United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of De Witt County, Illinois

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
1902 FOX DRIVE
CHAMPAIGN, ILLINOIS 61820

December 18, 1991

Jim Culver, National Leader, SSQAS
USDA, Soil Conservation Service
345 Federal Building
100 Centennial Mall North
Lincoln, NE 68508

Dear Jim:

Enclosed is a copy of the Soil Survey of DeWitt County, Illinois. This survey was prepared and published by the United States Department of Agriculture, Soil Conservation Service in cooperation with the Illinois Agricultural Experiment Station. The DeWitt County Soil and Water Conservation District was a sponsor of the survey and the DeWitt County Board shared in the cost of doing the field work. The Illinois Department of Agriculture's Division of Natural Resources also shared in the cost of doing the field work.

The soil survey identifies the kinds of soils in DeWitt County. It also provides interpretations of these soils for many farm and nonfarm uses. We hope it will be of value to you and your organization.

Sincerely,

ACTING FOR
CHARLES WHITMORE
State Conservationist

Enclosure

RLM:lm:soilsur-1

How To Use This Soil Survey

General Soil Map

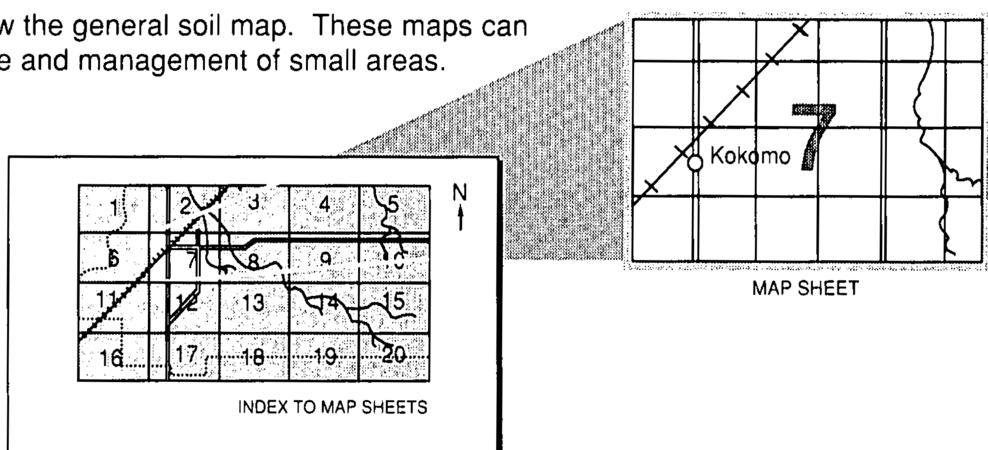
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** [illegible]

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the De Witt County Soil and Water Conservation District. The cost was shared by the De Witt County Board and the Illinois Department of Agriculture.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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This soil survey is Illinois Agricultural Experiment Station Soil Report No. 137.

Cover: Gently sloping and sloping soils on the Shelbyville Moraine. Contour farming and terraces help to control erosion on these soils.

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Issued September 1991

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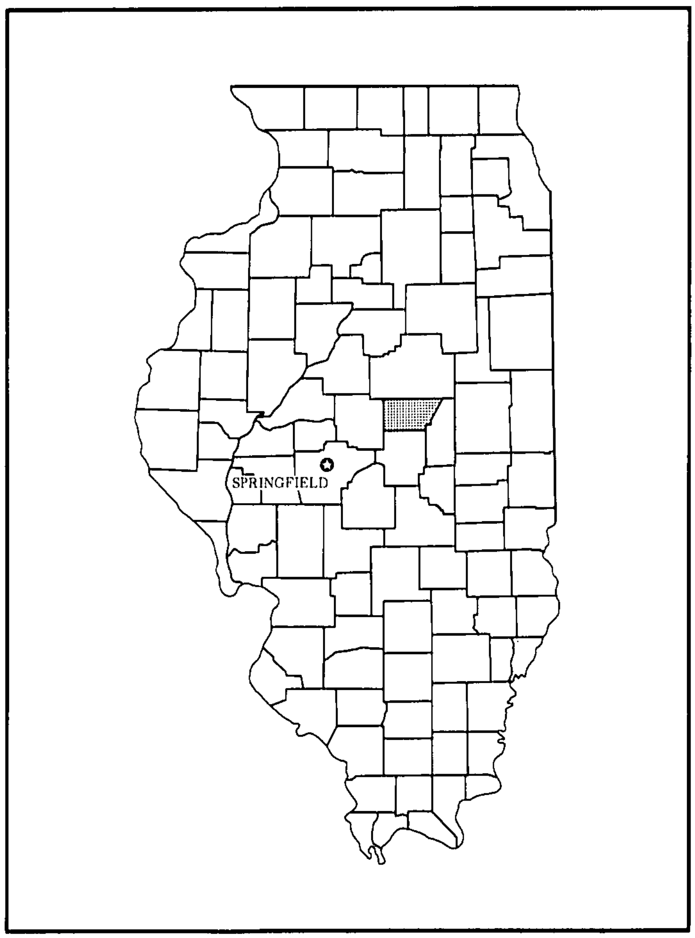
Foreword

This soil survey contains information that can be used in land-planning



Location of De Witt County in Illinois.

Soil Survey of
De Witt County, Illinois

By Roger D. Windhorn, Soil Conservation Service

Fieldwork by R.D. Windhorn and J. Steinkamp, Soil Conservation Service, and T. Brooks, D. Leach, M. McNamara, D. Mueller, and G. Westphal, De Witt County

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Illinois Agricultural Experiment Station

DE WITT COUNTY is in the east-central part of Illinois. It has a total land area of 253,510 acres, or about 399 square miles. In 1980, it had a population of 18,108. Clinton, the county seat, had a population of 8,014.

This soil survey updates the survey of De Witt County published in 1940 *(8)*. It provides more recent information and has larger maps, which show the soils in greater detail.

General Nature of the County

This section gives general information about De Witt County. It describes settlement and development, farming, physiography and drainage, and climate.

creeks for fishing and for travel lanes. They also favored the timbered areas because of the availability of firewood, the abundance of game, fear of prairie fires, and the belief that the prairies were in general infertile and unproductive.

In 1826, a second settlement was established around the present location of Waynesville, near Kickapoo Creek. This became the first town in the county. The first settlement around Clinton was on a site about 1 mile west of the present town. Created from portions of McLean and Macon Counties, De Witt County officially became a separate county in 1839. The county was named for De Witt Clinton, Governor of New York. The town of Clinton was platted in 1835 and became the county seat in May of 1839.

tributaries. This system drains all of the eastern, central of record was 20 inches. On the average, 34 days of the year have at least 1 inch of snow on the ground. The number of such days varies greatly from year to year.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil

taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed

properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the

General Soil Map Units

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

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

In some areas the general soil map of De Witt County does not join exactly with the general soil maps of Logan, McLean, Macon, and Piatt Counties. In a few areas the names of the associations do not agree across county lines because of variations in the extent of the major soils in the associations. The soils or the parent material in these associations and the use and management requirements are similar. The differences in the association names do not significantly affect the use of these maps for general planning.

Soil Descriptions

1. Ipava-Sable-Tama Association

Nearly level and gently sloping, poorly drained to moderately well drained soils formed in loess; on uplands

This association consists of soils on broad plains, ridgetops, and upland flats and in depressions and shallow drainageways. Slopes range from 0 to 5 percent.

This association makes up about 7 percent of the county. It is about 35 percent Ipava soils, 30 percent Sable soils, 20 percent Tama soils, and 15 percent minor soils.

The somewhat poorly drained, nearly level Ipava soils are on low ridges. Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is about 11 inches of black, friable silt loam and silty clay loam. The subsoil is silty clay loam about 37 inches thick. It is mottled. The upper part is brown, and the lower part is dark grayish brown and grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, friable silt loam.

The poorly drained, nearly level Sable soils are on broad flats below the Ipava and Tama soils. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam.

The moderately well drained, gently sloping Tama soils are on ridgetops and side slopes along drainageways. Typically, the surface layer is black, friable silt loam about 6 inches thick. The subsurface layer also is black, friable silt loam about 6 inches thick. The subsoil is about 35 inches thick. The upper part is brown, friable silty clay loam. The lower part is dark yellowish brown, mottled, friable silt loam. The underlying material to a depth of 60 inches or more is yellowish brown and light brownish gray, friable silt loam.

Of minor extent in this association are the very poorly drained Shiloh soils in shallow depressions.

Most areas are cultivated or are used for pasture and hay. This association is well suited to cultivated crops, pasture, and hay. The seasonal high water table is the major limitation. In the sloping areas water erosion is a hazard.

The seasonal high water table, moderately slow permeability, and the shrink-swell potential are the main limitations on sites for dwellings and septic tank absorption fields. Because of ponding, the Sable soils generally are unsuitable as sites for dwellings and septic tank absorption fields.

2. Plano-Elburn-Sable Association

Nearly level and gently sloping, well drained, somewhat poorly drained, and poorly drained soils formed in loess and outwash or entirely in loess; on outwash plains, stream terraces, or uplands

This association consists of soils on low, broad ridges and knolls and in nearly level areas between drainageways. Shallow depressions are common. Slopes range from 0 to 5 percent.

This association makes up about 2 percent of the county. It is about 40 percent Plano soils, 30 percent Elburn soils, 20 percent Sable soils, and 10 percent minor soils.

The well drained, nearly level and gently sloping Plano soils are on low ridges, on knolls, and on side slopes along drainageways. They formed in loess and glacial outwash. Typically, the surface layer is very dark brown, friable silt loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is dark brown, brown, and dark yellowish brown silty clay loam. The next part is dark yellowish brown silt loam. The lower part is brown and dark yellowish brown, stratified sandy loam, loam, and silt loam.

The somewhat poorly drained, nearly level Elburn soils are on low, broad ridges. They formed in loess and glacial outwash. Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 42 inches thick. The upper part is brown, mottled, friable silt loam and silty clay loam. The next part is brown, mottled, friable silt loam. The lower part is brown, mottled, friable, stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silt loam and sandy loam.

The poorly drained, nearly level Sable soils are on broad flats and in drainageways on uplands. They formed in loess. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam.

Of minor extent in this association are the poorly drained Thorp soils in shallow depressions.

Most areas are cultivated or are used for pasture and hay. This association is well suited to cultivated crops, pasture, and hay. The seasonal high water table is the major limitation in areas of the Elburn and Sable soils. Water erosion is a hazard in the gently sloping areas of the Plano soils.

The Elburn soils are poorly suited to dwellings and septic tank absorption fields because of the seasonal high water table. The Plano soils are well suited to septic tank absorption fields but are only moderately suited to dwellings because of the shrink-swell potential. Because of ponding, the Sable soils generally are unsuitable as sites for dwellings and septic tank absorption fields.

3. Sawmill-Lawson Association

Nearly level, poorly drained and somewhat poorly drained soils formed in alluvium; on flood plains

This association consists of soils on flood plains, mainly along Salt Creek and other major streams. These soils are occasionally flooded. Slopes range from 0 to 2 percent.

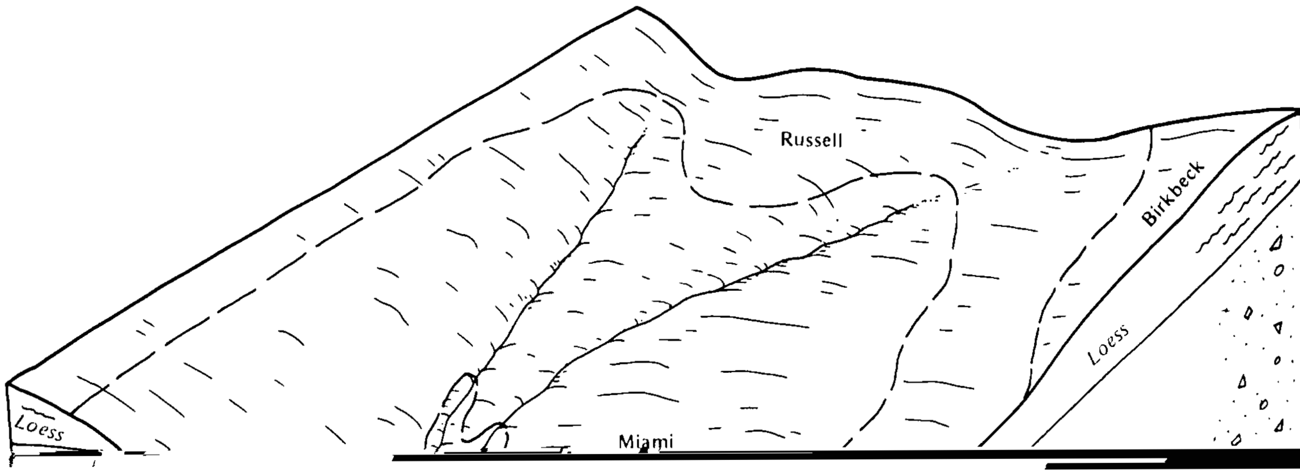
This association makes up about 5 percent of the county. It is about 40 percent Sawmill soils, 37 percent Lawson soils, and 23 percent minor soils.

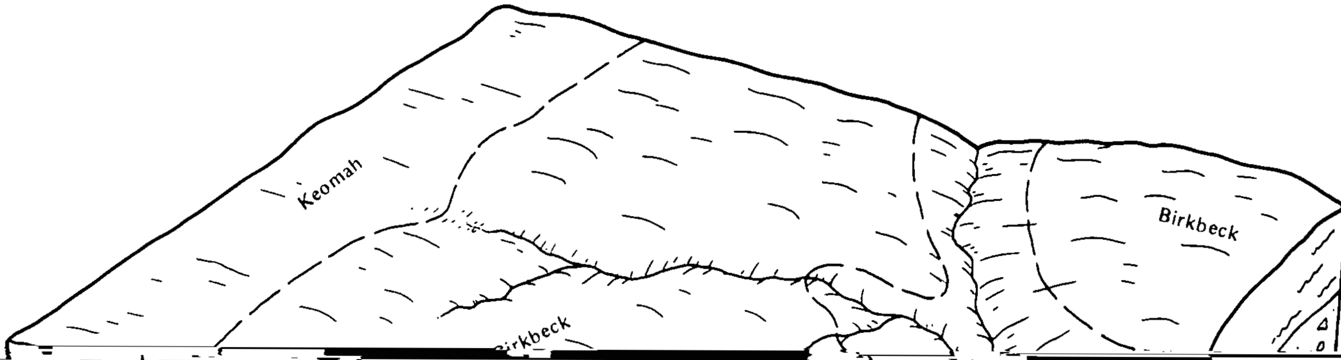
The poorly drained Sawmill soils are in swales and low areas on the flood plain. Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is dark gray and gray, mottled, friable and firm silty clay loam about 27 inches thick. The underlying material to a depth of 60 inches or more is gray, mottled, friable silty clay loam.

The somewhat poorly drained Lawson soils are in broad areas above the Sawmill soils on the flood plains. Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is about 27 inches of black, friable silt loam and silty clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown and dark gray, mottled, friable silty clay loam.

Of minor extent in this association are the well drained Camden, Ross, and St. Charles soils. Camden and St. Charles soils are on terraces above the major soils. Ross soils are on natural levees adjacent to the streams.

Most areas are used for cultivated crops. Some are used for pasture, hay, or woodland. Because the


Russell
Birkbeck
Loess
Loess
Miami


Keomah
Birkbeck

Russell soils are on side slopes along drainageways. They formed in loess and glacial till. Typically, the

friable silt loam or silty clay loam about 6 inches thick. It has been thinned by erosion. The subsoil is about 38 inches thick. The upper part is dark yellowish brown and yellowish brown, friable and firm silty clay loam. The lower part is brown and dark yellowish brown, firm loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm clay loam.

The somewhat poorly drained, nearly level Keomah

This association makes up about 7 percent of the county. It is about 75 percent Catlin soils, 15 percent

The Catlin soils are gently sloping and sloping. Typically, the surface layer is mixed very dark brown and brown, friable silty clay loam about 8 inches thick. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, yellowish brown, and brown, friable silty clay loam. The lower part is yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown and yellowish

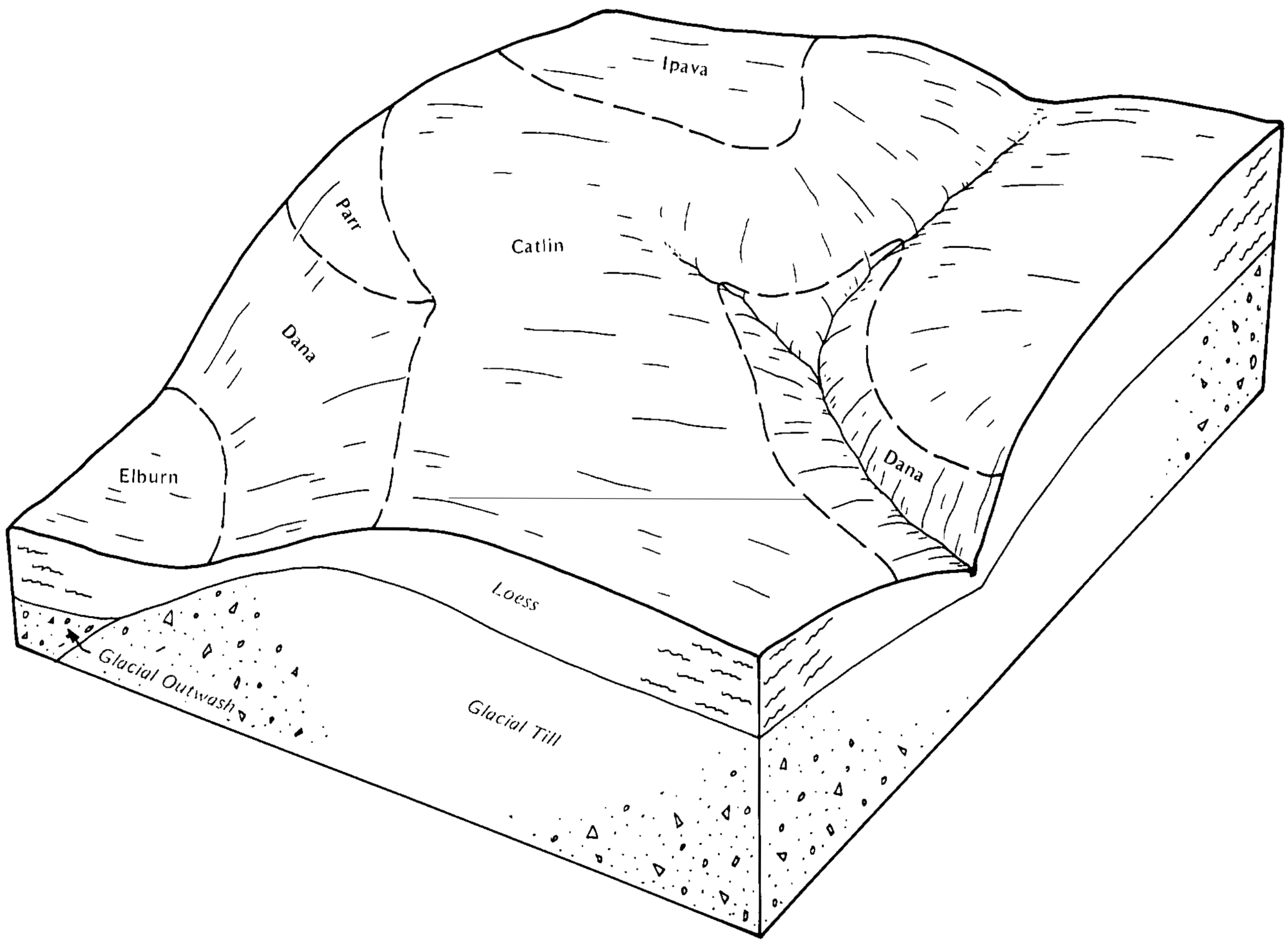


Figure 3.—Typical pattern of soils and parent material in the Catlin-Dana association.

broad flats and in shallow depressions and drainageways. Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam.

