.0	---	---	40-72	Soft	Moderate	Low------	High.
Ca----------	A/D	None--------	---	---	+.5-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
Carlisle												
CeB, CeC2--------- Centerburg	C	None--------	---	---	1.5-3.0	Perched	Nov-Apr	>60	---	High-----	High-----	Moderate.
CfB, CfC: Centerburg-------	C	None--------	---	---	1.5-3.0	Perched	Nov-Apr	>60	---	High-----	High-----	Moderate.
Urban land.												

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
ChA, ChB, ChC2, ChD2, ChE2--- Chili	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
CkB, CkC2--- Cincinnati	C	None	---	---	2.5-4.0	Perched	Jan-Apr	>60	---	High	Moderate	High.
CmC2, CmD2--- Clarksburg	C	None	---	---	1.5-3.0	Perched	Nov-Mar	>60	---	Moderate	Moderate	Moderate.
Cn--- Condit	D	None	---	---	+1-1.0	Apparent	Nov-Jul	>60	---	High	High	Moderate.
CoB, CoC2, CoD2, CoE2--- Coshocton	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
CrA--- Crane	B	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	High	Low.
FaD--- Fairpoint	C	None	---	---	>6.0	---	---	>60	---	Moderate	High	Moderate.
FcA, FcB--- Fitchville	C	None	---	---	1.0-2.5	Perched	Nov-May	>60	---	High	High	Moderate.
FoD2, FoE2--- Fox	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
FrB: Frankstown Variant---	B	None	---	---	>6.0	---	---	20-40	Hard	Moderate	Low	High.
Mertz---	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
GfA, GfB--- Glenford	C	None	---	---	2.0-3.5	Perched	Nov-May	>60	---	High	Moderate	Moderate.
GnB, GnC2, GnD--- Guernsey	C	None	---	---	2.0-3.5	Perched	Jan-Apr	50-80	Soft	High	High	Moderate.
HeF: Hazleton---	B	None	---	---	>6.0	---	---	>40	Hard	Moderate	Low	High.
Rock outcrop.												
HkC2, HkD2--- Hickory	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
HoB, HoC2, HoD2, HoE2---- Homewood	C	None	---	---	2.5-4.0	Perched	Nov-Apr	>60	---	Moderate	Low	Moderate.
KeB, KeC2, KeD2--- Keene	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
Kk---- Killbuck	C/D	Frequent	Brief	Jan-Dec	0-1.0	Apparent	Nov-Jun	>60	---	High	High	Moderate.
Lu---- Luray	C/D	None	---	---	+1-1.0	Apparent	Nov-Jul	>60	---	High	High	Low.
McB, McC2, McD2, McE---- Mechanicsburg	C	None	---	---	>6.0	---	---	40-72	Soft	Moderate	Moderate	Moderate.
Md---- Medway	B	Occasional	Very brief to long.	Nov-Jun	1.5-3.0	Apparent	Jan-Apr	>60	---	High	High	Low.
Me---- Melvin	D	Frequent	Brief	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High	High	Low.
MnA, MnB, MnC2, MnD2---- Mentor	B	None	---	---	4.0-6.0	Apparent	Feb-Mar	>60	---	High	Moderate	High.
MrE---- Mertz	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
NeC2, NeD2, NeE, NeF---- Negley	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
OcA, OcB, OcC2---- Ockley	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
OeA, OeC: Ockley---- Urban land.	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Or---- Orrville	C	Occasional	Very brief to brief.	Nov-May	1.0-2.5	Apparent	Nov-Jun	>60	---	High	High	Moderate.
PaC2---- Parke	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	High.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Pe Pewamo	C/D	None	---	---	+1-1.0	Apparent	Dec-May	>60	---	High	High	Low.
Pf: Pewamo	C/D	None	---	---	+1-1.0	Apparent	Dec-May	>60	---	High	High	Low.
Urban land.												
Pg. Pits												
RgC, RgD, RgE, RgF Rigley	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
RhE: Rigley	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	High.
Coshocton	C	None	---	---	1.5-3.0	Perched	Jan-Apr	40-84	Soft	High	High	High.
RsA Rush	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
Se Sebring	B/D	None	---	---	+1-1.0	Apparent	Nov-Jun	>60	---	High	High	Moderate.
Sh Shoals	C	Occasional	Brief	Oct-Jun	0.5-1.5	Apparent	Jan-Apr	>60	---	High	High	Low.
SkA Sleeth	C	None	---	---	1.0-3.0	Apparent	Jan-Apr	>60	---	High	High	Low.
So Sloan	B/D	Frequent	Brief	Nov-Jun	0-1.0	Apparent	Nov-Jun	>60	---	High	High	Low.
St Stonelick	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Low	Low.
Su: Stonelick	B	Occasional	Very brief	Nov-Jun	>6.0	---	---	>60	---	Moderate	Low	Low.
Urban land.												
Tg Tioga	B	Occasional	Brief	Nov-May	3.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low	Moderate.
TsB, TsC2 Titusville	C	None	---	---	1.5-3.0	Perched	Nov-May	>60	---	High	Moderate	High.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Uf. Udorthents												
Wa Wallkill	C/D	Frequent	Brief to long.	Sep-Jun	0-0.5	Apparent	Dec-May	>60	---	High	High	Moderate.
Ws Westland	B/D	None	---	---	+.5-1.0	Apparent	Dec-May	>60	---	High	High	Low.
Wt: Westland	B/D	None	---	---	+.5-1.0	Apparent	Dec-May	>60	---	High	High	Low.
Urban land.												

