

## Engineering Interpretations

### ***Building Site Development***

Soil properties influence development of building sites, including the selection of the site, the design of the structure, construction, post construction performance, and maintenance. Soil limitation ratings of slight, moderate, and severe are given for shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns, landscaping, and golf fairways.

#### ***Shallow Excavations***

Shallow excavations are trenches or holes dug in the soil to a maximum depth of 5 or 6 feet. They are used for pipelines, sewer lines, telephone and power transmission lines, basements, open ditches, and cemeteries. The ratings are based on the soil properties that influence ease of digging and resistance to sloughing.

#### ***Dwellings With or Without Basements***

These are single-family houses of three stories or less. The foundation is assumed to be spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or the depth of maximum frost penetration, whichever is deeper, for houses without basements, or at a depth of 7 feet if a basement is constructed. The ratings are based on properties affecting soil strength and settlement under a load, and those that affect excavation and construction costs.

#### ***Small Commercial Buildings***

Limitation ratings are given for the undisturbed soil on which small commercial buildings of less than three stories without basements are built. The foundation is assumed to be placed on spread footings of reinforced concrete at a depth of 2 feet or the depth of maximum frost penetration, whichever is deeper.

#### ***Local Roads and Streets***

Limitation ratings are given for the use of soils for construction of improved local roads and streets that have all-weather surfacing, commonly of asphalt, gravel with binder in it, or concrete, and that are expected to carry automobile traffic all year. These roads and streets are graded to shed water, and conventional drainage measures are provided. With the probable exception of the hard surface, roads and streets are built mainly from the soil at hand.

#### ***Lawns, Landscaping, and Golf Fairways***

The soils are rated for their use in establishing and maintaining turf for lawns and golf fairways and ornamental trees and shrubs for residential type landscaping. The ratings are based on the use of soil material at the location with some land smoothing. Irrigation may or may not be needed and is not a criterion in rating. Traps, trees, roughs, and greens are not considered as part of the golf fairway. The properties considered are those listed that affect plant growth and trafficability after vegetation is established.

*This subsection includes:*

- **(a) Building Site Development**

Bates County, Missouri: Detailed Soil Map Legend

Building Site Development

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
10: Verdigris-----	Very limited ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00	Not Rated Not Rated ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00
11: Verdigris-----	Very limited ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00	Not Rated Not Rated ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00
13: Okemah-----	Very limited ~shrink-swell (very limited) ~wetness (moderately limited)	1.00 0.45	Very limited ~shrink-swell (very limited) ~wetness (very limited)	1.00 1.00	Very limited ~shrink-swell (very limited)	1.00	Not Rated Not Rated ~shrink-swell (very limited)	1.00	Not limited	
14: Osage-----	Very limited ~wetness (very limited) ~shrink-swell (very limited) ~flooding (very limited)	1.00 1.00 1.00	Very limited ~shrink-swell (very limited) ~flooding (very limited) ~wetness (very limited)	1.00 1.00 1.00	Very limited ~flooding (very limited) ~shrink-swell (very limited) ~wetness (very limited)	1.00 1.00 1.00	Not Rated Not Rated ~wetness (very limited) ~shrink-swell (very limited)	1.00 1.00 1.00	Very limited ~wetness (very limited) ~flooding (very limited) ~too clayey (moderately limited)	1.00 1.00 0.60
21: Osage-----	Very limited ~wetness (very limited) ~shrink-swell (very limited) ~flooding (very limited)	1.00 1.00 1.00	Very limited ~shrink-swell (very limited) ~flooding (very limited) ~wetness (very limited)	1.00 1.00 1.00	Very limited ~flooding (very limited) ~shrink-swell (very limited) ~wetness (very limited)	1.00 1.00 1.00	Not Rated Not Rated ~wetness (very limited) ~shrink-swell (very limited)	1.00 1.00 1.00	Very limited ~wetness (very limited) ~flooding (very limited) ~too clayey (very limited)	1.00 1.00 1.00

