



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.

*Rock fragments* 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

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

The estimates of grain-size distribution, liquid limit, and plasticity index are 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 18 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, 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 (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at  $\frac{1}{3}$ -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 and septic tank absorption fields.

*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. 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 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 18, 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

Tables 19 and 20 give 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 19, 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 19 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 (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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 little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each

soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

*High water table* (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 19 are 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 19.

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.

In table 20, *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.

*Subsidence* is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 20 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

*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 texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. 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 and acidity.

## Engineering Index Test Data

Table 21 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 State Highway Department of Indiana, Division of Materials and Tests.

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 422 (ASTM), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 4318 (ASTM); Plasticity index—T 90 (AASHTO), D 4318 (ASTM); and Moisture density—T 99 (AASHTO), D 698 (ASTM).



# Classification of the Soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1975). 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 22 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 Udalf (*Ud*, meaning humid, 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 Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

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

**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-loamy, mixed, mesic Typic Hapludalfs.

**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 underlying material 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" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1975). 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."

### Allison Series

The Allison series consists of very deep, well drained, moderately permeable soils on flood plains.

These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Allison soils are similar to Battleground soils and are commonly adjacent to Du Page, Ross, Sawabash, and Tice soils. Battleground soils have a dark surface layer less than 24 inches thick. Du Page and Ross soils have more sand in the subsoil than the Allison soils. Du Page soils are in the slightly lower positions on the landscape, and Ross soils are in the slightly higher positions. Sawabash soils have a dominantly gray subsoil. Tice soils have gray mottles in the upper part of the subsoil. Sawabash and Tice soils are in the lower lying areas.

Typical pedon of Allison silt loam, frequently flooded, in a cultivated field; 160 feet east and 2,450 feet north of the southwest corner of sec. 30, T. 23 N., R. 5 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; common fine roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

A1—10 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; moderately alkaline; gradual smooth boundary.

A2—18 to 33 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; moderately alkaline; gradual smooth boundary.

A3—33 to 51 inches; very dark grayish brown (10YR 3/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky structure; firm; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; moderately alkaline; gradual smooth boundary.

BA—51 to 58 inches; dark brown (10YR 3/3) silty clay loam, dark brown (10YR 4/3) dry; moderate fine subangular blocky structure; firm; common very fine pores; thin discontinuous black (10YR 2/1) organic coatings on faces of peds; moderately alkaline; gradual smooth boundary.

Bw—58 to 80 inches; dark brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; few very fine pores; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; moderately alkaline.

The solum is more than 60 inches thick. The thickness of the mollic epipedon ranges from 24 to 60 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. It is silt loam or silty clay loam.

The Bw horizon has hue of 10YR and value and chroma of 3 or 4. It is silt loam or silty clay loam.

## Alvin Series

The Alvin series consists of very deep, well drained, moderately rapidly permeable soils on outwash plains, terraces, till plains, and recessional moraines. These soils formed in sandy sediments. Slopes range from 2 to 6 percent.

Alvin soils are commonly adjacent to Mahalasville, Spinks, Treaty, and Whitaker soils. Mahalasville and Treaty soils have a dark surface layer and a gray subsoil. Spinks soils have less clay in the solum than the Alvin soils. Whitaker soils have gray mottles in the upper part of the subsoil. They are on toe slopes.

Typical pedon of Alvin fine sandy loam, in an area of Alvin-Spinks complex, 2 to 6 percent slopes, eroded, in a cultivated field; 2,380 feet east and 1,360 feet north of the southwest corner of sec. 14, T. 22 N., R. 5 W.

Ap—0 to 10 inches; dark brown (10YR 4/3) fine sandy loam, brown (10YR 5/3) dry; common coarse dark brown (7.5YR 4/4) pockets of material from the subsoil; moderate medium granular structure; friable; common very fine roots; medium acid; abrupt smooth boundary.

Bt1—10 to 27 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; common very fine roots; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—27 to 38 inches; dark brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; friable; common very fine roots; thin continuous dark brown (7.5YR 3/4) clay films on faces of peds; medium acid; gradual smooth boundary.

E&Bt3—38 to 80 inches; dark brown (7.5YR 4/4) loamy sand that has pockets of sandy loam; weak coarse subangular blocky structure; friable; thin discontinuous dark brown (7.5YR 3/4) clay films on faces of peds; medium acid.

The solum is more than 80 inches thick.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. It is fine sandy loam or sandy loam.

The Bt and E&Bt horizons have hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6.

## Battleground Series

The Battleground series consists of very deep, well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Battleground soils are similar to Allison soils and are commonly adjacent to Lash, Sawabash, and Tice soils and the Ouiatenon soils that have a sandy substratum. Allison soils have a dark surface layer more than 23 inches thick. Lash and Ouiatenon soils have more sand and less clay in the subsoil than the Battleground soils. They are adjacent to stream channels. Sawabash soils have a dominantly gray subsoil. Tice soils have gray mottles in the upper part of the subsoil. Sawabash and Tice soils are in the lower lying areas.

Typical pedon of Battleground silt loam, frequently flooded, in a cultivated field; 560 feet west and 1,475 feet south of the northeast corner of sec. 34, T. 23 N., R. 5 W.

- Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; common fine roots; slight effervescence; moderately alkaline; abrupt smooth boundary.
- A—10 to 19 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.
- Bw1—19 to 34 inches; dark brown (10YR 3/3) silty clay loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; friable; few very fine roots; common very fine pores; thin continuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.
- Bw2—34 to 52 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; friable; common very fine pores; thin continuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.
- Bw3—52 to 80 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; common very fine pores; thin discontinuous dark brown (10YR 3/3) organic coatings on faces of peds; strong effervescence; moderately alkaline; gradual smooth boundary.

The solum is more than 60 inches thick. It is mildly

alkaline or moderately alkaline and has carbonates in all horizons. The thickness of the mollic epipedon ranges from 10 to 23 inches.

The Ap and A horizons have hue of 10YR, value of 3, and chroma of 2 or 3.

The Bw horizon has hue of 10YR and value and chroma of 3 or 4.

## Beecher Series

The Beecher series consists of somewhat poorly drained, slowly permeable soils on recessional moraines. These soils are deep over compact glacial till. They formed in silty material and in the underlying silty glacial till. Slopes range from 0 to 2 percent.

Beecher soils are commonly adjacent to Drummer and Marker soils. Drummer soils have a dominantly gray subsoil. They are in drainageways and depressions. Marker soils have a browner subsoil than the Beecher soils. They are in the more sloping areas along drainageways and on rises.

Typical pedon of Beecher silt loam, 0 to 2 percent slopes, in a cultivated field; 1,600 feet west and 1,680 feet south of the northeast corner of sec. 15, T. 24 N., R. 5 W.

- Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.
- Bt1—9 to 12 inches; olive brown (2.5Y 4/4) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; firm; common very fine pores; thin patchy dark grayish brown (10YR 4/2) clay films on faces of peds; thin continuous very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; clear smooth boundary.
- Bt2—12 to 16 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak fine prismatic structure parting to moderate medium subangular blocky; firm; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.
- Bt3—16 to 24 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.

**Bt4**—24 to 31 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

**2Bt5**—31 to 41 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; many very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds and continuous very dark grayish brown (10YR 3/2) clay films lining pores; 1 percent gravel; neutral; clear smooth boundary.

**2BCt**—41 to 44 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; many very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 2 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.

**2Cd**—44 to 60 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium prominent gray (N 6/0) mottles; massive; very firm; 2 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 45 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4. Reaction ranges from very strongly acid to slightly acid.

The 2Bt horizon has hue of 2.5Y or 5Y, value of 5, and chroma of 2 to 4.

The 2Cd horizon has hue of 5Y or 2.5Y, value of 5, and chroma of 3 or 4.

## Berks Series

The Berks series consists of well drained soils that are moderately deep to interbedded siltstone and shale bedrock. Permeability is moderate in the upper part of the subsoil and moderately rapid in the lower part. These soils formed in residuum on steep upland hillslopes. Slopes range from 25 to 60 percent.

Berks soils are commonly adjacent to High Gap Variant soils. High Gap Variant soils have an argillic horizon. They formed in glacial drift and in the underlying siltstone residuum. They are on the upper

part of side slopes in the less sloping areas at the higher elevations.

Typical pedon of Berks channery silt loam, 25 to 60 percent slopes, in a wooded area; 1,190 feet east and 1,240 feet north of the southwest corner of sec. 3, T. 22 N., R. 6 W.

**A**—0 to 3 inches; very dark grayish brown (10YR 3/2) channery silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many very fine roots; 20 percent channers; slightly acid; clear smooth boundary.

**E**—3 to 8 inches; brown (10YR 4/3) channery silt loam; moderate fine subangular blocky structure; friable; many very fine roots; many very fine pores; 30 percent channers; very strongly acid; clear smooth boundary.

**Bw1**—8 to 17 inches; light yellowish brown (10YR 6/4) very channery silt loam; moderate fine subangular blocky structure; friable; common very fine roots; common very fine pores; 55 percent channers; very strongly acid; clear smooth boundary.

**Bw2**—17 to 29 inches; pale brown (10YR 6/3) channery silt loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; 30 percent channers; very strongly acid; clear wavy boundary.

**Cr**—29 to 60 inches; interbedded siltstone and shale bedrock.

The thickness of the solum ranges from 20 to 40 inches.

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

The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. Reaction ranges from extremely acid to slightly acid.

## Billett Series

The Billett series consists of well drained and moderately well drained soils on terraces, sand dunes, outwash plains, till plains, and recessional moraines. The Billett soils that have a gravelly substratum are deep over gravelly coarse sand. The moderately wet phase is very deep. Permeability is moderately rapid in the upper part of the solum in the Billett soils that have a gravelly substratum, rapid in the lower part of the solum, and very rapid in the underlying material. It is moderately rapid in the moderately wet phase. Billett soils formed in loamy outwash and in the underlying gravelly outwash. Slopes range from 0 to 8 percent.

Billett soils are similar to Carmi and Elston soils and are commonly adjacent to La Hogue, Oakville, Rodman, and Troxel soils. Carmi and Elston soils have a dark

surface layer 10 or more inches thick. La Hogue soils have gray mottles in the upper part of the subsoil. They are in the lower lying areas. Oakville soils have less clay in the subsoil than the Billett soils. They are in the higher lying areas. Rodman soils have less clay in the subsoil and have a thinner solum than the Billett soils. They are in steep areas along terrace breaks and streams. Troxel soils have a dark surface layer 24 or more inches thick. They are in drainageways or depressions.

Typical pedon of Billett loam, gravelly substratum, 0 to 2 percent slopes, in a cultivated field; 590 feet west and 1,190 feet south of the northeast corner of sec. 11, T. 23 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, dark brown (10YR 4/3) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.

Bt1—9 to 14 inches; dark brown (10YR 4/3) loam; weak medium platy structure parting to moderate fine subangular blocky; friable; common fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—14 to 20 inches; dark brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; common fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.

2Bt3—20 to 27 inches; dark brown (7.5YR 3/4) loam; moderate medium subangular blocky structure; friable; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 9 percent gravel; neutral; clear smooth boundary.

2Bt4—27 to 38 inches; dark brown (7.5YR 3/4) sandy loam; moderate medium and coarse subangular blocky structure; friable; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 7 percent gravel; slightly acid; clear smooth boundary.

2Bt5—38 to 51 inches; dark brown (7.5YR 4/4) loamy sand; weak coarse subangular blocky structure; very friable; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 1 percent gravel; slightly acid; gradual smooth boundary.

2Bt6—51 to 56 inches; dark brown (7.5YR 4/4) loamy sand; weak coarse subangular blocky structure; very friable; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 8 percent gravel; neutral; clear wavy boundary.

3C—56 to 70 inches; yellowish brown (10YR 5/4) gravelly coarse sand; single grained; loose; 20

percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is loam or fine sandy loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is loam, fine sandy loam, or sandy loam. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 4 to 6. It is loam, fine sandy loam, sandy loam, loamy fine sand, or loamy sand. Reaction ranges from strongly acid to neutral.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In some pedons it is stratified.

## Bowes Series

The Bowes series consists of well drained soils on outwash plains. These soils are deep or very deep over gravelly coarse sand. Permeability is moderate in the upper part of the subsoil, moderately rapid in the lower part of the solum, and very rapid in the underlying material. The soils formed in silty material and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

Bowes soils are similar to Waupecan soils and are commonly adjacent to Bowes Variant and Lafayette soils and to the Mahalasville soils that have a gravelly substratum. Waupecan soils have a dark surface layer 10 or more inches thick. Bowes Variant soils have gray mottles in the lower part of the subsoil. They are at the slightly lower elevations. Lafayette and Mahalasville soils have a dark surface layer 10 or more inches thick. They have a mottled subsoil that is grayer than that of the Bowes soils. They are at the lower elevations or in depressions.

Typical pedon of Bowes silt loam, 0 to 2 percent slopes, in a cultivated field; 1,330 feet west and 140 feet south of the northeast corner of sec. 17, T. 22 N., R. 4 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

Bt1—9 to 17 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; firm; few fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—17 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky;

firm; few fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear wavy boundary.

2Bt3—28 to 32 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; few pebbles; strongly acid; clear wavy boundary.

2Bt4—32 to 37 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate coarse subangular blocky structure; firm; few fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; thin patchy black (N 2/0) iron and manganese oxide stains on faces of peds; few pebbles; strongly acid; gradual wavy boundary.

2Bt5—37 to 41 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate coarse subangular blocky structure; friable; few fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; thin patchy black (N 2/0) iron and manganese oxide stains on faces of peds; strongly acid; gradual wavy boundary.

2Bt6—41 to 49 inches; dark yellowish brown (10YR 4/4) fine sand; weak coarse subangular blocky structure; very friable; few fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; strongly acid; clear wavy boundary.

3Bt7—49 to 56 inches; dark brown (7.5YR 3/2) gravelly sandy clay loam; weak medium and coarse subangular blocky structure; firm; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 33 percent gravel; medium acid; clear wavy boundary.

3C—56 to 60 inches; dark yellowish brown (10YR 4/4) gravelly coarse sand; single grained; loose; 34 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 70 inches. The thickness of the silty material ranges from 28 to 50 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. The texture ranges from silt loam in the upper part to silty clay loam in the lower part.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 6. It is clay loam, sandy clay loam, fine sand, sandy loam, or fine sandy loam. Reaction ranges from strongly acid to slightly acid.

The 3Bt horizon has hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4. It is gravelly sandy clay loam, gravelly sandy loam, or gravelly loamy sand. Reaction

ranges from strongly acid to mildly alkaline.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is stratified and commonly is coarse sand or gravelly coarse sand.

## Bowes Variant

The Bowes Variant consists of moderately well drained soils on outwash plains. These soils are deep or very deep over gravelly sand. Permeability is moderate in the upper part of the subsoil, moderately rapid in the lower part of the subsoil, and very rapid in the underlying material. The soils formed in silty material and in the underlying loamy and gravelly outwash. Slopes range from 0 to 2 percent.

Bowes Variant soils are similar to the moderately wet Waupecan soils and are commonly adjacent to Bowes and Lafayette soils and to the Mahalassville soils that have a gravelly substratum. Waupecan soils have a dark surface layer 10 or more inches thick. Bowes soils do not have gray mottles in the subsoil. They are in the higher areas. Lafayette and Mahalassville soils have a dark surface layer 10 or more inches thick. They have a mottled subsoil that is grayer than that of the Bowes Variant soils. They are in low areas or in depressions.

Typical pedon of Bowes Variant silt loam, 0 to 2 percent slopes, in a cultivated field; 2,275 feet west and 1,380 feet north of the southeast corner of sec. 13, T. 22 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; many fine and very fine roots; neutral; abrupt smooth boundary.

Bt1—9 to 14 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; firm; common very fine roots; few very fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—14 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine roots; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—26 to 30 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common very fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 1 percent gravel; strongly acid; gradual smooth boundary.

2Bt4—30 to 43 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct grayish brown

(10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; few very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; 5 percent gravel; very strongly acid; clear wavy boundary.

3Bt5—43 to 53 inches; dark brown (10YR 4/3) gravelly sandy loam; common medium distinct grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; very friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 30 percent gravel; neutral; clear wavy boundary.

3C—53 to 60 inches; brown (10YR 5/3) gravelly sand; single grained; loose; 33 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 70 inches. The thickness of the silty material ranges from 24 to 50 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from very strongly acid to slightly acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. It is clay loam, sandy clay loam, loam, or sandy loam. Reaction ranges from very strongly acid to slightly acid.

The 3Bt horizon has hue of 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is gravelly sandy clay loam, gravelly sandy loam, or gravelly loamy sand. Reaction ranges from strongly acid to neutral.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

## Brenton Series

The Brenton series consists of very deep, somewhat poorly drained, moderately permeable soils on till plains. These soils formed in loess or other silty material and in the underlying glaciofluvial deposits. Slopes are 0 to 1 percent.

Brenton soils are similar to Millbrook soils and are commonly adjacent to Drummer, Raub, and Throckmorton soils. Millbrook soils have a dark surface layer less than 10 inches thick. Drummer soils have a grayer subsoil than the Brenton soils. They are in depressions and drainageways. Raub soils are underlain by glacial till. They are at the slightly higher elevations. Throckmorton soils do not have gray mottles in the upper part of the subsoil. They are on rises and in the more sloping areas.

Typical pedon of Brenton silt loam, in an area of Raub-Brenton complex, 0 to 1 percent slopes, in a cultivated field; 275 feet east and 1,975 feet south of the northwest corner of sec. 33, T. 22 N., R. 5 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—11 to 18 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct dark grayish brown (2.5Y 4/2) mottles; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (2.5Y 4/2) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—18 to 24 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark grayish brown (2.5Y 4/2) clay films on faces of peds; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt3—24 to 29 inches; olive brown (2.5Y 4/4) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine pores; thin continuous dark grayish brown (2.5Y 4/2) clay films on faces of peds; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt4—29 to 38 inches; olive brown (2.5Y 4/4) silty clay loam; common medium distinct grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few very fine roots; common very fine pores; thin patchy very dark gray (10YR 3/1) organic coatings on faces of prisms; neutral; clear smooth boundary.

2Bt5—38 to 48 inches; light olive brown (2.5Y 5/4) silt loam that has pockets of sandy loam; common medium distinct grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; common very fine and fine pores; thin patchy dark grayish brown (2.5Y 4/2) clay films on faces of peds and lining pores; 3 percent gravel; mildly alkaline; clear wavy boundary.

2BCt—48 to 52 inches; light olive brown (2.5Y 5/4) silt loam that has pockets of sand; common medium distinct grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/6) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin patchy dark grayish brown (2.5Y 4/2) clay films on faces of peds and lining pores; 3 percent gravel;

slight effervescence; mildly alkaline; clear wavy boundary.

2C—52 to 60 inches; light olive brown (2.5Y 5/4) silt loam that has thin strata of sand; common medium distinct grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/6) mottles; massive; firm; few fine pores; 3 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the loess or silty material ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 4. Reaction ranges from medium acid to neutral.

The 2Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 6. It is silt loam or sandy loam. In some pedons it has sandy strata below a depth of 40 inches. Reaction ranges from medium acid to mildly alkaline.

The 2C horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 2 to 6. The texture commonly ranges from fine sandy loam to silt loam. This horizon has strata of sand or loamy fine sand in all pedons.

## Camden Series

The Camden series consists of very deep, well drained, moderately permeable soils on till plains. These soils formed in silty material and in the underlying stratified loamy outwash. Slopes range from 0 to 2 percent.

Camden soils are similar to Mellott soils and are commonly adjacent to Fincastle, Rockfield, and Starks soils. Mellott soils have a darker surface layer than the Camden soils. Fincastle, Starks, and Rockfield soils are at the slightly lower elevations. Fincastle and Starks soils have gray mottles in the upper part of the subsoil. Rockfield soils have gray mottles in the lower part of the subsoil.

Typical pedon of Camden silt loam, 0 to 2 percent slopes, in a cultivated field; 300 feet east and 1,640 feet south of the northwest corner of sec. 34, T. 23 N., R. 3 W.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—9 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; firm; common fine roots; few fine pores; thin

continuous dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—15 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous dark brown (7.5YR 3/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—22 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt4—29 to 33 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt5—33 to 39 inches; dark brown (7.5YR 4/4) sandy loam; weak coarse subangular blocky structure; friable; common fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt6—39 to 50 inches; dark brown (7.5YR 4/4) fine sandy loam that has one 3-inch layer of gravelly sandy loam; weak coarse subangular blocky structure; firm; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt7—50 to 64 inches; dark yellowish brown (10YR 4/4) loam; common medium faint yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; friable; common fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2C—64 to 70 inches; yellowish brown (10YR 5/4) loam that has strata of sandy loam; massive; friable; few medium very dark grayish brown (10YR 3/2) iron and manganese oxide accumulations; neutral.

The thickness of the solum ranges from 45 to 65 inches. The thickness of the silt ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 4, 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. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is clay loam, fine sandy loam, loam, sandy clay loam, or sandy loam. Reaction ranges from strongly acid to neutral.

The 2C horizon has hue of 10YR, value of 4 or 5, and chroma of 4. It is stratified and commonly is sandy loam, loam, or silt loam.

### Carmi Series

The Carmi series consists of well drained soils on terraces and outwash plains. These soils are deep over sand and very gravelly coarse sand. Permeability is moderately rapid in the solum and very rapid in the underlying material. The soils formed in loamy outwash and in the underlying gravelly outwash. Slopes range from 0 to 6 percent.

Carmi soils are similar to Elston soils and to the Billett soils that have a gravelly substratum. They are commonly adjacent to Desker, Sparta, and Troxel soils. Billett soils have a dark surface layer less than 10 inches thick. Elston soils have less gravel in the upper part of the subsoil than the Carmi soils. Desker soils have a solum that is less than 40 inches thick. They are in the more sloping areas. Sparta soils have less clay in the subsoil than the Carmi soils. They are at the higher elevations. Troxel soils have a surface layer that is 24 or more inches thick and have less sand in the upper part of the solum than the Carmi soils. They are in potholes and drainageways.

Typical pedon of Carmi sandy loam, 2 to 6 percent slopes, in a cultivated field; 1,150 feet west and 2,540 feet south of the northeast corner of sec. 36, T. 23 N., R. 6 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) sandy loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; 1 percent gravel; neutral; abrupt smooth boundary.

A—10 to 13 inches; very dark gray (10YR 3/1) sandy loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common very fine pores; 1 percent gravel; strongly acid; clear smooth boundary.

Bt1—13 to 20 inches; dark brown (7.5YR 3/4) sandy loam; weak fine subangular blocky structure; friable; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; 1 percent gravel; medium acid; clear smooth boundary.

2Bt2—20 to 26 inches; dark brown (7.5YR 3/4) gravelly sandy loam; weak fine subangular blocky structure; friable; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 20 percent gravel; slightly acid; clear smooth boundary.

2Bt3—26 to 30 inches; dark brown (7.5YR 3/4) very gravelly sandy loam; weak fine subangular blocky

structure; friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 44 percent gravel; slightly acid; gradual smooth boundary.

2Bt4—30 to 41 inches; dark brown (7.5YR 3/4) very gravelly loamy sand; weak fine subangular blocky structure; very friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 45 percent gravel; neutral; gradual smooth boundary.

2BCt—41 to 45 inches; dark brown (7.5YR 3/4) very gravelly loamy sand; weak medium granular structure; very friable; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 50 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.

2C—45 to 60 inches; yellowish brown (10YR 5/4), stratified sand and very gravelly coarse sand; single grained; loose; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches.

The Ap and A horizons have hue of 10YR, value of 3, and chroma of 1 or 2. They are loam or sandy loam.

The Bt horizon has hue of 7.5YR, value of 3 or 4, and chroma of 2 to 4. It is loam, sandy clay loam, sandy loam, or loamy sand. Reaction ranges from strongly acid to neutral.

The 2Bt horizon is the gravelly or very gravelly analogs of loam, sandy loam, or loamy sand. Reaction ranges from very strongly acid to mildly alkaline.

The 2C horizon has hue of 10YR, value of 5, and chroma of 3 or 4. It is stratified and commonly is sand, gravelly sand, or very gravelly coarse sand.

### Ceresco Series

The Ceresco series consists of somewhat poorly drained soils on flood plains. These soils are moderately deep or deep over gravelly sand and very gravelly sand. Permeability is moderately rapid in the solum and very rapid in the underlying material. The soils formed in alluvium. Slopes range from 0 to 2 percent.

Ceresco soils are commonly adjacent to Cohoctah and Ouiatenon soils. Cohoctah soils have a dominantly gray subsoil. They are at the slightly lower elevations and in areas adjacent to uplands. Ouiatenon soils have a brown subsoil that does not have mottles. They have less clay in the subsoil than the Ceresco soils. They are in areas adjacent to stream channels.

Typical pedon of Ceresco loam, gravelly substratum, occasionally flooded, in a cultivated field; 1,880 feet west and 540 feet south of the northeast corner of sec. 27, T. 22 N., R. 4 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.

A—10 to 13 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; friable; common fine pores; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bw—13 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; common fine pores; thin discontinuous dark grayish brown (10YR 4/2) organic coatings on faces of peds; very dark gray (10YR 3/1) fillings in channels; slightly acid; clear smooth boundary.

Bg—20 to 31 inches; dark grayish brown (10YR 4/2) fine sandy loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine pores; thin continuous dark gray (10YR 4/1) organic coatings on faces of peds; few pebbles; neutral; clear wavy boundary.

Cg1—31 to 42 inches; grayish brown (10YR 5/2) gravelly sand; single grained; loose; 17 percent fine gravel; strong effervescence; moderately alkaline; clear smooth boundary.

Cg2—42 to 60 inches; grayish brown (10YR 5/2) very gravelly sand; single grained; loose; 46 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 14 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is loam or sandy loam.

The Bw horizon has hue of 10YR, value of 4, and chroma of 3 to 6. It is sandy loam or fine sandy loam. Reaction ranges from slightly acid to mildly alkaline.

The Bg horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 2. Reaction ranges from slightly acid to mildly alkaline.

The Cg horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2.

### Chalmers Series

The Chalmers series consists of poorly drained soils on till plains. These soils are deep over compact glacial till. Permeability is moderate in the solum and moderately slow in the underlying material. The soils formed in silty material and in the underlying glacial till. Slopes range from 0 to 2 percent.

Chalmers soils are similar to Treaty soils and are commonly adjacent to Millbrook and Toronto soils. Treaty soils have an argillic horizon. Millbrook and Toronto soils have a surface layer that is less than 10 inches thick and have a browner subsoil than the Chalmers soils. They are in the slightly higher positions on the landscape.

Typical pedon of Chalmers silty clay loam, in a cultivated field; 1,840 feet west and 2,050 feet south of the northeast corner of sec. 31, T. 23 N., R. 3 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; firm; common fine roots; medium acid; abrupt smooth boundary.

A—9 to 13 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent grayish brown (2.5Y 5/2) mottles; moderate fine subangular blocky structure; firm; common fine roots; slightly acid; gradual smooth boundary.

Bg1—13 to 20 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct olive brown (2.5Y 4/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many fine pores; thin continuous dark gray (10YR 4/1) and very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; gradual smooth boundary.

Bg2—20 to 30 inches; grayish brown (10YR 5/2) silty clay loam; common medium prominent light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many fine pores; thin continuous dark gray (10YR 4/1) organic coatings on faces of peds; krotovinas 2 inches in diameter filled with very dark gray (10YR 3/1) silty clay loam material; neutral; gradual smooth boundary.

2Bg3—30 to 35 inches; grayish brown (10YR 5/2) clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; many fine pores; thin discontinuous dark grayish brown (10YR 4/2) organic coatings on faces of peds; krotovinas 2 inches in diameter filled with very dark gray (10YR 3/1) silty clay loam material; 3 percent gravel; neutral; gradual smooth boundary.

2Bg4—35 to 45 inches; grayish brown (10YR 5/2) loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; many fine pores; thin patchy dark grayish brown (10YR 4/2) organic coatings on vertical faces of peds; 5 percent gravel; mildly

alkaline; gradual wavy boundary.

2Cd—45 to 60 inches; yellowish brown (10YR 5/4) loam; common medium distinct gray (10YR 6/1) and yellowish brown (10YR 5/8) mottles; weak medium platy till structure; very firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 24 to 40 inches.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1.

The Bg horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 1 or 2. It is silt loam or silty clay loam. Reaction ranges from slightly acid to mildly alkaline.

The 2Bg horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2. Reaction ranges from slightly acid to mildly alkaline.

The 2Cd horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 1 to 4.

### Cohoctah Series

The Cohoctah series consists of very poorly drained soils on flood plains. These soils are moderately deep or deep over sand and gravelly sand. Permeability is moderately rapid in the solum and very rapid in the underlying material. The soils formed in alluvium. Slopes range from 0 to 2 percent.

Cohoctah soils are commonly adjacent to Ceresco and Ouiatenon soils. Ceresco soils have a browner subsoil than the Cohoctah soils. Also, they are closer to stream channels. Ouiatenon soils have a dominantly brown subsoil. They are on flood plains adjacent to stream channels.

Typical pedon of Cohoctah fine sandy loam, gravelly substratum, rarely flooded, in a cultivated field; 990 feet south and 925 feet west of the northeast corner of sec. 28, T. 23 N., R. 3 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) fine sandy loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; firm; common fine roots; few pebbles; neutral; abrupt smooth boundary.

AB—10 to 13 inches; very dark gray (10YR 3/1) fine sandy loam, dark grayish brown (10YR 4/2) dry; few fine prominent dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; firm; common fine roots; common fine pores; few pebbles; neutral; clear wavy boundary.

Bg1—13 to 21 inches; dark grayish brown (10YR 4/2) fine sandy loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak medium

subangular blocky structure; firm; few fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) organic coatings on faces of peds; few pebbles; mildly alkaline; clear wavy boundary.

Bg2—21 to 28 inches; grayish brown (10YR 5/2) fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse prismatic structure; friable; few fine roots; few fine pores; thin patchy discontinuous dark grayish brown (10YR 4/2) organic coatings on faces of peds and in pores; few pebbles; slight effervescence; mildly alkaline; clear wavy boundary.

BCg—28 to 32 inches; grayish brown (10YR 5/2) loamy fine sand; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very friable; few fine roots; few fine pores; thin discontinuous dark grayish brown (10YR 4/2) organic coatings on faces of peds and in pores; slight effervescence; mildly alkaline; clear wavy boundary.

Cg1—32 to 38 inches; grayish brown (10YR 5/2) loamy sand; common medium distinct yellowish brown (10YR 5/4) mottles; weak coarse subangular blocky structure; loose; 1 percent gravel; slight effervescence; moderately alkaline; clear wavy boundary.

Cg2—38 to 48 inches; grayish brown (10YR 5/2) sand; common medium distinct yellowish brown (10YR 5/4) mottles; single grained; loose; 2 percent gravel; strong effervescence; moderately alkaline; clear smooth boundary.

2Cg3—48 to 60 inches; grayish brown (10YR 5/2) gravelly sand; common medium distinct yellowish brown (10YR 5/4) mottles; single grained; loose; 30 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 50 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam or loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 or 2. It is sandy loam, fine sandy loam, or loam. Reaction ranges from slightly acid to moderately alkaline.

The Cg and 2Cg horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The 2Cg horizon is the gravelly or very gravelly analogs of loamy sand, sand, or coarse sand.

### Coloma Series

The Coloma series consists of very deep, somewhat excessively drained, rapidly permeable soils on terraces

and outwash plains. These soils formed in sandy sediments. Slopes range from 6 to 15 percent.

Coloma soils are similar to Oakville, Sparta, and Spinks soils and are commonly adjacent to Elston soils and to the Billett soils that have a gravelly substratum. Oakville soils do not have bands in the subsoil and have finer sized sand than the Coloma soils. Sparta soils have a thicker and darker surface layer than the Coloma soils. Spinks soils have more than 6 inches of bands in the subsoil. Billett and Elston soils have more clay in the upper part of the subsoil than the Coloma soils. They are at the lower elevations.

Typical pedon of Coloma sand, 6 to 15 percent slopes, in an idle field; 550 feet west and 700 feet south of the center of sec. 26, T. 23 N., R. 5 W.

Ap—0 to 8 inches; dark brown (10YR 3/3) sand, pale brown (10YR 6/3) dry; weak very fine granular structure; very friable; common very fine roots; strongly acid; abrupt smooth boundary.

E—8 to 34 inches; yellowish brown (10YR 5/4) sand; weak coarse subangular blocky structure; very friable; few fine roots; medium acid; gradual wavy boundary.

E&Bt—34 to 80 inches; yellowish brown (10YR 5/4) sand (E); single grained; loose; bands of dark brown (7.5YR 4/4) loamy sand (B) at depths of 33, 37, 41, 45, 49, 52, 55, 59, 63, 67, 71, 75, and 79 inches; massive; very friable; bands are  $\frac{1}{8}$  to  $\frac{3}{8}$  inch thick, are discontinuous, and have a cumulative thickness of 3 inches within a depth of 60 inches; weak clay bridges connect sand grains in bands; medium acid.

The thickness of the solum is more than 80 inches. The total thickness of the Bt bands is less than 6 inches within a depth of 59 inches.

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

The E horizon has hue of 10YR, value of 5, and chroma of 4 to 6. Reaction ranges from very strongly acid to slightly acid.

The E part of the E&Bt horizon has hue of 10YR, value of 5, and chroma of 4 to 6. The Bt part has hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is loamy sand or sandy loam. The E&Bt horizon ranges from very strongly acid to medium acid.

## Crosby Series

The Crosby series consists of somewhat poorly drained, slowly permeable soils on till plains and recessional moraines. These soils are moderately deep over compact glacial till. They formed in a thin layer of

silty material and in the underlying glacial till. Slopes range from 0 to 6 percent.

The Crosby soils in this survey area have less clay in the subsoil than is defined as the range for the series. This difference, however, does not affect the use or behavior of these soils. The soils are classified as fine-loamy, mixed, mesic Aeric Ochraqualfs.

Crosby soils are commonly adjacent to Fincastle, Mahalasville, Miami, Starks, and Treaty soils. Fincastle and Starks soils have less sand in the upper part of the subsoil than the Crosby soils and have a thicker solum. They are in the more level areas. Mahalasville and Treaty soils have a darker surface layer than the Crosby soils and have a grayer subsoil. They are in depressions. Miami soils have a browner subsoil than the Crosby soils. They are on knolls and on the more sloping part of the side slopes.

Typical pedon of Crosby silt loam, in an area of Crosby-Miami complex, 2 to 6 percent slopes, eroded, in a cultivated field; 530 feet west and 1,450 feet north of the southeast corner of sec. 14, T. 22 N., R. 3 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; mixed with common medium distinct dark yellowish brown (10YR 4/4) pockets of silty clay loam from the subsoil; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

Bt1—9 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—18 to 22 inches; dark yellowish brown (10YR 4/6) clay loam; common medium prominent grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent gravel; neutral; clear smooth boundary.

2Bt3—22 to 31 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; moderate coarse subangular blocky structure; firm; few very fine pores; thin discontinuous dark gray (10YR 4/1) clay films on faces of peds; 5 percent gravel; neutral; gradual wavy boundary.

2Cd—31 to 60 inches; yellowish brown (10YR 5/4) loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium and thick platy till

structure; very firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 26 to 40 inches. The thickness of the silty material ranges from 0 to 18 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 3 to 6. Reaction ranges from strongly acid to neutral. Some pedons have a BC horizon.

The 2Cd horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

### Desker Series

The Desker series consists of well drained soils on kames, eskers, terraces, and outwash plains. These soils are moderately deep over sand and gravelly coarse sand or very gravelly coarse sand. Permeability is moderately rapid in the upper part of the solum, rapid in the lower part of the solum, and very rapid in the underlying material. The soils formed in gravelly outwash. Slopes range from 6 to 18 percent.

Desker soils are similar to Kosciusko soils and are commonly adjacent to Carmi, Longlois, and Rodman soils. Kosciusko soils have more clay in the upper part of the subsoil than the Desker soils and have a lighter colored surface layer. Carmi soils have a dark surface layer that is 10 or more inches thick. They are in the less sloping areas. Longlois soils have more clay in the subsoil than the Desker soils and have a thicker solum. They are in the less sloping areas, on toe slopes, and on ridgetops. Rodman soils have a thinner solum than the Desker soils and have less clay in the subsoil. They are in the steeper areas.

Typical pedon of Desker sandy loam, kame, 6 to 12 percent slopes, eroded, in a cultivated field; 2,480 feet west and 2,270 feet north of the southeast corner of sec. 6, T. 21 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) sandy loam, dark brown (10YR 4/3) dry; common coarse dark brown (7.5YR 3/4) pockets of material from the subsoil; moderate medium granular structure; friable; slightly acid; 12 percent gravel; abrupt smooth boundary.

Bt1—9 to 15 inches; dark brown (7.5YR 3/4) gravelly sandy loam; moderate fine subangular blocky structure; friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 15 percent gravel; slightly acid; clear smooth boundary.

Bt2—15 to 25 inches; dark brown (7.5YR 3/4) gravelly coarse sandy loam; weak fine subangular blocky structure; friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 18 percent gravel; neutral; clear wavy boundary.

BCt—25 to 34 inches; dark yellowish brown (10YR 4/4) gravelly loamy coarse sand; weak medium granular structure; very friable; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 20 percent gravel; slight effervescence; moderately alkaline; abrupt irregular boundary.

C—34 to 60 inches; brown (10YR 5/3), stratified sand and gravelly coarse sand; single grained; loose; 25 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is sandy loam or gravelly sandy loam. It is medium acid or slightly acid.

The Bt horizon has hue of 7.5YR and value and chroma of 3 or 4. It is gravelly sandy loam in the upper part and gravelly coarse sandy loam or gravelly loamy coarse sand in the lower part. Reaction ranges from medium acid to neutral in the upper part and from neutral to moderately alkaline in the lower part.

The C horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

### Drummer Series

The Drummer series consists of very deep, poorly drained, moderately permeable soils on recessional moraines and till plains. These soils formed in silty sediments and in the underlying glaciofluvial deposits. Slopes range from 0 to 2 percent.

Drummer soils are similar to Mahalasville soils and are commonly adjacent to Brenton, Millbrook, Raub, and Toronto soils. These associated soils are in the higher positions on the landscape. Mahalasville soils formed in less than 40 inches of silty material. Brenton, Raub, Millbrook, and Toronto soils have a browner subsoil than the Drummer soils. Also, Millbrook and Toronto soils have a thinner surface layer.

Typical pedon of Drummer silty clay loam, in an area of Drummer soils, in a cultivated field; 2,540 feet east and 100 feet south of the northwest corner of sec. 6, T. 22 N., R. 3 W.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure; firm; many medium roots; neutral; abrupt smooth boundary.

A—9 to 13 inches; black (10YR 2/1) silty clay loam,

dark gray (10YR 4/1) dry; weak medium prismatic structure parting to weak medium subangular blocky; firm; common medium roots; neutral; clear smooth boundary.

AB—13 to 17 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; common fine prominent light olive brown (2.5Y 5/4) mottles; moderate coarse prismatic structure parting to moderate fine subangular blocky; firm; common fine and medium roots; common fine pores; common fine strong brown (7.5YR 4/6) iron and manganese oxide accumulations; neutral; clear smooth boundary.

Bg1—17 to 23 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; common fine pores; thin continuous very dark gray (10YR 3/1) organic coatings on faces of peds; common fine strong brown (7.5YR 4/6) iron and manganese oxide accumulations; slightly acid; gradual smooth boundary.

Bg2—23 to 30 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate coarse angular blocky; firm; common fine roots; common fine pores; thin continuous very dark gray (10YR 3/1) organic coatings on faces of peds; few fine strong brown (7.5YR 4/6) iron and manganese oxide accumulations; neutral; gradual smooth boundary.

Bg3—30 to 38 inches; light brownish gray (2.5Y 6/2) silty clay loam; many coarse prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm; few fine roots; common fine pores; thin continuous dark gray (10YR 4/1) clay films on faces of peds; common medium black (5YR 2.5/1) iron and manganese oxide accumulations; neutral; gradual smooth boundary.

Bw1—38 to 54 inches; yellowish brown (10YR 5/6) silt loam; many coarse prominent light brownish gray (2.5Y 6/2) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few fine roots; common fine pores; thin discontinuous grayish brown (2.5Y 5/2) clay films on faces of peds; common medium black (5YR 2.5/1) iron and manganese oxide accumulations; neutral; clear wavy boundary.

2Bw2—54 to 70 inches; yellowish brown (10YR 5/6) clay loam; many coarse distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; thin patchy dark gray (10YR 4/1)

clay films on faces of peds; common medium black (5YR 2.5/1) iron and manganese oxide accumulations; 3 percent gravel; neutral; gradual smooth boundary.

2C—70 to 80 inches; yellowish brown (10YR 5/6) loam that has strata of silty clay loam; many coarse distinct grayish brown (10YR 5/2) mottles; massive; firm; few medium black (5YR 2.5/1) iron and manganese oxide accumulations; 5 percent gravel; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the silty material ranges from 40 to 60 inches.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1. The total combined thickness of the A horizons ranges from 10 to 20 inches.

The Bg horizon is mottled. It has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. Reaction ranges from slightly acid to mildly alkaline.

The 2Bw horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 to 6. It is clay loam, sandy clay loam, loam, or sandy loam. Reaction ranges from slightly acid to mildly alkaline.

The 2C horizon has hue of 2.5Y or 10YR, value of 4 to 7, and chroma of 1 to 8. The texture ranges from silty clay loam to sandy loam.

A stratified sandy substratum phase is recognized in the county.

## Du Page Series

The Du Page series consists of very deep, well drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Du Page soils are similar to Ross soils and are commonly adjacent to Allison, Battleground, Sawabash, and Tice soils. Ross soils are not calcareous in the upper part of the solum. Allison soils have less sand in the subsoil than the Du Page soils. They are in the slightly higher positions on the landscape. Battleground soils have a dark surface layer less than 24 inches thick and have less sand in the subsoil than the Du Page soils. They are at the slightly lower elevations. Sawabash and Tice soils have a grayer subsoil than the Du Page soils and have less sand in the subsoil. They are in the lower lying areas.

Typical pedon of Du Page loam, frequently flooded, in a cultivated field; 395 feet north and 60 feet west of the southeast corner of sec. 26, T. 23 N., R. 6 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; common fine

roots; slight effervescence; moderately alkaline; abrupt smooth boundary.

A1—10 to 14 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; common very fine roots; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.

A2—14 to 34 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky structure; friable; few very fine roots; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.

A3—34 to 49 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky structure; friable; common very fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; slight effervescence; moderately alkaline; gradual smooth boundary.

C—49 to 60 inches; dark brown (10YR 4/3) sandy loam; moderate fine subangular blocky structure; friable; few very fine pores; slight effervescence; moderately alkaline.

The thickness of the mollic epipedon ranges from 24 to 52 inches.

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

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

## Elston Series

The Elston series consists of well drained soils on terraces and outwash plains. These soils are deep or very deep over gravelly sand or coarse sand and very gravelly coarse sand. Permeability is moderately rapid in the upper part of the solum, rapid in the lower part of the solum, and very rapid in the underlying material. The soils formed in loamy outwash and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

The Elston soils in this survey area are taxadjuncts because they do not have a sufficient increase in clay content in the subsoil. This difference, however, does not affect the use or behavior of these soils. The soils are classified as coarse-loamy, mixed, mesic Typic Hapludolls.

Elston soils are similar to Carmi soils and to the Billett soils that have a gravelly substratum. They are commonly adjacent to Sparta and Troxel soils. Billett

soils have a dark surface layer less than 10 inches thick. Carmi soils have more gravel in the subsoil than the Elston soils. Sparta soils have less clay and gravel throughout the solum than the Elston soils. They are on rises. Troxel soils have less sand in the upper part of the subsoil than the Elston soils and have a thicker surface layer. They are in depressions and drainageways.

Typical pedon of Elston loam, gravelly substratum, 0 to 2 percent slopes, in a cultivated field; 200 feet east and 1,055 feet south of the northwest corner of sec. 7, T. 22 N., R. 5 W.

Ap—0 to 9 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

A—9 to 14 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; many fine pores; thin continuous black (10YR 2/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—14 to 19 inches; dark yellowish brown (10YR 3/4) loam; moderate fine subangular blocky structure; friable; common fine and medium pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—19 to 24 inches; dark brown (7.5YR 3/4) sandy loam; moderate medium subangular blocky structure; friable; many fine and medium pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—24 to 29 inches; dark brown (7.5YR 3/4) sandy loam; moderate medium subangular blocky structure; friable; many fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt4—29 to 34 inches; dark brown (7.5YR 3/4) sandy loam; moderate medium subangular blocky structure; friable; many fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 3 percent gravel; strongly acid; clear smooth boundary.

2Bt5—34 to 38 inches; dark brown (7.5YR 3/4) sandy loam; weak coarse subangular blocky structure; friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 10 percent gravel; strongly acid; gradual smooth boundary.

2Bt6—38 to 45 inches; dark brown (7.5YR 3/4) loamy sand; weak coarse subangular blocky structure; very friable; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 1 percent gravel;

strongly acid; clear wavy boundary.

2Bt7—45 to 52 inches; dark brown (7.5YR 3/4) loamy sand; weak coarse subangular blocky structure; very friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 6 percent gravel; medium acid; gradual wavy boundary.

2Bt8—52 to 58 inches; dark brown (7.5YR 3/4) loamy sand; weak coarse subangular blocky structure; very friable; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 8 percent gravel; slightly acid; clear wavy boundary.

3C—58 to 70 inches; yellowish brown (10YR 5/4) gravelly sand; single grained; loose; 19 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 70 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2. It is loam or sandy loam. The total combined thickness of the A horizons ranges from 10 to 23 inches.

The Bt horizon has hue of 7.5YR or 10YR and value and chroma of 3 or 4. Reaction ranges from strongly acid to slightly acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 or 4. It is sand, loamy sand, or sandy loam. The content of gravel ranges from 0 to 14 percent. Reaction ranges from strongly acid to neutral.

The 2C horizon has hue of 10YR, value of 5, and chroma of 3 or 4. It is stratified. The textures include sand, coarse sand, gravelly sand, and very gravelly coarse sand.

## Fincastle Series

The Fincastle series consists of somewhat poorly drained soils on till plains. These soils are deep over compact glacial till. Permeability is moderate in the upper part of the solum, moderately slow in the lower part of the solum, and slow in the underlying material. The soils formed in silty material and in the underlying glacial till. Slopes range from 0 to 3 percent.

Fincastle soils are similar to Toronto soils and are adjacent to Crosby, Mahalassville, Miami, Rockfield, Starks, and Treaty soils. Toronto soils have a darker surface layer than the Fincastle soils. Crosby soils have more sand in the upper part of the subsoil than the Fincastle soils. They are in positions on the landscape similar to those of the Fincastle soils. Mahalassville and Treaty soils have a dark surface layer and a gray subsoil. They are in the lower positions on the landscape. Miami soils have a brown subsoil that is not mottled. Also, they have more sand in the upper part of the subsoil than the Fincastle soils. They are on slight

risers and in the more sloping areas along drainageways. Rockfield soils do not have gray mottles in the upper part of the subsoil. They are on rises and in the more sloping areas adjacent to drainageways. Starks soils are underlain by stratified material. They are in positions on the landscape similar to those of the Fincastle soils.

Typical pedon of Fincastle silt loam, in an area of Starks-Fincastle complex, 0 to 2 percent slopes, in a cultivated field; 1,060 feet east and 1,060 feet north of the southwest corner of sec. 14, T. 23 N., R. 3 W.

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

Bt1—10 to 15 inches; olive brown (2.5Y 4/4) silt loam; common fine prominent grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; common fine roots; many fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin discontinuous light brownish gray (10YR 6/2) silt coatings on faces of peds; common fine black (N 2/0) iron and manganese oxide accumulations; very strongly acid; clear smooth boundary.

Bt2—15 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate fine and medium subangular blocky; firm; common fine roots; many fine pores; thin continuous light brownish gray (10YR 6/3) silt coatings on faces of peds; common fine black (N 2/0) iron and manganese oxide accumulations; very strongly acid; clear smooth boundary.

Bt3—23 to 31 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct grayish brown (10YR 5/2) and pale brown (10YR 6/3) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; many fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; thin discontinuous light brownish gray (10YR 6/3) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

Bt4—31 to 39 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct grayish brown (10YR 5/2) and pale brown (10YR 6/3) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds and lining

pores; common fine black (N 2/0) iron and manganese oxide accumulations; medium acid; clear wavy boundary.

2Bt5—39 to 48 inches; yellowish brown (10YR 5/6) clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few fine roots; many fine pores; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; common very dark grayish brown (10YR 3/2) linings in pores; common medium black (N 2/0) iron and manganese oxide accumulations; neutral; clear wavy boundary.

2Bt6—48 to 54 inches; yellowish brown (10YR 5/6) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few fine roots; common fine pores; thin patchy very dark grayish brown (10YR 4/2) clay films and clay flows; few dark grayish brown (10YR 4/2) linings in pores; few medium black (N 2/0) iron and manganese oxide accumulations; mildly alkaline; clear wavy boundary.

2Cd—54 to 60 inches; yellowish brown (10YR 5/4) loam; common coarse distinct gray (10YR 5/1) and many coarse distinct yellowish brown (10YR 5/6) mottles; weak medium platy till structure; very firm; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 22 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bt horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 2 to 6. Reaction ranges from very strongly acid to slightly acid.

The 2Bt horizon is mottled and has colors similar to those of the Bt horizon. Reaction ranges from strongly acid to mildly alkaline.

The 2Cd horizon has hue of 10YR, value of 5, and chroma of 3 to 6.

## Harpster Series

The Harpster series consists of very deep, very poorly drained, moderately permeable soils on outwash plains. These soils formed in silty sediments. Slopes range from 0 to 2 percent.

Harpster soils are commonly adjacent to Pella soils and to the Mahalasville soils that have a gravelly substratum. Mahalasville and Pella soils do not have free carbonates in the surface layer or the upper part of the subsoil. They are at the slightly higher elevations.

Typical pedon of Harpster silt loam, pothole, in a cultivated field; 2,240 feet east and 1,580 feet north of the southwest corner of sec. 9, T. 22 N., R. 4 W.

Apk—0 to 11 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few snail shells; strong effervescence (17 percent calcium carbonate); moderately alkaline; abrupt smooth boundary.

Bgk—11 to 17 inches; dark gray (5Y 4/1) silt loam; common medium prominent light olive brown (2.5Y 5/6) mottles; weak coarse prismatic structure parting to weak medium platy; friable; common very fine pores; thin discontinuous black (10YR 2/1) organic coatings on faces of peds; krotovina 2 inches in diameter filled with black (10YR 2/1) silty clay loam material; common snail shells; strong effervescence (44 percent calcium carbonate); moderately alkaline; clear smooth boundary.

Bg—17 to 30 inches; dark grayish brown (2.5Y 4/2) silty clay loam; weak coarse subangular blocky structure; firm; few very fine pores; thin discontinuous black (10YR 2/1) organic coatings on faces of peds; many coarse dark reddish brown (2.5YR 3/4) iron and manganese oxide accumulations; krotovina 2 inches in diameter filled with black (10YR 2/1) silty clay loam material; few snail shells; strong effervescence (1 percent calcium carbonate); moderately alkaline; clear smooth boundary.

Cg—30 to 60 inches; gray (5Y 5/1) silt loam; massive; firm; few very fine pores; thin continuous dark gray (10YR 4/1) organic coatings in pores; krotovina 2 inches in diameter filled with black (10YR 2/1) silty clay loam material; few snail shells; strong effervescence (21 percent calcium carbonate); moderately alkaline.

The thickness of the solum ranges from 22 to 40 inches. A calcic horizon is at the surface or within a depth of 16 inches.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1. The total combined thickness of the A horizons ranges from 10 to 24 inches. These horizons are silt loam or silty clay loam.

The Bg horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2.

The Cg horizon has hue of 5Y, 2.5Y, or 10YR, value of 5 or 6, and chroma of 1 or 2.

## High Gap Variant

The High Gap Variant consists of moderately well drained soils on uplands. These soils are moderately deep over interbedded siltstone and shale bedrock. Permeability is moderate in the upper part of the solum and moderately slow in the lower part. The soils formed in silty material, loamy glacial drift, and residuum derived from the underlying interbedded siltstone and shale bedrock. Slopes range from 1 to 12 percent.

High Gap Variant soils are commonly adjacent to Berks and Shadeland soils and to the Mahalassville soils that have a shale substratum. Berks soils do not have an argillic horizon. They formed in residuum derived from siltstone bedrock. They are on steep breaks along streams and drainageways. Mahalassville soils have a dark surface layer and a gray subsoil. They are in depressions and drainageways. Shadeland soils have gray mottles in the upper part of the subsoil. They are in the more level areas and in drainageways.

Typical pedon of High Gap Variant silt loam, 1 to 6 percent slopes, eroded, in a cultivated field; 1,400 feet west and 1,600 feet north of the southeast corner of sec. 22, T. 22 N., R. 6 W.

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; mixed with common coarse dark yellowish brown (10YR 4/4) material from the subsoil; moderate medium granular structure; friable; common very fine roots; 5 percent gravel; slightly acid; abrupt smooth boundary.

Bt1—9 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; 2 percent gravel; very strongly acid; clear smooth boundary.

2Bt2—15 to 21 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent gravel; very strongly acid; clear smooth boundary.

2Bt3—21 to 28 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 12 percent channers; very strongly acid; clear smooth boundary.

3Bt4—28 to 36 inches; dark yellowish brown (10YR 4/4) channery clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few very fine roots; few very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; 20 percent channers; very strongly acid; clear wavy boundary.

3Cr—36 to 60 inches; weathered interbedded siltstone and shale.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The Bt horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 4 to 6.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from very strongly acid to medium acid. The 3Bt horizon ranges from very strongly acid to medium acid.

