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Soil Management Units and Land Use Planning
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**RESEARCH
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Soil management units and land use planning

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INTRODUCTION

Land use and land use planning are of increasing concern because of limited soil resources and their many possible uses. When planning the use of any area an important consideration is its soil. A soil's suitability for a particular use often depends on characteristics of its profile to a depth of 3 to 5 ft. An area used for buildings, parking lots, airports or highways is not easily returned to use for crop production.

This report will help you with land use planning by relating soil maps, soil management groups, and soil management units to limitation of land for various uses.

Soils are a product of the environment in which they were formed. Soil characteristics result from interactions of plants and animals, climate, slope and water table on parent material. Knowledge of the environment in which the soil formed and the parent materials from which it developed enables soil scientists to predict how the soil will respond to various uses and management.

SOIL MAPS

Soil surveys of various kinds have been made in Michigan since 1901 (4). Since 1921 these surveys have been published cooperatively by the U.S. Department of Agriculture and the Michigan Agricultural Experiment Station. Soil maps made after 1940 are helpful for planning most land uses. Those made between 1921 and 1939 (particularly those after 1930) can be made useful for general farm planning and/or less detailed planning by updating the mapping unit legend. Soil maps prior to 1921 are too general for most land use planning.

Land type maps (reconnaissance soil surveys) made between 1935 and 1951 in Northern Michigan are suitable for general land use planning if the mapping unit legend is updated. All soil survey information must be supplemented by on-site investigations for most suburban and engineering uses.

SOIL MANAGEMENT GROUPS

Mapping unit names in soil surveys identify the predominant soil series and their subdivisions. Soil series are similar in thickness, arrangement of horizons; and other physical, chemical, and biological properties. Each series is named for a town or geographical feature located near the place the soil series was first recognized.

Soil series may be grouped according to dominant texture of the profile and natural drainage conditions. These groups are called **soil management groups** and are designated systematically by numbers and letters. This enables you to recall their properties and significance for various uses. The interrelationships of soil management groups are shown in Table 1.

Table 1. Interrelationships of soil management groups(a)

Dominant Profile Texture	Symbols	Natural Drainage Classes				
		Mineral Soils			Organic Soils (M) Very Poorly Drained	
		Well and Moderately Well Drained	Somewhat Poorly Drained	Poorly and Very Poorly Drained	16-51" thick	over 51" thick
		a	b	c	c	c
Fine Clay (over 60%)	0	0a	0b	0c		
Clay (40-60%)	1	1a	1b	1c	M/1c	
Clay loam and silty clay loam	1.5	1.5a	1.5b	1.5c		
Loam and silt loam	2.5	2.5a	2.5b	2.5c		
Sandy loam, 14-40", over clay	3/1	3/1a	3/1b	3/1c		
Sandy loam, 20-40", over loam to silty clay loam	3/2	3/2a	3/2b	3/2c		
Sandy loam	3	3a	3b	3c	M/3c	Mc
Sandy loam, 20-40", over sand and gravel	3/5	3/5a	3/5b	3/5c		
Loamy sand, 14-40", over clay	4/1	4/1a	4/1b	4/1c		
Loamy sand, 20-40", over loam to silty clay loam	4/2	4/2a	4/2b	4/2c		
Loamy sand	4	4a	4b	4c		
Sand to loamy sand, 40-60", over loam to clay	5/2	5/2a	5/2b	5c		
Sand with moderate to strong subsoil development	5.0	5a	5b	5c	M/4c	
Sand with minimal subsoil development	5.3	5.3a	5b	5c		
Sand with little or no subsoil development	5.7	5.7a	5b	5c		
Gravelly or stony loamy sand to loam	G	Ga	Gbc	Gbc		
Alluvial or Lowland Areas	L				L-Mc	
loamy	L-2	L-2a	L-2c	L-2c		
sandy	L-4	L-4a	L-4c	L-4c		
Marl	m				M/mc	
Bedrock, less than 20"	R	Ra	Rbc	Rbc		
Loam, 20-40", over bedrock	2/R	2/Ra				
Sandy loam, 20-40", over bedrock	3/R	3/Ra	3/Rbc	3/Rbc	M/Rc	
Sand to loamy sand, 20-40", over bedrock	4/R	4/Ra	4/Rbc	4/Rbc		

(a) When the following slope class letters are added to the soil management group symbols these slope phases are soil management units.

Slope classes: A = 0-2% slope
 B = 2-6% slope
 C = 6-12% slope

D = 12-18% slope
 E = 18-25% slope
 F = 25+% slope

This system was developed in 1955 by the Michigan Agricultural Experiment Station, the Cooperative Extension Service, and the Soil Conservation Service working with the National Project in Agricultural Communications to transmit soil survey information more effectively.

PROFILE TEXTURE

Texture refers to the proportion of sand, silt and clay present in a soil sample. Sand particles are from 2.0 to 0.05 mm in diameter and feel harsh and gritty. Silt particles range from 0.05 to 0.002 mm in diameter and feel soft and flour-like. Clay particles are less than 0.002 mm in diameter and feel greasy when moist. See Fig. 1 for interrelationships of common soil textural classes.

