SOIL DATA:

Llano Springs

in
Fort Worth, TX

This information was taken from NRCS web soil survey of Tarrant County, Texas.

United States Department of Agriculture
Soil Conservation Service in cooperation with
Texas Agricultural Experiment Station

Map Unit Description (Brief)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the selected area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit. A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The "Map Unit Description (Brief)" report gives a brief, general description of the major soils that occur in a map unit. Descriptions of nonsoil (miscellaneous areas) and minor map unit components may or may not be included. This description is written by the local soil scientists responsible for the respective soil survey area data. A more detailed description can be generated by the "Map Unit Description" report.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description (Brief)

Tarrant County, Texas

Description Category: SOI

Map Unit: 1—Aledo gravelly clay loam, 1 to 8 percent slopes

THE ALEDO SERIES CONSISTS OF SHALLOW, CALCAREOUS, GENTLY SLOPING TO ROLLING SOILS ON UPLANDS. IN A REPRESENTATIVE PROFILE, THE SURFACE LAYER IS DARK GRAYISH-BROWN GRAVELLY CLAY LOAM, ABOUT 4 INCHES THICK. BELOW THE SURFACE AND TO A DEPTH OF 16 INCHES IS GRAYISH-BROWN VERY GRAVELLY CLAY LOAM THAT RESTS ABRUPTLY ON COARSELY FRACTURED LIMESTONE.

Map Unit: 2—Aledo-Bolar complex, 5 to 20 percent slopes

THE ALEDO SERIES CONSISTS OF SHALLOW, CALCAREOUS, GENTLY SLOPING TO ROLLING SOILS ON UPLANDS. IN A REPRESENTATIVE PROFILE, THE SURFACE LAYER IS DARK GRAYISH-BROWN GRAVELLY CLAY LOAM, ABOUT 4 INCHES THICK. BELOW THE SURFACE AND TO A DEPTH OF 16 INCHES IS GRAYISH-BROWN VERY GRAVELLY CLAY LOAM THAT RESTS ABRUPTLY ON COARSELY FRACTURED LIMESTONE.

THE BOLAR SERIES CONSISTS OF MODERATELY DEEP, WELL DRAINED SOILS ON UPLANDS. THE SOIL FORMED IN INTERBEDDED LIMESTONE, MARL AND MARLY CLAY. THE SURFACE LAYER IS DARK BROWN CLAY LOAM 16 INCHES THICK. FROM 16 TO 32 INCHES IS BROWN CLAY LOAM. IT IS YELLOWISH BROWN VERY STONY CLAY LOAM FROM 32 TO 36 INCHES. BELOW IS FRACTURED LIMESTONE BEDROCK. INTERBEDDED WITH MARLY CLAY. THE SOIL IS CALCAREOUS THROUGHOUT.

Map Unit: 15—Bolar clay loam, 3 to 5 percent slopes

THE BOLAR SERIES CONSISTS OF MODERATELY DEEP, WELL DRAINED SOILS ON UPLANDS. THE SOIL FORMED IN INTERBEDDED LIMESTONE, MARL AND MARLY CLAY. THE SURFACE LAYER IS DARK BROWN CLAY LOAM 16 INCHES THICK. FROM 16 TO 32 INCHES IS BROWN CLAY LOAM. IT IS YELLOWISH BROWN VERY STONY CLAY LOAM FROM 32 TO 36 INCHES. BELOW IS FRACTURED LIMESTONE BEDROCK. INTERBEDDED WITH MARLY CLAY. THE SOIL IS CALCAREOUS THROUGHOUT.

Map Unit: 47—Medlin clay, 5 to 15 percent slopes

THE MEDLIN SERIES CONSISTS OF SOILS THAT ARE DEEP TO GEOLOGIC MATERIALS. THEY ARE WELL-DRAINED, GENTLY SLOPING TO MODERATELY STEEP SOILS ON UPLANDS. THE SOIL FORMED IN ALKALINE MARINE SEDIMENTS. IN A REPRESENTATIVE PROFILE, THE SURFACE LAYER IS GRAYISH-BROWN SILTY CLAY, ABOUT 6 INCHES THICK. THE LOWER LAYERS ARE GRAYISH-BROWN SILTY CLAY WITH ACCUMULATIONS OF CALCIUM. BELOW 49 INCHES IS MARLY SILTY CLAY.

Map Unit: 66—Sanger clay, 3 to 5 percent slopes

THE SERIES CONSISTS OF VERY DEEP, WELL-DRAINED CALCAREOUS GENTLY SLOPING TO STRONGLY SLOPING SOILS OF UPLANDS FORMED IN CLAYEY MARINE SEDIMENTS. IN A REPRESENTATIVE PROFILE, THE SURFACE LAYER IS DARK GRAYISH-BROWN CLAY ABOUT 38 INCHES THICK. BELOW THE SURFACE LAYER IS LIGHT YELLOWISH-BROWN SILTY CLAY WITH BROWN AND GRAY MOTTLES. BUT IS MAINLY 1 TO 5 PERCENT.

Map Unit: 74—Slidell clay, 1 to 3 percent slopes

THE SLIDELL SERIES CONSISTS OF VERY DEEP, MODERATELY WELL DRAINED, NEARLY LEVEL TO GENTLY SLOPING SOILS ON UPLANDS. THE SOIL FORMED IN LOWER CRETACEOUS SEDIMENTS. IN A REPRESENTATIVE PROFILE, THE SURFACE LAYER IS DARK GRAY AND VERY DARK GRAY CLAY ABOUT 19 INCHES THICK. THE UNDERLYING MATERIAL, TO A DEPTH OF 72 INCHES, IS CLAY THAT IS VERY DARK GRAY IN THE UPPER PART AND GRAYISH-BROWN IN THE LOWER PART AND CONTAINS COMMON CALCIUM CARBONATE CONCRETIONS. THE MATERIAL TO 80 INCHES IS LIGHT BROWNISH GRAY, CLAY.