## Hononegah Series

The Hononegah series consists of excessively drained soils on stream terraces. These soils are moderately deep or deep over very gravelly coarse sand. Permeability is rapid in the solum and very rapid in the underlying material. The soils formed in sandy outwash and in the underlying gravelly outwash. Slopes range from 0 to 6 percent.

Hononegah soils are commonly adjacent to Rodman, Sleeth, and Strawn soils and to the Mahalassville soils that have a gravelly substratum. Mahalassville soils have a grayer subsoil than the Hononegah soils. They are in depressional areas. Rodman soils have a dark surface layer less than 10 inches thick and have a solum less than 15 inches thick. Sleeth soils have gray mottles in the upper part of the subsoil. They are in the lower lying areas. Strawn soils have more clay and less sand in the subsoil than the Hononegah soils. They formed in glacial till. Rodman and Strawn soils are on steep breaks of terraces and till plains.

Typical pedon of Hononegah fine sandy loam, 0 to 2 percent slopes (fig. 17), in a cultivated field; 530 feet east and 590 feet north of the southwest corner of sec. 33, T. 23 W., R. 3 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) fine sandy loam, brown (10YR 4/3) dry; moderate medium granular structure; very friable; many fine and medium roots; 2 percent gravel; medium acid; abrupt smooth boundary.

Bt1—11 to 18 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; common fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 2 percent gravel; medium acid; clear wavy boundary.

Bt2—18 to 23 inches; dark brown (7.5YR 3/4) loamy sand; weak coarse subangular blocky structure; very friable; common fine roots; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 5 percent gravel; slightly acid; clear wavy boundary.

Bt3—23 to 30 inches; dark brown (7.5YR 4/4) loamy sand; weak coarse subangular blocky structure; very friable; common fine roots; common fine pores;

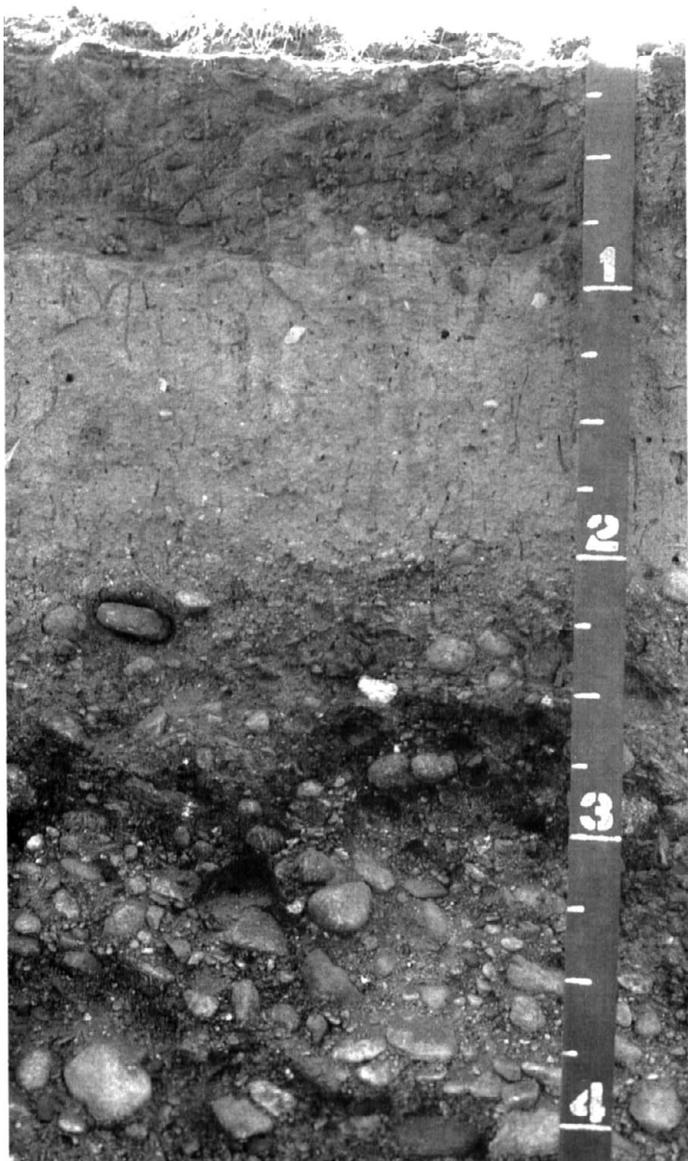


Figure 17.—Profile of Hononegah fine sandy loam, 0 to 2 percent slopes. Sandy outwash is underlain by gravelly outwash at a depth of about 2 feet. Depth is marked in feet.

thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 8 percent gravel; slightly acid; clear wavy boundary.

2Bt4—30 to 37 inches; dark brown (7.5YR 4/4) gravelly loamy sand; weak coarse subangular blocky structure; very friable; common fine roots; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 23 percent gravel; neutral; clear wavy boundary.

2Bt5—37 to 45 inches; dark brown (7.5YR 3/4) gravelly sand; weak coarse subangular blocky structure; very friable; common fine roots; common fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 19 percent gravel; neutral; clear wavy boundary.

2C—45 to 60 inches; brown (10YR 5/3) very gravelly coarse sand; single grained; loose; 55 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 50 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2. It is fine sandy loam or loamy sand.

The Bt horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 4. Reaction ranges from medium acid to mildly alkaline.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 4.

The 2C horizon has hue of 10YR, value of 5, and chroma of 3 or 4. It is stratified and commonly is coarse sand, gravelly coarse sand, or very gravelly coarse sand.

### Houghton Series

The Houghton series consists of very deep, very poorly drained soils on till plains, recessional moraines, outwash plains, and terraces. Permeability ranges from moderately slow to moderately rapid. The soils formed in organic deposits. Slopes range from 0 to 2 percent.

Houghton soils are similar to Muskego and Palms soils and are commonly adjacent to Drummer, Mahalassville, Pella, and Treaty soils. Muskego soils formed in organic deposits overlying coprogenous earth. Palms soils formed in organic deposits overlying mineral material. Drummer, Mahalassville, Pella, and Treaty soils formed in mineral material. They are in the slightly higher areas.

Typical pedon of Houghton muck, undrained, in a pasture; 460 feet east and 1,320 feet south of the center of sec. 23, T. 24 N., R. 4 W.

Oa1—0 to 6 inches; sapric material, black (10YR 2/1) broken face and rubbed; 5 percent fiber, trace rubbed; moderate medium granular structure; friable; many fine and very fine roots; 10 percent mineral material; mildly alkaline; clear smooth boundary.

Oa2—6 to 25 inches; sapric material, black (10YR 2/1) broken face and rubbed; 5 percent fiber, trace rubbed; moderate medium subangular blocky structure; friable; common fine and very fine roots;

10 percent mineral material; mildly alkaline; clear wavy boundary.

Oa3—25 to 37 inches; sapric material, black (5YR 2.5/1) broken face, black (N 2/0) rubbed; 15 percent fiber, trace rubbed; weak coarse subangular blocky structure; friable; common very fine roots; 1 percent mineral material; mildly alkaline; clear smooth boundary.

Oa4—37 to 60 inches; sapric material, dark reddish brown (5YR 3/3) broken face, dark reddish brown (5YR 2.5/3) rubbed; 25 percent fiber, 10 percent rubbed; massive; friable; 1 percent mineral material; mildly alkaline.

The thickness of the organic material is more than 51 inches. Reaction ranges from slightly acid to mildly alkaline throughout.

The surface tier has hue of 10YR or is neutral in hue. It has value of 2 and chroma of 0 or 1. The mineral content ranges from 5 to 50 percent.

The subsurface and bottom tiers have hue of 5YR, 7.5YR, or 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2. They are primarily sapric material, but thin layers of hemic material with a combined thickness of less than 10 inches are in some pedons.

### Kalamazoo Series

The Kalamazoo series consists of well drained soils on kames, outwash plains, and stream terraces. These soils are deep or very deep over very gravelly coarse sand and coarse sand. Permeability is moderate in the upper part of the solum, rapid in the lower part of the solum, and very rapid in the underlying material. The soils formed in loamy outwash and in the underlying gravelly outwash. Slopes range from 0 to 12 percent.

Kalamazoo soils are similar to Longlois and Ockley soils and are commonly adjacent to Kosciusko, Rodman, and Thackery soils. Longlois and Ockley soils have more clay in the lower part of the subsoil than the Kalamazoo soils. Kosciusko soils have a solum that is less than 40 inches thick. They are in the more sloping areas. Rodman soils have less clay in the subsoil than the Kalamazoo soils and have a thinner solum. They are in steep areas along terrace breaks and streams. Thackery soils have gray mottles in the lower part of the subsoil. They are in the lower lying areas.

Typical pedon of Kalamazoo loam, 0 to 2 percent slopes, in a cultivated field; 2,740 feet west and 200 feet south of the northeast corner of sec. 17, T. 24 N., R. 3 W.

Ap—0 to 11 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; weak medium granular structure;

friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—11 to 15 inches; brown (7.5YR 4/4) loam; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—15 to 24 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—24 to 29 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; medium acid; clear smooth boundary.

2Bt4—29 to 34 inches; brown (7.5YR 4/4) sandy clay loam; weak medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 10 percent gravel; medium acid; clear smooth boundary.

2BCt—34 to 61 inches; dark brown (7.5YR 3/2) loamy coarse sand; weak coarse subangular blocky structure; friable; thin continuous dark brown (7.5YR 3/2) clay bridges between sand grains; 12 percent gravel; slightly acid; gradual smooth boundary.

3C—61 to 70 inches; yellowish brown (10YR 5/4), stratified very gravelly coarse sand and coarse sand; single grained; loose; 50 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 80 inches.

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

The Bt horizon has hue of 7.5YR or 10YR and value and chroma of 4. It is silty clay loam, clay loam, or loam. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has hue of 5YR to 10YR, value of 4, and chroma of 2 to 4. It is sandy clay loam or sandy loam or the gravelly analogs of these textures. Reaction ranges from strongly acid to mildly alkaline.

The 2BCt horizon has colors similar to those of the 2Bt horizon. It is loamy coarse sand or loamy sand or the gravelly analogs of these textures.

The 3C horizon has hue of 10YR, value of 5, and chroma of 3 or 4. It is stratified and commonly is coarse sand and sand or the very gravelly and gravelly analogs of these textures.

A kame phase is recognized in the county.

## Kosciusko Series

The Kosciusko series consists of well drained soils on eskers, kames, terraces, and outwash plains. These soils are moderately deep over sand and very gravelly sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in gravelly outwash. Slopes range from 6 to 18 percent.

Kosciusko soils are similar to Desker soils and are commonly adjacent to Kalamazoo soils. Desker soils have a darker surface layer than the Kosciusko soils and have less clay in the upper part of the subsoil. Kalamazoo soils have a thicker solum than the Kosciusko soils. They are in the more level areas and on toe slopes.

Typical pedon of Kosciusko gravelly sandy clay loam, 6 to 12 percent slopes, severely eroded, in a cultivated field; 1,730 feet east and 680 feet south of the northwest corner of sec. 27, T. 22 N., R. 4 W.

- Ap—0 to 8 inches; brown (10YR 4/3) gravelly sandy clay loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; firm; common fine roots; 15 percent gravel; slightly acid; abrupt smooth boundary.
- Bt1—8 to 14 inches; dark brown (7.5YR 4/4) gravelly sandy clay loam; moderate medium subangular blocky structure; firm; common fine roots; common very fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 15 percent gravel; slightly acid; clear smooth boundary.
- Bt2—14 to 20 inches; dark brown (7.5YR 3/4) gravelly sandy clay loam; moderate medium subangular blocky structure; firm; common fine roots; common very fine pores; common thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 22 percent gravel; mildly alkaline; clear wavy boundary.
- BCt—20 to 27 inches; dark brown (7.5YR 3/4) gravelly sandy loam; weak medium subangular blocky structure; firm; few fine roots; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 32 percent gravel; slight effervescence; mildly alkaline; clear irregular boundary.
- C—27 to 60 inches; yellowish brown (10YR 5/4), stratified sand and very gravelly sand; single grained; loose; 40 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. Pedons in noncultivated areas have an A horizon. This horizon has hue of 10YR, value of 3,

and chroma of 1 or 2. It is sandy loam, gravelly sandy clay loam, or loam.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. It is gravelly clay loam, gravelly sandy clay loam, or very gravelly sandy loam. Reaction ranges from strongly acid to mildly alkaline.

The BCt horizon is gravelly sandy loam or very gravelly sandy loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

## Lafayette Series

The Lafayette series consists of somewhat poorly drained soils on outwash plains. These soils are deep or very deep over gravelly coarse sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in silty and loamy sediments and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

The Lafayette soils in this survey area have more clay in the upper part of the subsoil than is defined as the range for the series. This difference, however, does not affect the use or behavior of these soils. The soils are classified as fine, mixed, mesic Aquic Argiudolls.

Lafayette soils are similar to Mulvey soils and are commonly adjacent to Bowes, Bowes Variant, and Waupecan soils and to the Mahalasville soils that have a gravelly substratum. Mulvey soils have a dark surface layer less than 10 inches thick. Bowes, Bowes Variant, and Waupecan soils have a browner subsoil than the Lafayette soils. They are in the slightly higher positions on the landscape. Mahalasville soils have a grayer subsoil than the Lafayette soils. They are at the slightly lower elevations and in depressions.

Typical pedon of Lafayette silt loam, 0 to 2 percent slopes, in a cultivated field; 1,750 feet west and 260 feet north of the southeast corner of sec. 13, T. 22 N., R. 4 W.

- Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.
- A—10 to 13 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; few fine pores; medium acid; clear wavy boundary.
- BA—13 to 19 inches; brown (10YR 5/3) silt loam; few fine faint dark grayish brown (10YR 4/2) mottles; weak fine and medium subangular blocky structure; firm; common fine pores; thin patchy dark gray (10YR 4/1) clay films and very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; gradual wavy boundary.

**Bt1**—19 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; firm; common fine pores; thin continuous dark grayish brown (2.5YR 4/2) clay films on faces of peds; strongly acid; gradual smooth boundary.

**Bt2**—28 to 40 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium blocky; firm; common fine pores; thin continuous dark grayish brown (2.5Y 4/2) clay films on faces of peds and lining pores; strongly acid; clear smooth boundary.

**2Btg1**—40 to 45 inches; grayish brown (10YR 5/2) sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 13 percent fine gravel; strongly acid; clear wavy boundary.

**2Btg2**—45 to 50 inches; dark grayish brown (10YR 4/2) loamy coarse sand that has pockets of sandy loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; friable; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 9 percent fine gravel; strongly acid; clear wavy boundary.

**3Btg3**—50 to 65 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; common fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine and medium subangular blocky structure; firm; thin continuous very dark gray (N 3/0) clay films on faces of peds; 22 percent fine gravel; slightly acid; clear wavy boundary.

**3C**—65 to 70 inches; brown (10YR 5/3) gravelly coarse sand; single grained; loose; 24 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 55 to 70 inches. The thickness of the silty material ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is silty clay loam or silt loam. Reaction ranges from strongly acid to slightly acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is clay loam, sandy clay loam, sandy loam, or loamy coarse sand. Reaction ranges from strongly acid to slightly acid.

The 3Btg horizon ranges from slightly acid to neutral.

## La Hogue Series

The La Hogue series consists of somewhat poorly drained soils on till plains. These soils are deep over compact glacial till. Permeability is moderate in the solum and slow in the underlying material. The soils formed in glaciofluvial deposits and in the underlying glacial till. Slopes range from 0 to 2 percent.

La Hogue soils are commonly adjacent to Drummer, Linkville, and Oakville soils and to the Billett soils that are moderately wet. Billett soils have a dark surface layer less than 10 inches thick and do not have gray mottles in the upper part of the subsoil. They are in the slightly higher areas. Drummer soils have a grayer subsoil than the La Hogue soils and have less clay in the subsoil. Linkville and Oakville soils have a dominantly brown subsoil. They are on rises and in the more sloping areas along drainageways.

Typical pedon of La Hogue loam, till substratum, 0 to 2 percent slopes, in a cultivated field; 2,080 feet west and 2,490 feet north of the southeast corner of sec. 15, T. 22 N., R. 5 W.

**Ap**—0 to 10 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; many fine and medium roots; medium acid; abrupt smooth boundary.

**BA**—10 to 13 inches; dark brown (10YR 4/3) loam; common fine faint dark grayish brown (10YR 4/2) mottles; weak fine subangular blocky structure; friable; common very fine roots; many very fine pores; thin continuous very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

**Bt1**—13 to 22 inches; dark brown (10YR 4/3) clay loam; common medium faint dark grayish brown (10YR 4/2) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; strongly acid; clear smooth boundary.

**Bt2**—22 to 26 inches; dark brown (10YR 4/3) clay loam; common medium faint dark grayish brown (10YR 4/2) and prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; 2 percent gravel; strongly acid; clear smooth boundary.

**Btg1**—26 to 34 inches; dark grayish brown (10YR 4/2) clay loam; many coarse prominent yellowish brown

(10YR 5/8) mottles; moderate coarse subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; 2 percent gravel; medium acid; clear smooth boundary.

Btg2—34 to 42 inches; dark grayish brown (10YR 4/2) clay loam; many coarse prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent gravel; neutral; clear smooth boundary.

BCt—42 to 47 inches; brown (10YR 5/3) sandy loam that has strata of loamy sand 2 inches thick; common medium faint grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; friable; few very fine roots; common very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 7 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.

2Cd—47 to 60 inches; yellowish brown (10YR 5/4) loam; moderate medium platy till structure; very firm; 2 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the glaciofluvial material ranges from 40 to 60 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon is mottled. It has hue of 10YR, value of 4 or 5, and chroma of 2 to 6.

The 2BC horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 3 or 4. Reaction ranges from slightly acid to mildly alkaline.

## Lash Series

The Lash series consists of very deep, well drained soils on flood plains. These soils formed in alluvium. Permeability is moderately rapid in the solum and rapid in the underlying material. Slopes range from 0 to 2 percent.

Lash soils are commonly adjacent to Battleground soils and to the Ouiatenon soils that have a sandy substratum. Battleground soils have more clay and less sand in the subsoil than the Lash soils. Also, they are in areas farther away from stream channels adjacent to uplands. Ouiatenon soils have more sand and less clay in the subsoil than the Lash soils. They are in the higher areas adjacent to stream channels.

Typical pedon of Lash silt loam, frequently flooded, in a cultivated field; 630 feet west and 1,500 feet south of the northeast corner of sec. 25, T. 23 N., R. 6 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many very fine roots; strong effervescence; moderately alkaline; abrupt smooth boundary.

A—10 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; common very fine roots; many very fine pores; about 30 percent fine and medium sand; strong effervescence; moderately alkaline; clear smooth boundary.

Bw1—14 to 31 inches; dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few very fine roots; many very fine pores; thin continuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; about 35 percent fine and medium sand; strong effervescence; moderately alkaline; gradual smooth boundary.

Bw2—31 to 52 inches; dark brown (10YR 4/3) loam; weak fine subangular blocky structure; friable; many very fine pores; thin discontinuous dark brown (10YR 3/2) organic coatings on faces of peds; strong effervescence; moderately alkaline; gradual smooth boundary.

C—52 to 60 inches; dark brown (10YR 4/3) loamy sand; single grained; very friable; common very fine pores; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches.

The thickness of the A horizon ranges from 10 to 23 inches.

The Bw horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is silt loam, loam, or fine sandy loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is loamy sand or sand.

## Lauramie Series

The Lauramie series consists of very deep, well drained, moderately permeable soils on till plains and recessional moraines. These soils formed in a thin layer of silty material and in the underlying glaciofluvial material and glacial till. Slopes range from 0 to 6 percent.

Lauramie soils are similar to Linkville and Richardville soils and are commonly adjacent to Mellott, Octagon, and Tecumseh soils. Linkville soils have a dark surface layer 10 or more inches thick. Richardville soils have a lighter colored surface layer than the Lauramie soils. Mellott and Tecumseh soils have less sand in the upper part of the subsoil than the Lauramie soils. They are in the more level areas at the slightly higher elevations.

Octagon soils formed in compact glacial till and have a solum less than 40 inches thick. They are in the more sloping areas.

Typical pedon of Lauramie silt loam, 2 to 6 percent slopes, eroded, in a cultivated field; 300 feet west and 400 feet north of the southeast corner of sec. 26, T. 22 N., R. 4 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; common coarse dark brown (10YR 4/3) pockets of silty clay loam material from the subsoil; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—9 to 15 inches; dark brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt2—15 to 35 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 4 percent gravel; slightly acid; clear smooth boundary.

2Bt3—35 to 44 inches; dark brown (7.5YR 4/4) clay loam; moderate coarse subangular blocky structure; firm; common very fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds and in pores; 5 percent gravel; neutral; clear wavy boundary.

3BCt—44 to 50 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak coarse subangular blocky structure; firm; few very fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds and in pores; 8 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.

3C—50 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate medium platy till structure; friable; 8 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 70 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The Bt horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It is silt loam or silty clay loam. Reaction ranges from strongly acid to medium acid.

The 2Bt horizon has hue of 7.5YR, value of 4, and chroma of 4 to 6. It is sandy clay loam, clay loam, loam, or fine sandy loam. Reaction ranges from strongly acid to neutral.

The 3BCt horizon is neutral or mildly alkaline.

## Linkville Series

The Linkville series consists of very deep, well drained, moderately permeable soils on till plains and recessional moraines. These soils formed in a thin layer of glaciofluvial material and in the underlying glacial till. Slopes range from 0 to 6 percent.

Linkville soils are similar to Lauramie soils and are commonly adjacent to Spinks soils. Lauramie soils have a dark surface layer less than 10 inches thick. Spinks soils have less clay and more sand in the upper part of the subsoil than the Linkville soils. Also, they have a lighter colored surface layer. They are on rises.

Typical pedon of Linkville loam, loamy substratum, 0 to 2 percent slopes, in a cultivated field; 1,320 feet west and 2,420 feet north of the southeast corner of sec. 15, T. 22 N., R. 5 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common very fine roots; medium acid; abrupt smooth boundary.

A—10 to 15 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; common very fine roots; few very fine pores; thin continuous very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bt1—15 to 22 inches; dark brown (10YR 4/3) loam; moderate fine subangular blocky structure; friable; common very fine roots; common very fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—22 to 29 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt3—29 to 38 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 5 percent gravel; very strongly acid; clear smooth boundary.

2Bt4—38 to 55 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; very strongly acid; gradual smooth boundary.

2Bt5—55 to 64 inches; dark yellowish brown (10YR 4/4)

loam; moderate fine subangular blocky structure; firm; common very fine pores; thin continuous brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; strongly acid; clear wavy boundary.

2BCt—64 to 70 inches; brown (10YR 5/3) loam; weak medium subangular blocky structure; firm; few very fine pores; thin discontinuous dark brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.

2C—70 to 80 inches; brown (10YR 5/3) loam; moderate medium platy till structure; friable; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 80 inches.

The Ap and A horizons have hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4.

The 2Bt horizon has colors similar to those of the Bt horizon. Reaction ranges from very strongly acid to mildly alkaline.

The 2BC and 2C horizons have hue of 10YR, value of 5, and chroma of 3 or 4.

### Longlois Series

The Longlois series consists of well drained soils on eskers, kames, and outwash plains. These soils are deep over gravelly loamy coarse sand and sand or gravelly coarse sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in a thin layer of silty material, in loamy material, and in the underlying gravelly outwash. Slopes range from 2 to 6 percent.

Longlois soils are similar to Kalamazoo and Ockley soils and are commonly adjacent to Bowes, Desker, and Waupecan soils. Kalamazoo and Ockley soils have a lighter colored surface layer than the Longlois soils. Also, Kalamazoo soils have less clay in the lower part of the subsoil. Bowes and Waupecan soils have less sand in the upper part of the subsoil than the Longlois soils. They are in the more level, higher lying areas. Desker soils have less clay in the subsoil than the Longlois soils and have a solum that is less than 40 inches thick. They are in the more sloping areas.

Typical pedon of Longlois silt loam, 2 to 6 percent slopes, eroded, in a cultivated field; 1,640 feet west and 1,960 feet north of the southeast corner of sec. 18, T. 22 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; common coarse dark brown (7.5YR 3/4) pockets of silty clay loam

material from the subsoil; moderate medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

Bt1—9 to 16 inches; dark brown (7.5YR 3/4) silty clay loam; moderate medium subangular blocky structure; firm; common very fine roots; many very fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—16 to 20 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (7.5YR 3/4) clay films on faces of peds; 2 percent gravel; strongly acid; clear smooth boundary.

2Bt3—20 to 25 inches; dark brown (7.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm; common very fine roots; many very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 10 percent gravel; strongly acid; clear smooth boundary.

3Bt4—25 to 35 inches; dark brown (7.5YR 4/4) gravelly sandy clay loam; weak medium subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 20 percent gravel; strongly acid; gradual smooth boundary.

3Bt5—35 to 43 inches; dark brown (7.5YR 3/2) very gravelly sandy clay loam; weak fine subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 41 percent gravel; strongly acid; gradual smooth boundary.

3BCt—43 to 54 inches; dark brown (7.5YR 3/2) very gravelly sandy clay loam; weak fine subangular blocky structure; firm; few very fine roots; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 40 percent gravel; slight effervescence; mildly alkaline; gradual wavy boundary.

3C—54 to 60 inches; yellowish brown (10YR 5/4) gravelly loamy coarse sand that has strata of sand; single grained; loose; 20 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 4 to 6. It is strongly acid or medium acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of

3 or 4, and chroma of 3 to 6. It is strongly acid or medium acid.

The 3BCt horizon has hue of 7.5YR, value of 3 to 5, and chroma of 3 to 6.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 4. It is stratified. Textures include sand, gravelly loamy coarse sand, gravelly coarse sand, and very gravelly coarse sand.

A kame phase is recognized in the county.

## Mahalasville Series

The Mahalasville series consists of very deep, very poorly drained, moderately permeable soils on terraces, outwash plains, till plains, and recessional moraines. These soils formed in silty sediments and in the underlying glaciofluvial deposits. The gravelly substratum phase is deep over very gravelly loamy sand and gravelly sand. The shale substratum phase is deep over shale bedrock. Permeability is moderate in the solum of the gravelly substratum phase and very rapid in the substratum. It is moderate in the upper part of the solum in the shale substratum phase and moderately rapid in the lower part. Slopes range from 0 to 2 percent.

Mahalasville soils are similar to Drummer soils and are commonly adjacent to Fincastle, High Gap Variant, Lafayette, Shadeland, Starks, Treaty, and Waupecan soils. Drummer soils do not have an argillic horizon. They formed in more than 40 inches of silty sediments. Fincastle, Lafayette, Shadeland, and Starks soils have a browner subsoil than the Mahalasville soils. They are in the slightly higher positions on the landscape. High Gap Variant soils do not have gray mottles in the upper part of the subsoil. They are in the slightly higher lying areas. Treaty soils formed in silty material and in the underlying glacial till. They are in positions on the landscape similar to those of the Mahalasville soils. Waupecan soils do not have gray mottles in the upper part of the subsoil. They are in the higher positions on the landscape.

Typical pedon of Mahalasville silty clay loam, in an area of Mahalasville-Treaty complex, in a cultivated field; 2,200 feet east and 1,100 feet south of the northwest corner of sec. 24, T. 22 N., R. 3 W.

Ap—0 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; firm; many fine roots; neutral; abrupt smooth boundary.

Btg1—12 to 17 inches; dark gray (10YR 4/1) silty clay loam; common medium distinct olive brown (2.5Y 4/2) mottles; moderate fine subangular blocky structure; firm; thin continuous dark gray (10YR 4/1) clay films and black (10YR 2/1) organic coatings on

faces of peds; common very fine roots; common very fine pores; neutral; clear smooth boundary.

Btg2—17 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous gray (10YR 5/1) clay films and patchy black (10YR 2/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Btg3—25 to 38 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few very fine roots; common very fine pores; thin continuous gray (10YR 5/1) clay films on faces of peds; thin continuous black (10YR 2/1) organic coatings in pores; few very fine roots; common very fine pores; neutral; clear smooth boundary.

2Btg4—38 to 48 inches; grayish brown (2.5Y 5/2) loam that has strata of silt loam; common medium distinct light olive brown (2.5Y 5/6) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin discontinuous gray (10YR 5/1) clay films on faces of peds; thin continuous black (10YR 2/1) organic coatings in pores; mildly alkaline; gradual wavy boundary.

3C—48 to 60 inches; light olive brown (2.5Y 5/4) loamy sand that has strata of fine sandy loam; single grained; loose; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 24 to 40 inches.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The total combined thickness of the A horizons ranges from 10 to 21 inches.

The Btg horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 to 6, and chroma of 1 or 2.

The 2Btg horizon is mottled. It has colors similar to those of the Btg horizon. It is clay loam, sandy clay loam, loamy coarse sand, loam, sandy loam, or silt loam.

The 2Cg horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 or 2. Textures range from silt loam to sandy loam. This horizon has sandy strata in all pedons.

## Marker Series

The Marker series consists of moderately well drained soils on recessional moraines. These soils are

moderately deep over compact glacial till. Permeability is moderate in the solum and slow in the underlying material. The soils formed in silty glacial till. Slopes range from 2 to 6 percent.

Marker soils are commonly adjacent to Beecher and Drummer soils. Beecher soils have gray mottles immediately below the surface layer. They are in the more level areas. Drummer soils have a dominantly gray subsoil. They are in depressions and drainageways.

Typical pedon of Marker silt loam, 2 to 6 percent slopes, eroded, in a cultivated field; 330 feet east and 2,500 feet south of the northwest corner of sec. 10, T. 24 N., R. 5 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; common coarse olive brown (2.5Y 4/4) pockets of silty clay loam material from the subsoil; moderate medium granular structure; friable; 3 percent gravel; slightly acid; abrupt smooth boundary.

Bt1—8 to 14 inches; olive brown (2.5Y 4/4) clay loam; moderate fine subangular blocky structure; firm; many very fine and fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; 3 percent gravel; strongly acid; clear smooth boundary.

Bt2—14 to 21 inches; light olive brown (2.5Y 5/6) clay loam; common medium distinct grayish brown (2.5Y 5/2) mottles; moderate coarse prismatic structure parting to moderate coarse subangular blocky; firm; many very fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 3 percent gravel; neutral; clear smooth boundary.

2BCt—21 to 26 inches; light olive brown (2.5Y 5/6) silt loam; common medium distinct light brownish gray (2.5Y 6/2) mottles; moderate coarse subangular blocky structure; firm; many fine pores; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 5 percent gravel; slight effervescence; moderately alkaline; clear smooth boundary.

2Cd—26 to 60 inches; olive (5Y 5/3) silt loam; common medium distinct gray (5Y 5/1) mottles; massive; firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 20 to 40 inches.

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

The Bt horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 or 5, and chroma of 3 to 6. It has mottles with chroma of 2 or less in the lower part.

The 2BCt horizon is mildly alkaline or moderately alkaline.

The 2Cd horizon has hue of 2.5Y or 5Y, value of 5, and chroma of 3 or 4.

## Mellott Series

The Mellott series consists of very deep, well drained, moderately permeable soils on till plains. These soils formed in silty material and in the underlying glaciofluvial material and glacial till. Slopes range from 0 to 2 percent.

Mellott soils are similar to Camden and Tecumseh soils and are commonly adjacent to Millbrook, Throckmorton, and Toronto soils. Camden soils have a lighter colored surface layer than the Mellott soils. Tecumseh soils have a dark surface layer 10 or more inches thick. Millbrook and Toronto soils have gray mottles in the subsoil. They are at the slightly lower elevations and in drainageways. Throckmorton soils have gray mottles in the lower part of the subsoil. They are at the lower elevations.

Typical pedon of Mellott silt loam, 0 to 2 percent slopes, in a cultivated field; 740 feet east and 425 feet north of the southwest corner of sec. 17, T. 22 N., R. 4 W.

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; very strongly acid; abrupt smooth boundary.

Bt1—9 to 13 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; common very fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—13 to 28 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt3—28 to 33 inches; dark brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; strongly acid; clear smooth boundary.

2Bt4—33 to 42 inches; dark brown (7.5YR 3/2) sandy clay loam that has pockets of sandy loam; weak coarse subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 10 percent gravel; strongly acid; clear wavy boundary.

3Bt5—42 to 47 inches; yellowish brown (10YR 5/4) fine sandy loam; weak coarse subangular blocky

structure; firm; common very fine pores; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 5 percent gravel; slightly acid; clear smooth boundary.

3BCt—47 to 50 inches; yellowish brown (10YR 5/4) fine sandy loam; weak coarse subangular blocky structure; firm; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 3 percent gravel; slight effervescence; moderately alkaline; clear smooth boundary.

3C—50 to 60 inches; yellowish brown (10YR 5/4) loam; moderate medium platy till structure; friable; 10 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 22 to 40 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Reaction ranges from very strongly acid to medium acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. It is sandy clay loam, loam, or sandy loam. Reaction is strongly acid or medium acid.

The 3Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4. It is fine sandy loam or loam. Reaction is slightly acid or medium acid.

## Miami Series

The Miami series consists of well drained soils on till plains and recessional moraines. These soils are moderately deep over compact glacial till. Permeability is moderate in the upper part of the subsoil, moderately slow in the lower part of the subsoil, and slow in the underlying material. The soils formed in a thin layer of silty material and in the underlying glacial till. Slopes range from 2 to 18 percent.

Miami soils are similar to Octagon and Strawn soils and are commonly adjacent to Crosby, Fincastle, Richardville, and Starks soils. Octagon soils have a darker surface layer than the Miami soils, and Strawn soils have a thinner solum. Crosby, Fincastle, and Starks soils are on toe slopes, in drainageways, and on the less sloping part of side slopes. They have gray mottles immediately below the surface layer. Also, Fincastle and Starks soils have less sand in the upper part of the subsoil than the Miami soils. Richardville soils have a thicker solum than the Miami soils. They are in the less sloping areas at the higher elevations.

Typical pedon of Miami silt loam, in an area of

Crosby-Miami complex, 2 to 6 percent slopes, eroded, in a cultivated field; 1,980 feet west and 2,508 feet north of the southeast corner of sec. 14, T. 22 N., R. 3 W.

Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; common fine distinct dark yellowish brown (10YR 4/4) pockets of clay loam material from the subsoil; moderate medium granular structure; friable; many medium roots; slightly acid; abrupt smooth boundary.

Bt1—9 to 17 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; common fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; thin discontinuous light yellowish brown (10YR 6/4) silt coatings on faces of peds; strongly acid; clear smooth boundary.

Bt2—17 to 25 inches; dark yellowish brown (10YR 4/4) loam; weak medium prismatic structure parting to moderate coarse subangular blocky; firm; common fine roots; common fine pores; common thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; thin discontinuous light yellowish brown (10YR 6/4) silt coatings on faces of peds; 2 percent gravel; strongly acid; clear smooth boundary.

Bt3—25 to 36 inches; dark yellowish brown (10YR 4/4) sandy clay loam; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; few fine roots; common fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 8 percent gravel; neutral; clear wavy boundary.

Cd—36 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium and thick platy till structure; very firm; 10 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 24 to 40 inches. The thickness of the silty material ranges from 0 to 18 inches.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 to 4. It is dominantly silt loam, but the range includes loam and clay loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam, clay loam, sandy clay loam, or loam. Reaction ranges from strongly acid to neutral.

Some pedons have a BC horizon. This horizon is loam or fine sandy loam. Reaction is neutral or mildly alkaline.

The Cd horizon is loam or fine sandy loam.

## Milford Series

The Milford series consists of very deep, very poorly drained, moderately slowly permeable soils on recessional moraines, till plains, and outwash plains. These soils formed in silty lacustrine sediments. Slopes range from 0 to 2 percent.

Milford soils are similar to Peotone soils and are commonly adjacent to Drummer, Mahalasville, and Treaty soils. Peotone soils have a dark surface layer 24 or more inches thick. Drummer, Mahalasville, and Treaty soils have less clay in the subsoil than the Milford soils. They are in the slightly higher positions on the landscape.

Typical pedon of Milford silty clay loam, pothole, in a cultivated field; 1,980 feet east and 400 feet north of the southwest corner of sec. 10, T. 21 N., R. 3 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; firm; neutral; abrupt smooth boundary.

A—11 to 15 inches; black (N 2/0) silty clay loam, very dark gray (10YR 3/1) dry; moderate coarse angular blocky structure; firm; common fine pores; slightly acid; clear smooth boundary.

Bg1—15 to 26 inches; dark gray (5Y 4/1) silty clay; few medium distinct olive (5Y 4/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine pores; thin discontinuous black (N 2/0) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bg2—26 to 37 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak coarse subangular blocky; firm; common fine pores; thin discontinuous dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg3—37 to 43 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine distinct olive brown (2.5Y 4/4) mottles; weak coarse subangular blocky structure; firm; few fine pores; thin patchy dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BCg—43 to 54 inches; olive gray (5Y 4/2) silty clay loam; few fine distinct olive (5Y 4/4) mottles; weak coarse subangular blocky structure; firm; mildly alkaline; clear smooth boundary.

Cg—54 to 60 inches; olive gray (5Y 4/2) silt loam; few fine distinct olive (5Y 4/4) mottles; massive; firm; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches.

The Ap horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. The total combined thickness of the A horizons ranges from 12 to 24 inches.

The Bg horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. It is silty clay loam, clay loam, or silty clay. Reaction ranges from slightly acid to mildly alkaline.

The Cg horizon is mottled. It has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. It is silty clay loam, silt loam, or clay loam.

## Millbrook Series

The Millbrook series consists of very deep, somewhat poorly drained, moderately permeable soils on till plains. These soils formed in loess or other silty material and in the underlying glaciofluvial deposits. Slopes range from 0 to 2 percent.

Millbrook soils are similar to Brenton and Starks soils and are commonly adjacent to Drummer, Octagon, Throckmorton, and Toronto soils. Brenton soils have a dark surface layer 10 or more inches thick. Starks soils have a lighter colored surface layer than the Millbrook soils. Drummer soils have a thicker surface layer than the Millbrook soils and have a grayer subsoil. They are in depressions and drainageways. Octagon soils have a dominantly brown subsoil. They are on rises and in the more sloping areas along drainageways. Throckmorton soils do not have gray mottles in the upper part of the subsoil. They are on rises and in the more sloping areas adjacent to drainageways. Toronto soils are underlain by glacial till. They are at the slightly higher elevations.

Typical pedon of Millbrook silt loam, in an area of Toronto-Millbrook complex, 0 to 2 percent slopes, in a cultivated field; 1,910 feet west and 440 feet south of the northeast corner of sec. 4, T. 21 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; many fine and medium roots; medium acid; abrupt smooth boundary.

Bt1—9 to 13 inches; light olive brown (2.5Y 5/6) silty clay loam; common fine prominent grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; common fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

**Bt2**—13 to 20 inches; light olive brown (2.5Y 5/6) silty clay loam; common medium prominent grayish brown (10YR 5/2) and distinct dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

**Bt3**—20 to 29 inches; yellowish brown (10YR 5/6) silty clay loam; common medium distinct grayish brown (10YR 5/2) and faint dark yellowish brown (10YR 4/6) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of prisms; neutral; clear smooth boundary.

**2Bt4**—29 to 37 inches; yellowish brown (10YR 5/6) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine and medium pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; krotovinas 2 inches in diameter filled with very dark grayish brown (10YR 3/2) silty clay loam material; 5 percent gravel; neutral; clear smooth boundary.

**2Bt5**—37 to 49 inches; yellowish brown (10YR 5/6) loam that has pockets of loamy sand and sandy loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few fine roots; common fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds and lining pores; krotovinas 2 inches in diameter filled with very dark grayish brown (10YR 3/2) silty clay loam material; 5 percent gravel; neutral; clear wavy boundary.

**2C**—49 to 60 inches; yellowish brown (10YR 5/6) silt loam that has strata of loamy sand; common medium distinct grayish brown (10YR 5/2) mottles; massive; friable; few fine pores; krotovinas 2 inches in diameter filled with very dark grayish brown (10YR 3/2) silty clay loam material; 1 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the loess or silty material ranges from 24 to 40 inches.

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

The Bt horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has colors similar to those of the Bt horizon. It is clay loam, sandy clay loam, loam, or sandy loam. Reaction ranges from strongly acid to neutral.

The 2C horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 2 to 6. Textures range from fine sandy loam to silt loam. Strata of sand or loamy sand are in all pedons.

## Mulvey Series

The Mulvey series consists of somewhat poorly drained soils on outwash plains. These soils are deep or very deep over gravelly coarse sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in silty and loamy sediments and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

Mulvey soils are similar to Lafayette and Waynetown soils and are commonly adjacent to Bowes and Bowes Variant soils and to the Mahalasville soils that have a gravelly substratum. Lafayette soils have a dark surface layer 10 or more inches thick. Waynetown soils have a lighter colored surface layer than the Mulvey soils. Bowes and Bowes Variant soils have a browner subsoil than the Mulvey soils. They are in the slightly higher positions on the landscape. Mahalasville soils have a grayer subsoil than the Mulvey soils and have a dark surface layer 10 or more inches thick. They are in the lower lying depressional areas.

Typical pedon of Mulvey silt loam, 0 to 2 percent slopes, in a cultivated field; 1,640 feet west and 1,460 feet north of the southeast corner of sec. 20, T. 21 N., R. 5 W.

**Ap**—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

**Bt1**—9 to 13 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; medium acid; clear smooth boundary.

**Bt2**—13 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.

**2Bt3**—29 to 41 inches; dark yellowish brown (10YR 4/6)

clay loam; common medium prominent grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; 5 percent fine gravel; strongly acid; clear wavy boundary.

3Bt4—41 to 52 inches; dark yellowish brown (10YR 4/6) gravelly sandy clay loam; common medium prominent grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; 25 percent fine gravel; neutral; clear wavy boundary.

3Bg—52 to 66 inches; grayish brown (10YR 5/2) gravelly sandy loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; thin continuous gray (10YR 5/1) clay films on faces of peds; 20 percent fine gravel; neutral; clear wavy boundary.

3Cg—66 to 80 inches; gray (10YR 5/1) gravelly coarse sand; single grained; loose; 25 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 70 inches. The thickness of the silty material ranges from 22 to 40 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from very strongly acid to medium acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is sandy clay loam, clay loam, or loam. Reaction ranges from very strongly acid to medium acid.

The 3Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from strongly acid to neutral.

The 3Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is gravelly coarse sand or gravelly loamy sand.

### Muskego Series

The Muskego series consists of very deep, very poorly drained soils on till plains, recessional moraines, outwash plains, and terraces. These soils formed in organic deposits overlying coprogenous earth. Permeability is moderate or moderately rapid in the organic material and slow in the underlying coprogenous earth. Slopes range from 0 to 2 percent.

Muskego soils are similar to Houghton and Palms soils and are commonly adjacent to Drummer, Mahalasville, Pella, and Treaty soils. Houghton soils formed in more than 51 inches of organic material.

Palms soils formed in organic deposits overlying mineral material. Drummer, Mahalasville, Pella, and Treaty soils formed in mineral material. They are at the higher elevations.

Typical pedon of Muskego muck, drained, in an idle field; 150 feet west and 1,450 feet south of the northeast corner of sec. 36, T. 21 N., R. 4 W.

Op—0 to 10 inches; sapric material, black (10YR 2/1) broken face and rubbed; 5 percent fiber, trace rubbed; moderate fine granular structure; many very fine roots; 5 percent mineral material; neutral; clear smooth boundary.

Oa1—10 to 28 inches; sapric material, black (10YR 2/1) broken face and rubbed; 5 percent fiber, trace rubbed; moderate medium platy structure parting to moderate medium subangular blocky; friable; common very fine roots; neutral; clear smooth boundary.

Oa2—28 to 39 inches; sapric material, very dark gray (10YR 3/1) broken face and rubbed; 15 percent fiber, trace rubbed; moderate thick platy structure; firm; neutral; clear smooth boundary.

2C—39 to 60 inches; dark olive gray (5Y 3/2) coprogenous earth; massive; slightly plastic; mildly alkaline.

The thickness of the organic material and the depth to coprogenous earth range from 16 to 51 inches.

The surface tier has hue of 10YR or is neutral in hue. It has value of 2 and chroma of 0 or 1.

The subsurface and bottom tiers have hue of 7.5YR or 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2. They are primarily sapric material, but some pedons have thin layers of hemic material. Reaction is slightly acid or neutral.

The 2C horizon has hue of 2.5Y, 5Y, or 10YR, value of 2 to 5, and chroma of 1 to 3. Reaction ranges from neutral to moderately alkaline.

### Oakville Series

The Oakville series consists of very deep, somewhat excessively drained, rapidly permeable soils on sand dunes. These soils formed in eolian sandy sediments. Slopes range from 2 to 6 percent.

Oakville soils are similar to Coloma, Sparta, and Spinks soils and are commonly adjacent to La Hogue soils and to the moderately wet Billett soils. Coloma, Sparta, and Spinks soils have bands in the subsoil. Coloma and Sparta soils have medium-sized sand. Also, Sparta soils have a darker surface layer than the Oakville soils. Billett and La Hogue soils are at the lower elevations. Billett soils have more clay in the subsoil than the Oakville soils and have gray mottles in

the lower part of the subsoil. La Hogue soils have gray mottles in the upper part of the subsoil.

Typical pedon of Oakville loamy fine sand, in an area of Oakville-Billett, moderately wet, complex, 2 to 6 percent slopes, eroded, in a cultivated field; 900 feet south and 600 feet west of the northeast corner of sec. 6, T. 24 N., R. 5 W.

Ap—0 to 8 inches; dark brown (10YR 3/3) loamy fine sand, brown (10YR 5/3) dry; common medium faint dark yellowish brown (10YR 4/4) pockets of material from the subsoil; moderate medium granular structure; friable; common medium roots; neutral; abrupt smooth boundary.

Bw1—8 to 13 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak fine and medium subangular blocky structure; friable; common medium roots; neutral; clear wavy boundary.

Bw2—13 to 20 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine and medium subangular blocky structure; very friable; common medium roots; thin continuous dark yellowish brown (10YR 4/4) coatings on faces of peds; neutral; clear wavy boundary.

Bw3—20 to 30 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine and medium subangular blocky structure; very friable; common medium roots; thin continuous yellowish brown (10YR 5/4) coatings on faces of peds; neutral; gradual wavy boundary.

Bw4—30 to 41 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; thin continuous dark yellowish brown (10YR 4/4) coatings on faces of peds; medium acid; gradual wavy boundary.

Bw5—41 to 47 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; thin discontinuous yellowish brown (10YR 5/4) coatings on faces of peds; slightly acid; gradual wavy boundary.

Bw6—47 to 54 inches; dark yellowish brown (10YR 4/6) loamy fine sand; weak fine and medium subangular blocky structure; very friable; few very fine roots; thin continuous dark yellowish brown (10YR 4/4) coatings on faces of peds; medium acid; gradual wavy boundary.

Bw7—54 to 60 inches; yellowish brown (10YR 5/4) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; thin continuous dark yellowish brown (10YR 4/4) coatings on faces of peds; slightly acid; gradual wavy boundary.

Bw8—60 to 68 inches; yellowish brown (10YR 5/6) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; thin continuous dark yellowish brown (10YR 4/4) and thin patchy yellowish brown (10YR 5/4) coatings on faces of peds; medium acid; gradual wavy boundary.

Bw9—68 to 80 inches; yellowish brown (10YR 5/8) loamy fine sand; weak medium subangular blocky structure; very friable; few very fine roots; thin continuous dark yellowish brown (10YR 4/4) coatings on faces of peds; medium acid.

The solum is more than 80 inches thick.

The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is fine sand or loamy fine sand.

The Bw horizon has hue of 7.5YR or 10YR, value of 4 or 5, chroma of 4 to 6. It is loamy fine sand or fine sand. Reaction ranges from very strongly acid to neutral.

## Ockley Series

The Ockley series consists of well drained soils on outwash plains and stream terraces. These soils are deep or very deep over very gravelly coarse sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in silty material, in loamy outwash, and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

Ockley soils are similar to Kalamazoo and Longlois soils and are commonly adjacent to Kosciusko soils. Kalamazoo soils have less clay in the lower part of the subsoil than the Ockley soils. Longlois soils have a darker surface layer than the Ockley soils. Kosciusko soils have a thinner solum than the Ockley soils. They are in the more sloping areas along terrace breaks and drainageways.

Typical pedon of Ockley silt loam, 0 to 2 percent slopes, in a cultivated field; 1,450 feet west and 2,510 feet south of the northeast corner of sec. 26, T. 22 N., R. 3 W.

Ap—0 to 11 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

Bt1—11 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; thin discontinuous brown (7.5YR 4/4) clay films on faces of peds; thin continuous brown (10YR 4/3) organic coatings on faces of peds; medium acid; clear smooth boundary.

2Bt2—14 to 20 inches; brown (7.5YR 4/4) clay loam;

moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous brown (7.5YR 4/4) clay films on faces of peds; 4 percent gravel; medium acid; clear smooth boundary.

2Bt3—20 to 30 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin continuous brown (7.5YR 4/4) clay films on faces of peds; 4 percent gravel; medium acid; clear smooth boundary.

2Bt4—30 to 42 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 4 percent gravel; slightly acid; clear smooth boundary.

3Bt5—42 to 53 inches; brown (7.5YR 4/4) gravelly clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 30 percent gravel; medium acid; clear smooth boundary.

3Bt6—53 to 58 inches; brown (7.5YR 4/4) gravelly clay loam; weak coarse subangular blocky structure grading to moderate medium subangular blocky; firm; few fine roots; common fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 15 percent gravel; slightly acid; clear smooth boundary.

3Bct—58 to 63 inches; dark brown (7.5YR 3/4) coarse sandy loam; weak coarse subangular blocky structure; firm; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; clay bridges between sand grains; 12 percent gravel; slight effervescence; moderately alkaline; clear smooth boundary.

4C—63 to 80 inches; yellowish brown (10YR 5/4) very gravelly coarse sand; single grained; loose; 47 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 72 inches. The thickness of the silt ranges from 9 to 20 inches.

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

The Bt horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is strongly acid to medium acid. It is silt loam or silty clay loam.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 4 to 6. It is clay loam or sandy clay loam. Reaction ranges from very strongly acid to medium acid.

The 3Bt horizon has colors similar to those of the 2Bt horizon. It is gravelly sandy clay loam or gravelly clay loam.

The 4C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Textures include sand, gravelly sand, and very gravelly coarse sand.

## Octagon Series

The Octagon series consists of well drained soils on till plains and recessional moraines. These soils are moderately deep over compact glacial till. Permeability is moderate in the solum and slow in the underlying material. The soils formed in a thin layer of silty material and in the underlying glacial till. Slopes range from 2 to 12 percent.

Octagon soils are similar to Miami and Strawn soils and are commonly adjacent to Lauramie, Millbrook, and Toronto soils. Miami and Strawn soils have a lighter colored surface layer than the Octagon soils. Lauramie soils formed in glaciofluvial sediments and in the underlying friable glacial till. They are in the less sloping areas at the higher elevations. Millbrook and Toronto soils have gray mottles in the subsoil. They are in drainageways and at the slightly lower elevations.

Typical pedon of Octagon silt loam, 2 to 6 percent slopes, eroded, in a cultivated field; 1,770 feet west and 410 feet north of the southeast corner of sec. 14, T. 22 N., R. 4 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; common fine distinct dark yellowish brown (10YR 4/4) pockets of silty clay loam material from the subsoil; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.

Bt1—8 to 12 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate very fine and fine subangular blocky; firm; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—12 to 21 inches; dark yellowish brown (10YR 4/4) sandy clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine pores; thin discontinuous dark brown (10YR 3/3) clay films on faces of peds; 5 percent gravel; strongly acid; gradual smooth boundary.

2Bt3—21 to 29 inches; yellowish brown (10YR 5/4) sandy clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; common fine pores; thin discontinuous dark brown (10YR 3/3) and brown (10YR 4/3) clay films on faces of peds; few medium black (N 2/0) iron and

manganese oxide stains; 5 percent gravel; strongly acid; gradual smooth boundary.

2Bt4—29 to 37 inches; yellowish brown (10YR 5/4) sandy clay loam; weak coarse subangular blocky structure; firm; common fine pores; thin patchy dark brown (10YR 3/3) clay films on faces of peds; common medium black (N 2/0) iron and manganese oxide stains; 8 percent gravel; strongly acid; clear wavy boundary.

2Cd—37 to 60 inches; brown (10YR 5/3) fine sandy loam; weak medium and thick platy till structure; very firm; 10 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 40 inches. The thickness of the silty material ranges from 0 to 18 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is silt loam or clay loam.

The Bt horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from medium acid to neutral.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is clay loam, sandy clay loam, or loam. Reaction ranges from strongly acid to neutral.

The 2Cd horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 3 or 4. It is loam or fine sandy loam.

## Ouiatenon Series

The Ouiatenon series consists of somewhat excessively drained soils on flood plains. These soils are mainly deep over coarse sand, gravelly coarse sand, very gravelly coarse sand, loamy sand, sand, gravelly sand, and very gravelly sand. The sandy substratum phase is very deep. Permeability is generally rapid in the upper part of the underlying material and very rapid in the lower part. In the sandy substratum phase, permeability is rapid. The soils formed in sandy and gravelly alluvium. Slopes range from 0 to 2 percent.

Ouiatenon soils are commonly adjacent to Battleground, Ceresco, Cohoctah, and Lash soils. Battleground soils have more clay and less sand throughout the solum than the Ouiatenon soils. They are at the slightly lower elevations. Ceresco soils have gray mottles immediately below the surface layer. They are in areas farther away from stream channels than the Ouiatenon soils, adjacent to uplands. Cohoctah soils have a dominantly gray subsoil. They are on the slightly lower flood plains adjacent to uplands. Lash soils have more clay in the subsoil than the Ouiatenon soils. They are in the slightly lower areas away from stream channels.