The somewhat poorly drained, nearly level Ipava soils are on broad, low ridges. Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is about 11 inches of black, friable silt loam and silty clay loam. The subsoil is silty clay loam about 37 inches thick. It is mottled. The upper part is brown, and the lower part is dark grayish brown and grayish brown. The underlying material to a depth of 60 inches or more is grayish brown, friable silt loam.

The moderately well drained, gently sloping and sloping Catlin soils are on ridgetops, knolls, and side slopes. Typically, the surface layer is mixed very dark brown and brown, friable silty clay loam about 8 inches thick. The subsoil is about 38 inches thick. The upper part is dark yellowish brown, yellowish brown, and brown, friable silty clay loam. The lower part is yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown and yellowish brown, friable, calcareous loam.

Of minor extent in this association are the very poorly drained Peotone soils in shallow depressions below the major soils.

Most areas are used for cultivated crops. Some are used for pasture and hay. The nearly level and gently sloping areas are well suited to cultivated crops, pasture, and hay. The sloping areas are moderately suited to cultivated crops. The seasonal high water table is a limitation in the nearly level areas, and water [illegible] areas.

The Catlin and Ipava soils are poorly suited to septic tank absorption fields. The Ipava soils are poorly suited to dwellings, and the Catlin soils are moderately suited. The seasonal high water table, restricted permeability, and the shrink-swell potential are the main limitations. Because of ponding, the Sable soils generally are unsuitable as sites for septic tank absorption fields.

Broad Land Use Considerations

The soils in De Witt County vary widely in their suitability for major land uses. Most of the land in the [illegible]

Russell, Sable, and Tama are the major soils in these associations. In the nearly level areas used for crops, the major limitation is the seasonal high water table. Water erosion is a hazard in the more sloping areas. The soils in association 3 are occasionally [illegible] delay fieldwork and can cause slight or moderate crop damage. Lawson and Sawmill are the major soils in this association.

In 1982, about 2.5 percent of the county was used for pasture and hay *(13)*. All of the associations in the county generally are suitable for grasses and legumes. Water erosion is the main hazard in associations 1 and 2 and in associations 4 to 7. The seasonal high water table is a limitation in nearly level areas. The slope of the steep and very steep soils in association 4 limits the use of seeding equipment and the equipment used in harvesting hay. The occasional flooding in association 3 is a major hazard. It delays hay harvesting in some

Figure 5.—An area of Birkbeck silt loam, 1 to 4 percent slopes, which is well suited to picnic areas.

especially on the very steep slopes. The slope can limit the use of harvesting equipment. The occasional flooding in association 3 is a hazard.

In general, the gently sloping and sloping Camden, Plano, Proctor, and St. Charles soils are the best suited soils in the county for urban uses. These soils are most

plains in association 3 are generally unsuitable as sites for dwellings and septic tank absorption fields.

The suitability of the soils in the county for recreational uses is poor to good, depending on the intensity of the use. The soils that are best suited to camp and picnic areas are the gently sloping and of soils that are suitable for intensive recreational development are generally available in all of the associations.

The suitability for wildlife habitat is good throughout the county. Associations 1, 2, 3, 5, 6, and 7 are well suited to openland wildlife habitat. The soils that are best suited to woodland wildlife habitat are those in associations 3, 4, and 5. Some areas in association 3 are moderately suited to certain types of wetland wildlife habitat.

Detailed Soil Map Units

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

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

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

Soils that have profiles that are almost alike make up

areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

In some areas the detailed soil maps of De Witt County do not join with those of Logan, Macon, and Piatt Counties because of differences in the kind of parent material and conceptual differences in soil classification. The soils in these map units are similar and have similar potentials. The differences in the map unit names do not significantly affect the use and behavior of the soils.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary

Keomah soil. They make up 5 to 10 percent of the unit.

Air and water move through the Keomah soil at a slow or moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 2 to 4 feet below the surface during spring. Available water

brown, friable clay loam. The lower part is dark yellowish brown, mottled, friable loam. The underlying material to a depth of 60 inches or more is brown, friable, calcareous loam. In some areas, the subsoil is thinner and the underlying material contains more clay swell potential and the slope are limitations. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

If the soil is used as a site for septic tank absorption fields, the slope and the moderately slow permeability are limitations. Enlarging the absorption area or replacing the soil with more permeable material helps to overcome the restricted permeability. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IVe.

27E—Miami loam, 15 to 30 percent slopes. This steep, well drained soil is on side slopes in the uplands. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is dark grayish brown, friable loam about 5 inches thick. The subsurface layer is yellowish brown, friable loam about 4 inches thick. The subsoil is yellowish brown, friable clay loam about 37 inches thick. The underlying material to a depth of 60 inches or more is brown and yellowish brown, firm.

contour when a seedbed is prepared or the pasture is renovated.

If this soil is used as woodland, the hazard of water erosion and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas should be seeded to grass or to a grass-legume mixture. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots.

If this soil is used for woodland wildlife habitat, measures that exclude livestock are needed. These measures help to prevent depletion of the shrubs and sprouts that provide food and cover for woodland wooded areas. Available water capacity is high. Organic matter content is moderately low. The shrink-swell

Most areas are used for woodland and woodland wildlife habitat. This soil is well suited to woodland and to woodland wildlife habitat. It is moderately suited to pasture. It is generally unsuitable as a site for dwellings and septic tank absorption fields because of the slope.

If this soil is used as woodland, the hazard of water erosion and the equipment limitation are management concerns. They are caused by the slope. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Logging roads and skid trails should be established on the contour if possible. On the steeper slopes, the logs or trees should be skidded uphill with a cable and winch. Firebreaks should be the grass type. Bare logging areas

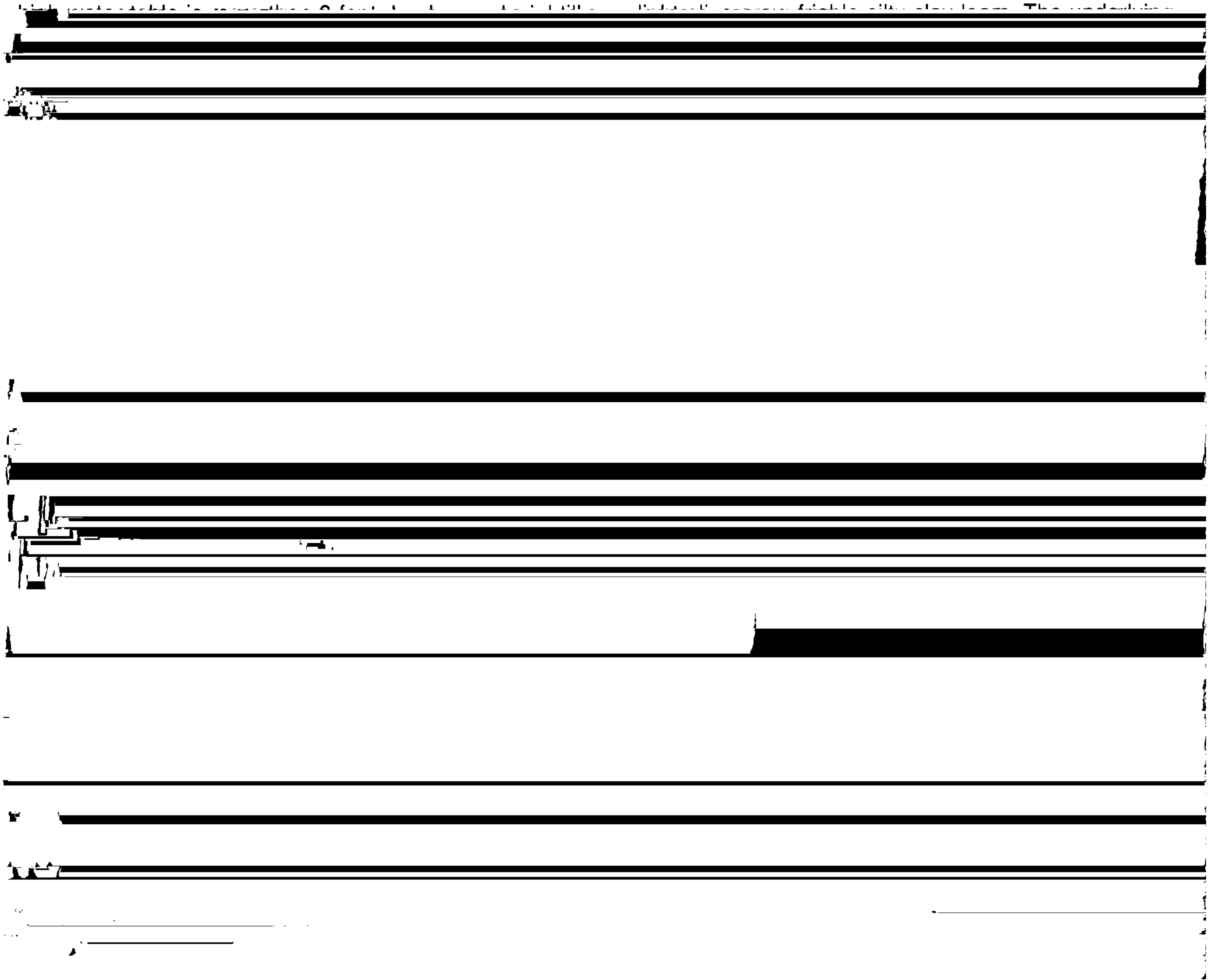
the poorly drained Sable soils. These soils are in shallow depressions below the Tama soil. They make

Air and water move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 4 to 6 feet below the surface during spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to dwellings and to septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, water erosion is the main hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay contains less clay. In other areas depth to the seasonal



is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways and depressions below the Ipava soil. They make up 5 to 10 percent of the unit.

Air and water move through the Ipava soil at a moderately slow rate. Surface runoff is slow in cultivated areas. The seasonal high water table is 1 to 3 feet below the surface during spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential and the potential for frost action also are high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It is poorly suited to

next part is olive gray, firm silty clay. The lower part is

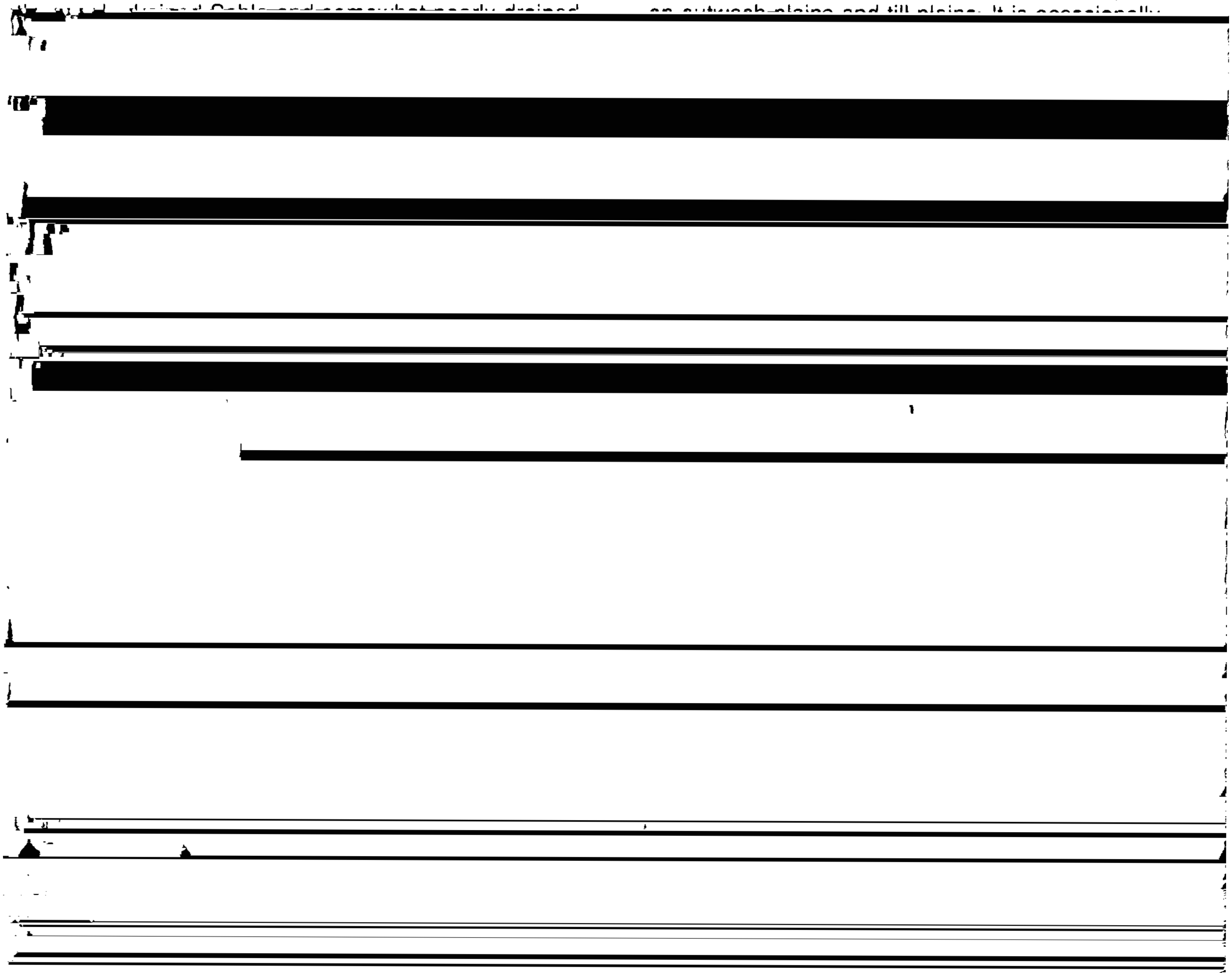
material to a depth of 60 inches or more is light olive gray, mottled, friable silt loam. In some areas the subsurface layer is darker. In other areas the underlying material is loamy.

Included with this soil in mapping are small areas of the somewhat poorly drained Ipava soils. These soils are not ponded and are on slight rises above the Denny soil. They make up 1 to 3 percent of the unit.

Air and water move through the Denny soil at a slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is very high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action

The next part is yellowish brown, mottled, friable clay loam. The lower part is brown and yellowish brown, mottled, firm loam. The underlying material to a depth of 60 inches or more is brown, mottled, firm, calcareous loam. In some places the surface soil is thicker. In other places, the upper part of the subsoil contains more sand and carbonates are closer to the surface. In some areas loamy outwash is mixed with the loam till in the underlying material. In other areas the subsoil contains more silt and less sand. In a few areas slopes are as much as 10 percent.

Included with this soil in mapping are small areas of well drained Sable and somewhat poorly drained



Ipava soils. These soils are in shallow depressions and drainageways below the Dana soil. They make up 2 to 5 percent of the unit.

If this soil is used as a site for septic tank absorption fields, the seasonal high water table and the moderately slow permeability are limitations. Unless the distribution lines are installed closer to the surface than is typical, measures that lower the water table, such as subsurface tile drains near the perimeter of the absorption field, are needed. Enlarging the absorption field helps to overcome the restricted permeability.

The land capability classification is IIe.

67—Harpster silty clay loam. This nearly level, poorly drained soil is on broad flats and in depressions on outwash plains and till plains. It is occasionally

ponded for brief periods in early spring. Individual areas are long and narrow or horseshoe shaped and range from 2 to 40 acres in size.

tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

The land capability classification is IIw.

68—Sable silty clay loam. This nearly level, poorly drained soil is on broad flats, in depressions, and in shallow drainageways in the uplands. It is occasionally ponded for brief periods in early spring. Individual areas [illegible] size.

Typically, the surface layer is black, friable silty clay loam about 8 inches thick. The subsurface layer also is black, friable silty clay loam. It is about 9 inches thick. The subsoil is dark gray, olive gray, and gray, mottled, friable and firm silty clay loam about 33 inches thick. The underlying material to a depth of 60 inches or more is olive gray, mottled, friable silt loam. In some areas the subsoil contains more clay. In other areas carbonates are within a depth of 40 inches.

irregular in shape and range from 10 to 80 acres in size.

Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is very dark gray, friable loam about 6 inches thick. The subsoil is very dark grayish brown and brown, friable loam about 23 inches thick. The underlying material to a depth of 60 inches or more is dark yellowish brown, friable sandy [illegible] color. In some areas the surface soil and subsoil contain more sand, and in other areas they contain less sand.

Included with this soil in mapping are small areas of the poorly drained Sawmill and somewhat poorly drained Lawson soils. These soils are lower on the landscape than the Ross soil. They make up 2 to 8 percent of the unit.

Air and water move through the Ross soil at a moderate rate. Surface runoff is slow in cultivated

107—Sawmill silty clay loam. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods from March through May. Individual areas are long and narrow and range from 5 to 100 acres in size.

Typically, the surface layer is black, friable silty clay loam about 9 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 15 inches thick. The subsoil is dark gray and gray, mottled, friable and firm silty clay loam about 27 inches thick. The underlying material to a depth of 60 inches or more is gray, mottled, friable silty clay loam. In some areas the surface layer is light colored and contains less clay. In other areas it contains more sand. In a few places the surface layer and subsoil contain less clay.

Included with this soil in mapping are small areas of the well drained Ross soils. These soils contain less clay throughout than the Sawmill soil. Also, they are higher on the landscape. They make up 3 to 5 percent of the unit.

[illegible] water moves through the Sawmill soil at a moderate rate. Surface runoff is slow in cultivated areas. The seasonal high water table is within a depth of 2 feet during spring. Available water capacity is very high. Organic matter content is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and woodland. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the hazard of flooding.

If this soil is used for corn, soybeans, or small grain,

enough to support the equipment. The seedling mortality rate can be reduced by planting species that can withstand excessive wetness. Harvesting methods that do not isolate the remaining trees or leave them widely spaced reduce the windthrow hazard. Only high-value trees should be removed from a strip 50 feet wide along the west and south edges of the woodland. The plant competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

The land capability classification is IIw.

134C2—Camden silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on side slopes on stream terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed dark grayish brown, very dark grayish brown, and yellowish brown, friable silt loam about 4 inches thick. It has been thinned by water erosion. The subsoil is about 41 inches thick. It is yellowish brown and is friable and firm. The upper part is silty clay loam, and the lower part is loam and sandy loam. The underlying material to a depth of 60 inches or more is yellowish brown, friable, stratified sandy loam, loam, and loamy sand. In places the surface layer is darker. In some areas the underlying material is brown sand. In other areas the upper part of the subsoil contains less silt and more system that leaves crop residue on the surface after planting, contour farming, and terraces help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain soil productivity and tilth.

Pasture plants and hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion. Seeding the pasture on the contour also helps to control water erosion.

If this soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation.

below the subsoil helps to prevent the structural

cultivated crops. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Surface drains, subsurface tile drainage, and surface inlet tile drains function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

In the areas used for pasture and hay, the ponding is a hazard. It can be controlled, however, by surface inlet

Restricted use during wet periods helps to prevent absorption fields. It is moderately suited to dwellings.

If this soil is used for corn, soybeans, or small grain, further water erosion is a hazard. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

171B2—Catlin silty clay loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on side slopes and ridges on till plains and moraines. Individual areas are irregular in shape and range from 3 to 300 acres in size.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Incorporating crop residue into the soil or adding other organic material can minimize crusting and improve tilth. A crop rotation that includes a deep-rooted legume can improve tilth and minimize surface compaction.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by installing tile lines around the base of the foundation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption

Ipava soils. These soils are in drainageways below the Catlin soil. They make up 2 to 5 percent of the unit.