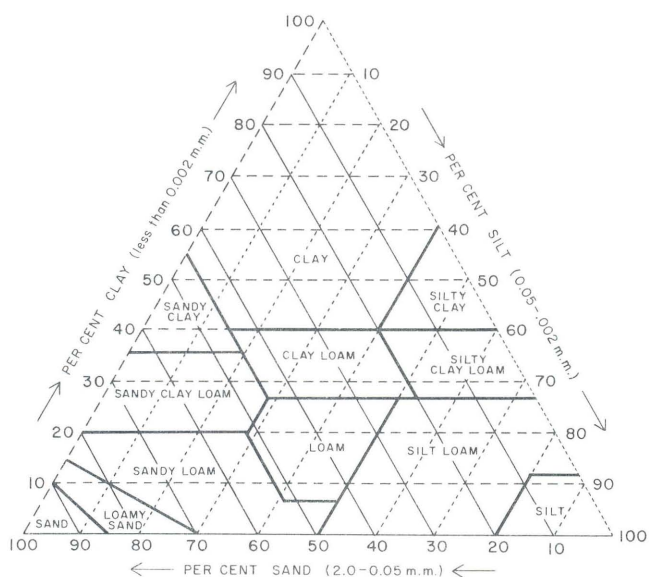


Fig. 1. The textural triangle, showing common soil classes.

Soils can be separated into mineral and organic soils on the basis of parent material. **Mineral soils** are given a number based on the dominant profile texture as follows: 0—fine clay, more than 60% clay; 1—clay, 40-60% clay; 1.5—clay loam and silty clay loam; 2.5—loam and silt loam; 3—sandy loam; 4—loamy sand; and 5—sand. Soil with contrasting textures in its profile is represented by a fraction. For example, 3/1 represents soil which has 14-40 in. of sandy loam over clay.

Gravelly or stony soils are indicated by a capital "G." Alluvial (lowland) soils having stratified materials and subject to flooding are preceded by a capital "L." Shallow soils (less than 20 in. to bedrock)

are indicated by a capital "R." Soils having 20-40 in. of soil material over bedrock are subdivided by characteristics of overlying materials as the numerator of a fraction: 2/R—loam over bedrock; 3/R—sandy loam over bedrock; and 4/R—loamy sand or sand over bedrock.

Organic soils are indicated by a capital "M" for muck or peat. Thin (16-51 in.) organic soils are subdivided by characteristics of underlying mineral materials: M/1—muck over clay; M/3—muck over sandy loam to clay loam; M/4—muck over loamy sand or sand; M/m—muck over marl; and M/R—muck over bedrock. Thick (greater than 51 in.) organic soils are given only the symbol "M."

NATURAL DRAINAGE

Lower case letters following the numbers or capital letters indicate natural drainage conditions: a—well to moderately well drained; b—somewhat poorly drained (formerly called imperfectly drained); and c—poorly and very poorly drained. Natural soil drainage is related to water table depth and the length of time during the year that the water table is in contact with part of the soil profile.

Well drained soils have water tables below 40 in. and commonly below 60 in. Moderately well drained soils have water tables between 30 and 40 in. for a short time during spring. Somewhat poorly drained soils have water tables near the surface sometime during the year, usually winter and spring. During summer these soils may have water tables below 60 in. Poorly drained soils have water tables near the surface much of the year, but during the summer they may be lower in the profile.

During dry periods when the water table cannot be observed near the land surface, natural soil drainage can be identified by observing the color patterns of soil profiles. Well drained Michigan soils have light colored surfaces to plow depth, and bright reddish brown colored subsoils with no mottles above 40 in. Or, if they developed under grasses rather than trees, they may have dark colored surfaces.

Moderately well drained soils have light colored surfaces and bright reddish brown subsoils with gray and orange mottles below 30 in. Somewhat poorly drained soils have moderately dark surfaces and reddish brown subsoils with gray, brown and orange mottles throughout. Poorly drained soils have dark surfaces and gray subsoils with orange, brown and yellow mottles throughout.

Other profile characteristics of soils are indicated by adding a dash and a second lower case letter to the soil management group. For example, a lower case "a" after a dash indicates soils with very acid subsoils; a lower case "c" following a dash indicates soils calcareous (limy) at or near the surface; a lower case "h" indicates soils with hardened and cemented subsoils; and a lower case "s" indicates soils stratified with fine sands and silts.

Thus, the Oa soil management group, such as Ontonagon (Table 2), represents well drained soils containing more than 60% clay. The 4/2c-c soil management group includes soils, such as Essexville, developed from 20 to 40 in. of loamy sand over loam to silty clay loam under naturally poorly drained conditions. They are calcareous at or near the surface.

The Gbc soil management group represents gravelly or stony soils, such as Nestoria and Diana, developed under somewhat poorly drained or poorly drained conditions. The L-4c soil management group includes alluvial soils, such as Alganssee and Glendora, developed from sand and loamy sand under somewhat poorly drained or poorly drained conditions on floodplains subject to seasonal overflow. The Mc soil management group represents deep organic soils, such as Carlisle, that are naturally very poorly drained. Several soil series, such as Bellefontaine, have characteristics of two or more soil series. These are designated by two or more soil management group symbols as included in mapping units on published soil maps.

SOIL MANAGEMENT UNITS

For more detailed uses, soil management groups must be further subdivided. For example, the well drained "a" groups need to be subdivided into slope classes. Slope represents the gradient or steepness of the soil surface and is expressed in percent. Percent slope is equal to the feet rise or fall of the land surface for each 100 ft of horizontal distance. Slope classes have been arbitrarily established and designated by capital letters. Those commonly found in recent (since 1940) Michigan soil surveys are:

- A—0-2% slope
- B—2-6% slope
- C—6-12% slope
- D—12-18% slope
- E—18-25% slope
- F—greater than 25% slope

Somewhat poorly drained soils rarely have slopes greater than 6% and poorly drained soils usually have slopes less than 2%. The soil management group symbol plus the slope class comprises a **soil management**

unit symbol. This grouping combines soils with similar profiles, management requirements, and responses to like management practices. For example, 1.5aC represents soil profiles of clay loam textures that are well drained and have 6 to 12% slopes.