TABLE 19.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. RN means report number; HO, horizon; MAX, maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; AA, AASHTO; and UN, Unified)

Soil name and location	Parent material	RN	Depth	HO	Moisture density		Percentage passing sieve--				Percentage smaller than--			LL	PI	Classification	
					MAX	OPT	No. 4	No. 10	No. 40	No. 200	0.02 mm	0.005 mm	0.002 mm			AA	UN
			In		Lb/ cu ft	Pct								Pct			
Bennington silt loam: Jersey Township, 220 yards south and 770 yards east of the northwest corner of sec. 15, T. 2 N., R. 15 W.	Glacial till	LC-23-31590	0-7	Ap	102	20	98	96	93	82	---	24	---	31	3	A-4	ML
		31591	18-29	Bt2, Bt3	107	18	98	94	91	80	---	43	---	39	19	A-6	CL
		31592	39-80	C2	119	13	92	85	78	65	---	31	---	28	9	A-4	CL
Centerburg silt loam: St. Albans Township, 1,890 yards south and 1,370 yards east of the northwest corner of quarter township 1, T. 2 N., R. 14 W.	Glacial till	LC-22-31587	0-7	Ap	100	22	99	97	94	83	---	23	---	29	6	A-4	ML
		31588	16-29	Bt3, Bt4	112	16	98	94	91	78	---	41	---	37	17	A-6	CL
		31589	40-53	C2	119	13	94	86	81	67	---	32	---	28	10	A-4	CL
Clarksburg silt loam: Perry Township, 160 yards north and 470 yards east of the southwest corner of sec. 4, T. 3 N., R. 10 W.	Colluvium	LC-31-31603	0-6	Ap	100	22	92	86	78	73	---	17	---	34	5	A-4	ML
		31604	37-52	Btx2	120	13	72	64	56	49	---	16	---	28	7	A-4	CL-ML
		31605	61-80	C	117	14	68	64	62	59	---	28	---	31	9	A-4	CL
Medway silt loam: St. Albans Township, 1,440 yards north and 3,310 yards east of the southwest corner of quarter township 2, T. 2 N., R. 14 W.	Alluvium	LC-29-31597	0-16	Ap, A	100	22	100	99	98	79	---	24	---	34	8	A-4	ML
		31598	22-36	Bw2, Bw3	117	14	100	96	94	76	---	34	---	30	11	A-6	CL
		31599	47-60	C	122	12	65	56	42	25	---	12	---	26	8	A-2	SC
Pewamo silty clay loam: Monroe Township, 160 yards south and 120 yards west of the northeast corner of sec. 6, T. 3 N., R. 15 W.	Glacial till	LC-30-31600	0-12	Ap, A	95	25	100	100	99	94	---	39	---	42	12	A-7	CL
		31601	12-27	Btg1, Btg2	107	18	99	98	97	95	---	52	---	46	23	A-7	CL