Typical pedon of Ouiatenon loamy sand, occasionally

flooded, in a cultivated field; 1,000 feet west and 850 feet south of the northeast corner of sec. 21, T. 22 N., R. 4 W.

Ap—0 to 12 inches; very dark gray (10YR 3/1) loamy sand, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; very friable; few pebbles; slight effervescence; moderately alkaline; abrupt smooth boundary.

A—12 to 16 inches; very dark grayish brown (10YR 3/2) loamy sand, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; very friable; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; 3 percent fine gravel; strong effervescence; moderately alkaline; clear smooth boundary.

AC—16 to 20 inches; dark brown (10YR 3/3) coarse sand, brown (10YR 5/3) dry; weak medium subangular blocky structure; very friable; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; 10 percent fine gravel; strong effervescence; moderately alkaline; clear wavy boundary.

C1—20 to 48 inches; dark brown (10YR 4/3) coarse sand that has one 2-inch layer of very gravelly sand; single grained; loose; 10 percent fine gravel; strong effervescence; moderately alkaline; clear smooth boundary.

C2—48 to 60 inches; dark brown (10YR 4/3) very gravelly coarse sand; single grained; loose; 38 percent gravel; strong effervescence; moderately alkaline.

The A horizon has hue of 10YR, value of 3, and chroma of 1 to 3. It ranges from 10 to 23 inches in thickness. It is fine sandy loam, sandy loam, or loamy sand.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Above a depth of 40 inches, it is loamy sand, sand, or coarse sand. The gravelly and very gravelly analogs of these textures are below a depth of 40 inches.

## Palms Series

The Palms series consists of very deep, very poorly drained soils on till plains, recessional moraines, and outwash plains, in glacial troughs, and on terraces. The gravelly substratum phase is deep over gravelly coarse sand. Permeability generally is moderate or moderately rapid in the organic material and moderate in the underlying loamy material. In the gravelly substratum phase, it is moderately rapid in the organic material and very rapid in the underlying material. The soils formed in organic deposits overlying loamy or sandy material.

Slopes range from 0 to 2 percent.

Palms soils are similar to Houghton and Muskego soils and are commonly adjacent to Drummer, Mahalassville, Pella, and Treaty soils. Houghton soils formed in more than 51 inches of organic material. Muskego soils formed in organic material overlying coprogenous earth. Drummer, Mahalassville, Pella, and Treaty soils formed in mineral material. They are in the slightly higher areas.

Typical pedon of Palms muck, drained, in an idle field; 2,245 feet west and 1,585 feet south of the northeast corner of sec. 25, T. 21 N., R. 6 W.

- Op—0 to 10 inches; sapric material, black (N 2/0) broken face and rubbed; 5 percent fiber, trace rubbed; moderate fine subangular blocky structure; many very fine roots; 5 percent mineral material; strongly acid; clear smooth boundary.
- Oa1—10 to 27 inches; sapric material, very dark grayish brown (10YR 3/2) broken face and rubbed; 20 percent fiber, trace rubbed; moderate coarse prismatic structure; friable; common fine and very fine roots; 5 percent mineral material; neutral; clear smooth boundary.
- Oa2—27 to 36 inches; sapric material, dark gray (N 4/0) broken face and rubbed; 5 percent fiber, trace rubbed; massive; friable; common very fine roots; 5 percent mineral material; strong effervescence; mildly alkaline; gradual smooth boundary.
- 2Cg1—36 to 56 inches; dark gray (N 4/0) silt loam; massive; firm; 1 percent gravel; strong effervescence; moderately alkaline; clear smooth boundary.
- 2Cg2—56 to 60 inches; dark gray (N 4/0) silt loam; massive; firm; 10 percent gravel; strong effervescence; moderately alkaline.

The thickness of the organic material ranges from 16 to 50 inches. Reaction ranges from strongly acid to mildly alkaline in the organic material.

The surface tier has hue of 10YR or is neutral in hue. It has value of 2 and chroma of 0 or 1. The mineral content ranges from 5 to 50 percent.

The subsurface and bottom tiers have hue of 7.5YR or 10YR or are neutral in hue. They have value of 2 to 4 and chroma of 0 to 2. They are primarily sapric material, but thin layers of hemic material with a combined thickness of less than 10 inches are in some pedons. Reaction ranges from slightly acid to mildly alkaline.

The 2Cg horizon has hue of 2.5Y, 5Y, or 10YR or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. It is loam or silt loam.

Palms muck, gravelly substratum, undrained, is a taxadjunct because it is underlain by sandy material

instead of loamy material and because it is calcareous throughout. These differences, however, do not affect the use or behavior of this soil. The soil is classified as sandy or sandy-skeletal, mixed, euic, mesic Terric Medisaprists.

## Pella Series

The Pella series consists of very deep, very poorly drained, moderately permeable soils on outwash plains and till plains. These soils formed in silty sediments underlain by loamy outwash. Slopes range from 0 to 2 percent.

Pella soils are commonly adjacent to Drummer, Mahalassville, and Treaty soils. Drummer, Mahalassville, and Treaty soils have a thicker solum than the Pella soils. They are in the higher positions on the landscape.

Typical pedon of Pella silty clay loam, pothole, in a cultivated field; 1,810 feet east and 360 feet south of the northwest corner of sec. 13, T. 22 N., R. 4 W.

- Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; firm; neutral; abrupt smooth boundary.
- A—10 to 15 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; common fine prominent dark gray (5Y 4/1) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; common fine roots; neutral; clear smooth boundary.
- Bg1—15 to 23 inches; olive gray (5Y 5/2) silty clay loam; common medium prominent light olive brown (2.5Y 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; common fine pores; thin discontinuous very dark gray (N 3/0) and patchy black (10YR 2/1) organic coatings on faces of peds; krotovina 2 inches in diameter filled with black (10YR 2/1) silty clay loam material; neutral; clear smooth boundary.
- Bg2—23 to 31 inches; olive gray (5Y 5/2) silt loam; common medium prominent light olive brown (2.5Y 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; common fine pores; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; krotovina 2 inches in diameter filled with black (10YR 2/1) silty clay loam material; slight effervescence; mildly alkaline; clear smooth boundary.
- Cg1—31 to 35 inches; grayish brown (2.5Y 5/2) silt loam; many coarse distinct light olive brown (2.5Y 5/4) mottles; massive; firm; few fine pores; thin continuous dark gray (10YR 4/1) organic coatings in pores; krotovina 2 inches in diameter filled with

black (10YR 2/1) silty clay loam material; strong effervescence; moderately alkaline; clear smooth boundary.

Cg2—35 to 46 inches; grayish brown (2.5Y 5/2) silt loam; many coarse distinct light olive brown (2.5Y 5/4) mottles; massive; firm; few fine pores; thin continuous very dark gray (10YR 3/1) organic coatings in pores; krotovina 2 inches in diameter filled with black (10YR 2/1) silty clay loam material; strong effervescence; moderately alkaline; clear smooth boundary.

2Cg3—46 to 60 inches; grayish brown (2.5Y 5/2) silt loam that has one 4-inch layer of gravelly sandy loam; common medium distinct light olive brown (2.5Y 5/4) mottles; massive; friable; about 25 percent sand; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 50 inches. The depth to free carbonates ranges from 20 to 40 inches.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The total combined thickness of the A horizons ranges from 10 to 24 inches.

The Bg horizon is mottled. It has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. Reaction is neutral or mildly alkaline.

The 2Cg horizon is mottled. It has hue of 5Y, 2.5Y, or 10YR, value of 5 or 6, and chroma of 1 to 4. It is loam, silt loam, silty clay loam, clay loam, or sandy loam.

### Peotone Series

The Peotone series consists of very deep, very poorly drained soils on till plains and recessional moraines. These soils formed in silty lacustrine sediments. Permeability is moderately slow or slow in the solum and moderately slow in the underlying material. Slopes range from 0 to 2 percent.

Peotone soils are similar to Milford soils and are commonly adjacent to Drummer soils. Milford soils have a dark surface layer less than 24 inches thick. Drummer soils have less clay in the subsoil than the Peotone soils and have a thinner surface layer. They are in the slightly higher positions on the landscape.

Typical pedon of Peotone silty clay loam, pothole, in a cultivated field; 1,320 feet west and 1,715 feet north of the southeast corner of sec. 18, T. 24 N., R. 5 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine subangular blocky structure; firm; slightly acid; abrupt smooth boundary.

A1—10 to 19 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate very fine and fine subangular blocky structure; firm; many very fine pores; slightly acid; gradual smooth boundary.

A2—19 to 29 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; moderate medium subangular blocky structure; very firm; many very fine and fine pores; slightly acid; gradual smooth boundary.

Bg1—29 to 33 inches; black (N 2/0) silty clay, very dark gray (10YR 3/1) dry; common medium prominent distinct olive (2.5Y 4/2) mottles; moderate medium and coarse subangular blocky structure; very firm; many very fine pores; neutral; gradual wavy boundary.

Bg2—33 to 42 inches; dark grayish brown (2.5Y 4/2) silty clay; common medium distinct olive brown (2.5Y 4/4) mottles; moderate medium and coarse prismatic structure; very firm; many very fine and fine pores; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg3—42 to 50 inches; dark grayish brown (2.5Y 4/2) silty clay; common medium distinct olive brown (2.5Y 4/4) mottles; weak medium prismatic structure; very firm; many very fine and fine pores; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

BCg—50 to 55 inches; dark grayish brown (2.5Y 4/2) silty clay loam; many medium distinct olive brown (2.5Y 4/4) mottles; weak coarse subangular blocky structure; firm; thin continuous dark gray (10YR 3/1) organic coatings in pores; neutral; gradual wavy boundary.

Cg—55 to 60 inches; olive gray (5Y 4/2) silty clay loam; massive; firm; neutral.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 or 1.

The Bg horizon has hue of 5Y, 2.5Y, or 10YR or is neutral in hue. It has value of 2 to 5 and chroma of 0 to 2. It is silty clay or silty clay loam. Reaction ranges from slightly acid to mildly alkaline.

The Cg horizon has hue of 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam.

### Pinevillage Series

The Pinevillage series consists of well drained, very deep, moderately rapidly permeable soils on flood

plains. These soils formed in loamy alluvium. Slopes range from 2 to 8 percent.

Pinevillage soils are commonly adjacent to Lash, Sawabash, and Tice soils. Lash soils have a darker surface layer than the Pinevillage soils and have less gravel in the subsoil and underlying material. Sawabash and Tice soils have a grayer subsoil, a darker surface layer, and less sand and gravel in the subsoil than the Pinevillage soils. They are in the lower areas on flood plains.

Typical pedon of Pinevillage gravelly sandy loam, 2 to 8 percent slopes, rarely flooded, in a walnut plantation; 1,600 feet west and 910 feet north of the southeast corner of sec. 24, T. 23 N., R. 6 W.

- Ap—0 to 8 inches; dark brown (10YR 3/3) gravelly sandy loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; common fine roots; 20 percent gravel; slight effervescence; moderately alkaline; abrupt smooth boundary.
- C1—8 to 24 inches; dark brown (10YR 4/3) gravelly sandy loam; weak fine subangular blocky structure; friable; common very fine roots; 30 percent gravel; 10 percent cobbles; 2 percent stones; slight effervescence; moderately alkaline; clear smooth boundary.
- C2—24 to 45 inches; dark brown (10YR 4/3) very gravelly sandy loam; weak fine subangular blocky structure; friable; common very fine roots; 40 percent gravel; 10 percent cobbles; 5 percent stones; slight effervescence; moderately alkaline; clear smooth boundary.
- C3—45 to 55 inches; dark brown (10YR 4/3) gravelly loam; weak fine subangular blocky structure; friable; common very fine roots; 15 percent gravel; slight effervescence; moderately alkaline; clear wavy boundary.
- C4—55 to 60 inches; dark yellowish brown (10YR 4/4) gravelly loamy sand; single grained; loose; 8 percent cobbles, 3 percent stones, 20 percent gravel; slight effervescence; moderately alkaline.

The content of coarse fragments averages 35 to 50 percent in the 10- to 40-inch control section.

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

The C horizon has hue of 10YR and value and chroma of 3 or 4.

### Rainsville Series

The Rainsville series consists of moderately well drained soils on till plains and recessional moraines. These soils are deep over compact glacial till. Permeability is moderate in the upper part of the solum,

moderately slow in the lower part of the solum, and slow in the underlying material. The soils formed in silty material, in loamy glaciofluvial material, and in the underlying glacial till. Slopes range from 2 to 6 percent.

Rainsville soils are commonly adjacent to Fincastle, Miami, and Starks soils. Fincastle and Starks soils have a grayer subsoil than the Rainsville soils and have less sand in the upper part of the subsoil. They are in drainageways and the less sloping areas. Miami soils do not have gray mottles in the lower part of the subsoil and have a solum that is less than 40 inches thick. They are on knobs and in the more sloping areas along drainageways.

Typical pedon of Rainsville silt loam, 2 to 6 percent slopes, eroded, in a cultivated field; 2,300 feet west and 2,300 feet north of the southeast corner of sec. 2, T. 23 N., R. 6 W.

- Ap—0 to 9 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; common fine dark yellowish brown (10YR 4/4) pockets of silty clay loam material from the subsoil; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.
- Bt1—9 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous brown (10YR 4/3) clay films on faces of peds; thin discontinuous light yellowish brown (10YR 6/4) silt coatings on faces of peds; medium acid; clear wavy boundary.
- 2Bt2—14 to 24 inches; dark yellowish brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; common thin continuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 2 percent gravel; strongly acid; clear smooth boundary.
- 2Bt3—24 to 37 inches; dark yellowish brown (7.5YR 4/4) clay loam; medium coarse subangular blocky structure; firm; few fine roots; common fine pores; thin discontinuous dark brown (7.5YR 3/2) clay films on faces of peds; 5 percent gravel; strongly acid; clear wavy boundary.
- 2Bt4—37 to 41 inches; dark yellowish brown (10YR 4/4) sandy loam; weak coarse subangular blocky structure; firm; thin continuous brown (10YR 4/3) clay films on faces of peds; 5 percent gravel; strongly acid; clear wavy boundary.
- 3Bt5—41 to 49 inches; dark yellowish brown (10YR 4/4) clay loam; few medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; common thin continuous brown (10YR 4/3) clay films on faces of peds; 5 percent

gravel; neutral; clear smooth boundary.

- 3BCt—49 to 54 inches; light olive brown (2.5Y 5/4) loam; common medium prominent grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; thin discontinuous brown (10YR 4/3) clay films on faces of peds; 10 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.
- 3Cd—54 to 60 inches; light olive brown (2.5Y 5/4) loam; weak medium and thick platy till structure; very firm; 10 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 45 to 60 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The Bt horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from medium acid to neutral.

The 2Bt horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. Reaction ranges from very strongly acid to medium acid.

The 3Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 3 or 4. Reaction is neutral or mildly alkaline.

The 3Cd horizon has hue of 2.5Y, value of 5, and chroma of 3 or 4.

## Raub Series

The Raub series consists of somewhat poorly drained soils on till plains. These soils are deep over compact glacial till. Permeability is moderate in the upper part of the solum, moderately slow in the lower part of the solum, and slow in the underlying material. The soils formed in silty material and in the underlying glacial till. Slopes are 0 to 1 percent.

Raub soils are similar to Toronto soils and are commonly adjacent to Brenton, Drummer, and Throckmorton soils. Toronto soils have a dark surface layer less than 10 inches thick. Brenton soils are underlain by loamy outwash. They are at the slightly lower elevations. Drummer soils have a grayer subsoil than the Raub soils and are underlain by loamy and sandy outwash. They are in depressions and drainageways. Throckmorton soils have a browner subsoil than the Raub soils. They are on rises and in the more sloping areas.

Typical pedon of Raub silt loam, in an area of Raub-Brenton complex, 0 to 1 percent slopes, in a cultivated field; 1,650 feet west and 1,020 feet north of the southeast corner of sec. 33, T. 22 N., R. 5 W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2)

silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; common very fine roots; slightly acid; abrupt smooth boundary.

- Bt—11 to 16 inches; light olive brown (2.5Y 5/4) silty clay loam; common medium prominent dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin patchy very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.
- Btg1—16 to 23 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common very fine roots; many fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; gradual smooth boundary.
- Btg2—23 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few very fine roots; many very fine pores; thin continuous dark grayish brown (2.5Y 4/2) clay films on faces of peds; medium acid; gradual smooth boundary.
- Btg3—29 to 34 inches; grayish brown (2.5Y 5/2) silt loam; many coarse prominent yellowish brown (10YR 5/8) mottles; moderate coarse subangular blocky structure; firm; few very fine roots; many very fine pores; thin continuous dark grayish brown (2.5Y 4/2) and very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.
- 2Btg4—34 to 41 inches; grayish brown (2.5Y 5/2) loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few very fine roots; many very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 3 percent gravel; neutral; clear wavy boundary.
- 2BCt—41 to 53 inches; light olive brown (2.5Y 5/4) loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin discontinuous dark grayish brown (10YR 4/2) and very dark gray (N 3/0) clay films on faces of peds; 5 percent gravel; slight effervescence; moderately alkaline; clear wavy boundary.
- 2Cd—53 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium prominent grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium platy till structure; very firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from strongly acid to slightly acid.

The 2Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 2 to 6. It is clay loam or loam. Reaction is slightly acid or neutral.

The 2Cd horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 3 or 4.

### Richardville Series

The Richardville series consists of very deep, well drained, moderately permeable soils on till plains and recessional moraines. These soils formed in a thin layer of silty material and in the underlying glaciofluvial material and glacial till. Slopes range from 0 to 12 percent.

Richardville soils are similar to Lauramie soils and are commonly adjacent to Fincastle, Miami, Rockfield, and Starks soils. Lauramie soils have a darker surface layer than the Richardville soils. Fincastle soils have gray mottles in the subsoil. They are at the slightly lower elevations. Miami soils formed in compact glacial till and have a solum less than 40 inches thick. They are in the more sloping areas. Rockfield and Starks soils are at the slightly lower elevations. Rockfield soils have gray mottles in the lower part of the subsoil. Starks soils have gray mottles in the subsoil and have stratified underlying material.

Typical pedon of Richardville silt loam, 2 to 6 percent slopes, eroded, in a cultivated field; 2,440 feet east and 920 feet south of the northwest corner of sec. 10, T. 23 N., R. 3 W.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; common coarse dark brown (7.5YR 4/4) pockets of silty clay loam material from the subsoil; weak medium granular structure; friable; common fine roots; 1 percent gravel; medium acid; abrupt smooth boundary.

Bt1—7 to 13 inches; dark brown (7.5YR 4/4) clay loam; weak fine and medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 2 percent gravel; very strongly acid; clear smooth boundary.

2Bt2—13 to 21 inches; dark brown (7.5YR 4/4) sandy clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin

continuous dark brown (7.5YR 3/4) clay films on faces of peds; 2 percent gravel; very strongly acid; clear smooth boundary.

2Bt3—21 to 30 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin discontinuous dark brown (7.5YR 4/4) clay films on faces of peds; 2 percent gravel; very strongly acid; clear smooth boundary.

2Bt4—30 to 41 inches; dark yellowish brown (10YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; thin discontinuous dark brown (7.5YR 4/4) clay films on faces of peds; 10 percent gravel; strongly acid; clear smooth boundary.

2Bt5—41 to 51 inches; dark yellowish brown (10YR 4/4) sandy clay loam; weak coarse subangular blocky structure; firm; common fine pores; thin discontinuous dark brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; neutral; clear smooth boundary.

2C—51 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam; moderate thick platy till structure; friable; 10 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 0 to 20 inches. The depth to the 2C horizon ranges from 40 to 55 inches.

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

The Bt horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 to 6. It is silty clay loam or clay loam. Reaction ranges from very strongly acid to neutral.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 4 to 6. It is sandy clay loam or clay loam. Reaction ranges from strongly acid to mildly alkaline.

The 2C horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

### Rockfield Series

The Rockfield series consists of moderately well drained soils on till plains. These soils are deep or very deep over compact glacial till. Permeability is moderate in the upper part of the solum, moderately slow in the lower part of the solum, and slow in the underlying material. The soils formed in silty material, in glaciofluvial material, and in the underlying glacial till. Slopes range from 1 to 3 percent.

Rockfield soils are similar to Throckmorton soils and are commonly adjacent to Fincastle, Mahalasville,

Miami, Starks, and Treaty soils. Throckmorton soils have a darker surface layer than the Rockfield soils. Fincastle and Starks soils have a grayer subsoil than the Rockfield soils. They are in drainageways and the more level areas. Mahalassville and Treaty soils have a dark surface layer and a gray subsoil. They are in depressions and drainageways. Miami soils do not have gray mottles in the subsoil and have a solum that is less than 40 inches thick. They are on rises and in the more sloping areas.

Typical pedon of Rockfield silt loam, 1 to 3 percent slopes, in a cultivated field; 910 feet east and 2,280 feet south of the northwest corner of sec. 4, T. 23 N., R. 5 W.

Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.

Bt1—10 to 17 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—17 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt3—25 to 32 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; common fine and medium black (N 2/0) iron and manganese oxide accumulations; strongly acid; clear smooth boundary.

2Bt4—32 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct dark yellowish brown (10YR 4/6) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; common fine and medium black (N 2/0) iron and manganese oxide accumulations; strongly acid; clear smooth boundary.

2Bt5—38 to 46 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium black (N 2/0)

iron and manganese oxide accumulations; 1 percent gravel; strongly acid; gradual wavy boundary.

3Bt6—46 to 57 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; common fine and medium black (N 2/0) iron and manganese oxide accumulations; 5 percent gravel; neutral; gradual wavy boundary.

3BCt—57 to 67 inches; light olive brown (2.5Y 5/4) loam; common medium prominent gray (10YR 5/1) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin discontinuous dark brown (7.5YR 4/2) clay films on faces of peds; 5 percent gravel; mildly alkaline; gradual wavy boundary.

3Cd—67 to 80 inches; light olive brown (2.5Y 5/4) loam; few medium prominent yellowish brown (10YR 5/8) mottles; weak medium and thick platy till structure; very firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 70 inches. The thickness of the silty material ranges from 24 to 40 inches. Mottles with chroma of 2 or less are at a depth of 24 to 48 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from very strongly acid to medium acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is clay loam, loam, or sandy loam. Reaction ranges from strongly acid to neutral.

The 3Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is clay loam or loam. Reaction is neutral or mildly alkaline.

The 3BCt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 4 to 6.

The 3Cd horizon has hue of 2.5Y or 10YR, value of 5, and chroma of 3 or 4.

## Rodman Series

The Rodman series consists of excessively drained, very rapidly permeable soils on the lower part of steep breaks on glacial till plains, on steep kames, and on steep breaks on outwash plains and terraces. These soils are shallow over very gravelly coarse sand and coarse sand. They formed in loamy outwash over gravelly outwash. Slopes range from 12 to 60 percent.

The Rodman soils in this survey area are taxadjuncts because they have a calcareous surface soil. This

difference, however, does not affect the use or behavior of these soils. The soils are classified as sandy-skeletal, mixed, mesic Entic Hapludolls.

Rodman soils are commonly adjacent to Elston, Kalamazoo, and Strawn soils. Elston and Kalamazoo soils have a thicker solum than the Rodman soils and have more clay in the subsoil. They are on the upper part of terrace breaks. Strawn soils are moderately deep to glacial till, do not have a thick, dark surface layer, and have an argillic horizon. They are on the upper part of till plain breaks.

Typical pedon of Rodman gravelly sandy loam, in an area of Strawn-Rodman complex, 18 to 50 percent slopes, in a wooded area; 540 feet west and 2,070 feet north of the southeast corner of sec. 13, T. 23 N., R. 4 W.

- A1—0 to 5 inches; very dark gray (10YR 3/1) gravelly sandy loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; many fine roots; 18 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.
- A2—5 to 11 inches; very dark grayish brown (10YR 3/2) gravelly coarse sandy loam, dark brown (10YR 4/3) dry; moderate fine granular structure; friable; common fine roots; 5 percent coarse gravel and 25 percent fine gravel; slight effervescence; mildly alkaline; clear smooth boundary.
- AB—11 to 15 inches; dark brown (10YR 3/3) gravelly loamy coarse sand, brown (10YR 5/3) dry; moderate fine granular structure; very friable; common fine roots; 5 percent coarse gravel and 28 percent fine gravel; strong effervescence; mildly alkaline; clear smooth boundary.
- C—15 to 60 inches; brown (10YR 5/3) very gravelly coarse sand that has strata of coarse sand; single grained; loose; 10 percent coarse gravel and 45 percent fine gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 10 to 15 inches.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is gravelly loam, gravelly sandy loam, or gravelly coarse sandy loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is commonly stratified coarse sand, gravelly coarse sand, very gravelly coarse sand, or extremely gravelly coarse sand.

## Ross Series

The Ross series consists of very deep, well drained, moderately permeable soils on flood plains. These soils

formed in loamy alluvium. Slopes range from 0 to 2 percent.

Ross soils are similar to Du Page soils and are commonly adjacent to Allison and Battleground soils. Du Page soils are calcareous throughout the solum. Allison and Battleground soils are at the slightly lower elevations. They have less sand in the upper part of the subsoil than the Ross soils. Also, Battleground soils have a dark surface layer less than 24 inches thick.

Typical pedon of Ross silt loam, protected, in a cultivated field; 890 feet east and 1,920 feet south of the northwest corner of sec. 2, T. 24 N., R. 3 W.

- Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; many very fine roots; 2 percent gravel; mildly alkaline; abrupt smooth boundary.
- A—10 to 17 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; common very fine roots; common very fine pores; mildly alkaline; gradual wavy boundary.
- Bw1—17 to 23 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; common very fine roots; common very fine pores; mildly alkaline; gradual wavy boundary.
- Bw2—23 to 32 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; common very fine pores; mildly alkaline; gradual wavy boundary.
- Bw3—32 to 39 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; common very fine pores; mildly alkaline; gradual wavy boundary.
- Bw4—39 to 51 inches; brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; thin continuous very dark grayish brown (10YR 3/2) organic stains on faces of peds; mildly alkaline; clear wavy boundary.
- Bw5—51 to 80 inches; brown (10YR 4/3) sandy loam; weak coarse subangular blocky structure; friable; thin continuous dark brown (10YR 3/3) organic stains on faces of peds; mildly alkaline.

The solum is more than 80 inches thick. The thickness of the mollic epipedon ranges from 24 to 45 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bw horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. It is loam, sandy loam, or silty

clay loam. Reaction ranges from slightly acid to moderately alkaline.

### Saranac Series

The Saranac series consists of very poorly drained soils on flood plains. These soils are deep over gravelly loamy coarse sand. Permeability is moderately slow in the solum and rapid in the underlying material. The soils formed in clayey and silty alluvium overlying gravelly material. Slopes range from 0 to 2 percent.

Saranac soils are commonly adjacent to Ceresco and Cohoctah soils. Ceresco and Cohoctah soils have less clay in the subsoil than the Saranac soils. Also, Ceresco soils have a browner subsoil. Ceresco and Cohoctah soils are on the narrower flood plains.

Typical pedon of Saranac silty clay, gravelly substratum, occasionally flooded, in a cultivated field; 1,850 feet east and 2,080 feet south of the northwest corner of sec. 23, T. 22 N., R. 4 W.

Ap—0 to 10 inches; black (10YR 2/1) silty clay, very dark grayish brown (10YR 3/2) dry; moderate medium granular structure; firm; slightly acid; abrupt smooth boundary.

A—10 to 18 inches; black (10YR 2/1) silty clay, very dark grayish brown (10YR 3/2) dry; moderate fine subangular blocky structure; firm; neutral; clear smooth boundary.

Bg1—18 to 28 inches; dark gray (N 4/0) silty clay; few fine distinct gray (5Y 5/1) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; very firm; thin continuous black (10YR 2/1) organic coatings on faces of peds; few fine pores; neutral; gradual smooth boundary.

Bg2—28 to 39 inches; gray (5Y 5/1) silty clay; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate coarse prismatic structure; very firm; common fine pores; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds and lining pores; krotovinas 2 inches in diameter filled with very dark gray (N 3/0) silty clay material; neutral; clear smooth boundary.

Bg3—39 to 49 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak coarse prismatic structure; firm; few fine pores; thin discontinuous very dark gray (10YR 3/1) organic coatings on faces of peds and lining pores; krotovinas 2 inches in diameter filled with very dark gray (N 3/0) silty clay material; neutral; gradual wavy boundary.

Cg1—49 to 58 inches; dark gray (N 4/0) silt loam; many coarse prominent light olive brown (2.5YR 5/4) mottles; massive; friable; few fine pores; krotovinas 2 inches in diameter filled with very dark gray (N

3/0) silty clay material; 1 percent gravel; slight effervescence; neutral; clear wavy boundary.

Cg2—58 to 70 inches; light brownish gray (10YR 6/2) gravelly loamy coarse sand that has strata of silt loam and gravelly loam; single grained; loose; 25 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 23 inches.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2.

The Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. It is silt loam, silty clay loam, or clay loam in the upper part and gravelly loamy coarse sand in the lower part.

### Sawabash Series

The Sawabash series consists of very deep, very poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Sawabash soils are commonly adjacent to Battleground and Tice soils. Battleground and Tice soils are in the higher lying areas. Battleground soils have a brown subsoil that does not have mottles. Tice soils have a browner subsoil than the Sawabash soils.

Typical pedon of Sawabash silty clay loam, frequently flooded, in a cultivated field; 2,240 feet west and 660 feet north of the southeast corner of sec. 25, T. 4 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; strong effervescence; mildly alkaline; abrupt smooth boundary.

A1—9 to 18 inches; very dark grayish brown (2.5Y 3/2) silty clay loam, brown (10YR 5/3) dry; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common very fine and fine pores; thin discontinuous red (2.5YR 4/6) iron and manganese oxide stains on faces of peds and in pores; strong effervescence; mildly alkaline; gradual smooth boundary.

A2—18 to 36 inches; very dark gray (10YR 3/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; firm; common very fine and fine pores; thin discontinuous red (2.5YR 4/6) iron and manganese oxide stains on faces of peds and in pores; strong

effervescence; mildly alkaline; gradual smooth boundary.

A3—36 to 46 inches; very dark gray (N 3/0) silty clay loam, dark grayish brown (10YR 4/2) dry; few medium prominent dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; firm; common very fine pores; slight effervescence; mildly alkaline; clear smooth boundary.

Bg—46 to 55 inches; dark grayish brown (2.5Y 4/2) silty clay loam; few medium distinct olive brown (2.5Y 4/4) mottles; weak coarse subangular blocky structure; firm; slight effervescence; mildly alkaline; clear smooth boundary.

Cg—55 to 60 inches; dark gray (10YR 4/1) silty clay loam; common medium distinct dark brown (10YR 4/3) mottles; massive; firm; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 24 to 48 inches.

The Ap and A horizons have hue of 2.5Y or 10YR or are neutral in hue. They have value of 2 or 3 and chroma of 0 to 2.

The Bg and Cg horizons have hue of 10YR or 2.5Y, value of 4, and chroma of 1 or 2.

## Shadeland Series

The Shadeland series consists of moderately deep, somewhat poorly drained soils on uplands. Permeability is moderate in the upper part of the solum and moderately slow in the lower part. These soils formed in silty material, loamy glacial drift, and residuum derived from the underlying interbedded siltstone and shale bedrock. Slopes range from 1 to 4 percent.

Shadeland soils are commonly adjacent to High Gap Variant soils and to the Mahalasville soils that have a shale substratum. High Gap Variant soils are not mottled in the upper part of the subsoil. They are on slight rises and in the more sloping areas along drainageways. Mahalasville soils have a dark surface layer and a gray subsoil. They are in depressions and drainageways.

Typical pedon of Shadeland silt loam, 1 to 4 percent slopes, in a cultivated field; 880 feet west and 80 feet south of the center of sec. 22, T. 22 N., R. 6 W.

Ap—0 to 8 inches; dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; many very fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; brown (10YR 5/3) silt loam; common medium faint light brownish gray (10YR 6/2) and distinct yellowish brown (10YR 5/6)

mottles; moderate fine subangular blocky structure; friable; common very fine roots; many very fine pores; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; clear wavy boundary.

Bt2—12 to 16 inches; brown (10YR 5/3) silty clay loam; common medium faint light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; common very fine roots; many very fine pores; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; very strongly acid; clear wavy boundary.

2Bt3—16 to 27 inches; brown (10YR 5/3) clay loam; common medium faint light brownish gray (10YR 6/2) and distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few very fine roots; common very fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent gravel; very strongly acid; clear wavy boundary.

3Bt4—27 to 31 inches; dark brown (7.5YR 4/4) clay loam; common medium prominent distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; common medium black (N 2/0) iron and manganese oxide accumulations; 12 percent channers; slightly acid; clear wavy boundary.

3Bct—31 to 34 inches; strong brown (7.5YR 5/6) channery clay loam; common distinct medium brown (7.5YR 5/2) mottles; weak thick platy structure; firm; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; common medium black (N 2/0) iron and manganese oxide accumulations; 25 percent channers; slightly acid; abrupt irregular boundary.

3Cr—34 to 60 inches; weathered interbedded siltstone and shale.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from very strongly acid to medium acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 6. Reaction ranges from very strongly acid to medium acid.

The 3Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. Reaction ranges from strongly acid to slightly acid.

The 3BCt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6.

### Sleeth Series

The Sleeth series consists of somewhat poorly drained soils on terraces and outwash plains. These soils are deep over gravelly sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in loamy and gravelly outwash. Slopes range from 0 to 2 percent.

Sleeth soils are commonly adjacent to Kalamazoo soils and to the Mahalassville soils that have a gravelly substratum. Kalamazoo soils have a brown subsoil. They are on rises and in the more sloping areas. Mahalassville soils have a dark surface layer and a gray subsoil. They are in depressional areas.

Typical pedon of Sleeth loam, 0 to 2 percent slopes, in a cultivated field; 2,340 feet west and 1,740 feet south of the northeast corner of sec. 29, T. 22 N., R. 4 W.

- Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; many fine and very fine roots; strongly acid; abrupt smooth boundary.
- Bt1—10 to 16 inches; brown (10YR 5/3) loam; common medium faint grayish brown (10YR 5/2) mottles; weak fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.
- Bt2—16 to 30 inches; dark yellowish brown (10YR 4/4) loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent gravel; medium acid; gradual smooth boundary.
- Btg1—30 to 47 inches; gray (10YR 5/1) sandy clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; common very fine pores; thin continuous dark gray (10YR 4/1) clay films on faces of peds; 5 percent gravel; slightly acid; gradual wavy boundary.
- 2Btg2—47 to 54 inches; dark gray (10YR 4/1) gravelly sandy loam; common medium prominent strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; friable; common very fine pores; thin continuous dark gray (10YR 4/1) clay films on faces of peds; 20 percent gravel; neutral; clear wavy boundary.

2BCtg—54 to 58 inches; dark grayish brown (10YR 4/2) gravelly loamy sand; common medium prominent strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; very friable; thin discontinuous dark gray (10YR 4/1) clay films on faces of peds; 20 percent gravel; neutral; clear wavy boundary.

2C—58 to 70 inches; yellowish brown (10YR 5/4) gravelly sand; common medium distinct grayish brown (10YR 5/2) mottles; single grained; loose; 25 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The Bt horizon is mottled. It has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is loam, sandy clay loam, or clay loam. Reaction ranges from strongly acid to slightly acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4. It is gravelly sandy clay loam or gravelly sandy loam. Reaction is neutral or mildly alkaline.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is stratified sand and gravelly sand.

### Sloan Series

The Sloan series consists of very deep, very poorly drained, moderately permeable soils on flood plains. These soils formed in loamy alluvium. Slopes range from 0 to 2 percent.

Sloan soils are commonly adjacent to Cohoctah soils. Cohoctah soils have less clay in the subsoil than the Sloan soils and have more gravel in the underlying material. They are in the wider areas on flood plains.

Typical pedon of Sloan clay loam, occasionally flooded, in a cultivated field; 480 feet south and 480 feet west of the center of sec. 20, T. 21 N., R. 4 W.

- Ap—0 to 9 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; moderate fine subangular blocky structure; firm; common fine pores; slightly acid; abrupt smooth boundary.
- A—9 to 16 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; few fine distinct dark yellowish brown (10YR 4/3) mottles; weak fine subangular blocky structure; firm; common fine pores; slightly acid; clear smooth boundary.
- Bg1—16 to 24 inches; grayish brown (2.5Y 5/2) loam; common medium prominent yellowish brown (10YR

5/6) mottles; weak fine subangular blocky structure; firm; few fine pores; thin continuous dark gray (10YR 4/1) and thin patchy gray (N 5/0) organic coatings on faces of peds; neutral; gradual smooth boundary.

Bg2—24 to 32 inches; grayish brown (2.5Y 5/2) loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; firm; common fine pores; thin discontinuous gray (N 5/0) organic coatings on faces of peds; black (10YR 2/1) clay loam fillings in krotovinas; neutral; clear smooth boundary.

Bg3—32 to 44 inches; grayish brown (2.5Y 5/2) loam that has thin strata of sandy loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; few fine pores; thin discontinuous gray (N 5/0) organic coatings on faces of peds; black (10YR 2/1) clay loam fillings in krotovinas; neutral; gradual wavy boundary.

Cg1—44 to 48 inches; grayish brown (10YR 5/2) sandy loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; 10 percent gravel; mildly alkaline; clear wavy boundary.

Cg2—48 to 60 inches; grayish brown (10YR 5/2) gravelly loam; massive; friable; 20 percent gravel; slight effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 55 inches. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is clay loam, silty clay loam, or loam.

The Bg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 4 or 5 and chroma of 0 to 2. It is clay loam or loam. Reaction ranges from slightly acid to moderately alkaline.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is stratified loam or sandy loam or the gravelly analogs of these textures.

## Sloan Variant

The Sloan Variant consists of moderately deep, very poorly drained, moderately permeable soils on flood plains. These soils formed in alluvium overlying interbedded siltstone and shale bedrock. Slopes range from 0 to 2 percent.

Sloan Variant soils are commonly adjacent to Sawabash and Tice soils. These soils are in the slightly lower positions on the landscape. Sawabash soils have less sand in the subsoil than the Sloan Variant soils and have a thicker solum. Tice soils have a browner subsoil

than the Sloan Variant soils. Also, they have less sand in the subsoil and have a thicker solum.

Typical pedon of Sloan Variant silty clay loam, occasionally flooded, in a cultivated field; 950 feet east and 380 feet north of the southwest corner of sec. 10, T. 22 N., R. 6 W.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; firm; many fine roots; 2 percent gravel; moderately alkaline; abrupt smooth boundary.

BA—10 to 17 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; common medium prominent dark brown (7.5YR 4/4) mottles; moderate fine subangular blocky structure; firm; common fine roots; few very fine pores; 5 percent gravel; moderately alkaline; clear smooth boundary.

2Btg1—17 to 26 inches; dark grayish brown (10YR 4/2) very channery sandy clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate fine subangular blocky structure; firm; common fine roots; many very fine pores; thin discontinuous dark gray (10YR 4/1) clay films on faces of peds; 35 percent channers; moderately alkaline; clear smooth boundary.

2Btg2—26 to 33 inches; dark grayish brown (10YR 4/2) very channery sandy clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; weak fine subangular blocky structure; firm; few fine roots; many very fine pores; thin discontinuous dark gray (10YR 4/1) clay films on faces of peds; 55 percent channers; moderately alkaline; clear smooth boundary.

3Cr—33 inches; weathered interbedded siltstone and shale.

The solum ranges from 20 to 40 inches in thickness. It is mildly alkaline or moderately alkaline.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1.

The Btg horizon is mottled. It has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 1 or 2.

## Sparta Series

The Sparta series consists of very deep, excessively drained, rapidly permeable soils on sand dunes. These soils formed in eolian sandy sediments. Slopes range from 2 to 12 percent.

The Sparta soils in this survey area are taxadjuncts because they have a low base saturation in the surface layer and thin bands of loamy sand above a depth of 60 inches. These differences, however, do not affect the

use or behavior of these soils. The soils are classified as mixed, mesic Alfic Udipsamments.

Sparta soils are similar to Coloma, Oakville, and Spinks soils and are commonly adjacent to Carmi and Elston soils and to the Billett soils that have a gravelly substratum. Coloma, Oakville, and Spinks soils have a lighter colored surface layer than the Sparta soils. Also, Oakville soils do not have bands in the subsoil and have finer textured sand. Billett, Carmi, and Elston soils have more clay in the upper part of the subsoil than the Sparta soils. They are at the lower elevations.

Typical pedon of Sparta sand, 2 to 6 percent slopes, in a cultivated field; 135 feet west and 150 feet south of the northeast corner of sec. 35, T. 23 N., R. 6 W.

- Ap—0 to 12 inches; very dark brown (10YR 2/2) sand, dark grayish brown (10YR 4/2) dry; weak fine granular structure; very friable; many very fine roots; strongly acid; abrupt smooth boundary.
- A—12 to 19 inches; very dark brown (10YR 2/2) sand, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; very friable; common very fine roots; strongly acid; gradual smooth boundary.
- E1—19 to 29 inches; dark brown (10YR 4/3) sand; weak medium granular structure; very friable; few very fine roots; strongly acid; gradual smooth boundary.
- E2—29 to 41 inches; dark yellowish brown (10YR 4/4) sand; weak medium subangular blocky structure; very friable; few very fine roots; strongly acid; gradual smooth boundary.
- E3—41 to 48 inches; yellowish brown (10YR 5/4) sand; weak medium subangular blocky structure; very friable; few very fine roots; strongly acid; gradual wavy boundary.
- E&Bt—48 to 80 inches; brown (7.5YR 5/4) sand (E); weak medium subangular blocky structure; very friable; bands of dark brown (7.5YR 4/4) loamy sand (Bt) at depths of 48, 51, 53, 57, 60, 62, 64, 67, 70, 72, 75, and 78 inches; massive; very friable; bands are  $\frac{1}{8}$  to  $\frac{3}{8}$  inch thick, are discontinuous, and have a cumulative thickness of 1 inch within a depth of 60 inches; weak clay bridges connect sand grains in bands; strongly acid.

The Ap and A horizons have hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The E horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from strongly acid to medium acid.

The E part of the E&Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The E&Bt horizon is strongly acid or medium acid.

## Spinks Series

The Spinks series consists of very deep, well drained soils on outwash plains, terraces, till plains, and recessional moraines. These soils formed in sandy sediments. Permeability is rapid in the upper part of the solum, moderately rapid in the lower part of the solum, and rapid in the underlying material. Slopes range from 2 to 12 percent.

Spinks soils are similar to Coloma, Oakville, and Sparta soils and are commonly adjacent to Alvin, Mahalasville, Treaty, and Whitaker soils. Coloma and Sparta soils have bands in the subsoil that are less than 6 inches thick and have coarser sand than the Spinks soils. Oakville soils do not have bands in the subsoil. Alvin soils have more clay in the upper part of the subsoil than the Spinks soils. They are at the lower elevations. Mahalasville and Treaty soils have a dark surface layer and a gray subsoil. They are in depressions and on toe slopes. Whitaker soils have gray mottles in the subsoil. They are on toe slopes.

Typical pedon of Spinks fine sand, 6 to 12 percent slopes, in an idle field; 1,650 feet east and 1,980 feet north of the southwest corner of sec. 14, T. 22 N., R. 5 W.

- Ap—0 to 9 inches; dark brown (10YR 3/3) fine sand, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; common very fine roots; medium acid; abrupt smooth boundary.
- E—9 to 21 inches; dark yellowish brown (10YR 4/4) fine sand; weak fine subangular blocky structure; very friable; common very fine roots; medium acid; gradual wavy boundary.
- E&Bt—21 to 68 inches; dark yellowish brown (10YR 4/4) fine sand (E); weak fine subangular blocky structure; very friable; bands of dark brown (7.5YR 4/4) loamy fine sand (Bt); massive; very friable; bands are  $\frac{1}{8}$  inch to 3 inches thick and have a cumulative thickness of more than 6 inches within a depth of 60 inches; weak clay bridges connect sand grains in bands; neutral; gradual wavy boundary.
- C—68 to 80 inches; brown (10YR 5/3) fine sand; single grained; loose; strong effervescence; moderately alkaline.

The solum is more than 60 inches thick.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 3. It is fine sand or sand.

The E horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is fine sand or sand. Reaction ranges from medium acid to neutral.

The E part of the E&Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. The Bt part has hue of 7.5YR, value of 4 or 5, and chroma of 4. The

E&Bt horizon ranges from medium acid to mildly alkaline.

The C horizon has hue of 10YR, value of 5, and chroma of 3 or 4. It is fine sand or sand.

### Starks Series

The Starks series consists of very deep, somewhat poorly drained, moderately permeable soils on till plains. These soils formed in silty material and in the underlying glaciofluvial deposits. Slopes range from 0 to 2 percent.

Starks soils are similar to Millbrook soils and are commonly adjacent to Crosby, Fincastle, Mahalassville, Rockfield, and Treaty soils. Millbrook soils have a darker surface layer than the Starks soils. Crosby and Fincastle soils are underlain by glacial till. They are at the slightly higher elevations. Mahalassville and Treaty soils have a dark surface layer and a gray subsoil. They are in the lower positions on the landscape. Rockfield soils do not have gray mottles in the upper part of the subsoil. They are underlain by glacial till. They are on slight rises and in the more sloping areas adjacent to drainageways.

Typical pedon of Starks silt loam (fig. 18), in an area of Starks-Fincastle complex, 0 to 2 percent slopes, in a cultivated field; 910 feet east and 900 feet north of the southwest corner of sec. 14, T. 23 N., R. 3 W.

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

Bt1—10 to 20 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and distinct yellowish brown (10YR 5/6) mottles; weak fine prismatic structure parting to moderate medium and fine subangular blocky; firm; common fine roots; common fine pores; thin continuous grayish brown (10YR 5/2) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—20 to 27 inches; brown (10YR 5/3) silty clay loam; common medium faint grayish brown (10YR 5/2) and distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin discontinuous grayish brown (10YR 5/2) clay films on faces of peds; few very dark grayish brown (10YR 4/2) clay linings in pores; slightly acid; clear smooth boundary.

Bt3—27 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to

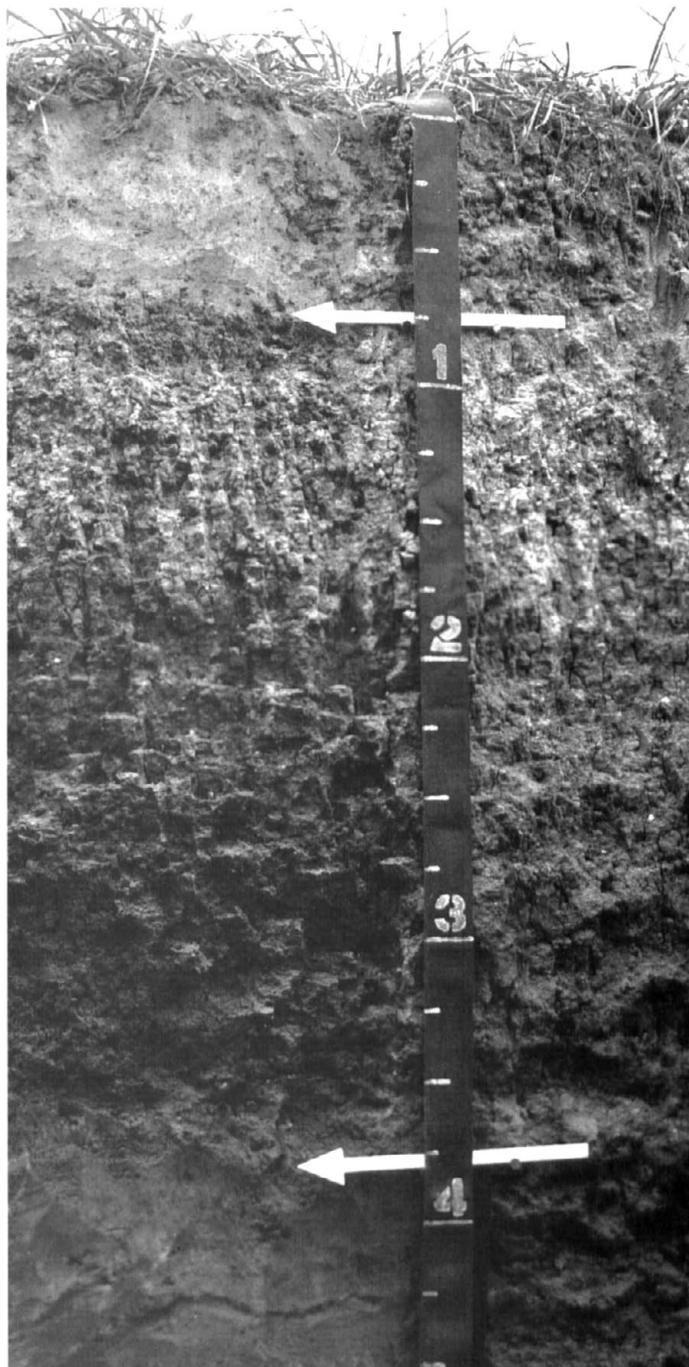


Figure 18.—Profile of Starks silt loam. Stratified glaciofluvial material is at a depth of about 4 feet. Depth is marked in feet.

moderate medium subangular blocky; firm; common fine roots; common fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt4—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; weak medium prismatic structure parting to weak medium subangular blocky; firm; common fine roots; common fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt5—38 to 46 inches; yellowish brown (10YR 5/4) silt loam that has pockets of loam and sandy loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; common fine pores; thin patchy grayish brown (10YR 5/2) clay films on faces of peds; 3 percent fine gravel; neutral; clear smooth boundary.

2Bt6—46 to 56 inches; yellowish brown (10YR 5/6) loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; firm; few fine roots; common fine pores; thin patchy very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear wavy boundary.

2C—56 to 70 inches; yellowish brown (10YR 5/4) sandy loam that has thin strata of loamy sand and several pockets of silt loam; common medium distinct grayish brown (10YR 5/2) mottles; firm; massive; 10 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 70 inches. The thickness of the silty material ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bt horizon is mottled. It has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Reaction ranges from strongly acid to slightly acid.

The 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is silt loam, silty clay loam, loam, sandy loam, sandy clay loam, or clay loam. Reaction ranges from strongly acid to mildly alkaline.

The 2C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. The texture dominantly ranges from sandy loam to silt loam. Strata of sand, loamy sand, or loamy fine sand are in all pedons.

## Strawn Series

The Strawn series consists of well drained soils on steep breaks on till plains. These soils are shallow or moderately deep over compact glacial till. Permeability is moderate in the solum and moderately slow in the underlying material. The soils formed in loamy glacial till. Slopes range from 18 to 50 percent.

Strawn soils are similar to Miami and Octagon soils

and are adjacent to Rodman soils. Miami and Octagon soils have a thicker solum than the Strawn soils. Also, Octagon soils have a darker surface layer. Rodman soils have a dark surface layer and have more sand and gravel in the subsoil than the Strawn soils. They are underlain by sand and gravel. They are on the lower part of steep breaks on till plains.

Typical pedon of Strawn loam, in an area of Strawn-Rodman complex, 18 to 50 percent slopes, in a wooded area; 620 feet west and 2,100 feet north of the southeast corner of sec. 13, T. 23 N., R. 3 W.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many medium roots; neutral; clear smooth boundary.

E—3 to 9 inches; brown (10YR 4/3) loam; weak fine subangular blocky structure parting to moderate medium granular; friable; many medium roots; many fine pores; thin discontinuous very dark grayish brown (10YR 3/2) organic stains on faces of peds and in pores; strongly acid; clear smooth boundary.

Bt—9 to 16 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; firm; common medium roots; common fine pores; thin continuous dark yellowish brown (10YR 3/4) clay films on faces of peds; 4 percent gravel; neutral; clear wavy boundary.

Cd—16 to 60 inches; yellowish brown (10YR 5/4) loam; moderate thick platy till structure; very firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 10 to 24 inches.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2. It is silt loam or loam.

The E horizon, if it occurs, has hue of 10YR, value of 4 or 5, and chroma of 3. It is silt loam or loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam or clay loam. Reaction ranges from medium acid to mildly alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 3 or 4.

## Tecumseh Series

The Tecumseh series consists of very deep, well drained, moderately permeable soils on till plains. These soils formed in silty material and in the underlying glaciofluvial material and glacial till. Slopes range from 0 to 2 percent.

Tecumseh soils are similar to Mellott soils and are commonly adjacent to Lauramie soils. Mellott soils have a dark surface layer less than 10 inches thick. Lauramie

soils have more sand in the upper part of the subsoil than the Tecumseh soils. They are in the more sloping areas on rises and along drainageways.

Typical pedon of Tecumseh silt loam, 0 to 2 percent slopes, in a cultivated field; 375 feet east and 2,500 feet north of the southwest corner of sec. 21, T. 22 N., R. 4 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; medium acid; abrupt smooth boundary.

A—10 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; common very fine pores; medium acid; clear smooth boundary.

Bt1—15 to 21 inches; dark yellowish brown (10YR 3/4) silty clay loam; moderate medium subangular blocky structure; firm; many very fine pores; thin continuous very dark grayish brown (10YR 3/2) organic coatings and clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—21 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; many very fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt3—30 to 35 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; many very fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; 1 percent gravel; medium acid; clear smooth boundary.

2Bt4—35 to 40 inches; dark brown (7.5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm; many very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 1 percent gravel; strongly acid; clear smooth boundary.

2Bt5—40 to 48 inches; dark brown (7.5YR 4/4) fine sandy loam; moderate coarse subangular blocky structure; firm; many very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 1 percent gravel; strongly acid; clear smooth boundary.

3Bt6—48 to 57 inches; dark yellowish brown (10YR 4/4) loam; moderate coarse subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 5 percent gravel; slightly acid; clear smooth boundary.

3Bt7—57 to 65 inches; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure; firm; thin discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent gravel;

neutral; clear wavy boundary.

