

LOCATION MENFRO

MO+IL

Established Series
Rev. RWF-RLT
08/2004

MENFRO SERIES

The Menfro series consists of very deep, well drained, moderately permeable soils formed in thick loess deposits on upland ridgetops, backslopes and benches adjacent to the Missouri and Mississippi Rivers and their major tributaries. Slopes range from 2 to 60 percent. Mean annual temperature is 56 degrees F, and mean annual precipitation is 36 inches.

TAXONOMIC CLASS: Fine-silty, mixed, superactive, mesic Typic Hapludalfs

TYPICAL PEDON: Menfro silt loam - pasture. (Colors are for moist soil unless otherwise stated.)

A--0 to 3 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary. (1 to 4 inches thick)

E--3 to 6 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; many fine and few medium roots; strongly acid; clear smooth boundary. (0 to 8 inches thick)

BE--6 to 11 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure parting to moderate medium granular; very friable; many fine and few medium roots; moderately acid; clear smooth boundary. (0 to 8 inches thick)

Bt1--11 to 17 inches; dark yellowish brown (10YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; many fine and few medium roots; many distinct pale brown (10YR 6/3) silt coatings and dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt2--17 to 24 inches; yellowish brown (10YR 5/4) silty clay loam; strong coarse subangular blocky structure parting to strong medium subangular blocky; firm; many fine and few medium roots; many distinct pale brown (10YR 6/3) silt coatings and dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt3--24 to 33 inches; dark yellowish brown (10YR 4/6) silty clay loam; strong medium prismatic structure parting to strong medium subangular blocky; firm; common very fine and fine roots; many distinct pale brown (10YR 6/3) silt coatings and dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt4--33 to 40 inches; brown (7.5YR 4/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common very fine and fine roots; common distinct pale brown (10YR 6/3) silt coatings and dark yellowish brown (10YR 4/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt5--40 to 51 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic

structure parting to moderate medium subangular blocky; friable; common very fine and few fine roots; common distinct pale brown (10YR 6/3) silt coatings and strong brown (7.5YR 4/6) clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt6--51 to 62 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure; friable; few very fine roots; common distinct light brownish gray (10YR 6/2) silt coatings and strong brown (7.5YR 4/6) clay films on faces of peds; strongly acid; gradual smooth boundary.

Bt7--62 to 80 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; few fine roots; common distinct light brownish gray (10YR 6/2) silt coatings and strong brown (7.5YR 4/6) clay films on faces of peds; few iron and manganese stains; strongly acid. (Combined thickness of the Bt horizon is 24 to 75 inches.)

TYPE LOCATION: Boone County, Missouri. About 11/2 miles southeast of Wilton; about 2,600 feet east and 1,050 feet north of the southwest corner of sec. 36, T. 46 N., R. 13 W.; Hartsburg Quadrangle; lat. 38 degrees 43 minutes 15 seconds N. and long. 92 degrees 20 minutes 29 seconds W.

RANGE IN CHARACTERISTICS: The solum typically is 50 to 70 inches thick but ranges from 30 to 100 inches in thickness.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 2 to 4. The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4, with value of 4 or more rubbed and 5.5 or more dry. They are strongly acid to neutral, depending on local liming practices.

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

The BE horizon, where present, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or silty clay loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. The upper 20 inches of the argillic horizon averages between 27 and 35 percent clay, and the horizon with the highest clay maximum ranges from 30 to 38 percent. The BE and Bt horizon ranges from very strongly acid to neutral.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is silt loam or silty clay loam. Reaction is moderately acid to neutral in the upper part and ranges to slightly alkaline in the lower part of some pedons.

COMPETING SERIES: These are the Baraboo, Bertrand, Blackhammer, Camden, Dodge, Dubuque, Fayette, Flagg, Greenridge, Hackers, Jackson, Jemerson, La Farge, Lambeau, Martinsburg, Middletown, Navlys, Palermo, Palsgrove, Pepin, Piscasaw, Ridgway, Rozetta, Ruma, Rush, Russell, Seaton, St. Charles, Stookey, Sylvan, Thebes and Yellowriver soils. Baraboo, Dubuque, La Farge and Palsgrove soils have a lithic or paralithic contact within a depth of 60 inches. Bertrand and Hackers soils have strata immediately below the argillic horizon containing more than 15 percent fine sand and coarser. Blackhammer soils have more than 5 percent rock fragments in the lower part of the argillic horizon. Camden, Dodge, Flagg, Greenridge, Middletown, Piscasaw, Rush, Russell, St. Charles and Thebes soils average more than 15 percent fine sand or coarser in the lower part of the series control section. Fayette and Rozetta soils typically have yellower hue and an average soil temperature cooler than 54 degrees F. Jemerson soils have more than 5 percent sand in the upper part of the control section. Jackson, Lambeau, Pepin, Seaton and Stookey soils average less than 27 percent clay in the particle size control section.

