

The following 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.

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, 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 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.

SOIL FEATURES--Continued
Anderson County, Kansas

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
001CA: Catoosa-----	20-40	In Bedrock (lithic)	In ---	Indurated	---	Moderate	Moderate
001CB: Catoosa-----	20-40	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
Rock Outcrop----	---	---	---	---	None	---	---
001CC: Collinsville----	4-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
001EC: Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
031EB: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
031EC: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
031EP: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Apperson-----	40-60	Bedrock (lithic)	---	Indurated	---	High	Low
031ER: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Collinsville----	4-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
031LU: Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
059CM: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
059DN: Dennis-----	---	---	---	---	---	High	Moderate
Bates-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	Low	Moderate
059EA: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
059EC: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
059LN: Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
Rock Outcrop----	---	---	---	---	None	---	---
059OV: Osage-----	---	---	---	---	---	High	Moderate
602CM: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Rock Outcrop----	---	---	---	---	None	---	---
602EF: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
602LB: Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---
BOP: Borrow Pits----	---	---	---	---	---	---	---
Cb: Catoosa-----	20-40	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
Cc: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Rock Outcrop----	---	---	---	---	---	---	---
Cd: Collinsville----	4-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
Bates-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	Low	Moderate
Db: Dennis-----	40-60	Bedrock (paralithic)	---	Moderately cemented	---	High	Moderate
De: Dennis, eroded--	40-60	Bedrock (paralithic)	---	Moderately cemented	---	High	Moderate
Eb: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
Ec:		In	In				
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Ed:							
Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Eh:							
Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Ek:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Eo:							
Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Gullied Land----	---	---	---	---	---	---	---
Ep:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Talihina-----	10-20	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Ev:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Verdigris-----	---	---	---	---	---	Low	Low
GRP:							
Gravel Pits-----	---	---	---	---	---	---	---
Kb:							
Kenoma-----	---	---	---	---	---	High	Moderate
Kd:							
Kenoma, eroded--	---	---	---	---	---	High	Moderate
Kh:							
Kenoma-----	---	---	---	---	---	High	Moderate
Olpe-----	---	---	---	---	---	High	Moderate
La:							
Lanton-----	---	---	---	---	None	High	Moderate
Le:							
Leanna, drained-	---	---	---	---	---	High	Moderate
Lh:							
Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
LIQ:							
Limestone Quarry	---	---	---	---	---	---	---
Me:							
Mason-----	---	---	---	---	---	Moderate	Moderate
Mf:							
Mayes-----	---	---	---	---	---	High	Moderate
Ok:							
Okemah-----	---	---	---	---	---	High	Moderate
Op:							
Olpe-----	---	---	---	---	---	High	Moderate
Os:							
Osage-----	---	---	---	---	---	High	Moderate
Se:							
Stony Land-----	---	---	---	---	---	---	---
Talihina-----	10-20	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Sf:							
Summit-----	---	---	---	---	---	High	Low
Sh:							
Summit-----	---	---	---	---	---	High	Low
Sk:							
Summit, eroded--	---	---	---	---	---	High	Low
So:							
Summit, eroded--	---	---	---	---	---	High	Low
Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
VC:							
Verdigris-----	---	---	---	---	---	Low	Low
Vf:							
Verdigris-----	---	---	---	---	---	Low	Low
Vx:							
Verdigris-----	---	---	---	---	---	Low	Low
W:							
Water-----	---	---	---	---	Low	---	---
Wb:							
Welda-----	---	---	---	---	Moderate	Moderate	Moderate
Wc:							
Welda-----	---	---	---	---	Moderate	Moderate	Moderate
Wd:							
Woodson-----	---	---	---	---	Low	High	Moderate
Wf:							
Woodson-----	---	---	---	---	Low	High	Moderate
Wh:							
Woodson, eroded-	---	---	---	---	Low	High	Moderate