Air and water move through the Catlin soil at a moderate rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3.5 to 6.0 feet below the surface during spring. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A crop rotation that includes 1 year or more of forage crops, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, terraces, or a combination of these can help to keep soil loss within tolerable limits. Returning crop residue to the soil and regularly adding other organic material help to maintain productivity, minimize

and stream terraces. Individual areas are irregular in shape and range from 2 to 40 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 42 inches thick. It is brown, mottled, and friable. The upper part is silt loam and silty clay loam. The next part is silt loam. The lower part is stratified silt loam, loam, and sandy loam. The underlying material to a depth of 60 inches or more is brown, mottled, friable silty loam and sandy loam. In some areas the surface layer is thinner. In other areas the upper part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the well drained Plano and poorly drained Sable soils. Plano soils are on slight rises above the Elburn soil. Sable soils are in drainageways and depressions below the Elburn soil. Included soils make up 2 to 10 percent of the unit.

Air and water move through the upper part of the Elburn soil at a moderate rate and through the lower part at a moderate or moderately rapid rate. Surface are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 13 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is dark brown, brown, and dark yellowish brown silty clay loam. The next part is dark yellowish brown silt loam. The lower part is brown and dark yellowish brown, stratified sandy loam, loam, and silt loam. In some areas the lower part of the subsoil is loamy glacial till. In other areas it contains less sand.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Elburn soils. These soils are in drainageways or on broad flats below the Plano soil. They make up 5 to 10 percent of the unit.

Air and water move through the Plano soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content also is high. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

No major limitations affect the use of this soil for

drainageways below the Plano soil. They make up 2 to 5 percent of the unit.

Air and water move through the Plano soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential also is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, hay, and septic tank absorption fields. It is moderately suited to dwellings.

In the areas used for corn, soybeans, or small grain, further water erosion is a hazard. Deterioration of tilth is a problem. A conservation tillage system that leaves crop residue on the surface after planting, contour farming, or terraces help to control water erosion. Incorporating crop residue into the soil or adding other organic material can minimize crusting and improve tilth. A crop rotation that includes a deep-rooted legume can improve tilth and minimize surface compaction.

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the

the somewhat poorly drained Elburn and Ipava soils. These soils are not ponded and are on slight rises above the Thorp soil. They make up 1 to 3 percent of the unit.

Air and water move through the Thorp soil at a slow rate. Surface runoff is ponded in cultivated areas. The seasonal high water table is 0.5 foot above the surface to 2.0 feet below during spring. Available water capacity is very high. Organic matter content is moderate. The surface layer can be easily tilled only within a narrow range in moisture content. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to pasture and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

grain because a drainage system has been installed.

of the subsoil contains less sand and more silt.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in drainageways below the Parr soil. They make up 2 to 5 percent of the unit.

Air and water move through the upper part of the Parr soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The shrink-swell potential and the potential for frost action also are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is well suited to pasture and hay. It is poorly suited to septic tank absorption fields.

further water erosion is a hazard. Deterioration of tilth is brown, friable silt loam. It is about 4 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is yellowish brown, mottled, friable and firm silt loam and silty clay loam. The lower part is yellowish brown, mottled, friable loam. In some places the lower part of the subsoil contains less sand. In other places it contains more sand.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in shallow depressions and drainageways below the Birkbeck soil. They make up 5 to 10 percent of the unit.

Air and water move through the upper part of the Birkbeck soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. The seasonal high water table is 3 to 6 feet below the surface during spring.

233C2—Birkbeck silt loam, 4 to 8 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is mixed brown and yellowish brown, friable silt loam about 6 inches thick. It has been thinned by water erosion. The subsoil extends to a depth of more than 60 inches. It is mottled and friable. The upper part is brown and dark yellowish brown silty clay loam. The next part is yellowish brown and grayish brown silt loam. The lower part is yellowish brown loam. In some places the lower part of the subsoil contains less sand and more silt. In other places, the subsoil is thinner and glacial till is within a depth of 40 inches.

management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. If the soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Installing subsurface tile drains near the foundation reduces the wetness. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table is a limitation if this soil is used as a site for septic tank absorption fields. Installing subsurface tile drains near the perimeter of the absorption field helps to lower the water table.

The land capability classification is IIIe.

243B—St. Charles silt loam, 1 to 5 percent slopes. This gently sloping, well drained soil is on stream

planting, contour farming, or terraces help to control water erosion. Returning crop residue to the soil or regularly adding other organic material helps to maintain productivity and tilth and increases the rate of water intake.

Establishing pasture plants or hay on this soil helps to control water erosion. Overgrazing, however, reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing the foundation or extending the footings below the subsoil helps to prevent the structural damage caused by shrinking and swelling.

If this soil is used as a site for septic tank absorption fields, the moderate permeability is a limitation. It can be overcome by enlarging the absorption area.

The land capability classification is IIe.

244—Hartsburg silty clay loam. This nearly level, poorly drained soil is on broad flats on outwash plains and till plains. It is occasionally ponded for brief periods

Most areas are cultivated. This soil is well suited to cultivated crops, pasture, and hay. It generally is unsuitable as a site for dwellings and septic tank absorption fields because of the ponding.

This soil can be used for corn, soybeans, or small grain because a drainage system has been installed. Measures that maintain or improve the drainage system are needed. Subsurface tile drains and surface inlet tile function satisfactorily if suitable outlets are available. Land grading helps to control the ponding. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and productivity, minimize surface compaction and crusting, and increase the rate of water intake.

The land capability classification is IIw.

279B—Rozetta silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is predominantly on ridgetops in the uplands, but a few areas are on toe slopes and stream terraces near the major drainageways. Individual areas are irregular in shape and range from 4 to 200 acres in size.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The subsurface layer also is brown, friable silt loam about 5 inches thick. The subsoil is about 43 inches thick. It is friable. The upper part is dark yellowish brown and yellowish brown silty clay loam. The lower part is brown, mottled silt loam. The

The plants grazed by livestock or harvested for hay grow well on this soil. Overgrazing reduces forage yields, causes surface compaction and excessive runoff, and increases the susceptibility to water erosion. Proper stocking rates, rotation grazing, deferred grazing, and applications of fertilizer help to keep the pasture in good condition and help to control water erosion.

If this soil is used as woodland, plant competition is a management concern. It affects the seedlings of desirable species. The competition in openings where timber has been harvested can be controlled by chemical or mechanical means. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Measures that protect the woodland from fire are needed.

If this soil is used as a site for dwellings with basements, the seasonal high water table and the shrink-swell potential are limitations. If the soil is used as a site for dwellings without basements, the shrink-swell potential is a limitation. Installing subsurface tile drains near the foundation lowers the water table. Extending the footings below the subsoil or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling.

The seasonal high water table and the moderate permeability are limitations if this soil is used as a site the poorly drained Sable soils. These soils are in depressions and drainageways below the Russell soil. They make up 2 to 10 percent of the unit.

Air and water move through the upper part of the Russell soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is low. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings and septic [illegible]

hay.

[illegible]

The lower part is yellowish brown, friable clay loam and loam. The underlying material to a depth of 60 inches or more is dark yellowish brown and yellowish brown, firm loam. In some areas, the subsoil is thinner and the underlying material is closer to the surface. In a few places the surface layer is thicker and contains less clay.

Included with this soil in mapping are small areas of the poorly drained Sable and somewhat poorly drained Keomah soils. These soils are in depressions and drainageways below the Russell soil. They make up 5 to 8 percent of the unit.

[illegible]

Russell soil at a moderate rate and through the lower

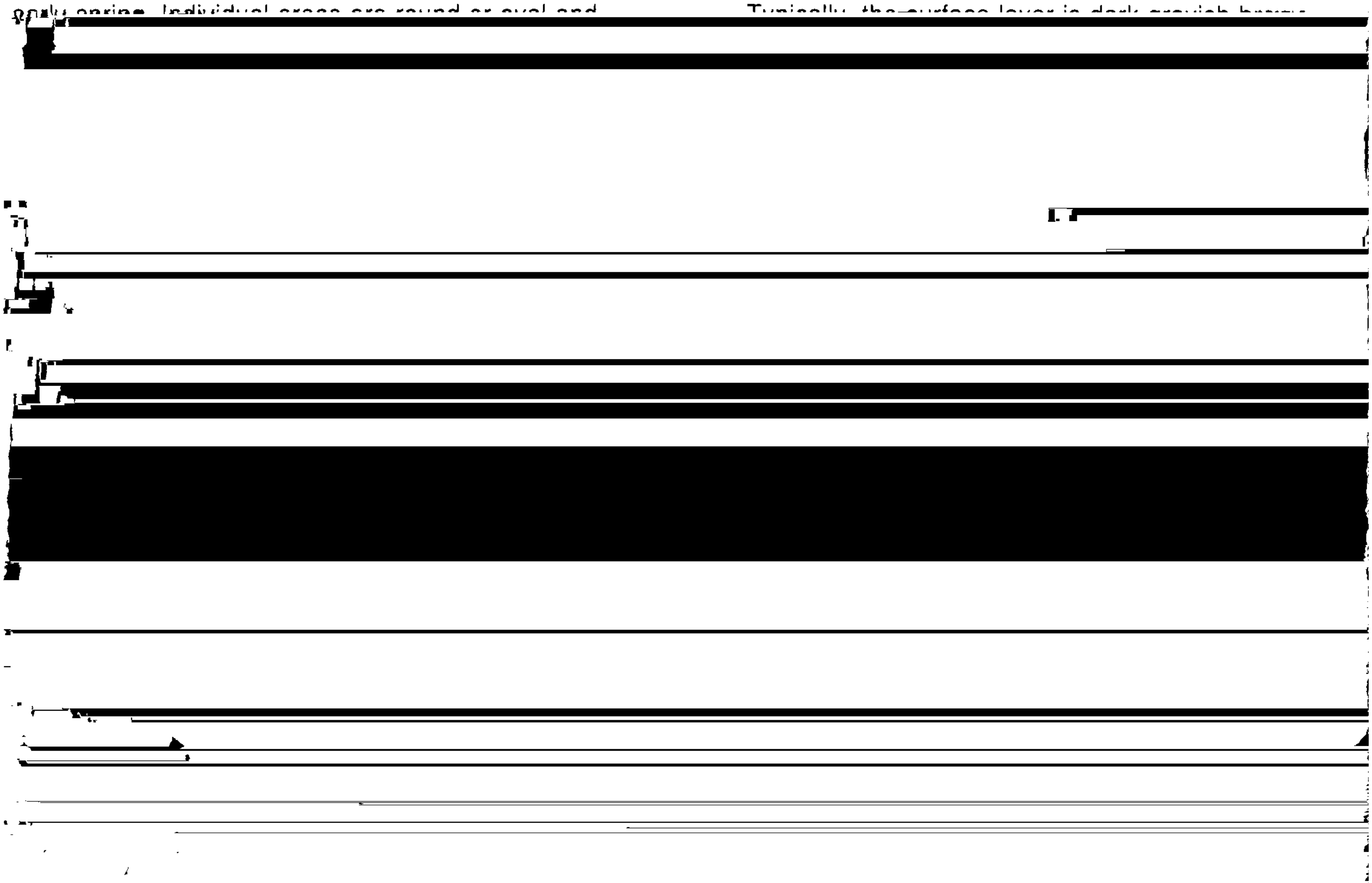
[illegible]

subsoil helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

If this soil is used as a site for septic tank absorption fields, the moderate permeability and the slope are limitations. Enlarging the absorption area helps to overcome the restricted permeability. Installing the filter lines on the contour or cutting and filling help to overcome the slope.

The land capability classification is VIe.

330—Peotone silty clay loam. This nearly level, very poorly drained soil is in shallow depressions on till plains. It is occasionally ponded for brief periods in



range from 3 to 80 acres in size.

Typically, the surface soil is black, friable silty clay loam about 22 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable. The upper part is dark gray, very dark gray, and gray, mottled silty clay loam. The lower part is light gray, mottled silt loam. In places the surface soil is thinner. In some areas the surface soil and subsoil contain less clay. In other areas the underlying material contains more sand.

In the areas used for pasture and hay, the ponding is a hazard. It can be controlled, however, by surface inlet tile drains, subsurface tile drains, or shallow ditches. Restricted use during wet periods helps to prevent surface compaction and deterioration of tilth. Proper stocking rates, rotation grazing, and applications of fertilizer help to keep the pasture in good condition.

The land capability classification is IIw.

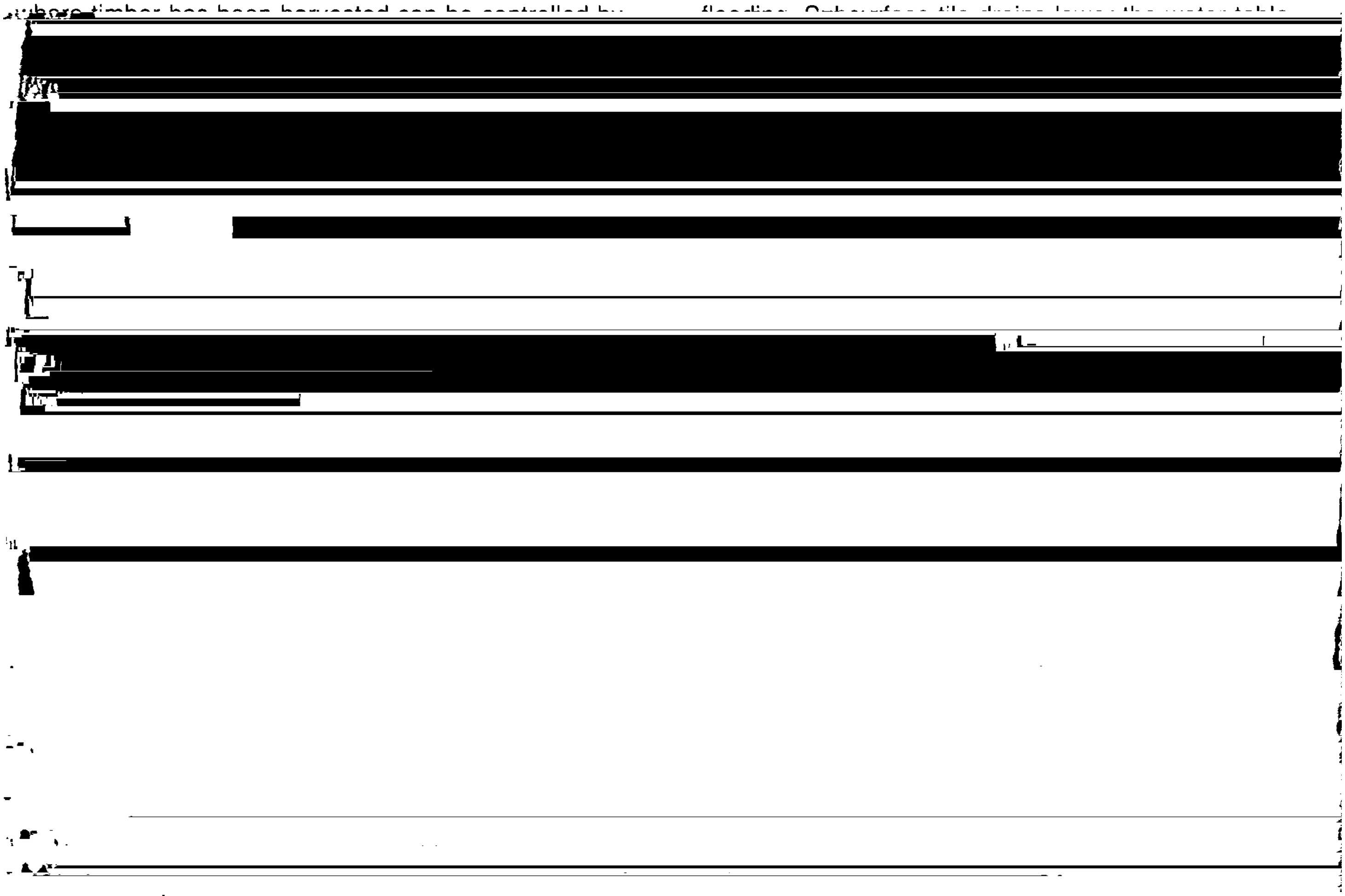
415—Orion silt loam. This nearly level, somewhat poorly drained soil is on flood plains. It is occasionally flooded for brief periods from March through May. Individual areas are fan shaped or irregular in shape and range from 5 to 40 acres in size.

friable silt loam about 8 inches thick. The next layer extends to a buried soil at a depth of about 38 inches. It is brown, mottled, friable silt loam. The buried soil is very dark gray and black, mottled, friable silt loam and silty clay loam. The underlying material to a depth of 60 inches or more is dark grayish brown, mottled, friable, stratified silt loam and loam. In places the buried soil is below a depth of 40 inches. In some areas the surface layer is darker.

satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain tilth and productivity.

If this soil is used for pasture or hay, the flooding is a hazard. Dikes and diversions help to control the flooding, and subsurface tile drains lower the water table. Overgrazing causes surface compaction and deterioration of tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. In the areas used for hay, the flooding delays harvesting during some years.

If this soil is used as woodland, the equipment limitation is a management concern. Plant competition also is a management concern. It affects the seedlings of desirable species. The competition in openings



chemical or mechanical means. Machinery should be used only when the soil is firm enough to support the equipment. Excluding livestock from the woodland helps to prevent destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree

septic tank absorption fields because of the hazard of flooding.

If this soil is used for corn, soybeans, or small grain, the flooding is a hazard and the seasonal high water table is a limitation. The flooding delays planting in some years. Dikes or diversions help to reduce the extent of the crop damage caused by floodwater. Planting corn, soybeans, or small grain varieties adapted to a shorter growing season and wetter conditions also reduces the extent of this damage. Subsurface tile drains function satisfactorily if suitable outlets are available. Keeping tillage to a minimum and returning crop residue to the soil help to maintain productivity and tilth.

If this soil is used for pasture and hay, the flooding is a hazard. Dikes or diversions help to control the

Overgrazing causes surface compaction and deterioration of tilth. Proper stocking rates, pasture rotation, restricted use during wet periods, and applications of fertilizer help to keep the pasture in good condition. In the areas used for hay, the flooding delays

Weeds and grasses grow in a few idle areas at the edge of built-up land. Special management is needed when trees and shrubs are planted and after they are established. Periodic supplemental watering is needed in some areas. Red maple, silver maple, hackberry, green ash, and sycamore can be planted along streets.

This unit is not assigned a land capability classification.

683—Lawndale silt loam. This nearly level, somewhat poorly drained soil is on outwash plains in the uplands. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 14 inches thick. The subsoil extends to a depth of more than 60 inches. It is friable and mottled. The upper part is brown silty clay loam. The next part is olive brown silty clay loam and silt loam. The lower part [illegible] loamy fine sand. In some areas

The land capability classification is I.

684B—Broadwell silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains in the uplands. Individual areas are long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is dark brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part is dark yellowish brown, friable silty clay loam. The next part is dark yellowish brown, friable silt loam. The lower part is dark yellowish brown and yellowish brown, loose loamy fine sand and fine sand. In some places the underlying material contains less sand and more silt. In other places the surface layer contains more clay. In a few areas the lower part of the subsoil is silty.

Included with this soil in mapping are small areas of

802B—Orthents, loamy, gently sloping. These somewhat poorly drained and moderately well drained, moderately fine textured soils are mostly in cut and fill areas in the uplands. The landscape has been leveled. Individual areas are rectangular or irregular in shape and range from 5 to 100 acres in size.

Typically, these soils consist of soil material underlain by rocks, concrete, bricks, organic waste, and similar material. In some areas the altered material is deposited on unaltered natural soils.

Included with these soils in mapping are some urban areas and some borrow areas. Also included are a few sloping or strongly sloping areas. Included areas make up 2 to 6 percent of the unit.

Air and water move through the Orthents at a moderate to moderately slow rate. Surface runoff is slow or medium. The seasonal high water table is 1 to 6 feet below the surface during spring. Available water capacity is moderate. The shrink-swell potential is moderate or high, and the potential for frost action is moderate.

Most areas are near the power plant at Clinton Lake. Other areas are near roadways or commercial buildings. These soils are moderately suited to picnic areas and playgrounds. They are poorly suited to dwellings, local roads and streets, and septic tank absorption fields.