Data Source Information

Soil Survey Area: Tarrant County, Texas
Survey Area Data: Version 5, Jan 2, 2007

Physical Soil Properties

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

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, 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. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

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

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

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

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Physical Soil Properties– Tarrant County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
1—Aledo gravelly clay loam, 1 to 8 percent slopes														
Aledo	0-7	—	—	20-35	1.20-1.50	4.00-14.00	0.07-0.18	3.0-5.9	1.0-3.0	.17	.32	1	5	56
	7-17	—	—	20-35	1.20-1.50	4.00-14.00	0.05-0.12	0.0-2.9	0.5-1.0	.10	.32			
	17-24	—	—	—	—	4.00-14.00	—	—	0.5-1.0					
2—Aledo-Bolar complex, 5 to 20 percent slopes														
Aledo	0-8	—	—	20-35	1.20-1.50	4.00-14.00	0.07-0.18	3.0-5.9	1.0-3.0	.17	.32	1	5	56
	8-17	—	—	20-35	1.20-1.50	4.00-14.00	0.05-0.12	0.0-2.9	0.5-1.0	.10	.32			
	17-24	—	—	—	—	4.00-14.00	—	—	0.5-1.0					
Bolar	0-10	—	—	20-40	1.20-1.50	4.00-14.00	0.11-0.18	3.0-5.9	1.0-3.0	.32	.32	3	4L	86
	10-30	—	—	20-40	1.20-1.50	4.00-14.00	0.10-0.15	3.0-5.9	0.5-1.0	.20	.32			
	30-36	—	—	—	—	0.42-14.00	—	—	0.5-1.0					
Unnamed, minor components	—	—	—	—	—	—	—	—	—					
15—Bolar clay loam, 3 to 5 percent slopes														
Bolar	0-8	—	—	20-40	1.20-1.50	4.00-14.00	0.11-0.18	3.0-5.9	1.0-3.0	.32	.32	3	4L	86
	8-31	—	—	20-40	1.20-1.50	4.00-14.00	0.11-0.18	3.0-5.9	0.5-2.0	.32	.32			
	31-41	—	—	—	—	0.42-14.00	—	—	0.5-1.0					

Physical Soil Properties– Tarrant County, Texas														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct					
47—Medlin clay, 5 to 15 percent slopes														
Medlin	0-9	—	—	40-60	1.30-1.55	0.01-0.42	0.10-0.15	6.0-8.9	1.0-3.0	.32	.32	4	4	86
	9-33	—	—	40-60	1.30-1.55	0.01-0.42	0.10-0.15	6.0-8.9	0.3-1.0	.32	.32			
	33-67	—	—	40-60	1.35-1.60	0.01-0.42	0.08-0.12	6.0-8.9	0.2-0.5	.32	.32			
66—Sanger clay, 3 to 5 percent slopes														
Sanger	0-16	—	—	40-60	1.40-1.55	0.01-0.42	0.12-0.18	6.0-8.9	1.0-3.0	.32	.32	4	4	86
	16-46	—	—	40-60	1.40-1.55	0.01-0.42	0.12-0.18	6.0-8.9	0.5-2.0	.32	.32			
	46-63	—	—	40-60	1.40-1.55	0.01-0.42	0.12-0.18	6.0-8.9	0.1-1.0	.32	.32			
	63-80	—	—	40-60	1.40-1.60	0.01-0.42	0.12-0.18	6.0-8.9	0.1-1.0	.32	.32			
74—Slidell clay, 1 to 3 percent slopes														
Slidell	0-22	—	—	40-60	1.25-1.55	0.01-0.42	0.15-0.18	6.0-8.9	1.0-4.0	.32	.32	5	4	86
	22-80	—	—	40-60	1.25-1.55	0.01-0.42	0.15-0.18	6.0-8.9	1.0-3.0	.32	.32			

Data Source Information

Soil Survey Area: Tarrant County, Texas
Survey Area Data: Version 5, Jan 2, 2007

Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

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

Potential for 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, saturated hydraulic conductivity (Ksat), 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 to pavements and other rigid structures.

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

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

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

Report—Soil Features

Soil Features– Tarrant County, Texas									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
1—Aledo gravelly clay loam, 1 to 8 percent slopes									
Aledo	Lithic bedrock	8-20	—	Indurated	0	—	None	Moderate	Low
2—Aledo-Bolar complex, 5 to 20 percent slopes									
Aledo	Lithic bedrock	8-20	—	Indurated	0	—	None	Moderate	Low
Bolar	Lithic bedrock	20-40	—	Indurated	0	—	None	High	Low
Unnamed, minor components		—	—		—	—			
15—Bolar clay loam, 3 to 5 percent slopes									
Bolar	Lithic bedrock	20-40	—	Indurated	0	—	None	High	Low
47—Medlin clay, 5 to 15 percent slopes									
Medlin		—	—		0	—	None	High	Low
66—Sanger clay, 3 to 5 percent slopes									
Sanger		—	—		0	—	None	High	Low
74—Slidell clay, 1 to 3 percent slopes									
Slidell		—	—		0	—	None	Moderate	Low

Data Source Information

Soil Survey Area: Tarrant County, Texas
Survey Area Data: Version 5, Jan 2, 2007