Martinsburg soils have a thicker E horizon and the horizon having the maximum clay content is deeper in the profile. Ridgway and Yellowriver soils have more than 5 percent sand in some horizon above a depth of 40 inches. Ruma soils have more than 7 percent sand in the lower part of the series control section. Sylvan soils have sola less than 40 inches and have carbonates within 40 inches.

GEOGRAPHIC SETTING: Menfro soils are on upland ridgetops, backslopes and benches adjacent to the Missouri and Mississippi Rivers and their major tributaries. Slope gradients range from 2 to 60 percent. Menfro soils formed in loess deposits ranging from 6 to 20 feet or more thick. The mean annual temperature ranges from 54 to 59 degrees F, and mean annual precipitation ranges from 32 to 42 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Haymond, Winfield, and Weingarten soils. Haymond soils are coarse-silty and are on flood plains. Winfield soils are moderately well drained. Weingarten soils have cherty residuum at depths of 40 to 60 inches. Both of these soils are typically on lower slopes.

DRAINAGE AND PERMEABILITY: Well drained. The potential for surface runoff ranges from low to very high. Permeability is moderate. Saturated hydraulic conductivity is moderately high or high (4.0 to 14.11 micrometers/sec).

USE AND VEGETATION: Natural vegetation is deciduous hardwoods. The cleared areas are cropped to soybeans, small grain, corn, hay, and pasture. Most of the steeper areas remain in timber.

DISTRIBUTION AND EXTENT: Central and eastern Missouri adjacent to the Missouri and Mississippi River Valleys. West-central and southwestern Illinois adjacent to the Mississippi River Valley. MLRA 115. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Indianapolis, Indiana

SERIES ESTABLISHED: Illinois, (III-2 Edwardsville project), 1939.

REMARKS: Base saturation at 1.25m below the top of the argillic horizon ranges from 60 to 87 percent and averages about 72 percent. The clay mineralogy is mixed but dominated by montmorillonite (est. 60-75 percent) with lesser amounts of illite.

Diagnostic horizons and features recognized in this series are:
ochric epipedon - the zone from the surface of the soil to a depth of 11 inches (Ap, E, and BE horizons);
argillic horizon - the zone from approximately 11 inches to 80 inches (Bt1, Bt2, Bt3, Bt4, Bt5, Bt6 and Bt7 horizons);
udic moisture regime.

These soils are prime farmland where the slopes are less than 6 percent.

National Cooperative Soil Survey
U.S.A.

LOCATION MEXICO

MO

Established Series

Rev. JMH-DMM-GPB-MAC-GRS

12/2006

MEXICO SERIES

The Mexico series consists of very deep, poorly drained soils formed in loess over loamy sediments derived from till. These soils are on ridge and hillsides of the Central Claypan Till Plains and have slopes of 0 to 4 percent. Mean annual temperature is about 12 degrees C (53 degrees F), and mean annual precipitation is 991 millimeters (39 inches).

TAXONOMIC CLASS: Fine, smectitic, mesic Vertic Epiaqualfs

TYPICAL PEDON: Mexico silt loam - on a 1 percent slope on an interfluvium in a cultivated field at an elevation of 243 meters (798 feet). (Colors are for moist soil unless otherwise stated.)

Ap--0 to 23 centimeters (0 to 9 inches); very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium and thin platy structure; friable; few fine roots; common fine tubular pores; few fine prominent yellowish brown (10YR 5/6) masses of oxidized iron; few fine faint black (10YR 2/1) iron-manganese concretions; slightly acid; abrupt smooth boundary. [13 to 23 centimeters (5 to 9 inches) thick]

Btg1--23 to 38 centimeters (9 to 14 inches); 70 percent dark grayish brown (10YR 4/2) and 30 percent grayish brown (10YR 5/2) silt loam; weak fine subangular blocky structure; friable; few fine roots; common fine and medium tubular pores; very few faint dark grayish brown (10YR 4/2) clay films on faces of peds; few distinct gray (10YR 6/1) silt coats on faces of peds; common fine prominent strong brown (7.5YR 5/6) and yellowish brown (10YR 5/8) masses of oxidized iron; few fine distinct black (10YR 2/1) iron-manganese concretions; friable; strongly acid; abrupt smooth boundary. [Thickness of the upper Btg horizon(s) is 0 to 23 centimeters (0 to 9 inches).]