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
51B2: Deepwater-----	Moderately limited ~shrink-swell (moderately limited)	0.45	Limited ~wetness (limited)	0.73	Moderately limited ~shrink-swell (moderately limited)	0.45	Not Rated Not Rated		Not limited	
	~wetness (slightly limited)	0.08	~shrink-swell (moderately limited)	0.39	~slope (slightly limited)	0.15	~shrink-swell (moderately limited)	0.45		
52: Hepler-----	Very limited ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00	Very limited ~flooding (very limited)	1.00	Not Rated Not Rated		Moderately limited ~flooding (moderately limited)	0.60
	~wetness (moderately limited)	0.59	~wetness (very limited)	1.00	~shrink-swell (moderately limited)	0.45	~flooding (very limited)	1.00	~wetness (slightly limited)	0.28
	~shrink-swell (moderately limited)	0.45	~shrink-swell (slightly limited)	0.29	~wetness (slightly limited)	0.28	~shrink-swell (moderately limited)	0.45		
53: Hepler-----	Moderately limited ~wetness (moderately limited)	0.59	Very limited ~wetness (very limited)	1.00	Moderately limited ~shrink-swell (moderately limited)	0.45	Not Rated Not Rated		Slightly limited ~wetness (slightly limited)	0.28
	~shrink-swell (moderately limited)	0.45	~shrink-swell (slightly limited)	0.30	~wetness (slightly limited)	0.28	~shrink-swell (moderately limited)	0.45		
							~wetness (slightly limited)	0.28		
54B: Newtonia-----	Moderately limited ~shrink-swell (moderately limited)	0.45	Moderately limited ~shrink-swell (moderately limited)	0.36	Moderately limited ~shrink-swell (moderately limited)	0.45	Not Rated Not Rated		Not limited	
					~slope (slightly limited)	0.15	~shrink-swell (moderately limited)	0.45		

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
55B: Catoosa-----	Moderately limited ~shrink-swell (moderately limited) ~depth to bedrock (moderately limited)	0.45  0.32	Very limited ~hard bedrock <40" (very limited) ~shrink-swell (slightly limited)	1.00  0.18	Moderately limited ~shrink-swell (moderately limited) ~depth to bedrock (moderately limited) ~slope (slightly limited)	0.45  0.32 0.15	Not Rated Not Rated ~shrink-swell (moderately limited) ~depth to bedrock (moderately limited)	0.45  0.45 0.32	Slightly limited ~depth to bedrock (slightly limited)	0.17
56B: Bates-----	Not limited		Slightly limited ~soft bedrock <40" (slightly limited)	0.00	Slightly limited ~slope (slightly limited)	0.15	Not Rated Not Rated		Slightly limited ~depth to bedrock (slightly limited)	0.03
56C2: Bates-----	Not limited		Slightly limited ~soft bedrock <40" (slightly limited)	0.20	Limited ~slope (limited)	0.68	Not Rated Not Rated		Slightly limited ~depth to bedrock (slightly limited)	0.21
58: Hartwell-----	Very limited ~shrink-swell (very limited) ~wetness (very limited)	1.00  1.00	Very limited ~wetness (very limited) ~shrink-swell (limited)	1.00  0.95	Very limited ~shrink-swell (very limited) ~wetness (limited)	1.00  0.99	Not Rated Not Rated ~shrink-swell (very limited) ~wetness (limited)	1.00  0.99	Limited ~wetness (limited)	0.99
60B: Kenoma-----	Very limited ~shrink-swell (very limited) ~wetness (very limited)	1.00  1.00	Very limited ~wetness (very limited) ~shrink-swell (very limited)	1.00  1.00	Very limited ~shrink-swell (very limited) ~wetness (limited)	1.00  0.99	Not Rated Not Rated ~shrink-swell (very limited) ~wetness (limited)	1.00  0.99	Limited ~wetness (limited)	0.99