TABLE 20.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Alford	Fine-silty, mixed, mesic Typic Hapludalfs
Algiers	Fine-loamy, mixed, nonacid, mesic Aquic Udifluvents
Amanda	Fine-loamy, mixed, mesic Typic Hapludalfs
Amanda Variant	Fine-silty, mixed, mesic Typic Hapludalfs
Bennington	Fine, illitic, mesic Aeric Ochraqualfs
Berks	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Brownsville	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Carlisle	Euic, mesic Typic Medisaprists
Centerburg	Fine-loamy, mixed, mesic Aquic Hapludalfs
Chili	Fine-loamy, mixed, mesic Typic Hapludalfs
Cincinnati	Fine-silty, mixed, mesic Typic Fragiudalfs
Clarksburg	Fine-loamy, mixed, mesic Typic Fragiudalfs
Condit	Fine, illitic, mesic Typic Ochraqualfs
Coshocton	Fine-loamy, mixed, mesic Aquultic Hapludalfs
Crane	Fine-loamy, mixed, mesic Aquic Argiudolls
Fairpoint	Loamy-skeletal, mixed, nonacid, mesic Typic Udorthents
Fitchville	Fine-silty, mixed, mesic Aeric Ochraqualfs
Fox	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludalfs
Frankstown Variant	Fine-loamy, mixed, mesic Typic Hapludults
Glenford	Fine-silty, mixed, mesic Aquic Hapludalfs
Guernsey	Fine, mixed, mesic Aquic Hapludalfs
Hazleton	Loamy-skeletal, mixed, mesic Typic Dystrochrepts
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Homewood	Fine-loamy, mixed, mesic Typic Fragiudalfs
Keene	Fine-silty, mixed, mesic Aquic Hapludalfs
Killbuck	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Luray	Fine-silty, mixed, mesic Typic Argiaquolls
Mechanicsburg	Fine-loamy, mixed, mesic Ultic Hapludalfs
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Mentor	Fine-silty, mixed, mesic Typic Hapludalfs
Mertz	Loamy-skeletal, mixed, mesic Typic Hapludults
Negley	Fine-loamy, mixed, mesic Typic Paleudalfs
Ockley	Fine-loamy, mixed, mesic Typic Hapludalfs
Orrville	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Parke	Fine-silty, mixed, mesic Ultic Hapludalfs
Pewamo	Fine, mixed, mesic Typic Argiaquolls
Rigley	Coarse-loamy, mixed, mesic Typic Hapludults
Rush	Fine-silty, mixed, mesic Typic Hapludalfs
*Sebring	Fine-silty, mixed, mesic Typic Ochraqualfs
Shoals	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Sleeth	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Sloan	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
Stonelick	Coarse-loamy, mixed (calcareous), mesic Typic Udifluvents
Tioga	Coarse-loamy, mixed, mesic Dystric Fluventic Eutrochrepts
Titusville	Fine-loamy, mixed, mesic Aquic Fragiudalfs
Udorthents	Loamy, mixed, mesic Udorthents
*Wallkill	Fine-loamy, mixed, nonacid, mesic Thapto-Histic Fluvaquents
Westland	Fine-loamy, mixed, mesic Typic Argiaquolls

Interpretive Groups

INTERPRETIVE GROUPS

(Dashes indicate that the soil was not assigned to the interpretive group)

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol
AfA Alford	I	Yes	5A
AfB Alford	IIe	Yes	5A
AfC2 Alford	IIIe	No	5A
AhB Alford-Urban land	---	No	---
Ak Algiers	IIw	Yes**	4A
AmB2 Amanda	IIe	Yes	5A
AmC2 Amanda	IIIe	No	5A
AmD2 Amanda	IVe	No	5R
AmE Amanda	VIe	No	5R
AmF Amanda	VIIe	No	5R
AvC2 Amanda Variant	IIIe	No	5A
AvD2 Amanda Variant	IVe	No	5R
BeA Bennington	IIw	Yes***	4A
BeB Bennington	IIe	Yes***	4A
BfA Bennington-Urban land	---	No	---
BgB Berks	IIe	No	4F
BgD Berks (north aspect) Berks (south aspect)	IVe	No	 4R 3R
BrC Brownsville	IIIe	No	4F
BrD, BrE Brownsville (north aspect) Brownsville (south aspect)	IVe	No	 4R 3R

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol
BrF	VIe	No	
Brownsville (north aspect)			4R
Brownsville (south aspect)			3R
BrG	VIIe	No	
Brownsville (north aspect)			4R
Brownsville (south aspect)			3R
Ca	IIIw	No	6W
Carlisle			
CeB	IIe	Yes	5A
Centerburg			
CeC2	IIIe	No	5A
Centerburg			
CfB, CfC	---	No	---
Centerburg-Urban land			
ChA	IIs	Yes	4A
Chili			
ChB	IIe	Yes	4A
Chili			
ChC2	IIIe	No	4A
Chili			
ChD2	IVe	No	4R
Chili			
ChE2	VIe	No	4R
Chili			
CkB	IIe	Yes	4A
Cincinnati			
CkC2	IIIe	No	4A
Cincinnati			
CmC2	IIIe	No	4A
Clarksburg			
CmD2	IVe	No	4R
Clarksburg			
Cn	IIIw	Yes***	5W
Condit			
CoB	IIe	Yes	4A
Coshocton			
CoC2	IIIe	No	4A
Coshocton			
CoD2, CoE2	IVe	No	
Coshocton (north aspect)			4R
Coshocton (south aspect)			3R
CrA	IIw	Yes***	---
Crane			