Btg2--38 to 53 centimeters (14 to 21 inches); 70 percent dark grayish brown (10YR 4/2) and 30 percent gray (10YR 5/1) clay; moderate fine subangular blocky structure; friable; few very fine roots; few fine tubular pores; many distinct dark gray (10YR 4/1) clay films on faces of peds; few distinct very dark grayish brown (10YR 3/2) organoargillans on faces of peds; few distinct gray (10YR 6/1) silt coats on faces of peds; common fine prominent red (2.5YR 4/6) and strong brown (7.5YR 5/6) masses of oxidized iron; few fine faint black (10YR 2/1) iron-manganese concretions; very strongly acid; clear smooth boundary.

Btg3--53 to 69 centimeters (21 to 27 inches); grayish brown (10YR 5/2) silty clay; moderate fine subangular blocky structure; firm; few very fine roots; few fine tubular pores; 60 percent distinct grayish brown (10YR 5/2) clay films on faces of peds; common distinct very dark grayish brown (10YR 3/2) organoargillans on faces of peds and along surfaces of pores; many fine prominent yellowish brown (10YR 5/6) and few fine prominent yellowish red (5YR 4/6) masses of oxidized iron; few fine prominent black (10YR 2/1) iron-manganese concretions; very strongly acid; abrupt smooth boundary.

Btg4--69 to 86 centimeters (27 to 34 inches); grayish brown (10YR 5/2) silty clay; weak medium prismatic structure parting to weak fine subangular blocky; firm; few very fine roots; common fine

tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common coarse prominent brown (7.5YR 4/4) and common fine prominent red (2.5YR 4/6) masses of oxidized iron; few fine prominent black (10YR 2/1) iron-manganese concretions; few fine prominent black (10YR 2/1) masses of manganese; strongly acid; abrupt smooth boundary. [Thickness of the middle Btg horizon(s) is 25 to 66 centimeters (10 to 26 inches).]

Btg5--86 to 107 centimeters (34 to 42 inches); light brownish gray (10YR 6/2) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; common fine tubular pores; few faint gray (2.5Y 6/1) clay films on surfaces along pores; few coarse prominent strong brown (7.5YR 4/6) and few fine prominent dark yellowish brown (10YR 4/6) and reddish brown (5YR 4/4) masses of oxidized iron; few fine prominent black (10YR 2/1) masses of manganese on vertical faces of peds; few fine prominent black (10YR 2/1) iron-manganese concretions; strongly acid; gradual smooth boundary. [Thickness of the lower Btg horizon(s) is 13 to 50 centimeters (5 to 20 inches).]

2Btg6--107 to 135 centimeters (42 to 53 inches); gray (10YR 5/1) silty clay loam; moderate medium prismatic structure; firm; few very fine roots; few fine tubular pores; common faint gray (10YR 6/1) clay films on faces of peds; few medium prominent strong brown (7.5YR 4/6) and few fine prominent yellowish brown (10YR 5/6) masses of oxidized iron; few fine distinct black (10YR 2/1) masses of manganese; moderately acid; clear smooth boundary.

2Btg7--135 to 203 centimeters (53 to 80 inches); gray (10YR 5/1) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few fine tubular pores; many faint gray (2.5Y 5/1) clay films on faces of peds; common medium prominent dark yellowish brown (10YR 4/6) and brown (7.5YR 4/4) masses of oxidized iron; slightly acid.

TYPE LOCATION: Montgomery County, Missouri; about 3 miles east of Montgomery City; 341 meters (1,119 feet) east and 149 meters (489 feet) north from the southwest corner of sec. 23, T. 49 N., R. 5 W; New Florence USGS quadrangle, latitude 38 degrees 59 minutes 45 seconds N. and longitude 91 degrees 26 minutes 44 seconds W; UTM, Zone 15, 634616 easting, 4317461 northing, NAD 83.

