

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	Thickness	Hardness		Uncoated Steel	Concrete
		In	In				
085MA:							
Martin-----	---	---	---	---	High	High	Low
117SA:							
Shelby-----	---	---	---	---	Moderate	Moderate	Moderate
117SC:							
Steinauer-----	---	---	---	---	Moderate	High	Low
Shelby-----	---	---	---	---	Moderate	Moderate	Moderate
131BS:							
Burchard-----	---	---	---	---	Moderate	Moderate	Low
Steinauer-----	---	---	---	---	Moderate	High	Low
131CH:							
Chase-----	---	---	---	---	High	High	Low
177KS:							
Kipson-----	7-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
177MC:							
Martin-----	---	---	---	---	High	High	Low
197SA:							
Sarpy-----	---	---	---	---	Low	Low	Low
197SC:							
Sarpy-----	---	---	---	---	Low	Low	Low
Haynie-----	---	---	---	---	High	Low	Low
600AD:							
Ivan-----	---	---	---	---	Moderate	Low	Low
600CA:							
Carr-----	---	---	---	---	Low	Low	Low
Sarpy-----	---	---	---	---	Low	Low	Low
600SA:							
Sarpy-----	---	---	---	---	Low	Low	Low
AED:							
Arents, Earthen Dam-----	---	---	---	---	---	---	---
Bd:							
Benfield-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Bf:							
Benfield-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Ce:							
Chase-----	---	---	---	---	High	High	Low
Cm:							
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Cs:							
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Em:							
Elmont-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
Eo:							
Elmont, eroded--	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
Eu:							
Eudora-----	---	---	---	---	High	Low	Low
Ex:							
Eudora-----	---	---	---	---	High	Low	Low
Kimo-----	---	---	---	---	High	High	Low
Gm:							
Gymer-----	---	---	---	---	Moderate	Moderate	Moderate
Hn:							
Haynie-----	---	---	---	---	High	Low	Low
Hs:							
Haynie-----	---	---	---	---	High	Low	Low
Sarpy-----	---	---	---	---	Low	Low	Low
Kc:							
Kennebec-----	---	---	---	---	High	Moderate	Low
Kf:							
Kennebec-----	---	---	---	---	High	Moderate	Low
Km:							
Kimo-----	---	---	---	---	High	High	Low
M-W:							
Miscellaneous Water-----	---	---	---	---	---	---	---
Mm:							
Monona-----	---	---	---	---	High	Low	Low
Mo:							
Morrill-----	---	---	---	---	Moderate	Moderate	Moderate
Mr:							
Morrill, eroded--	---	---	---	---	Moderate	Moderate	Moderate
Mt:							
Morrill-----	---	---	---	---	Moderate	Moderate	Moderate
Mu:							
Muir-----	---	---	---	---	Moderate	Low	Moderate

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
Op: Ortello-----	---	---	---	---	Moderate	Moderate	Low
Ot: Ortello-----	---	---	---	---	Moderate	Moderate	Low
Pe: Pawnee-----	---	---	---	---	High	High	Low
Pn: Pawnee-----	---	---	---	---	High	High	Low
Po: Pawnee, sev er--	---	---	---	---	High	High	Low
Ps: Paxico-----	---	---	---	---	High	High	Low
Pt: Pits, Quarries--	---	---	---	---	---	---	---
Re: Reading-----	---	---	---	---	High	Moderate	Low
Sf: Sarpy-----	---	---	---	---	Low	Low	Low
Sg: Sharpsburg-----	---	---	---	---	High	Moderate	Moderate
Th: Thurman-----	---	---	---	---	Low	Low	Low
Tu: Tully-----	---	---	---	---	Moderate	High	Low
Tx: Tully, eroded---	---	---	---	---	Moderate	High	Low
Tz: Tuttle-----	40-60	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
W: Water-----	---	---	---	---	Low	---	---
Wb: Wabash-----	---	---	---	---	Moderate	High	Moderate
Wd: Wamego-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	Moderate	Moderate
We: Wamego-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	Moderate	Moderate
Wg: Wann-----	---	---	---	---	High	Moderate	Low
Wk: Wymore-----	---	---	---	---	High	High	Moderate
Wm: Wymore-----	---	---	---	---	High	High	Moderate
Wn: Wymore-----	---	---	---	---	High	High	Moderate
Ws: Wymore Variant--	---	---	---	---	Moderate	High	Moderate
Zo: Zook-----	---	---	---	---	High	High	Moderate