The seasonal high water table and the shrink-swell potential are the main limitations if these soils are used as sites for dwellings. Installing subsurface tile drains near the foundation reduces the wetness. Extending the footings or reinforcing the foundation helps to prevent the structural damage caused by shrinking and swelling. Low strength, the moderate potential for frost action, and the shrink-swell potential are limitations on sites for local roads and streets. These limitations can be overcome by strengthening or replacing the base material. Removing excess water can minimize the damage caused by frost action and by shrinking and swelling. The water can be removed by grading and shaping the roadway and by ditching and banking the roadsides.

The seasonal high water table is the main limitation if these soils are used for playgrounds or picnic areas.

Typically, the loamy material has been deposited, removed, or shaped in fill areas surrounding the Clinton Power Station, along railroad beds and roadways, and in revegetated gravel pits and fill areas. Soil borings indicate that the soil material does not occur in a consistent pattern. A few areas are nearly level or gently sloping.

Included with these soils in mapping are gravel pits and urban areas. Also included are a few areas of Miami soils near the borders of the unit. Included areas make up 2 to 10 percent of the unit.

Available water capacity varies in the Orthents but generally is moderate. Permeability also varies because the soils have been compacted by construction equipment and because the texture varies. The content of organic matter and plant nutrients generally is moderate.

Most of the acreage is idle land. A few areas are developed for nonfarm uses. Unless a good plant cover protects the surface, water erosion is a severe hazard. It is especially severe in the more sloping areas. In severely eroded areas, special management is needed to establish and maintain a plant cover that controls runoff and water erosion. Newly exposed areas lack a plant cover, but some developed areas have a good cover of sod. Onsite investigation is needed to determine the limitations or hazards affecting the development of specific areas for urban uses.

This map unit is not assigned a land capability classification.

865—Pits, gravel. This map unit consists of excavations from which sand and gravel have been or are being removed. Piles of sand and gravel and other spoil material are within and around the excavations. Individual areas are irregularly shaped or round and range from less than 2 acres to 20 acres in size.

Included in this unit in mapping are some small areas of natural soils on haulage roads or lanes. These soils make up less than 10 percent of the unit.

Air and water move through the soil material at a rapid rate. Surface runoff is slow to rapid. Ponding occurs on the bottom of the excavations. Available sufficient soil material can be spread over the area to allow for plant growth. Reclamation through grading, shaping, and filling is possible, especially in the smaller pits. It increases the number of uses that can be made of the area. The feasibility and extent of reclamation depend on the desired alternative uses and individual site conditions.

This unit is not assigned a land capability classification.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 223,395 acres in De Witt County, or nearly 87 percent of the total acreage, meets the requirements for prime farmland. This land generally is used for cultivated crops, which account for most of the local farm income each year. Scattered areas of this land are throughout the county, mainly in associations 1, 2, 3, 6, and 7, which are described under the heading "General Soil Map Units."

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Use and Management of the Soils

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

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

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

Planners and others using soil survey information [illegible]

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

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

Approximately 204,617 acres in De Witt County, or about 80 percent of the total acreage, was pasture or cropland in 1982 *(13)*. Of this acreage, 196,163 acres was used for corn or soybeans, 2,295 acres for hay, 3,968 acres for pasture, and 1,714 acres for winter wheat.

The potential of the soils in De Witt County for increased food production is fair or poor. Most of the land that is not used for cultivated crops is highly susceptible to water erosion or is subject to flooding. A few of the wooded areas are suitable for row crop [illegible] the soil. Loss of the surface layer is especially damaging to soils in areas where part or all of the subsoil formed in glacial till, such as Dana, Miami, Parr, and Russell soils. The second reason that loss of the surface layer is damaging is that it results in the sedimentation of streams and lakes. Control of water erosion minimizes this pollution and improves the quality of water available for municipal use, for recreation, and for fish and wildlife.

Measures that control water provide a protective

faster in spring and allow for more rapid seed germination than is typical in areas where conventional tillage methods are applied. If constructed on the contour, the ridges obstruct waterflow and thus help to prevent excessive runoff and water erosion.

Terraces and contour farming also are effective in controlling erosion. The terraces used in De Witt County are generally parallel tile outlet terraces. These terraces allow for the use of equipment with various row widths and eliminate bothersome point rows. Terraces help to

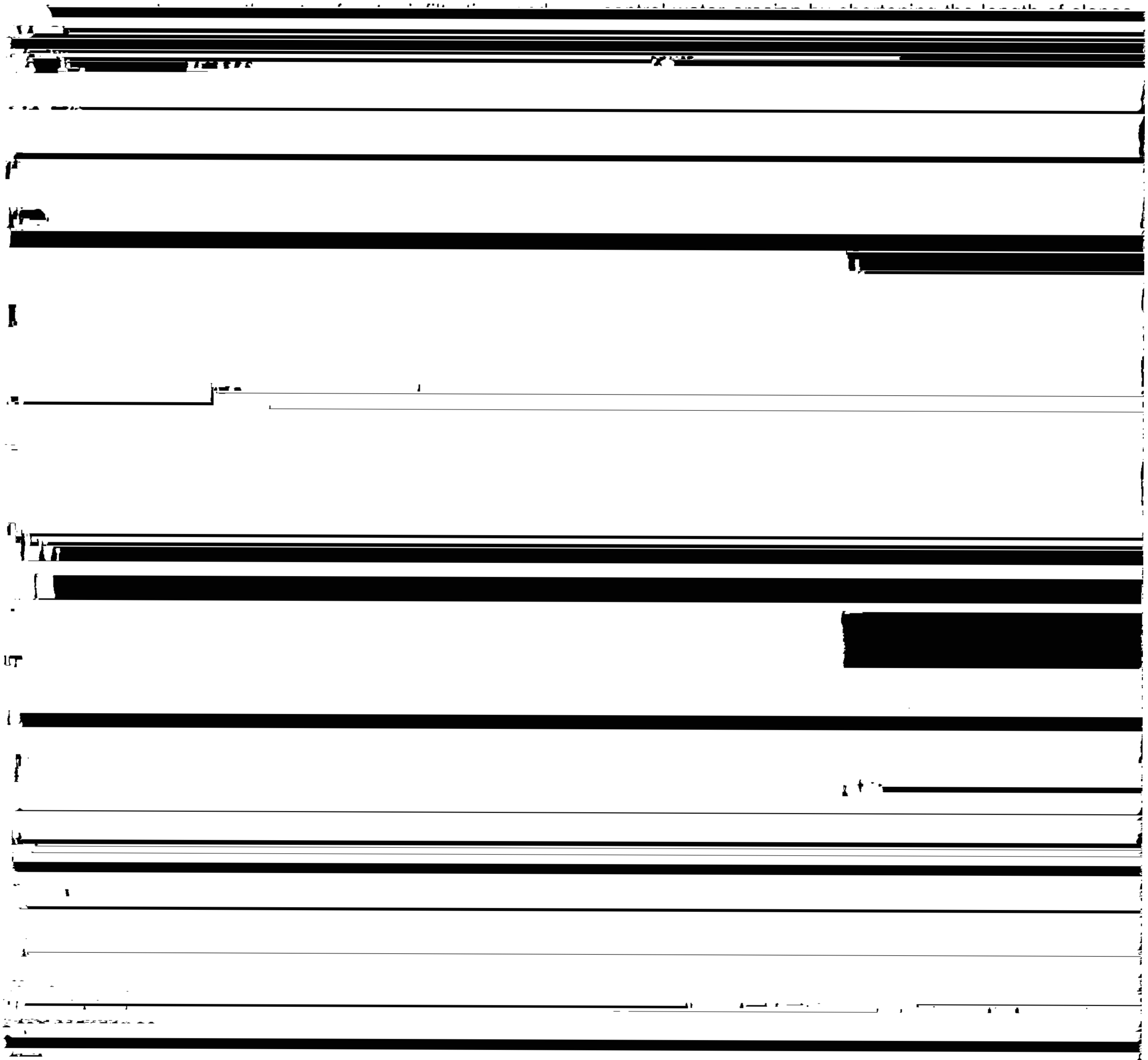


Figure 6.—An area of Keomah and Sable soils, which are wet early in spring.

Hartsburg, Peotone, Sable, Sawmill, and Shiloh soils. These soils have a surface layer of silty clay loam. They stay wet until late in spring. If they are tilled when wet, they tend to be very cloddy when dry. Because of the cloddiness, preparing a good seedbed is difficult.

In some sloping areas, poor tilth is a management concern because of the loss of the original friable surface layer. Preparing a good seedbed and tilling are difficult because the present plow layer is partly or mostly subsoil material that has a higher content of clay than the original surface layer. These areas tend to be cloddy when tilled and slippery when wet. They are on knolls and ridges throughout the county.

Poor tilth also is a problem on soils that have a plowpan in the lower part of the surface layer. This pan can form in soils that have a surface layer of silt loam or silty clay loam. It reduces the rate at which water moves downward through the soil. Because of the impeded drainage, the runoff rate and the hazard of water erosion can be increased in sloping areas and the soils stay wetter longer in spring.

Wetness is a management concern on much of the acreage used for crops and pasture in the county (fig. 6). In most areas tile drainage systems have been installed, but many systems are old and should be replaced.

Some soils are naturally so wet that the production of crops generally is not possible unless a drainage system is installed. These are the poorly drained or very poorly drained Harpster, Hartsburg, Peotone, Sable, Sawmill, and Thorp soils. Most areas of these soils have been drained.

Unless drained, the somewhat poorly drained soils are generally wet enough for planting to be delayed in some years. Elburn, Ipava, Keomah, Lawndale, Lawson, and Orion soils are examples.

The design of surface and subsurface drainage systems varies with the kind of soil and the availability of outlets. In some areas of the very poorly drained and poorly drained soils in depressions, a combination of

underground tile drains may be needed. The tile should

the kinds and amounts of fertilizer and lime to be applied.

The field crops suited to the soils and climate of the survey area include many that are not commonly grown. Corn and soybeans are the major row crops. Winter wheat and oats are the most common close-growing crops. Forage crops include smooth bromegrass, orchardgrass, Kentucky bluegrass, alfalfa, and red clover.

Most of the well drained and moderately well drained soils in De Witt County are suitable for vegetable and

nursery plants. Soils in low areas, where frost is

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents *(6)*. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

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

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

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

Land Capability Classification

Land capability classification shows, in a general

narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

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

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

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

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

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of water erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United settlement, much of the original woodland has been cleared for the production of row crops. Much of the remaining woodland is in areas that are too steep, too wet, or too isolated for row crops. Each year, some land is cleared, generally in parcels as large as several

indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

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

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site

Birkbeck, Catlin, Ipava, Sable, and Tama are examples of soils in these areas. If careful consideration is given to species selection, location, site preparation, planting technique, spacing, and maintenance, windbreaks can be established in these areas (fig. 7). The most common trees and shrubs grown as windbreaks are northern whitecedar, eastern white pine, Norway spruce, Amur honeysuckle, gray dogwood, flowering dogwood, Russian olive, silky dogwood, eastern cottonwood, and pin oak.

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

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

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

Table 9 shows the height that locally grown trees and shrubs are predicted to reach in 20 years on various soils. The estimates in table 9 are based on

Figure 7.—A windbreak on a farmstead in De Witt County.

The demand for recreational facilities has increased greatly in the past several years. The potential for the development of additional facilities is good in areas of associations 4 and 5, which are described in the section "General Soil Map Units." These areas are characterized by rolling terrain and wooded slopes. They have good potential for the development of small ponds.

The soils of the survey area are rated in table 10

evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be [illegible]

surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Steve Brady, state wildlife biologist, Soil Conservation Service and seed crops are corn, wheat, oats, and barley.

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

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these

areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include owls, thrushes, woodpeckers, opossum, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas (fig. 8). Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, and beaver.

In the following paragraphs, the associations

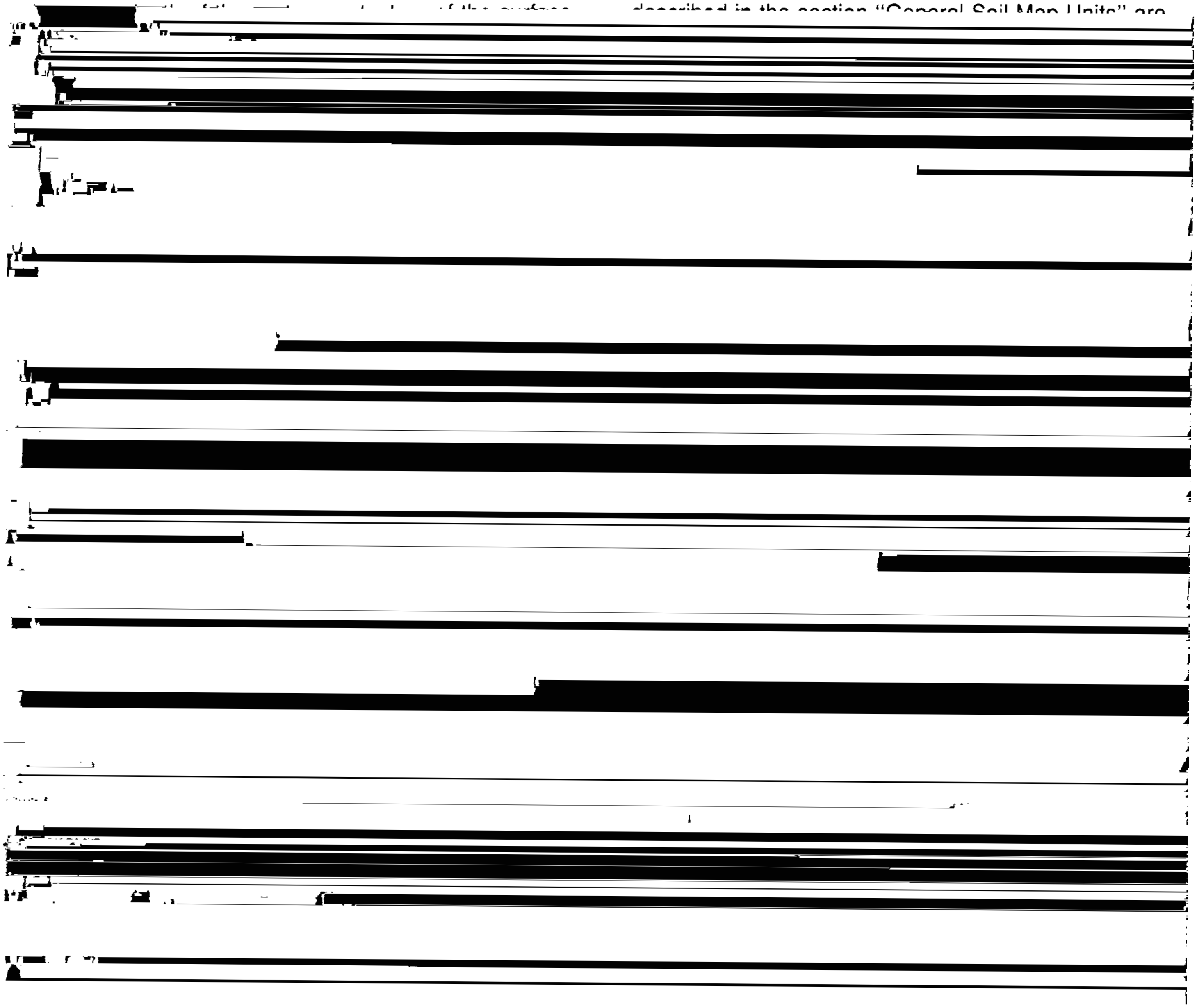


Figure 8.—Wetland wildlife habitat in an area near Clinton Lake.

Protecting the natural vegetation or establishing a permanent cover of vegetation along drainageways and streams, protecting the woodland from grazing by livestock, and applying good pasture management and the measures identified in the description of wildlife area 1 can improve the habitat for wildlife. Establishing food plots by flooding the adjacent farmland and establishing shallow water areas adjacent to Clinton Lake can help to attract waterfowl to this area.

Engineering

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

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

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

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

Soil properties, site features, and observed

Figure 9.—A gently rolling area on the Shelbyville Moraine, which provides excellent sites for homes.

trafficability after vegetation is established.

properties and site features are moderately favorable the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

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

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

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

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

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

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the

of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

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

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

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

Construction Materials

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

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

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

The ratings are based on soil properties, site thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a

properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading

in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more

texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

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

material. Excessive slope can affect the storage capacity of the reservoir area.

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

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

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

Drainage is the removal of excess surface and

drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

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

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

Soil Properties

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

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed *(11)*. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

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

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

Engineering Index Properties

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

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

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

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

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

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

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

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

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

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area [illegible]

density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

[illegible]

high, shrinking and swelling can cause damage to [illegible]

often needed.

The shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 [illegible]

than 20 percent clay and sandy clay loams, sandy [illegible]

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 [illegible]

layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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

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

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

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

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

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

Also considered are local information about the

the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

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

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

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

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

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the

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

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

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(12).* Beginning with the broadest, these categories are the [illegible]

Typic identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup [illegible]

Birkbeck Series

The Birkbeck series consists of moderately well drained soils on till plains in the uplands. These soils formed in loess and in the underlying loam till. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 1 to 8 percent.

Birkbeck soils are similar to Camden, Rozetta, Russell, and St. Charles soils and are commonly adjacent to Miami and Russell soils. Camden and St. Charles soils formed in loess and loamy outwash. Rozetta soils formed entirely in loess. The well drained Russell soils are on the steeper slopes below the Birkbeck soils. Their mantle of loess is thinner than that of the Birkbeck soils. The well drained Miami soils formed in glacial till on the steeper side slopes below the Birkbeck soils.

Typical pedon of Birkbeck silt loam, 1 to 4 percent slopes, 2,376 feet north and 1,250 feet east of the southwest corner of sec. 26, T. 20 N., R. 3 E.

Ap—0 to 3 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak thick platy structure parting to weak fine subangular blocky; friable; slightly acid; clear smooth boundary.

E—3 to 7 inches; brown (10YR 4/3, 5/3) silt loam, very pale brown (10YR 7/3) dry; moderate thin platy structure; friable; medium acid; abrupt smooth boundary.

Bt1—7 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and medium angular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—17 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/8) and common fine faint brown (10YR 5/3) mottles; moderate medium and coarse angular blocky structure; firm; few distinct light gray (10YR 7/2) silt coatings and common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide within peds; medium acid; clear smooth boundary.

Bt3—31 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; firm; few distinct very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay films on faces of peds and in root channels; common fine stains and concretions of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Bt4—40 to 52 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/8) mottles; weak medium and coarse prismatic structure; friable; few faint very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay films on faces of peds and in root channels; common fine stains and concretions of iron and manganese oxide within peds; neutral; abrupt smooth boundary.

2BC—52 to 60 inches; yellowish brown (10YR 5/4 and 5/6) loam; few fine distinct gray (10YR 5/1) and common medium prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; friable; few faint dark brown (10YR 3/3) clay films in root channels; common fine stains and concretions of iron and manganese oxide; common pebbles; mildly alkaline.

The thickness of the solum ranges from 50 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The content of clay in the control section ranges from 27 to 35 percent.

The Ap horizon has value of 3 or 4 and chroma of 2 or 3. The E horizon has chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2C horizon, if it occurs, has value of 4 to 6 and chroma of 2 to 4.

Broadwell Series

The Broadwell series consists of well drained soils on outwash plains in the uplands. These soils formed in loess and in the underlying sandy material. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slopes range from 2 to 5 percent.

Broadwell soils are similar to Catlin, Dana, Plano, Proctor, and Tama soils and commonly are adjacent to Lawndale, Sable, and Tama soils. Catlin and Dana soils formed in loess and glacial till. Plano and Proctor soils have a lower content of sand in the lower part than the Broadwell soils. Tama soils formed entirely in loess. They are in landscape positions similar to those of the Broadwell soils. The somewhat poorly drained Lawndale soils are in nearly level areas below the Broadwell soils. The poorly drained Sable soils are lower on the landscape than the Broadwell soils.

