

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
005PD: Pawnee, eroded--	---	---	---	---	High	High	Low
005SS: Shelby, eroded--	---	---	---	---	Moderate	Moderate	Moderate
Steinauer-----	---	---	---	---	Moderate	High	Low
005VS: Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
013BS: Burchard-----	---	---	---	---	Moderate	Moderate	Low
013BX: Burchard-----	---	---	---	---	Moderate	Moderate	Low
Steinauer-----	---	---	---	---	Moderate	Moderate	Low
013MF: Martin-----	---	---	---	---	High	High	Low
013MY: Muscotah-----	---	---	---	---	Moderate	High	Low
013PN: Pawnee-----	---	---	---	---	High	High	Low
013PO: Pawnee-----	---	---	---	---	High	High	Low
013WE: Wamego-----	20-40	Bedrock (paralithic)	---	Noncemented	Moderate	Moderate	Moderate
013WG: Wamego-----	20-40	Bedrock (paralithic)	---	Noncemented	Moderate	Moderate	Moderate
Vinland-----	10-20	Bedrock (paralithic)	---	Noncemented	Moderate	Low	Moderate
013WN: Wymore-----	---	---	---	---	High	High	Moderate
087MO: Martin-----	---	---	---	---	High	High	Low
Oska-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Moderate
087SS: Sibleyville----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
087SW: Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
087VC: Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
087VO: Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
131BS: Burchard-----	---	---	---	---	Moderate	Moderate	Low
Steinauer-----	---	---	---	---	Moderate	High	Low
131OM: Olmitz-----	---	---	---	---	Moderate	Moderate	Moderate
131ST: Steinauer-----	---	---	---	---	Moderate	High	Low
149CE: Chase-----	---	---	---	---	High	High	Low
149CS: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
149MO: Morrill-----	---	---	---	---	Moderate	Moderate	Moderate
177EL: Elmont-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
177KS: Kipson-----	7-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
177LM: Ladysmith-----	---	---	---	---	Moderate	High	Low
177MF: Martin-----	---	---	---	---	High	High	Low
177MM: Morrill-----	---	---	---	---	Moderate	Moderate	Moderate
177SK: Shelby-----	---	---	---	---	Moderate	Moderate	Moderate
177ST: Sibleyville----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
177SV: Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
Ba:		In	In				
Burchard-----	---	---	---	---	Moderate	Moderate	Low
Shelby-----	---	---	---	---	Moderate	Moderate	Moderate
Bb:							
Burchard, eroded	---	---	---	---	Moderate	Moderate	Low
Shelby, eroded--	---	---	---	---	Moderate	Moderate	Moderate
Bc:							
Burchard-----	---	---	---	---	Moderate	Moderate	Low
Shelby-----	---	---	---	---	Moderate	Moderate	Moderate
Ca:							
Chase-----	---	---	---	---	High	High	Low
Cb:							
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Ka:							
Kennebec-----	---	---	---	---	High	Moderate	Low
Kb:							
Kennebec-----	---	---	---	---	High	Moderate	Low
Kc:							
Kennebec-----	---	---	---	---	High	Moderate	Low
KD:							
Kennebec-----	---	---	---	---	High	Moderate	Low
Ma:							
Martin-----	---	---	---	---	High	High	Low
MAA:							
Martin-----	---	---	---	---	High	High	Low
Mb:							
Martin, eroded--	---	---	---	---	High	High	Low
Mc:							
Martin-----	---	---	---	---	High	High	Low
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	High Low	Low Moderate
Oa:							
Olmitz-----	---	---	---	---	Moderate	Moderate	Moderate
Pa:							
Pawnee-----	---	---	---	---	High	High	Low
Pb:							
Pawnee-----	---	---	---	---	High	High	Low
Pc:							
Pawnee, eroded--	---	---	---	---	High	High	Low
Pt:							
Pits, Quarries--	---	---	---	---	---	---	---
Ra:							
Reading-----	---	---	---	---	High	Moderate	Low
RE:							
Reading-----	---	---	---	---	High	Moderate	Low
Sa:							
Shelby-----	---	---	---	---	Moderate	Moderate	Moderate
Sb:							
Shelby, eroded--	---	---	---	---	Moderate	Moderate	Moderate
Va:							
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
Vb:							
Vinland-----	10-20	Bedrock (paralithic)	---	---	Moderate	Low	Moderate
Rock Outcrop----	---	---	---	---	None	---	---
Vc:							
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
W:							
Water-----	---	---	---	---	Low	---	---
Wa:							
Wabash-----	---	---	---	---	High	High	Moderate
WAA:							
Wabash-----	---	---	---	---	High	High	Moderate
Wb:							
Wymore-----	---	---	---	---	High	High	Moderate
Wc:							
Wymore, eroded--	---	---	---	---	High	High	Moderate
Za:							
Zook-----	---	---	---	---	High	High	Moderate