Soil management units have been used to determine suitability of soils for municipal waste water disposal (3) and the adapted conservation practices to control erosion with a particular cropping system. For agricultural purposes soil management groups have been used for fertilizer recommendations (2) or further grouped for selecting coniferous planting stock (1) and for designing soil drainage and irrigation systems.

DEGREE OF LIMITATION FOR SIX LAND USES

Degrees of limitation of soil management units for six land uses are given in Table 3. The six uses are: residential development, with and without public sewer; highways and streets; parks and recreation; cropland; and woodland. Degree of limitation of the soil is based on its natural condition and is not for areas artificially drained or altered by cut and fill operations. The four degrees of limitation are: slight—relatively free of limitations or limitations are easily overcome; moderate—limitations must be recognized, but they can be overcome with careful design and good management; severe—limitations are severe enough to make use questionable; and very severe—extreme measures are needed to overcome the limitations and such usage generally is unsound or not practical.

SUGGESTIONS FOR USING WITH SOIL MAPS

Each area on a soil map is represented by a map symbol identified in the mapping unit legend. (Soils present are described in the soil survey report.) The symbol indicates the soil series, texture of plow layer, and slope. For some symbols slope is omitted. Usually, slope class is then A, 0 to 2%, but sometimes the symbol represents land types with considerable range in slope. If uncertain, consult the soil survey report.

To determine the soil management group for each soil series see Table 2. The addition of slope, from the mapping unit legend, to the soil management group produces the soil management unit. Using the soil management unit and Table 3, limitations for various uses can be determined.

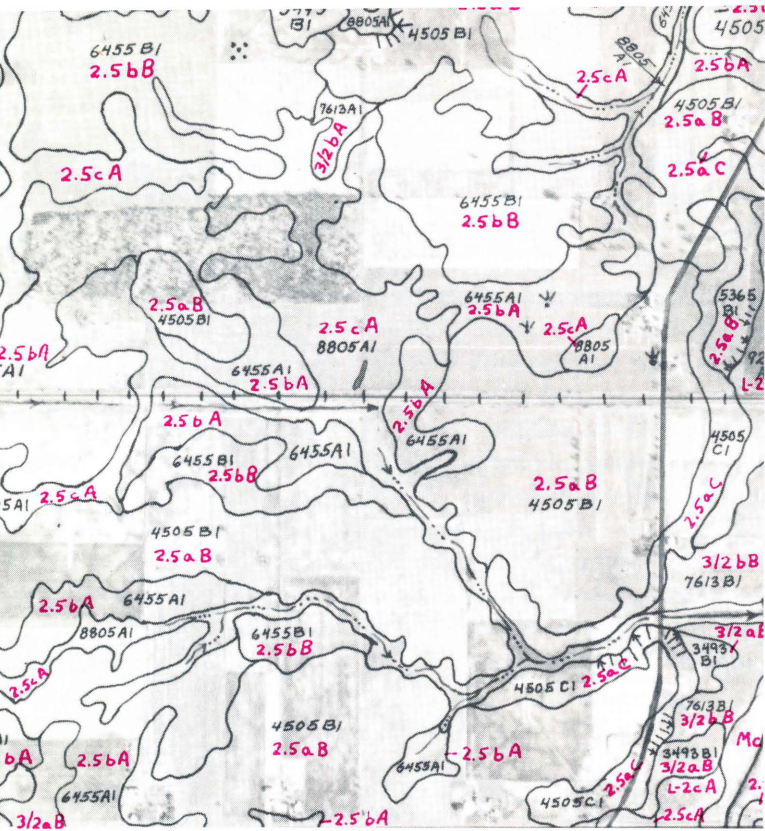


Fig. 2. Soil map of section 1, Sunfield Township, Eaton County, with soil management unit designations in red added to each map unit delineation.

The following suggestions may facilitate soil map usage:

1. Placing the soil management group or unit designations on the soil map in red (Fig. 2) will facilitate using the map with Table 3. The meaning of the management group or unit is summarized in Table 1.

2. A colored generalized soil management unit map (Fig. 3) made from a soil map will help planners develop land use plans for cities, townships and counties. This map also shows how soil survey information can be used in land use planning. A suggested color scheme for such a generalized soil management unit map is based on soil properties. These groupings of soils have similar limitations for similar uses. Poorly drained soils are coded blue to purple because of the naturally high water tables. Well drained soils have bright colored subsols and are coded red to yellow. Somewhat poorly drained soils are coded green, an intermediate color between red to yellow and blue to purple. Sandy soils are referred to as "light textured" soils and coded in lighter shades of each color group. Clay soils are coded in darker shades and intermediate textures are coded in intermediate shades in each color used.

The 0 to 6% slopes are represented by a lack of lines. Areas of slopes greater than 6% are indicated by