Typical pedon of Broadwell silt loam, 2 to 5 percent slopes, 396 feet south and 500 feet east of the northwest corner of sec. 19, T. 20 N., R. 1 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; friable; neutral; clear smooth boundary.

AB—10 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; friable; medium acid; clear smooth boundary.

Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; many distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—23 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—30 to 40 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

the upper part of the profile and moderate or moderately rapid in the lower part. Slopes range from 5 to 10 percent.

Camden soils are similar to Birkbeck, Rozetta, Russell, and St. Charles soils and commonly are adjacent to St. Charles and Lawson soils. Birkbeck and Russell soils formed in loess and glacial till. Rozetta soils formed entirely in loess. St. Charles soils are higher on the stream terraces than the Camden soils. Also, they formed in a thicker mantle of loess. Lawson soils are on flood plains below the Camden soils.

Typical pedon of Camden silt loam, 5 to 10 percent slopes, eroded, 561 feet east and 264 feet south of the northwest corner of sec. 17, T. 19 N., R. 2 E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; mixed with streaks and pockets of yellowish brown (10YR 5/4) silty clay loam from the subsoil; weak fine subangular blocky structure; friable; neutral; abrupt smooth boundary.

24 to 40 inches. The content of clay ranges from 18 to 35 percent in the control section.

[illegible]

or 3. The Bt and 2BC horizons have hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6. The 2Bt horizon is dominantly sandy loam, loam, or silt loam but in some pedons has thin strata of loamy sand. The 2C horizon has value of 4 to 6 and chroma of 3 to 6. It is stratified sandy loam, loam, silt loam, or loamy sand.

Catlin Series

The Catlin series consists of moderately well drained, moderately permeable soils on till plains and moraines [illegible]

blocky structure; friable; many distinct very dark brown (10YR 2/2) and brown (10YR 4/3) clay films [illegible]

oxide within peds; slightly acid; clear smooth boundary.

Bt4—27 to 41 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and common fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; common faint brown (10YR 4/3) clay films on faces of peds and few distinct very dark brown (10YR 2/2) clay films in root channels; common medium stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

[illegible]

soils. They are in landscape positions similar to those of the Dana soils. Parr soils formed almost entirely in loamy till. Plano and Proctor soils formed in loess and in the underlying loamy outwash. Tama soils and the somewhat poorly drained Ipava soils formed entirely in loess. Ipava soils are in the less sloping areas below the Dana soils.

Typical pedon of Dana silt loam, 2 to 6 percent slopes, eroded, 330 feet west and 2,112 feet north of the southeast corner of sec. 7, T. 20 N., R. 1 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with streaks and pockets of yellowish brown (10YR 5/4) silty clay loam from the subsoil; weak fine and medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; yellowish brown (5/4) silty clay loam; moderate fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—12 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; friable; few distinct very dark grayish brown (10YR 3/2) and common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; medium acid; gradual smooth boundary.

Bt3—22 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; medium acid; abrupt smooth boundary.

2Bt4—30 to 43 inches; yellowish brown (10YR 5/4) clay loam; few fine distinct grayish brown (10YR 5/2) mottles in the lower 6 inches; weak coarse subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; few pebbles; neutral; clear smooth boundary.

2BC—43 to 47 inches; brown (10YR 4/3) and yellowish brown (10YR 5/4) loam; few fine distinct grayish brown (10YR 5/2) mottles; weak coarse subangular blocky structure; firm; few fine stains of iron and manganese oxide within peds; few pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

2C—47 to 60 inches; brown (10YR 4/3) loam; few fine and medium distinct grayish brown (10YR 5/2) mottles; massive; firm; few fine and medium stains and concretions of iron and manganese oxide along vertical cracks; few pebbles; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 50 inches. The thickness of the loess ranges from 20 to 40 inches. The content of clay ranges from 27 to 35 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. The 2C horizon is loam or clay loam.

Denny Series

The Denny series consists of poorly drained, slowly permeable soils in depressions on till plains and outwash plains in the uplands. These soils formed in loess. Slopes are 0 to 1 percent.

Denny soils commonly are adjacent to Ipava and Sable soils. The somewhat poorly drained Ipava soils are on low ridges above the Denny soils. The poorly drained Sable soils are on broad flats on the slightly higher parts of the landscape.

Typical pedon of Denny silt loam, 825 feet east and 75 feet north of the southwest corner of sec. 5, T. 19 N., R. 1 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam mixed with some grayish brown (10YR 5/2) silt loam; gray (10YR 5/1) dry; weak medium subangular blocky structure parting to weak fine granular; friable; neutral; abrupt smooth boundary.

Eg1—9 to 14 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Eg2—14 to 20 inches; dark grayish brown (10YR 4/2) silt loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium platy structure; friable; few faint very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; abrupt smooth boundary.

Btg1—20 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine angular blocky structure; firm; few faint very dark gray (10YR 3/1) and dark gray (N 4/0) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg2—25 to 30 inches; olive gray (5Y 5/2) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; firm; few distinct very dark gray (10YR 3/1) and dark gray (N 4/0) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; neutral; gradual wavy boundary.

Btg3—30 to 55 inches; light olive gray (5Y 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium and coarse prismatic structure parting to weak medium angular blocky; friable; few distinct very dark gray (10YR 3/1) clay films in root channels and on faces of peds and few distinct dark grayish brown (2.5Y 4/2) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; neutral; gradual wavy boundary.

Cg—55 to 60 inches; light olive gray (5Y 6/2) silt loam; common fine and medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine and medium concretions and stains of iron and manganese oxide within peds; neutral.

The thickness of the solum ranges from 40 to 60 inches. The content of clay ranges from 35 to 45 percent in the control section.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The Btg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. The Cg horizon hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is silt loam or silty clay loam.

Elburn Series

The Elburn series consists of somewhat poorly drained soils on outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Permeability is moderate in the upper part of the profile and moderate or moderately rapid in the lower part. Slopes range from 0 to 2 percent.

Elburn soils are similar to Ipava and Lawndale soils and commonly are adjacent to Plano and Sable soils. Ipava soils formed entirely in loess and have a higher content of clay in the control section than the Elburn soils. Lawndale soils formed in loess and sandy material. Plano soils are well drained and are in the

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine and medium subangular blocky structure; friable; medium acid; clear smooth boundary.

A—10 to 14 inches; silt loam, very dark grayish brown (10YR 3/2) crushed, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

BA—14 to 18 inches; brown (10YR 4/3) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; friable; few distinct very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—18 to 24 inches; silty clay loam, brown (10YR 4/3) crushed; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—24 to 32 inches; brown (10YR 4/3) silty clay loam; few fine distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; moderate medium angular and subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; medium acid; gradual wavy boundary.

Bt3—32 to 44 inches; brown (10YR 4/3) silt loam; few fine distinct yellowish brown (10YR 5/6) and common fine distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure; friable; few distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

2BC—44 to 56 inches; brown (10YR 4/3), stratified silt loam, loam, and sandy loam; common distinct yellowish brown (10YR 5/6) and grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; friable; few faint dark gray (10YR 4/1) clay films in root channels; few pebbles; slightly acid; gradual wavy boundary.

2C—56 to 60 inches; brown (10YR 4/3), stratified sandy

40 to 60 inches. The thickness of the mollic epipedon ranges from 11 to 18 inches. The content of clay ranges from 25 to 35 percent in the control section.

The Ap and A horizons have value of 2 or 3. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. The 2BC and 2C horizons have hue of 7.5YR, 10YR, or 2.5Y, value of 4 to 6, and chroma of 2 to 8. They are stratified silt loam, sandy loam, loam, or clay loam.

Harpster Series

The Harpster series consists of poorly drained, moderately permeable soils on outwash plains and till

angular blocky; firm; common distinct dark gray (N 4/0) clay films on faces of peds; few fine stains and concretions of iron oxide and calcium carbonate within peds; few snail shells; slight effervescence; moderately alkaline; clear smooth boundary.

Bg3—28 to 40 inches; dark gray (5Y 4/1) silty clay loam; many fine and medium prominent light olive brown (2.5Y 5/6) mottles; strong medium prismatic structure parting to moderate medium angular blocky; firm; few distinct dark gray (N 4/0) clay films on faces of peds; few fine and medium stains and concretions of iron oxide and calcium carbonate within peds; few snail shells; few black (10YR 2/1) formed in loess and in the underlying glacial till. They are in the higher or more sloping areas. Harpster soils have a calcic horizon. The somewhat poorly drained Ipava soils are slightly higher on the landscape than the Hartsburg soils. Also, they contain more clay in the control section. Sable soils do not have carbonates within a depth of 40 inches. They are in landscape positions similar to those of the Hartsburg soils.

Typical pedon of Hartsburg silty clay loam, 1,220 feet west and 1,350 feet south of the northeast corner of sec. 9, T. 20 N., R. 2 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam,

subangular blocky structure parting to weak fine

fine prominent dark yellowish brown (10YR 4/4) and common medium prominent yellowish brown (10YR 5/6) mottles; massive; friable; few fine and medium stains and concretions of iron oxide and calcium carbonate along vertical cracks; few black (10YR 2/1) krotovinas; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 30 to 48 inches. The depth to free carbonates ranges from 20 to 35 inches. The thickness of the mollic epipedon ranges from 10 to 20 inches. The content of clay in the 10- to 40-inch control section ranges from 25 to 35 percent.

or 3, and chroma of 1 or 2, or they are neutral in hue distinct yellowish brown (10YR 5/6) mottles; strong medium angular blocky structure; firm; many distinct dark gray (10YR 4/1) clay films on faces of peds; common medium stains of iron and manganese oxide within peds; slightly acid; gradual smooth boundary.

Btg1—32 to 44 inches; dark grayish brown (2.5Y 4/2) silty clay loam; common fine prominent gray (10YR

Typical pedon of Keomah silt loam, 2,310 feet west and 165 feet north of the southeast corner of sec. 28, T. 20 N., R. 3 E.

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

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

Lawndale Series

The Lawndale series consists of somewhat poorly drained soils on outwash plains in the uplands. These soils formed in loess and in the underlying sandy material. Permeability is moderate in the upper part of the profile and moderately rapid or rapid in the lower part. Slopes range from 0 to 2 percent.

Lawndale soils are similar to Elburn and Ipava soils and commonly are adjacent to Broadwell, Plano, and Sable soils. Elburn and Plano soils formed in loess and loamy outwash. Ipava soils formed entirely in loess and have more clay in the subsoil than the Lawndale soils. Broadwell and Plano soils are well drained and are in the slightly higher or more sloping areas. Sable soils are poorly drained and are on flats below the Lawndale soils.

Typical pedon of Lawndale silt loam, 2,574 feet north and 2,600 feet east of the southwest corner of sec. 30, T. 20 N., R. 1 E.

Ap—0 to 14 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure parting to weak fine subangular blocky; friable; neutral; abrupt smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; moderate fine subangular blocky structure; friable; common distinct very dark gray (10YR 3/1) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—19 to 27 inches; brown (10YR 4/3) silty clay loam; few fine prominent yellowish brown (10YR 5/8) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—27 to 39 inches; olive brown (2.5Y 4/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) and common fine and medium prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; few fine stains and concretions of iron and manganese oxide; slightly acid; clear smooth boundary.

BC1—39 to 50 inches; olive brown (2.5Y 4/4) silt loam; common fine and medium distinct gray (10YR 5/1) and many fine and medium prominent yellowish brown (10YR 5/8) mottles; weak coarse subangular blocky structure; friable; common fine stains and concretions of iron and manganese oxide; slightly acid; abrupt smooth boundary.

2BC2—50 to 60 inches; dark yellowish brown (10YR 3/4) loamy fine sand; few medium distinct gray (10YR 5/1) mottles; weak coarse subangular blocky structure; very friable; neutral.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the loess ranges from 40 to 60 inches. The mollic epipedon ranges from 12 to 18 inches in thickness.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 2 to 6. The 2BC horizon is loamy sand, loamy fine sand, fine sand, or sand.

Lawson Series

The Lawson series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Lawson soils are similar to Sawmill soils and commonly are adjacent to Ross and Sawmill soils. The well drained Ross soils are slightly higher on the flood plains than the Lawson soils and are nearer to streams. The poorly drained Sawmill soils are lower on the landscape than the Lawson soils.

Typical pedon of Lawson silt loam, 495 feet west and 1,254 feet north of the southeast corner of sec. 12, T. 19 N., R. 2 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak medium subangular blocky structure; friable; neutral; abrupt smooth boundary.

A1—8 to 25 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine and medium subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

A2—25 to 30 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine prismatic structure; friable; mildly alkaline; clear smooth boundary.

A3—30 to 35 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few fine faint dark grayish brown (10YR 4/2) and brown (10YR 4/3) mottles; weak fine subangular blocky structure; friable; few fine stains of iron oxide within peds; mildly alkaline; gradual smooth boundary.

Cg—35 to 60 inches; dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) silty clay loam; few fine prominent olive brown (2.5Y 4/4) mottles; massive; friable; few fine stains and concretions of iron oxide along vertical cracks; mildly alkaline.

The mollic epipedon ranges from 24 to 36 inches in thickness. The content of clay in the control section ranges from 18 to 30 percent.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Cg horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3. It is silty clay loam or silt loam.

Miami Series

The Miami series consists of well drained soils on side slopes in the uplands. These soils formed in loamy glacial till that in some areas is mantled with loess. Permeability is moderate in the upper part of the profile and moderately slow in the lower part. Slopes range from 10 to 50 percent.

Miami soils are similar to Russell soils and commonly are adjacent to Birkbeck and Russell soils. Birkbeck and Russell soils formed in loess and glacial till. They are in the less sloping areas above the Miami soils.

Typical pedon of Miami silt loam, 30 to 50 percent slopes, 1,056 feet east and 1,782 feet north of the southwest corner of sec. 26, T. 20 N., R. 3 E.

A—0 to 5 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure; friable; about 43 percent sand; few pebbles; slightly acid; abrupt smooth boundary.

E—5 to 7 inches; brown (10YR 5/3) silt loam; weak medium platy structure; friable; about 27 percent sand; few pebbles; medium acid; clear smooth boundary.

Bt1—7 to 11 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; about 30 percent sand; few pebbles; medium acid; clear smooth boundary.

Bt2—11 to 21 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; friable; many faint dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron oxide within peds; about 29 percent sand; few pebbles; strongly acid; clear smooth boundary.

Bt3—21 to 30 inches; brown (10YR 4/3) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak medium angular blocky; firm; common faint dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron oxide within peds; about 32 percent sand; few pebbles; strongly acid; clear smooth boundary.

Bt4—30 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few faint dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron oxide within peds; about 30 percent sand; common pebbles; neutral; clear smooth boundary.

BC—38 to 49 inches; dark yellowish brown (10YR 4/4) loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few fine stains of iron oxide within peds; about 31 percent sand; few pebbles; slight effervescence; mildly alkaline; clear smooth boundary.

C—49 to 60 inches; brown (10YR 5/3) loam; few fine distinct yellowish brown (10YR 5/6) mottles; massive; firm; about 32 percent sand; common pebbles; strong effervescence; mildly alkaline.

The mantle of loess, if it occurs, is as much as 18 inches thick. The A or Ap horizon has value of 3 to 5 and chroma of 1 to 3. It is loam or silt loam. The E horizon has value of 4 or 5 and chroma of 2 to 4. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. It is silt loam, clay loam, or silty clay loam. The C horizon has value of 5 or 6 and chroma of 3 or 4. It is clay loam or loam.

Orion Series

The Orion series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium overlying a buried soil. Slopes range from 0 to 2 percent.

The Orion soils in this county have slightly more clay in the control section than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Orion soils are commonly adjacent to Lawson, Miami, and Sawmill soils. Lawson soils have a mollic epipedon. They are in landscape positions similar to those of the Orion soils. Miami soils are well drained and are on the steeper upland slopes bordering the flood plains. Sawmill soils are poorly drained and are in swales below the Orion soils. They have a mollic epipedon.

Typical pedon of Orion silt loam, 528 feet west and 1,716 feet north of the southeast corner of sec. 31, T. 20 N., R. 2 E.

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak thick platy structure parting to weak fine subangular blocky; friable; few fine stains and concretions of iron and manganese oxide; neutral; clear smooth boundary.

C—8 to 38 inches; brown (10YR 4/3, 5/3) silt loam; few thin light brownish gray (10YR 6/2) and pale brown (10YR 6/3) strata; few fine faint grayish brown (10YR 5/2) and very few fine prominent yellowish brown (10YR 5/8) mottles; weak thick platy structure parting to weak fine subangular blocky; friable; few faint very dark gray (10YR 3/1) organic coatings in root channels; mildly alkaline; clear smooth boundary.

Ab1—38 to 47 inches; very dark gray (10YR 3/1) silt loam; few fine prominent yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine stains and concretions of

adjacent to Catlin and Dana soils. Catlin and Dana soils have a mantle of loess that is thicker than that of the Parr soils. They are in landscape positions similar to those of the Parr soils. Dana soils are moderately well drained.

Typical pedon of Parr silt loam, 5 to 10 percent slopes, eroded, 400 feet east and 957 feet north of the southwest corner of sec. 32, T. 19 N., R. 2 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; mixed with some streaks and pockets of dark yellowish brown (10YR 4/4) silty clay loam from the subsoil; weak fine subangular blocky structure; friable; medium acid; abrupt smooth boundary.

Bt1—8 to 13 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine subangular blocky structure; friable; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds

The thickness of the solum ranges from 24 to 40 inches. The loess is less than 18 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. It is silt loam or silty clay loam. The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 6. The 2C horizon has value of 5 or 6 and chroma of 3 or 4.

Peotone Series

The Peotone series consists of very poorly drained, moderately slowly permeable soils in depressions on till plains. These soils formed in colluvial sediments. Slopes are 0 to 1 percent.

Peotone soils are similar to Sawmill and Shiloh soils and commonly are adjacent to Ipava and Sable soils. Sawmill soils have a lower content of clay than the Peotone soils. They are on flood plains. Shiloh soils have slightly less sand in the control section than the Peotone soils. Ipava and Sable soils are better drained than the Peotone soils and are slightly higher on the landscape. They have a mollic epipedon that is less than 24 inches thick.

Typical pedon of Peotone silty clay loam, 1,122 feet east and 2,343 feet north of the southwest corner of sec. 19, T. 19 N., R. 2 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; medium acid; clear smooth boundary.

A1—7 to 12 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

A2—12 to 22 inches; black (N 2/0) silty clay loam, dark gray (N 4/0) dry; moderate medium subangular blocky structure; friable; neutral; clear smooth boundary.

Bg1—22 to 28 inches; very dark gray (N 3/0) silty clay loam, gray (N 5/0) dry; moderate medium prismatic structure parting to moderate fine and medium angular blocky; friable; neutral; clear smooth boundary.

Bg2—28 to 33 inches; dark gray (5Y 4/1) silty clay loam; moderate medium prismatic structure parting to moderate fine angular blocky; friable; few faint dark gray (N 4/0) clay films on faces of peds; few

fine and medium prominent yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate fine angular blocky; friable; few faint dark gray (5Y 4/1) clay films on faces of peds; few faint black (10YR 2/1) krotovinas; common fine stains and concretions of iron and manganese oxide; mildly alkaline; gradual smooth boundary.

BCg—47 to 60 inches; light gray (5Y 6/1) silt loam; few fine and medium prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few faint dark gray (10YR 4/1) clay films on faces of peds; few faint black (10YR 2/1) krotovinas; few fine and medium stains and concretions of iron and manganese oxide; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The thickness of the mollic epipedon ranges from 24 to 36 inches. The content of clay in the 10- to 40-inch control section ranges from 35 to 45 percent.

The Ap and A horizons have hue of 10YR or 2.5Y or are neutral in hue. They have value of 2 or 3. The Bg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 6 and chroma of 0 to 2. Some pedons have a Cg horizon within a depth of 60 inches. This horizon is silt loam or silty clay loam.