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol
FaD----	IVs	No	---
Fairpoint			
FcA----	IIw	Yes***	5A
Fitchville			
FcB----	IIe	Yes***	5A
Fitchville			
FoD2----	IVe	No	4R
Fox			
FoE2----	VIe	No	4R
Fox			
FrB----	VIs	No	
Frankstown Variant----			4D
Mertz----			4F
GfA----	I	Yes	5A
Glenford			
GfB----	IIe	Yes	5A
Glenford			
GnB----	IIe	Yes	4A
Guernsey			
GnC2----	IIIe	No	4A
Guernsey			
GnD----	IVe	No	4R
Guernsey			
HeF----	VIIe	No	
Hazleton (north aspect)----			4R
Hazleton (south aspect)----			3R
Rock outcrop.			
HkC2----	IIIe	No	5A
Hickory			
HkD2----	IVe	No	5R
Hickory			
HoB----	IIe	Yes	5A
Homewood			
HoC2----	IIIe	No	5A
Homewood			
HoD2----	IVe	No	5R
Homewood			
HoE2----	VIe	No	5R
Homewood			
KeB----	IIe	Yes	4A
Keene			
KeC2----	IIIe	No	4A
Keene			

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol
KeD2---- Keene	IVe	No	4R
Kk---- Killbuck	IIIw	Yes**	5W
Lu---- Luray	IIw	Yes***	5W
McB---- Mechanicsburg	IIe	Yes	4A
McC2---- Mechanicsburg	IIIe	No	4A
McD2---- Mechanicsburg	IVe	No	4R
McE---- Mechanicsburg	VIe	No	4R
Md---- Medway	IIw	Yes	5A
Me---- Melvin	IIIw	Yes**	6W
MnA---- Mentor	I	Yes	5A
MnB---- Mentor	IIe	Yes	5A
MnC2---- Mentor	IIIe	No	5A
MnD2---- Mentor	IVe	No	5R
MrE---- Mertz	VIIe	No	4F
NeC2---- Negley	IIIe	No	5A
NeD2---- Negley	IVe	No	5R
NeE---- Negley	VIe	No	5R
NeF---- Negley	VIIe	No	5R
OcA---- Ockley	I	Yes	5A
OcB---- Ockley	IIe	Yes	5A
OcC2---- Ockley	IIIe	No	5A

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol
OeA, OeC---------- Ockley-Urban land	---	No	---
Or---------- Orrville	IIw	Yes***	5A
PaC2---------- Parke	IIIe	No	5A
Pe---------- Pewamo	IIw	Yes***	5W
Pf---------- Pewamo-Urban land	---	No	---
Pg---------- Pits, gravel	---	No	---
RgC---------- Rigley	IIIe	No	4A
RgD----------	IVe	No	
Rigley (north aspect)----------			4R
Rigley (south aspect)----------			3R
RgE----------	VIe	No	
Rigley (north aspect)----------			4R
Rigley (south aspect)----------			3R
RgF----------	VIIe	No	
Rigley (north aspect)----------			4R
Rigley (south aspect)----------			3R
RhE----------	VIe	No	
Rigley-Coshocton (north aspect)----------			4R
Rigley-Coshocton (south aspect)----------			3R
RsA---------- Rush	I	Yes	5A
Se---------- Sebring	IIIw	Yes***	5W
Sh---------- Shoals	IIw	Yes***	5W
SkA---------- Sleeth	IIw	Yes***	5A
So---------- Sloan	IIIw	Yes**	5W
St---------- Stonelick	IIw	Yes	4A
Su---------- Stonelick-Urban land	---	No	---
Tg---------- Tioga	IIw	Yes	4A

See footnotes at end of table.

INTERPRETIVE GROUPS--Continued

Map symbol and soil name	Land capability*	Prime farmland*	Woodland ordination symbol
TsB---- Titusville	IIe	Yes	5D
TsC2---- Titusville	IIIe	No	5D
Uf---- Udorthents, loamy	---	No	---
Wa---- Wallkill	IIIw	No	4W
Ws---- Westland	IIw	Yes***	5W
Wt---- Westland-Urban land	---	No	---

* A complex is treated as a single management unit in the land capability and prime farmland columns.

** Where drained and either protected from flooding or not frequently flooded during the growing season.

*** Where drained.

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