

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
Morris County, Kansas

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top In	Thickness In	Hardness		Uncoated Steel	Concrete
017IN:							
Irwin, eroded---	---	---	---	---	Moderate	High	Low
017IS:							
Irwin, eroded---	---	---	---	---	Moderate	High	Low
017RA:							
Reading-----	---	---	---	---	High	Moderate	Low
017TU:							
Tully-----	---	---	---	---	Moderate	High	Low
041HA:							
Hobbs-----	---	---	---	---	Moderate	Low	Low
041HB:							
Hobbs-----	---	---	---	---	Moderate	Low	Low
061BE:							
Benfield-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Low	High	Low
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Low	Moderate	Low
061CF:							
Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Low	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Low
061ID:							
Irwin-----	---	---	---	---	Moderate	High	Low
061KB:							
Kahola-----	---	---	---	---	Moderate	Low	Low
061KO:							
Konza-----	---	---	---	---	Moderate	High	Moderate
061RA:							
Reading-----	---	---	---	---	Moderate	Moderate	Low
061TN:							
Tully-----	---	---	---	---	Low	High	Low
111RA:							
Reading-----	---	---	---	---	High	Moderate	Low
115CS:							
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
115LA:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
197CE:							
Chase-----	---	---	---	---	High	High	Low
197FL:							
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
197IX:							
Ivan-----	---	---	---	---	Moderate	Low	Low
197RE:							
Reading-----	---	---	---	---	High	Moderate	Low
AED:							
Arents, Earthen Dam-----	---	---	---	---	---	---	---
Ar:							
Ivan, channeled-	---	---	---	---	Moderate	Low	Low
BOA:							
Borrow Pits----	---	---	---	---	---	---	---
Ch:							
Chase-----	---	---	---	---	High	High	Low
Cs:							
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Dh:							
Dwight-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
Fc:							
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Fe:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Ic:							
Irwin-----	---	---	---	---	Moderate	High	Low
Id:							
Irwin-----	---	---	---	---	Moderate	High	Low
Ie:							
Irwin-----	---	---	---	---	Moderate	High	Low
In:							
Irwin, eroded---	---	---	---	---	Moderate	High	Low
Io:							
Irwin, eroded---	---	---	---	---	Moderate	High	Low
Iv:							
Ivan-----	---	---	---	---	Moderate	Low	Low
Kennebec-----	---	---	---	---	High	Moderate	Low
IVV:							
Ivan-----	---	---	---	---	Moderate	Low	Low
Ks:							
Kipson-----	7-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Low
Sogn-----	4-20	Bedrock (lithic)	---	---	Moderate	Low	Low

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
Lb:		In	In				
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Ld:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Dwight-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
Le:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	---	Moderate	Low	Low
Ls:							
Ladysmith-----	---	---	---	---	Moderate	High	Low
Lt:							
Ladysmith, eroded-----	---	---	---	---	Moderate	High	Low
M-W:							
Miscellaneous Water-----	---	---	---	---	---	---	---
Mr:							
Mason-----	---	---	---	---	---	Moderate	Moderate
Reading-----	---	---	---	---	High	Moderate	Low
Os:							
Osage-----	---	---	---	---	---	High	Moderate
QUA:							
Quarries-----	---	---	---	---	---	---	---
Rd:							
Reading-----	---	---	---	---	High	Moderate	Low
Sm:							
Smolan-----	---	---	---	---	Moderate	Moderate	Low
Sn:							
Smolan, eroded--	---	---	---	---	Moderate	Moderate	Low
Ts:							
Tully-----	---	---	---	---	Moderate	High	Low
Tt:							
Tully, eroded---	---	---	---	---	Moderate	High	Low
Ty:							
Tully, cherty---	---	---	---	---	Moderate	High	Low
Tully-----	---	---	---	---	Moderate	High	Low
W:							
Water-----	---	---	---	---	---	---	---