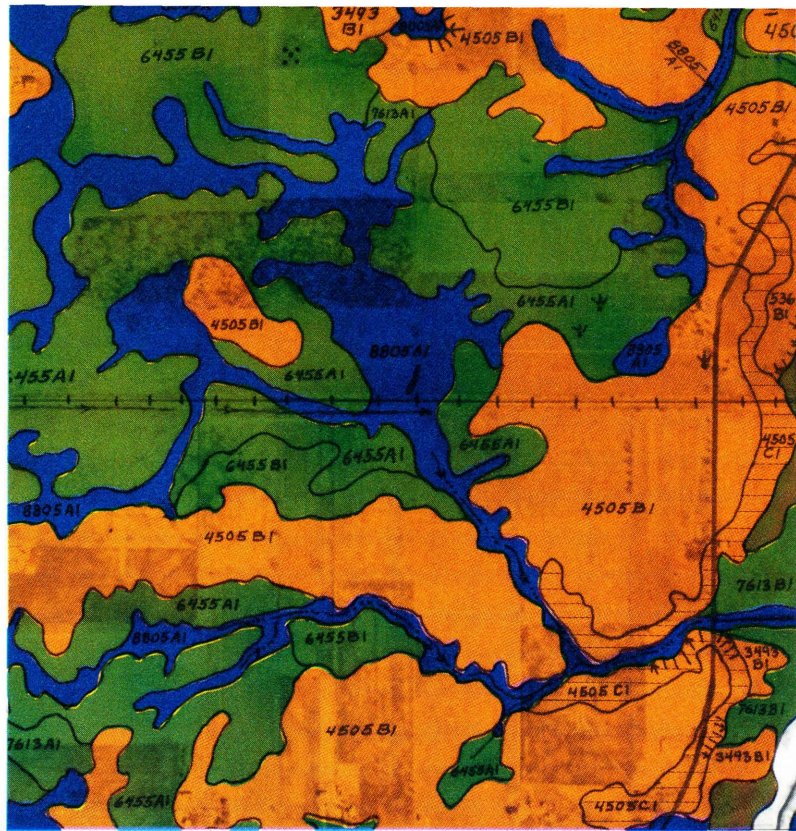


Fig. 3. Generalized soil management unit map of section 1, Sunfield Township, Eaton County.

Generalized Soil Management Groups		Color
Oa, 1a, 3/1a, 4/1a		Scarlet red
Ob, 1b, 3/1b, 4/1b		Grass green
Oc, 1c, 3/1c, 4/1c		Copenhagen blue
1.5a, 2.5a, 3/2a, 4/2a		Orange
1.5b, 2.5b, 3/2b, 4/2b		Olive green
1.5c, 2.5c, 3/2c, 4/2c		Ultramarine blue
3a, 3/5a		Flesh
3b, 3/5b		True green
3c, 3/5c		Purple
4a, 5a, 5.3a, 5.7a, 5/2a, Ca		Canary yellow
4b, 5b, 5/2b		Green bice
4c, 5c, Gbc		Sky blue
L-2a, L-2c, L-4a, L-4c, L-Mc		Dark brown
Mc, M/1c, M/3c, M/4c, M/mc, M/Rc		Warm gray
Ra, Rbc, 2/Ra, 3/Ra, 3/Rbc, 4/Ra, 4/Rbc		Sepia
Slope		
Class	%	
A, B	0-6	(no lines)
C	6-12	(black horizontal lines)
D	12-18	(black vertical lines)
E, F	18+	(black horizontal and vertical lines)

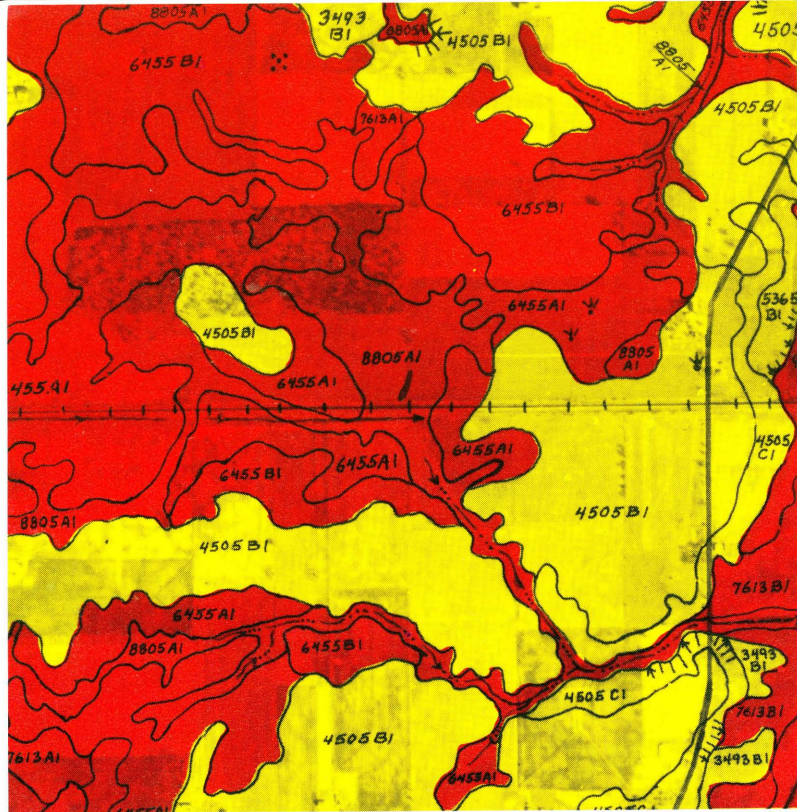


Fig. 4. Map showing degrees of limitation for residential development without public sewer in section 1, Sunfield Township, Eaton County. (Yellow—moderate limitations, red—severe and very severe limitations.)

black lines on the colored portion. The 6 to 12% slopes are represented by horizontal lines and 12 to 18% slopes by vertical lines. Slopes steeper than 18% are represented by horizontal plus vertical lines. Special symbols on the soil map may indicate slopes greater than 6% where they are not wide enough to delineate as separate map units.

Using this generalized soil management unit map, with the degrees of limitation in Table 3, enables you to determine limitations for six uses from a single map.

3. You may develop a limitation map or single factor map for a single land use by coding each degree of limitation the same color. Soils with slight limitations are colored green, those with moderate limitations yellow, and those with severe and very severe limitations red. Where two degrees of limitation apply, hatching with both colors can be used. The map in Fig. 4 shows the degrees of limitation for residential development without public sewer for the area in Figs. 2 and 3. This area has predominantly moderate (yellow) or severe and very severe limitations (red) for residential development without public sewer. Separate maps must be prepared for each land use and assumed condition of use.