RANGE IN CHARACTERISTICS:

Depth to top of the argillic horizon: 13 to 33 centimeters (5 to 13 inches)

Thickness of silt loam surface layers: 13 to 43 centimeters (5 to 17 inches)

Depth to top of the claypan: 18 to 46 centimeters (7 to 18 inches)

Particle-size control section: averages 38 to 50 percent clay, with at least one horizon having 45 to 60 percent

Depth to lithologic discontinuity (loamy sediments or 2Btg horizon): 76 to 152 centimeters (30 to 60 inches) in uneroded pedons and ranges from 71 to 152 centimeters (28 to 60 inches) in eroded pedons

Depth to till (3Btg horizon), where present: 152 to 203 centimeters (60 to 80 inches)

Depth to base of the argillic horizon: greater than 203 centimeters (80 inches)

Solum thickness: greater than 203 centimeters (80 inches)

Depth to carbonates: greater than 203 centimeters (80 inches)

Ap horizon

Hue: 10YR

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 to 3

Texture: silt loam or silty clay loam

Average clay content: 15 to 30 percent

Average sand content: 3 to 10 percent

Reaction: moderately acid to neutral

BE horizon (where present)

Hue: 10YR

Value: 4 or 5

Chroma: 2 or 3

Texture: silt loam

Average clay content: 15 to 26 percent

Average sand content: 3 to 10 percent

Reaction: moderately acid to neutral

Upper Btg horizon

Some eroded pedons lack the upper Btg horizon

Hue: 10YR

Value: 3 to 6

Chroma: 2

Redoximorphic features: Red or yellowish red masses of iron accumulation normally present along with yellowish brown and strong brown masses of iron accumulation.

Texture: silt loam or silty clay loam

Average clay content: 25 to 35 percent

Average sand content: 4 to 12 percent

Reaction: strongly acid to neutral

Middle Btg horizon (claypan)

Hue: 10YR

Value: 4 to 6

Chroma: 1 to 3

Redoximorphic features: Brown and yellowish brown masses of iron accumulation, but the red masses diminish with increasing depth.

Texture: silty clay or clay

Average clay content: 40 to 60 percent

Average sand content: 0 to 4 percent

Reaction: very strongly acid to strongly acid

Lower Btg horizon

Hue: 10YR or 2.5Y

Value: 4 to 6

Chroma: 1 to 3

Redoximorphic features: Brown and yellowish brown masses of iron accumulation, but the red masses diminish with increasing depth.

Texture: silty clay loam or silt loam

Average clay content: 28 to 38 percent

Average sand content: 0 to 4 percent

Reaction: very strongly acid to neutral

2Btg horizon

Hue: 10YR or 2.5Y

Value: 4 to 6

Chroma: 1 to 4

Texture: dominantly silty clay loam, silt loam, or silty clay, with clay loam in some pedons

Average clay content: 24 to 38 percent

Average sand content: 4 to 25 percent

Reaction: very strongly acid to neutral

COMPETING SERIES: These are the Bucknell, Gifford, Kilwinning, Kniffin, Leonard, Pershing, Rathbun, Rinda, Shields, and Stateline series. Bucknell soils are less than 203 centimeters (80 inches) to the base of the argillic horizon and formed in paleosols derived from till. Gifford soils formed in loess and silty sediments or alluvium on stream terraces. Kilwinning soils formed entirely in loess, allow 2.5Y hue in the upper Btg horizon, and are typically less acid in the lower part of the series control section. Kniffin, Pershing and Rathbun soils are more than 152 centimeters (60 inches) to a lithologic discontinuity and formed in more than 152 centimeters (60 inches) of loess. Leonard soils are 30 to 76 centimeters (12 to 30 inches) deep to a paleosol containing till pebbles. Rinda soils are less than 46 centimeters (18 inches) to a lithologic discontinuity and formed in thin loess or silty sediments and the underlying paleosol formed in till. Shields soils have carbonates above a depth of 152 centimeters (60 inches) and formed in till. Stateline soils are less than 203 centimeters (80 inches) to the base of the argillic horizon and formed in loess or loamy sediments and the underlying clayey paleosol.

GEOGRAPHIC SETTING: Mexico soils are on ridges and hillsides of dissected till plains. These soils formed in 71 to 152 centimeters (28 to 60 inches) of loess over loamy sediments derived from pre-Illinoian till. Slopes range from 0 to 4 percent. The mean annual temperature ranges from 10 to 13 degrees C (50 to 55 degrees F), and mean annual precipitation ranges from 890 to 1020 millimeters (35 to 40 inches).