3BCt—65 to 75 inches; yellowish brown (10YR 5/4) loam; weak coarse subangular blocky structure; friable; thin discontinuous dark yellowish brown (10YR 4/4) clay films on faces of peds; 5 percent gravel; slight effervescence; moderately alkaline; clear wavy boundary.

3C—75 to 80 inches; yellowish brown (10YR 5/4) fine sandy loam; massive; friable; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 60 to 80 inches. The thickness of the silty material ranges from 24 to 40 inches. Depth to the 3Bt horizon ranges from 40 to 60 inches.

The Ap and A horizons have hue of 10YR, value of 3, and chroma of 1 or 2. The total combined thickness of the A horizons ranges from 10 to 18 inches.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. Reaction ranges from very strongly acid to slightly acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is clay loam, sandy clay loam, or fine sandy loam. Reaction ranges from strongly acid to slightly acid.

The 3Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Reaction is slightly acid or neutral.

The 3C horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

## Thackery Series

The Thackery series consists of moderately well drained soils on terraces and outwash plains. These soils are deep over gravelly sand. Permeability is moderate in the upper part of the solum, moderately rapid in the lower part of the solum, and very rapid in the underlying material. The soils formed in silty material, in loamy outwash, and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

Thackery soils are commonly adjacent to Kalamazoo, Ockley, and Waynetown soils and to the Mahalassville soils that have a gravelly substratum. Kalamazoo and Ockley soils do not have gray mottles in the lower part of the subsoil. They are in the higher lying areas. Mahalassville soils have a dark surface layer and a dominantly gray subsoil. They are in depressional areas. Waynetown soils have gray mottles in the upper part of the subsoil. They are in the lower lying areas.

Typical pedon of Thackery silt loam, 0 to 2 percent slopes, in a cultivated field; 675 feet west and 910 feet south of the northeast corner of sec. 29, T. 22 N., R. 4 W.

- Ap—0 to 10 inches; dark brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.
- Bt1—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.
- 2Bt2—16 to 24 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; 5 percent gravel; medium acid; clear smooth boundary.
- 2Bt3—24 to 34 inches; dark yellowish brown (10YR 4/4) sandy clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; 5 percent gravel; medium acid; clear smooth boundary.
- 2Bt4—34 to 42 inches; dark yellowish brown (10YR 4/4) sandy clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few very fine roots; common very fine pores; thin continuous dark brown (7.5YR 4/2) clay films on faces of peds; 5 percent gravel; medium acid; clear smooth boundary.
- 2Bt5—42 to 48 inches; dark yellowish brown (10YR 4/4) sandy clay loam; common medium distinct gray (10YR 5/1) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 4/2) clay films on faces of peds; 11 percent gravel; slightly acid; clear smooth boundary.
- 3BCt—48 to 54 inches; dark brown (7.5YR 4/2) gravelly sandy loam; weak coarse subangular blocky structure; firm; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 22 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.
- 3Cg—54 to 60 inches; grayish brown (10YR 5/2) gravelly sand; single grained; loose; 27 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to 60 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam or silt loam. Reaction ranges from strongly acid to slightly acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 to 6. Reaction ranges from strongly acid to mildly alkaline.

The 3Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 2. It is stratified. Textures include sand and gravelly sand.

### Throckmorton Series

The Throckmorton series consists of moderately well drained soils on recessional moraines and till plains. These soils are deep over compact glacial till.

Permeability is moderate in the upper part of the solum, moderately slow in the lower part of the solum, and slow in the underlying glacial till. The soils formed in silty material and in the underlying glaciofluvial material and glacial till. Slopes range from 1 to 3 percent.

Throckmorton soils are similar to Rockfield soils and are commonly adjacent to Drummer, Mellott, Millbrook, Octagon, and Toronto soils. Rockfield soils have a lighter colored surface layer than the Throckmorton soils. Drummer soils have a thicker surface layer than the Throckmorton soils and have a grayer subsoil. They are in depressions and drainageways. Mellott soils do not have mottles in the subsoil. They are at the slightly higher elevations. Millbrook and Toronto soils have gray mottles immediately below the surface layer. They are in the more level areas. Octagon soils have a brown subsoil that does not have mottles. They are in the more sloping areas along drainageways and on rises.

Typical pedon of Throckmorton silt loam, 1 to 3 percent slopes, in a cultivated field; 590 feet east and 200 feet north of the southwest corner of sec. 27, T. 22 N., R. 6 W.

- Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; neutral; abrupt smooth boundary.
- Bt1—9 to 12 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; firm; common very fine pores; thin continuous dark brown (10YR 3/3) clay films and organic coatings on faces of peds; slightly acid; clear smooth boundary.
- Bt2—12 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; firm; many very fine pores; thin continuous dark brown (10YR 3/3) clay films on faces of peds; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

**Bt3**—22 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; many very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

**Bt4**—29 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; many very fine pores; thin continuous dark brown (10YR 4/3) clay films on faces of peds; very strongly acid; clear smooth boundary.

**2Bt5**—34 to 42 inches; dark yellowish brown (10YR 4/4) clay loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate coarse subangular blocky structure; firm; many very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 1 percent gravel; very strongly acid; clear wavy boundary.

**2Bt6**—42 to 45 inches; dark brown (10YR 4/3) sandy loam; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; moderate coarse subangular blocky structure; firm; many very fine pores; thin discontinuous dark brown (10YR 3/3) clay films on faces of peds; common fine black (N 2/0) iron and manganese oxide accumulations; 12 percent gravel; medium acid; clear smooth boundary.

**3Bt7**—45 to 58 inches; brown (10YR 5/3) loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; firm; common very fine pores; thin discontinuous dark brown (10YR 3/3) clay films on faces of peds; few fine black (N 2/0) iron and manganese oxide accumulations; 6 percent gravel; slightly acid; gradual wavy boundary.

**3Cd**—58 to 65 inches; yellowish brown (10YR 5/4) loam; common medium distinct light brownish gray (10YR 6/2) mottles; massive; very firm; 6 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 24 to 40 inches. Mottles with chroma of 2 or less are within a depth of about 24 to 40 inches.

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

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Reaction ranges from very strongly acid to slightly acid.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 4. It is clay loam or sandy

loam. Reaction ranges from very strongly acid to medium acid.

The 3Bt horizon has hue of 10YR, value of 5, and chroma of 3 or 4. Reaction is slightly acid or neutral.

The 3Cd horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

## Tice Series

The Tice series consists of very deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

The Tice soils in this survey area have more clay in the lower part of the surface soil and the upper part of the subsoil than is defined as the range for the series. This difference, however, does not affect the use or behavior of these soils. The soils are classified as fine, mixed, mesic Fluvaquentic Hapludolls.

Tice soils are commonly adjacent to Battleground and Sawabash soils. Battleground soils have a brown subsoil that is not mottled. They are at the higher elevations. Sawabash soils have a dominantly gray subsoil and have a surface layer that is more than 24 inches thick. They are in the lower lying areas.

Typical pedon of Tice silty clay loam, frequently flooded, in a cultivated field; 3,000 feet west and 500 feet north of the southeast corner of sec. 25, T. 24 N., R. 4 W.

**Ap**—0 to 10 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate medium granular structure; firm; slight effervescence; mildly alkaline; abrupt smooth boundary.

**A**—10 to 14 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; firm; common very fine pores; thin continuous very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

**Bw1**—14 to 34 inches; dark brown (10YR 4/3) silty clay loam; common fine faint dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure; firm; common very fine pores; thin continuous dark gray (10YR 4/1) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

**Bw2**—34 to 40 inches; dark brown (10YR 4/3) silty clay loam; common medium faint dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure; firm; common very fine pores; thin continuous dark gray (10YR 4/1) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

Bw3—40 to 50 inches; dark brown (10YR 4/3) silty clay loam; common fine distinct dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; firm; mildly alkaline; gradual smooth boundary.

C—50 to 60 inches; yellowish brown (10YR 5/4) loam; common fine distinct gray (10YR 5/1) mottles; massive; firm; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. Reaction ranges from medium acid to mildly alkaline.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. It is loam or silty clay loam.

### Toronto Series

The Toronto series consists of somewhat poorly drained soils on till plains and recessional moraines. These soils are deep over compact glacial till. Permeability is moderate in the upper part of the solum, moderately slow in the lower part of the solum, and slow in the underlying material. The soils formed in silty material and in the underlying glacial till. Slopes range from 0 to 6 percent.

The Toronto soils in this survey area contain more clay in the upper part of the subsoil than is defined as the range for the series. This difference, however, does not affect the use or behavior of these soils. The soils are classified as fine, mixed, mesic Udollic Ochraqualfs.

Toronto soils are similar to Fincastle and Raub soils and are commonly adjacent to Drummer, Millbrook, Octagon, and Throckmorton soils. Fincastle soils have a lighter colored surface layer than the Toronto soils. Raub soils have a dark surface layer 10 or more inches thick. Drummer and Millbrook soils are underlain by loamy outwash. Drummer soils have a thicker surface layer than the Toronto soils and have a grayer subsoil. They are in depressions and drainageways. Millbrook soils are at the slightly lower elevations. Octagon soils have a brown subsoil that is not mottled. They are in the more sloping areas along drainageways and on rises. Throckmorton soils have a browner subsoil than the Toronto soils. They are on slight rises.

Typical pedon of Toronto silt loam, in an area of Toronto-Millbrook complex, 0 to 2 percent slopes, in a cultivated field; 1,675 feet west and 230 feet north of the southeast corner of sec. 33, T. 22 N., R. 4 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate

medium granular structure; friable; common fine and medium roots; neutral; abrupt smooth boundary.

Bt1—9 to 13 inches; dark brown (10YR 4/3) silty clay loam; common fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; common fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin patchy very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Bt2—13 to 19 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; few medium black (N 2/0) iron and manganese oxide accumulations; strongly acid; clear smooth boundary.

Bt3—19 to 27 inches; dark yellowish brown (10YR 4/4) silty clay; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; few medium black (N 2/0) iron and manganese oxide accumulations; strongly acid; clear smooth boundary.

2Bt4—27 to 32 inches; dark yellowish brown (10YR 4/6) clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; few medium black (N 2/0) iron and manganese oxide accumulations; 2 percent gravel; medium acid; clear smooth boundary.

2Bt5—32 to 40 inches; dark yellowish brown (10YR 4/6) clay loam; common medium distinct grayish brown (10YR 5/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common fine pores; thin discontinuous dark grayish brown (10YR 4/2) and continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; krotovinas 2 inches in diameter filled with very dark grayish brown (10YR 3/2) silty clay loam material; 3 percent gravel; slightly acid; clear smooth boundary.

2Bt6—40 to 46 inches; yellowish brown (10YR 5/4) loam; common medium distinct dark yellowish brown (10YR 4/6) and grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure;

firm; common fine grayish brown (10YR 5/2) clay films on faces of peds; krotovinas 2 inches in diameter filled with very dark grayish brown (10YR 3/2) silty clay loam material; 3 percent gravel; neutral; clear smooth boundary.

2BCt—46 to 52 inches; yellowish brown (10YR 5/4) loam; common medium distinct grayish brown (10YR 5/2) and dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; common fine pores; thin discontinuous dark grayish brown (10YR 4/2) clay films on faces of peds; 10 percent gravel; slight effervescence; mildly alkaline; clear wavy boundary.

2Cd—52 to 60 inches; yellowish brown (10YR 5/4) loam; common coarse distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak medium platy till structure; very firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 22 to 40 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 3 or 4. It has mottles with chroma of 2 or less. It is dominantly silty clay loam, but the range includes silty clay. Reaction ranges from very strongly acid to medium acid.

The 2Bt horizon has hue of 2.5Y or 10YR, value of 4 or 5, and chroma of 3 to 6. Reaction ranges from medium acid to mildly alkaline.

The 2Cd horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 3 or 4.

## Treaty Series

The Treaty series consists of very poorly drained soils on till plains and recessional moraines. These soils are deep over compact glacial till. Permeability is moderate in the solum and moderately slow in the underlying material. The soils formed in silty material and in the underlying glacial till. Slopes range from 0 to 2 percent.

Treaty soils are similar to Chalmers soils and are commonly adjacent to Crosby, Fincastle, Mahalasville, and Starks soils. Chalmers soils do not have an argillic horizon. Crosby, Fincastle, and Starks soils have a light colored surface layer and have a browner subsoil than the Treaty soils. They are in the slightly higher positions on the landscape. Mahalasville soils are underlain by stratified sediments. They are in landscape positions similar to those of the Treaty soils.

Typical pedon of Treaty silty clay loam, in an area of

Mahalasville-Treaty complex, in a cultivated field; 530 feet west and 1,190 feet south of the northeast corner of sec. 23, T. 22 N., R. 3 W.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many fine roots; neutral; clear wavy boundary.

Btg1—10 to 15 inches; dark gray (10YR 4/1) silty clay loam; common fine prominent light olive brown (2.5Y 5/4) mottles; moderate fine subangular blocky structure; firm; common fine roots; common fine pores; thin continuous very dark gray (N 3/0) clay films on faces of peds; patchy thin black (10YR 2/1) organic stains on faces of peds; slightly acid; clear smooth boundary.

Btg2—15 to 21 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent light olive brown (2.5Y 5/4) mottles; moderate fine and medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous very dark gray (5Y 3/1) clay films on faces of peds; neutral; clear smooth boundary.

Btg3—21 to 26 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common fine pores; thin discontinuous dark gray (5Y 4/1) clay films on faces of peds; neutral; clear smooth boundary.

Btg4—26 to 37 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct light olive brown (2.5Y 5/6) mottles; weak medium and coarse prismatic structure parting to weak medium subangular blocky; firm; few fine roots; few fine pores; thin discontinuous dark gray (5Y 4/1) clay films on faces of peds; neutral; clear smooth boundary.

2Btg5—37 to 48 inches; grayish brown (2.5Y 5/2) loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; thin discontinuous dark grayish brown (2.5Y 4/2) clay films on faces of peds; 4 percent gravel; mildly alkaline; clear smooth boundary.

2Cd—48 to 60 inches; light olive brown (2.5Y 5/4) loam; common medium prominent yellowish brown (10YR 5/6) and gray (N 5/0) mottles; weak medium platy till structure; very firm; 5 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The Btg horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 or 2. Reaction ranges from slightly acid to mildly alkaline.

The 2Btg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. It is clay loam or loam. Reaction is neutral or mildly alkaline.

The 2Cd horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 3 or 4.

### Troxel Series

The Troxel series consists of very deep, well drained, moderately permeable soils in depressions on outwash plains and terraces. These soils formed in silty and loamy material and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

The Troxel soils in this survey area have more clay in the upper part of the surface soil than is defined as the range for the series. Also, they do not have a sufficient increase in clay content in the subsoil. These differences, however, do not affect the use or behavior of these soils. The soils are classified as fine, mixed, mesic Cumulic Hapludolls.

Troxel soils are commonly adjacent to Carmi and Elston soils and to the Billett soils that have a gravelly substratum. Billett, Carmi, and Elston soils have more sand in the subsoil than the Troxel soils and have a thinner surface layer. They are at the higher elevations.

Typical pedon of Troxel silty clay loam, 0 to 2 percent slopes, in a cultivated field; 100 feet west and 1,400 feet north of the southeast corner of sec. 8, T. 22 N., R. 5 W.

- Ap—0 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; slightly acid; abrupt smooth boundary.
- A1—12 to 20 inches; black (N 2/0) silty clay loam, very dark grayish brown (2.5Y 3/2) dry; moderate medium granular structure; friable; slightly acid; clear wavy boundary.
- A2—20 to 27 inches; black (N 2/0) silty clay loam, very dark grayish brown (2.5Y 3/2) dry; moderate medium granular structure; friable; neutral; clear wavy boundary.
- A3—27 to 35 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; many fine pores; thin continuous black (N 2/0) organic coatings on faces of peds; neutral; clear smooth boundary.
- A4—35 to 42 inches; black (10YR 2/1) clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; thin continuous very dark grayish

brown (2.5Y 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

2Bt1—42 to 47 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; firm; thin continuous very dark grayish brown (2.5Y 3/2) clay films on faces of peds; neutral; clear wavy boundary.

2Bt2—47 to 52 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; firm; thin continuous very dark grayish brown (2.5Y 3/2) clay films on faces of peds; neutral; clear wavy boundary.

2Bt3—52 to 61 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium subangular blocky structure; friable; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear wavy boundary.

2Bt4—61 to 71 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; thin continuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 2 percent gravel; neutral; clear wavy boundary.

3BCt—71 to 80 inches; brown (10YR 4/3) gravelly coarse sand; single grained; loose; thin continuous brown (10YR 4/3) clay films bridging sand grains; 18 percent gravel; neutral.

The thickness of the solum ranges from 60 to more than 80 inches. The thickness of the silty material ranges from 40 to 60 inches. The total combined thickness of the A horizons ranges from 24 to 45 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The A horizon has hue of 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. It is silt loam, silty clay loam, or clay loam.

The 2Bt horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 3 or 4. It is silty clay loam, fine sandy loam, clay loam, loam, or sandy loam. Reaction ranges from medium acid to neutral.

### Walkill Series

The Walkill series consists of very deep, very poorly drained soils on till plains, recessional moraines, and outwash plains. These soils formed in recent alluvium and in the underlying organic deposits and coprogenous earth. Permeability is moderately slow in the mineral material, moderately slow to moderately rapid in the organic material, and slow in the underlying coprogenous earth. Slopes range from 0 to 2 percent.

The Walkill soils in this survey area have more silt and less sand in the mineral material than are defined as the range for the series. These differences, however,

do not affect the use or behavior of these soils. The soils are classified as fine-silty, mixed, mesic Thapto-Histic Fluvaquents.

Walkill soils are commonly adjacent to Drummer, Mahalasville, Pella, and Treaty soils. These associated soils formed in mineral material. They are in the slightly higher areas.

Typical pedon of Walkill silt loam, coprogenous earth substratum, in an idle field; 1,640 feet east and 1,340 feet north of the southwest corner of sec. 11, T. 21 N., R. 3 W.

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

Bg1—10 to 20 inches; dark gray (10YR 4/1) silt loam; moderate fine subangular blocky structure; firm; common fine roots; few very fine pores; neutral; clear smooth boundary.

Bg2—20 to 27 inches; dark gray (10YR 4/1) silt loam; moderate fine subangular blocky structure; firm; common fine roots; few very fine pores; neutral; abrupt smooth boundary.

2Oa1—27 to 38 inches; sapric material, black (10YR 2/1) broken face and rubbed; 5 percent fiber, trace rubbed; moderate medium subangular blocky structure; firm; common fine and very fine roots; thin patchy dark gray (10YR 4/1) silt coatings on faces of peds; 30 percent mineral material; neutral; clear smooth boundary.

2Oa2—38 to 54 inches; sapric material, dark reddish brown (5YR 2.5/2) broken face and rubbed; 5 percent fiber, trace rubbed; moderate medium subangular blocky structure; friable; neutral; gradual smooth boundary.

3C—54 to 60 inches; very dark grayish brown (2.5Y 3/2) coprogenous earth; massive; friable; mildly alkaline.

The thickness of the mineral material ranges from 16 to 40 inches. Coprogenous earth is within a depth of 40 to 60 inches.

The Ap and Bg horizons have hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Reaction is slightly acid or neutral.

The 2O horizon has hue of 5YR to 10YR or is neutral in hue. It has value of 2 or 3 and chroma of 0 to 2. Reaction ranges from slightly acid to mildly alkaline.

The 3C horizon has hue of 5Y to 10YR, value of 2 to 5, and chroma of 1 to 3. Reaction ranges from slightly acid to mildly alkaline.

## Washtenaw Series

The Washtenaw series consists of very deep, very poorly drained soils on recessional moraines and till plains. These soils formed in recent alluvium and in the underlying glacial drift. Permeability is moderate in the recent alluvium and slow in the underlying glacial drift. Slopes range from 0 to 2 percent.

The Washtenaw soils in this survey area have more silt and less sand in the upper part of the solum than are defined as the range for the series. These differences, however, do not affect the use or behavior of these soils. The soils are classified as fine-silty, mixed, mesic Aeric Fluvaquents.

Washtenaw soils are commonly adjacent to Crosby, Mahalasville, Miami, and Treaty soils. These adjacent soils do not have a buried dark surface layer. They are at the higher elevations.

Typical pedon of Washtenaw silt loam, in a cultivated field; 590 feet west and 2,110 feet north of the southeast corner of sec. 14, T. 22 N., R. 3 W.

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

C—10 to 23 inches; dark grayish brown (10YR 4/2) silt loam; weak medium platy structure parting to weak medium granular; friable; common very fine roots; slightly acid; clear smooth boundary.

2Ab—23 to 31 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium subangular blocky structure; firm; common very fine pores; 7 percent gravel; slightly acid; clear smooth boundary.

2Btgb1—31 to 42 inches; dark gray (10YR 4/1) silty clay loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark gray (10YR 4/1) clay films on faces of peds; 3 percent gravel; neutral; clear smooth boundary.

2Btgb2—42 to 50 inches; gray (10YR 5/1) clay loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; thin continuous dark gray (10YR 4/1) clay films on faces of peds; 5 percent gravel; neutral; clear smooth boundary.

2Btgb3—50 to 65 inches; gray (10YR 5/1) loam; common medium prominent dark yellowish brown (10YR 4/6) mottles; weak coarse subangular blocky structure; firm; thin patchy very dark gray (10YR 4/1) clay films on faces of peds; 5 percent gravel; mildly alkaline; clear wavy boundary.

2C—65 to 70 inches; yellowish brown (10YR 5/4) loam;

common medium distinct grayish brown (10YR 5/2) mottles; firm; massive; 10 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 60 to 80 inches. The thickness of the recent alluvial material ranges from 20 to 40 inches.

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

The 2Ab horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The 2Btgb horizon is mottled. It has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Reaction ranges from slightly acid to mildly alkaline.

### Waupecan Series

The Waupecan series consists of well drained and moderately well drained soils on outwash plains. These soils are deep or very deep over gravelly sand. Permeability is moderate in the upper part of the solum, moderately rapid in the lower part of the solum, and very rapid in the underlying material. The soils formed in silty material and in the underlying gravelly sand outwash. Slopes range from 0 to 2 percent.

Waupecan soils are similar to Bowes and Bowes Variant soils and are commonly adjacent to Lafayette and Longlois soils and to the Mahalassville soils that have a gravelly substratum. Bowes and Bowes Variant soils have a dark surface layer less than 10 inches thick. Lafayette soils have a mottled subsoil that is grayer than that of the Waupecan soils. They are at the lower elevations. Longlois soils have more sand in the upper part of the subsoil than the Waupecan soils. They are on rises and in the more sloping areas along drainageways and depressions. Mahalassville soils have a dominantly gray subsoil. They are in depressions and drainageways.

Typical pedon of Waupecan silt loam, 0 to 2 percent slopes, in a cultivated field; 2,250 feet east and 2,120 feet south of the northwest corner of sec. 10, T. 22 N., R. 4 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; many fine roots; many fine pores; strongly acid; clear wavy boundary.

BA—11 to 17 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; many fine roots; many fine pores; thin continuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Bt1—17 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium subangular blocky structure parting to moderate fine subangular

blocky; firm; common fine roots; common fine pores; thin continuous dark yellowish brown (10YR 3/4) clay films on faces of peds; thin discontinuous very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—24 to 35 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt3—35 to 44 inches; dark brown (7.5YR 4/4) sandy loam; weak coarse subangular blocky structure; firm; few fine roots; common fine pores; thin discontinuous dark reddish brown (5YR 3/4) clay films on faces of peds; 5 percent gravel; strongly acid; clear smooth boundary.

2Bt4—44 to 61 inches; dark brown (7.5YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; thin discontinuous dark reddish brown (5YR 3/4) clay films on faces of peds; 10 percent gravel; slightly acid; clear wavy boundary.

2C—61 to 70 inches; yellowish brown (10YR 5/4) gravelly sand; single grained; loose; 23 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 50 to more than 70 inches. The thickness of the silty material ranges from 24 to 55 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The total combined thickness of the A horizons ranges from 10 to 20 inches.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 4. Reaction ranges from strongly acid to neutral.

The 2Bt horizon has hue of 7.5YR or 10YR and value and chroma of 3 or 4. It is clay loam, sandy loam, or loamy sand or the gravelly analogs of these textures. Reaction ranges from strongly acid to neutral.

The 2C horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

A moderately wet phase is recognized in the county.

### Waynetown Series

The Waynetown series consists of somewhat poorly drained soils on outwash plains and stream terraces. These soils are deep or very deep over gravelly coarse sand. Permeability is moderate in the solum and very rapid in the underlying material. The soils formed in silty material, in loamy outwash, and in the underlying gravelly outwash. Slopes range from 0 to 2 percent.

Waynetown soils are similar to Mulvey soils and are commonly adjacent to Kalamazoo and Thackery soils

and to the Mahalassville soils that have a gravelly substratum. Mulvey soils have a darker surface layer than the Waynetown soils. Kalamazoo soils have a browner subsoil than the Waynetown soils and have more sand in the upper part of the subsoil. They are at the slightly higher elevations. Mahalassville soils have a dark surface layer and a gray subsoil. They are in depressional areas. Thackery soils do not have gray mottles in the upper part of the subsoil. They are in the slightly higher areas.

Typical pedon of Waynetown silt loam, 0 to 2 percent slopes, in a cultivated field; 500 feet east and 750 feet south of the northwest corner of sec. 28, T. 22 N., R. 4 W.

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

Bt1—10 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; common distinct dark grayish brown (10YR 4/2) mottles; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; thin continuous light brownish gray (10YR 6/2) silt coatings on faces of peds; medium acid; clear smooth boundary.

2Btg1—26 to 32 inches; grayish brown (10YR 5/2) clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark gray (10YR 4/1) clay films on faces of peds; 1 percent gravel; medium acid; clear smooth boundary.

3Btg2—32 to 44 inches; dark gray (10YR 4/1) gravelly sandy clay loam; common medium prominent strong brown (7.5YR 4/6) mottles; moderate coarse subangular blocky structure; firm; common very fine pores; thin continuous dark gray (10YR 4/1) clay films on faces of peds; 18 percent gravel; neutral; clear wavy boundary.

3Btg3—44 to 53 inches; dark grayish brown (10YR 4/2) gravelly sandy loam; common medium prominent strong brown (7.5YR 4/6) mottles; weak coarse subangular blocky structure; friable; thin

discontinuous dark gray (10YR 4/1) clay films on faces of peds; 20 percent gravel; neutral; clear wavy boundary.

3Cg—53 to 60 inches; grayish brown (10YR 5/2) gravelly coarse sand; common medium distinct yellowish brown (10YR 5/4) mottles; single grained; loose; 25 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 50 to 70 inches. The thickness of the silty material ranges from 20 to 40 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is medium acid or slightly acid.

The 2Btg horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is medium acid or slightly acid.

The 3Btg horizon has colors similar to those of the 2Btg horizon. It is neutral or mildly alkaline.

The 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is coarse sand or gravelly coarse sand.

## Wea Series

The Wea series consists of very deep, well drained soils on flood plains. These soils formed in silty alluvium and in the underlying loamy and gravelly outwash. Permeability is moderate in the solum and very rapid in the underlying material. Slopes range from 0 to 2 percent.

Wea soils are commonly adjacent to Allison and Battleground soils and to the Ouiatenon soils that have a sandy substratum. Allison and Battleground soils have less sand in the upper part of the subsoil than the Wea soils. Also, Battleground soils have a dark surface layer less than 24 inches thick. Allison and Battleground soils are at the slightly lower elevations. Ouiatenon soils have less clay and more sand in the subsoil than the Wea soils and do not have an argillic horizon. They are in the higher lying areas.

Typical pedon of Wea silt loam, occasionally flooded, in a cultivated field; 2,440 feet east and 460 feet south of the northwest corner of sec. 9, T. 23 N., R. 4 W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; many very fine roots; 2 percent gravel; neutral; abrupt smooth boundary.

A—10 to 25 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure; friable; common very fine roots; common very fine pores; 2 percent

gravel; neutral; clear smooth boundary.

2Bt1—25 to 31 inches; dark brown (7.5YR 3/2) clay loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; firm; common very fine roots; common very fine pores; thin continuous dark reddish brown (5YR 2.5/2) clay films on faces of peds; thin continuous black (10YR 2/1) organic coatings on faces of peds; 5 percent gravel; neutral; clear smooth boundary.

3Bt2—31 to 37 inches; dark brown (7.5YR 3/4) gravelly sandy clay loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; firm; common very fine pores; thin continuous dark brown (7.5YR 3/2) clay films on faces of peds; 20 percent gravel; neutral; clear smooth boundary.

3Bt3—37 to 47 inches; dark brown (7.5YR 3/4) gravelly sandy loam; weak coarse subangular blocky structure; friable; common very fine pores; thin continuous dark brown (7.5YR 3/4) clay films on faces of peds; 28 percent gravel; neutral; clear wavy boundary.

3Bt4—47 to 59 inches; dark brown (7.5YR 4/4) gravelly sandy loam; weak coarse subangular blocky structure; friable; thin continuous dark brown (7.5YR 4/4) clay films on faces of peds; 30 percent gravel; neutral; clear wavy boundary.

3Bc1—59 to 64 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam; weak fine subangular blocky structure; friable; thin discontinuous very dark grayish brown (10YR 3/2) clay films on faces of peds; 33 percent gravel; mildly alkaline; clear wavy boundary.

3C—64 to 70 inches; yellowish brown (10YR 5/4) gravelly sand; single grained; loose; 33 percent gravel; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 60 to 70 inches. The thickness of the mollic epipedon ranges from 24 to 40 inches.

The Ap horizon has hue of 10YR, value of 3, and chroma of 1 or 2.

The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 4. It is sandy clay loam or clay loam. Reaction is slightly acid or neutral.

The 3Bt horizon has hue of 7.5YR or 10YR and value and chroma of 3 or 4. Reaction ranges from slightly acid to mildly alkaline.

The 3C horizon has hue of 10YR, value of 5, and chroma of 3 or 4. Textures include sand and gravelly sand.

### Whitaker Series

The Whitaker series consists of somewhat poorly drained soils on till plains. These soils are deep over

compact glacial till. Permeability is moderate in the solum and slow in the underlying material. The soils formed in glaciofluvial deposits overlying glacial till. Slopes range from 0 to 2 percent.

Whitaker soils are commonly adjacent to Mahalassville and Treaty soils. Mahalassville and Treaty soils have a dark surface layer and a gray subsoil. They are in the lower positions on the landscape.

Typical pedon of Whitaker loam, till substratum, 0 to 2 percent slopes, in a cultivated field; 2,075 feet west and 1,780 feet north of the southeast corner of sec. 14, T. 22 N., R. 5 W.

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

Bt—10 to 17 inches; brown (10YR 5/3) loam; common fine faint grayish brown (10YR 5/2) and prominent strong brown (7.5YR 4/6) mottles; moderate fine subangular blocky structure; firm; common very fine roots; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; gradual smooth boundary.

Btg1—17 to 43 inches; grayish brown (10YR 5/2) clay loam; common coarse prominent strong brown (7.5YR 4/6) mottles; moderate medium subangular blocky structure; firm; common very fine roots; thin continuous dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; gradual smooth boundary.

Btg2—43 to 50 inches; gray (10YR 5/1) sandy clay loam; common coarse prominent strong brown (7.5YR 4/6) mottles; moderate coarse subangular blocky structure; firm; few very fine roots; thin continuous dark gray (10YR 4/1) clay films on faces of peds; mildly alkaline; clear wavy boundary.

Btg3—50 to 58 inches; grayish brown (10YR 5/2) loamy sand; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; very friable; thin discontinuous dark gray (10YR 4/1) clay films on faces of peds; mildly alkaline; clear smooth boundary.

2Cd—58 to 70 inches; yellowish brown (10YR 5/4) loam; weak medium platy till structure; very firm; 4 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the silty material ranges from 0 to 20 inches.

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

The B horizon is mottled. It has hue of 10YR, value

of 4 or 5, and chroma of 1 to 4. It is loam, clay loam, and sandy clay loam in the upper part and sandy loam and loamy sand in the lower part. Reaction ranges from

strongly acid to moderately alkaline.

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



# Formation of the Soils

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This section describes the major factors of soil formation and their importance in the formation of the soils in Tippecanoe County. It also describes the processes of soil formation that have affected the soils in the county.

## Factors of Soil Formation

Soil is produced by soil-forming processes acting on material deposited or accumulated by geologic agents. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material; the climate under which the soil formed; the plant and animal life on and in the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

Climate and living organisms, chiefly plants, are active factors of soil formation. They act on the parent material that has accumulated through the weathering of rocks and slowly change it into a natural body that has genetically related horizons. The effects of climate and living organisms are conditioned by relief. The parent material also affects the kind of soil profile that is formed and, in extreme cases, determines it almost entirely. Finally, time is needed for the development of a soil profile. Some time is always required for the differentiation of soil horizons. Usually, a long time is needed for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effects of any one factor unless conditions are specified for the other four. Many of the processes of soil formation are unknown.

## Parent Material

Parent material is the unconsolidated mass in which a soil forms. It determines the limits of the chemical and mineralogical composition of the soil.

Glaciers covered Tippecanoe County as recently as about 20,000 years ago. The parent material of the soils

of Tippecanoe County was mostly deposited by glaciers, by meltwater from the glaciers, or by windblown silt and sand. After this material was deposited, some of it was reworked and redeposited by subsequent actions of wind and water. Where the glacial deposits are thin, the parent material is material weathered from bedrock. Although the parent materials in the county are of similar glacial origin, their properties vary greatly, sometimes within small areas, depending on how the materials were deposited.

Some of the soils on the till plain have been influenced by lacustrine deposits. In some small areas on the till plain and in glacial sluiceways, the soils formed entirely in lacustrine material. Soils along streams formed in recent alluvium. A layer of silty material or loess covers much of the survey area.

In Tippecanoe County, the bedrock beneath the unconsolidated deposits consists of siltstone and shale. In the western part of the county, the bedrock is Mississippian age siltstone and shale. New Albany shale of Devonian age is in the eastern part of the county. Some soils formed in residuum derived from the underlying bedrock. These soils are in areas where the glacial deposits, if any, are thin.

Several glaciers have covered the county, but the Wisconsinan glacier, which was the most recent, has had the greatest influence on the soils. The thickness of the glacial drift ranges from 0 to about 350 feet. The shallowest areas are in the West Point and Americus areas. The drift is thickest in the part of the county along lines that correspond to the Old Teays River System, a preglacial system that ran in a general east-west direction across central Indiana (Wayne, 1956).

Glacial till is material laid down directly by glaciers with a minimum of water action. It consists of particles of different sizes that are mixed together. The pebbles include a wide variety of rocks, ranging from sedimentary rocks, such as black shale, to igneous rocks, such as granite. The glacial till in Tippecanoe County is mostly calcareous. The texture of the till is mainly loam, but in some areas it is sandy loam or silt loam. Silt loam till is confined mainly to a high area in the northwestern part of the county. Layers of sand,

loamy sand, and gravel are common. Generally, the till is firm and compact because of consolidation by the glacial ice that covered it. In some areas the till is friable. A thin layer of loess covers much of the till in the less sloping areas. Stratified sand and gravel underlie much of the glacial till throughout the county. The sand and gravel have been bonded into a hard mass by calcium carbonates in areas where they crop out on steep slopes. An example of soils that formed in glacial till are Strawn soils. These soils are typically moderately fine textured in the subsoil.

Outwash material was deposited by running water from melting glaciers. The size of the particles that make up outwash material varies, depending on the velocity of the water that carried them. When the water slowed down, the coarser particles were deposited first. Finer particles, such as very fine sand, silt, and clay, were carried along in the stream by slowly moving water.

Because of this sorting action, outwash deposits generally occur as layers of particles that are similar in size, such as silt, sand, or gravel. In Tippecanoe County these deposits are on stream terraces, outwash plains, kames, and eskers. Most of outwash plain areas are covered by a blanket of loess. Consequently, the soils in these areas formed in both the loess and the outwash material. The Elston soils that have a gravelly substratum are examples of soils that formed in outwash.

Residuum is material weathered from bedrock. The nature of the bedrock determines the chemical and mineralogical characteristics of the soils that form in it. The bedrock in the survey area is sedimentary rock of Mississippian and Devonian age. Bedrock of Mississippian age is mostly siltstone that has thin layers of shale (fig. 19). It is generally in the western part of the county. Bedrock of Devonian age is mostly shale and generally is in the eastern part of the county. Berks soils formed in residuum derived from Mississippian age bedrock.

Lacustrine material was deposited from still or ponded glacial meltwater. The coarser fragments drop out of moving water as outwash, and only the finer particles, such as very fine sand, silt, and clay, remain to settle out in still water. Lacustrine deposits in Tippecanoe County are dominantly silty or clayey. Milford soils are examples.

Alluvial material was deposited by floodwaters of streams in recent time. This material varies in texture, depending on the speed of the water by which it was deposited. Ouatennon and Battleground soils formed in alluvium.

Organic deposits consist of partially decomposed plant remains. After the glaciers withdrew from the area,

water was left standing in lakes and in depressions on outwash plains, flood plains, and till plains. Grasses and sedges growing in these shallow lakes died, and their remains fell to the bottom. Because of the wetness in these areas, the plant remains did not decompose. The lakes eventually filled with organic material, which developed into muck. Houghton soils formed in organic material.

Loess is fine grained material consisting dominantly of silt-sized particles. The loess in Tippecanoe County was carried by the wind from western sources after the glaciers melted. Since the wind picked up mostly silt-sized particles, the loess deposits have a very high content of silt. In Tippecanoe County the soil layers that formed in loess are silt loam or silty clay loam. Fincastle and Toronto soils formed in 22 to 40 inches of loess over glacial till.

## Plant and Animal Life

Plants have been the main living organisms influencing the soils in the county; however, bacteria, fungi, earthworms, and animals have also had an important effect.

The chief contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The kind of organic material on and in the soil depends on the kinds of plants that grew on the soil. The remains of these plants accumulate on the surface and in the soil. They decay and eventually become organic matter. Plant roots provide channels for the downward movement of water through the soil, bring plant nutrients from the lower part of the profile to the upper part, and add organic matter as they decay. Bacteria in the soil help to break down the organic matter into plant nutrients.

The native vegetation in Tippecanoe County consisted of prairie grasses and deciduous forests. Generally, the prairie areas were in the western part of the county and the wooded areas were in the eastern part.

The soils in the prairie areas have more total accumulated organic matter than the soils in the timbered areas. The vegetation in these prairie areas consisted chiefly of tall prairie grasses. Where the prairie and timber areas met, there was a mixture of grasses and trees. Raub, Brenton, and Drummer soils formed under prairie vegetation.

In the timbered areas of the county, differences in natural soil drainage and minor changes in the parent material affected the composition of the forest species. Well drained soils, such as Miami soils, were covered by sugar maple, walnut, poplar, hickory, beech, and several species of oak. Elm, ash, pin oak, swamp white

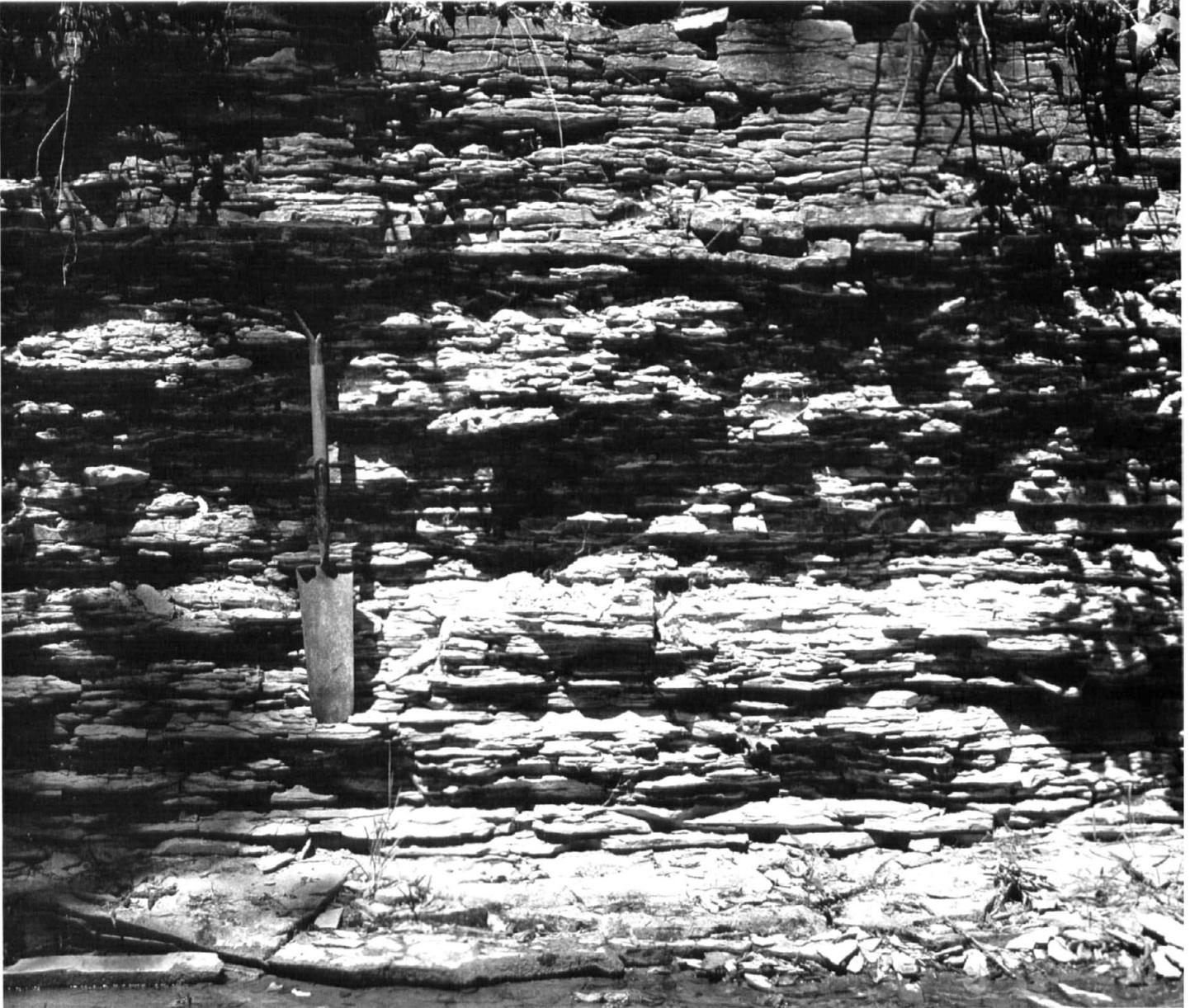


Figure 19.—Interbedded siltstone and shale bedrock of Mississippian age.

oak, soft maple, and some marsh grasses and sedges were common on the very poorly drained soils. The very poorly drained Mahalasville and Treaty soils formed under wet conditions.

### Climate

Climate determines the kind of plant and animal life on and in the soil and the amount of water available for the weathering of minerals and the transportation of soil

material. Through its effect on soil temperature, it determines the rate of chemical reactions in the soil. These effects tend to be uniform in relatively small areas, such as those the size of a county.

The climate in Tippecanoe County is cool and humid. It is presumably similar to the one that prevailed during the period when the soils were forming. The soils in the county differ from those that formed under a dry, warm climate and from those that formed under a hot, moist climate. Although the climate is uniform throughout the

county, its effects are modified locally by runoff, direction of slope, and steepness of slope. Therefore, the differences among the soils in the county are, to a minor extent, the result of climatic differences.

## Relief

Relief, or topography, has a marked effect on soil formation through its influence on natural drainage, erosion, plant cover, and soil temperature. In Tippecanoe County, slopes range from 0 to 60 percent. Natural soil drainage classes in the county range from excessively drained in the more sloping areas to very poorly drained in the depressions.

Relief influences the formation of soils by affecting runoff and drainage. Drainage, through its effect on aeration of the soil, determines the soil color. Runoff is greatest on the steeper slopes. In many low areas, water is temporarily ponded. Water and air move freely through most soils that are well drained and slowly through most soils that are very poorly drained. Iron compounds give most soils their color. Well drained soils are brightly colored and oxidized. Poorly aerated soils are dull gray and mottled because iron compounds are in a reduced state. Miami and Kalamazoo soils are examples of well drained, well aerated soils. Milford soils are examples of poorly aerated, very poorly drained soils.

## Time

Differences in the length of time that the parent material has been in place are commonly reflected in the degree of development of the soil profile. Some soils develop rapidly; others develop slowly.

The soils in Tippecanoe County range from young to mature. The glacial deposits in which many of the soils formed have been exposed to the soil-forming factors long enough for the development of distinct horizons within the soil profile. However, some soils that formed in recent alluvial sediment have not been in place long enough for the formation of distinct horizons.

Ouiatenon soils are young soils that formed in alluvial material. Miami soils show the effect of time on the leaching of lime from the soil. The parent material in

which these soils formed was calcareous. The soils are now leached to a depth of 24 to 40 inches.

## Processes of Soil Formation

Several processes have been involved in the formation of the soils in Tippecanoe County. These processes are the accumulation of organic matter; the dissolution, transfer, and removal of calcium carbonates and bases; and the liberation and translocation of silicate clay minerals. In most soils, more than one of these processes have been responsible for horizon differentiation.

Some organic matter has accumulated in the surface layer of all of the soils of the county. The content of organic matter is low in some soils but is high in others. Generally, the soils that have the most organic matter, such as Drummer soils, have a thick, black surface layer.

Carbonates and bases have been leached from the upper horizons of nearly all of the soils in the county. Leaching probably preceded the translocation of silicate clay minerals. Most of the carbonates and bases have been leached from the A and B horizons of well drained soils. Even in the wettest soils, leaching is indicated by the absence of carbonates and by an acid reaction.

Clay accumulates in pores and other voids and forms films along which water moves. The leaching of bases and translocation of silicate clays are among the more important processes in horizon differentiation in the soils of the survey area. Miami soils are examples of soils in which translocated silicate clays have accumulated in the Bt horizon in the form of clay films.

Gleying, or the reduction and transfer of iron, has occurred in all of the very poorly drained, poorly drained, and somewhat poorly drained soils in Tippecanoe County. In the naturally wet soils, this process has been significant in horizon differentiation. The gray color of the subsoil indicates the reduction of iron oxides. The reduction is commonly accompanied by some transfer and redistribution of the iron from the upper horizons to lower horizons or completely out of the profile. The mottles that occur in some horizons indicate the segregation of iron.

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# Glossary

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**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.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Area reclaim** (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

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, and K), expressed as a percentage of the total cation-exchange capacity.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**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.

**Coarse fragments.** If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles 2 millimeters to 38 centimeters (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 or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

**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.

**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.

**Coprogenous earth (sedimentary peat).** Fecal material deposited in water by aquatic organisms.

**Corrosion.** Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

**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 to rock** (in tables). Bedrock is too near the surface for the specified use.

**Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Drainage class** (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

*Somewhat excessively drained.*—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

*Well drained.*—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

*Somewhat poorly drained.*—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly

pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

**Poorly drained.**—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

**Very poorly drained.**—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

**Drainage, subsurface.** Removal of excess ground water through buried drains. The drains collect the water and convey it to a gravity or pump outlet.

**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.

**End moraine.** See Terminal moraine.

**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 human or animal activities 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.

**Fallow.** Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

**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 oven-dry 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.

**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.

**Forb.** Any herbaceous plant not a grass or a sedge.

**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 35 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 the 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 the wind.

**Low strength.** The soil is not strong enough to support loads.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**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, recessional, 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, 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.)

**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.

**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 movement of water through the soil.

**Percs slowly** (in tables). The slow movement of water through the soil, adversely affecting the specified use.

**Permeability.** The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow .....	less than 0.06 inch
Slow .....	0.06 to 0.2 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, such as 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

**Recessional moraine.** An end moraine built during a temporary but significant halt in the final retreat of a glacier.

**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 drawbar 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.

**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.

**Saprolite** (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

**Sedimentary peat.** See Coprogenous earth.

**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.

**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.

**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 underlying material. The living roots and plant and animal activities are largely confined to the solum.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

**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 wind erosion and water erosion.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** 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). A layer of otherwise suitable soil material that is too thin for the specified use.

**Till plain.** An extensive area of nearly level to undulating soils 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, in soils in extremely small amounts. They are essential to plant growth.

**Underlying material.** See Substratum.

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

**Variant, soil.** A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

**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 oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

# Tables

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TABLE 1.--TEMPERATURE AND PRECIPITATION  
(Recorded in the period 1961-90 at Lafayette, Indiana)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
<u>°</u> <u>F</u>	<u>°</u> <u>F</u>	<u>°</u> <u>F</u>	<u>°</u> <u>F</u>	<u>°</u> <u>F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>	<u>In</u>	<u>In</u>	
January-----	31.0	13.9	22.4	60	-19	10	1.73	0.61	2.66	3	6.1
February-----	35.3	16.8	26.1	63	-14	17	1.66	.75	2.44	4	6.3
March-----	47.7	28.9	38.3	77	2	116	2.98	1.75	4.08	6	2.7
April-----	60.5	39.2	49.9	84	19	321	3.61	1.87	5.12	7	.7
May-----	72.0	49.5	60.8	90	28	644	3.87	2.09	5.44	7	.0
June-----	81.2	58.9	70.0	95	40	901	3.81	2.04	5.36	6	.0
July-----	84.4	62.6	73.5	97	45	1,038	3.90	2.13	5.46	6	.0
August-----	82.3	60.1	71.2	94	41	966	3.54	1.91	4.98	5	.0
September---	76.8	53.3	65.0	92	32	750	2.84	1.63	4.09	5	.0
October-----	64.5	41.4	53.0	86	21	413	2.52	1.40	3.51	5	.3
November-----	50.3	32.3	41.3	75	12	144	2.88	1.47	4.11	5	1.0
December-----	36.4	20.5	28.4	64	-12	28	2.71	1.10	4.08	5	5.2
Yearly:											
Average---	60.2	39.8	50.0	---	---	---	---	---	---	---	---
Extreme---	106	-25	---	98	-20	---	---	---	---	---	---
Total-----	---	---	---	---	---	5,349	36.03	31.73	39.97	64	22.4

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL  
(Recorded in the period 1961-90 at Lafayette, Indiana)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
<b>Last freezing temperature in spring:</b>			
1 year in 10 later than--	Apr. 24	May 11	May 18
2 years in 10 later than--	Apr. 18	May 4	May 13
5 years in 10 later than--	Apr. 6	Apr. 22	May 2
<b>First freezing temperature in fall:</b>			
1 year in 10 earlier than--	Oct. 15	Oct. 4	Sept. 23
2 years in 10 earlier than--	Oct. 20	Oct. 9	Sept. 27
5 years in 10 earlier than--	Oct. 31	Oct. 18	Oct. 4

TABLE 3.--GROWING SEASON  
(Recorded in the period 1961-90 at Lafayette, Indiana)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
9 years in 10	184	156	136
8 years in 10	192	163	142
5 years in 10	208	178	154
2 years in 10	224	193	166
1 year in 10	232	201	172

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

Map symbol	Soil name	Acres	Percent
Am	Allison silt loam, protected-----	390	0.1
Ap	Allison silt loam, frequently flooded-----	928	0.3
AtB2	Alvin-Spinks complex, 2 to 6 percent slopes, eroded-----	519	0.2
Ba	Battleground silt loam, protected-----	355	0.1
Bb	Battleground silt loam, frequently flooded-----	4,516	1.4
BgA	Beecher silt loam, 0 to 2 percent slopes-----	436	0.1
BkF	Berks channery silt loam, 25 to 60 percent slopes-----	114	*
BlA	Billett fine sandy loam, gravelly substratum, 0 to 2 percent slopes-----	1,150	0.4
BlB2	Billett fine sandy loam, gravelly substratum, 2 to 6 percent slopes, eroded-----	202	0.1
BmA	Billett fine sandy loam, moderately wet, 0 to 2 percent slopes-----	205	0.1
BnA	Billett loam, gravelly substratum, 0 to 2 percent slopes-----	3,809	1.2
BnB2	Billett loam, gravelly substratum, 2 to 6 percent slopes, eroded-----	676	0.2
BoA	Bowes silt loam, 0 to 2 percent slopes-----	1,508	0.5
BpA	Bowes Variant silt loam, 0 to 2 percent slopes-----	282	0.1
CaA	Camden silt loam, 0 to 2 percent slopes-----	3,074	1.0
CfB	Carmi sandy loam, 2 to 6 percent slopes-----	1,106	0.3
CgA	Carmi loam, 0 to 2 percent slopes-----	1,896	0.6
Ck	Ceresco sandy loam, gravelly substratum, rarely flooded-----	427	0.1
Cl	Ceresco loam, gravelly substratum, occasionally flooded-----	3,056	0.9
Cm	Chalmers silty clay loam-----	555	0.2
Co	Cohoctah fine sandy loam, gravelly substratum, rarely flooded-----	499	0.2
Cp	Cohoctah loam, gravelly substratum, occasionally flooded-----	2,429	0.8
CrC	Coloma sand, 6 to 15 percent slopes-----	376	0.1
CtA	Crosby silt loam, 0 to 2 percent slopes-----	4,715	1.5
CwB2	Crosby-Miami complex, 2 to 6 percent slopes, eroded-----	15,018	4.7
DmC2	Desker gravelly sandy loam, 6 to 12 percent slopes, eroded-----	418	0.1
DoC2	Desker sandy loam, kame, 6 to 12 percent slopes, eroded-----	1,030	0.3
DpD2	Desker-Rodman complex, kame, 12 to 18 percent slopes, eroded-----	461	0.1
Du	Drummer soils-----	42,946	13.3
Dy	Du Page loam, frequently flooded-----	447	0.1
EkA	Elston sandy loam, gravelly substratum, 0 to 2 percent slopes-----	1,315	0.4
EmA	Elston loam, gravelly substratum, 0 to 2 percent slopes-----	9,021	2.8
FcB	Fincastle-Crosby complex, 1 to 3 percent slopes-----	3,414	1.1
Hd	Harpster silt loam, pothole-----	117	*
HfB2	High Gap Variant silt loam, 1 to 6 percent slopes, eroded-----	342	0.1
HfC2	High Gap Variant silt loam, 6 to 12 percent slopes, eroded-----	115	*
HnB	Hononegah loamy sand, 2 to 6 percent slopes-----	456	0.1
HoA	Hononegah fine sandy loam, 0 to 2 percent slopes-----	2,020	0.6
Hv	Houghton muck, undrained-----	319	0.1
KaA	Kalamazoo loam, 0 to 2 percent slopes-----	2,368	0.7
KaB2	Kalamazoo loam, 2 to 6 percent slopes, eroded-----	832	0.3
KbB2	Kalamazoo silt loam, 2 to 6 percent slopes, eroded-----	1,234	0.4
KcB2	Kalamazoo silt loam, kame, 2 to 6 percent slopes, eroded-----	803	0.2
KcC2	Kalamazoo silt loam, kame, 6 to 12 percent slopes, eroded-----	455	0.1
KoD2	Kosciusko sandy loam, 12 to 18 percent slopes, eroded-----	202	0.1
KpC3	Kosciusko gravelly sandy clay loam, 6 to 12 percent slopes, severely eroded-----	678	0.2
LaA	Lafayette silt loam, 0 to 2 percent slopes-----	1,687	0.5
LeA	La Hogue loam, till substratum, 0 to 2 percent slopes-----	394	0.1
Lm	Lash silt loam, frequently flooded-----	1,283	0.4
LnA	Lauramie silt loam, 0 to 2 percent slopes-----	727	0.2
LnB2	Lauramie silt loam, 2 to 6 percent slopes, eroded-----	3,472	1.1
LoA	Linkville loam, loamy substratum, 0 to 2 percent slopes-----	444	0.1
LoB	Linkville loam, loamy substratum, 2 to 6 percent slopes-----	334	0.1
LvB2	Longlois silt loam, 2 to 6 percent slopes, eroded-----	947	0.3
LwB2	Longlois silt loam, kame, 2 to 6 percent slopes, eroded-----	2,194	0.7
Mb	Mahalasville silty clay loam, gravelly substratum-----	6,365	2.0
Mc	Mahalasville silty clay loam, shale substratum-----	181	0.1
Md	Mahalasville-Treaty complex-----	12,868	4.0
MmB2	Marker silt loam, 2 to 6 percent slopes, eroded-----	1,574	0.5
MoA	Mellott silt loam, 0 to 2 percent slopes-----	3,158	1.0
MsC2	Miami silt loam, 6 to 12 percent slopes, eroded-----	3,684	1.1
MsD2	Miami silt loam, 12 to 18 percent slopes, eroded-----	1,212	0.4

See footnote at end of table.