The kind of map you choose will depend on the area or your interests. Some soil management units

have no land uses with slight limitations and some have the same limitations for several land uses. Possibilities 1 and 2 may be most useful for smaller areas, such as townships, or relatively homogeneous soil areas. Where fewer soil management units exist, simply delete those not present from Table 3. As you become familiar with the color and hatching patterns, you may find them useful for larger areas. The authors will be pleased to learn of your experiences and suggestions concerning better use of soil information in land use planning.

Soil maps and soil management units plus other pertinent information should be used to help land use planners make the best decision based on the soil resources. As a result, our soil resources can be used more wisely for the welfare of all society.

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Table 2. Soil management group designation for soil series in Michigan

Soil Series	Soil Mgm't. Group(a)	Soil Series	Soil Mgm't. Group(a)	Soil Series	Soil Mgm't. Group(a)
Abscota	L-4a	Carbondale	Mc	Emmert	Ga
Adolph	2.5c	Carlisle	Mc	Emmet	3a
Adrian	M/4c	Casco	4a	Ensign	Rbc
Ahmeek	3a-a	Cathro	M/3c	Ensley	3c
Alcona	3a-s	Celina	2.5a	Epoufette	4c
Algansee	L-4c	Ceresco	L-2c	Essexville	4/2c-c
Alger	3a	Champion	3a-a	Evart	L-4c
Allendale	4/1b	Channing	5b-h	Ewen	L-2a
Allouez	Ga	Charity	1c-c	Fabius	4b
Alpena	Ga	Charlevoix	3b	Fairport	2/Ra
Amasa	3/5a-a	Chatham	3a	Fox	3/5a
Angelica	2.5c	Chelsea	5a	Froberg	1a
Antrim	4a	Cheneaux	4b	Fulton	1b
Arenac	5/2b	Chippeny	M/Rc	Gaastra	2.5b
Arkport	3a-s	Cohoctah	L-2c	Gagetown	2.5a-cs
AuGres	5b	Coldwater	3b	Gay	3c
AuTrain	5a-h	Coloma	4a	Genesee	L-2a
Avoca	4/2b	Colwood	2.5c-s	Gilechrist	4a
Bach	2.5c-cs	Conover	2.5b	Gilford	4c
Baraga	Ga	Coral	3b	Gladwin	4b
Barker	1.5a	Corunna	3/2c	Glendora	L-4c
Barry	3c	Coventry	3/5a	Glengary	L-2c
Belding	3/2b	Crivitz	4a-a	Gogebic	3a-a
Bellefontaine	3/5a & 4a	Crosby	2.5b	Goodman	2.5a
Belleville	4/2c	Croswell	5a	Gorner	L-2c
Bentley	4a	Crystal Falls	3/Ra & Ra	Granby	5c
Bergland	0c	Dafter	3/1b	Graycalm	5a
Berrien	5/2a	Danby	L-2c	Grayling	5.7a
Berville	3/2c	Dawson	Mc-a	Greenwood	Mc-a
Bibon	5/2a	Deer Park	5.3a	Griffin	L-2c & L-4c
Blount	1.5b	Deerton	4/Ra	Guelph	2.5a
Blue Lake	4a	Deford	4c	Hartwick	5a
Bohemian	2.5a-s	Del Rey	1.5b	Hessel	Gbc
Bono	1c	Detour	Gbc	Hettinger	1.5c
Bowers	1.5b	Diana	Gbc	Hiawatha	5a
Boyer	4a	Dighton	2.5a	Hibbing	1.5a
Brady	4b	Dixboro	3b-s	Hillsdale	3a
Breckenridge	3/2c	Dowagiac	3/5a	Hodunk	3a
Brems	5b	Dresden	3/5a	Houghton	Mc
Brevort	4/2c	Dryburg	3/1a	Hoytville	1c
Bridgman	5.3a	Dryden	3a	Huron	1a
Brimley	2.5b-s	Duel	4/Ra	Huronville	1a
Bronson	4a	East Lake	5a	Ingalls	4/2b
Brookston	2.5c	Eastport	5.3a	Ionia	3/5a
Bruce	2.5c-s	Echo	5a	Iosco	4/2b
Brule	L-2c	Edmore	4c	Iron River	3a-a
Burleigh	4/2c	Edwards	M/mc	Isabella	2.5a
Burt	Rbc	Eel	L-2a	Jeddo	1.5c
Cadmus	3/2a	Elmdale	3a	Johnswood	3a
Capac	2.5b	Elo	2.5a-a	Kalamazoo	3/5a

(a) Modifying symbols used after dash in soil management groups:

a—Naturally very strongly acid soils.

c—Soils which are calcareous (limy) at or near the surface.

h—Subsoils which are hardened and cemented.

s—Stratified with fine sands and silts.