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Armstrong, Gara, Leonard, Lindley and Putnam soils. The somewhat poorly drained Armstrong, the moderately well drained Gara, and the well drained Lindley soils have more sand in the upper part of the solum and are down slope. Leonard soils are 30 to 76 centimeters (12 to 30) inches to a paleosol containing till pebbles. Putnam soils have an abrupt textural change. Leonard soils are down slope and Putnam soils are on the main divides upslope from Mexico soils.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Poorly drained. The potential for runoff is high to very high. Permeability is very slow. Saturated hydraulic conductivity (Ksat) is 0.01 to 0.42 micrometers per second. In undisturbed areas a perched water table has an upper limit of 15 to 61 centimeters (0.5 to 1.5 feet) during December to May in most years.

USE AND VEGETATION: Most areas are used to grow corn, soybeans, and small grains. Native vegetation is tall prairie grass.

DISTRIBUTION AND EXTENT: The Central Claypan Areas, MLRA 113, of northeast Missouri. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Indianapolis, Indiana

SERIES ESTABLISHED: St. Charles County, Missouri, 1952.

REMARKS: With this revision, the Mexico Series is reclassified as Fine, smectitic, mesic Vertic Epiaqualfs and the type location is moved to a more representative site. This series was previously classified as Fine, smectitic, mesic Aeric Vertic Epiaqualfs. The previous typical pedon lacked lab data and the location was uncertain. This more representative pedon with lab data is approximately 2.4 miles east by northeast of the previous type location.

Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from the surface to a depth of 23 centimeters (9 inches) (Ap horizon);
Argillic horizon - the zone from 23 to 203 centimeters (9 to 80 inches) (Btg, and 2Btg horizons).

Claypan the zone from 36 to 86 centimeters (14 to 34 inches) (Btg2, Btg3, and Btg4 horizons).
Lithologic discontinuity occurs at a depth of 107 centimeters (42 inches) (top of 2Btg1 horizon).

ADDITIONAL DATA: LAB SAMPLE NUMBER M0513904 (University of Missouri Lab) is data for the typical pedon. LAB SAMPLE NUMBERS MO500706, MO500708, MO500709, MO502703, MO511302, MO511303, MO511304, MO513907, MO516302, MO521903, and MO602701 are additional data used for the series range in characteristics.

National Cooperative Soil Survey
U.S.A.

LOCATION WILDERNESS

MO

Established Series

Rev. FLG-RLT

10/2006

WILDERNESS SERIES

The Wilderness series consists of very deep, moderately well drained soils that have a fragipan at depths of 15 to about 29 inches. These upland soils formed in colluvium and the underlying residuum from cherty limestone. Permeability is moderate above the fragipan and slow in the fragipan and moderate below the fragipan. Slope gradients range from 2 to 35 percent. The mean annual temperature is 56 degrees F, and the mean annual precipitation is 44 inches.

TAXONOMIC CLASS: Loamy-skeletal, siliceous, active, mesic Oxyaquic Fragiudalfs

TYPICAL PEDON: Wilderness gravelly silt loam - on an east-facing convex slope of 3 percent under mixed hardwoods at an elevation of 975 feet. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 6 inches; brown (10YR 4/3) gravelly silt loam; pale brown (10YR 6/3) dry; weak very fine subangular blocky structure; friable; 20 percent chert gravel; many fine and medium roots; moderately acid; abrupt smooth boundary. (3 to 7 inches thick)

Bt--6 to 17 inches; strong brown (7.5YR 5/6) very gravelly silty clay loam; weak fine subangular blocky structure; friable; 55 percent chert gravel; common fine roots; few faint clay films on faces of peds; moderately acid; gradual wavy boundary. (8 to 17 inches thick)

2Ex--17 to 27 inches; pale brown (10YR 6/3) extremely gravelly silt loam; common medium faint brownish yellow (10YR 6/6) mottles; weak medium platy structure; very firm; 70 percent brittle; 80 percent chert gravel; very strongly acid; gradual wavy boundary. (0 to 14 inches thick)

2Btx--27 to 38 inches; strong brown (7.5YR 5/6) extremely gravelly silty clay loam; common fine distinct pale brown (10YR 6/3) mottles; moderate very coarse prismatic structure parting to weak fine subangular blocky; very firm; 75 percent brittle; few distinct clay films of faces of prisms; 80 percent chert gravel; very strongly acid; gradual wavy boundary. (6 to 14 inches thick)

3Bt--38 to 60 inches; yellowish red (5YR 5/6) and red (2.5YR 4/8) extremely gravelly silty clay; moderate fine subangular blocky structure; firm; common distinct clay films on faces of peds and chert fragments; 80 percent chert gravel; very strongly acid. (18 to 38 inches thick)

TYPE LOCATION: Shannon County, Missouri; five miles southeast of Winona; 1,900 feet east and 1,300 feet north of the southwest corner, sec. 15, T. 26 N., R. 3 W.; USGS Low Wassie topographic quadrangle; latitude 36 degrees 55 minutes 03 seconds N. and longitude 91 degrees 16 minutes 12 seconds W., CONUS 27.