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

Map symbol	Soil name	Acres	Percent
MtC3	Miami clay loam, 6 to 12 percent slopes, severely eroded-----	1,532	0.5
MtD3	Miami clay loam, 12 to 18 percent slopes, severely eroded-----	207	0.1
Mu	Milford silty clay loam, pothole-----	1,869	0.6
MwA	Mulvey silt loam, 0 to 2 percent slopes-----	293	0.1
Mz	Muskego muck, drained-----	376	0.1
OaB2	Oakville-Billett, moderately wet, complex, 2 to 6 percent slopes, eroded-----	272	0.1
OgA	Ockley silt loam, 0 to 2 percent slopes-----	2,642	0.8
Omb2	Octagon silt loam, 2 to 6 percent slopes, eroded-----	3,508	1.1
Omc2	Octagon silt loam, 6 to 12 percent slopes, eroded-----	1,070	0.3
OpC3	Octagon clay loam, 6 to 12 percent slopes, severely eroded-----	323	0.1
Ou	Ouiatenon sandy loam, frequently flooded-----	2,182	0.7
Ox	Ouiatenon loamy sand, occasionally flooded-----	4,578	1.4
Oy	Ouiatenon fine sandy loam, sandy substratum, frequently flooded-----	577	0.2
Pc	Palms muck, drained-----	642	0.2
Pd	Palms muck, gravelly substratum, undrained-----	266	0.1
Pg	Pella silty clay loam, pothole-----	1,354	0.4
Pk	Peotone silty clay loam, pothole-----	994	0.3
PmB	Pinevillage gravelly sandy loam, 2 to 8 percent slopes, rarely flooded-----	527	0.2
Pt	Pits, gravel-----	1,258	0.4
RaB2	Rainsville silt loam, 2 to 6 percent slopes, eroded-----	796	0.2
RcA	Raub-Brenton complex, 0 to 1 percent slopes-----	6,344	2.0
RdA	Richardville silt loam, 0 to 2 percent slopes-----	1,322	0.4
RdB2	Richardville silt loam, 2 to 6 percent slopes, eroded-----	6,060	1.9
RdC2	Richardville silt loam, 6 to 12 percent slopes, eroded-----	605	0.2
RoB	Rockfield silt loam, 1 to 3 percent slopes-----	5,149	1.6
RsF	Rodman gravelly loam, 25 to 60 percent slopes-----	2,130	0.7
Rz	Ross silt loam, protected-----	142	*
Sd	Saranac silty clay, gravelly substratum, occasionally flooded-----	285	0.1
Sf	Sawabash silty clay loam, frequently flooded-----	612	0.2
ShB	Shadeland silt loam, 1 to 4 percent slopes-----	283	0.1
SmA	Sleeth loam, 0 to 2 percent slopes-----	509	0.2
Sn	Sloan clay loam, occasionally flooded-----	2,839	0.9
So	Sloan Variant silty clay loam, occasionally flooded-----	303	0.1
SrB	Sparta sand, 2 to 6 percent slopes-----	493	0.2
SrC	Sparta sand, 6 to 12 percent slopes-----	253	0.1
StC	Spinks fine sand, 6 to 12 percent slopes-----	146	*
SwA	Starks-Fincastle complex, 0 to 2 percent slopes-----	37,753	11.7
SyF	Strawn-Rodman complex, 18 to 50 percent slopes-----	9,058	2.8
TbA	Tecumseh silt loam, 0 to 2 percent slopes-----	1,355	0.4
TcA	Thackery silt loam, 0 to 2 percent slopes-----	425	0.1
TfB	Throckmorton silt loam, 1 to 3 percent slopes-----	9,690	3.0
Tg	Tice silty clay loam, frequently flooded-----	887	0.3
TmA	Toronto-Millbrook complex, 0 to 2 percent slopes-----	25,636	8.0
TnB2	Toronto-Octagon complex, 2 to 6 percent slopes, eroded-----	2,472	0.8
TtA	Troxel silty clay loam, 0 to 2 percent slopes-----	1,264	0.4
Ua	Udorthents, loamy-----	3,654	1.1
Ubb	Urban land-Billett, gravelly substratum, complex, 2 to 8 percent slopes-----	517	0.2
UcA	Urban land-Carmi complex, 0 to 2 percent slopes-----	2,043	0.6
Umb	Urban land-Miami complex, 2 to 8 percent slopes-----	769	0.2
UmC	Urban land-Miami complex, 8 to 15 percent slopes-----	748	0.2
UsA	Urban land-Starks-Fincastle complex, 0 to 2 percent slopes-----	6,202	1.9
Wb	Wallkill silt loam, coprogenous earth substratum-----	527	0.2
We	Washtenaw silt loam-----	588	0.2
WgA	Waupecan silt loam, 0 to 2 percent slopes-----	4,108	1.3
WhA	Waupecan silt loam, moderately wet, 0 to 2 percent slopes-----	1,343	0.4
WmA	Waynetown silt loam, 0 to 2 percent slopes-----	393	0.1
WtA	Wea silt loam, occasionally flooded-----	300	0.1
WuA	Whitaker loam, till substratum, 0 to 2 percent slopes-----	443	0.1
	Water areas more than 40 acres in size-----	895	0.3
	Water areas less than 40 acres in size-----	431	0.1
	Total-----	322,000	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
Am	Allison silt loam, protected
Ap	Allison silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
AtB2	Alvin-Spinks complex, 2 to 6 percent slopes, eroded
Ba	Battleground silt loam, protected
Bb	Battleground silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
BgA	Beecher silt loam, 0 to 2 percent slopes (where drained)
BlA	Billett fine sandy loam, gravelly substratum, 0 to 2 percent slopes
BlB2	Billett fine sandy loam, gravelly substratum, 2 to 6 percent slopes, eroded
BmA	Billett fine sandy loam, moderately wet, 0 to 2 percent slopes
BnA	Billett loam, gravelly substratum, 0 to 2 percent slopes
BnB2	Billett loam, gravelly substratum, 2 to 6 percent slopes, eroded
BoA	Bowes silt loam, 0 to 2 percent slopes
BpA	Bowes Variant silt loam, 0 to 2 percent slopes
CaA	Camden silt loam, 0 to 2 percent slopes
CfB	Carmi sandy loam, 2 to 6 percent slopes
CgA	Carmi loam, 0 to 2 percent slopes
Ck	Ceresco sandy loam, gravelly substratum, rarely flooded (where drained)
Cl	Ceresco loam, gravelly substratum, occasionally flooded (where drained)
Cm	Chalmers silty clay loam (where drained)
Co	Cohoctah fine sandy loam, gravelly substratum, rarely flooded (where drained)
Cp	Cohoctah loam, gravelly substratum, occasionally flooded (where drained)
CtA	Crosby silt loam, 0 to 2 percent slopes (where drained)
CwB2	Crosby-Miami complex, 2 to 6 percent slopes, eroded (where drained)
Du	Drummer soils (where drained)
Dy	Du Page loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
EkA	Elston sandy loam, gravelly substratum, 0 to 2 percent slopes
EmA	Elston loam, gravelly substratum, 0 to 2 percent slopes
FcB	Fincastle-Crosby complex, 1 to 3 percent slopes (where drained)
HfB2	High Gap Variant silt loam, 1 to 6 percent slopes, eroded
KaA	Kalamazoo loam, 0 to 2 percent slopes
KaB2	Kalamazoo loam, 2 to 6 percent slopes, eroded
KbB2	Kalamazoo silt loam, 2 to 6 percent slopes, eroded
KcB2	Kalamazoo silt loam, kame, 2 to 6 percent slopes, eroded
LaA	Lafayette silt loam, 0 to 2 percent slopes (where drained)
LeA	La Hogue loam, till substratum, 0 to 2 percent slopes (where drained)
Lm	Lash silt loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
LnA	Lauramie silt loam, 0 to 2 percent slopes
LnB2	Lauramie silt loam, 2 to 6 percent slopes, eroded
LoA	Linkville loam, loamy substratum, 0 to 2 percent slopes
LoB	Linkville loam, loamy substratum, 2 to 6 percent slopes
LvB2	Longlois silt loam, 2 to 6 percent slopes, eroded
LwB2	Longlois silt loam, kame, 2 to 6 percent slopes, eroded
Mb	Mahalasville silty clay loam, gravelly substratum (where drained)
Mc	Mahalasville silty clay loam, shale substratum (where drained)
Md	Mahalasville-Treaty complex (where drained)
MmB2	Marker silt loam, 2 to 6 percent slopes, eroded
MoA	Mellott silt loam, 0 to 2 percent slopes
MwA	Mulvey silt loam, 0 to 2 percent slopes (where drained)
OgA	Ockley silt loam, 0 to 2 percent slopes
OmB2	Octagon silt loam, 2 to 6 percent slopes, eroded
RaB2	Rainsville silt loam, 2 to 6 percent slopes, eroded
RcA	Raub-Brenton complex, 0 to 1 percent slopes (where drained)
RdA	Richardville silt loam, 0 to 2 percent slopes
RdB2	Richardville silt loam, 2 to 6 percent slopes, eroded
RoB	Rockfield silt loam, 1 to 3 percent slopes

TABLE 5.--PRIME FARMLAND--Continued

Map symbol	Soil name
Rz	Ross silt loam, protected
Sd	Saranac silty clay, gravelly substratum, occasionally flooded (where drained)
Sf	Sawabash silty clay loam, frequently flooded (where drained and either protected from flooding or not frequently flooded during the growing season)
ShB	Shadeland silt loam, 1 to 4 percent slopes (where drained)
SmA	Sleeth loam, 0 to 2 percent slopes (where drained)
Sn	Sloan clay loam, occasionally flooded (where drained)
So	Sloan Variant silty clay loam, occasionally flooded (where drained)
SwA	Starks-Fincastle complex, 0 to 2 percent slopes (where drained)
TbA	Tecumseh silt loam, 0 to 2 percent slopes
TcA	Thackery silt loam, 0 to 2 percent slopes
TfB	Throckmorton silt loam, 1 to 3 percent slopes
Tg	Tice silty clay loam, frequently flooded (where protected from flooding or not frequently flooded during the growing season)
TmA	Toronto-Millbrook complex, 0 to 2 percent slopes (where drained)
TnB2	Toronto-Octagon complex, 2 to 6 percent slopes, eroded (where drained)
TtA	Troxel silty clay loam, 0 to 2 percent slopes
We	Washtenaw silt loam (where drained)
WgA	Waupecan silt loam, 0 to 2 percent slopes
WhA	Waupecan silt loam, moderately wet,
WmA	Waynetown silt loam, 0 to 2 percent slopes (where drained)
WtA	Wea silt loam, occasionally flooded
WuA	Whitaker loam, till substratum, 0 to 2 percent slopes (where drained)

TABLE 6.--ADAPTABILITY OF FOUR TILLAGE SYSTEMS

(Unless otherwise indicated, ratings are for corn or for soybeans in a rotation system where soybeans follow corn. See text for explanations of some of the terminology used in this table. Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Limitations		Tillage system						
			Moldboard		Chisel		No-till		Ridge-till
			Fall	Spring	Fall	Spring	Slot-plant	Residue-cleared rows	
Am----- Allison	---	---	Poor	Good	Good	Good	Good	Good	Good.
Ap----- Allison	Flooding	---	Poor	Good	Fair	Good	Good	Good	Good.
AtB2----- Alvin-Spinks	Erodes easily	Soil blowing	Poor	Fair*	Fair*	Good*	Good	Good	Good.
Ba----- Battleground	---	---	Poor	Good	Good	Good	Good	Good	Good.
Bb----- Battleground	Flooding	---	Poor	Good	Fair	Good	Good	Good	Good.
BgA----- Beecher	Wetness	---	Good	Good	Good	Fair	Fair**	Good	Good.
BlA----- Billett	Soil blowing	---	Fair*	Good*	Good*	Good*	Good	Good	Good.
BlB2----- Billett	Erodes easily, soil blowing.	---	Poor	Good*	Good*	Good*	Good	Good	Good.
BmA----- Billett	Soil blowing	---	Fair*	Good*	Good*	Good*	Good	Good	Good.
BnA----- Billett	---	---	Good	Good	Good	Good	Good	Good	Good.
BnB2----- Billett	Erodes easily	---	Fair*	Good*	Fair*	Good*	Good	Good	Good.
BoA----- Bowes	---	---	Good	Good	Good	Good	Good	Good	Good.
BpA----- Bowes Variant	---	---	Good	Good	Good	Good	Good	Good	Good.
CaA----- Camden	---	---	Good	Good	Good	Good	Good	Good	Good.
CfB----- Carmi	Erodes easily, soil blowing.	---	Poor	Good*	Good*	Good*	Good	Good	Good.
CgA----- Carmi	---	---	Good	Good	Good	Good	Good	Good	Good.
Ck----- Ceresco	Wetness, soil blowing.	---	Fair*	Good*	Poor	Good*	Fair**	Good	Fair.
Cl----- Ceresco	Wetness, flooding.	---	Poor	Good	Poor	Good	Fair**	Good	Fair.

See footnotes at end of table.

TABLE 6.--ADAPTABILITY OF FOUR TILLAGE SYSTEMS--Continued

Soil name and map symbol	Limitations		Tillage system						
			Moldboard		Chisel		No-till		Ridge-till
			Fall	Spring	Fall	Spring	Slot-plant	Residue-cleared rows	
Cm----- Chalmers	Wetness, ponding.	---	Good	Fair	Good	Fair	Fair**	Fair**	Good.
Co----- Cohoctah	Soil blowing	Wetness, ponding.	Poor	Good	Poor	Good	Poor**	Poor**	Good.
Cp----- Cohoctah	---	Wetness, ponding, flooding.	Poor	Fair	Poor	Good	Poor**	Poor**	Good.
CtA----- Crosby	Wetness	---	Good	Good	Good	Fair	Fair**	Good	Good.
CwB2----- Crosby-Miami	Erodes easily, wetness.	---	Poor	Good*	Good*	Good*	Good	Good	Good.
DmC2----- Desker	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
DoC2----- Desker	Soil blowing	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
Du----- Drummer	Wetness, ponding.	---	Good	Fair	Good	Fair	Fair**	Fair**	Good.
Dy----- Du Page	Flooding	---	Poor	Good	Fair	Good	Good	Good	Good.
EKA----- Elston	Soil blowing	---	Fair*	Good*	Good*	Good*	Good	Good	Good.
EmA----- Elston	---	---	Good	Good	Good	Good	Good	Good	Good.
FcB----- Fincastle- Crosby	Erodes easily, wetness.	---	Poor	Good*	Good*	Good*	Good	Good	Good.
Hd----- Harpster	Wetness, ponding.	---	Good	Fair	Good	Fair	Fair**	Fair**	Good.
HfB2----- High Gap Variant	Erodes easily	---	Poor	Good*	Good*	Good*	Good	Good	Good.
HfC2----- High Gap Variant	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
HnB, HoA----- Hononegah	---	Soil blowing	Poor	Fair*	Fair*	Good*	Good	Good	Good.
KaA----- Kalamazoo	---	---	Good	Good	Good	Good	Good	Good	Good.
KaB2, Kbb2, KcB2----- Kalamazoo	Erodes easily	---	Fair*	Good*	Good*	Good*	Good	Good	Good.

See footnotes at end of table.

TABLE 6.--ADAPTABILITY OF FOUR TILLAGE SYSTEMS--Continued

Soil name and map symbol	Limitations		Tillage system						
			Moldboard		Chisel		No-till		Ridge-till
			Fall	Spring	Fall	Spring	Slot-plant	Residue-cleared rows	
KcC2----- Kalamazoo	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
KpC3----- Kosciusko	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
LaA----- Lafayette	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
LeA----- La Hogue	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
Lm----- Lash	Flooding	---	Poor	Good	Fair	Good	Good	Good	Good.
LnA----- Lauramie	---	---	Good	Good	Good	Good	Good	Good	Good.
LnB2----- Lauramie	Erodes easily	---	Poor	Good*	Good*	Good*	Good	Good	Good.
LoA----- Linkville	---	---	Good	Good	Good	Good	Good	Good	Good.
LoB----- Linkville	Erodes easily	---	Poor	Good*	Good*	Good*	Good	Good	Good.
LvB2, LwB2---- Longlois	Erodes easily	---	Fair*	Good*	Good*	Good*	Good	Good	Good.
Mb, Mc----- Mahalasville	Ponding	Wetness	Good	Fair	Good	Fair	Fair**	Fair**	Good.
Md----- Mahalasville- Treaty	Ponding	Wetness	Good	Fair	Good	Fair	Fair**	Fair**	Good.
MmB2----- Marker	Erodes easily, wetness.	---	Poor	Good*	Good*	Good*	Good	Good	Good.
MoA----- Mellott	---	---	Good	Good	Good	Good	Good	Good	Good.
MsC2, MtC3---- Miami	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
Mu----- Milford	---	Wetness, ponding.	Good	Poor	Good	Poor	Poor**	Poor**	Good.
MwA----- Mulvey	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
Mz----- Muskego	---	Wetness, ponding, soil blowing.	Poor	Good*	Poor	Good*	Poor	Fair	Poor.
OaB2----- Oakville- Billett	Erodes easily	Soil blowing	Poor	Fair*	Fair*	Good*	Good	Good	Good.

See footnotes at end of table.

TABLE 6.--ADAPTABILITY OF FOUR TILLAGE SYSTEMS--Continued

Soil name and map symbol	Limitations		Tillage system						
			Moldboard		Chisel		No-till		Ridge-till
			Moderate	Severe	Fall	Spring	Fall	Spring	
OgA----- Ockley	---	---	Good	Good	Good	Good	Good	Good	Good.
OmB2----- Octagon	Erodes easily	---	Poor	Good*	Good*	Good*	Good	Good	Good.
OmC2, OpC3----- Octagon	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
Ou, Ox, Oy----- Ouiatenon	Flooding, soil blowing.	---	Poor	Good*	Fair*	Good*	Good	Good	Good.
Pc----- Palms	---	Wetness, ponding, soil blowing.	Poor	Good*	Poor	Good*	Poor	Fair	Poor.
Pg----- Pella	---	Wetness, ponding.	Good	Poor	Good	Poor	Poor**	Poor**	Good.
Pk----- Peotone	---	Wetness, ponding.	Good	Poor	Good	Poor	Poor**	Poor**	Good.
PmB----- Pinevillage	Erodes easily	---	Poor	Fair*	Fair*	Good*	Good	Good	Good.
RaB2----- Rainsville	Erodes easily	---	Poor	Good*	Good*	Good*	Good	Good	Good.
RcA----- Raub-Brenton	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
RdA----- Richardville	---	---	Good	Good	Good	Good	Good	Good	Good.
RdB2----- Richardville	Erodes easily	---	Poor	Good*	Good*	Good*	Good	Good	Good.
RdC2----- Richardville	---	Erodes easily	Poor	Fair*	Fair*	Good*	Good	Good	Good.
RoB----- Rockfield	Erodes easily	---	Fair	Good*	Good*	Good*	Good	Good	Good.
Rz----- Ross	---	---	Poor	Good	Good	Good	Good	Good	Good.
Sd----- Saranac	---	Wetness, ponding, flooding.	Poor	Fair	Poor	Good	Poor**	Poor**	Good.
Sf----- Sawabash	---	Wetness, ponding, flooding.	Poor	Fair	Poor	Good	Poor**	Poor**	Good.
ShB----- Shadeland	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
SmA----- Sleeth	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.

See footnotes at end of table.

TABLE 6.--ADAPTABILITY OF FOUR TILLAGE SYSTEMS--Continued

Soil name and map symbol	Limitations		Tillage system						
			Moldboard		Chisel		No-till		Ridge-till
			Fall	Spring	Fall	Spring	Slot-plant	Residue-cleared rows	
Sn----- Sloan	---	Wetness, ponding, flooding.	Poor	Fair	Poor	Good	Poor**	Poor**	Good.
So----- Sloan Variant	---	Wetness, ponding, flooding.	Poor	Fair	Poor	Good	Poor**	Poor**	Good.
SrB----- Sparta	---	Soil blowing	Poor	Fair*	Fair*	Good*	Good	Good	Good.
StC----- Spinks	---	Soil blowing	Poor	Fair*	Fair*	Good*	Good	Good	Good.
SWA----- Starks- Fincastle	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
TbA----- Tecumseh	---	---	Good	Good	Good	Good	Good	Good	Good.
TcA----- Thackery	---	---	Good	Good	Good	Good	Good	Good	Good.
TfB----- Throckmorton	Erodes easily	---	Fair	Good*	Good*	Good*	Good	Good	Good.
Tg----- Tice	Wetness, flooding.	---	Poor	Good	Poor	Good	Fair**	Good	Good.
TmA----- Toronto- Millbrook	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
TnB2----- Toronto- Octagon	Erodes easily, wetness.	---	Poor	Good*	Good*	Good*	Good	Good	Good.
TtA----- Troxel	Ponding	---	Good	Good	Good	Good	Good	Good	Good.
Wb----- Walkill	---	Wetness, ponding.	Good	Poor	Good	Poor	Poor**	Poor**	Good.
We----- Washtenaw	Wetness, ponding.	---	Good	Poor	Good	Poor	Poor**	Poor**	Good.
WgA, WhA----- Waupecan	---	---	Good	Good	Good	Good	Good	Good	Good.
WmA----- Waynetown	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.
WtA----- Wea	Flooding	---	Poor	Good	Fair	Good	Good	Good	Good.

See footnotes at end of table.

TABLE 6.--ADAPTABILITY OF FOUR TILLAGE SYSTEMS--Continued

Soil name and map symbol	Limitations		Tillage system						
			Moldboard		Chisel		No-till		Ridge-till
			Moderate	Severe	Fall	Spring	Fall	Spring	
WuA----- Whitaker	Wetness	---	Good	Good	Good	Fair	Good	Good	Good.

\* If the new crop is planted in soybean residue instead of corn residue, the ratings for moldboard plowing and chisel plowing should be interpreted as one level lower--for example, a rating of "Fair" should be interpreted as "Poor" and a rating of "Good" should be interpreted as "Fair." Tillage of soybean residue results in an amount of surface cover that does not adequately reduce the hazard of erosion.

\*\* If the new crop is planted in soybean residue instead of corn residue, the ratings for no-till planting should be interpreted as one level higher--for example, a rating of "Fair" should be interpreted as "Good" and a rating of "Poor" should be interpreted as "Fair." Soybeans leave less residue than corn, and thus the soil is allowed to warm up more quickly.

TABLE 7.--LAND CAPABILITY 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	Bromegrass- alfalfa hay	Tall fescue
		<u>Bu</u>	<u>Bu</u>	<u>Bu</u>	<u>Tons</u>	<u>AUM*</u>
Am----- Allison	I	140	49	56	4.6	9.2
Ap----- Allison	IIw	140	49	56	4.6	9.2
AtB2----- Alvin-Spinks	IIe	90	32	36	3.0	6.0
Ba----- Battleground	I	125	44	50	4.1	8.2
Bb----- Battleground	IIw	125	44	50	4.1	8.2
BgA----- Beecher	IIw	110	39	50	3.6	7.2
BkF----- Berks	VIIe	---	---	---	---	---
BlA----- Billett	IIIIs	95	33	38	3.1	6.2
BlB2----- Billett	IIIe	90	32	36	3.0	6.0
BmA----- Billett	IIIIs	100	35	40	3.3	6.6
BnA----- Billett	IIIIs	85	30	34	2.8	5.6
BnB2----- Billett	IIIe	85	30	34	2.8	5.6
BoA----- Bowes	I	125	44	50	4.1	8.2
BpA----- Bowes Variant	I	125	44	50	4.1	8.2
CaA----- Camden	I	125	44	50	4.1	8.2
CfB----- Carmi	IIe	80	28	32	2.6	5.2
CgA----- Carmi	IIs	90	32	36	3.0	6.0
Ck----- Ceresco	IIw	90	32	36	3.0	6.0
Cl----- Ceresco	IIw	95	33	38	3.1	6.2

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Bromegrass-alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
Cm----- Chalmers	IIw	150	53	60	5.0	10.0
Co----- Cohoctah	IIIw	95	33	38	3.1	6.2
Cp----- Cohoctah	IIIw	100	35	40	3.3	6.6
CrC----- Coloma	VI s	---	---	---	---	---
CtA----- Crosby	IIw	120	42	54	4.0	8.0
CwB2----- Crosby-Miami	IIe	110	39	50	3.6	7.2
DmC2----- Desker	IIIe	65	23	33	2.1	4.2
DoC2----- Desker	IIIe	60	21	30	2.0	4.0
DpD2----- Desker-Rodman	IVe	45	16	23	1.5	3.0
Du----- Drummer	IIw	155	54	62	5.1	10.2
Dy----- Du Page	IIw	125	44	50	4.1	8.2
EkA----- Elston	II s	75	26	30	2.5	5.0
EmA----- Elston	II s	90	32	36	3.0	6.0
FcB----- Fincastle-Crosby	IIe	125	44	50	4.1	8.2
Hd----- Harpster	IVw	60	21	---	2.0	4.0
HfB2----- High Gap Variant	IIe	85	30	34	2.8	5.6
HfC2----- High Gap Variant	IIIe	75	26	30	2.5	5.0
HnB----- Hononegah	IV s	55	19	25	1.8	3.6
HoA----- Hononegah	IV s	60	21	27	2.0	4.0
Hv----- Houghton	Vw	---	---	---	---	---

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Bromegrass- alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
KaA----- Kalamazoo	IIs	90	32	36	3.0	6.0
KaB2, KbB2, KcB2----- Kalamazoo	IIE	85	30	34	2.8	5.6
KcC2----- Kalamazoo	IIIe	75	26	30	2.5	5.0
KoD2----- Kosciusko	IVe	60	21	30	2.0	4.0
KpC3----- Kosciusko	IVe	65	23	33	2.1	4.2
LaA----- Lafayette	IIW	140	49	56	4.6	9.2
LeA----- La Hogue	IIW	130	46	52	4.3	8.6
Lm----- Lash	IIW	95	33	---	3.1	6.2
LnA----- Lauramie	I	125	44	50	4.1	8.2
LnB2----- Lauramie	IIE	120	42	48	4.0	8.0
LoA----- Linkville	I	130	46	52	4.3	8.6
LoB----- Linkville	IIE	130	46	52	4.3	8.6
LvB2, LwB2----- Longlois	IIE	110	39	44	3.6	7.2
Mb----- Mahalasville	IIW	155	54	62	5.1	10.2
Mc----- Mahalasville	IIW	150	53	60	5.0	10.0
Md----- Mahalasville-Treaty	IIW	153	54	61	5.0	10.0
MmB2----- Marker	IIE	110	39	50	3.6	7.2
MoA----- Mellott	I	125	44	50	4.1	8.2
MsC2----- Miami	IIIe	95	33	43	3.1	6.2
MsD2----- Miami	IVe	80	28	36	2.6	5.2

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Bromegrass-alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
MtC3----- Miami	IVe	90	32	40	3.0	6.0
MtD3----- Miami	VIe	---	---	---	2.5	5.0
Mu----- Milford	IVw	60	21	---	2.0	4.0
MwA----- Mulvey	IIw	125	44	50	4.1	8.2
Mz----- Muskego	IVw	110	39	---	3.6	7.2
OaB2----- Oakville-Billett	IVs	70	25	32	2.3	4.6
OgA----- Ockley	I	110	39	44	3.6	7.2
OmB2----- Octagon	IIe	110	39	50	3.6	7.2
OmC2----- Octagon	IIIe	100	35	45	3.3	6.6
OpC3----- Octagon	IVe	95	33	43	3.1	6.2
Ou----- Ouiatenon	IIIs	65	23	---	2.1	4.2
Ox----- Ouiatenon	IIIs	60	21	---	2.0	4.0
Oy----- Ouiatenon	IIIs	65	23	---	2.1	4.2
Pc----- Palms	IIIw	120	42	---	4.0	8.0
Pd----- Palms	Vw	---	---	---	---	---
Pg----- Pella	IVw	60	21	---	2.0	4.0
Pk----- Peotone	IVw	60	21	---	2.0	4.0
PmB----- Pinevillage	IVs	85	30	34	2.8	5.6
Pt. Pits						
RaB2----- Rainsville	IIe	115	40	52	---	7.6

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Bromegrass- alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
RcA----- Raub-Brenton	IIw	140	49	56	4.6	9.2
RdA----- Richardville	I	120	42	48	4.0	8.0
RdB2----- Richardville	IIe	115	40	46	3.8	7.6
RdC2----- Richardville	IIIe	105	37	42	3.5	7.0
RoB----- Rockfield	IIe	120	42	48	4.0	8.0
RsF----- Rodman	VIIIs	---	---	---	---	0.2
Rz----- Ross	I	135	47	54	4.5	9.0
Sd----- Saranac	IIIw	130	46	---	4.3	8.6
Sf----- Sawabash	IIIw	120	42	---	4.0	8.0
ShB----- Shadeland	IIe	100	35	40	3.3	6.6
SmA----- Sleeth	IIw	120	42	48	4.0	8.0
Sn----- Sloan	IIIw	130	46	52	4.3	8.6
So----- Sloan Variant	IIIw	110	39	44	3.6	7.2
SrB----- Sparta	IVs	75	21	34	2.5	5.0
SrC----- Sparta	VIIs	---	---	---	2.5	5.0
StC----- Spinks	IIIe	60	21	27	2.0	4.0
SwA----- Starks-Fincastle	IIw	135	47	54	4.5	9.0
SyF----- Strawn-Rodman	VIIe	---	---	---	---	---
TbA----- Tecumseh	I	130	46	52	4.3	8.6
TcA----- Thackery	I	110	39	44	3.6	7.2

See footnote at end of table.

TABLE 7.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Bromegrass-alfalfa hay	Tall fescue
		Bu	Bu	Bu	Tons	AUM*
TfB----- Throckmorton	IIe	125	44	50	4.1	8.2
Tg----- Tice	IIIw	140	49	---	4.6	9.2
TmA----- Toronto-Millbrook	IIw	135	47	54	4.5	9.0
TnB2----- Toronto-Octagon	IIe	120	42	48	4.0	8.0
TtA----- Troxel	I	135	47	---	4.5	9.0
Ua. Udorthents						
UbB. Urban land-Billett						
UcA. Urban land-Carmi						
UmB, UmC. Urban land-Miami						
UsA. Urban land-Starks-Fincastle						
Wb----- Walkill	IIIw	100	35	---	3.3	6.6
We----- Washtenaw	IIw	130	46	52	4.3	8.6
WgA, WhA----- Waupecan	I	135	47	54	4.5	9.0
WmA----- Waynetown	IIw	125	44	50	4.1	8.2
WtA----- Wea	IIw	120	42	48	4.0	8.0
WuA----- Whitaker	IIw	120	42	48	4.0	8.0

\* 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 8.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas and Urban land map units are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	22,539	---	---	---	---
II	227,387	59,747	153,040	14,600	---
III	29,925	8,401	9,023	12,501	---
IV	12,886	4,408	4,710	3,768	---
V	585	---	585	---	---
VI	836	207	---	629	---
VII	11,302	9,172	---	2,130	---
VIII	---	---	---	---	---

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
AtB2: Alvin-----	4A	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Black walnut----- Yellow-poplar-----	80 80 --- 90	4 4 --- 6	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
Spinks-----	4S	Slight	Moderate	Moderate	Slight	Northern red oak---- White oak-----	70 66	4 3	Eastern white pine, red pine.
Ba, Bb----- Battleground	8A	Slight	Moderate	Slight	Slight	Yellow-poplar-----	100	8	Black walnut.
BgA----- Beecher	4C	Slight	Slight	Slight	Severe	White oak----- Northern red oak---- Green ash----- Bur oak-----	70 70 --- ---	4 4 --- ---	Eastern white pine, Scotch pine, red pine.
BkF----- Berks	3R	Moderate	Severe	Moderate	Slight	Northern red oak---- Black oak----- Virginia pine-----	60 60 60	3 3 6	Virginia pine, eastern white pine, Japanese larch, red pine.
BmA----- Billett	3A	Slight	Slight	Slight	Slight	Northern red oak---- White oak----- Black oak----- Northern pin oak---- Shagbark hickory---	60 --- --- --- ---	3 --- --- --- ---	Red pine, eastern white pine, white spruce.
CaA----- Camden	7A	Slight	Slight	Slight	Slight	Yellow-poplar----- White oak----- Northern red oak---- Green ash-----	95 85 85 76	7 5 5 5	White oak, black walnut, green ash, eastern white pine, red pine, yellow- poplar, white ash.
Ck, Cl----- Ceresco	4W	Slight	Moderate	Slight	Slight	Northern red oak---- White ash----- Red maple----- Bur oak----- Green ash----- Quaking aspen-----	76 --- --- --- --- ---	4 --- --- --- --- ---	Eastern white pine, yellow- poplar, red maple, white ash, red pine.

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
Co, Cp----- Cohoctah	2W	Slight	Severe	Severe	Severe	Silver maple-----	80	2	Eastern white pine, white spruce, northern whitecedar.
						Red maple-----	56	2	
						Eastern cottonwood--	---	---	
						White ash-----	---	---	
						Swamp white oak-----	---	---	
CrC----- Coloma	4S	Slight	Moderate	Moderate	Slight	Northern red oak----	70	4	Eastern white pine.
CtA----- Crosby	4A	Slight	Slight	Slight	Slight	White oak-----	75	4	Eastern white pine, northern red oak, white ash, red maple, yellow-poplar, American sycamore.
						Pin oak-----	85	5	
						Yellow-poplar-----	85	6	
						Northern red oak----	75	4	
CwB2: Crosby-----	4A	Slight	Slight	Slight	Slight	White oak-----	75	4	Eastern white pine, northern red oak, white ash, red maple, yellow-poplar, American sycamore.
						Pin oak-----	85	5	
						Yellow-poplar-----	85	6	
						Northern red oak----	75	4	
Miami-----	5A	Slight	Slight	Slight	Slight	White oak-----	90	5	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
						Yellow-poplar-----	98	7	
DpD2: Desker. Rodman-----	4S	Slight	Slight	Severe	Slight	Northern red oak----	70	4	Eastern white pine, red pine, jack pine.
						White oak-----	70	4	
						Red pine-----	75	10	
						Eastern white pine--	85	14	
FcB: Fincastle-----	4A	Slight	Slight	Slight	Slight	Northern red oak----	75	4	Eastern white pine, white ash, red maple, yellow-poplar, American sycamore.
						White oak-----	75	4	
						Pin oak-----	85	5	
						Yellow-poplar-----	85	6	

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
FcB: Crosby-----	4A	Slight	Slight	Slight	Slight	White oak----- Pin oak----- Yellow-poplar----- Northern red oak----	75 85 85 75	4 5 6 4	Eastern white pine, northern red oak, white ash, red maple, yellow-poplar, American sycamore.
HfB2, HfC2----- High Gap Variant	6A	Slight	Slight	Slight	Slight	Yellow-poplar-----	85	6	Yellow-poplar, eastern white pine.
Hv----- Houghton	2W	Slight	Severe	Severe	Severe	White ash----- Red maple----- Black willow----- Quaking aspen----- Silver maple-----	51 51 --- 56 76	2 2 --- 4 2	---
KaA, KaB2, KbB2, KcB2, KcC2----- Kalamazoo	4A	Slight	Slight	Slight	Slight	Northern red oak---- White ash----- Black walnut----- Yellow-poplar----- White oak----- Black cherry----- American basswood--- Sugar maple-----	65 65 65 65 --- --- 65 61	4 4 --- 3 --- --- 4 3	Black walnut, yellow-poplar, eastern white pine, white spruce, red pine, Carolina poplar.
KoD2----- Kosciusko	4S	Slight	Slight	Moderate	Slight	Northern red oak---- White oak----- Eastern white pine-- Black oak----- Jack pine-----	78 76 70 --- ---	4 4 10 --- ---	Eastern white pine, red pine, jack pine.
KpC3----- Kosciusko	4A	Slight	Slight	Slight	Slight	Northern red oak---- White oak----- Eastern white pine-- Black oak----- Jack pine-----	78 76 70 --- ---	4 4 10 --- ---	Eastern white pine, red pine, jack pine.
Lm----- Lash	8A	Slight	Moderate	Slight	Slight	Yellow-poplar-----	100	8	Black walnut, eastern cottonwood.
Mb, Mc----- Mahalasville	5W	Slight	Severe	Severe	Severe	Pin oak----- White oak-----	85 75	5 4	Eastern white pine, red maple, white ash, silver maple.
Md: Mahalasville---	5W	Slight	Severe	Severe	Severe	Pin oak----- White oak-----	85 75	5 4	Eastern white pine, red maple, white ash.

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
Md: Treaty-----	5W	Slight	Severe	Severe	Severe	Pin oak----- White oak----- Northern red oak----	90 75 ---	5 4 ---	Eastern white pine, red maple, white ash.
MsC2, MsD2, MtC3, MtD3----- Miami	5A	Slight	Slight	Slight	Slight	White oak----- Yellow-poplar-----	90 98	5 7	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
MwA----- Mulvey	4A	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar-----	80 80 90	4 4 6	White oak, black walnut, northern red oak.
Mz----- Muskego	2W	Slight	Severe	Severe	Severe	Tamarack----- Red maple----- White ash----- Green ash----- Black willow----- Quaking aspen----- Silver maple-----	50 51 52 --- --- 56 ---	3 2 2 --- --- 4 ---	---
OaB2: Oakville-----	4S	Slight	Moderate	Moderate	Slight	White oak----- Red pine----- Eastern white pine-- Jack pine-----	70 78 85 68	4 10 14 7	Eastern white pine, red pine, jack pine.
Billett-----	4A	Slight	Slight	Slight	Slight	Northern red oak---- White oak----- Black oak----- Northern pin oak---- Shagbark hickory----	60 --- --- --- ---	4 --- --- --- ---	Red pine, eastern white pine, white spruce.
OgA----- Ockley	5A	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar-----	90 90 98	5 5 7	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
Ou, Ox, Oy----- Ouiatenon	6A	Slight	Slight	Slight	Slight	Yellow-poplar-----	90	6	Black walnut.
Pc----- Palms	2W	Slight	Severe	Severe	Severe	White ash----- Red maple----- Quaking aspen----- Black willow----- Silver maple-----	51 51 56 --- 76	2 2 4 --- 2	Red maple, silver maple, green ash.

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
Pd----- Palms	2W	Slight	Severe	Severe	Severe	Red maple----- Silver maple----- White ash----- Quaking aspen-----	51 76 51 56	2 2 2 4	Red maple, silver maple, green ash.
PmB----- Pinevillage	3F	Slight	Moderate	Severe	Slight	Sugar maple----- Black walnut----- American sycamore--- Hackberry-----	60 --- --- ---	3 --- --- ---	Green ash, eastern white pine, yellow- poplar, American sycamore.
RaB2----- Rainsville	5A	Slight	Slight	Slight	Slight	White oak----- Yellow-poplar----- Northern red oak--- Shagbark hickory---	88 98 90 ---	5 7 5 ---	White oak, yellow-poplar, northern red oak, white ash, green ash, eastern white pine, black cherry, black walnut.
RdA, RdB2, RdC2- Richardville	7A	Slight	Slight	Slight	Slight	Yellow-poplar----- Northern red oak--- Black oak----- White oak-----	94 90 88 85	7 5 5 5	Eastern white pine, white ash, yellow- poplar, black walnut.
RoB----- Rockfield	8A	Slight	Slight	Slight	Slight	Yellow-poplar----- White ash-----	105 85	8 6	Eastern white pine, yellow- poplar, white oak, black walnut, green ash, white ash.
RsF----- Rodman	4R	Severe	Severe	Severe	Slight	Northern red oak--- White oak----- Red pine----- Eastern white pine--	70 70 75 85	4 4 10 14	Eastern white pine, red pine, jack pine.
Rz----- Ross	5A	Slight	Slight	Slight	Slight	Northern red oak--- Yellow-poplar----- Sugar maple----- White oak----- Black walnut----- Black cherry----- White ash-----	86 96 85 --- --- --- ---	5 7 4 --- --- --- ---	Eastern white pine, black walnut, white ash, yellow- poplar.
Sd----- Saranac	5W	Slight	Severe	Moderate	Moderate	Pin oak----- Red maple----- Bur oak----- White ash-----	85 --- --- ---	5 --- --- ---	Eastern white pine, red maple, white ash.
Sf----- Sawabash	5W	Slight	Severe	Severe	Slight	Pin oak----- American sycamore---	86 ---	5 ---	Green ash, American sycamore.

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
ShB----- Shadeland	4A	Slight	Moderate	Slight	Slight	White oak-----	75	4	Eastern white pine, white ash, yellow-poplar, swamp white oak, pin oak.
						Pin oak-----	85	5	
						Yellow-poplar-----	85	6	
SmA----- Sleeth	5A	Slight	Slight	Slight	Slight	Pin oak-----	85	5	Eastern white pine, white ash, red maple, yellow-poplar, American sycamore.
						Yellow-poplar-----	85	6	
						White oak-----	70	4	
Sn----- Sloan	5W	Slight	Severe	Moderate	Moderate	Pin oak-----	86	5	Red maple, green ash, eastern cottonwood, pin oak, swamp white oak, silver maple, American sycamore.
						Swamp white oak-----	---	---	
						Red maple-----	---	---	
						Green ash-----	---	---	
So----- Sloan Variant	2W	Slight	Severe	Severe	Slight	Pin oak-----	36	2	Red maple, eastern white pine.
						Swamp white oak-----	---	---	
SrB, SrC----- Sparta	4S	Slight	Slight	Severe	Slight	Northern red oak----	70	4	Red pine, eastern white pine, jack pine.
						Eastern white pine--	---	---	
						Red pine-----	---	---	
StC----- Spinks	4S	Slight	Moderate	Moderate	Slight	Northern red oak----	70	4	Eastern white pine, red pine.
						White oak-----	66	3	
SwA: Starks-----	4A	Slight	Slight	Slight	Slight	White oak-----	80	4	Sugar maple, American sycamore, yellow-poplar, white oak, green ash.
						Northern red oak----	80	4	
						Yellow-poplar-----	90	6	
						Black walnut-----	---	---	
Fincastle-----	4A	Slight	Slight	Slight	Slight	Northern red oak----	75	4	Eastern white pine, white ash, red maple, yellow-poplar, American sycamore.
						White oak-----	75	4	
						Pin oak-----	85	5	
						Yellow-poplar-----	85	6	

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
SyF: Strawn-----	4R	Severe	Severe	Moderate	Slight	White oak----- Northern red oak---- Yellow-poplar----- Black walnut-----	80 80 90 ---	4 4 6 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
Rodman-----	4R	Moderate	Moderate	Severe	Slight	Northern red oak---- White oak----- Red pine----- Eastern white pine--	70 70 75 85	4 4 10 14	Eastern white pine, red pine, jack pine.
TcA----- Thackery	5A	Slight	Slight	Slight	Slight	Northern red oak---- White oak----- Black walnut----- Black cherry----- Sugar maple----- White ash----- Yellow-poplar-----	90 90 --- --- --- --- ---	5 5 --- --- --- --- ---	Eastern white pine, black walnut, yellow-poplar, white ash, red pine, northern red oak, white oak, green ash, black cherry, American sycamore, eastern cottonwood.
Tg----- Tice	5A	Slight	Slight	Slight	Slight	Pin oak----- Yellow-poplar----- Virginia pine----- Eastern cottonwood-- White ash-----	96 90 90 --- ---	5 6 9 --- ---	American sycamore, eastern cottonwood, green ash, yellow-poplar, red maple, cherrybark oak.
TmA: Toronto.									
Millbrook-----	4A	Slight	Slight	Slight	Slight	White oak----- Northern red oak---- Yellow-poplar----- Black walnut-----	80 80 90 ---	4 4 6 ---	White oak, black walnut, northern red oak, green ash, sugar maple.
Wb----- Wallkill	2W	Slight	Severe	Severe	Severe	White ash----- Eastern cottonwood-- Silver maple----- Black willow----- Green ash-----	52 --- --- --- ---	2 --- --- --- ---	Green ash, silver maple, swamp white oak, pin oak.

See footnote at end of table.

TABLE 9.--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	Wind-throw hazard	Common trees	Site index	Productivity class*	
We----- Washtenaw	5W	Slight	Severe	Severe	Moderate	Pin oak-----	86	5	Eastern white pine, black spruce, red maple, green ash, white spruce.
						Northern red oak----	75	4	
						Red maple-----	70	3	
						Silver maple-----	---	---	
						White ash-----	---	---	
						American basswood---	---	---	
White oak-----	---	---							
WmA----- Waynetown	5A	Slight	Slight	Slight	Slight	Pin oak-----	85	5	Eastern white pine, green ash, red maple, yellow-poplar, American sycamore.
						Yellow-poplar-----	85	6	
						White oak-----	75	4	
WuA----- Whitaker	4A	Slight	Slight	Slight	Slight	White oak-----	70	4	Eastern white pine, white ash, red maple, yellow-poplar, American sycamore.
						Pin oak-----	85	5	
						Yellow-poplar-----	85	6	
						Northern red oak----	75	4	

\* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 10.--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
Am, Ap----- Allison	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern whitecedar, Austrian pine, Washington hawthorn, white fir.	Norway spruce-----	Eastern white pine, pin oak.
AtB2: Alvin-----	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, northern whitecedar, Osage-orange, eastern redcedar.	Eastern white pine, red pine, Norway spruce.	---
Spinks-----	---	Washington hawthorn, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---
Ba, Bb----- Battleground	---	Siberian peashrub	White spruce, green ash, Osage-orange, eastern redcedar, northern whitecedar, Washington hawthorn, nannyberry viburnum.	Black willow-----	---
BgA----- Beecher	---	Washington hawthorn, Amur privet, eastern redcedar, Amur honeysuckle, American cranberrybush, arrowwood.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
BkF----- Berks	Siberian peashrub	Tatarian honeysuckle, Amur honeysuckle, lilac, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, Austrian pine, red pine, eastern white pine.	---	---

TABLE 10.--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
B1A, B1B2----- Billett	---	Amur honeysuckle, Amur privet, American cranberrybush, Washington hawthorn.	Austrian pine, Osage-orange, eastern redcedar, northern whitecedar.	Eastern white pine, red pine, Norway spruce.	---
BnA----- Billett	Lilac-----	Russian-olive, Siberian peashrub, eastern redcedar.	Eastern white pine, honeylocust, hackberry, red pine, Norway spruce, green ash, Amur maple.	---	---
BnA, BnB2----- Billett	---	Amur honeysuckle, Amur privet, American cranberrybush, Washington hawthorn.	Austrian pine, Osage-orange, eastern redcedar, northern whitecedar.	Eastern white pine, red pine, Norway spruce.	---
BoA----- Bowes	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
BpA----- Bowes Variant	---	Amur privet, American cranberrybush, Amur honeysuckle, silky dogwood.	White fir, Washington hawthorn, blue spruce, Austrian pine, northern whitecedar.	Norway spruce-----	Eastern white pine, pin oak.
CaA----- Camden	---	Amur honeysuckle, Amur privet, silky dogwood, American cranberrybush.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
CfB, CgA----- Carmi	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn- olive, Amur honeysuckle, lilac, silky dogwood.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
Ck, Cl----- Ceresco	---	Amur privet, silky dogwood, American cranberrybush, Amur honeysuckle.	Northern whitecedar, white fir, blue spruce, Washington hawthorn, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.

TABLE 10.--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
Cm----- Chalmers	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
Co, Cp----- Cohoctah	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
CrC----- Coloma	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, silky dogwood.	Austrian pine, jack pine, red pine.	Eastern white pine	---
CtA----- Crosby	---	Arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
CwB2: Crosby-----	---	Arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
Miami-----	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
DmC2, DoC2----- Desker	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---

TABLE 10.--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
DpD2: Desker-----	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---
Rodman-----	Siberian peashrub	Silky dogwood, gray dogwood, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Black locust, jack pine, Virginia pine.	---	---
Du: Drummer-----	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine	Pin oak.
Drummer, stratified sandy substratum-----	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine.	Eastern white pine	Pin oak.
Dy----- Du Page	---	Siberian peashrub	Green ash, Osage-orange, eastern redcedar, northern whitecedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow-----	---
EkA, EmA----- Elston	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---
FcB: Fincastle-----	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 10.--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
FcB: Crosby-----	---	Arrowwood, eastern redcedar, Washington hawthorn, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, green ash, Osage-orange.	Eastern white pine, pin oak.	---
Hd----- Harpster	---	Nannyberry viburnum, Washington hawthorn.	White spruce, northern whitecedar, eastern redcedar, green ash, Osage-orange.	Black willow-----	---
HfB2, HfC2----- High Gap Variant	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
HnB, HoA----- Hononegah	Gray dogwood, Siberian peashrub.	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac.	Austrian pine, jack pine, red pine.	Eastern white pine	---
Hv. Houghton					
KaA, KaB2, KkB2, KcB2, KcC2----- Kalamazoo	---	Lilac, American cranberrybush, Siberian peashrub, silky dogwood, nannyberry viburnum, eastern redcedar.	Red pine, jack pine, green ash.	Eastern white pine, Norway spruce.	Carolina poplar.
KoD2----- Kosciusko	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn-olive, Amur honeysuckle, Washington hawthorn.	Eastern white pine, red pine, Austrian pine, jack pine.	---	---

TABLE 10.--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
KpC3----- Kosciusko	Siberian peashrub	Lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, eastern white pine, Austrian pine, black locust.	---	---
LaA----- Lafayette	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
LeA----- La Hogue	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Lm----- Lash	---	Siberian peashrub	Green ash, Osage-orange, eastern redcedar, northern whitecedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow-----	---
LnA, LnB2----- Lauramie	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, Washington hawthorn, northern whitecedar.	Austrian pine, Norway spruce.	Eastern white pine, pin oak.
LoA, LoB----- Linkville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
LvB2, LwB2----- Longlois	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Mb, Mc----- Mahalassville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 10.--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
Md: Mahalasville-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
Treaty-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
MmB2----- Marker	---	Eastern redcedar, arrowwood, Washington hawthorn, Amur privet, Amur honeysuckle, American cranberrybush.	Green ash, Austrian pine, Osage-orange.	Eastern white pine, pin oak.	---
MoA----- Mellott	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
MsC2, MsD2, MtC3, MtD3----- Miami	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Mu----- Milford	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
MwA----- Mulvey	---	Amur privet, American cranberrybush, Amur honeysuckle, silky dogwood.	Austrian pine, white fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Mz----- Muskego	Whitebelle honeysuckle, common ninebark.	Amur privet, nannyberry viburnum, silky dogwood, Amur honeysuckle.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.