Table 2. Soil management group designation for soil series in Michigan (continued)

Soil Series	Soil Mgm't. Group(a)	Soil Series	Soil Mgm't. Group(a)	Soil Series	Soil Mgm't. Group(a)
Kalkaska	5a	Missaukee	3b	Pewamo	1.5c
Karlin	4a	Monico	3b-a	Pickford	1c
Kawbawgam	3/Rbc	Montcalm	4a	Pinconning	4/1c
Kawkawlin	1.5b	Moran	2/Ra	Pimora	L-2c
Kendallville	3/2a	Morley	1.5a	Plainfield	5a
Kent	1a	Morocco	5b	Pleine	3c
Kerston	L-Mc	Moye	4b	Porcupine	4a
Keweenaw	4a-a	Munising	3a-a	Posen	3a
Kibbie	2.5b-s	Munuscong	3/1c	Poygan	1.5c
Kidder	2.5a	Mussey	4c	Randville	4a-a
Kinross	5c-a	Nahma	3/Rbc	Richter	3b-s
Kiva	4a	Nappanee	1b	Riddles	2.5a
Kokomo	2.5c	Negaunee	3/Ra	Rifle	Mc
Lacota	3c	Nester	1.5a	Rimer	3/1b
Lake Linden	1.5a	Nestoria	Gbc	Rodman	Ga
Lamson	3c-s	Newaygo	3/5a	Rollin	M/mc
Landes	L-2a	Newton	5c	Ronald	3/5c
Lapeer	3a	Nisula	1b	Roscommon	5c
Latty	1c	Numica	1.5a	Roselawn	5.3a & 4a
Leelanau	4a	Oakville	5a	Roschms	0b
Lenawee	1.5c	Ockley	2.5a	Rousseau	4a
Linwood	M/3c	Ocqueoc	4/2a	Rubicon	5.3a
Locke	3b	Ogden	M/1c	Rudyard	0b
Londo	2.5b	Ogemaw	5b-h	Ruse	Rbc
London	2.5b	Ogontz	3/2c	Saganing	4c
Longlois	2.5a	Omega	5.7a	Sanilac	2.5b-cs
Longrie	3/Ra	Omena	3a	Saranac	L-2c
Loxley	Mc-a	Onaway	2.5a	Satago	3/Rbc
Lucas	1a	Onota	3/Ra	Sauble	5.3a
Lupton	Mc	Ontonagon	0a	Saugatuck	5b-h
Mackinac	2.5b	Orienta	5/2b	Saverine	3/2b
Macomb	3/2b	Oshtemo	4a	Sebewa	3/5c
Mancelona	4a	Otisco	4b	Selfridge	4/2b
Manistee	4/1a	Ottawa	5/2a	Selkirk	1b
Marenisco	4a-a	Ottokee	4a	Seney	5a
Markey	M/4c	Owosso	3/2a	Seward	3/1a
Marlette	2.5a	Padus	3a-a	Shelldrake	5.3a
Martisco	M/mc	Palms	M/3c	Shoals	L-2c
Matherton	3/5b	Palo	3/5b	Sigma	4b
Maumee	5c	Parkhill	2.5c	Sims	1.5c
McBride	3a	Parma	3/Ra	Sisson	2.5a-s
McGregor	3/5b-c	Paulding	0c	Skaneec	3b-a
Mecosta	L-4a	Pelkie	L-2c	Sleeth	2.5b
Melita	5/2a	Pella	2.5c-s	Sioan	L-2c
Menominee	4/2a	Pence	4a-a	Spalding	Mc-a
Metamora	3/2b	Pennock	L-2c	Sparta	5a
Metea	4/2a	Perrin	4a	Spinks	4a
Miami	2.5a	Pert	1b	Spirit	2.5b
Michigamee	3/Ra & Ra	Perth	1b	Stambaugh	3/5a-a
Minoa	3b-s	Peshekee	Ra		

(a) Modifying symbols used after dash in soil management groups:
a—Naturally very strongly acid soils.
c—Soils which are calcareous (limy) at or near the surface.

h—Subsoils which are hardened and cemented.
s—Stratified with fine sands and silts.

Table 2. Soil management group designation for soil series in Michigan (continued)

Soil Series	Soil Mgm't. Group(a)	Soil Series	Soil Mgm't. Group(a)	Soil Series	Soil Mgm't. Group(a)
St. Clair	1a	Tobico	5c-c	Warners	M/mc
St. Ignace	Ra	Toledo	1c	Warsaw	3/5a
Steuben	3a-a	Tonkey	3c-s	Wasepi	4b
Strongs	5a	Traumik	5b	Washtenaw	L-2c
Summerville	Ra	Traverse	3b	Watton	1.5a
Sumner	4a	Trenary	3a	Wauseon	3/1c
Sundell	3/Rbc	Trout Lake	5b-h	Wea	2.5a
Sunfield	3/5a	Tula	3b	Weare	5a
Superior	1a	Tuscola	2.5a-s	Westland	2.5c
Tacoosh	M/3c	Twining	1.5b	Wexford	5a
Tahquamenon	Mc-a	Tyre	4/Rbc	Wheatley	5c
Tappan	2.5c-c	Úbly	3/2a	Willette	M/1c
Tawas	M/4c	Vilas	5.3a	Winegars	4b
Teasdale	3b	Volinia	3/5a	Winneshiek	2/Ra
Tedrow	5b	Wainola	4b	Wisner	1.5c-c
Thackery	2.5a	Waiska	Ga	Witbeck	3c
Thetford	4b	Wakefield	2.5a-a	Yalmer	4a-a
Thomas	1.5c-c	Wallace	5a-h	Ypsi	3/1b
Thomastown	4b	Wallkill	L-2c		

(a) Modifying symbols used after dash in soil management groups:

a—Naturally very strongly acid soils.

c—Soils which are calcareous (limy) at or near the surface.

h—Subsoils which are hardened and cemented.

s—Stratified with fine sands and silts.