RANGE IN CHARACTERISTICS: Depth to the fragipan ranges from 15 to 29 inches.

The Ap or A horizon has value of 3 to 5 and chroma of 2 or 3. Pedons with E horizons have value of 4 to

6, and chroma of 2 to 4. Texture is the gravelly or very gravelly analogues of silt loam or loam. Reaction is very strongly acid to slightly acid. Some pedons have a BE horizon.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6; and chroma of 4 to 6. It is the very gravelly, very cobbly, or extremely gravelly analogues of silty clay loam, loam, or silt loam. Reaction is slightly acid to very strongly acid.

The 2Ex, Btx, Bx and 2Btx horizons are mottled with 5YR to 10YR hue, value of 4 to 6, and chroma of 2 to 8. In some pedons the Ex horizon has lower chroma than the Bx horizon and there is an indication of very weak coarse platy structure but the high chert content largely obscures this feature. The gravel content ranges from 25 to 85 percent by volume. Texture is the gravelly to extremely gravelly, and very cobbly to extremely cobbly analogues of loam, silt loam, or silty clay loam. Pedons that are associated with interbedded cherty limestone and sandstone have texture of very cobbly or very gravelly sandy loam. Reaction is strongly acid to extremely acid.

The 2Bt or 3Bt horizon has hue of 10R to 10YR, value of 3 to 6 and chroma of 2 to 8. It is the gravelly to extremely gravelly analogues of silty clay or clay but in some pedons is clay. Reaction is very strongly acid to moderately acid.

COMPETING SERIES: This is the Keeno series. Similar soils in other families are the Nixa and Scholten series. Keeno soils have an A horizon with color value of 3 or less moist and 5 or less dry. Nixa soils do not have an argillic horizon above the fragipan. Scholten soils are ultisols.

GEOGRAPHIC SETTING: The Wilderness soils are on gently sloping to steep upland ridgetops and side slopes. Slope gradients are dominantly 2 to 9 percent with an extreme range of 35 percent. These soils formed in colluvium and the underlying residuum from cherty limestone. The mean annual temperature ranges from 52 to 57 degrees F, and mean annual precipitation ranges from 37 to 45 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Captina, Clarksville, Coulstone, Doniphan, Lebanon, Poynor, Tonti and Viraton soils. The Clarksville, Coulstone, Doniphan, and Poynor soils do not have a fragipan and commonly are on steeper side slopes. The Captina, Lebanon, Tonti and Viraton soils have less than 35 percent by volume coarse fragments in the particle size control section and are on more gently sloping, wider ridgetops, upslope from the Wilderness soils.

DRAINAGE AND PERMEABILITY: Moderately well drained. Permeability is moderate above the fragipan, slow in the fragipan and moderate below the fragipan. The saturated hydraulic conductivity is moderately high above the fragipan, low in the fragipan, and moderately high below the fragipan. The surface runoff index is high to very high. A seasonal high water table is from 1.0 to 2.0 feet for brief periods from December through April in most years.

USE AND VEGETATION: Most areas of these soils are in forest, although an appreciable acreage is used for pasture and hayland. Native vegetation is mixed hardwoods dominated by oak and hickory.

DISTRIBUTION AND EXTENT: The Ozarks area (MLRA 116A and 116B) of Missouri. The series is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Morgantown, West Virginia.

SERIES ESTABLISHED: Mark Twain National Forest Area, Missouri (parts of Carter, Oregon, Ripley, and Shannon Counties), 1972.

REMARKS: Diagnostic horizons and features recognized in this series are:

Ochric epipedon - the zone from the surface of the soil to a depth of 6 inches (Ap horizon).

Argillic horizon - the zone from approximately 6 inches to 17 inches and 38 inches to 60 inches or more (Bt and B't horizons).

Fragipan - the zone from approximately 17 inches to 38 inches (Ex and Bx horizons).

National Cooperative Soil Survey

U.S.A.