TABLE 10.--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
OaB2: Oakville-----	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn-olive, Washington hawthorn, Amur honeysuckle.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
Billett-----	Lilac-----	Russian-olive, Siberian peashrub, eastern redcedar.	Eastern white pine, honeylocust, hackberry, red pine, Norway spruce, green ash, Amur maple.	---	---
OgA----- Ockley	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
OmB2, OmC2, OpC3-- Octagon	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Ou, Ox, Oy----- Quiatenon	---	Siberian peashrub	Green ash, Osage-orange, eastern redcedar, northern whitecedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow-----	---
Pc----- Palms	Whitebelle honeysuckle, common ninebark.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
Pd. Palms					
Pg----- Pella	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern whitecedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 10.--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
Pk----- Peotone	---	Amur privet, American cranberrybush.	Norway spruce, Austrian pine, northern whitecedar, Washington hawthorn.	Eastern white pine	Pin oak.
PmB----- Pinevillage	---	Siberian peashrub	Green ash, Osage-orange, eastern redcedar, northern whitecedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow-----	---
Pt. Pits					
RaB2----- Rainsville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
RcA: Raub-----	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Brenton-----	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
RdA, RdB2, RdC2--- Richardville	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
RoB----- Rockfield	Silky dogwood-----	Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, northern whitecedar, white fir, Washington hawthorn, blue spruce.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 10.--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
RsF----- Rodman	Siberian peashrub	Silky dogwood, gray dogwood, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Black locust, jack pine, Virginia pine.	---	---
Rz----- Ross	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir, Austrian pine.	Norway spruce-----	Pin oak, eastern white pine.
Sd----- Saranac	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, northern whitecedar, Washington hawthorn, Norway spruce, blue spruce.	Eastern white pine	Pin oak.
Sf----- Sawabash	---	Washington hawthorn, nannyberry viburnum.	Osage-orange, green ash, northern whitecedar, eastern redcedar, white spruce.	Black willow-----	---
ShB----- Shadeland	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
SmA----- Sleeth	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Sn----- Sloan	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.

TABLE 10.--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
So----- Sloan Variant	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
SrB, SrC----- Sparta	Siberian peashrub	Amur honeysuckle, lilac, eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive.	Red pine, jack pine, Austrian pine.	Eastern white pine	---
StC----- Spinks	---	Washington hawthorn, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, eastern redcedar, northern whitecedar, Osage-orange.	Eastern white pine, Norway spruce, red pine.	---
SwA: Starks-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Fincastle-----	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
SyF: Strawn.					
Rodman-----	Siberian peashrub	Silky dogwood, gray dogwood, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Black locust, jack pine, Virginia pine.	---	---
TbA----- Tecumseh	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
TcA----- Thackery	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn, Austrian pine.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 10.--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
TfB----- Throckmorton	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Tg----- Tice	---	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
TmA: Toronto-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Millbrook-----	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
TnB2: Toronto-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Octagon-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
TtA----- Troxel	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Ua. Udorthents					
UbB: Urban land.					
Billett-----	---	Amur honeysuckle, Amur privet, American cranberrybush, Washington hawthorn.	Austrian pine, Osage-orange, eastern redcedar, northern whitecedar.	Eastern white pine, red pine, Norway spruce.	---

TABLE 10.--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
UcA: Urban land.					
Carmi-----	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, silky dogwood.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
UmB, UmC: Urban land.					
Miami-----	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
UsA: Urban land.					
Starks-----	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Fincastle-----	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
Wb----- Wallkill	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern whitecedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
We----- Washtenaw	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Northern whitecedar, Norway spruce, Austrian pine, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
WgA, WhA----- Waupacan	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern whitecedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 10.--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
WmA----- Waynetown	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
WtA----- Wea	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern whitecedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
WuA----- Whitaker	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern whitecedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.

TABLE 11.--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
Am----- Allison	Severe: flooding.	Slight-----	Slight-----	Slight-----	Slight.
Ap----- Allison	Severe: flooding.	Moderate: flooding.	Slight-----	Moderate: flooding.	Severe: flooding.
AtB2: Alvin-----	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
Spinks-----	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Ba----- Battleground	Severe: flooding.	Slight-----	Slight-----	Slight-----	Slight.
Bb----- Battleground	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
BgA----- Beecher	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
BkF----- Berks	Severe: slope, small stones.	Severe: small stones, slope.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
BlA----- Billett	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
BlB2----- Billett	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
BmA----- Billett	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.
BnA----- Billett	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
BnB2----- Billett	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
BoA----- Bowes	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
BpA----- Bowes Variant	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight-----	Slight.
CaA----- Camden	Slight-----	Slight-----	Slight-----	Severe: erodes easily.	Slight.
CfB----- Carmi	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
CgA----- Carmi	Slight-----	Slight-----	Slight-----	Slight-----	Slight.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ck----- Ceresco	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Cl----- Ceresco	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Cm----- Chalmers	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Co, Cp----- Cohoctah	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
CrC----- Coloma	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
CtA----- Crosby	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
CwB2: Crosby-----	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Miami-----	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
DmC2----- Desker	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, droughty, slope.
DoC2----- Desker	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope.
DpD2: Desker-----	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rodman-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
Du: Drummer-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Drummer, stratified sandy substratum-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Dy----- Du Page	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
EkA, EmA Elston-----	Slight-----	Slight-----	Slight-----	Slight-----	Slight.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
FcB: Fincastle-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Crosby-----	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Hd----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
HfB2----- High Gap Variant	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, thin layer.	Slight-----	Moderate: thin layer, area reclaim.
HfC2----- High Gap Variant	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer, area reclaim.
HnB----- Hononegah	Slight-----	Slight-----	Moderate: slope, small stones.	Slight-----	Severe: droughty.
HoA----- Hononegah	Slight-----	Slight-----	Moderate: small stones.	Slight-----	Moderate: droughty.
Hv----- Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
KaA, KaB2----- Kalamazoo	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----	Moderate: small stones.
KbB2, KcB2----- Kalamazoo	Slight-----	Slight-----	Moderate: slope.	Severe: erodes easily.	Slight.
KcC2----- Kalamazoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
KoD2----- Kosciusko	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
KpC3----- Kosciusko	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, droughty, slope.
LaA----- Lafayette	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
LeA----- La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Lm----- Lash	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
LnA----- Lauramie	Slight-----	Slight-----	Slight-----	Slight-----	Slight.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
LnB2----- Lauramie	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
LoA----- Linkville	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
LoB----- Linkville	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
LvB2, LwB2----- Longlois	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
Mb, Mc----- Mahalasville	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Md: Mahalasville-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Treaty-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
MmB2----- Marker	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
MoA----- Mellott	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
MsC2----- Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MsD2----- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MtC3----- Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MtD3----- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Mu----- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
MwA----- Mulvey	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Mz----- Muskego	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
OaB2: Oakville-----	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Billett-----	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
OgA----- Ockley	Slight-----	Slight-----	Moderate: small stones.	Slight-----	Slight.
OmB2----- Octagon	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
OmC2, OpC3----- Octagon	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight-----	Moderate: slope.
Ou----- Ouiatenon	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Ox----- Ouiatenon	Severe: flooding.	Slight-----	Moderate: small stones, flooding.	Slight-----	Moderate: droughty, flooding.
Oy----- Ouiatenon	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Pc, Pd----- Palms	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Pg----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Pk----- Peotone	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
PmB----- Pinevillage	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight-----	Moderate: small stones, large stones, droughty.
Pt. Pits					
RaB2----- Rainsville	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
RcA: Raub-----	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Brenton-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
RdA----- Richardville	Slight-----	Slight-----	Slight-----	Severe: erodes easily.	Slight.
RdB2----- Richardville	Slight-----	Slight-----	Moderate: slope.	Severe: erodes easily.	Slight.
RdC2----- Richardville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
RoB----- Rockfield	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
RsF----- Rodman	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.
Rz----- Ross	Severe: flooding.	Slight-----	Slight-----	Slight-----	Slight.
Sd----- Saranac	Severe: flooding, ponding, too clayey.	Severe: ponding, too clayey.	Severe: too clayey, ponding.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
Sf----- Sawabash	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
ShB----- Shadeland	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, thin layer, area reclaim.
SmA----- Sleeth	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Sn----- Sloan	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
So----- Sloan Variant	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
SrB----- Sparta	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
SrC----- Sparta	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty, slope, too sandy.
StC----- Spinks	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
SwA: Starks-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Fincastle-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
SyF: Strawn-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rodman-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: droughty, slope.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
TbA----- Tecumseh	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
TcA----- Thackery	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight-----	Slight.
TfB----- Throckmorton	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
Tg----- Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
TmA: Toronto-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Millbrook-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
TnB2: Toronto-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Octagon-----	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
TtA----- Troxel	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Ua. Udorthents					
UbB: Urban land.					
Billett-----	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
UcA: Urban land.					
Carmi-----	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
UmB: Urban land.					
Miami-----	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight-----	Slight.
UmC: Urban land.					
Miami-----	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
UsA: Urban land.					

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
UsA: Starks-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Fincastle-----	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Wb----- Wallkill	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
We----- Washtenaw	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
WgA, WhA----- Waupecan	Slight-----	Slight-----	Slight-----	Slight-----	Slight.
WmA----- Waynetown	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
WtA----- Wea	Severe: flooding.	Slight-----	Moderate: flooding.	Slight-----	Moderate: flooding.
WuA----- Whitaker	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.

TABLE 12.--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 herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Am, Ap----- Allison	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
AtB2: Alvin-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Spinks-----	Fair	Fair	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Ba, Bb----- Battleground	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BgA----- Beecher	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
BkF----- Berks	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
B1A, B1B2----- Billett	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BmA----- Billett	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
BnA, BnB2----- Billett	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
BoA----- Bowes	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BpA----- Bowes Variant	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
CaA----- Camden	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
CfB, CgA----- Carmi	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ck, Cl----- Ceresco	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cm----- Chalmers	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Co, Cp----- Cohoctah	Good	Good	Good	Good	Good	Good	Good	Fair	Good	Good.
CrC----- Coloma	Poor	Fair	Fair	Fair	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
CtA----- Crosby	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
CwB2: Crosby-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Miami-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
DmC2, DoC2----- Desker	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
DpD2: Desker-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rodman-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Du: Drummer-----	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
Drummer, stratified sandy substratum-----	Fair	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
Dy----- Du Page	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
EkA, EmA----- Elston	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
FcB: Fincastle-----	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Crosby-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Hd----- Harpster	Fair	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Fair.
HfB2----- High Gap Variant	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HfC2----- High Gap Variant	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
HnB, HoA----- Hononegah	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Hv----- Houghton	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
KaA, KaB2, Kbb2, KcB2----- Kalamazoo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
KcC2----- Kalamazoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
KoD2----- Kosciusko	Poor	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
KpC3----- Kosciusko	Fair	Good	Good	Fair	Fair	Very poor.	Very poor.	Good	Fair	Very poor.
LaA----- Lafayette	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
LeA----- La Hogue	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Lm----- Lash	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
LnA, LnB2----- Lauramie	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoA, LoB----- Linkville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LvB2, LwB2----- Longlois	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Mb----- Mahalasville	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Poor.
Mc----- Mahalasville	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Md: Mahalasville----- Treaty-----	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MmB2----- Marker	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MoA----- Mellott	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MsC2----- Miami	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MsD2----- Miami	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MtC3----- Miami	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MtD3----- Miami	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Mu----- Milford	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MwA----- Mulvey	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Mz----- Muskego	Good	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
OaB2: Oakville-----	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Billett-----	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
OgA----- Ockley	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OmB2----- Octagon	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
OmC2, OpC3----- Octagon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ou, Ox, Oy----- Quiatenon	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Pc----- Palms	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Pd----- Palms	Poor	Fair	Poor	Fair	Fair	Good	Good	Fair	Fair	Good.
Pg----- Pella	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
Pk----- Peotone	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
PmB----- Pinevillage	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
Pt. Pits										
RaB2----- Rainsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RcA: Raub-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Brenton-----	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
RdA, RdB2----- Richardville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
RdC2----- Richardville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
RoB----- Rockfield	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
RsF----- Rodman	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Rz----- Ross	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Sd----- Saranac	Very poor.	Poor	Fair	Fair	Fair	Good	Good	Poor	Fair	Good.
Sf----- Sawabash	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Fair	Poor	Fair.
ShB----- Shadeland	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
SmA----- Sleeth	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Sn----- Sloan	Fair	Fair	Fair	Poor	Poor	Good	Good	Fair	Poor	Good.
So----- Sloan Variant	Very poor.	Poor	Poor	Poor	Poor	Good	Fair	Fair	Poor	Fair.
SrB----- Sparta	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
SrC----- Sparta	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
StC----- Spinks	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SwA: Starks-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Fincastle-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
SyF: Strawn-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rodman-----	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
TbA----- Tecumseh	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TcA----- Thackery	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
TfB----- Throckmorton	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Tg----- Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
TmA: Toronto-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Millbrook-----	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
TnB2: Toronto-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 12.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Conif- erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
TnB2: Octagon-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TtA----- Troxel	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ua. Udorthents										
Ubb: Urban land.										
Billett-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UcA: Urban land.										
Carmi-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UmB: Urban land.										
Miami-----	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
UmC: Urban land.										
Miami-----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
UsA: Urban land.										
Starks-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Fincastle-----	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Wb----- Wallkill	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
We----- Washtenaw	Fair	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
WgA, WhA----- Waupecan	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WmA----- Waynetown	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
WtA----- Wea	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WuA----- Whitaker	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 13.--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 but 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
Am----- Allison	Slight-----	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.	Slight.
Ap----- Allison	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
AtB2: Alvin-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
Spinks-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Severe: droughty.
Ba----- Battleground	Slight-----	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, frost action.	Slight.
Bb----- Battleground	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
BgA----- Beecher	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
BkF----- Berks	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
BlA----- Billett	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
BlB2----- Billett	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Slight.
BmA----- Billett	Severe: cutbanks cave.	Slight-----	Moderate: wetness.	Slight-----	Moderate: frost action.	Moderate: droughty.
BnA----- Billett	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
BnB2----- Billett	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Slight.
BoA----- Bowes	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
BpA----- Bowes Variant	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.

TABLE 13.--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
CaA----- Camden	Slight-----	Moderate: shrink-swell.	Slight-----	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
CfB----- Carmi	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Slight.
CgA----- Carmi	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
Ck----- Ceresco	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action.	Moderate: wetness.
Cl----- Ceresco	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
Cm----- Chalmers	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Co----- Cohoctah	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, frost action.	Severe: ponding.
Cp----- Cohoctah	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, frost action.	Severe: ponding.
CrC----- Coloma	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
CtA----- Crosby	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
CwB2: Crosby-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Miami-----	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
DmC2----- Desker	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
DoC2----- Desker	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: droughty, slope.
DpD2: Desker-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 13.--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
DpD2: Rodman-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Du: Drummer-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Drummer, stratified sandy substratum-----	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Dy----- Du Page	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
EkA, EmA----- Elston	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
FcB: Fincastle-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Crosby-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Hd----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
HfB2----- High Gap Variant	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: thin layer, area reclaim.
HfC2----- High Gap Variant	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope, thin layer, area reclaim.
HnB----- Hononegah	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Severe: droughty.
HoA----- Hononegah	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.
Hv----- Houghton	Severe: excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
KaA----- Kalamazoo	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: small stones.

TABLE 13.--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
KaB2----- Kalamazoo	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: small stones.
KbB2, KcB2----- Kalamazoo	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
KcC2----- Kalamazoo	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
KoD2----- Kosciusko	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
KpC3----- Kosciusko	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
LaA----- Lafayette	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
LeA----- La Hogue	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.
Lm----- Lash	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
LnA----- Lauramie	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
LnB2----- Lauramie	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
LoA----- Linkville	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.
LoB----- Linkville	Slight-----	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Slight.
LvB2, LwB2----- Longlois	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Mb, Mc----- Mahalasville	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Md: Mahalasville-----	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Treaty-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 13.--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
MmB2----- Marker	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
MoA----- Mellott	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
MsC2----- Miami	Moderate: slope, dense layer.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MsD2----- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
MtC3----- Miami	Moderate: slope, dense layer.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
MtD3----- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
Mu----- Milford	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
MwA----- Mulvey	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Mz----- Muskego	Severe: excess humus, ponding.	Severe: ponding, subsides.	Severe: ponding, subsides.	Severe: ponding, subsides.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
OaB2: Oakville-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
Billett-----	Severe: cutbanks cave.	Slight-----	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
OgA----- Ockley	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
OmB2----- Octagon	Moderate: dense layer.	Slight-----	Slight-----	Moderate: slope.	Severe: low strength.	Slight.
OmC2, OpC3----- Octagon	Moderate: dense layer, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
Ou----- Ouiatenon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ox----- Ouiatenon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.

TABLE 13.--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
Oy----- Ouiatenon	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Pc----- Palms	Severe: excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Pd----- Palms	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: ponding, excess humus.
Pg----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Pk----- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
PmB----- Pinevillage	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action, large stones.	Moderate: small stones, large stones, droughty.
Pt. Pits						
RaB2----- Rainsville	Moderate: dense layer, wetness.	Slight-----	Moderate: wetness.	Moderate: slope.	Severe: low strength.	Slight.
RcA: Raub-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Brenton-----	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
RdA----- Richardville	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.
RdB2----- Richardville	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, frost action.	Slight.
RdC2----- Richardville	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, slope, frost action.	Moderate: slope.
RoB----- Rockfield	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.



TABLE 13.--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
SyF: Rodman-----	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
TbA----- Tecumseh	Slight-----	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
TcA----- Thackery	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Slight.
TfB----- Throckmorton	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
Tg----- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
TmA: Toronto-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Millbrook-----	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
TnB2: Toronto-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Octagon-----	Moderate: dense layer.	Slight-----	Slight-----	Moderate: slope.	Severe: low strength.	Slight.
TtA----- Troxel	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Ua. Udorthents						
Ubb: Urban land.						
Billett-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Moderate: frost action.	Slight.
UcA: Urban land.						
Carmi-----	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Moderate: frost action.	Slight.

TABLE 13.--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
UmB: Urban land.						
Miami-----	Moderate: dense layer.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: low strength.	Slight.
UmC: Urban land.						
Miami-----	Moderate: slope, dense layer.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
UsA: Urban land.						
Starks-----	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Fincastle-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
Wb----- Walkill	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding.
We----- Washtenaw	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
WgA----- Waupecan	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
WhA----- Waupecan	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
WmA----- Waynetown	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
WtA----- Wea	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
WuA----- Whitaker	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: wetness.

TABLE 14.--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 but 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
Am----- Allison	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Poor: thin layer.
Ap----- Allison	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Poor: thin layer.
AtB2: Alvin-----	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage.
Spinks-----	Slight-----	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Ba----- Battleground	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
Bb----- Battleground	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
BgA----- Beecher	Severe: wetness, percs slowly.	Slight-----	Severe: wetness.	Severe: wetness.	Poor: wetness.
BkF----- 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.
B1A, B1B2----- Billett	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
BmA----- Billett	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
BnA, BnB2----- Billett	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
BoA----- Bowes	Slight-----	Severe: seepage.	Severe: seepage.	Slight-----	Fair: too clayey, thin layer.
BpA----- Bowes Variant	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too clayey, small stones, wetness.
CaA----- Camden	Slight-----	Moderate: seepage.	Severe: seepage.	Slight-----	Fair: too clayey.

TABLE 14.--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
CfB, CgA----- Carmi	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Ck----- Ceresco	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness, thin layer.
Cl----- Ceresco	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, thin layer.
Cm----- Chalmers	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Co----- Cohoctah	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
Cp----- Cohoctah	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, thin layer.
CrC----- Coloma	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
CtA----- Crosby	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
CwB2: Crosby-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Miami-----	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----	Slight-----	Good.
DmC2, DoC2----- Desker	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
DpD2: Desker-----	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Rodman-----	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Du: Drummer-----	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

TABLE 14.--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
Du: Drummer, stratified sandy substratum--	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
Dy----- Du Page	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
EkA, EmA----- Elston	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
FcB: Fincastle-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Crosby-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Hd----- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
HfB2----- High Gap Variant	Severe: thin layer, seepage, wetness.	Severe: seepage, wetness.	Severe: seepage.	Moderate: seepage, wetness.	Poor: area reclaim, thin layer.
HfC2----- High Gap Variant	Severe: thin layer, seepage, wetness.	Severe: seepage, slope, wetness.	Severe: seepage.	Moderate: seepage, wetness, slope.	Poor: area reclaim, thin layer.
HnB, HoA----- Hononegah	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Hv----- Houghton	Severe: subsides, ponding.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
KaA, KaB2, KbB2, KcB2----- Kalamazoo	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
KcC2----- Kalamazoo	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
KoD2----- Kosciusko	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
KpC3----- Kosciusko	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

TABLE 14.--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
LaA----- Lafayette	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
LeA----- La Hogue	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Lm----- Lash	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
LnA----- Lauramie	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
LnB2----- Lauramie	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
LoA----- Linkville	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
LoB----- Linkville	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey.
LvB2, LwB2----- Longlois	Slight-----	Moderate: seepage, slope.	Severe: seepage.	Slight-----	Fair: too clayey.
Mb----- Mahalasville	Severe: ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
Mc----- Mahalasville	Severe: ponding.	Severe: seepage, ponding.	Severe: depth to rock, seepage, ponding.	Severe: ponding.	Poor: ponding, thin layer.
Md: Mahalasville-----	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: hard to pack, ponding.
Treaty-----	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
MmB2----- Marker	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Severe: wetness.	Fair: wetness.
MoA----- Mellott	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
MsC2----- Miami	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
MsD2----- Miami	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 14.--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
MtC3----- Miami	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
MtD3----- Miami	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Mu----- Milford	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
MwA----- Mulvey	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
Mz----- Muskego	Severe: ponding, subsides.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus.	Severe: seepage, ponding.	Poor: hard to pack, ponding.
OaB2: Oakville-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Billett-----	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
OgA----- Ockley	Slight-----	Severe: seepage.	Severe: seepage.	Slight-----	Poor: small stones.
OmB2----- Octagon	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----	Slight-----	Good.
OmC2, OpC3----- Octagon	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Ou, Ox, Oy----- Ouiatenon	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.
Pc----- Palms	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
Pd----- Palms	Severe: subsides, ponding.	Severe: seepage, excess humus.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, excess humus.
Pg----- Pella	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Pk----- Peotone	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.

TABLE 14.--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
PmB----- Pinevillage	Moderate: flooding, large stones.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
Pt. Pits					
RaB2----- Rainsville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
RcA: Raub-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
Brenton-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RdA----- Richardville	Moderate: percs slowly.	Moderate: seepage.	Slight-----	Slight-----	Good.
RdB2----- Richardville	Moderate: percs slowly.	Moderate: seepage, slope.	Slight-----	Slight-----	Good.
RdC2----- Richardville	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
RoB----- Rockfield	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
RsF----- Rodman	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Rz----- Ross	Moderate: flooding, wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Good.
Sd----- Saranac	Severe: flooding, ponding, percs slowly.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: too clayey, ponding.
Sf----- Sawabash	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
ShB----- Shadeland	Severe: thin layer, seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: area reclaim, wetness, thin layer.
SmA----- Sleeth	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.

TABLE 14.--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
Sn----- Sloan	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
So----- Sloan Variant	Severe: flooding, thin layer, seepage.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, ponding.	Poor: area reclaim, ponding, thin layer.
SrB----- Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
SrC----- Sparta	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
StC----- Spinks	Moderate: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
SwA: Starks-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Fincastle-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
SyF: Strawn-----	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Rodman-----	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
TbA----- Tecumseh	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey.
TcA----- Thackery	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, small stones, wetness.
TfB----- Throckmorton	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Tg----- Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Good.
TmA: Toronto-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Millbrook-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 14.--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
TnB2: Toronto-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Octagon-----	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----	Slight-----	Good.
TtA----- Troxel	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Ua. Udorthents					
Ubb: Urban land.					
Billett-----	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage.
UcA: Urban land.					
Carmi-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
UmB: Urban land.					
Miami-----	Severe: percs slowly.	Moderate: seepage, slope.	Slight-----	Slight-----	Good.
UmC: Urban land.					
Miami-----	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
UsA: Urban land.					
Starks-----	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Fincastle-----	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Wb----- Walkill	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
We----- Washtenaw	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

TABLE 14.--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
WgA----- Waupecan	Slight-----	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey, thin layer.
WhA----- Waupecan	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: too clayey, wetness, thin layer.
WmA----- Waynetown	Severe: wetness.	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
WtA----- Wea	Severe: flooding.	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding.	Fair: too clayey.
WuA----- Whitaker	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

TABLE 15.--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 but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Am, Ap----- Allison	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
AtB2: Alvin-----  Spinks-----	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
Ba, Bb----- Battleground	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
BgA----- Beecher	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
BkF----- Berks	Poor: slope, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
B1A, B1B2----- Billett	Good-----	Probable-----	Probable-----	Fair: too clayey, small stones, area reclaim.
BmA----- Billett	Good-----	Probable-----	Improbable: too sandy.	Fair: small stones, area reclaim, thin layer.
BnA, BnB2----- Billett	Good-----	Probable-----	Probable-----	Fair: too clayey, small stones, area reclaim.
BoA----- Bowes	Good-----	Probable-----	Probable-----	Poor: area reclaim.
BpA----- Bowes Variant	Fair: wetness.	Probable-----	Probable-----	Fair: small stones, area reclaim.
CaA----- Camden	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CfB, CgA----- Carmi	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
Ck, Cl----- Ceresco	Fair: wetness.	Probable-----	Probable-----	Poor: area reclaim.
Cm----- Chalmers	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Co, Cp----- Cohoctah	Poor: wetness.	Probable-----	Probable-----	Poor: area reclaim, wetness.
CrC----- Coloma	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy, small stones.
CtA----- Crosby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
CwB2: Crosby-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Miami-----	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
DmC2, DoC2----- Desker	Good-----	Probable-----	Probable-----	Poor: small stones.
DpD2: Desker-----	Fair: slope.	Probable-----	Probable-----	Poor: small stones, slope.
Rodman-----	Fair: slope.	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
Du: Drummer-----	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Drummer, stratified sandy substratum----	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Dy----- Du Page	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
EkA, EmA----- Elston	Good-----	Probable-----	Probable-----	Fair: small stones, area reclaim.
FcB: Fincastle-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Crosby-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Hd----- Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HfB2, HfC2----- High Gap Variant	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, thin layer.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HnB, HoA----- Hononegah	Good-----	Probable-----	Probable-----	Poor: area reclaim, small stones.
Hv----- Houghton	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
KaA, KaB2, Kbb2, KcB2, KcC2----- Kalamazoo	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
KoD2----- Kosciusko	Fair: slope.	Probable-----	Probable-----	Poor: small stones, area reclaim, slope.
KpC3----- Kosciusko	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
LaA----- Lafayette	Fair: wetness.	Probable-----	Probable-----	Fair: too clayey, area reclaim.
LeA----- La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Lm----- Lash	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
LnA, LnB2----- Lauramie	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
LoA, LoB----- Linkville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
LvB2, LwB2----- Longlois	Good-----	Probable-----	Probable-----	Fair: small stones.
Mb----- Mahalasville	Poor: wetness.	Probable-----	Probable-----	Poor: wetness.
Mc----- Mahalasville	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Md: Mahalasville-----	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Treaty-----	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MmB2----- Marker	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MoA----- Mellott	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
MsC2----- Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
MsD2----- Miami	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MtC3----- Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
MtD3----- Miami	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Mu----- Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
MwA----- Mulvey	Fair: wetness.	Probable-----	Probable-----	Fair: area reclaim.
Mz----- Muskego	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
OaB2: Oakville-----	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
Billett-----	Good-----	Probable-----	Improbable: too sandy.	Fair: small stones, area reclaim, thin layer.
OgA----- Ockley	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
OmB2----- Octagon	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
OmC2, OpC3----- Octagon	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, slope.
Ou, Ox----- Ouiatenon	Good-----	Probable-----	Probable-----	Poor: too sandy, area reclaim.
Oy----- Ouiatenon	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Pc----- Palms	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
Pd----- Palms	Poor: wetness.	Probable-----	Probable-----	Poor: excess humus, wetness.
Pg----- Pella	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Pk----- Peotone	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
PmB----- Pinevillage	Fair: large stones.	Probable-----	Probable-----	Poor: small stones, area reclaim.
Pt. Pits				
RaB2----- Rainsville	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
RcA: Raub-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Brenton-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
RdA, RdB2----- Richardville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
RdC2----- Richardville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
RoB----- Rockfield	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
RsF----- Rodman	Poor: slope.	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
Rz----- Ross	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Sd----- Saranac	Poor: wetness.	Probable-----	Probable-----	Poor: too clayey, wetness.
Sf----- Sawabash	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ShB----- Shadeland	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey, thin layer.
SmA----- Sleeth	Fair: wetness.	Probable-----	Probable-----	Poor: area reclaim.
Sn----- Sloan	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
So----- Sloan Variant	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones.
SrB, SrC----- Sparta	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
StC----- Spinks	Good-----	Probable-----	Improbable: too sandy.	Poor: too sandy.
SwA: Starks-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Fincastle-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
SyF: Strawn-----	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rodman-----	Poor: slope.	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
TbA----- Tecumseh	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
TcA----- Thackery	Fair: wetness.	Probable-----	Probable-----	Poor: area reclaim.
TfB----- Throckmorton	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Tg----- Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TmA: Toronto-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Millbrook-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
TnB2: Toronto-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Octagon-----	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
TtA----- Troxel	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Ua. Udorthents				
UbB: Urban land.				
Billett-----	Good-----	Probable-----	Probable-----	Fair: too clayey, small stones, area reclaim.
UcA: Urban land.				
Carmi-----	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
UmB: Urban land.				
Miami-----	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too clayey.
UmC: Urban land.				
Miami-----	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
UsA: Urban land.				
Starks-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Fincastle-----	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Wb----- Wallkill	Poor: thin layer, wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
We----- Washtenaw	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
WgA, WhA----- Waupecan	Good-----	Probable-----	Probable-----	Poor: area reclaim.
WmA----- Waynetown	Fair: wetness.	Probable-----	Probable-----	Fair: small stones, area reclaim.
WtA----- Wea	Good-----	Probable-----	Probable-----	Fair: too clayey, area reclaim.
WuA----- Whitaker	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 16.--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 but 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
Am, Ap----- Allison	Moderate: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Favorable-----	Favorable.
AtB2: Alvin-----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Soil blowing---	Droughty, rooting depth.
Spinks-----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty, erodes easily.
Ba, Bb----- Battleground	Moderate: seepage.	Moderate: low strength.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
BgA----- Beecher	Slight-----	Moderate: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, rooting depth.
BkF----- Berks	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Depth to rock, slope, large stones.	Droughty, depth to rock, slope.
B1A, B1B2----- Billett	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Favorable.
BmA----- Billett	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy, soil blowing.	Droughty.
BnA, BnB2----- Billett	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy-----	Favorable.
BoA----- Bowes	Moderate: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
BpA----- Bowes Variant	Severe: seepage.	Moderate: thin layer, piping, wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Erodes easily.
CaA----- Camden	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
CfB----- Carmi	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Favorable.
CgA----- Carmi	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy-----	Favorable.
Ck----- Ceresco	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, droughty.

TABLE 16.--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
Cl----- Ceresco	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness-----	Wetness.
Cm----- Chalmers	Moderate: seepage.	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Ponding-----	Wetness.
Co----- Cohoctah	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, frost action.	Ponding, soil blowing.	Wetness.
Cp----- Cohoctah	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, frost action.	Ponding-----	Wetness.
CrC----- Coloma	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
CtA----- Crosby	Slight-----	Moderate: piping.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
CwB2: Crosby-----	Moderate: slope.	Moderate: piping.	Severe: no water.	Percs slowly, frost action, slope.	Erodes easily, wetness.	Wetness, erodes easily.
Miami-----	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
DmC2----- Desker	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty, rooting depth.
DoC2----- Desker	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
DpD2: Desker-----	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
Rodman-----	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
Du: Drummer-----	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding-----	Wetness.
Drummer, stratified sandy substratum-----	Severe: seepage.	Severe: ponding.	Severe: cutbanks cave.	Ponding, frost action.	Ponding-----	Wetness.
Dy----- Du Page	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.

TABLE 16.--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
EkA----- Elston	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Favorable.
EmA----- Elston	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy-----	Favorable.
FcB: Fincastle-----	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
Crosby-----	Slight-----	Moderate: piping.	Severe: no water.	Percs slowly, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
Hd----- Harpster	Moderate: seepage.	Severe: ponding, piping.	Moderate: slow refill.	Ponding, frost action.	Ponding-----	Wetness.
HfB2----- High Gap Variant	Moderate: seepage, slope.	Severe: thin layer.	Severe: no water.	Percs slowly, thin layer, slope.	Area reclaim, erodes easily.	Erodes easily, area reclaim.
HfC2----- High Gap Variant	Severe: slope.	Severe: thin layer.	Severe: no water.	Percs slowly, thin layer, slope.	Slope, area reclaim, erodes easily.	Slope, erodes easily, area reclaim.
HnB, HoA----- Hononegah	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty, rooting depth.
Hv----- Houghton	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness.
KaA, KaB2----- Kalamazoo	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Favorable-----	Favorable.
KbB2, KcB2----- Kalamazoo	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
KcC2----- Kalamazoo	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope-----	Slope.
KoD2, KpC3----- Kosciusko	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
LaA----- Lafayette	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
LeA----- La Hogue	Moderate: seepage.	Severe: wetness.	Severe: slow refill, cutbanks cave.	Frost action---	Wetness-----	Wetness.
Lm----- Lash	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.
LnA----- Lauramie	Moderate: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.

TABLE 16.--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
LnB2----- Lauramie	Moderate: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
LoA----- Linkville	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.
LoB----- Linkville	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.
LvB2, LwB2----- Longlois	Moderate: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Favorable-----	Favorable.
Mb----- Mahalasville	Severe: seepage.	Severe: ponding.	Severe: cutbanks cave.	Ponding, frost action.	Ponding-----	Wetness.
Mc----- Mahalasville	Severe: seepage.	Severe: ponding.	Severe: no water.	Ponding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
Md: Mahalasville-----	Severe: seepage.	Severe: thin layer, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Wetness, percs slowly.
Treaty-----	Moderate: seepage.	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Ponding, erodes easily.	Wetness, erodes easily.
MmB2----- Marker	Moderate: seepage, slope.	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.
MoA----- Mellott	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
MsC2, MsD2, MtC3, MtD3----- Miami	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Mu----- Milford	Slight-----	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
MwA----- Mulvey	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
Mz----- Muskego	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, percs slowly.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
OaB2: Oakville-----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
Billett-----	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Too sandy, soil blowing.	Droughty.

TABLE 16.--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
OgA----- Ockley	Severe: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
OmB2----- Octagon	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, percs slowly.	Erodes easily, rooting depth.
OmC2, OpC3----- Octagon	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily, percs slowly.	Slope, erodes easily, rooting depth.
Ou, Ox, Oy----- Ouiatenon	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
Pc----- Palms	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Wetness, rooting depth.
Pd----- Palms	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill, cutbanks cave.	Ponding, subsides.	Ponding, soil blowing.	Wetness.
Pg----- Pella	Moderate: seepage.	Severe: piping, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding-----	Wetness.
Pk----- Peotone	Slight-----	Severe: ponding.	Severe: slow refill.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Wetness, percs slowly.
PmB----- Pinevillage	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Large stones, soil blowing.	Large stones, droughty.
Pt. Pits						
RaB2----- Rainsville	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Severe: slow refill.	Slope-----	Erodes easily, wetness.	Erodes easily.
RcA: Raub-----	Slight-----	Severe: wetness.	Severe: slow refill.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
Brenton-----	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Wetness-----	Wetness.
RdA----- Richardville	Moderate: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
RdB2----- Richardville	Moderate: seepage, slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
RdC2----- Richardville	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.

TABLE 16.--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
RoB----- Rockfield	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Severe: slow refill.	Frost action, slope.	Erodes easily, wetness.	Erodes easily.
RsF----- Rodman	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
Rz----- Ross	Severe: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Favorable-----	Favorable.
Sd----- Saranac	Severe: seepage.	Severe: ponding.	Severe: slow refill, cutbanks cave.	Ponding, flooding, frost action.	Erodes easily, ponding.	Wetness, erodes easily.
Sf----- Sawabash	Moderate: seepage.	Severe: ponding.	Moderate: slow refill.	Ponding, flooding, frost action.	Ponding-----	Wetness.
ShB----- Shadeland	Moderate: seepage.	Severe: thin layer.	Severe: no water.	Thin layer, frost action.	Area reclaim, erodes easily, wetness.	Wetness, erodes easily, area reclaim.
SmA----- Sleeth	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Wetness-----	Wetness.
Sn----- Sloan	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding, frost action.	Erodes easily, wetness.	Wetness, erodes easily.
So----- Sloan Variant	Moderate: seepage.	Severe: ponding.	Severe: no water.	Ponding, thin layer, flooding.	Area reclaim, ponding.	Wetness, area reclaim.
SrB----- Sparta	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy, soil blowing.	Droughty.
SrC----- Sparta	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
StC----- Spinks	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, too sandy, soil blowing.	Slope, droughty.
SwA: Starks-----	Moderate: seepage.	Severe: thin layer, wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
Fincastle-----	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
SyF: Strawn-----	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.

TABLE 16.--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
SyF: Rodman-----	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, too sandy.	Slope, droughty.
TbA----- Tecumseh	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
TcA----- Thackery	Severe: seepage.	Moderate: thin layer, piping, wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Erodes easily.
TfB----- Throckmorton	Moderate: seepage.	Severe: thin layer.	Severe: slow refill.	Frost action---	Erodes easily, wetness.	Erodes easily.
Tg----- Tice	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding, frost action.	Wetness-----	Favorable.
TmA: Toronto-----	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Frost action---	Wetness-----	Wetness.
Millbrook-----	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
TnB2: Toronto-----	Moderate: seepage, slope.	Severe: wetness.	Severe: slow refill.	Frost action, slope.	Wetness-----	Wetness.
Octagon-----	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily, percs slowly.	Erodes easily, rooting depth.
TtA----- Troxel	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.
Ua. Udorthents						
UbB: Urban land.						
Billett-----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy-----	Favorable.
UcA: Urban land.						
Carmi-----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Too sandy-----	Favorable.
UmB: Urban land.						
Miami-----	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.

TABLE 16.--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
UmC: Urban land.						
Miami-----	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
UsA: Urban land.						
Starks-----	Moderate: seepage.	Severe: thin layer, wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
Fincastle-----	Moderate: seepage.	Severe: wetness.	Severe: slow refill.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
Wb----- Walkill	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, percs slowly, subsides.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
We----- Washtenaw	Moderate: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, percs slowly, frost action.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
WgA----- Waupecan	Severe: seepage.	Moderate: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
WhA----- Waupecan	Severe: seepage.	Moderate: thin layer, wetness.	Severe: cutbanks cave.	Deep to water	Erodes easily	Erodes easily, rooting depth.
WmA----- Waynetown	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.
WtA----- Wea	Moderate: seepage.	Moderate: thin layer, piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.
WuA----- Whitaker	Moderate: seepage.	Severe: wetness.	Severe: cutbanks cave, slow refill.	Frost action---	Erodes easily, wetness.	Wetness, erodes easily.