Table 3. Degree of limitation of soil management units for various uses

Soil Management Unit			Degree of Limitation for Various uses (a)					
Soil Management Group	Slope		Residential Development		Highways and Streets	Parks and Recreation	Cropland	Woodland
	Class	%	Without Public Sewer	With Public Sewer (b)				
Group 0	Fine clay soils (over 60% of clay) and Group 1		Clay soils (40 to 60% clay)					
0a, 1a	A, B	0-6	Sev	Sev	Sev	Sli	Mod	Sli
	C	6-12	Sev	Sev	Sev	Mod	Mod	Sli
	D	12-18	Sev	Sev	Sev	Mod	Sev	Sli
	E, F	18+	Sev	Sev	Sev	Sev	Sev	Sli
0b, 1b	A, B	0-6	Sev	Sev	Sev	Sev	Mod	Sev
0c, 1c	A	0-2	Sev	Sev	Sev	Sev	Mod	Sev
Group 1.5	Clay loam and silty clay loam soils							
1.5a	A, B	0-6	Sev	Mod	Mod	Sli	Sli	Sli
	C	6-12	Sev	Mod	Mod	Sli	Mod	Sli
	D	12-18	Sev	Sev	Mod	Mod	Mod	Sli
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Sli
1.5b	A, B	0-6	Sev	Sev	Sev	Mod-Sev	Sli	Sev
1.5c	A	0-2	Sev	Sev	Sev	Sev	Sli	Sev

(a) Sli—Slight
 Mod—Moderate
 Sev—Severe
 V Sev—Very Severe

(b) Limitations for residential development with public sewer also apply to foundations for low buildings.

Table 3. Degree of limitation of soil management units for various uses (continued)

Soil Management Unit			Degree of Limitation for Various uses (a)					
Soil Management Group	Slope		Residential Development		Highways and Streets	Parks and Recreation	Cropland	Woodland
	Class	%	Without Public Sewer	With Public Sewer (b)				
Group 2.5 Loam and silt loam soils								
2.5a	A, B	0-6	Mod	Sli	Mod	Sli	Sli	Sli
	C	6-12	Mod	Mod	Mod	Mod	Mod	Sli
	D	12-18	Sev	Sev	Mod	Sev	Mod	Sli
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Sli
2.5b	A	0-4	Sev	Sev	Sev	Mod	Sli	Mod
2.5c	A	0-2	Sev	Sev	Sev	Sev	Sli	Sev
Group 3/1 Sandy loam (14-40 inches thick) over clay soils								
3/1a	A, B	0-6	Sev	Sev	Mod	Sli	Sli	Sli
	C	6-12	Sev	Sev	Mod	Mod	Mod	Sli
	D	12-18	Sev	Sev	Mod	Mod-Sev	Mod	Sli
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Sli
3/1b	A	0-4	Sev	Sev	Sev	Mod	Sli	Sev
3/1c	A	0-2	Sev	Sev	Sev	Sev	Sli	Sev
Group 3/2 Sandy loam (20 to 40 inches thick) over clay loam to loam soils								
3/2a	A, B	0-6	Mod	Sli	Mod	Sli-Mod	Sli	Sli
	C	6-12	Mod	Mod	Mod	Sli-Mod	Mod	Sli
	D	12-18	Sev	Sev	Mod	Mod	Mod	Sli
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Sli
3/2b	A	0-4	Sev	Mod	Mod	Mod	Sli	Sev
3/2c	A	0-2	Sev	Sev	Sev	Sev	Sli	Sev
Group 3 Sandy loam soils and Group 3/5 Sandy loam (20 to 40 inches thick) over sand and gravel								
3a, 3/5a	A, B	0-6	Sli	Sli	Sli	Sli	Sli	Sli
	C	6-12	Mod	Mod	Sli	Mod	Mod	Sli
	D	12-18	Sev	Sev	Sli	Sev	Mod	Sli
	E, F	18+	Sev	Sev	Sli	Sev	Sev	Sli
3b, 3/5b	A	0-4	Sev	Mod	Mod	Mod	Sli	Sev
3c, 3/5c	A	0-2	Sev	Sev	Sev	Sev	Sli	Sev
Group 4/1 Loamy sand (14 to 40 inches thick) over clay soils								
4/1a	A, B	0-6	Sev	Sev	Mod	Mod	Sli	Sli
	C	6-12	Sev	Sev	Mod	Mod	Mod	Sli
	D	12-18	Sev	Sev	Mod	Sev	Mod	Sli
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Sli
4/1b	A, B	0-6	Sev	Sev	Sev	Mod	Mod	Sev
4/1c	A	0-2	Sev	Sev	Sev	Mod	Mod	Sev
Group 4/2 Loamy sand (20 to 40 inches thick) over loam soils								
4/2a	A, B	0-6	Sli	Sli	Mod	Sli	Sli	Sli
	C	6-12	Mod	Mod	Mod	Mod	Mod	Sli
	D	12-18	Sev	Sev	Mod	Sev	Mod	Sli
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Sli
4/2b	A	0-4	Sev	Mod-Sev	Mod	Mod	Mod	Sev
4/2c	A	0-2	Sev	Sev	Sev	Sev	Mod	Sev

(a) Sli—Slight
 Mod—Moderate
 Sev—Severe
 V Sev—Very Severe

(b) Limitations for residential development with public sewer also apply to foundations for low buildings.