SITE CLASSIFICATION for ONSITE SEWAGE SYSTEM – 19 CSR 20-3.060(2) & (7)

Owner: _____

Pit/Core #: _____

Date: _____

Suitability See recommendations below S – Suitable; PS – Provisionally Suitable; U – Unsuitable; for conventional system.

LANDSCAPE POSITION:		Slope aspect: _____	
Flooding frequency: None <input type="checkbox"/> Rare <input type="checkbox"/> Occasional <input type="checkbox"/> Frequent <input type="checkbox"/>		Surface depression(s) in evaluated area? _____	
& TOPOGRAPHY		Slope Type: Uniform <input type="checkbox"/> Complex <input type="checkbox"/>	
Percent Slope: _____		Shape down (profile): _____	
Shape across (contour): _____			
SOIL CHARACTERISTICS (See Profile Description for details)			
TEXTURE to a depth of _____ inches		Depth of unsuitable texture _____ inches	
STRUCTURE to a depth of _____ inches		Depth of unsuitable structure _____ inches	
SOIL DRAINAGE		Type of water table: _____	
Surface drainage limitations: _____		Depth to water table _____ inches	
SOIL THICKNESS		Depth of bedrock: _____ inches	
Type: _____		Rock outcrops? _____	
RESTRICTIVE HORIZON		Type: _____	
Depth: _____		Thickness: _____	
AVAILABLE SPACE		Estimated space available: _____	
Adequate for a conventional system? _____		an alternative system? _____	
		replacement area? _____	
OTHER FACTORS Note any environmental hazards: _____			
High groundwater contamination potential? (If yes, indicate reason): _____			
Sinkhole <input type="checkbox"/> Rapid permeability <input type="checkbox"/> Depth to highly permeable bedrock <input type="checkbox"/> Fill material /depth <input type="checkbox"/>			
OVERALL Notes: _____			

Overall site classification will be determined by the lowest of the uncorrectable characteristics.

- **S** An overall site classification of **suitable** indicates soil and site conditions favorable for the operation of a conventional absorption system.
- **PS** Sites classified as **provisionally suitable** require some modifications and careful planning, design, and installation for a conventional system or alternative system to function satisfactorily.
- **U** Sites originally classified as **unsuitable** may possibly be reclassified as **provisionally suitable** according to subsection (7)(K).
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Recommendations* associated with Provisionally Suitable or Unsuitable classifications:

- _____ Trenches must not be dug when wet to prevent damaging soil/trench surfaces.
- _____ Surface water diversion is needed.
- _____ An interceptor drain should be installed upslope at a depth of _____ inches.
- _____ Shallow or modified shallow placed trenches should be installed at a depth of _____ inches.
- _____ An alternative/engineered system is needed to overcome site limitations.
- _____
- _____
- _____
- _____

Owner: _____

Date _____

Comments/Recommendations

*Recommendations are to assist the property owner, and their agents in complying with the standards, and are subject to approval by the administrative authority.

I, the undersigned, hereby certify that the site evaluation was made in accordance with the requirements of Sections 701.025-701.059 RSMo and 19 CSR 20-3.060 and 19 CSR 20-3.080, and that the data recorded is correct to the best of my knowledge.

Print name _____

OSE ID # _____

Signature _____

Date _____

Important Recommendations for Installers and Homeowners:

- Protect the absorption area before and after construction. Do not drive over or store excavated materials on field area etc.
- Shallow placed absorption systems utilize more permeable and better-aerated soil horizons.
- Do not install soil absorption system when soil is wet.
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- Establish & maintain adequate vegetative cover over the field.
- Regularly inspect, maintain, and pump your sewage system.
- Install water saving devices & practice water conservation.
- Check for and repair any water leaks as soon as discovered.
- Spread out water use, such as laundry, throughout the week.
- Restrict garbage disposal use.
- Do not put fats or grease into the sewage system.
- Keep chemicals and hazardous wastes out of your system.
- Use disinfectants and high strength cleaners sparingly.
- Do not plan any building improvements, patios, etc. near the sewage system or repair area.

