

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.

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
027CT: Crete-----	---	---	---	---	Moderate	Moderate	Low
027EU: Eudora-----	---	---	---	---	High	Low	Low
027HE: Haynie-----	---	---	---	---	High	Low	Low
Sarpy-----	---	---	---	---	Low	Low	Low
027HN: Hobbs-----	---	---	---	---	Moderate	Low	Low
089ND: Nibson-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Low	Low	Low
123AB: Armo-----	---	---	---	---	Low	Low	Low
123AC: Armo-----	---	---	---	---	Low	Low	Low
123HB: Harney-----	---	---	---	---	Low	High	Low
123HE: Harney-----	---	---	---	---	Low	High	Low
Mento-----	40-70	Bedrock (lithic)	---	Strongly cemented	Low	High	Low
123LA: Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Armo-----	---	---	---	---	Low	Low	Low
123NA: New Cambria-----	---	---	---	---	Low	High	Low
123NC: Nibson-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Low	Low	Low
123RB: Roxbury-----	---	---	---	---	Moderate	Low	Low
123RC: Roxbury-----	---	---	---	---	Moderate	Low	Low
123WA: Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
143EE: Edalgo-----	20-40	Bedrock (paralithic)	---	---	Moderate	Moderate	Low
Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Moderate
143GE: Geary-----	---	---	---	---	Low	Low	Low
143HE: Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Moderate
Rock Outcrop----	---	---	---	---	None	---	---
143HP: Hobbs-----	---	---	---	---	Moderate	Low	Low
Geary-----	---	---	---	---	High	Low	Low
143LA: Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
143RO: Roxbury-----	---	---	---	---	Moderate	Low	Low
157BK: Geary-----	---	---	---	---	High	Low	Low
Hobbs-----	---	---	---	---	Moderate	Low	Low
157CH: Crete-----	---	---	---	---	Moderate	Moderate	Low
157ED: Eudora-----	---	---	---	---	High	Low	Low
157KN: Kenesaw-----	---	---	---	---	Moderate	Moderate	Low
157SD: Inavale-----	---	---	---	---	Low	Moderate	Low
201CG: Cass-----	---	---	---	---	Moderate	Moderate	Low
201CS: Crete-----	---	---	---	---	Moderate	Moderate	Low
201SA: Sarpy-----	---	---	---	---	Low	Low	Low
Aa: Hobbs-----	---	---	---	---	Low	Low	Low
Ah: Saltine-----	---	---	---	---	High	High	High
Ar: Armo-----	---	---	---	---	Low	Low	Low
Ba: Hastings-----	---	---	---	---	Moderate	Moderate	Low
Hobbs-----	---	---	---	---	Low	Low	Low
Br: Bridgeport-----	---	---	---	---	Moderate	Low	Low
Ca: Cozad-----	---	---	---	---	Low	Low	Low
Cass-----	---	---	---	---	Low	Moderate	Low
Cb: Cass-----	---	---	---	---	Low	Moderate	Low

SOIL FEATURES--Continued  
Cloud 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
		In	In				
Cf:							
Munjor-----	---	---	---	---	Low	Moderate	Low
Inavale-----	---	---	---	---	Low	Moderate	Low
CLP:							
Clay Pits-----	---	---	---	---	---	---	---
Cr:							
Crete-----	---	---	---	---	Moderate	Moderate	Low
Cs:							
Crete-----	---	---	---	---	Moderate	Moderate	Low
Ct:							
Crete-----	---	---	---	---	Moderate	Moderate	Low
Cu:							
Crete-----	---	---	---	---	Moderate	Moderate	Low
De:							
Detroit-----	---	---	---	---	Moderate	High	Low
Eu:							
Eudora-----	---	---	---	---	High	Low	Low
Ge:							
Geary-----	---	---	---	---	High	Low	Low
GRP:							
Gravel Pits-----	---	---	---	---	Low	---	---
Gs:							
Geary-----	---	---	---	---	Moderate	Low	Low
Hb:							
Hastings-----	---	---	---	---	Moderate	Moderate	Low
Hc:							
Hastings-----	---	---	---	---	Moderate	Moderate	Low
Hd:							
Hastings-----	---	---	---	---	Moderate	Moderate	Low
He:							
Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Low	Low	Moderate
Ho:							
Hobbs-----	---	---	---	---	Low	Low	Low
Hr:							
Hord-----	---	---	---	---	Moderate	High	Low
Hu:							
Humbarger-----	---	---	---	---	Moderate	Low	Low
Kp:							
Kipson-----	7-20	Bedrock (paralithic)	---	---	Moderate	Low	Low
Lh:							
Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Low	Low	Moderate
Lm:							
Longford-----	---	---	---	---	Moderate	High	Low
Ln:							
Longford-----	---	---	---	---	Moderate	High	Low
Lo:							
Longford-----	---	---	---	---	Moderate	High	Low
M-W:							
Miscellaneous Water-----	---	---	---	---	---	---	---
Mc:							
Mccook-----	---	---	---	---	Moderate	Low	Low
Mr:							
Muir-----	---	---	---	---	Moderate	Low	Moderate
Nc:							
New Cambria-----	---	---	---	---	Moderate	High	Low
Nu:							
Nuckolls-----	---	---	---	---	Low	High	Low
Nx:							
Nuckolls-----	---	---	---	---	Low	High	Low
QUA:							
Quarries-----	---	---	---	---	---	---	---
Rx:							
Roxbury-----	---	---	---	---	Moderate	Low	Low
Sa:							
Inavale-----	---	---	---	---	Low	Moderate	Low
SAP:							
Sand Pits-----	---	---	---	---	---	---	---
Sd:							
Inavale-----	---	---	---	---	Low	Moderate	Low
St:							
Sutphen-----	---	---	---	---	Moderate	High	Low
To:							
Tobin-----	---	---	---	---	Moderate	Low	Low
W:							
Water-----	---	---	---	---	---	---	---
Wa:							
Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low