Plano Series

The Plano series consists of well drained, moderately permeable soils on outwash plains and stream terraces. These soils formed in loess and in the underlying loamy outwash. Slopes range from 0 to 5 percent.

Plano soils are similar to Broadwell, Catlin, Dana, Proctor, and Tama soils and commonly are adjacent to Broadwell, Catlin, Dana, Elburn, and Ipava soils. Broadwell soils formed in loess and sandy material. They are in landscape positions similar to those of the Plano soils. The moderately well drained Catlin and Dana soils formed in loess and loamy glacial till. They are in landscape positions similar to those of the Plano soils. Proctor soils have a mantle of loess that is thinner than that of the Plano soils. Ipava and Tama soils formed entirely in loess. Elburn and Ipava soils are somewhat poorly drained and are on the flatter parts of the landscape below the Plano soils.

Typical pedon of Plano silt loam, 0 to 2 percent medium subangular blocky structure; friable; slightly acid; abrupt smooth boundary.

BA—13 to 17 inches; dark brown (10YR 3/3) silty clay loam; moderate fine subangular blocky structure;

3/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt1—17 to 23 inches; brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Bt2—23 to 36 inches; dark yellowish brown (10YR 4/4)

in loess and in the underlying loamy outwash. Permeability is moderate in the upper part of the profile and moderate or moderately rapid in the lower part. Slopes range from 2 to 6 percent.

surface layer than is definitive for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Proctor soils are similar to Broadwell, Catlin, Dana, Plano, and Tama soils and commonly are adjacent to Ipava, Lawson, and Plano soils. Broadwell soils formed in loess and sandy material. Catlin and Dana soils formed in loess and glacial till. Plano soils have a mantle of loess that is thicker than that of the Proctor root channels; few fine stains and concretions of iron and manganese oxide; few pebbles; neutral; gradual smooth boundary.

2C—42 to 60 inches; dark yellowish brown (10YR 4/4), stratified sandy loam and loam; massive; friable; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. The thickness of the loess ranges from 20 to 40 inches.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 3 to 6. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It

stratified loamy sand, sandy loam, loam, or silt loam.

Ross Series

The Ross series consists of well drained, moderately

The solum ranges from 30 to 60 inches in thickness. The thickness of the mollic epipedon ranges from 24 to 40 inches.

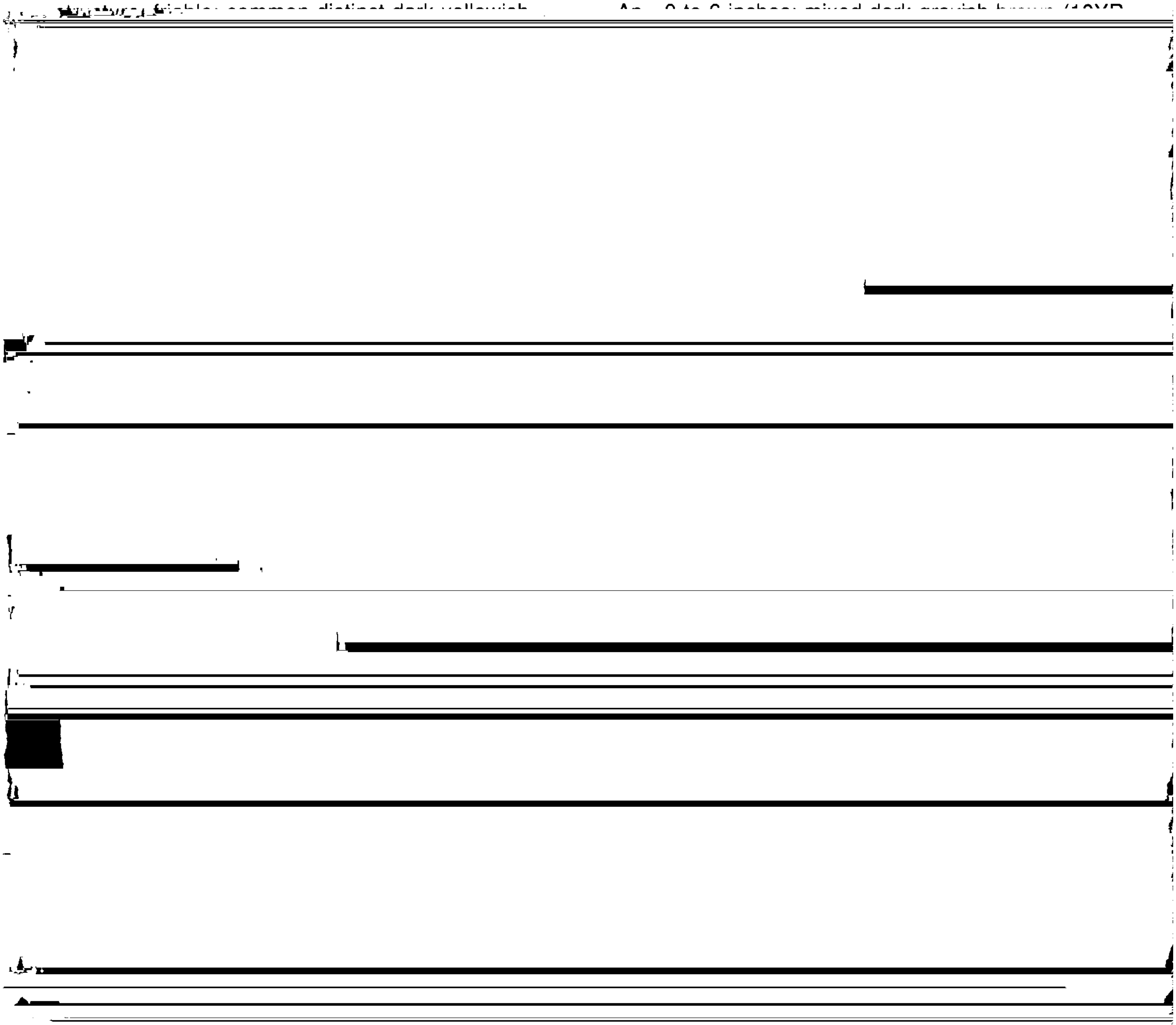
The Ap and A horizons have chroma of 1 to 3. The Bw horizon has value of 2 to 5 and chroma of 1 to 4. The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. It is dominantly sandy loam, loam, or silt loam. In some pedons, however, the lower part has thin strata of loamy sand.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on uplands and

Slopes range from 1 to 5 percent.

Rozetta soils are similar to Birkbeck, Camden, Russell, and St. Charles soils and commonly are adjacent to Keomah and Russell soils. Birkbeck and Russell soils formed in loess and in the underlying friable; common distinct dark yellowish



brown (10YR 4/4) clay films and few distinct light gray (10YR 7/1) silt coatings on faces of peds; few medium stains and concretions of iron and manganese oxide; strongly acid; clear smooth boundary.

BC—42 to 53 inches; brown (10YR 5/3) silt loam; common fine distinct dark yellowish brown (10YR 4/4) and common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure; friable; few distinct light gray (10YR 7/1)

Ap—0 to 6 inches; mixed dark grayish brown (10YR 4/2) and brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; medium acid; abrupt smooth boundary.

Bt1—6 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine angular blocky structure; friable; few faint dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—16 to 25 inches; yellowish brown (10YR 5/6) silty clay loam; few fine faint grayish brown (10YR 5/2) soils and commonly are adjacent to Ipava and Tama soils. Harpster soils have a calcic horizon. Hartsburg soils have free carbonates within a depth of 40 inches. The somewhat poorly drained Ipava and moderately well drained Tama soils are higher on the landscape than the Sable soils. Also, Ipava soils have more clay in the control section.

Typical pedon of Sable silty clay loam, 1,452 feet west and 66 feet south of the northeast corner of sec. [illegible]

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure; friable; slightly acid; clear smooth boundary.

A—8 to 17 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine and medium subangular blocky structure; friable; few fine stains of iron oxide within peds; neutral; clear smooth boundary.

Btg1—17 to 22 inches; dark gray (5Y 4/1) silty clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; common faint black (10YR 2/1) clay films on faces of peds; few fine stains of iron and manganese oxide within peds [illegible]

neutral in hue. They have value of 2 or 3 and chroma of 0 or 1. The Btg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 4 to 6 and chroma of 0 to 2. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 or 6, and chroma of 1 or 2. It is silt loam or silty clay loam.

Sawmill Series

[illegible]

moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes are 0 to 1 percent.

Sawmill soils are similar to Lawson, Peotone, and Shiloh soils and commonly are adjacent to Lawson and Ross soils. Peotone and Shiloh soils contain more clay in the subsoil than the Sawmill soils. They are not flooded. Lawson and Ross soils are slightly higher on the landscape than the Sawmill soils. Lawson soils are somewhat poorly drained. Ross soils are well drained.

Typical pedon of Sawmill silty clay loam, 2,541 feet west and 1,155 feet north of the southeast corner of sec. 32, T. 21 N., R. 5 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (N 4/1) dry; weak fine and medium angular blocky structure; friable; neutral; clear [illegible] pebbles; about 5 percent sand; neutral; clear smooth boundary.

Bg3—41 to 53 inches; gray (5Y 5/1) silty clay loam; few

blocky structure; firm; few fine pebbles; neutral; clear smooth boundary.

A—11 to 20 inches; very dark gray (N 3/0) silty clay soils formed in loess and in the underlying loamy outwash. Slopes range from 1 to 5 percent.

St. Charles soils are similar to Birkbeck, Camden, Rozetta, and Russell soils and commonly are adjacent to Camden and Lawson soils. Birkbeck and Russell soils formed in loess and loamy glacial till. Camden soils have a mantle of loess that is thinner than that of the St. Charles soils. They are on the steeper side slopes below the St. Charles soils. Rozetta soils formed entirely in loess. Lawson soils are on flood plains below the St. Charles soils.

Typical pedon of St. Charles silt loam, 1 to 5 percent slopes, 1,000 feet east and 3,700 feet south of the northwest corner of sec. 7, T. 19 N., R. 3 E.

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; weak fine subangular blocky and some weak thin platy structure; friable; neutral; abrupt smooth boundary.

BE—7 to 18 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; many distinct dark brown (10YR 3/3) clay films and common faint brown (10YR 5/3) silt coatings on faces of peds; medium acid; clear smooth boundary.

of 3 or 4. It is silty clay loam or silt loam. The 2BC and 2C horizons are sandy loam, silt loam, or loam. The 2BC horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6.

Tama Series

The Tama series consists of moderately well drained, moderately permeable soils in the uplands. These soils formed in loess. Slopes range from 1 to 5 percent.

Tama soils are similar to Broadwell, Catlin, Dana, Plano, and Proctor soils and commonly are adjacent to Ipava and Sable soils. Broadwell soils formed in loess and sandy material. Catlin and Dana soils formed in loess and glacial till. Plano and Proctor soils formed in loess and loamy outwash. Ipava soils are somewhat poorly drained and are slightly higher on the landscape than the Tama soils. Also, they have more clay in the control section. Sable soils are poorly drained and are in swales below the Tama soils.

Typical pedon of Tama silt loam, 1 to 5 percent slopes, 20 feet east and 2,046 feet south of the northwest corner of sec. 31, T. 19 N., R. 1 E.

Ap—0 to 6 inches; black (10YR 2/1) silt loam, dark gray friable; few fine stains and concretions of iron and manganese oxide along vertical cracks; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to more than 60 inches. The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 3 to 6.

Btg2—26 to 33 inches; dark gray (5Y 4/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine concretions and stains of iron and manganese oxide within peds; slightly acid; clear smooth boundary.

Btg3—33 to 50 inches; gray (5Y 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6)

[illegible]

Formation of the Soils

Dr. Leon Follmer, associate geologist, Illinois State Geological Survey, helped prepare this section.

Soil forms through processes that act on deposited or accumulated geologic material. These processes result in features called soil characteristics. The soil characteristics 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 that the forces of soil formation have acted on the parent material.

Climate and plant and animal life are the active factors of soil formation. They act directly on the parent material either in place or after relocation by water, glaciers, or wind and slowly change it into a natural body that has genetically related horizons. Relief can modify the effects of climate and plant and animal life. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for the transformation of the parent material into a soil that has differentiated horizons. Usually, a long time is required 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 these, in particular loess and the underlying glacial drift.

Glacial till is material laid down directly by continental glaciers with a minimum of water action. It consists of clay, silt, sand, pebbles, and boulders, all of which are mixed together. The small pebbles generally have distinct edges and corners, indicating they have not been subject to intensive washing by water.

The glacial till in De Witt County was deposited during the Wisconsinan Glaciation, the most recent glaciation *(14)*. A distinct landscape feature of this glaciation is in the southwest corner of the county. Extending diagonally from northwest to southeast is the Shelbyville Moraine *(7)*. This moraine, or ridge, marks the farthest advance of the Wisconsinan Glaciation in the state. The glacial till that makes up the moraine and underlies most of the county is calcareous loam or clay loam.

Soils that formed entirely in till are generally on strongly sloping to very steep side slopes. Miami soils are an example. In most areas of the county, the glacial till is overlain by loess of varying thickness. Birkbeck, Catlin, Dana, and Russell are examples of soils that formed in loess and in the underlying glacial till.

Glacial outwash is material that was deposited by water in front of moraines or along the major streams. As the glaciers that extended into De Witt County on outwash plains in front of moraines in the southwestern and northeastern parts of the county.

Alluvium is material that was deposited by floodwater from streams. It is silty or loamy. Alluvial areas are

undissected by drainageways. Catlin, Ipava, and Sable soils are examples.

About 10 percent of the county supported timber at the time of early settlement. The organic matter that spring rains in these areas can cause extensive erosion when the soils are partially frozen and more water runs off the surface.

More detailed information about the climate in De Witt County is given in the section "General Nature of the County."

Relief

Relief, or the local changes in elevation, has markedly affected the soils in De Witt County through its effects on runoff, infiltration, erosion, and natural drainage. Relief largely determines how much water infiltrates into the soil and how much runs off the surface. On the steeper slopes, runoff is most rapid and the rate of water infiltration is lowest. In low areas water is temporarily ponded by runoff from the adjacent slopes.

Relief also affects the natural drainage of the soil, or the depth to the seasonal high water table. Because of its effect on aeration of the soil, natural drainage in turn determines the color of the subsoil. The very poorly drained Peotone soils are in depressions. They are ponded or have a seasonal high water table near the surface in the early part of the growing season. The soil pores are essentially devoid of oxygen, and the naturally occurring iron and manganese compounds in the soils are in a reduced chemical state. The subsoil is dull gray and mottled. In the more sloping, well drained Miami soils, the seasonal high water table is generally below a depth of 6 feet. The pores in these soils have an abundant supply of oxygen, and the iron and manganese compounds are in an oxidized chemical state. The subsoil, which is brownish, appears brightly colored.

Nearly level, poorly drained soils, such as Sable soils, are less well developed than the gently sloping, moderately well drained Catlin soils. In the Sable soils, a seasonal high water table near the surface inhibits the downward movement of the products of weathering. In the Catlin soils, the seasonal high water table is farther from the surface and more of the products of weathering can be translocated.

Local relief directly determines the intensity of erosion. The hazard of erosion increases as the slope and the runoff rate increase.

Time

To a great extent, time determines the degree of profile development in a soil. The influence of time, however, is modified by wetness, erosion, the deposition of material, and local relief.

In most of the soils in De Witt County, enough time has passed to allow for the removal of calcium carbonates from the upper part of the profile. Harpster soils, however, are still calcareous in the surface layer because they are in depressions and have a seasonal high water table.

Erosion continually removes the most recently exposed material and thus tends to allow leaching to occur in fresh geologic material. The steeper soils are morphologically younger than the soils in the more stable landscape positions.

Differences in length of time that the parent material has been in place are reflected by the degree of profile development in the soil. Lawson soils are characterized by weak profile development because they are on flood plains that continue to receive recent alluvial sediments. They have not been in place long enough for the formation of distinct horizons. Rozetta soils are more strongly developed and have distinct horizons because the loess in which they formed has been in place much longer than the parent material of the Lawson soils.

References

(1) Anonymous. 1882. History of De Witt County, Illinois. W.R. Brink & Co., Philadelphia, Pennsylvania, 355 pp., illus.

(2) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vols., illus.

(3) American Society for Testing and Materials. 1985. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(4) Anderson, C.D., and others. 1984. Illinois agronomy handbook. Univ. of Ill., Coop. Ext. Serv., 96 pp., illus.

(5) Clinton & De Witt County History Book Committee. 1985. Clinton and De Witt County, Illinois, 1835-1985. Kes-Print, Inc., Shawnee Mission, Kansas. 544 pp., illus.

(6) Fehrenbacher, J.B., R.A. Pope, I.J. Jansen, J.D. Alexander, and B.W. Ray. 1978. Soil productivity in Illinois. Univ. of Ill., Coll. of Agric., Coop. Ext. Serv. Circ. 1156, 21 pp., illus.

(7) Hunt, Cathy S., and John P. Kempton. 1977. Geology for planning in De Witt County, Illinois. Ill. State Geol. Surv., Environ. Geol. Note 83, 28 pp., illus.

(8) Smith, Guy D., and L.H. Smith. 1940. De Witt County soils. Univ. of Ill., Agric. Exp. Stn. Soil Rep. 67, 28 pp., illus.

(9) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus.

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

(11) United States Department of Agriculture. 1972. Soil survey laboratory methods and procedures for collecting soil samples. Soil Surv. Invest. Rep. 1, 63 pp., illus.

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

(13) United States Department of Commerce, Bureau of the Census. 1984. 1982 census of agriculture. Vol. I, Part 13.

(14) Willman, H.B., and others. 1975. Handbook of Illinois stratigraphy. Ill. State Geol. Surv. Bull. 95, 261 pp., illus.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

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

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

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

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage 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

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

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.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

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.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or

constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

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

Congeliturbate. Soil material disturbed by frost action.

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—

follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

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.

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

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide

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.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material typically broad and shallow, seeded to grass or

protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil

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 expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

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.

forming numerous depressions or small basins.

Lacustrine deposit (geology). Material deposited in

lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

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,*

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the degrees of acidity or alkalinity, expressed as pH values, are—

the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

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

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

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.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

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.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{+} + Mg^{++}$. The degrees of sodicity and their respective ratios are—

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

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.

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.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediments of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

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

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters).