Table 3. Degree of limitation of soil management units for various uses (continued)

Soil Management Unit			Degree of Limitation for Various uses (a)					
Soil Management Group	Slope		Residential Development		Highways and Streets	Parks and Recreation	Cropland	Woodland
	Class	%	Without Public Sewer	With Public Sewer (b)				
Group 4 Loamy sand soils								
4a	A, B	0-6	Sli	Sli	Sli	Sli	Mod	Mod
	C	6-12	Mod	Mod	Sli	Mod	Mod	Mod
	D	12-18	Sev	Sev	Sli	Sev	Mod	Mod
	E, F	18+	Sev	Sev	Sli	Sev	Sev	Mod
4b	A	0-4	Sev	Mod	Mod	Mod	Mod	Sev
4c	A	0-2	Sev	Sev	Sev	Sev	Mod	Sev
Group 5/2 Sand to loamy sand (40 to 60 inches thick) over loam to clay soils								
5/2a	A, B	0-6	Sli-Mod	Sli-Mod	Sli	Mod	Mod	Sli
	C	6-12	Mod	Mod	Sli	Mod	Sev	Sli
	D	12-18	Sev	Sev	Sli	Sev	Sev	Sli
	E, F	18+	Sev	Sev	Sli	Sev	Sev	Sli
5/2b	A	0-4	Sev	Mod-Sev	Mod	Mod	Mod	Sev
5c	A	0-2	Sev	Sev	Sev	Sev	Mod	Sev
Group 5 Sand soils								
5a, 5.3a, 5.7a	A, B	0-6	Sli	Sli	Sli	Mod	Mod	Mod
	C	6-12	Mod	Mod	Sli	Mod	Sev	Mod
	D	12-18	Sev	Sev	Sli	Sev	Sev	Mod
	E, F	18+	Sev	Sev	Sli	Sev	Sev	Mod
5b	A	0-4	Sev	Mod	Mod	Mod	Mod	Sev
5c	A	0-2	Sev	Sev	Sev	Sev	Mod	Sev
Group G Gravelly or stony soils								
Ga	A, B	0-6	Sli	Sli	Sli	Mod	Sev	Mod-Sev
	C	6-12	Mod	Mod	Sli	Mod	Sev	Mod-Sev
	D	12-18	Sev	Sev	Sli	Sev	Sev	Mod-Sev
	E, F	18+	Sev	Sev	Sli	Sev	Sev	Mod-Sev
Gbc	A	0-4	Sev	Sev	Sev	Sev	Sev	Sev
Group L Alluvial (lowland) soils								
L-2a	A	0-2	V Sev	V Sev	V Sev	Mod	Mod	Mod
L-2c	A	0-2	V Sev	V Sev	V Sev	Sev	Mod-Sev	Sev
L-4a	A	0-2	V Sev	V Sev	V Sev	Mod	Mod-Sev	Mod
L-4c	A	0-2	V Sev	V Sev	V Sev	Sev	Mod-Sev	Sev
L-Mc	A	0-2	V Sev	V Sev	V Sev	V Sev	Mod-Sev	Sev
Group M Organic soils (mucks and peats)								
Mc	A	0-2	V Sev	V Sev	V Sev	V Sev	Mod	Sev
M/1c	A	0-2	V Sev	V Sev	V Sev	V Sev	Mod	Sev
M/3c	A	0-2	V Sev	V Sev	V Sev	V Sev	Sli	Sev
M/4c	A	0-2	V Sev	V Sev	V Sev	V Sev	Mod	Sev
M/mc	A	0-2	V Sev	V Sev	V Sev	V Sev	Sli	Sev
M/Re	A	0-2	V Sev	V Sev	V Sev	V Sev	V Sev	Sev

(a) Sli—Slight
 Mod—Moderate
 Sev—Severe
 V Sev—Very Severe

(b) Limitations for residential development with public sewer also apply to foundations for low buildings.

Table 3. Degree of limitation of soil management units for various uses (continued)

Soil Management Unit			Degree of Limitation for Various uses (a)					
Soil Management Group	Slope		Residential Development		Highways and Streets	Parks and Recreation	Cropland	Woodland
	Class	%	Without Public Sewer	With Public Sewer (b)				
Group R Bedrock soils								
Ra	A, B	0-6	V Sev	Sev	Mod-Sev	Sli-Mod	Sev	Sev
	C	6-12	V Sev	Sev	Mod-Sev	Mod	Sev	Sev
	D	12-18	V Sev	Sev	Mod-Sev	Sev	Sev	Sev
	E, F	18+	V Sev	Sev	Mod-Sev	Sev	Sev	Sev
Rbc	A	0-4	V Sev	Sev	Sev	Sev	Sev	Sev
Loam, 20 to 40 inches, over bedrock								
2/Ra	A, B	0-6	Sev	Mod	Mod	Mod	Sli	Mod
	C	6-12	Sev	Mod	Mod	Sev	Mod	Mod
	D	12-18	Sev	Sev	Mod	Sev	Sev	Mod
	E, F	18+	Sev	Sev	Mod	Sev	Sev	Mod
Sandy loam, 20 to 40 inches, over bedrock								
3/Ra	A, B	0-6	Mod-Sev	Mod-Sev	Mod-Sev	Sli-Mod	Mod	Mod-Sev
	C	6-12	Mod-Sev	Mod-Sev	Mod-Sev	Sli-Mod	Mod	Mod-Sev
	D	12-18	Sev	Sev	Mod-Sev	Sev	Sev	Mod-Sev
	E, F	18+	Sev	Sev	Mod-Sev	Sev	Sev	Mod-Sev
3/Rbc	A	0-4	Sev	Mod	Mod	Sev	Mod	Mod-Sev
Sand to loamy sand, 20 to 40 inches, over bedrock								
4/Ra	A, B	0-6	Sev	Mod	Sli-Mod	Sli	Sev	Mod-Sev
	C	6-12	Sev	Mod	Sli-Mod	Mod	Sev	Mod-Sev
	D	12-18	Sev	Sev	Mod-Sev	Sev	Sev	Mod-Sev
	E, F	18+	Sev	Sev	Mod-Sev	Sev	Sev	Mod-Sev
4/Rbc	A	0-4	Sev	Mod	Mod	Sev	Mod	Mod-Sev

(a) Sli—Slight
 Mod—Moderate
 Sev—Severe
 V Sev—Very Severe

(b) Limitations for residential development with public sewer also apply to foundations for low buildings.