TABLE 17.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Am, Ap----- Allison	0-18	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	100	95-100	75-100	25-40	5-15
	18-51	Silty clay loam, silt loam.	CL, ML, CL-ML	A-6, A-7, A-4	0	100	100	95-100	75-100	25-50	5-25
	51-80	Silty clay loam, silt loam.	ML, CL, CH, MH	A-6, A-7, A-4	0	100	100	95-100	75-100	25-50	5-25
AtB2: Alvin-----	0-10	Fine sandy loam	SM, ML	A-4, A-2-4	0	100	100	80-100	25-50	<25	NP-10
	10-27	Fine sandy loam, sandy loam.	SM, ML	A-2-4, A-4	0	100	100	70-100	15-50	<25	NP-10
	27-38	Fine sandy loam, sandy loam.	SM, SC, CL, ML	A-2-4, A-4, A-6	0	100	100	70-100	15-50	<25	NP-10
	38-60	Sandy loam, loamy sand.	SP, SP-SM, SM	A-2-4	0	100	100	70-90	15-35	<20	NP-10
Spinks-----	0-8	Fine sand-----	SP-SM, SM	A-2-4, A-3, A-1-b	0	100	100	70-95	0-30	<20	NP-4
	8-28	Loamy sand, sand, loamy fine sand.	SM, SP-SM, SC-SM	A-2-4, A-3, A-1-b	0	100	100	70-95	0-30	<25	NP-7
	28-61	Fine sand, loamy fine sand, sand.	SM, SP-SM, SC-SM	A-2-4, A-3	0	100	100	70-95	0-30	<25	NP-7
	61-70	Fine sand, sand	SP-SM, SM	A-2-4, A-3, A-1-b	0	100	100	70-90	0-15	<20	NP-4
Ba, Bb----- Battleground	0-10	Silt loam-----	CL	A-6, A-4	0	100	100	95-100	75-100	25-40	5-15
	10-19	Silt loam, silty clay loam.	CL	A-6, A-7, A-4	0	100	100	95-100	75-100	25-50	5-25
	19-60	Silty clay loam, silt loam.	CL	A-6, A-7, A-4	0	100	100	95-100	75-100	25-50	5-25
BgA----- Beecher	0-9	Silt loam-----	ML	A-6, A-4	0	100	100	95-100	85-100	25-40	4-15
	9-41	Silty clay loam	CL, CH	A-6, A-7-6	0	100	100	95-100	95-100	35-55	15-35
	41-60	Silty clay loam	CL	A-6, A-7-6	0-5	98-100	95-100	85-95	70-85	25-45	10-25
BkF----- Berks	0-8	Channery silt loam.	ML, SM-SC, SC	A-6, A-4, A-7	0-30	55-80	50-75	45-70	40-65	25-40	5-15
	8-17	Very channery silt loam.	GM, SM, GC, SC	A-1, A-2, A-4	0-30	40-80	35-70	25-60	20-45	25-40	5-15
	17-29	Channery silt loam.	SC, SM-SC, ML	A-6, A-4, A-7	0-30	55-80	50-75	45-70	40-65	25-40	5-15
	29	Weathered bedrock	---	---	---	---	---	---	---	---	---
BlA, BlB2----- Billett	0-9	Fine sandy loam	SM, SC-SM, SC	A-4	0	95-100	90-100	80-90	20-45	<25	NP-10
	9-30	Fine sandy loam	SC, SC-SM, SM	A-2-4, A-4	0	85-100	75-100	60-90	25-50	10-30	NP-10
	30-39	Sandy loam, fine sandy loam.	SC, SC-SM, SM	A-2-4, A-4	0	85-100	75-100	55-90	25-50	10-30	NP-10
	39-60	Loamy sand-----	SM, SP-SM, SC-SM	A-1, A-2-4	0-5	85-100	75-100	55-85	10-25	---	NP
	60-65	Gravelly coarse sand.	SP, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
BmA----- Billett	0-9	Fine sandy loam	SM, SC, SC-SM	A-4, A-2-4	0	100	100	80-100	25-50	<25	NP-10
	9-22	Fine sandy loam, sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	100	100	70-100	15-50	<25	NP-10
	22-80	Sandy loam, loamy sand.	SM, SC, SP-SM	A-2-4, A-4	0	100	100	70-90	15-35	<25	NP-10
BnA, BnB2----- Billett	0-9	Loam-----	ML, CL-ML	A-4, A-6	0	95-100	90-100	75-85	50-65	20-40	5-20
	9-27	Loam-----	SC, SC-SM, CL, CL-ML	A-4, A-6	0	85-100	75-100	60-90	40-60	20-40	5-20
	27-38	Sandy loam-----	SC, SC-SM, SM	A-2-4, A-4	0	90-100	75-100	55-85	25-40	10-30	NP-10
	38-56	Loamy sand-----	SM, SP-SM, SC-SM	A-1, A-2-4	0-5	85-100	75-100	55-85	10-25	---	NP
	56-60	Gravelly coarse sand.	SP, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
BoA----- Bowes	0-9	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-28	Silty clay loam, silt loam.	CL, ML	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	28-56	Clay loam, gravelly sandy clay loam, fine sand.	CL, SC, SM-SC	A-2, A-4, A-6, A-7	0-5	60-100	50-90	30-85	0-65	0-60	NP-30
	56-60	Gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
BpA----- Bowes Variant	0-9	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-26	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	26-53	Gravelly sandy loam, loam, clay loam.	CL, SC, SP-SM, SW	A-2, A-4, A-6, A-1	0-5	60-100	50-100	35-90	25-60	<60	NP-30
	53-60	Gravelly sand----	SW, SP, SP-SM, SW-SM	A-1-b, A-3	0-10	65-85	50-75	15-40	0-10	---	NP
CaA----- Camden	0-9	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	85-100	25-40	4-15
	9-29	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7-6	0	100	100	95-100	85-100	25-50	5-35
	29-64	Loam, sandy loam, fine sandy loam.	ML, SC, SM, CL	A-2, A-4, A-6	0	85-100	75-100	55-90	25-60	10-40	NP-20
	64-70	Stratified sandy loam to silt loam.	SM, SC, ML, CL	A-2-4, A-4, A-6	0	90-100	75-100	55-100	25-100	25-40	NP-10
CfB----- Carmi	0-13	Sandy loam-----	SC-SM, SC, SM	A-2-4, A-4	0	80-100	75-100	60-80	25-40	<25	NP-10
	13-45	Very gravelly loamy sand, sandy loam, very gravelly sandy loam.	SC-SM, SC, SM, SP-SM	A-2-4, A-4, A-6	0-5	40-100	35-100	20-85	5-40	<30	NP-10
	45-60	Sand, very gravelly coarse sand.	SP-SM, SW-SM, SP, SW	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CgA----- Carmi	0-20	Loam-----	CL-ML, ML	A-4, A-6	0	90-100	90-100	75-85	50-65	20-40	5-20
	20-54	Gravelly sandy loam, loam, gravelly loamy sand.	SC-SM, SM, CL-ML	A-2-4, A-4, A-6	0-5	60-85	50-80	35-70	10-60	10-40	NP-20
	54-60	Sand, very gravelly coarse sand.	SP-SM, SW-SM, SP, SW	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP
Ck----- Ceresco	0-16	Sandy loam-----	SM, SC-SM, SC	A-2-4, A-4	0	100	100	90-100	25-45	<25	NP-10
	16-40	Sandy loam, fine sandy loam, loamy fine sand.	SC-SM, SM, SC	A-2-4, A-4	0	85-100	75-100	60-100	15-45	<30	NP-10
	40-60	Gravelly sand, very gravelly sand.	SP, SP-SM	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP
Cl----- Ceresco	0-13	Loam-----	CL-ML, CL	A-4, A-6	0	100	100	90-100	55-85	20-40	5-25
	13-31	Sandy loam, fine sandy loam, loam.	SC-SM, CL-ML, SC, CL	A-2-4, A-4	0	85-100	75-100	60-100	25-80	10-40	NP-25
	31-60	Gravelly sand, very gravelly sand.	SP, SP-SM, SW, SW-SM	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP
Cm----- Chalmers	0-13	Silty clay loam	CL, ML, CH	A-6, A-7-6	0	100	100	95-100	85-100	35-55	10-30
	13-30	Silty clay loam, silt loam.	CL, ML, CH, CL-ML	A-6, A-4, A-7-6	0	100	100	90-100	80-100	25-65	4-40
	30-45	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7-6	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	45-60	Loam-----	CL-ML, CL, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
Co----- Cohoctah	0-13	Fine sandy loam	SM, SC, SC-SM	A-4, A-2-4	0	100	100	85-100	30-45	<25	NP-10
	13-32	Loam, sandy loam, fine sandy loam.	SM, SM-SC, SC	A-4, A-2-4	0	85-100	75-100	60-100	25-45	10-40	NP-25
	32-60	Sand, gravelly coarse sand, loamy sand.	SP-SM, SM, SW, SW-SM	A-1-b, A-3, A-2-4	0-10	65-100	50-100	65-95	0-30	---	NP
Cp----- Cohoctah	0-20	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	90-100	55-80	20-40	5-25
	20-45	Loam, sandy loam, fine sandy loam.	SM-SC, SC	A-4, A-2-4	0	85-100	75-100	60-100	25-45	10-40	NP-25
	45-60	Sand, gravelly coarse sand, loamy sand.	SP-SM, SP, SW-SM	A-1-b, A-3, A-2-4	0-10	65-100	50-100	65-95	0-30	---	NP
CrC----- Coloma	0-8	Sand-----	SM, SP-SM	A-2-4, A-3	0	100	100	70-90	5-15	---	NP
	8-34	Sand-----	SM, SP-SM	A-2-4, A-3	0	100	100	70-90	5-15	---	NP
	34-60	Stratified sand to sandy loam.	SM, SP-SM	A-2-4, A-3	0-8	100	100	70-90	5-15	---	NP
CtA----- Crosby	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-29	Clay loam, silty clay loam, loam.	CL, ML, CH, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-100	85-100	55-90	20-55	5-35
	29-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
CwB2: Crosby-----	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-31	Clay loam, silty clay loam, loam.	CL, ML, CH, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-100	85-100	55-90	20-55	5-35
	31-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
Miami-----	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-36	Clay loam, sandy clay loam, loam.	CL, CL-ML	A-6, A-4, A-7-6	0-1	90-100	90-100	75-100	45-90	20-50	5-30
	36-60	Loam, fine sandy loam.	CL, CL-ML, SC, SM	A-4, A-6	0-3	90-100	85-98	65-90	40-70	15-35	NP-20
DmC2----- Desker	0-8	Gravelly sandy loam.	SC-SM, SC, SM	A-2-4	0-5	55-80	50-75	35-65	10-30	<25	NP-10
	8-14	Gravelly sandy loam, gravelly coarse sandy loam.	SC-SM, SC, SM	A-2-4	0-5	55-90	50-75	25-55	15-25	10-30	NP-10
	14-27	Gravelly loamy coarse sand.	SW-SM, SM, SP-SM	A-1-b	0-5	65-85	50-75	25-50	0-15	---	NP
	27-60	Gravelly sand, sand, very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	45-85	25-75	10-40	0-10	---	NP
DoC2----- Desker	0-9	Sandy loam-----	SM, SC-SM, SC	A-2-4	0-5	80-100	75-100	60-80	25-40	<25	NP-10
	9-15	Gravelly sandy loam, gravelly coarse sandy loam.	SC-SM, SC, SM	A-2-4	0-5	55-90	50-75	25-55	15-25	10-30	NP-10
	15-34	Gravelly loamy coarse sand.	SW-SM, SM, SP-SM	A-1-b	0-5	65-85	50-75	25-50	0-15	---	NP
	34-60	Gravelly sand, sand, very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	45-85	25-75	10-40	0-10	---	NP
DpD2: Desker-----	0-9	Sandy loam-----	SM, SC-SM, SC	A-2-4	0-5	80-100	75-100	60-80	25-40	<25	NP-10
	9-14	Gravelly sandy loam, gravelly coarse sandy loam.	SC-SM, SC	A-2-4	0-5	55-90	50-75	25-50	15-25	10-30	NP-10
	14-30	Gravelly loamy coarse sand.	SW-SM, SM, SP-SM	A-1-b	0-5	65-85	50-75	25-50	0-15	---	NP
	30-60	Gravelly sand, sand, very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1	0-10	45-85	25-75	10-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
DpD2: Rodman-----	0-8	Gravelly sandy loam.	SC-SM, SM, SC	A-2-4	0-5	55-80	50-75	35-65	10-30	<25	NP-10
	8-12	Gravelly loam, gravelly sandy loam, gravelly loamy coarse sand.	ML, CL, SC, SM	A-4, A-2-4, A-1-b	0-5	65-90	50-75	25-55	0-25	<40	NP-20
	12-60	Stratified sand to extremely gravelly coarse sand.	SP, SW-SM, SW, GW-GM	A-1	1-10	45-65	25-50	10-20	0-10	---	NP
Du: Drummer-----	0-17	Silty clay loam	CL, ML, CH	A-6, A-7-6	0	100	100	95-100	85-100	35-55	10-30
	17-54	Silty clay loam, silt loam.	CL, ML, CH, CL-ML	A-6, A-4, A-7-6	0	100	100	95-100	85-100	25-65	4-40
	54-70	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SM-SC	A-6, A-7, A-4, A-2	0	95-100	90-100	85-95	25-80	10-60	NP-30
	70-80	Stratified sandy loam to silty clay loam.	SC, CL, SM-SC, SM	A-4, A-6, A-7, A-2	0	90-100	75-100	55-100	25-90	10-50	NP-25
Drummer, stratified sandy substratum-----	0-11	Silty clay loam	CL, ML, CH	A-6, A-7-6	0	100	100	95-100	85-100	35-55	10-30
	11-44	Silty clay loam	CL, CH	A-7-6	0	100	100	95-100	85-100	40-65	20-40
	44-58	Loam, silt loam, fine sandy loam.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-2	0	95-100	90-100	85-100	25-90	10-40	NP-20
	58-70	Stratified silt loam to sand.	SP-SM, SM, CL, CL-ML	A-2-4, A-3, A-4, A-6	0	90-100	85-100	55-100	0-75	<40	NP-15
Dy----- Du Page	0-49	Loam-----	CL, CL-ML	A-6, A-4	0	100	100	90-100	55-80	20-40	5-25
	49-60	Sandy loam-----	SC, SC-SM, SM	A-4, A-2-4	0	100	100	90-100	25-45	10-30	NP-10
EkA----- Elston	0-10	Sandy loam-----	SM, SC-SM, SC	A-2-4, A-4	0	100	100	80-90	25-40	<25	NP-10
	10-25	Sandy loam-----	SM, SC-SM, SC	A-2-4, A-4	0	100	100	80-90	25-40	10-30	NP-10
	25-49	Loamy sand, loamy coarse sand, sand.	SP-SM, SM	A-2-4, A-3	0	85-100	75-100	40-85	0-25	---	NP
	49-60	Gravelly sand, gravelly coarse sand, coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EmA----- Elston	0-14	Loam-----	ML, CL-ML	A-4, A-6	0	100	100	85-100	55-70	20-40	5-20
	14-19	Loam-----	CL-ML, CL	A-4, A-6	0	100	100	90-100	50-80	20-40	5-20
	19-38	Sandy loam-----	SM, SC-SM, SC	A-2-4, A-4	0	90-100	75-100	55-85	25-40	10-30	NP-10
	38-58	Loamy sand, loamy coarse sand, sand.	SP-SM, SM	A-2-4, A-3	0	85-100	75-100	40-85	0-25	---	NP
	58-70	Gravelly sand, gravelly coarse sand, coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
FcB: Fincastle-----	0-8	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	8-32	Silty clay loam, silt loam.	CL, ML, CH	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-55	5-35
	32-42	Clay loam, loam	CL, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	42-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	65-90	45-70	15-30	NP-15
Crosby-----	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-38	Clay loam, silty clay loam, loam.	CL, ML, CL-ML, CH	A-6, A-4, A-7-6	0-1	95-100	90-100	85-100	55-90	20-55	5-35
	38-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
Hd----- Harpster	0-11	Silt loam-----	CL, ML	A-6, A-4	0	100	100	95-100	80-95	30-40	5-20
	11-30	Silty clay loam, silt loam.	CL, CH, ML	A-7-6, A-4, A-6	0	100	100	95-100	70-100	25-55	5-35
	30-60	Silty clay loam, silt loam.	CL, CH, ML, CL-ML	A-6, A-4, A-7-6	0	100	100	95-100	70-100	25-50	NP-25
HfB2, HfC2----- High Gap Variant	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-28	Clay loam, silt loam, silty clay loam.	CL, ML, CL-ML	A-7-6, A-6, A-4	0	80-100	75-100	70-100	50-100	20-50	5-35
	28-36	Channery clay loam.	CL, SC, SC-SM, SM	A-7-6, A-4, A-6	0-5	60-85	50-75	45-70	35-55	20-60	5-30
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
HnB----- Hononegah	0-10	Loamy sand-----	SM, SP-SM	A-2-4	0-3	95-100	95-100	60-85	10-25	---	NP
	10-34	Gravelly loamy sand, loamy sand, fine sandy loam.	SM, SP-SM, SC-SM, SC	A-2-4, A-1, A-4	0-15	70-100	55-98	40-90	10-50	<30	NP-10
	34-60	Coarse sand, very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-a, A-1-b	0-15	45-85	25-75	10-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HoA----- Hononegah	0-11	Fine sandy loam	SM, SC-SM, SC	A-2-4, A-4	0-3	95-100	90-100	80-90	20-45	<25	NP-10
	11-45	Gravelly loamy sand, loamy sand, fine sandy loam.	SM, SP-SM, SC-SM, SC	A-2-4, A-1, A-4	0-15	70-100	55-98	40-90	10-50	<30	NP-10
	45-60	Coarse sand, very gravelly coarse sand.	SP, SW, SW-SM, SP-SM	A-1-a, A-1-b	0-15	45-85	25-75	10-40	0-10	---	NP
Hv----- Houghton	0-60	Sapric material	PT	A-8	0	---	---	---	---	---	---
KaA, KaB2----- Kalamazoo	0-11	Loam-----	ML, CL-ML	A-4, A-6	0	100	100	85-100	55-70	20-40	5-20
	11-34	Loam, sandy clay loam, gravelly sandy loam.	SC, CL, CL-ML, SM-SC	A-4, A-6, A-7, A-2-4	0	60-100	50-100	30-100	15-80	10-60	NP-20
	34-61	Loamy coarse sand, loamy sand, gravelly loamy sand.	SM, SP-SM	A-2-4, A-1-b	0-5	70-100	55-98	40-85	5-25	---	NP
	61-65	Sand, gravelly sand, very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP
KbB2, KcB2, KcC2----- Kalamazoo	0-9	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	65-90	25-40	4-15
	9-32	Clay loam, sandy clay loam, silty clay loam.	SC, CL, CH, SM-SC	A-4, A-6, A-7-6, A-2-4	0	95-100	90-100	80-100	40-90	20-60	5-35
	32-46	Loamy coarse sand, loamy sand, gravelly loamy sand.	SM, SP-SM	A-2-4, A-1-b	0-5	70-100	55-98	40-85	5-25	---	NP
	46-60	Sand, gravelly sand, very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP
KoD2----- Kosciusko	0-5	Sandy loam-----	SM, SC-SM, SC	A-2-4	0	80-100	75-98	60-80	25-40	<25	NP-10
	5-20	Gravelly sandy clay loam, gravelly sandy loam.	SC-SM, SC, SM	A-2-4	0-3	60-90	50-75	30-60	15-35	10-60	NP-20
	20-27	Gravelly loamy sand, very gravelly sandy loam, gravelly sandy loam.	SM, SC, SM-SC, SP-SM	A-1, A-2-4	0-5	40-90	40-75	20-55	5-25	<30	NP-10
	27-60	Stratified very gravelly coarse sand to coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
KpC3----- Kosciusko	0-8	Gravelly sandy clay loam.	SC, SC-SM	A-2, A-2-4	0-3	60-90	50-75	30-60	15-35	20-60	5-20
	8-27	Gravelly sandy clay loam, gravelly sandy loam.	SC-SM, SC, SM	A-2	0-5	60-90	50-75	30-60	15-35	10-60	NP-20
	27-60	Stratified very gravelly coarse sand to coarse sand.	SP, SP-SM, GP, SW, SW-SM	A-1-a, A-1-b	0-10	45-85	25-75	10-40	0-10	---	NP
LaA----- Lafayette	0-13	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	13-40	Silt loam, silty clay loam.	CL, ML, CH	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-55	5-35
	40-45	Sandy clay loam, sandy loam.	SC, SM, SM-SC	A-6, A-4, A-2	0	90-100	75-100	45-85	20-50	10-60	NP-20
	45-65	Gravelly loam, gravelly sandy loam, loamy coarse sand.	SC-SM, SC, SM, SP-SM	A-2, A-4, A-6, A-1-b	0-5	60-100	50-98	30-60	5-40	<40	NP-20
	65-70	Gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
LeA----- La Hogue	0-13	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	85-100	55-70	20-40	5-20
	13-42	Clay loam, sandy clay loam.	CL, SC, SM-SC	A-6, A-4, A-2, A-7-6	0	90-100	75-90	45-85	20-65	20-60	5-30
	42-47	Stratified sandy loam to loamy sand.	SC, SC-SM, SM	A-4, A-2-4	0	80-100	75-100	55-85	10-40	<30	NP-15
	47-60	Loam-----	CL, CL-ML, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
Lm----- Lash	0-14	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	65-90	25-40	5-15
	14-52	Fine sandy loam, silt loam, loam.	CL, ML, SM, SC	A-4, A-6, A-2-4	0	100	100	85-100	30-90	10-40	NP-25
	52-60	Loamy sand, sand, loam.	SP-SM, SM, CL, CL-ML	A-4, A-6, A-2-4	0	100	100	65-100	15-80	<40	NP-25
LnA, LnB2----- Lauramie	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-15	Silty clay loam, silt loam.	CL, ML	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	15-44	Clay loam, loam, sandy clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	90-100	90-100	75-100	45-90	20-50	5-30
	44-50	Fine sandy loam	CL-ML, SC, SM	A-4	0-1	90-100	85-95	65-80	40-55	15-25	NP-10
	50-60	Fine sandy loam	CL-ML, SM, SC	A-4	0-3	90-100	85-95	65-80	40-55	15-25	NP-10
LoA, LoB----- Linkville	0-15	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	85-100	55-70	20-40	5-20
	15-38	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7-6	0	95-100	90-100	80-100	50-80	20-50	5-30
	38-70	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7-6	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	70-80	Loam-----	CL, CL-ML, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
LvB2, LwB2----- Longlois	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-90	25-40	4-15
	9-16	Silty clay loam	CL	A-6, A-7-6	0	100	100	90-100	80-90	35-50	15-35
	16-25	Silty clay loam, clay loam, sandy clay loam.	CL, SC, SM-SC	A-6, A-7-6, A-2, A-4	0	90-100	75-90	45-85	20-65	20-60	15-30
	25-54	Gravelly sandy clay loam, very gravelly sandy clay loam.	CL, SC, SM-SC	A-6, A-7-6, A-2, A-4	0-5	45-85	25-75	15-70	10-55	20-60	5-30
	54-60	Stratified sand to gravelly loamy coarse sand.	SP, SW, SP-SM, GP-GM, SW-SM	A-1-b	0-10	65-85	50-75	15-50	0-15	---	NP
Mb----- Mahalasville	0-13	Silty clay loam	CL, ML, CH	A-6, A-7-6	0	100	100	95-100	85-100	35-55	10-30
	13-33	Silty clay loam	CL, CH	A-7-6	0	100	100	95-100	90-100	40-65	20-40
	33-46	Clay loam, sandy clay loam.	CL, SC, SM-SC	A-4, A-6	0-1	90-100	75-90	45-85	20-65	20-60	5-30
	46-60	Gravelly coarse sand, gravelly loamy sand, gravelly sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-5	65-85	50-75	15-70	0-20	---	NP
Mc----- Mahalasville	0-10	Silty clay loam	CL, ML, CH	A-6, A-7	0	100	100	95-100	85-100	35-45	15-25
	10-33	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	90-100	35-45	15-25
	33-54	Clay loam, loam	CL, SC, SM-SC, CL-ML	A-6, A-7, A-4	0-3	85-100	75-98	55-90	40-65	20-60	5-30
	54-59	Loamy coarse sand	SP-SM, SM	A-2-4	0-3	85-100	75-100	40-60	5-15	---	NP
	59	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Md: Mahalasville----	0-12	Silty clay loam	CL, CH, ML	A-6, A-7-6	0	100	100	95-100	85-100	35-55	10-30
	12-38	Silty clay loam	CL, CH	A-7-6	0	100	100	95-100	90-100	40-65	20-40
	38-48	Loam, silt loam	ML, CL-ML, CL	A-6, A-4	0	95-100	95-100	85-100	60-95	20-40	NP-20
	48-60	Stratified silt to sand.	CL, SM, SP-SM, CL-ML	A-4, A-6, A-2-4, A-3	0	90-100	85-100	55-100	0-75	<40	NP-15
Treaty-----	0-10	Silty clay loam	CL, CH, ML	A-6, A-7-6	0	100	100	95-100	85-100	35-55	10-30
	10-37	Silty clay loam, silt loam.	CL, CH, ML, CL-ML	A-6, A-4, A-7-6	0	100	100	95-100	85-100	25-65	4-40
	37-48	Clay loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4, A-7-6	0	95-100	90-100	85-95	55-80	20-50	5-30
	48-60	Loam, silt loam	CL-ML, CL, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
MmB2----- Marker	0-8	Silt loam-----	CL, ML	A-6, A-4	0	100	95-100	85-100	70-100	30-40	4-20
	8-21	Clay loam-----	CL	A-6, A-7-6	0-1	95-100	90-100	85-100	60-85	30-50	10-30
	21-26	Silt loam-----	CL, ML	A-6, A-4	0-1	95-100	90-100	80-95	70-85	30-40	5-15
	26-60	Silt loam-----	CL, ML	A-6, A-4	0-3	95-100	90-100	80-95	70-85	30-35	5-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MoA----- Mellott	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-28	Silty clay loam, silt loam.	CL, ML	A-6, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	28-42	Loam, sandy clay loam.	CL, SC, SM-SC	A-6, A-4, A-2-6, A-2	0	90-100	75-100	45-85	20-65	20-60	NP-25
	42-50	Loam, fine sandy loam.	CL, CL-ML, SC, SM	A-4, A-6	0-1	90-100	85-98	65-90	40-70	20-40	NP-25
	50-60	Loam-----	CL, CL-ML, ML	A-4, A-6	0-3	90-100	85-98	70-90	45-70	15-30	NP-15
MsC2, MsD2----- Miami	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-27	Clay loam, silty clay loam, sandy clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	90-100	90-100	75-100	45-90	20-50	5-30
	27-35	Loam, fine sandy loam.	CL, SM, SC, CL-ML	A-4, A-6	0-1	90-100	85-98	65-90	40-70	20-40	5-25
	35-60	Loam, fine sandy loam.	CL, CL-ML, SC, ML	A-4, A-6	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
MtC3, MtD3----- Miami	0-7	Clay loam-----	CL	A-6, A-7-6	0	95-100	90-100	85-100	60-85	30-50	10-30
	7-23	Clay loam, silty clay loam, sandy clay loam.	CL	A-6, A-7-6	0	90-100	90-100	75-95	45-80	20-50	10-30
	23-29	Loam, fine sandy loam.	CL, SM, SC, CL-ML	A-4, A-6	0-1	90-100	85-98	65-90	40-70	20-40	5-25
	29-60	Loam, fine sandy loam.	CL, CL-ML, SC, ML	A-4, A-6	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Mu----- Milford	0-15	Silty clay loam	CL, CH, ML	A-6, A-7-6	0	100	100	95-100	80-100	35-55	10-30
	15-26	Silty clay-----	CL, CH	A-7-6	0	100	100	95-100	85-100	45-65	20-40
	26-54	Silty clay loam, silty clay, clay loam.	CL, CH, ML	A-7-6, A-4, A-6	0	100	100	85-100	70-100	20-65	5-40
	54-60	Silt loam, clay loam, silty clay loam.	CL, ML, CL-ML	A-6, A-7, A-4	0	100	100	85-100	70-100	20-60	NP-30
MwA----- Mulvey	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-29	Silt loam, silty clay loam.	CL, ML, CH	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-55	5-35
	29-41	Sandy clay loam, clay loam, loam.	CL, SC, SM-SC, CL-ML	A-4, A-6, A-2, A-7-6	0	85-100	75-100	45-90	20-65	20-60	5-30
	41-66	Gravelly sandy clay loam, gravelly sandy loam, gravelly coarse sandy loam.	SC, SC-SM, SM	A-2	0-5	55-90	50-75	25-60	15-35	10-60	NP-20
	66-80	Gravelly loamy coarse sand, gravelly coarse sand.	SP, SW, SP-SM, SM	A-1-b, A-2-4	0-10	65-85	50-75	15-50	0-15	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Mz----- Muskego	0-10	Sapric material	PT	A-8	0	---	---	---	---	---	---
	10-39	Sapric material	PT	A-8	0	---	---	---	---	---	---
	39-60	Coprogenous earth	OL	A-5	0	95-100	95-100	85-100	75-100	40-50	2-8
OaB2: Oakville-----	0-8	Loamy fine sand	SM	A-2	0	100	100	90-100	20-35	---	NP
	8-80	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	85-100	0-35	---	NP
Billett-----	0-8	Fine sandy loam	SM, SC, SC-SM	A-4, A-2-4	0	100	100	80-100	25-50	<25	NP-10
	8-22	Fine sandy loam, sandy loam.	SM, SC, SC-SM	A-4, A-2-4	0	100	100	70-100	15-50	<25	NP-10
	22-80	Loamy fine sand, sandy loam, loamy sand.	SM, SC, SP-SM	A-2-4, A-4	0	100	100	70-95	10-35	<25	NP-10
OgA----- Ockley	0-11	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-90	25-40	4-15
	11-42	Silty clay loam, clay loam, silt loam.	CL, ML, CH	A-6, A-4, A-7-6	0	90-100	75-100	55-100	50-90	20-60	5-35
	42-63	Gravelly clay loam, gravelly sandy clay loam, coarse sandy loam.	SC, SM, SM-SC	A-2-4	0-5	60-100	50-100	30-60	15-35	<60	NP-30
	63-70	Stratified sand to very gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b, A-1-a	0-10	45-85	25-75	10-40	0-10	---	NP
OmB2, OmC2----- Octagon	0-8	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	8-37	Clay loam, sandy clay loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0-1	90-100	90-100	75-95	45-80	20-50	5-30
	37-60	Loam, fine sandy loam.	CL-ML, CL, SC, ML	A-4, A-6	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
OpC3----- Octagon	0-8	Clay loam-----	CL	A-6, A-7-6	0-1	95-100	90-100	85-100	60-85	30-50	10-30
	8-22	Clay loam, sandy clay loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0-1	90-100	90-100	75-95	45-80	20-50	5-30
	22-28	Loam, fine sandy loam.	CL, SM, CL-ML, SC	A-4, A-6	0-1	90-100	85-98	65-90	40-70	20-40	5-25
	28-60	Loam, fine sandy loam.	CL-ML, CL, SC, ML	A-4, A-6	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
Ou----- Ouiatenon	0-6	Sandy loam-----	SM, SC-SM, SC	A-2-4, A-4	0	90-100	85-100	70-95	25-45	<25	NP-10
	6-18	Coarse sand, loamy sand, sand.	SP-SM, SM	A-2-4, A-3	0	85-100	75-100	35-90	0-30	---	NP
	18-36	Coarse sand, loamy sand, sand.	SP-SM, SM	A-2-4, A-3	0	85-100	75-100	35-90	0-30	---	NP
	36-60	Very gravelly coarse sand, gravelly coarse sand, gravelly loamy sand.	SW, SW-SM, SP, SP-SM	A-1, A-2-4, A-3	0-10	45-85	25-75	10-70	0-20	---	NP



TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RaB2----- Rainsville	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-14	Silty clay loam, silt loam.	CL, ML	A-6, A-7-6	0	100	100	90-100	75-90	30-50	5-35
	14-37	Loam, clay loam	CL, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-100	85-95	55-80	20-60	5-30
	37-41	Loam, sandy clay loam, sandy loam.	CL, SC, CL-ML, SM-SC	A-2, A-4, A-6	0-1	85-100	75-100	45-90	20-60	10-60	NP-20
	41-54	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7-6	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	54-60	Loam-----	CL, CL-ML, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
RcA: Raub-----	0-11	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	11-34	Silty clay loam, silt loam.	CL, CH, ML	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-55	5-35
	34-53	Clay loam, loam	CL	A-6, A-7	0-1	95-100	90-100	85-95	55-80	35-50	15-25
	53-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
Brenton-----	0-11	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	100	90-100	75-100	25-40	4-15
	11-38	Silty clay loam, silt loam.	CL, ML, CH	A-6, A-7, A-4	0	100	100	90-100	75-100	25-55	5-35
	38-52	Sandy loam, sand, silt loam.	SC, SM, ML, CL	A-6, A-7, A-4, A-2-4	0	90-100	85-100	55-95	0-75	<40	NP-15
	52-60	Stratified sand to silt loam.	CL-ML, CL, SM, SP-SM	A-2-4, A-4, A-6, A-3	0	90-100	85-100	55-100	0-75	<40	NP-15
RdA, RdB2, RdC2-- Richardville	0-7	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	7-13	Clay loam, silty clay loam.	CL, ML	A-6, A-7-6	0	95-100	90-100	85-100	55-90	30-50	10-35
	13-41	Sandy clay loam	SC, CL, SC-SM	A-6, A-4, A-2	0	90-100	75-100	45-95	20-55	20-60	5-20
	41-51	Sandy clay loam, fine sandy loam.	CL, CL-ML, SM	A-4, A-6, A-7-6	0-1	90-100	85-98	60-95	30-60	15-50	NP-30
	51-60	Sandy loam, fine sandy loam.	SM, SC	A-4	0-3	90-100	85-98	60-80	40-50	15-25	NP-10
RoB----- Rockfield	0-10	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-25	Silty clay loam, silt loam.	CL, ML	A-6, A-7-6	0	100	100	90-100	75-100	30-50	5-35
	25-46	Clay loam, loam	CL, CL-ML	A-6, A-4, A-7-6	0	95-100	90-100	80-100	50-80	20-60	5-30
	46-67	Loam, clay loam	CL, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-98	85-95	55-80	20-50	5-30
	67-80	Loam-----	CL, CL-ML, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RsF----- Rodman	0-10	Gravelly loam----	SC, SM-SC	A-4, A-6	0-5	60-85	50-75	35-55	25-40	20-40	5-20
	10-15	Gravelly loam, gravelly sandy loam, gravelly loamy coarse sand.	SP-SM, SC, SM, SM-SC	A-2, A-1	0-5	55-85	50-75	25-55	0-25	<40	NP-20
	15-60	Stratified sand to extremely gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	0-10	45-65	25-50	10-20	0-10	---	NP
Rz----- Ross	0-17	Silt loam-----	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	75-100	25-40	5-15
	17-39	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	100	100	90-100	55-100	20-50	5-25
	39-60	Sandy loam-----	SM-SC, SM, SC	A-4, A-2-4	0	100	100	90-100	25-45	10-30	NP-10
Sd----- Saranac	0-18	Silty clay-----	CH, CL, MH	A-7	0	100	100	95-100	90-100	40-60	15-40
	18-58	Silty clay loam, silty clay, silt loam.	CL, ML, CL-ML, CH	A-6, A-7, A-4	0	100	95-100	90-100	70-100	25-65	5-40
	58-70	Stratified silt loam to gravelly loamy coarse sand.	SP, SM, SP-SM	A-1, A-2-4	0-10	65-85	50-75	25-50	0-15	---	NP
Sf----- Sawabash	0-9	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
	9-46	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
	46-55	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
	55-60	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
ShB----- Shadeland	0-8	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	8-16	Silt loam, silty clay loam, clay loam.	CL, ML, CL-ML	A-6, A-4, A-7-6	0	80-100	75-100	70-100	50-100	20-50	5-35
	16-27	Clay loam-----	CL	A-6, A-4, A-7	0-1	80-100	75-100	70-95	50-85	20-60	5-30
	27-34	Clay loam, channery clay loam.	CL, SC, SM-SC	A-4, A-6, A-7-6	1-5	60-100	50-95	45-90	35-85	20-60	5-30
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
SmA----- Sleeth	0-10	Loam-----	ML, CL-ML	A-4, A-6	0	100	100	85-100	55-70	20-40	5-20
	10-47	Clay loam, loam, sandy clay loam.	CL, SC, SM-SC, CL-ML	A-6, A-4, A-7-6, A-2	0	90-100	75-100	45-90	20-65	20-60	5-30
	47-58	Gravelly sandy loam, gravelly sandy clay loam, gravelly loamy sand.	SC, SM, SM-SC	A-2	0-5	60-90	50-75	30-60	15-35	10-60	NP-20
	58-70	Stratified sand to gravelly sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Sn----- Sloan	0-16	Clay loam-----	CL	A-6, A-7-6	0	100	100	75-100	55-85	30-50	10-30
	16-32	Clay loam, loam	CL	A-6, A-7-6	0	100	100	75-100	55-85	30-50	10-30
	32-60	Stratified gravelly sandy loam to silty clay loam.	CL, SC, SM, SM-SC	A-4, A-6, A-2-4	0	85-100	70-100	50-90	25-60	10-40	NP-15
So----- Sloan Variant	0-10	Silty clay loam	CL, ML	A-6, A-7	0-3	95-100	90-100	85-100	75-95	35-50	10-25
	10-17	Silty clay loam	CL, ML	A-6, A-7	0-3	95-100	90-100	85-100	75-95	35-50	10-25
	17-33	Very channery sandy clay loam, extremely channery sandy clay loam.	GP-GC, GC	A-2	0-10	30-55	20-50	20-45	5-25	30-40	10-18
	33	Weathered bedrock	---	---	---	---	---	---	---	---	---
SrB, SrC----- Sparta	0-19	Sand-----	SP-SM, SM	A-3, A-2	0	100	100	70-90	5-15	---	NP
	19-48	Sand-----	SP-SM, SM	A-2, A-3, A-4	0	100	100	70-90	5-15	---	NP
	48-80	Sand, loamy sand	SP-SM, SM, SP	A-2, A-3	0	100	100	70-90	5-30	---	NP
StC----- Spinks	0-9	Fine sand-----	SP-SM, SM	A-2-4, A-3	0	100	100	85-95	5-15	---	NP
	9-21	Sand, fine sand	SM, SP-SM	A-2-4, A-3	0	100	100	70-95	5-15	---	NP
	21-68	Fine sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	85-95	5-25	---	NP
	68-80	Fine sand, sand	SP-SM, SM	A-2-4, A-3	0	100	100	70-95	5-25	---	NP
SwA: Starks-----	0-10	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-38	Silty clay loam	CL, CH	A-6, A-7-6	0	100	100	90-100	80-100	35-55	15-35
	38-56	Loam, silt loam, sandy loam.	CL, SC, CL-ML, SC-SM	A-4, A-6, A-2-4	0	90-100	85-100	60-95	25-85	10-40	NP-20
	56-70	Stratified loamy sand to silt loam.	SM, CL-ML, CL, SP-SM	A-2-4, A-4, A-6, A-3	0	90-100	85-100	55-100	0-75	<40	NP-15
Fincastle-----	0-10	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-39	Silty clay loam, silt loam.	CL, ML, CH	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-55	5-35
	39-54	Clay loam, loam	CL, CL-ML	A-6, A-4, A-7-6	0	95-100	90-100	85-95	55-80	20-50	5-30
	54-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	65-90	45-70	15-30	NP-15
SyF: Strawn-----	0-9	Loam-----	CL, ML, CL-ML	A-4, A-6	0	95-100	90-100	85-95	55-70	15-40	NP-15
	9-16	Clay loam, loam	CL, CL-ML	A-6, A-4	0-5	95-100	90-100	85-95	55-80	20-40	5-25
	16-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-5	90-100	85-98	65-90	45-70	15-30	NP-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SyF: Rodman-----	0-5	Gravelly sandy loam.	SC-SM, SM, SC	A-2-4	0-5	55-80	50-75	35-65	10-30	<25	NP-10
	5-15	Gravelly coarse sandy loam, gravelly loamy coarse sand.	SC, SM	A-2-4, A-1-b	0-5	50-75	25-55	0-24	20-55	<40	NP-20
	15-60	Stratified sand to extremely gravelly coarse sand.	SP, GW-GM, SW, SW-SM	A-1	1-10	45-65	25-50	5-40	0-10	---	NP
TbA----- Tecumseh	0-15	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	15-30	Silty clay loam	CL, ML	A-6, A-7-6	0	100	100	90-100	75-100	35-50	15-35
	30-48	Clay loam, sandy clay loam, fine sandy loam.	CL, SC-SM, SC, SM	A-2, A-7-6, A-4, A-6	0	95-100	90-100	80-95	25-75	10-60	NP-30
	48-65	Loam-----	CL-ML, CL	A-4, A-6	0-1	95-100	90-100	85-95	55-70	20-40	5-25
	65-75	Loam-----	CL-ML, CL	A-4, A-6	0-1	95-100	90-100	85-95	55-70	20-40	5-25
	75-80	Fine sandy loam	SM, SC	A-4	0-3	90-100	85-98	65-80	40-50	15-25	NP-10
TcA----- Thackery	0-10	Silt loam-----	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	75-90	25-40	4-15
	10-16	Silt loam, silty clay loam.	CL, ML, CL-ML	A-6, A-7-6	0	100	100	90-100	75-90	25-50	5-35
	16-48	Clay loam, sandy clay loam.	CL, SC, SM-SC	A-6, A-4, A-2, A-7-6	0	90-100	75-100	45-95	20-75	20-60	5-30
	48-54	Gravelly sandy clay loam, gravelly sandy loam.	SM, SC, SM-SC	A-2	0-5	60-90	50-75	30-60	15-35	10-60	NP-20
	54-60	Stratified sand to gravelly sand.	SW, SP, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
TfB----- Throckmorton	0-9	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-34	Silt loam, silty clay loam.	CL, ML	A-6, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	34-45	Clay loam, sandy loam, sandy clay loam.	CL, SC-SM, SC, SM	A-6, A-4, A-2, A-7-6	0	90-100	85-100	80-95	25-75	10-60	NP-30
	45-58	Loam-----	CL, CL-ML	A-4, A-6	0-1	95-100	90-100	85-95	55-70	20-40	5-25
	58-60	Loam-----	CL-ML, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15
Tg----- Tice	0-14	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	80-100	35-50	10-25
	14-50	Silty clay loam	CL, ML	A-7, A-6	0	100	100	95-100	80-100	35-50	10-25
	50-60	Stratified silty clay loam to loam.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	100	90-100	55-100	20-50	5-25
TmA: Toronto-----	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-27	Silty clay loam, silty clay.	CL, ML, CH	A-6, A-7-6	0	100	100	90-100	75-100	35-65	15-40
	27-52	Clay loam, loam	CL, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	52-60	Loam-----	CL, CL-ML, ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15



TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
UcA: Carmi-----	0-19	Loam-----	CL-ML, ML	A-4, A-6	0	90-100	90-100	75-85	50-65	20-40	5-20
	19-43	Gravelly loamy sand, loam, gravelly sandy loam.	SC-SM, SM, CL-ML	A-2-4, A-4, A-6	0-5	60-85	50-80	35-70	10-60	10-40	NP-20
	43-60	Sand, very gravelly coarse sand.	SP-SM, SW-SM, SW	A-1-b, A-1-a	0-15	45-85	25-75	10-40	0-10	---	NP
UmB, UmC: Urban land.											
Miami-----	0-10	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-23	Clay loam, silty clay loam, sandy clay loam.	CL, CL-ML	A-6, A-4, A-7-6	0	90-100	90-100	75-100	45-90	20-50	5-30
	23-36	Loam, fine sandy loam.	CL, SC, CL-ML, SM	A-4, A-6	0-1	90-100	85-95	65-90	40-70	20-40	5-25
	36-60	Loam, fine sandy loam.	CL, CL-ML, SC, ML	A-4, A-6	0-3	90-100	85-98	65-90	40-70	15-30	NP-15
UsA: Urban land.											
Starks-----	0-9	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	9-32	Silty clay loam	CL, CH	A-6, A-7-6	0	100	100	90-100	80-100	35-55	15-35
	32-57	Loam, silt loam, sandy loam.	CL, SC, CL-ML, SC-SM	A-4, A-6, A-2-4	0	90-100	85-100	60-95	25-85	10-40	NP-20
	57-70	Stratified loamy sand to silt loam.	SM, CL, CL-ML, SP-SM	A-2-4, A-4, A-6, A-3	0	90-100	85-100	55-100	0-75	<40	NP-15
Fincastle-----	0-11	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	11-38	Silty clay loam, silt loam.	CL, ML, CH	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-55	5-35
	38-46	Clay loam, loam	CL, CL-ML	A-6, A-4, A-7-6	0-1	95-100	90-100	85-95	55-80	20-50	5-30
	46-60	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	65-90	45-70	15-30	NP-15
Wb----- Walkill	0-10	Silt loam-----	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-27	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	100	90-100	75-100	25-40	4-15
	27-54	Sapric material	PT	A-8	0	---	---	---	---	---	---
	54-60	Coprogenous earth	CL, CH	A-6, A-7	0	100	100	95-100	80-100	30-60	15-30
We----- Washtenaw	0-10	Silt loam-----	ML, CL, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-23	Silt loam-----	CL, ML, CL-ML	A-6, A-4	0	100	100	90-100	75-100	25-40	4-15
	23-50	Silty clay loam, clay loam.	CL, ML, CH	A-6, A-7-6	0-1	85-100	80-100	70-95	50-90	30-55	5-35
	50-70	Loam-----	CL, ML, CL-ML	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
WgA----- Waupecan	0-11	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	11-35	Silty clay loam, silt loam.	CL, ML	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	35-61	Sandy loam, gravelly loamy sand, gravelly clay loam.	SM, SC, SM-SC, SP-SM	A-2-4, A-4, A-6, A-7-6	0-5	70-100	50-98	35-85	10-40	10-60	NP-30
	61-70	Gravelly sand, gravelly coarse sand.	SP, SW, SP-SM, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
WhA----- Waupecan	0-15	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	15-36	Silt loam, silty clay loam.	CL, ML	A-6, A-4, A-7-6	0	100	100	90-100	75-100	25-50	5-35
	36-58	Gravelly loamy sand, gravelly clay loam, sandy loam.	SM, SC, SM-SC, SP-SM	A-2-4, A-4, A-6, A-7-6	0-5	70-100	50-98	30-85	10-40	10-60	NP-30
	58-65	Gravelly sand, gravelly coarse sand.	SP, SP-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
WmA----- Waynetown	0-10	Silt loam-----	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-26	Silty clay loam	CL, CH, MH	A-6, A-7-6	0	100	100	90-100	75-100	35-55	15-35
	26-32	Loam, clay loam	CL, CL-ML	A-6, A-4, A-7-6	0	90-100	75-100	55-85	50-65	20-60	5-30
	32-53	Gravelly sandy clay loam, gravelly sandy loam, gravelly clay loam.	SC, SM, SM-SC	A-2-4, A-2-6	0-5	60-90	50-75	30-60	15-50	10-60	NP-30
	53-60	Gravelly coarse sand, coarse sand.	SP, SP-SM, SW, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
WtA----- Wea	0-10	Silt loam-----	CL, ML, CL-ML	A-4, A-6	0	100	100	90-100	75-100	25-40	4-15
	10-25	Silt loam-----	CL, ML	A-4, A-6	0	100	100	90-100	65-100	25-40	5-20
	25-31	Clay loam, sandy clay loam.	CL, SC, SM-SC	A-4, A-6, A-7-6	0	95-100	90-100	80-95	40-75	20-60	5-30
	31-64	Sandy loam, gravelly sandy clay loam, gravelly sandy loam.	SC, SC-SM, SM	A-2-4	0-5	60-100	50-95	30-85	15-35	10-60	NP-20
	64-70	Sand, gravelly sand.	SP-SM, SP, SW, SW-SM	A-1-b	0-10	65-85	50-75	15-40	0-10	---	NP
WuA----- Whitaker	0-10	Loam-----	CL, CL-ML	A-4, A-6	0	100	100	85-100	55-70	20-40	5-20
	10-17	Loam-----	CL, CL-ML	A-6, A-4	0	100	100	90-100	50-80	20-40	5-20
	17-50	Clay loam, sandy clay loam.	CL, SC, SM-SC	A-4, A-6, A-7-6	0	95-100	90-100	80-95	40-75	20-60	5-30
	50-58	Sandy loam, loamy sand.	SM, SC-SM, SP-SM, SC	A-2-4, A-4	0-1	100	95-100	60-95	10-50	<30	NP-10
	58-70	Loam-----	ML, CL-ML, CL	A-4, A-6	0-3	90-100	85-98	75-90	45-70	15-30	NP-15

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "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 erodi- bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
Am, Ap----- Allison	0-18	20-27	1.30-1.60	0.6-2.0	0.21-0.24	6.1-8.4	Low-----	0.28	5	6	2-4
	18-51	25-35	1.40-1.60	0.6-2.0	0.18-0.21	6.1-8.4	Moderate----	0.28			
	51-80	25-40	1.40-1.60	0.6-2.0	0.15-0.21	6.1-8.4	Moderate----	0.28			
AtB2: Alvin-----	0-10	10-15	1.40-1.70	2.0-6.0	0.16-0.18	4.5-7.3	Low-----	0.24	5	3	.5-1
	10-27	10-15	1.50-1.70	2.0-6.0	0.14-0.20	4.5-7.3	Low-----	0.24			
	27-38	15-18	1.50-1.70	2.0-6.0	0.12-0.20	4.5-6.0	Low-----	0.24			
	38-60	3-10	1.50-1.70	2.0-6.0	0.05-0.13	5.1-8.4	Low-----	0.24			
Spinks-----	0-8	0-10	1.40-1.70	6.0-20	0.06-0.08	5.1-7.3	Low-----	0.15	5	1	.5-1
	8-28	0-15	1.50-1.70	2.0-20	0.05-0.10	5.6-7.3	Low-----	0.17			
	28-61	3-15	1.50-1.70	2.0-6.0	0.04-0.08	5.6-7.8	Low-----	0.17			
	61-70	0-10	1.50-1.70	6.0-20	0.04-0.06	6.6-8.4	Low-----	0.17			
Ba, Bb----- Battleground	0-10	20-27	1.30-1.60	0.6-2.0	0.21-0.24	7.4-8.4	Low-----	0.28	5	4L	2-5
	10-19	20-35	1.40-1.60	0.6-2.0	0.21-0.24	7.4-8.4	Moderate----	0.28			
	19-80	15-35	1.40-1.70	0.6-2.0	0.18-0.22	7.4-8.4	Moderate----	0.43			
BgA----- Beecher	0-9	20-27	1.20-1.50	0.2-0.6	0.22-0.24	4.5-6.0	Low-----	0.37	3	6	2-4
	9-41	35-40	1.40-1.60	0.6-2.0	0.11-0.19	4.5-6.5	Moderate----	0.37			
	41-60	27-30	1.70-1.90	0.06-0.2	0.14-0.20	7.4-8.4	Moderate----	0.37			
BkF----- Berks	0-8	5-23	1.20-1.50	0.6-6.0	0.08-0.12	3.6-6.5	Low-----	0.17	3	---	.5-3
	8-17	5-27	1.40-1.60	0.6-2.0	0.04-0.10	3.6-6.5	Low-----	0.17			
	17-29	5-20	1.40-1.60	2.0-6.0	0.04-0.10	3.6-6.5	Low-----	0.17			
	29	---	---	---	---	---	---	---			
BlA, BlB2----- Billett	0-9	8-15	1.40-1.70	2.0-6.0	0.16-0.18	4.5-7.3	Low-----	0.20	4	3	1-3
	9-30	10-20	1.50-1.70	2.0-6.0	0.12-0.19	5.1-7.3	Low-----	0.32			
	30-39	10-18	1.50-1.70	2.0-6.0	0.11-0.16	5.1-7.3	Low-----	0.24			
	39-60	5-15	1.60-1.80	6.0-20	0.08-0.10	5.6-7.3	Low-----	0.17			
	60-65	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
BmA----- Billett	0-9	5-15	1.40-1.70	2.0-6.0	0.13-0.18	4.5-7.8	Low-----	0.20	4	3	1-2
	9-22	6-18	1.50-1.70	2.0-6.0	0.10-0.17	4.5-7.3	Low-----	0.20			
	22-80	3-10	1.50-1.70	2.0-6.0	0.07-0.14	5.1-7.3	Low-----	0.20			
BnA, BnB2----- Billett	0-9	8-15	1.40-1.70	2.0-6.0	0.20-0.22	4.5-7.3	Low-----	0.28	4	5	1-3
	9-27	10-20	1.50-1.70	2.0-6.0	0.12-0.19	5.1-7.3	Low-----	0.32			
	27-38	10-18	1.50-1.70	2.0-6.0	0.11-0.16	5.1-7.3	Low-----	0.24			
	38-56	5-15	1.60-1.80	6.0-20	0.08-0.10	5.6-7.3	Low-----	0.17			
	56-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
BoA----- Bowes	0-9	15-27	1.30-1.60	0.6-2.0	0.21-0.24	5.6-7.3	Low-----	0.32	5	6	2-4
	9-28	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-6.5	Moderate----	0.43			
	28-56	3-30	1.50-1.70	2.0-6.0	0.10-0.16	5.1-7.8	Low-----	0.17			
	56-60	1-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low-----	0.10			
BpA----- Bowes Variant	0-9	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.32	5	5	2-4
	9-26	25-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Moderate----	0.43			
	26-53	10-30	1.50-1.70	2.0-6.0	0.10-0.14	4.5-7.3	Moderate----	0.24			
	53-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			

TABLE 18.--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
CaA Camden	0-9	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5	6	1-2
	9-29	25-35	1.40-1.60	0.6-2.0	0.16-0.20	5.1-7.3	Moderate	0.37			
	29-64	10-27	1.40-1.60	0.6-2.0	0.11-0.22	5.1-7.3	Low	0.37			
	64-70	5-20	1.50-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low	0.37			
CfB Carmi	0-13	10-20	1.40-1.70	2.0-6.0	0.13-0.20	5.1-7.8	Low	0.20	4	3	2-4
	13-45	5-22	1.50-1.70	2.0-6.0	0.12-0.19	4.5-7.8	Low	0.20			
	45-60	1-5	1.60-1.80	>6.0	0.02-0.04	7.9-8.4	Low	0.15			
CgA Carmi	0-20	10-20	1.30-1.60	0.6-2.0	0.13-0.20	5.1-7.8	Low	0.28	4	5	2-4
	20-54	5-22	1.40-1.70	2.0-6.0	0.12-0.19	4.5-7.8	Low	0.20			
	54-60	1-5	1.60-1.80	>6.0	0.02-0.07	7.9-8.4	Low	0.15			
Ck Ceresco	0-16	2-15	1.40-1.70	2.0-6.0	0.13-0.18	6.1-7.8	Low	0.20	4	3	3-5
	16-40	10-20	1.50-1.70	2.0-6.0	0.08-0.19	6.1-7.8	Low	0.24			
	40-60	0-10	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			
Cl Ceresco	0-13	10-15	1.30-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low	0.24	4	5	3-5
	13-31	10-20	1.50-1.70	2.0-6.0	0.08-0.19	6.1-7.8	Low	0.24			
	31-60	0-10	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			
Cm Chalmers	0-13	28-35	1.20-1.60	0.6-2.0	0.21-0.23	6.1-7.3	Moderate	0.28	5	7	3-6
	13-30	20-35	1.40-1.60	0.6-2.0	0.18-0.21	6.6-7.8	Moderate	0.28			
	30-45	15-35	1.50-1.70	0.6-2.0	0.17-0.20	6.6-7.8	Moderate	0.28			
	45-60	12-18	1.70-1.90	0.2-0.6	0.05-0.12	7.4-8.4	Low	0.28			
Co Cohoctah	0-13	5-20	1.40-1.70	2.0-6.0	0.13-0.18	6.1-7.8	Low	0.20	4	3	3-6
	13-32	5-27	1.50-1.70	2.0-6.0	0.12-0.20	6.1-8.4	Low	0.28			
	32-60	5-10	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			
Cp Cohoctah	0-20	10-20	1.30-1.60	2.0-6.0	0.20-0.22	6.1-7.8	Low	0.28	4	5	3-6
	20-45	5-25	1.50-1.70	2.0-6.0	0.12-0.20	6.1-8.4	Low	0.28			
	45-60	5-10	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			
CrC Coloma	0-8	0-10	1.40-1.70	6.0-20	0.05-0.09	4.5-7.3	Low	0.15	5	1	<1
	8-34	0-10	1.50-1.70	6.0-20	0.05-0.12	4.5-6.5	Low	0.15			
	34-60	2-12	1.50-1.70	6.0-20	0.03-0.08	4.5-6.0	Low	0.15			
CtA Crosby	0-9	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.43	3	5	1-3
	9-29	25-35	1.50-1.70	0.06-0.2	0.15-0.20	5.1-7.3	Moderate	0.43			
	29-60	12-18	1.70-2.00	0.06-0.2	0.05-0.17	7.4-8.4	Low	0.43			
CwB2: Crosby	0-9	11-24	1.30-1.60	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.43	3	5	1-3
	9-31	28-35	1.50-1.70	0.06-0.2	0.15-0.20	5.1-7.3	Moderate	0.43			
	31-60	12-18	1.70-2.00	0.06-0.2	0.05-0.17	7.4-8.4	Low	0.43			
Miami	0-9	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low	0.37	4	5	1-3
	9-36	25-35	1.50-1.70	0.2-2.0	0.15-0.20	5.1-7.3	Moderate	0.37			
	36-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low	0.37			
DmC2 Desker	0-8	12-18	1.40-1.70	2.0-6.0	0.11-0.13	5.6-6.5	Low	0.15	4	3	2-4
	8-14	12-18	1.50-1.70	2.0-6.0	0.09-0.12	5.6-7.3	Low	0.17			
	14-27	4-10	1.60-1.80	6.0-20	0.06-0.09	6.6-8.4	Low	0.15			
	27-60	1-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			
DoC2 Desker	0-9	7-15	1.40-1.70	2.0-6.0	0.12-0.15	5.6-6.5	Low	0.20	4	3	2-4
	9-15	12-18	1.50-1.70	2.0-6.0	0.09-0.12	5.6-7.3	Low	0.17			
	15-34	4-10	1.60-1.80	6.0-20	0.06-0.09	6.6-8.4	Low	0.15			
	34-60	1-5	1.70-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			

TABLE 18.--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
<b>DpD2:</b>											
<b>Desker</b> -----	0-9	7-15	1.40-1.70	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.20	4	3	2-4
	9-14	12-18	1.50-1.70	2.0-6.0	0.09-0.12	5.6-7.3	Low-----	0.17			
	14-30	4-10	1.60-1.80	6.0-20	0.06-0.09	6.6-8.4	Low-----	0.15			
	30-60	1-5	1.70-1.80	>20	0.02-0.04	7.9-8.4	Low-----	0.10			
<b>Rodman</b> -----	0-8	5-20	1.30-1.60	2.0-6.0	0.09-0.12	6.6-7.8	Low-----	0.15	3	8	2-4
	8-12	5-25	1.40-1.60	2.0-6.0	0.09-0.12	6.6-7.8	Low-----	0.20			
	12-60	0-10	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
<b>Du:</b>											
<b>Drummer</b> -----	0-17	28-35	1.20-1.60	0.6-2.0	0.21-0.23	5.6-7.3	Moderate----	0.28	5	7	3-6
	17-54	20-35	1.40-1.60	0.6-2.0	0.21-0.24	5.6-7.8	Moderate----	0.28			
	54-70	20-33	1.40-1.70	0.6-2.0	0.17-0.20	6.1-7.8	Moderate----	0.28			
	70-80	15-30	1.50-1.70	0.6-2.0	0.11-0.19	7.4-8.4	Low-----	0.28			
<b>Drummer, stratified sandy substratum</b> -----	0-11	28-35	1.20-1.60	0.6-2.0	0.21-0.23	6.1-7.3	Moderate----	0.28	5	7	3-6
	11-44	28-35	1.40-1.60	0.6-2.0	0.20-0.22	6.1-7.3	Moderate----	0.28			
	44-58	15-27	1.50-1.70	0.6-2.0	0.17-0.20	6.6-7.8	Low-----	0.28			
	58-70	5-15	1.50-1.70	0.6-2.0	0.05-0.14	7.4-8.4	Low-----	0.20			
<b>Dy</b> -----	0-49	18-27	1.20-1.60	0.6-2.0	0.18-0.24	6.6-8.4	Low-----	0.28	5	6	3-5
<b>Du Page</b>	49-60	10-20	1.50-1.70	0.6-2.0	0.17-0.19	7.9-8.4	Low-----	0.28			
<b>EkA</b> -----	0-10	7-15	1.40-1.70	2.0-6.0	0.18-0.20	5.1-7.3	Low-----	0.20	4	3	2-4
<b>Elston</b>	10-25	5-18	1.50-1.70	2.0-6.0	0.10-0.14	5.1-6.5	Low-----	0.24			
	25-49	3-12	1.60-1.80	6.0-20	0.08-0.10	5.1-7.3	Low-----	0.17			
	49-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
<b>EmA</b> -----	0-14	10-18	1.30-1.60	2.0-6.0	0.20-0.22	5.1-7.3	Low-----	0.28	4	5	2-4
<b>Elston</b>	14-19	10-18	1.40-1.60	2.0-6.0	0.17-0.19	5.1-6.5	Low-----	0.32			
	19-38	5-18	1.50-1.70	2.0-6.0	0.10-0.14	5.1-6.5	Low-----	0.24			
	38-58	3-12	1.60-1.80	6.0-20	0.08-0.10	5.1-7.3	Low-----	0.17			
	58-70	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
<b>FcB:</b>											
<b>Fincastle</b> -----	0-8	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	5	5	1-3
	8-32	23-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Moderate----	0.37			
	32-42	18-32	1.50-1.70	0.2-0.6	0.15-0.19	5.1-7.8	Moderate----	0.37			
	42-60	12-18	1.70-2.00	0.06-0.2	0.05-0.19	7.4-8.4	Low-----	0.37			
<b>Crosby</b> -----	0-9	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.43	3	5	1-3
	9-38	20-35	1.50-1.70	0.06-0.2	0.15-0.20	5.1-7.3	Moderate----	0.43			
	38-60	15-27	1.70-2.00	0.06-0.2	0.05-0.17	7.4-8.4	Low-----	0.43			
<b>Hd</b> -----	0-11	22-27	1.20-1.60	0.6-2.0	0.21-0.24	7.4-8.4	Low-----	0.28	5	4L	3-6
<b>Harpster</b>	11-30	25-35	1.40-1.60	0.6-2.0	0.18-0.22	7.4-8.4	Moderate----	0.28			
	30-60	15-30	1.40-1.60	0.6-2.0	0.17-0.22	7.4-8.4	Low-----	0.28			
<b>HfB2, HfC2</b> -----	0-9	18-25	1.30-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.37	4	6	1-3
<b>High Gap Variant</b>	9-28	28-35	1.50-1.70	0.6-2.0	0.15-0.19	4.5-6.0	Moderate----	0.37			
	28-36	30-45	1.50-1.70	0.2-0.6	0.07-0.11	4.5-6.0	Moderate----	0.37			
	36	---	---	---	---	---	-----	---			
<b>HnB</b> -----	0-10	3-12	1.40-1.70	6.0-20	0.04-0.06	5.6-7.8	Low-----	0.17	4	2	1-2
<b>Hononegah</b>	10-34	6-15	1.60-1.80	6.0-20	0.03-0.05	5.6-7.8	Low-----	0.15			
	34-60	2-7	1.60-1.80	>20	0.02-0.03	7.9-8.4	Low-----	0.15			

TABLE 18.--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
HoA----- Hononegah	0-11	8-15	1.40-1.70	2.0-6.0	0.10-0.15	5.6-7.8	Low-----	0.20	4	3	1-2
	11-45	6-15	1.60-1.80	6.0-20	0.03-0.05	5.6-7.8	Low-----	0.15			
	45-60	2-7	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low-----	0.15			
Hv----- Houghton	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.6-7.8	-----	---	5	2	>70
KaA, KaB2----- Kalamazoo	0-11	8-25	1.30-1.60	0.6-2.0	0.16-0.22	5.1-7.3	Low-----	0.32	4	5	1-3
	11-34	18-30	1.50-1.70	0.6-2.0	0.10-0.18	5.1-7.3	Low-----	0.32			
	34-61	2-15	1.60-1.80	6.0-20	0.02-0.08	5.1-7.8	Low-----	0.15			
	61-65	0-10	1.60-1.80	>20	0.01-0.04	7.4-8.4	Low-----	0.10			
KbB2, KcB2, KcC2----- Kalamazoo	0-9	10-20	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	4	5	1-3
	9-32	18-30	1.50-1.70	0.6-2.0	0.10-0.18	5.1-7.3	Low-----	0.32			
	32-46	2-15	1.60-1.80	6.0-20	0.02-0.08	5.1-7.8	Low-----	0.15			
	46-60	0-10	1.60-1.80	>20	0.01-0.04	7.4-8.4	Low-----	0.10			
KoD2----- Kosciusko	0-5	7-18	1.40-1.70	0.6-2.0	0.13-0.15	5.1-6.5	Low-----	0.24	4	3	1-2
	5-20	18-27	1.50-1.70	0.6-2.0	0.10-0.15	5.1-6.5	Low-----	0.28			
	20-27	4-12	1.60-1.80	0.6-2.0	0.05-0.11	5.1-7.8	Low-----	0.28			
	27-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
KpC3----- Kosciusko	0-8	20-25	1.40-1.70	0.6-2.0	0.16-0.18	5.1-6.5	Low-----	0.24	3	5	.5-1
	8-27	18-27	1.50-1.70	0.6-2.0	0.10-0.15	5.1-6.5	Low-----	0.28			
	27-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
LaA----- Lafayette	0-13	15-25	1.20-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.28	5	6	2-4
	13-40	25-35	1.40-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Moderate----	0.43			
	40-45	10-30	1.50-1.70	0.6-2.0	0.14-0.18	5.6-6.5	Low-----	0.32			
	45-65	5-22	1.60-1.80	0.6-2.0	0.08-0.12	6.1-7.3	Low-----	0.17			
	65-70	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
LeA----- La Hogue	0-13	15-25	1.30-1.60	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.28	5	6	2-4
	13-42	20-30	1.50-1.70	0.6-2.0	0.15-0.19	5.1-6.5	Low-----	0.28			
	42-47	10-20	1.60-1.80	0.6-2.0	0.09-0.13	5.6-7.3	Low-----	0.28			
	47-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
Lm----- Lash	0-14	10-18	1.20-1.50	0.6-2.0	0.22-0.24	7.4-8.4	Low-----	0.32	5	4L	2-4
	14-52	5-18	1.40-1.60	2.0-6.0	0.14-0.21	7.4-8.4	Low-----	0.32			
	52-60	5-15	1.50-1.70	6.0-20	0.08-0.10	7.9-8.4	Low-----	0.17			
LnA, LnB2----- Lauramie	0-9	10-20	1.30-1.60	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.32	5	5	1-3
	9-15	15-32	1.40-1.60	0.6-2.0	0.18-0.22	5.1-6.5	Moderate----	0.43			
	15-44	20-32	1.50-1.70	0.6-2.0	0.14-0.19	5.1-7.3	Moderate----	0.32			
	44-50	10-18	1.50-1.70	0.6-2.0	0.13-0.16	6.6-7.8	Low-----	0.28			
	50-60	8-15	1.50-1.70	0.6-2.0	0.07-0.13	7.4-8.4	Low-----	0.28			
LoA, LoB----- Linkville	0-15	10-20	1.30-1.60	0.6-2.0	0.20-0.22	5.1-7.3	Low-----	0.24	5	5	2-4
	15-38	13-30	1.50-1.70	0.6-2.0	0.15-0.19	4.5-6.5	Low-----	0.32			
	38-70	10-30	1.50-1.70	0.6-2.0	0.15-0.19	4.5-7.8	Low-----	0.32			
	70-80	8-15	1.50-1.70	0.6-2.0	0.08-0.13	7.4-8.4	Low-----	0.32			
LvB2, LwB2----- Longlois	0-9	11-22	1.30-1.60	0.6-2.0	0.20-0.24	5.1-7.3	Low-----	0.32	5	5	1-3
	9-16	27-35	1.40-1.60	0.6-2.0	0.18-0.20	6.6-7.8	Moderate----	0.32			
	16-25	22-35	1.50-1.70	0.6-2.0	0.15-0.19	4.5-6.0	Moderate----	0.32			
	25-54	20-32	1.50-1.70	0.6-2.0	0.04-0.16	5.1-7.8	Low-----	0.10			
	54-60	0-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low-----	0.10			
Mb----- Mahalasville	0-13	27-35	1.20-1.60	0.6-2.0	0.21-0.23	6.1-7.3	Moderate----	0.28	5	7	3-6
	13-33	30-35	1.40-1.60	0.6-2.0	0.18-0.20	6.1-7.3	Moderate----	0.28			
	33-46	20-30	1.50-1.70	0.6-2.0	0.15-0.22	6.6-7.8	Low-----	0.28			
	46-60	1-5	1.60-1.80	>20.0	0.02-0.04	7.4-8.4	Low-----	0.10			