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Decatur, Illinois)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	34.5	17.1	25.8	38	13	1	2.03	0.95	2.96	5	6.8
February----	39.9	21.4	30.7	45	17	4	2.03	1.13	2.83	5	5.4
March-------	50.5	30.4	40.5	55	28	42	3.48	1.97	4.82	7	4.1
April-------	65.3	42.4	53.9	68	40	192	4.13	2.29	5.76	8	.5
May---------	75.9	52.1	64.0	79	48	445	4.09	2.02	5.90	7	.0
June--------	84.8	61.0	72.9	88	58	696	4.48	1.97	6.63	6	.0
July--------	88.0	65.1	76.6	91	63	830	4.17	1.82	6.16	6	.0
August------	86.1	63.1	74.6	87	61	770	3.69	1.65	5.43	6	.0
September---	80.7	55.7	68.2	83	53	554	3.21	.86	5.09	5	.0
October-----	68.6	44.3	56.5	72	41	249	2.63	1.10	3.92	5	.0
November----	52.2	33.0	42.6	56	31	52	2.56	1.35	3.62	5	2.1
December----	39.9	23.3	31.6	44	19	6	2.62	.97	3.99	5	5.1
Yearly:											
Average---	63.9	42.4	53.2	---	---	---	---	---	---	70	24.0
Extreme---	---	---	---	113	-23	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,841	39.12	18.08	57.11	---	---

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-80 at Decatur, Illinois)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 13	Mar. 21	Apr. 4
2 years in 10 later than--	Mar. 22	Mar. 31	Apr. 15
5 years in 10 later than--	Mar. 29	Apr. 9	Apr. 24
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 8	Oct. 3
2 years in 10 earlier than--	Oct. 26	Oct. 13	Oct. 5
5 years in 10 earlier than--	Nov. 4	Oct. 26	Oct. 16

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Decatur, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	199	180	150
8 years in 10	206	186	158
5 years in 10	219	200	173
2 years in 10	232	213	188
1 year in 10	239	219	196

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

Map symbol	Soil name	Acres	Percent
17	Keomah silt loam	3,605	1.4
27D2	Miami loam, 10 to 15 percent slopes, eroded	3,255	1.3
27E	Miami loam, 15 to 30 percent slopes	5,690	2.2
27G	Miami silt loam, 30 to 50 percent slopes	2,700	1.0
36B	Tama silt loam, 1 to 5 percent slopes	14,535	5.6
43	Ipava silt loam	45,345	17.6
45	Denny silt loam	275	0.1
56B2	Dana silt loam, 2 to 6 percent slopes, eroded	2,980	1.2
67	Harpster silty clay loam	2,940	1.1
68	Sable silty clay loam	69,100	26.8
73	Ross loam	310	0.1
107	Sawmill silty clay loam	5,365	2.1
134C2	Camden silt loam, 5 to 10 percent slopes, eroded	575	0.2
138	Shiloh silty clay loam	200	0.1
148B2	Proctor silt loam, 2 to 6 percent slopes, eroded	310	0.1
171B2	Catlin silty clay loam, 2 to 5 percent slopes, eroded	46,090	17.8
171C2	Catlin silty clay loam, 5 to 10 percent slopes, eroded	1,545	0.6
198	Elburn silt loam	2,150	0.8
199A	Plano silt loam, 0 to 2 percent slopes	1,045	0.4
199B2	Plano silt loam, 2 to 5 percent slopes, eroded	1,310	0.5
206	Thorp silt loam	515	0.2
221C2	Parr silt loam, 5 to 10 percent slopes, eroded	1,180	0.5
233B	Birkbeck silt loam, 1 to 4 percent slopes	17,130	6.6
233C2	Birkbeck silt loam, 4 to 8 percent slopes, eroded	2,095	0.8
243B	St. Charles silt loam, 1 to 5 percent slopes	1,280	0.5
244	Hartsburg silty clay loam	3,870	1.5
279B	Rozetta silt loam, 1 to 5 percent slopes	1,550	0.6
322C2	Russell silt loam, 5 to 10 percent slopes, eroded	6,900	2.7
322D3	Russell silty clay loam, 10 to 15 percent slopes, severely eroded	865	0.3
330	Peotone silty clay loam	525	0.2
415	Orion silt loam	555	0.2
451	Lawson silt loam	5,270	2.0
533	Urban land	375	0.1
683	Lawndale silt loam	275	0.1
684B	Broadwell silt loam, 2 to 5 percent slopes	265	0.1
802B	Orthents, loamy, gently sloping	1,260	0.5
802D	Orthents, loamy, strongly sloping	225	0.1
865	Pits, gravel	50	*
	Water	5,250	2.0
	Total	258,760	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
17	Keomah silt loam (where drained)
36B	Tama silt loam, 1 to 5 percent slopes
43	Ipava silt loam
45	Denny silt loam (where drained)
56B2	Dana silt loam, 2 to 6 percent slopes, eroded
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
73	Ross loam
107	Sawmill silty clay loam (where drained)
138	Shiloh silty clay loam (where drained)
148B2	Proctor silt loam, 2 to 6 percent slopes, eroded
171B2	Catlin silty clay loam, 2 to 5 percent slopes, eroded
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B2	Plano silt loam, 2 to 5 percent slopes, eroded
206	Thorp silt loam (where drained)
[illegible]	[illegible]
233B	Birkbeck silt loam, 1 to 4 percent slopes
243B	St. Charles silt loam, 1 to 5 percent slopes
244	Hartsburg silty clay loam (where drained)
279B	Rozetta silt loam, 1 to 5 percent slopes
330	Peotone silty clay loam (where drained)
415	Orion silt loam
451	Lawson silt loam

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
17 Keomah	IIw	131	44	52	5.1	8.0
27D2 Miami	IVe	110	36	45	4.3	7.2
27E Miami	VIe	---	---	---	3.7	6.2
27G Miami	VIIe	---	---	---	---	---
36B Tama	IIe	153	46	61	5.8	9.7
43 Ipava	I	163	52	66	6.1	10.1
45 Denny	IIIw	113	37	47	---	---
56B2 Dana	IIe	134	42	56	5.2	8.6
67 Harpster	IIw	136	44	52	---	---
68 Sable	IIw	156	51	61	---	---
73 Ross	IIw	145	46	60	5.5	9.1
107 Sawmill	IIw	147	47	54	---	---
134C2 Camden	IIIe	117	37	52	4.7	7.8
138 Shiloh	IIw	139	46	56	---	---
148B2 Proctor	IIe	138	42	57	5.3	8.8
171B2 Catlin	IIe	144	44	59	5.6	9.3
171C2 Catlin	IIIe	141	43	57	5.5	9.1
198 Elburn	I	161	50	63	6.1	10.2
199A Plano	I	151	45	60	5.8	9.7

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Orchardgrass-alfalfa hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Tons	AUM*
199B2---------------------- Plano	IIe	145	43	58	5.4	9.3
206------------------------ Thorp	IIw	126	42	51	---	---
221C2---------------------- Parr	IIIe	117	40	52	4.8	8.0
233B----------------------- Birkbeck	IIe	122	41	54	4.9	8.2
233C2---------------------- Birkbeck	IIIe	116	38	52	4.7	7.8
243B----------------------- St. Charles	IIe	126	39	55	5.0	8.1
244------------------------ Hartsburg	IIw	145	47	56	---	---
279B----------------------- Rozetta	IIe	130	40	53	5.1	8.6
322C2---------------------- Russell	IIIe	114	37	40	4.4	7.3
322D3---------------------- Russell	VIe	---	---	---	3.4	5.7
330------------------------ Peotone	IIw	123	42	43	---	---
415------------------------ Orion	IIw	135	43	52	4.7	7.8
451------------------------ Lawson	IIw	161	48	62	5.7	9.5
533**. Urban land						
683------------------------ Lawndale	I	156	50	62	5.8	9.7
684B----------------------- Broadwell	IIe	144	44	58	5.3	9.2
802B, 802D. Orthents						
865**. Pits						

* 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.

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

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)	
		Erosion (e)	Wetness (w)
		Acres	Acres
I	48,815	---	---
II	177,705	85,450	92,255
III	12,570	12,295	275
IV	3,255	3,255	---
V	---	---	---
VI	6,555	6,555	---
VII	2,700	2,700	---
VIII	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

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

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
27D2 Miami	5A	Slight	Slight	Slight	Slight	White oak	90	72	Eastern white pine, red pine, white ash, yellow poplar, black walnut.
						Yellow poplar	98	104	
						Sweetgum	76	70	
27E Miami	5R	Moderate	Moderate	Slight	Slight	White oak	90	72	Eastern white pine, red pine, white ash, yellow poplar, black walnut.
						Yellow poplar	98	104	
						Sweetgum	76	70	
27G Miami	5R	Severe	Severe	Slight	Slight	White oak	90	72	Eastern white pine, red pine, white ash, yellow poplar, black walnut.
						Yellow poplar	98	104	
						Sweetgum	76	70	
73 Ross	5A	Slight	Slight	Slight	Slight	Northern red oak	86	68	Eastern white pine, black walnut, white ash, Norway spruce, yellow poplar.
						Yellow poplar	96	100	
						Sugar maple	85	52	
						White oak	---	---	
						Black walnut	---	---	
						Black cherry	---	---	
						White ash	---	---	
107 Sawmill	5W	Slight	Moderate	Moderate	Moderate	Pin oak	90	72	American sycamore, black spruce, hackberry, European larch, green ash, pin oak, [illegible] swamp white oak.
						Eastern cottonwood	---	---	
						Sweetgum	---	---	
						Cherrybark oak	---	---	
						American sycamore	---	---	
233C2	5A	Slight	Slight	Slight	Slight	White oak	86	68	White oak, [illegible]

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Potential productivity: Common trees	Site index	Volume*	Trees to plant
322D3 Russell	5A	Slight	Slight	Slight	Slight	White oak	90	72	Eastern white pine, white ash, yellow poplar, black walnut, white oak, northern red oak, green ash, black cherry.
						Northern red oak	90	72	
						Yellow poplar	96	100	
						Sweetgum	76	70	
415 Orion	2W	Slight	Moderate	Slight	Slight	Silver maple	80	34	White spruce, silver maple, white ash, eastern cottonwood.
						Red maple	---	---	
						White ash	---	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
17----------------- Keomah	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
27D2-------------- Miami	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
36B--------------- Tama	---	American cranberrybush, American plum, common chokecherry, silky dogwood.	Blue spruce, eastern arborvitae, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
43----------------- Ipava	---	American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn, nannyberry, green ash.	Norway spruce-----	Eastern white pine, pin oak.
45----------------- Denny	---	Silky dogwood, American cranberrybush, nannyberry.	Austrian pine, eastern arborvitae, Norway spruce, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
56B2-------------- Dana	---	American cranberrybush, silky dogwood, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
67----------------- Harpster	Redosier dogwood.	Nannyberry viburnum, Washington hawthorn, blackhaw, common chokecherry.	White spruce, eastern arborvitae, eastern redcedar, green ash, Osageorange, hackberry.	Baldcypress-------	---

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
68. Sable	---	Silky dogwood, American cranberrybush, nannyberry.	Washington hawthorn, white fir, blue spruce, eastern arborvitae, Austrian pine, Norway spruce, green ash.	Eastern white pine	Pin oak.
73. Ross	---	Silky dogwood, American cranberrybush.	Washington hawthorn, eastern arborvitae, blue spruce, white fir, Austrian pine, nannyberry, green ash.	Norway spruce	Pin oak, eastern white pine.
107. Sawmill	---	American cranberrybush, silky dogwood, nannyberry.	Norway spruce, Austrian pine, eastern arborvitae, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
134C2. Camden	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
138. Shiloh	---	American cranberrybush, silky dogwood, nannyberry.	Norway spruce, Austrian pine, eastern arborvitae, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
148B2. Proctor	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
171B2, 171C2. Catlin	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	Washington hawthorn, eastern arborvitae, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
198 Elburn	---	Silky dogwood, American cranberrybush.	Austrian pine, white fir, eastern arborvitae, Washington hawthorn, blue spruce, nannyberry, green ash.	Norway spruce	Eastern white pine, pin oak.
199A, 199B2 Plano	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	Washington hawthorn, eastern arborvitae, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
206 Thorp	---	Silky dogwood, American cranberrybush, nannyberry.	Washington hawthorn, white fir, blue spruce, eastern arborvitae, Austrian pine, Norway spruce, green ash.	Eastern white pine	Pin oak.
221C2 Parr	---	American plum, American cranberrybush, silky dogwood, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
233B, 233C2 Birkbeck	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
243B St. Charles	---	Silky dogwood, American cranberrybush, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
279B-------------- Rozetta	---	American cranberrybush, silky dogwood, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
322C2, 322D3------ Russell	---	American cranberrybush, silky dogwood, American plum, common chokecherry.	White fir, blue spruce, eastern arborvitae, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
330--------------- Peotone	---	Silky dogwood, American cranberrybush, nannyberry.	Norway spruce, Austrian pine, eastern arborvitae, blue spruce, white fir, Washington hawthorn, green ash.	Eastern white pine	Pin oak.
415--------------- Orion	---	American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn, nannyberry, green ash.	Norway spruce-----	Eastern white pine, pin oak.
451--------------- Lawson	---	American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, eastern arborvitae, Washington hawthorn, nannyberry, green ash.	Norway spruce-----	Eastern white pine, pin oak.
683--------------- Lawndale	---	Silky dogwood, American cranberrybush.	Washington hawthorn, eastern arborvitae, blue spruce, white fir, Austrian pine, nannyberry, green ash.	Norway spruce-----	Pin oak, eastern white pine.
684B-------------- Broadwell	---	Silky dogwood, American	White fir, blue spruce, eastern	Norway spruce, Austrian pine.	Pin oak, eastern white pine.

TABLE 10.--RECREATIONAL DEVELOPMENT

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

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17 Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
27D2 Miami	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27E Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
27G Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
36B Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
43 Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
45 Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
56B2 Dana	Slight	Slight	Moderate: slope.	Slight	Slight.
67 Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68 Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
73 Ross	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
107 Sawmill	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
134C2 Camden	Slight	Slight	Severe: slope.	Slight	Slight.
138 Shiloh	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
148B2 Proctor	Slight	Slight	Moderate: slope.	Slight	Slight.
171B2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
199A------------------ Plano	Slight----------	Slight----------	Slight----------	Slight----------	Slight.
199B2----------------- Plano	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
206------------------- Thorp	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
221C2----------------- Parr	Moderate: percs slowly.	Moderate: percs slowly.	Severe: slope.	Slight----------	Slight.
233B------------------ Birkbeck	Slight----------	Slight----------	Moderate: slope.	Severe: erodes easily.	Slight.
233C2----------------- Birkbeck	Slight----------	Slight----------	Severe: slope.	Severe: erodes easily.	Slight.
243B------------------ [illegible]	Slight---------- [illegible]	Slight---------- [illegible]	Moderate: [illegible]	Severe: [illegible]	Slight. [illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
244------------------- Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
279B------------------ Rozetta	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
322C2----------------- Russell	Slight----------	Slight----------	Severe: slope.	Severe: erodes easily.	Slight.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 11.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
17----------------- Keomah	Good	Good	Fair	Fair	Fair	Fair	Good	Fair	Fair.
27D2, 27E---------- Miami	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
27G---------------- Miami	Very poor	Poor	Good	Good	Very poor	Very poor	Poor	Good	Very poor.
36B---------------- Tama	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
43----------------- Ipava	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
45----------------- Denny	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
56B2--------------- Dana	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
67----------------- Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
68----------------- Sable	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
73----------------- Ross	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
107---------------- Sawmill	Good	Good	Good	Fair	Good	Fair	Good	Fair	Fair.
134C2-------------- Camden	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Poor.
138---------------- Shiloh	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
148B2-------------- Proctor	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
171B2-------------- Catlin	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
171C2-------------- Catlin	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
198---------------- Elburn	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B2-------- Plano	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
206---------------- Thorp	Good	Good	Good	Good	Good	Good	Good	Good	Good.

TABLE 11.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
221C2--------------- Parr	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
233B--------------- Birkbeck	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
233C2--------------- Birkbeck	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
243B--------------- St. Charles	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
244---------------- Hartsburg	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
279B--------------- Rozetta	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
322C2--------------- Russell	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
322D3. Russell									
330---------------- Peotone	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
415---------------- Orion	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
451---------------- Lawson	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
533*. Urban land									
683---------------- Lawndale	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
684B--------------- Broadwell	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
802B, 802D. Orthents									
865*. Pits									

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

TABLE 12.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition 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
17----------------- Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, frost action, low strength.	Slight.
27D2-------------- Miami	Moderate: slope, dense layer.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
27E, 27G---------- Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.
36B--------------- Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
43----------------- Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
45----------------- Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
56B2-------------- Dana	Moderate: dense layer, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
67----------------- Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
68----------------- Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
73----------------- Ross	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
107--------------- Sawmill	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
134C2------------- Camden	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
138----------------- Shiloh	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
148B2--------------- Proctor	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight----------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
171B2--------------- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
[illegible]	Moderate:	Moderate:	Moderate:	Moderate:	Severe:	Slight.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
330--------------- Peotone	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
415--------------- Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding, frost action.	Moderate: wetness, flooding.
451--------------- Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
533*. Urban land						
683--------------- Lawndale	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
684B-------------- Broadwell	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
802B, 802D. Orthents						
865*. Pits						

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

TABLE 13.--SANITARY FACILITIES

[illegible] are defined in the Glossary. See text for definitions of [illegible]

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
171B2: Catlin	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
171C2: Catlin	Severe: wetness.	Severe: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
198: Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: wetness.
199A: Plano	Slight	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
199B2: Plano	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
206: Thorp	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
221C2: Parr	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
233B, 233C2: Birkbeck	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
243B: St. Charles	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
244: Hartsburg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
279B: Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
322C2: Russell	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
322D3: Russell	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
330: Peotone	Severe: ponding, percs slowly.	Slight	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
415: Orion	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
451: Lawson	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
533*. Urban land					
683----------------- Lawndale	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: wetness.	Poor: hard to pack, wetness.
684B---------------- Broadwell	Slight-----------	Severe: seepage.	Severe: seepage.	Slight-- --------	Fair: too clayey, thin layer.
802B, 802D.					

TABLE 14.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
17 Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
27D2 Miami	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope, too clayey.
27E Miami	Fair: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
27G Miami	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36B Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
43 Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
45 Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
56B2 Dana	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
67 Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68 Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
73 Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
107 Sawmill	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
134C2 Camden	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
138 Shiloh	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
148B2 Proctor	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
171B2, 171C2 Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
198 Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199A, 199B2	Good	Improbable:	Improbable:	Good.