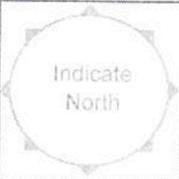
Minimum Set-Back Distances Based on 19 CSR 20-3.060(1)(D) Table 1 [See also (6)(D) for lagoons]			
Minimum Distance from	Sewage Tank	Disposal Area	Lagoons
	(feet)	(feet)	(feet)
Private water supply well	50	100	100
Public water supply well	300	300	300
Cistern	25	25	25
Spring	50	100	100
Classified stream or lake	50	50	50
Stream or open ditch	25	25	25
Property lines	10	10**	75
Building foundation	5	15	[100]
Basement	15	25	[100]
Swimming pool	15	15	
Pressure water line	10	10	10
Suction water line	50	100	100
Upslope interceptor drain	-	10	
Downslope interceptor drain	-	25	
Embankment or cuts	-	20	
Edge of sink holes	50	100	500
Other absorption system	-	20	20

**Recommend 25 feet from downslope property line.

OFFICIAL USE - APPLICATION # _____

SITE EVALUATION for ONSITE SEWAGE SYSTEM

Property Owner:		Date:	
Site Address:		Mailing Address :	
, MO			
Subdivision, Lot:		Day() -	Evening() -
County:	Legal Location: 1/4 1/4 1/4 ,S ,T ,R		
Residence - # Bedrooms:	# People	Latitude:	Longitude:
Business - Type:	Design flow: gpd;	System is: New	Replacement Repair

	
<u>LEGEND</u>	<u>SITE DIAGRAM</u>
	<u>CROSS-SECTION</u>

Site Diagram and Cross-Section : Show relative location of buildings, wells, roads, rock outcrops, depressions, sinkholes, location of soil observations, etc. Indicate the evaluated area(s) and direction of slope. (Property lines, easements, buried utilities, etc., are as observed, or as reported by property owner)

SITE CLASSIFICATION for ONSITE SEWAGE SYSTEM – 19 CSR 20-3.060(2) & (7)

Owner: _____

Pit/Core #: _____

Date: _____

Suitability See recommendations below S – Suitable; PS – Provisionally Suitable; U – Unsuitable; for conventional system.

LANDSCAPE POSITION: _____		Slope aspect: _____	
Flooding frequency: None <input type="checkbox"/> Rare <input type="checkbox"/> Occasional <input type="checkbox"/> Frequent <input type="checkbox"/>		Surface depression(s) in evaluated area? _____	
& TOPOGRAPHY Percent Slope: _____		Slope Type: Uniform <input type="checkbox"/> Complex <input type="checkbox"/>	
Shape across (contour): _____		Shape down (profile): _____	
SOIL CHARACTERISTICS (See Profile Description for details)			
TEXTURE to a depth of _____ inches		Depth of unsuitable texture _____ inches	
STRUCTURE to a depth of _____ inches		Depth of unsuitable structure _____ inches	
SOIL DRAINAGE Type of water table: _____		Depth to water table _____ inches	
Surface drainage limitations: _____		Runoff slope length _____ feet	
SOIL THICKNESS Depth of bedrock: _____ inches		Rock outcrops? _____	
RESTRICTIVE HORIZON Type: _____		Depth: _____ Thickness: _____	
AVAILABLE SPACE Estimated space available: _____			
Adequate for a conventional system? _____		an alternative system? _____ replacement area? _____	
OTHER FACTORS Note any environmental hazards: _____			
High groundwater contamination potential? (If yes, indicate reason): _____			
Sinkhole <input type="checkbox"/> Rapid permeability <input type="checkbox"/> Depth to highly permeable bedrock <input type="checkbox"/> Fill material /depth <input type="checkbox"/>			
OVERALL Notes: _____			

Overall site classification will be determined by the lowest of the uncorrectable characteristics.

- **S** An overall site classification of **suitable** indicates soil and site conditions favorable for the operation of a conventional absorption system.
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Recommendations* associated with Provisionally Suitable or Unsuitable classifications:

Trenches must not be dug when wet to prevent damaging soil/trench surfaces.

Surface water diversion is needed.

An interceptor drain should be installed upslope at a depth of _____ inches.

Shallow or modified shallow placed trenches should be installed at a depth of _____ inches.

An alternative/engineered system is needed to overcome site limitations.

Owner: _____

Date _____

Comments/Recommendations

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Public water supply well	300	300	300
Cistern	25	25	25
Spring	50	100	100
Classified stream or lake	50	50	50
Stream or open ditch	25	25	25
Property lines	10	10**	75
Building foundation	5	15	[100]
Basement	15	25	[100]
Swimming pool	15	15	
Pressure water line	10	10	10
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Downslope interceptor drain	-	25	
Embankment or cuts	-	20	
Edge of sink holes	50	100	500
Other absorption system	-	20	20

**Recommend 25 feet from downslope property line.

SITE CLASSIFICATION for ONSITE SEWAGE SYSTEM – 19 CSR 20-3.060(2) & (7)

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