TABLE 18.--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
Mc----- Mahalasville	0-10	28-35	1.20-1.60	0.6-2.0	0.21-0.23	6.6-7.3	Moderate-----	0.28	5	7	3-6
	10-33	28-35	1.40-1.60	0.6-2.0	0.18-0.20	6.6-7.3	Moderate-----	0.43			
	33-54	20-35	1.50-1.70	0.6-2.0	0.15-0.19	6.6-7.8	Moderate-----	0.32			
	54-59	2-10	1.60-1.80	2.0-6.0	0.03-0.05	6.6-7.8	Low-----	0.15			
	59	---	---	---	---	---	-----	---			
Md: Mahalasville----	0-12	28-30	1.20-1.60	0.2-0.6	0.21-0.23	6.6-7.3	Low-----	0.28	5	7	3-6
	12-38	28-35	1.40-1.60	0.6-2.0	0.18-0.20	6.6-7.3	Moderate-----	0.28			
	38-48	8-25	1.50-1.70	0.6-2.0	0.17-0.19	7.4-7.8	Low-----	0.28			
	48-60	3-18	1.50-1.70	0.6-2.0	0.19-0.21	7.9-8.4	Low-----	0.28			
Treaty-----	0-10	28-35	1.20-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.32	5	7	3-6
	10-37	28-35	1.40-1.60	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
	37-48	20-35	1.50-1.70	0.6-2.0	0.15-0.19	6.6-7.8	Moderate-----	0.43			
	48-60	12-18	1.70-1.90	0.2-0.6	0.17-0.19	7.4-8.4	Low-----	0.43			
MmB2----- Marker	0-8	18-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.32	4	6	1-3
	8-21	28-34	1.50-1.70	0.6-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.32			
	21-26	24-27	1.50-1.70	0.6-2.0	0.15-0.20	7.4-8.4	Low-----	0.32			
	26-60	24-27	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.43			
MoA----- Mellott	0-9	16-27	1.30-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5	5	2-4
	9-28	25-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.43			
	28-42	10-30	1.50-1.70	0.6-2.0	0.16-0.19	5.1-6.0	Low-----	0.43			
	42-50	10-20	1.50-1.70	0.6-2.0	0.14-0.17	5.6-7.8	Low-----	0.43			
	50-60	12-18	1.50-1.70	0.6-2.0	0.08-0.13	7.4-8.4	Low-----	0.43			
MsC2, MsD2----- Miami	0-9	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	4	5	1-2
	9-27	25-35	1.50-1.70	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	27-35	18-27	1.50-1.70	0.2-0.6	0.14-0.19	6.6-7.8	Low-----	0.37			
	35-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
MtC3, MtD3----- Miami	0-7	28-35	1.40-1.70	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37	3	6	.5-2
	7-23	25-35	1.50-1.70	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	23-29	18-27	1.50-1.70	0.2-0.6	0.14-0.19	6.6-7.8	Low-----	0.37			
	29-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
Mu----- Milford	0-15	30-40	1.20-1.60	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	4	3-6
	15-26	40-45	1.40-1.60	0.2-0.6	0.11-0.13	5.6-7.3	High-----	0.32			
	26-54	35-42	1.40-1.60	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	54-60	20-30	1.50-1.70	0.2-0.6	0.20-0.22	7.4-8.4	Low-----	0.43			
MwA----- Mulvey	0-9	10-20	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.32	5	5	2-4
	9-29	25-35	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.43			
	29-41	20-33	1.50-1.70	0.6-2.0	0.16-0.18	4.5-6.0	Moderate-----	0.32			
	41-66	10-28	1.50-1.70	0.6-2.0	0.09-0.13	5.1-7.3	Low-----	0.24			
	66-80	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
Mz----- Muskego	0-10	---	0.10-0.21	0.6-6.0	0.35-0.45	5.6-7.3	-----	---	4	2	60-90
	10-39	---	0.10-0.21	0.6-6.0	0.35-0.45	5.6-7.3	-----	---			
	39-60	18-35	0.30-1.10	0.06-0.2	0.18-0.24	6.6-8.4	Moderate-----	0.28			
OaB2: Oakville-----	0-8	2-14	1.40-1.70	6.0-20	0.09-0.12	4.5-7.3	Low-----	0.17	5	2	.5-2
	8-80	0-10	1.50-1.70	6.0-20	0.06-0.10	4.5-7.3	Low-----	0.15			
Billett-----	0-8	5-15	1.40-1.70	2.0-6.0	0.13-0.18	4.5-7.8	Low-----	0.20	4	3	1-2
	8-22	6-18	1.50-1.70	2.0-6.0	0.10-0.17	4.5-7.3	Low-----	0.20			
	22-80	3-10	1.50-1.70	2.0-6.0	0.07-0.14	5.1-7.3	Low-----	0.20			

TABLE 18.--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
OgA----- Ockley	0-11	11-22	1.30-1.60	0.6-2.0	0.20-0.24	5.6-6.5	Low-----	0.37	5	5	1-2
	11-42	25-35	1.40-1.60	0.6-2.0	0.15-0.22	4.5-6.0	Moderate----	0.37			
	42-63	20-30	1.50-1.70	0.6-2.0	0.06-0.11	5.6-6.5	Low-----	0.24			
	63-70	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
OmB2, OmC2----- Octagon	0-8	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.28	4	6	2-4
	8-37	18-30	1.50-1.70	0.6-2.0	0.15-0.19	5.6-7.3	Low-----	0.28			
	37-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
OpC3----- Octagon	0-8	28-30	1.40-1.70	0.6-2.0	0.15-0.19	5.6-7.3	Low-----	0.28	3	6	1-2
	8-22	18-30	1.50-1.70	0.6-2.0	0.15-0.19	5.6-7.3	Low-----	0.28			
	22-28	12-20	1.50-1.70	0.6-2.0	0.15-0.19	6.6-7.8	Low-----	0.28			
	28-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
Ou----- Ouiatenon	0-6	5-18	1.40-1.70	2.0-6.0	0.13-0.15	7.4-8.4	Low-----	0.20	3	3	2-4
	6-18	0-10	1.50-1.70	6.0-20	0.06-0.11	7.4-8.4	Low-----	0.15			
	18-36	0-5	1.50-1.70	6.0-20	0.06-0.11	7.4-8.4	Low-----	0.15			
	36-60	0-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
Ox----- Ouiatenon	0-16	2-10	1.40-1.70	2.0-6.0	0.10-0.12	7.4-8.4	Low-----	0.17	3	2	1-3
	16-20	0-10	1.50-1.70	6.0-20	0.06-0.11	7.4-8.4	Low-----	0.15			
	20-48	0-5	1.50-1.70	6.0-20	0.06-0.11	7.4-8.4	Low-----	0.15			
	48-60	0-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
Oy----- Ouiatenon	0-13	8-18	1.40-1.70	2.0-6.0	0.16-0.18	7.4-8.4	Low-----	0.20	3	3	2-4
	13-21	2-10	1.50-1.70	6.0-20.0	0.09-0.11	7.4-8.4	Low-----	0.17			
	21-60	1-10	1.60-1.80	6.0-20.0	0.06-0.10	7.4-8.4	Low-----	0.15			
Pc----- Palms	0-36	---	0.25-0.45	0.6-6.0	0.35-0.45	5.1-7.8	-----	---	5	2	>75
	36-60	7-35	1.45-1.75	0.6-2.0	0.14-0.22	6.1-8.4	Low-----	0.37			
Pd----- Palms	0-42	---	0.25-0.45	2.0-6.0	0.35-0.45	5.1-7.8	-----	---	5	2	>75
	42-60	0-8	1.70-1.90	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
Pg----- Pella	0-15	28-35	1.20-1.60	0.6-2.0	0.21-0.23	6.1-7.8	Moderate----	0.28	5	7	4-6
	15-23	28-35	1.40-1.60	0.6-2.0	0.21-0.24	6.6-7.8	Moderate----	0.28			
	23-31	15-27	1.40-1.60	0.6-2.0	0.15-0.20	7.4-8.4	Low-----	0.28			
	31-60	15-30	1.50-1.70	0.6-2.0	0.10-0.22	7.4-8.4	Low-----	0.28			
Pk----- Peotone	0-19	28-40	1.20-1.60	0.2-0.6	0.21-0.23	5.6-7.3	Moderate----	0.28	5	4	4-7
	19-50	35-45	1.40-1.70	0.06-0.2	0.11-0.20	6.1-7.8	Moderate----	0.28			
	50-60	25-40	1.40-1.60	0.2-0.6	0.15-0.22	6.6-8.4	Moderate----	0.43			
PmB----- Pinevillage	0-8	7-18	1.40-1.70	2.0-6.0	0.11-0.13	7.4-8.4	Low-----	0.17	5	3	1-2
	8-45	7-18	1.50-1.70	2.0-6.0	0.07-0.15	7.4-8.4	Low-----	0.17			
	45-60	7-18	1.60-1.80	2.0-6.0	0.02-0.05	7.4-8.4	Low-----	0.17			
Pt. Pits											
RaB2----- Rainsville	0-9	13-25	1.30-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.37	5	5	1-3
	9-14	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.6-7.3	Moderate----	0.37			
	14-37	20-30	1.50-1.70	0.6-2.0	0.17-0.19	4.5-6.0	Low-----	0.37			
	37-41	15-30	1.50-1.70	0.6-2.0	0.14-0.18	4.5-6.0	Low-----	0.37			
	41-54	18-25	1.50-1.70	0.2-0.6	0.17-0.19	6.6-7.8	Low-----	0.37			
	54-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth		Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
	In	Pct						K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
<b>RcA:</b>											
<b>Raub</b>	0-11	20-27	1.30-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.28	5	6	2-4
	11-34	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-6.5	Moderate	0.37			
	34-53	20-32	1.50-1.70	0.2-0.6	0.15-0.19	6.1-7.3	Moderate	0.37			
	53-60	12-18	1.70-2.00	0.06-0.2	0.05-0.19	7.4-8.4	Low	0.37			
<b>Brenton</b>	0-11	20-27	1.30-1.60	0.6-2.0	0.22-0.24	5.6-7.8	Low	0.28	5	6	2-4
	11-38	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.28			
	38-52	18-27	1.50-1.70	0.6-2.0	0.15-0.19	5.6-7.8	Low	0.28			
	52-60	5-20	1.50-1.70	0.6-2.0	0.11-0.20	5.6-8.4	Low	0.28			
<b>RdA, RdB2, RdC2-- Richardville</b>	0-7	10-20	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.37	5	5	1-2
	7-13	28-34	1.40-1.60	0.6-2.0	0.18-0.20	5.6-6.5	Moderate	0.37			
	13-41	25-34	1.50-1.70	0.6-2.0	0.13-0.19	4.5-6.0	Moderate	0.37			
	41-51	18-30	1.50-1.70	0.6-2.0	0.13-0.19	6.1-7.3	Low	0.37			
	51-60	6-15	1.50-1.70	0.6-2.0	0.08-0.13	7.4-8.4	Low	0.28			
<b>RoB-- Rockfield</b>	0-10	12-24	1.30-1.60	0.6-2.0	0.22-0.24	4.5-7.3	Low	0.37	5	5	1-2
	10-25	25-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.0	Moderate	0.37			
	25-46	20-32	1.50-1.70	0.6-2.0	0.15-0.19	5.1-7.3	Moderate	0.37			
	46-67	18-27	1.50-1.70	0.2-0.6	0.17-0.19	6.6-7.8	Low	0.37			
	67-80	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low	0.37			
<b>RsF-- Rodman</b>	0-10	8-25	1.30-1.60	2.0-6.0	0.10-0.12	6.6-7.8	Low	0.20	3	8	2-4
	10-15	5-25	1.50-1.70	2.0-6.0	0.09-0.12	6.6-7.8	Low	0.20			
	15-60	0-10	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low	0.10			
<b>Rz-- Ross</b>	0-17	15-27	1.20-1.50	0.6-2.0	0.19-0.24	6.1-7.8	Low	0.32	5	5	3-5
	17-39	18-32	1.30-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Moderate	0.32			
	39-60	5-20	1.50-1.70	0.6-2.0	0.05-0.18	6.1-8.4	Low	0.32			
<b>Sd-- Saranac</b>	0-18	40-45	1.20-1.60	0.2-0.6	0.12-0.14	6.1-7.8	Moderate	0.28	5	4	3-6
	18-58	20-45	1.40-1.60	0.2-0.6	0.11-0.20	6.6-7.3	Moderate	0.43			
	58-70	3-10	1.60-1.80	6.0-20	0.02-0.11	7.4-7.8	Low	0.10			
<b>Sf-- Sawabash</b>	0-9	28-34	1.20-1.60	0.6-2.0	0.21-0.23	7.4-8.4	Moderate	0.28	5	4L	4-8
	9-46	28-34	1.40-1.60	0.6-2.0	0.18-0.20	7.4-8.4	Moderate	0.28			
	46-55	28-34	1.40-1.60	0.6-2.0	0.18-0.20	7.4-8.4	Moderate	0.43			
	55-60	28-34	1.40-1.60	0.6-2.0	0.18-0.20	7.4-8.4	Moderate	0.43			
<b>ShB-- Shadeland</b>	0-8	18-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-6.5	Low	0.37	4	6	1-2
	8-16	25-35	1.40-1.60	0.6-2.0	0.18-0.22	5.1-6.0	Moderate	0.43			
	16-27	28-35	1.50-1.70	0.6-2.0	0.15-0.19	4.5-6.0	Moderate	0.32			
	27-34	28-35	1.50-1.70	0.2-0.6	0.10-0.17	5.1-6.0	Moderate	0.32			
	34	---	---	---	---	---	---	---			
<b>SmA-- Sleeth</b>	0-10	11-22	1.30-1.60	0.6-2.0	0.20-0.24	6.6-7.3	Low	0.32	5	5	5-3
	10-47	20-35	1.50-1.70	0.6-2.0	0.15-0.19	5.6-6.5	Moderate	0.32			
	47-58	18-35	1.50-1.70	0.6-2.0	0.14-0.16	6.6-8.4	Moderate	0.32			
	58-70	2-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low	0.10			
<b>Sn-- Sloan</b>	0-16	28-33	1.30-1.60	0.6-2.0	0.16-0.19	6.1-7.8	Moderate	0.24	5	6	3-6
	16-32	22-35	1.50-1.70	0.6-2.0	0.15-0.19	6.1-8.4	Moderate	0.37			
	32-60	10-30	1.50-1.70	0.6-2.0	0.13-0.18	6.6-8.4	Low	0.37			
<b>So-- Sloan Variant</b>	0-10	28-34	1.20-1.60	0.6-2.0	0.21-0.23	7.4-8.4	Moderate	0.28	3	7	3-6
	10-17	28-34	1.40-1.60	0.6-2.0	0.18-0.20	7.4-8.4	Moderate	0.28			
	17-33	20-30	1.50-1.70	0.6-2.0	0.06-0.11	7.4-8.4	Low	0.28			
	33	---	---	---	---	---	---	---			

TABLE 18.--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
SrB, SrC Sparta	0-19	1-5	1.40-1.70	6.0-20	0.06-0.09	5.1-7.3	Low-----	0.17	5	1	.5-2
	19-48	1-8	1.50-1.70	6.0-20	0.05-0.11	5.1-7.3	Low-----	0.17			
	48-80	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-7.8	Low-----	0.17			
StC Spinks	0-9	0-10	1.40-1.70	6.0-20	0.06-0.08	5.1-7.3	Low-----	0.15	5	1	.5-1
	9-21	0-15	1.50-1.70	6.0-20	0.05-0.10	5.6-7.3	Low-----	0.17			
	21-68	3-15	1.50-1.70	2.0-6.0	0.04-0.08	5.6-7.8	Low-----	0.17			
	68-80	0-10	1.50-1.70	6.0-20	0.04-0.06	6.6-8.4	Low-----	0.17			
SwA: Starks	0-10	18-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	5	6	1-3
	10-38	28-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-6.5	Moderate----	0.37			
	38-56	18-27	1.50-1.70	0.6-2.0	0.16-0.19	5.1-7.8	Low-----	0.37			
	56-70	5-20	1.50-1.70	0.6-2.0	0.08-0.18	5.1-7.8	Low-----	0.37			
Fincastle	0-10	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	5	5	1-3
	10-39	25-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Moderate----	0.37			
	39-54	18-32	1.50-1.70	0.2-0.6	0.15-0.19	5.1-7.8	Moderate----	0.37			
	54-60	12-18	1.70-2.00	0.06-0.2	0.05-0.19	7.4-8.4	Low-----	0.37			
SyF: Strawn	0-9	18-27	1.30-1.60	0.6-2.0	0.20-0.24	6.1-7.3	Low-----	0.37	5	6	1-3
	9-16	18-35	1.50-1.70	0.6-2.0	0.15-0.20	5.6-7.8	Moderate----	0.37			
	16-60	12-18	1.70-2.00	0.2-0.6	0.08-0.12	7.4-8.4	Low-----	0.37			
Rodman	0-5	5-20	1.40-1.70	2.0-6.0	0.09-0.12	6.6-7.8	Low-----	0.15	3	8	2-4
	5-15	5-25	1.50-1.70	2.0-6.0	0.09-0.12	6.6-7.8	Low-----	0.20			
	15-60	0-10	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
TbA Tecumseh	0-15	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low-----	0.32	5	5	2-4
	15-30	28-34	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Moderate----	0.43			
	30-48	15-30	1.50-1.70	0.6-2.0	0.15-0.19	5.1-6.5	Low-----	0.32			
	48-65	15-25	1.50-1.70	0.6-2.0	0.17-0.19	6.1-7.3	Low-----	0.32			
	65-75	15-20	1.50-1.70	0.6-2.0	0.16-0.18	7.4-8.4	Low-----	0.32			
	75-80	8-18	1.55-1.70	0.6-2.0	0.08-0.13	7.4-8.4	Low-----	0.37			
TcA Thackery	0-10	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	4	5	1-3
	10-16	25-35	1.40-1.60	0.6-2.0	0.17-0.22	5.1-6.5	Moderate----	0.37			
	16-48	20-35	1.50-1.70	0.6-2.0	0.13-0.18	5.1-7.8	Moderate----	0.37			
	48-54	15-27	1.50-1.70	2.0-6.0	0.04-0.10	6.1-7.8	Low-----	0.10			
	54-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-7.8	Low-----	0.10			
TfB Throckmorton	0-9	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.32	5	5	1-3
	9-34	25-34	1.40-1.60	0.6-2.0	0.18-0.22	4.5-6.5	Moderate----	0.43			
	34-45	15-30	1.50-1.70	0.6-2.0	0.11-0.22	4.5-6.0	Low-----	0.32			
	45-58	15-25	1.50-1.70	0.2-0.6	0.15-0.19	6.1-7.3	Low-----	0.32			
	58-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
Tg Tice	0-14	28-35	1.20-1.60	0.6-2.0	0.21-0.24	6.1-7.8	Moderate----	0.32	5	7	2-3
	14-50	27-40	1.40-1.60	0.6-2.0	0.18-0.20	5.6-7.8	Moderate----	0.32			
	50-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Low-----	0.32			
TmA: Toronto	0-9	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-6.5	Low-----	0.32	5	5	2-4
	9-27	25-40	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.0	Moderate----	0.32			
	27-52	15-40	1.50-1.70	0.2-0.6	0.15-0.19	5.6-7.8	Moderate----	0.32			
	52-60	12-18	1.70-2.00	0.06-0.2	0.05-0.19	7.9-8.4	Low-----	0.32			
Millbrook	0-9	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.8	Low-----	0.32	5	6	2-4
	9-37	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate----	0.43			
	37-49	18-35	1.50-1.70	0.6-2.0	0.12-0.19	5.1-7.3	Moderate----	0.32			
	49-60	5-20	1.50-1.70	0.6-2.0	0.11-0.19	5.6-8.4	Low-----	0.32			

TABLE 18.--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 erodi- bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
<b>TnB2:</b>											
<b>Toronto</b> -----	0-9	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-6.5	Low-----	0.32	5	5	3-5
	9-25	28-40	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.0	Moderate----	0.32			
	25-42	15-40	1.50-1.70	0.2-0.6	0.15-0.19	5.6-7.8	Moderate----	0.32			
	42-60	12-18	1.70-2.00	0.06-0.2	0.05-0.19	7.9-8.4	Low-----	0.32			
<b>Octagon</b> -----	0-8	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.28	4	6	2-4
	8-37	18-30	1.50-1.70	0.6-2.0	0.15-0.19	5.6-7.3	Low-----	0.28			
	37-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
<b>TtA</b> -----	0-12	27-35	1.20-1.60	0.6-2.0	0.21-0.23	5.6-6.5	Moderate----	0.28	5	4	3-8
<b>Troxel</b>	12-42	20-35	1.40-1.60	0.6-2.0	0.20-0.22	5.6-6.5	Moderate----	0.28			
	42-71	12-27	1.50-1.70	0.6-2.0	0.15-0.20	5.6-6.5	Low-----	0.28			
	71-80	2-10	1.60-1.80	0.6-2.0	0.09-0.19	6.6-7.8	Low-----	0.28			
<b>Ua.</b> <b>Udorthents</b>											
<b>UbB:</b> <b>Urban land.</b>											
<b>Billett</b> -----	0-8	8-15	1.40-1.70	2.0-6.0	0.20-0.22	4.5-7.3	Low-----	0.28	4	5	1-3
	8-20	10-20	1.50-1.70	2.0-6.0	0.12-0.19	5.1-7.3	Low-----	0.32			
	20-30	10-18	1.50-1.70	2.0-6.0	0.11-0.16	5.1-7.3	Low-----	0.24			
	30-43	5-15	1.60-1.80	6.0-20	0.08-0.10	5.6-7.3	Low-----	0.17			
	43-60	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.10			
<b>UcA:</b> <b>Urban land.</b>											
<b>Carmi</b> -----	0-19	10-20	1.30-1.60	2.0-6.0	0.13-0.20	5.1-7.8	Low-----	0.28	4	5	2-4
	19-43	5-22	1.40-1.70	2.0-6.0	0.12-0.19	4.5-7.8	Low-----	0.20			
	43-60	1-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low-----	0.15			
<b>UmB, UmC:</b> <b>Urban land.</b>											
<b>Miami</b> -----	0-10	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	4	5	1-2
	10-23	25-35	1.50-1.70	0.6-2.0	0.15-0.20	5.1-6.0	Moderate----	0.37			
	23-36	18-27	1.50-1.70	0.2-0.6	0.14-0.19	6.6-7.8	Low-----	0.37			
	36-60	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			
<b>UsA:</b> <b>Urban land.</b>											
<b>Starks</b> -----	0-9	18-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	5	6	1-3
	9-32	28-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-6.5	Moderate----	0.37			
	32-57	18-30	1.50-1.70	0.6-2.0	0.16-0.19	5.1-7.8	Low-----	0.37			
	57-70	5-20	1.50-1.70	0.6-2.0	0.08-0.18	5.1-7.8	Low-----	0.37			
<b>Fincastle</b> -----	0-11	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	5	5	1-3
	11-38	25-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.5	Moderate----	0.37			
	38-46	18-32	1.50-1.70	0.2-0.6	0.15-0.19	5.1-7.8	Moderate----	0.37			
	46-60	12-18	1.70-2.00	0.06-0.2	0.05-0.19	7.4-8.4	Low-----	0.37			
<b>Wb</b> -----	0-10	20-27	1.20-1.60	0.6-2.0	0.22-0.24	7.4-8.4	Low-----	0.32	5	5	1-6
<b>Walkill</b>	10-27	15-27	1.40-1.60	0.2-0.6	0.18-0.20	6.1-7.3	Low-----	0.37			
	27-54	---	0.10-0.30	0.2-6.0	0.35-0.45	5.6-7.3	-----	-----			
	54-60	18-35	0.30-1.10	0.06-0.2	0.18-0.24	5.1-7.3	Moderate----	0.28			

TABLE 18.--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
We----- Washtenaw	0-10	15-27	1.30-1.60	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.37	5	6	2-6
	10-23	15-27	1.30-1.60	0.6-2.0	0.20-0.22	6.1-7.3	Low-----	0.37			
	23-50	28-35	1.40-1.60	0.06-0.2	0.15-0.20	6.1-7.3	Moderate----	0.37			
	50-70	15-25	1.70-1.90	0.06-0.2	0.05-0.19	7.4-8.4	Low-----	0.37			
WgA----- Waupecan	0-11	15-27	1.20-1.60	0.6-2.0	0.22-0.24	6.1-7.8	Low-----	0.32	5	6	2-4
	11-35	25-35	1.40-1.60	0.6-2.0	0.18-0.22	5.6-7.3	Moderate----	0.43			
	35-61	10-30	1.50-1.70	2.0-6.0	0.08-0.18	5.6-7.3	Low-----	0.10			
	61-70	1-5	1.60-1.80	>20	0.02-0.04	6.6-8.4	Low-----	0.10			
WhA----- Waupecan	0-15	15-27	1.20-1.60	0.6-2.0	0.22-0.24	6.1-7.8	Low-----	0.32	5	6	2-4
	15-36	25-35	1.40-1.60	0.6-2.0	0.18-0.22	5.6-7.3	Moderate----	0.43			
	36-58	10-30	1.50-1.60	2.0-6.0	0.08-0.18	5.6-7.3	Low-----	0.10			
	58-65	1-5	1.60-1.80	>20	0.02-0.04	6.6-8.4	Low-----	0.10			
WmA----- Waynetown	0-10	15-27	1.30-1.60	0.6-2.0	0.22-0.24	5.1-7.3	Low-----	0.37	5	5	1-2
	10-26	28-34	1.40-1.60	0.6-2.0	0.18-0.22	5.6-6.5	Moderate----	0.37			
	26-32	20-30	1.50-1.70	0.6-2.0	0.13-0.17	5.6-6.5	Low-----	0.37			
	32-53	18-30	1.50-1.70	0.6-2.0	0.06-0.13	6.6-7.8	Low-----	0.28			
	53-60	1-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low-----	0.10			
WtA----- Wea	0-10	15-27	1.20-1.60	0.6-2.0	0.22-0.24	6.1-7.3	Low-----	0.28	5	5	2-4
	10-25	18-27	1.40-1.60	0.6-2.0	0.17-0.22	6.1-7.3	Low-----	0.28			
	25-31	20-30	1.50-1.70	0.6-2.0	0.15-0.19	6.1-7.3	Low-----	0.28			
	31-64	15-30	1.50-1.70	0.6-2.0	0.11-0.17	6.1-7.3	Low-----	0.28			
	64-70	1-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low-----	0.17			
WuA----- Whitaker	0-10	15-27	1.30-1.60	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.37	5	5	1-3
	10-17	20-27	1.40-1.60	0.6-2.0	0.18-0.20	5.6-7.3	Low-----	0.37			
	17-50	20-34	1.50-1.70	0.6-2.0	0.15-0.19	5.1-7.8	Moderate----	0.37			
	50-58	3-15	1.50-1.70	0.6-2.0	0.10-0.20	6.6-8.4	Low-----	0.37			
	58-70	12-18	1.70-2.00	0.06-0.2	0.05-0.10	7.4-8.4	Low-----	0.37			

TABLE 19.--WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
Am----- Allison	B	Rare-----	---	---	Ft >6.0	---	---
Ap----- Allison	B	Frequent-----	Very brief to long.	Jan-May	>6.0	---	---
AtB2: Alvin-----	B	None-----	---	---	>6.0	---	---
Spinks-----	A	None-----	---	---	>6.0	---	---
Ba----- Battleground	B	Rare-----	---	---	>6.0	---	---
Bb----- Battleground	B	Frequent-----	Brief or long	Nov-Jun	>6.0	---	---
BgA----- Beecher	C	None-----	---	---	1.0-3.0	Perched	Dec-Jun
BkF----- Berks	C	None-----	---	---	>6.0	---	---
B1A, B1B2----- Billett	B	None-----	---	---	>6.0	---	---
BmA----- Billett	B	None-----	---	---	3.0-6.0	Apparent	Nov-Apr
BnA, BnB2----- Billett	B	None-----	---	---	>6.0	---	---
BoA----- Bowes	B	None-----	---	---	>6.0	---	---
BpA----- Bowes Variant	B	None-----	---	---	2.0-6.0	Apparent	Dec-May
CaA----- Camden	B	None-----	---	---	>6.0	---	---
CfB, CgA----- Carmi	B	None-----	---	---	>6.0	---	---
Ck----- Ceresco	B	Rare-----	---	---	1.0-2.0	Apparent	Sep-May
Cl----- Ceresco	B	Occasional-----	Brief-----	Jan-May	1.0-2.0	Apparent	Sep-May
Cm----- Chalmers	B/D	None-----	---	---	+ .5-1.0	Apparent	Dec-May
Co----- Cohoctah	B/D	Rare-----	---	---	+ .5-1.0	Apparent	Sep-May

TABLE 19.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
Cp----- Cohoctah	B/D	Occasional-----	Brief-----	Jan-Dec	+5-1.0	Apparent	Sep-May
CrC----- Coloma	A	None-----	---	---	>6.0	---	---
CtA----- Crosby	C	None-----	---	---	1.0-3.0	Perched	Jan-Apr
CwB2: Crosby-----	C	None-----	---	---	1.0-3.0	Perched	Jan-Apr
Miami-----	B	None-----	---	---	>6.0	---	---
DmC2, DoC2----- Desker	A	None-----	---	---	>6.0	---	---
Dpd2: Desker-----	A	None-----	---	---	>6.0	---	---
Rodman-----	A	None-----	---	---	>6.0	---	---
Du----- Drummer	B/D	None-----	---	---	+5-2.0	Apparent	Mar-Jun
Dy----- Du Page	B	Frequent-----	Very brief to long.	Jan-Jun	>6.0	---	---
EkA, EmA----- Elston	B	None-----	---	---	>6.0	---	---
FcB: Fincastle-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Crosby-----	C	None-----	---	---	1.0-3.0	Perched	Jan-Apr
Hd----- Harpster	B/D	None-----	---	---	+5-2.0	Apparent	Feb-Jun
HfB2, HfC2----- High Gap Variant	B	None-----	---	---	2.0-3.5	Perched	Jan-May
HnB, HoA----- Hononegah	A	None-----	---	---	>6.0	---	---
Hv----- Houghton	A/D	None-----	---	---	+1-1.0	Apparent	Sep-Jun
KaA, KaB2, KbB2, KcB2, KcC2----- Kalamazoo	B	None-----	---	---	>6.0	---	---
KoD2, KpC3----- Kosciusko	B	None-----	---	---	>6.0	---	---
LaA----- Lafayette	B	None-----	---	---	1.0-3.0	Apparent	Jan-May
LeA----- La Hogue	B	None-----	---	---	1.0-3.0	Apparent	Jan-May

TABLE 19.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
Lm----- Lash	B	Frequent-----	Brief or long	Nov-Apr	Ft >6.0	---	---
LnA, LnB2----- Lauramie	B	None-----	---	---	>6.0	---	---
LoA, LoB----- Linkville	B	None-----	---	---	>6.0	---	---
LvB2, LwB2----- Longlois	B	None-----	---	---	>6.0	---	---
Mb----- Mahalasville	B/D	None-----	---	---	+5-1.0	Apparent	Dec-May
Mc----- Mahalasville	B/D	None-----	---	---	+5-1.0	Perched	Dec-May
Md: Mahalasville-----	B/D	None-----	---	---	+5-1.0	Apparent	Dec-May
Treaty-----	B/D	None-----	---	---	+5-1.0	Apparent	Dec-May
MmB2----- Marker	B	None-----	---	---	1.5-3.0	Apparent	Dec-May
MoA----- Mellott	B	None-----	---	---	>6.0	---	---
Msc2, MsD2, MtC3, MtD3-- Miami	B	None-----	---	---	>6.0	---	---
Mu----- Milford	B/D	None-----	---	---	+2-1.0	Apparent	Dec-Jun
MwA----- Mulvey	B	None-----	---	---	1.0-3.0	Apparent	Dec-May
Mz----- Muskego	A/D	None-----	---	---	+1-1.0	Apparent	Nov-Aug
OaB2: Oakville-----	A	None-----	---	---	>6.0	---	---
Billett-----	B	None-----	---	---	3.0-6.0	Apparent	Nov-Apr
OgA----- Ockley	B	None-----	---	---	>6.0	---	---
OmB2, OmC2, OpC3----- Octagon	B	None-----	---	---	>6.0	---	---
Ou----- Ouiatenon	A	Frequent-----	Brief-----	Nov-May	>6.0	---	---
Ox----- Ouiatenon	A	Occasional-----	Brief-----	Nov-May	>6.0	---	---
Oy----- Ouiatenon	A	Frequent-----	Brief or long	Nov-Jun	>6.0	---	---
Pc----- Palms	A/D	None-----	---	---	+1-1.0	Apparent	Nov-May

TABLE 19.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
Pd----- Palms	A/D	None-----	---	---	<u>Ft</u> +1-1.0	Apparent	Nov-Jun
Pg----- Pella	B/D	None-----	---	---	+5-2.0	Apparent	Dec-Jun
Pk----- Peotone	C/D	None-----	---	---	+2-1.0	Apparent	Nov-Jun
PmB----- Pinevillage	B	Rare-----	---	---	>6.0	---	---
Pt. Pits							
RaB2----- Rainsville	B	None-----	---	---	2.5-4.0	Apparent	Dec-May
RcA: Raub-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Brenton-----	B	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
RdA, RdB2, RdC2----- Richardville	B	None-----	---	---	>6.0	---	---
RoB----- Rockfield	B	None-----	---	---	2.5-4.0	Apparent	Dec-Apr
Rsf----- Rodman	A	None-----	---	---	>6.0	---	---
Rz----- Ross	B	Rare-----	---	---	>6.0	---	---
Sd----- Saranac	C	Occasional-----	Brief-----	Dec-May	+5-1.0	Apparent	Dec-Jun
Sf----- Sawabash	B/D	Frequent-----	Brief or long	Nov-Jun	+5-1.0	Apparent	Nov-Jun
ShB----- Shadeland	C	None-----	---	---	1.0-2.0	Perched	Dec-May
SmA----- Sleeth	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Sn----- Sloan	B/D	Occasional-----	Brief-----	Nov-Jun	+5-1.0	Apparent	Nov-Jun
So----- Sloan Variant	B	Occasional-----	Brief or long	Nov-Jun	+5-1.0	Perched	Nov-Jun
SrB, SrC----- Sparta	A	None-----	---	---	>6.0	---	---
StC----- Spinks	A	None-----	---	---	>6.0	---	---
SwA: Starks-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Fincastle-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr

TABLE 19.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
SyF: Strawn-----	B	None-----	---	---	>6.0	---	---
Rodman-----	A	None-----	---	---	>6.0	---	---
TbA----- Tecumseh	B	None-----	---	---	>6.0	---	---
TcA----- Thackery	B	None-----	---	---	2.0-3.5	Apparent	Jan-Apr
TfB----- Throckmorton	B	None-----	---	---	2.5-4.0	Apparent	Dec-May
Tg----- Tice	B	Frequent-----	Very brief to long.	Jan-Jun	1.5-3.0	Apparent	Mar-Jun
TmA: Toronto-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Millbrook-----	B	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
TnB2: Toronto-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Octagon-----	B	None-----	---	---	>6.0	---	---
TtA----- Troxel	B	None-----	---	---	>6.0	---	---
Ua. Udorthents							
UbB: Urban land. Billett-----	B	None-----	---	---	>6.0	---	---
UcA: Urban land. Carmi-----	B	None-----	---	---	>6.0	---	---
UmB, UmC: Urban land. Miami-----	B	None-----	---	---	>6.0	---	---
UsA: Urban land. Starks-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Fincastle-----	C	None-----	---	---	1.0-3.0	Apparent	Jan-Apr
Wb----- Wallkill	C/D	None-----	---	---	+1-1.0	Apparent	Sep-Jun
We----- Washtenaw	C/D	None-----	---	---	+1.5-1.0	Apparent	Dec-May
WgA----- Waupecan	B	None-----	---	---	>6.0	---	---

TABLE 19.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
WhA----- Waupecan	B	None-----	---	---	<u>Ft</u> 3.0-6.0	Apparent	Mar-May
WmA----- Waynetown	C	None-----	---	---	1.0-3.0	Apparent	Dec-May
WtA----- Wea	B	Occasional-----	Brief or long	Nov-Jun	>6.0	---	---
WuA----- Whitaker	C	None-----	---	---	1.0-3.0	Apparent	Dec-May

TABLE 20.--SOIL FEATURES

(The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
Am----- Allison	>60	---	---	---	High-----	High-----	Low.
Ap----- Allison	>60	---	---	---	High-----	High-----	Low.
AtB2: Alvin-----	>60	---	---	---	Moderate-----	Low-----	High.
Spinks-----	>60	---	---	---	Low-----	Low-----	Low.
Ba----- Battleground	>60	---	---	---	High-----	Low-----	Low.
Bb----- Battleground	>60	---	---	---	High-----	Low-----	Low.
BgA----- Beecher	>60	---	---	---	High-----	High-----	High.
BkF----- Berks	20-40	Soft	---	---	Low-----	Low-----	High.
B1A, B1B2, BmA, BnA, BnB2----- Billett	>60	---	---	---	Moderate-----	Low-----	Moderate.
BoA----- Bowes	>60	---	---	---	High-----	Moderate-----	Moderate.
BpA----- Bowes Variant	>60	---	---	---	High-----	Moderate-----	Moderate.
CaA----- Camden	>60	---	---	---	High-----	Low-----	Moderate.
CfB, CgA----- Carmi	>60	---	---	---	Moderate-----	Low-----	High.
Ck----- Ceresco	>60	---	---	---	High-----	Low-----	Moderate.
Cl----- Ceresco	>60	---	---	---	High-----	Low-----	Moderate.
Cm----- Chalmers	>60	---	---	---	High-----	High-----	Low.
Co----- Cohoctah	>60	---	---	---	High-----	High-----	Low.
Cp----- Cohoctah	>60	---	---	---	High-----	High-----	Low.
CrC----- Coloma	>60	---	---	---	Low-----	Low-----	Moderate.

TABLE 20.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
CtA----- Crosby	>60	---	---	---	High-----	High-----	Moderate.
CwB2: Crosby-----	>60	---	---	---	High-----	High-----	Moderate.
Miami-----	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
DmC2, DoC2----- Desker	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
DpD2: Desker-----	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
Rodman-----	>60	---	---	---	Low-----	Low-----	Low.
Du----- Drummer	>60	---	---	---	High-----	High-----	Moderate.
Dy----- Du Page	>60	---	---	---	Moderate-----	Low-----	Low.
EkA, EmA----- Elston	>60	---	---	---	Moderate-----	Low-----	Moderate.
FcB: Fincastle-----	>60	---	---	---	High-----	High-----	Moderate.
Crosby-----	>60	---	---	---	High-----	High-----	Moderate.
Hd----- Harpster	>60	---	---	---	High-----	High-----	Low.
HfB2, HfC2----- High Gap Variant	20-40	Soft	---	---	Moderate-----	High-----	High.
HnB, HoA----- Hononegah	>60	---	---	---	Low-----	Low-----	Low.
Hv----- Houghton	>60	---	1-4	55-60	High-----	High-----	Low.
KaA, KaB2, KkB2, KcB2, KcC2----- Kalamazoo	>60	---	---	---	Moderate-----	Low-----	Low.
KoD2, KpC3----- Kosciusko	>60	---	---	---	Moderate-----	Low-----	Moderate.
LaA----- Lafayette	>60	---	---	---	High-----	High-----	Moderate.
LeA----- La Hogue	>60	---	---	---	High-----	High-----	Moderate.
Lm----- Lash	>60	---	---	---	Moderate-----	Low-----	Low.

TABLE 20.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
LnA, LnB2----- Lauramie	>60	---	---	---	Moderate-----	Moderate-----	High.
LoA, LoB----- Linkville	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
LvB2, LwB2----- Longlois	>60	---	---	---	Moderate-----	Moderate-----	High.
Mb----- Mahalasville	>60	---	---	---	High-----	High-----	Low.
Mc----- Mahalasville	40-60	Soft	---	---	High-----	High-----	Low.
Md: Mahalasville-----	>60	---	---	---	High-----	High-----	Low.
Treaty-----	>60	---	---	---	High-----	High-----	Low.
MmB2----- Marker	>60	---	---	---	High-----	Moderate-----	Moderate.
MoA----- Mellott	>60	---	---	---	High-----	Moderate-----	Moderate.
MsC2, MsD2, MtC3, MtD3-- Miami	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
Mu----- Milford	>60	---	---	---	High-----	Moderate-----	Low.
MwA----- Mulvey	>60	---	---	---	High-----	High-----	High.
Mz----- Muskego	>60	---	---	35-45	High-----	Moderate-----	Moderate.
OaB2: Oakville-----	>60	---	---	---	Low-----	Low-----	Moderate.
Billett-----	>60	---	---	---	Moderate-----	Low-----	Moderate.
OgA----- Ockley	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
OmB2, OmC2, OpC3----- Octagon	>60	---	---	---	Moderate-----	High-----	Moderate.
Ou----- Ouiatenon	>60	---	---	---	Low-----	Low-----	Low.
Ox----- Ouiatenon	>60	---	---	---	Low-----	Low-----	Low.
Oy----- Ouiatenon	>60	---	---	---	Low-----	Low-----	Low.
Pc----- Palms	>60	---	2-4	25-32	High-----	High-----	Moderate.

TABLE 20.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
Pd----- Palms	>60	---	2-4	25-30	High-----	High-----	High.
Pg----- Pella	>60	---	---	---	High-----	High-----	Low.
Pk----- Peotone	>60	---	---	---	High-----	High-----	Moderate.
PmB----- Pinevillage	>60	---	---	---	Moderate-----	Low-----	Low.
Pt. Pits							
RaB2----- Rainsville	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
RcA: Raub-----	>60	---	---	---	High-----	High-----	Moderate.
Brenton-----	>60	---	---	---	High-----	High-----	Moderate.
RdA, RdB2, RdC2----- Richardville	>60	---	---	---	Moderate-----	Moderate-----	High.
RoB----- Rockfield	>60	---	---	---	High-----	High-----	Moderate.
RsF----- Rodman	>60	---	---	---	Low-----	Low-----	Low.
Rz----- Ross	>60	---	---	---	Moderate-----	Low-----	Low.
Sd----- Saranac	>60	---	---	---	High-----	High-----	Low.
Sf----- Sawabash	>60	---	---	---	High-----	High-----	Low.
ShB----- Shadeland	20-40	Soft	---	---	High-----	High-----	Moderate.
SmA----- Sleeth	>60	---	---	---	High-----	High-----	Low.
Sn----- Sloan	>60	---	---	---	High-----	High-----	Low.
So----- Sloan Variant	20-40	Soft	---	---	High-----	High-----	Low.
SrB, SrC----- Sparta	>60	---	---	---	Low-----	Low-----	Moderate.
StC----- Spinks	>60	---	---	---	Low-----	Low-----	Low.
SwA: Starks-----	>60	---	---	---	High-----	High-----	Moderate.

TABLE 20.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
SwA: Fincastle-----	>60	---	---	---	High-----	High-----	Moderate.
SyF: Strawn-----	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
Rodman-----	>60	---	---	---	Low-----	Low-----	Low.
TbA----- Tecumseh	>60	---	---	---	High-----	Moderate-----	Moderate.
TcA----- Thackery	>60	---	---	---	High-----	Moderate-----	Moderate.
TfB----- Throckmorton	>60	---	---	---	High-----	Moderate-----	High.
Tg----- Tice	>60	---	---	---	High-----	High-----	Low.
TmA: Toronto-----	>60	---	---	---	High-----	High-----	High.
Millbrook-----	>60	---	---	---	High-----	High-----	Moderate.
TnB2: Toronto-----	>60	---	---	---	High-----	High-----	High.
Octagon-----	>60	---	---	---	Moderate-----	High-----	Moderate.
TtA----- Troxel	>60	---	---	---	High-----	Low-----	Moderate.
Ua. Udorthents							
UbB: Urban land.							
Billett-----	>60	---	---	---	Moderate-----	Low-----	Moderate.
UcA: Urban land.							
Carmi-----	>60	---	---	---	Moderate-----	Low-----	High.
UmB, UmC: Urban land.							
Miami-----	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
UsA: Urban land.							
Starks-----	>60	---	---	---	High-----	High-----	Moderate.
Fincastle-----	>60	---	---	---	High-----	High-----	Moderate.
Wb----- Wallkill	>60	---	---	2-10	High-----	High-----	Low.

TABLE 20.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	<u>In</u>		<u>In</u>	<u>In</u>			
We----- Washtenaw	>60	---	---	---	High-----	High-----	Low.
WgA, WhA----- Waupecan	>60	---	---	---	High-----	Moderate-----	Moderate.
WmA----- Waynetown	>60	---	---	---	High-----	High-----	Moderate.
WtA----- Wea	>60	---	---	---	Moderate-----	Moderate-----	Moderate.
WuA----- Whitaker	>60	---	---	---	High-----	High-----	Moderate.

TABLE 21.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; UN, Unified; and NP, nonplastic)

Soil name and location	Parent material	Report number	Depth	Moisture density		Percentage passing sieve--				Percentage smaller than--				LL	PI	Classi- fication		
				MAX	OPT	No. 4	No. 10	No. 40	No. 200	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO	UN	
			In	Lb/ cu ft	Pct													
Drummer silty clay loam: 2,540 feet east and 100 feet south of the northwest corner of sec. 6, T. 22 N., R. 3 W.	About 54 inches of silty material over glaciofluvial deposits.	S83-IN-157	3-1	0-9	100	20	---	99	98	90	---	---	---	25	41	17	A-7-6	CL
			3-4	17-23	100	21	---	99	97	87	---	---	---	30	50	29	A-7-6	CL, CH
			3-8	54-70	107	19	---	99	97	84	---	---	---	28	45	25	A-7-6	CL
			3-9	70-80	125	11	---	91	84	56	---	---	---	14	22	7	A-4	CL-ML, CL
Mahalasville silty clay loam: 1,600 feet east and 50 feet south of the northwest corner of sec. 32, T. 23 N., R. 3 W.	About 38 inches of silty material over glaciofluvial deposits.	S83-IN-157	19-1	0-10	98	22	---	100	98	92	---	---	---	30	44	19	A-7-6	CL
			19-3	13-19	100	22	---	100	100	97	---	---	---	39	58	38	A-7-6	CH
			19-6	38-50	117	14	---	100	97	74	---	---	---	16	26	10	A-4	CL
			19-7	50-60	113	12	---	99	89	17	---	---	---	17	NP	NP	A-2-4	SM
Millbrook silt loam: 1,910 feet west and 440 feet south of the northeast corner of sec. 4, T. 21 N., R. 4 W.	About 29 inches of silty material over glaciofluvial deposits.	S84-IN-157	33-1	0-9	108	17	---	100	98	82	---	---	---	18	28	8	A-4	CL
			33-4	20-29	107	19	---	100	100	96	---	---	---	39	45	21	A-7-6	CL
			33-5	29-37	107	18	---	100	99	91	---	---	---	29	38	18	A-6	CL
			33-7	49-60	124	10	---	100	96	64	---	---	---	7	NP	NP	A-4	ML
33-8	49-60	123	10	---	100	97	34	---	---	---	6	NP	NP	A-2-4	SM			
Waupecan silt loam: 2,250 feet east and 2,120 feet south of the northwest corner of sec. 10, T. 22 N., R. 4 W.	About 35 inches of silty material over gravelly outwash.	S83-IN-157	2-1	0-11	106	16	---	100	99	92	---	---	---	17	28	21	A-6	CL
			2-4	24-35	103	21	---	100	99	94	---	---	---	29	40	21	A-6	CL
			2-5	35-44	109	17	---	97	91	66	---	---	---	26	37	19	A-6	CL
			2-8	61-70	121	12	---	70	27	4	---	---	---	4	NP	NP	A-1-b	SP

TABLE 22.--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
Allison-----	Fine-silty, mixed, mesic Cumulic Hapludolls
Alvin-----	Coarse-loamy, mixed, mesic Typic Hapludalfs
Battleground-----	Fine-silty, mixed, mesic Fluventic Hapludolls
Beecher-----	Fine, illitic, mesic Udollic Ochraqualfs
Berks-----	Loamy-skeletal, mixed, mesic Typic Dystrachrepts
Billett-----	Coarse-loamy, mixed, mesic Mollic Hapludalfs
Bowes-----	Fine-silty, mixed, mesic Mollic Hapludalfs
Bowes Variant-----	Fine-silty, mixed, mesic Mollic Hapludalfs
Brenton-----	Fine-silty, mixed, mesic Aquic Argiudolls
Camden-----	Fine-silty, mixed, mesic Typic Hapludalfs
Carmi-----	Coarse-loamy, mixed, mesic Typic Hapludolls
Ceresco-----	Coarse-loamy, mixed, mesic Fluvaquentic Hapludolls
Chalmers-----	Fine-silty, mixed, mesic Typic Haplaquolls
Cohoctah-----	Coarse-loamy, mixed, mesic Fluvaquentic Haplaquolls
Coloma-----	Mixed, mesic Alfic Udipsamments
*Crosby-----	Fine, mixed, mesic Aeric Ochraqualfs
Desker-----	Coarse-loamy, mixed, mesic Mollic Hapludalfs
Drummer-----	Fine-silty, mixed, mesic Typic Haplaquolls
Du Page-----	Fine-loamy, mixed, mesic Cumulic Hapludolls
*Elston-----	Coarse-loamy, mixed, mesic Typic Argiudolls
Fincastle-----	Fine-silty, mixed, mesic Aeric Ochraqualfs
Harpster-----	Fine-silty, mesic Typic Calcicquolls
High Gap Variant-----	Fine-loamy, mixed, mesic Ultic Hapludalfs
Hononegah-----	Sandy, mixed, mesic Entic Hapludolls
Houghton-----	Euic, mesic Typic Medisaprists
Kalamazoo-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Kosciusko-----	Fine-loamy, mixed, mesic Typic Hapludalfs
La Hogue-----	Fine-loamy, mixed, mesic Aquic Argiudolls
*Lafayette-----	Fine-silty, mixed, mesic Aquic Argiudolls
Lash-----	Coarse-loamy, mixed, mesic Fluventic Hapludolls
Lauramie-----	Fine-loamy, mixed, mesic Mollic Hapludalfs
Linkville-----	Fine-loamy, mixed, mesic Typic Argiudolls
Longlois-----	Fine-loamy, mixed, mesic Mollic Hapludalfs
Mahalasville-----	Fine-silty, mixed, mesic Typic Argiaquolls
Marker-----	Fine-loamy, mixed, mesic Aquollic Hapludalfs
Mellott-----	Fine-silty, mixed, mesic Mollic Hapludalfs
Miami-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Milford-----	Fine, mixed, mesic Typic Haplaquolls
Millbrook-----	Fine-silty, mixed, mesic Udollic Ochraqualfs
Mulvey-----	Fine-silty, mixed, mesic Udollic Ochraqualfs
Muskego-----	Coprogenous, euic, mesic Limnic Medisaprists
Oakville-----	Mixed, mesic Typic Udipsamments
Ockley-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Octagon-----	Fine-loamy, mixed, mesic Mollic Hapludalfs
Ouiatenon-----	Sandy, mixed, mesic Fluventic Hapludolls
Palms-----	Loamy, mixed, euic, mesic Terric Medisaprists
Pella-----	Fine-silty, mixed, mesic Typic Haplaquolls
Peotone-----	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Pinevillage-----	Loamy-skeletal, mixed (calcareous), mesic Typic Udifluvents
Rainsville-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Raub-----	Fine-silty, mixed, mesic Aquic Argiudolls
Richardville-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Rockfield-----	Fine-silty, mixed, mesic Typic Hapludalfs
*Rodman-----	Sandy-skeletal, mixed, mesic Typic Hapludolls
Ross-----	Fine-loamy, mixed, mesic Cumulic Hapludolls
Saranac-----	Fine, mixed, mesic Fluvaquentic Haplaquolls
Sawabash-----	Fine-silty, mixed (calcareous), mesic Cumulic Haplaquolls
Shadeland-----	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Sleeth-----	Fine-loamy, mixed, mesic Aeric Ochraqualfs
Sloan-----	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls

TABLE 22.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Sloan Variant-----	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
*Sparta-----	Sandy, mixed, mesic Entic Hapludolls
Spinks-----	Sandy, mixed, mesic Psammentic Hapludalfs
Starks-----	Fine-silty, mixed, mesic Aeric Ochraqualfs
Strawn-----	Fine-loamy, mixed, mesic Typic Hapludalfs
Tecumseh-----	Fine-silty, mixed, mesic Typic Argiudolls
Thackery-----	Fine-loamy, mixed, mesic Aquic Hapludalfs
Throckmorton-----	Fine-silty, mixed, mesic Mollic Hapludalfs
*Tice-----	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
*Toronto-----	Fine-silty, mixed, mesic Udollic Ochraqualfs
Treaty-----	Fine-silty, mixed, mesic Typic Argiaquolls
*Troxel-----	Fine-silty, mixed, mesic Typic Argiudolls
Udorthents-----	Udorthents
*Wallkill-----	Fine-loamy, mixed, nonacid, mesic Thapto-Histic Fluvaquents
*Washtenaw-----	Fine-loamy, mixed, nonacid, mesic Aeric Fluvaquents
Waupecan-----	Fine-silty, mixed, mesic Typic Argiudolls
Waynetown-----	Fine-silty, mixed, mesic Aeric Ochraqualfs
Wea-----	Fine-loamy, mixed, mesic Typic Argiudolls
Whitaker-----	Fine-loamy, mixed, mesic Aeric Ochraqualfs