

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				
045KC: Kennebec-----	---	---	---	---	High	Moderate	Low
045MO: Martin-----	---	---	---	---	High	High	Low
Oska-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Moderate
045OE: Oska-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Moderate
045SW: Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
045SX: Rock Outcrop----	0-0	Bedrock (lithic)	---	---	---	---	---
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
045VM: Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
Martin-----	---	---	---	---	High	High	Low
045WS: Woodson-----	---	---	---	---	High	High	Moderate
059CM: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	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
111CA: Chase-----	---	---	---	---	High	High	Low
111EA: Elmont-----	40-60	Bedrock (paralithic)	---	---	High	Moderate	Low
111EF: Eram-----	20-40	Bedrock (paralithic)	---	---	None	High	Moderate
Bates-----	20-40	Bedrock (paralithic)	---	---	---	Low	Moderate
177AN: Kennebec-----	---	---	---	---	High	Moderate	Low
177BK: Martin-----	---	---	---	---	High	High	Low
Kennebec-----	---	---	---	---	High	Moderate	Low
177BR: Fluvents-----	---	---	---	---	---	---	---
177DM: Dwight-----	---	---	---	---	Moderate	High	Moderate
Martin-----	---	---	---	---	High	High	Low
177DW: Dwight-----	---	---	---	---	Moderate	High	Moderate
177EN: Elmont-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
177LB: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
177LC: Labette, eroded-	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
177LD: Ladysmith-----	---	---	---	---	Moderate	High	Low
177LM: Ladysmith-----	---	---	---	---	Moderate	High	Low
177LS: Ladysmith, eroded-----	---	---	---	---	Moderate	High	Low
177MF: Martin-----	---	---	---	---	High	High	Low
177RE: Reading-----	---	---	---	---	High	Moderate	Low
177SU: 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
177SW: Stony Steep Land Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
197CE: Chase-----	---	---	---	---	High	High	Low

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
197CS: Clime-----	20-40	In Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
197IB: Irwin-----	---	---	---	---	Moderate	High	Low
197WE: Wamego-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	Moderate	Moderate
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---
Bd: Bates-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	Low	Moderate
Cm: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Cs: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
Dn: Dennis-----	---	---	---	---	---	High	Moderate
Ds: Dwight-----	---	---	---	---	Moderate	High	Moderate
Ed: Elmont-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
EL: Elmont-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
En: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Er: Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
INT: Aguolls-----	---	---	---	---	Moderate	---	---
KB: Kennebec-----	---	---	---	---	High	Moderate	Low
Ke: Kenoma-----	40-60	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
LA: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Ln: Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
Rock Outcrop----	---	---	---	---	None	---	---
Ls: Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
Summit-----	---	---	---	---	---	High	Low
LU: Lula-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
M-W: Miscellaneous Water-----	---	---	---	---	---	---	---
MA: Martin-----	---	---	---	---	High	High	Low
Mb: Mason-----	---	---	---	---	---	Moderate	Moderate
Oe: Olpe-----	---	---	---	---	---	High	Moderate
Kenoma-----	---	---	---	---	---	High	Moderate
Op: Arents-----	---	---	---	---	Moderate	High	High
Os: Osage-----	---	---	---	---	---	High	Moderate
Ov: Osage-----	---	---	---	---	---	High	Moderate
Ow: Osage-----	---	---	---	---	---	High	Moderate
Pt: Pits, Quarries--	---	---	---	---	---	---	---
SI: Sibleyville----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Sn: Summit-----	---	---	---	---	---	High	Low
So: Summit-----	---	---	---	---	---	High	Low
Vb: Verdigris-----	---	---	---	---	---	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
Vc: Verdigris-----	---	In	In	---	---	Low	Low
W: Water-----	---	---	---	---	Low	---	---
Wo: Woodson-----	---	---	---	---	High	High	Moderate