TABLE 15.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition 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	Drainage	Irrigation	Terraces and diversions	Grassed waterways
17----------------- Keomah	Slight---------	Severe: hard to pack.	Frost action, percs slowly.	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.	Erodes easily, percs slowly.
27D2, 27E, 27G---- Miami	Severe: slope.	Severe: piping.	Deep to water	Slope, rooting depth.	Slope, erodes easily.	Slope, erodes easily, rooting depth.
36B---------------- Tama	Moderate: seepage, slope.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
43----------------- Ipava	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
45----------------- Denny	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
56B2--------------- Dana	Moderate: seepage, slope.	Moderate: thin layer.	Deep to water	Slope----------	Erodes easily	Erodes easily.
67----------------- Harpster	Moderate: seepage.	Severe: ponding, piping.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
68----------------- Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
73----------------- Ross	Severe: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
107---------------- Sawmill	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness--------	Wetness.
134C2-------------- Camden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
138---------------- Shiloh	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
148B2-------------- Proctor	Severe: seepage.	Severe: piping.	Deep to water	Slope----------	Erodes easily, too sandy.	Erodes easily.
171B2, 171C2------	Moderate:	Moderate:	Deep to water	Slope	[illegible]	[illegible]

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
199B2-------------- Plano	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
206---------------- Thorp	Severe: seepage.	Severe: ponding.	Ponding, percs slowly, [illegible]	Ponding, percs slowly, [illegible]	Erodes easily, ponding, [illegible]	Wetness, erodes easily, [illegible]

TABLE 16.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
17---------------- Keomah	0-12	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	12-43	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	100	95-100	45-60	30-45
	43-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
27D2-------------- Miami	0-5	Loam-------------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	5-38	Clay loam, silty clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	38-49	Loam-------------	CL, SC	A-4, A-6	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	49-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
27E--------------- Miami	0-11	Loam-------------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	11-38	Clay loam, silty clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	38-49	Loam-------------	CL, SC	A-4, A-6	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	49-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
27G--------------- Miami	0-11	Silt loam--------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	11-38	Clay loam, silty clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	38-49	Loam-------------	CL, SC	A-4, A-6	0-3	85-100	85-100	70-90	40-90	25-35	8-15
	49-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
36B--------------- Tama	0-12	Silt loam--------	ML, CL	A-6, A-7	0	100	100	100	95-100	35-45	10-20
	12-29	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	29-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
43---------------- Ipava	0-13	Silt loam--------	ML, CL	A-6	0	100	100	95-100	90-100	25-40	10-20
	13-55	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	55-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	5-20
45---------------- Denny	0-9	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	95-100	30-40	8-15
	9-20	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	20-30	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-60	15-35
	30-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	25-40	11-20
56B2-------------- Dana	0-8	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-95	30-35	8-12
	8-30	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-98	38-50	20-32
	30-43	Clay loam--------	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	37-50	17-30
	43-60	Loam, clay loam	CL, ML, CL-ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	17-30	2-14
67---------------- Harpster	0-15	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	15-40	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	40-60	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
68--------------- Sable	0-17	Silty clay loam	CL, CH, ML, MH	A-7	0	100	100	95-100	95-100	41-65	15-35
	17-50	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	50-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
73--------------- Ross	0-14	Loam-------------	ML, CL-ML, CL	A-4, A-6	0	90-100	90-100	80-100	65-95	20-35	NP-12
	14-37	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	90-100	85-100	70-100	55-95	22-45	3-20
	37-60	Stratified sandy loam to silt loam.	CL, ML, SM, SC	A-6, A-4, A-2	0-5	100	75-100	50-100	25-80	<30	NP-12
107-------------- Sawmill	0-26	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-50	15-30
	26-53	Silty clay loam, clay loam.	CL	A-6, A-7, A-4	0	100	100	85-100	70-95	25-50	8-25
	53-60	Silty clay loam, clay loam, silt loam.	CL	A-4, A-6, A-7	0	100	100	75-100	65-95	20-50	8-30
134C2------------ Camden	0-4	Silt loam--------	CL, ML, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	4-30	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	90-100	25-40	15-25
	30-45	Loam, sandy loam, silt loam.	ML, SC, SM, CL	A-2, A-4, A-6	0-5	90-100	85-100	60-100	30-70	20-40	3-15
	45-60	Stratified loamy sand to silt loam.	SM, SC, ML, CL	A-2, A-4	0-5	90-100	80-100	50-80	20-60	<25	3-10
138-------------- Shiloh	0-20	Silty clay loam	CL	A-7	0	100	100	95-100	90-100	40-50	15-25
	20-57	Silty clay, silty clay loam.	CL, CH	A-7	0	100	100	95-100	90-100	40-65	15-40
	57-60	Silty clay loam, silty clay, silt loam.	CL	A-7, A-6	0	100	100	95-100	90-100	30-50	15-30
148B2------------ Proctor	0-9	Silt loam--------	CL	A-6	0	100	100	95-100	85-100	25-40	10-20
	9-22	Silty clay loam	CL	A-7, A-6	0	95-100	90-100	85-100	85-100	25-50	10-25
	22-42	Clay loam, sandy loam, loam.	CL, SC, CL-ML, SM-SC	A-6, A-7, A-4, A-2	0	90-100	85-100	75-100	30-80	20-45	5-25
	42-60	Stratified silt loam to loamy sand.	SC, CL, SM-SC, CL-ML	A-2, A-4, A-6	0	85-100	80-100	50-100	25-80	20-40	5-20
171B2, 171C2----- Catlin	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	85-100	35-50	10-20
	8-41	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	90-100	90-100	80-100	35-50	20-30
	41-60	Loam, clay loam, silt loam.	CL	A-6, A-7	0	90-100	90-100	85-100	60-100	25-45	10-20
198-------------- Elburn	0-14	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	14-44	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	75-90	30-50	15-35
	44-60	Loam, sandy loam, silt loam.	CL, CL-ML, SC, SM-SC	A-6, A-4, A-2	0	90-100	80-100	60-90	25-80	20-40	5-20

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
199A, 199B2------ Plano	0-13	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	13-44	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	44-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	85-95	60-90	30-70	<25	NP-10
206-------------- Thorp	0-11	Silt loam--------	CL	A-6, A-4	0	95-100	95-100	90-100	75-95	20-40	8-19
	11-17	Silt loam--------	CL	A-4, A-6	0	95-100	95-100	90-100	75-95	25-35	7-15
	17-50	Silty clay loam	CL	A-7, A-6	0	95-100	95-100	90-100	75-95	35-50	13-27
	50-60	Silt loam, clay loam, loam.	CL	A-6, A-4, A-7	0	90-100	90-100	90-100	70-90	20-50	8-26
221C2------------ Parr	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-100	50-90	15-30	4-15
	8-35	Clay loam, loam, silty clay loam.	CL	A-6, A-4	0	90-100	90-100	75-100	50-95	25-35	9-15
	35-39	Loam-------------	CL	A-6, A-4	0	90-100	90-100	75-85	50-65	25-35	8-15
	39-60	Loam-------------	CL, ML, CL-ML	A-4	0-3	85-95	85-95	75-85	50-65	<25	3-8
233B, 233C2------ Birkbeck	0-3	Silt loam--------	CL, ML	A-4, A-6, A-7	0	100	100	95-100	95-100	28-45	5-15
	3-7	Silt loam--------	CL, ML	A-4, A-6	0	100	100	100	95-100	30-40	7-15
	7-52	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	95-100	85-100	30-50	10-25
	52-60	Loam, silty clay loam, clay loam.	CL, CL-ML	A-4, A-6	0-5	95-100	85-100	70-100	55-80	25-40	5-20
243B------------- St. Charles	0-7	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	22-35	7-15
	7-46	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
	46-52	Loam, silt loam, sandy loam.	CL, SC	A-4, A-6	0	90-100	75-100	75-95	40-80	20-35	8-20
	52-60	Stratified sandy loam to silt loam.	SC, CL, CL-ML, SM-SC	A-2, A-4, A-6	0-5	90-100	75-90	60-90	30-70	15-35	5-15
244-------------- Hartsburg	0-14	Silty clay loam	CL, ML	A-7, A-6	0	100	100	100	95-100	35-50	10-25
	14-27	Silty clay loam	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-30
	27-60	Silt loam, loam	CL	A-6	0	95-100	90-100	90-100	70-100	25-40	11-20
279B------------- Rozetta	0-5	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
	5-10	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	10-42	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	42-60	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	85-100	25-40	7-20
322C2------------ Russell	0-6	Silt loam--------	CL-ML, CL, ML	A-4	0	100	100	90-100	70-90	<25	3-8
	6-25	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-20
	25-44	Clay loam, loam	CL	A-6	0	95-100	90-95	80-95	60-80	30-35	10-15
	44-60	Clay loam, loam	CL-ML, CL	A-4	0-3	85-95	80-90	65-90	50-75	<25	4-8
322D3------------ Russell	0-3	Silty clay loam	CL	A-6	0	100	100	90-100	80-95	30-40	10-20
	3-29	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-20
	29-47	Clay loam, loam	CL	A-6	0	95-100	90-95	80-95	60-80	30-35	10-15
	47-60	Clay loam, loam	CL-ML, CL	A-4	0-3	85-95	80-90	65-90	50-75	<25	4-8

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
330-------------- Peotone	0-22	Silty clay loam	CH, CL	A-7	0	100	95-100	95-100	80-100	40-65	15-35
	22-47	Silty clay loam, silty clay.	CH, CL	A-7	0-5	100	95-100	90-100	85-100	40-70	15-40
	47-60	Silty clay loam, silt loam.	CL, CH, ML, MH	A-7, A-6	0-5	95-100	95-100	90-100	75-98	30-60	15-30
415-------------- Orion	0-8	Silt loam--------	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	8-38	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	38-52	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
	52-60	Stratified silt loam to sand.	CL, CL-ML	A-4	0	80-100	80-100	80-100	80-100	20-30	4-10
451-------------- Lawson	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	85-100	20-40	5-20
	8-30	Silt loam, silty clay loam.	CL, CL-ML	A-4	0	100	100	90-100	85-100	20-30	5-10
	30-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	60-100	20-45	10-25
533*. Urban land											
683-------------- [illegible]	0-14	Silt loam--------	CL	A-6, A-7, A-4	0	100	100	100	95-100	25-45	8-25

TABLE 17.--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 K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
17----------------	0-12	16-22	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low-----------	0.37	3	6	1-2
Keomah	12-43	27-42	1.30-1.45	0.06-0.6	0.18-0.20	4.5-5.5	High----------	0.37			
	43-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-7.3	Moderate------	0.37			
27D2--------------	0-5	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	4	5	.5-1
Miami	5-38	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate------	0.37			
	38-49	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low-----------	0.37			
	49-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Moderate------	0.37			
27E---------------	0-11	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	4	5	.5-3
Miami	11-38	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate------	0.37			
	38-49	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low-----------	0.37			
	49-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Moderate------	0.37			
27G---------------	0-11	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	4	5	.5-3
Miami	11-38	27-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-7.3	Moderate------	0.37			
	38-49	20-27	1.45-1.65	0.6-2.0	0.14-0.19	6.6-7.8	Low-----------	0.37			
	49-60	15-30	1.70-1.90	0.06-0.2	0.05-0.10	7.4-8.4	Moderate------	0.37			
36B---------------	0-12	20-26	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate------	0.28	5	6	3-4
Tama	12-29	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate------	0.43			
	29-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate------	0.43			
43----------------	0-13	20-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate------	0.28	5	6	4-5
Ipava	13-55	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High----------	0.43			
	55-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate------	0.43			
45----------------	0-9	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.37	3	6	3-4
Denny	9-20	15-22	1.25-1.45	0.2-0.6	0.18-0.20	5.6-7.3	Low-----------	0.37			
	20-30	35-45	1.20-1.40	0.06-0.2	0.11-0.22	5.6-7.3	High----------	0.37			
	30-60	25-35	1.40-1.60	0.2-0.6	0.20-0.22	5.6-7.8	Moderate------	0.37			
56B2--------------	0-8	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.32	5	5	2-4
Dana	8-30	27-35	1.45-1.65	0.6-2.0	0.18-0.20	5.1-6.5	Moderate------	0.43			
	30-43	27-35	1.45-1.65	0.6-2.0	0.15-0.19	6.1-7.3	Moderate------	0.43			
	43-60	15-30	1.70-1.90	0.2-0.6	0.05-0.10	6.6-8.4	Low-----------	0.43			
67----------------	0-15	27-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate------	0.28	5	4L	5-6
Harpster	15-40	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate------	0.28			
	40-60	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate------	0.28			
68----------------	0-17	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate------	0.28	5	7	5-6
Sable	17-50	24-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate------	0.28			
	50-60	20-28	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low-----------	0.28			
73----------------	0-14	15-27	1.20-1.45	0.6-2.0	0.19-0.24	6.1-7.8	Low-----------	0.32	5	5	3-4
Ross	14-37	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low-----------	0.32			
	37-60	5-25	1.35-1.60	0.6-6.0	0.05-0.18	6.1-8.4	Low-----------	0.32			
107---------------	0-26	27-35	1.20-1.40	0.6-2.0	0.21-0.23	6.1-7.8	Moderate------	0.28	5	7	4-5
Sawmill	26-53	25-35	1.30-1.45	0.6-2.0	0.17-0.20	6.1-7.8	Moderate------	0.28			
	53-60	18-35	1.35-1.50	0.6-2.0	0.15-0.19	6.1-8.4	Moderate------	0.28			
134C2-------------	0-4	14-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	6	.5-1
Camden	4-30	22-35	1.35-1.55	0.6-2.0	0.16-0.20	5.1-7.3	Moderate------	0.37			
	30-45	18-30	1.45-1.65	0.6-2.0	0.11-0.22	5.1-7.3	Low-----------	0.37			
	45-60	5-20	1.55-1.75	0.6-6.0	0.11-0.22	5.6-8.4	Low-----------	0.37			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
138-------------- Shiloh	0-20	35-40	1.30-1.50	0.2-0.6	0.18-0.21	6.1-7.3	High---------	0.28	5	7	4-6
	20-57	35-45	1.35-1.55	0.2-0.6	0.09-0.18	6.1-7.8	High---------	0.28			
	57-60	25-45	1.30-1.50	0.2-0.6	0.18-0.20	6.1-8.4	High---------	0.28			
148B2------------ Proctor	0-9	18-27	1.10-1.30	0.6-2.0	0.22-0.24	5.1-7.8	Low----------	0.32	5	6	3-4
	9-22	25-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	22-42	22-35	1.30-1.55	0.6-6.0	0.13-0.16	5.6-7.3	Moderate-----	0.43			
	42-60	15-32	1.40-1.70	0.6-6.0	0.07-0.19	6.1-7.8	Low----------	0.43			
171B2, 171C2----- Catlin	0-8	27-30	1.15-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	1-3
	8-41	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	41-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low----------	0.43			
198-------------- [illegible]	0-14	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.28	5	6	4-5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
	44-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low----------	0.43			
199A, 199B2------ Plano	0-13	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5-4	6	3-5
	13-44	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	44-60	10-20	1.50-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low----------	0.43			
206-------------- Thorp	0-11	20-27	1.15-1.35	0.2-0.6	0.22-0.24	5.1-7.8	Low----------	0.37	5	6	2-4
	11-17	18-25	1.30-1.50	0.2-0.6	0.20-0.22	5.1-7.3	Low----------	0.37			
	17-50	27-35	1.35-1.55	0.06-0.2	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	50-60	20-30	1.40-1.60	0.06-0.2	0.15-0.22	5.6-7.8	Moderate-----	0.37			
221C2------------ Parr	0-8	12-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	4	5	2-4
	8-35	22-32	1.40-1.55	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.32			
	35-39	20-25	1.55-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Moderate-----	0.32			
	39-60	10-20	1.70-1.90	0.2-0.6	0.05-0.10	7.4-8.4	Low----------	0.32			
233B, 233C2------ Birkbeck	0-3	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	.5-3
	3-7	15-27	1.25-1.50	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.37			
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
330-------------- Peotone	0-22	33-40	1.20-1.40	0.2-0.6	0.21-0.23	5.6-7.8	High---------	0.28	5	4	5-7
	22-47	35-45	1.30-1.60	0.2-0.6	0.11-0.20	6.1-7.8	High---------	0.28			
	47-60	25-40	1.40-1.65	0.2-0.6	0.18-0.20	6.6-8.4	High---------	0.28			
415-------------- Orion	0-8	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
	8-38	18-26	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
	38-52	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
	52-60	10-18	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
451-------------- Lawson	0-8	10-27	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	5	3-5
	8-30	18-30	1.20-1.55	0.6-2.0	0.18-0.22	6.1-7.8	Low----------	0.28			
	30-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
533*. Urban land											
683-------------- Lawndale	0-14	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
	14-50	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	50-60	3-10	1.50-1.85	2.0-20	0.05-0.10	5.6-7.3	Low----------	0.15			
684B------------- Broadwell	0-16	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
	16-51	25-35	1.25-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
	51-60	3-10	1.20-2.00	6.0-20	0.05-0.09	5.6-7.3	Low----------	0.15			
802B, 802D. Orthents											
865*. Pits											

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

TABLE 18.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "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	Hydro-logic group	Flooding			High water table			Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months		Uncoated steel	Concrete
					Ft					
17----------------- Keomah	C	None---------	---	---	2.0-4.0	Apparent	Nov-Jul	High------	High------	Moderate.
27D2, 27E, 27G----- Miami	B	None---------	---	---	>6.0	---	---	Moderate	Moderate	Moderate.
36B---------------- Tama	B	None---------	---	---	4.0-6.0	Apparent	Nov-Jun	High------	Moderate	Moderate.
43----------------- Ipava	B	None---------	---	---	1.0-3.0	Apparent	Mar-Jun	High------	High------	Moderate.
45----------------- Denny	D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High------	High------	Moderate.
56B2--------------- Dana	B	None---------	---	---	3.0-6.0	Perched	Mar-Apr	High------	Moderate	Moderate.
67----------------- Harpster	B/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	High------	High------	Low.
68----------------- Sable	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High------	High------	Low.
73----------------- Ross	B	Occasional	Very brief	Mar-May	4.0-6.0	Apparent	Feb-Apr	Moderate	Low-------	Low.
107---------------- Sawmill	B/D	Occasional	Brief------	Mar-May	0-2.0	Apparent	Mar-Jun	High------	High------	Low.
134C2-------------- Camden	B	None---------	---	---	>6.0	---	---	High------	Low-------	Moderate.
138---------------- Shiloh	B/D	None---------	---	---	+1-2.0	Apparent	Mar-Jun	High------	High------	Low.
148B2-------------- Proctor	B	None---------	---	---	>6.0	---	---	High------	Moderate	Moderate.
171B2, 171C2------- Catlin	B	None---------	---	---	3.5-6.0	Apparent	Feb-May	High------	High------	Moderate.
198---------------- Elburn	B	None---------	---	---	1.0-3.0	Apparent	Jan-May	High------	High------	Moderate.
199A, 199B2-------- Plano	B	None---------	---	---	>6.0	---	---	High------	Moderate	Low.
206---------------- Thorp	C/D	None---------	---	---	+.5-2.0	Apparent	Feb-Jun	High------	High------	Moderate.
221C2-------------- Parr	B	None---------	---	---	>6.0	---	---	Moderate	High------	Moderate.
233B, 233C2-------- Birkbeck	B	None---------	---	---	3.0-6.0	Apparent	Mar-May	High------	High------	Moderate.

TABLE 18.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft					
243B--------------- St. Charles	B	None---------	---	---	>6.0	---	---	High------	Moderate	Moderate.
244--------------- Hartsburg	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	High------	High------	Low.
279B---------------	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	High	[illegible]	[illegible]

TABLE 19.--ENGINEERING INDEX TEST DATA

(MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; and UN, Unified)

Soil name and location	Sample number	Horizon	Depth	Moisture density: MAX	Moisture density: OPT	Percentage passing sieve--: No. 4	No. 10	No. 40	No. 200	LL	PI	Classification: AASHTO	UN
			In	Lb/cu ft	Pct					Pct			
Catlin silty clay loam:	84IL-039-												
627 feet west and	11-1	Ap	0-8	101	20	100	100	99	98	37	14	A-6(15)	CL
462 feet south of	11-3	Bt2	14-21	92	24	100	100	100	99	44	20	A-7-6(22)	CL
the northeast	11-7	BC	41-46	115	14	100	100	87	68	31	14	A-6(7)	CL
corner of sec. 6,													
T. 20 N., R. 3 E.													
Ipava silt loam:	83IL-039-												
86 feet east and	15-1	Ap	0-7	104	19	99	99	97	93	33	11	A-6(11)	CL
3,600 feet south of	15-4	Bt1, Btg1	18-32	94	21	100	100	100	99	52	27	A-7-6(31)	CH
the northwest corner	15-5												
of sec. 10,	15-7	Cg	55-60	109	17	100	100	99	98	30	8	A-4(8)	CL
T. 20 N., R. 3 E.													
Miami silt loam:	83IL-039-												
1,056 feet east and	8-4	Bt1	11-21	113	14	98	96	89	65	30	14	A-6(6)	CL
1,782 feet north of	8-8	C	49-60	117	14	97	95	89	65	27	13	A-6(5)	CL
the southwest corner													
of sec. 26,													
T. 20 N., R. 3 E.													
Russell silt loam:	83IL-039-												
2,900 feet north and	18-4	Bt2	16-25	102	21	100	100	100	98	42	21	A-7-6(22)	CL
1,100 feet west of	18-5	2Bt3	25-36	109	17	100	100	98	83	35	16	A-6(12)	CL
the southeast corner	18-7	C	44-60	118	14	97	95	90	64	30	14	A-6(6)	CL
of sec. 32,													
T. 20 N., R. 3 E.													

TABLE 20.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Birkbeck	Fine-silty, mixed, mesic Typic Hapludalfs
Broadwell	Fine-silty, mixed, mesic Typic Argiudolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
*Catlin	Fine-silty, mixed, mesic Typic Argiudolls
*Dana	Fine-silty, mixed, mesic Typic Argiudolls
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Harpster	Fine-silty, mesic Typic Calciaquolls
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Lawndale	Fine-silty, mixed, mesic Aquic Argiudolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
*Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Loamy, mesic Udorthents
*Parr	Fine-loamy, mixed, mesic Typic Argiudolls
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls
Plano	Fine-silty, mixed, mesic Typic Argiudolls
*Proctor	Fine-silty, mixed, mesic Typic Argiudolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Russell	Fine-silty, mixed, mesic Typic Hapludalfs
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls
Shiloh	Fine, montmorillonitic, mesic Cumulic Haplaquolls
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Thorp	Fine-silty, mixed, mesic Argiaquic Argialbolls

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