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
61B: Summit-----	Very limited ~shrink-swell (very limited) ~wetness (moderately limited)	1.00  0.45	Very limited ~shrink-swell (very limited) ~wetness (very limited)	1.00  1.00	Very limited ~shrink-swell (very limited)	1.00	Not Rated Not Rated  ~shrink-swell (very limited)	1.00	Moderately limited ~too clayey (moderately limited)	0.60
61C2: Summit-----	Very limited ~shrink-swell (very limited) ~wetness (moderately limited) ~slope (slightly limited)	1.00  0.45  0.15	Very limited ~shrink-swell (very limited) ~wetness (very limited) ~slope (slightly limited)	1.00  1.00  0.15	Very limited ~shrink-swell (very limited) ~slope (limited)	1.00  0.83	Not Rated Not Rated  ~shrink-swell (very limited)	1.00	Moderately limited ~too clayey (moderately limited)	0.60
63B2: Eram-----	Very limited ~shrink-swell (very limited) ~wetness (limited)	1.00  0.99	Very limited ~wetness (very limited) ~shrink-swell (limited) ~soft bedrock <40" (slightly limited)	1.00  0.66  0.05	Very limited ~shrink-swell (very limited) ~wetness (limited) ~slope (slightly limited)	1.00  0.60  0.15	Not Rated Not Rated  ~shrink-swell (very limited) ~wetness (limited)	1.00  0.60	Limited ~wetness (limited) ~depth to bedrock (slightly limited)	0.60  0.12
63C: Eram-----	Very limited ~shrink-swell (very limited) ~wetness (limited) ~slope (slightly limited)	1.00  0.99  0.15	Very limited ~wetness (very limited) ~shrink-swell (limited) ~slope (slightly limited)	1.00  0.99  0.15	Very limited ~shrink-swell (very limited) ~slope (limited) ~wetness (limited)	1.00  0.83  0.60	Not Rated Not Rated  ~shrink-swell (very limited) ~wetness (limited)	1.00  0.60	Limited ~wetness (limited) ~depth to bedrock (slightly limited)	0.60  0.12

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
65B: Clareson-----	Moderately limited ~shrink-swell (moderately limited)	0.45	Very limited ~hard bedrock <40" (very limited)	1.00	Moderately limited ~shrink-swell (moderately limited)	0.45	Not Rated Not Rated		Limited ~droughty (limited)	0.68
	~depth to bedrock (moderately limited)	0.36	~shrink-swell (slightly limited)	0.17	~depth to bedrock (moderately limited)	0.36	~shrink-swell (moderately limited)	0.45	~depth to bedrock (slightly limited)	0.21
					~slope (slightly limited)	0.15	~depth to bedrock (moderately limited)	0.36		
66B: Olpe-----	Moderately limited ~shrink-swell (moderately limited)	0.45	Moderately limited ~shrink-swell (moderately limited)	0.43	Moderately limited ~shrink-swell (moderately limited)	0.45	Not Rated Not Rated		Very limited ~droughty (very limited)	1.00
					~slope (slightly limited)	0.15	~shrink-swell (moderately limited)	0.45	~small stones (moderately limited)	0.55
68D: Coweta-----	Not Rated Not Rated		Very limited ~soft bedrock <20" (very limited)	1.00	Very limited ~slope (very limited)	1.00	Not Rated Not Rated		Very limited ~shallow to bedrock (very limited)	1.00
	~soft bedrock <20" (limited)	0.80	~slope (moderately limited)	0.60	~soft bedrock <20" (limited)	0.80	~soft bedrock <20" (limited)	0.80	~droughty (very limited)	1.00
	~slope (moderately limited)	0.60					~slope (slightly limited)	0.16	~large stones (slightly limited)	0.19
72E: Balltown-----	Very limited ~large stones (very limited)	1.00	Very limited ~hard bedrock <40" (very limited)	1.00	Very limited ~large stones (very limited)	1.00	Not Rated Not Rated		Very limited ~large stones >30% (very limited)	1.00
	~depth to bedrock (limited)	0.99	~large stones (very limited)	1.00	~slope (very limited)	1.00	~large stones (very limited)	1.00	~droughty (very limited)	1.00
	~slope (limited)	0.83	~slope (limited)	0.83	~depth to bedrock (limited)	0.99	~depth to bedrock (limited)	0.99	~depth to bedrock (limited)	0.99

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73E:										
Eram-----	Very limited ~shrink-swell (very limited)	1.00	Very limited ~wetness (very limited)	1.00	Very limited ~shrink-swell (very limited)	1.00	Not Rated Not Rated		Limited ~wetness (limited)	0.60
	~wetness (limited)	0.99	~soft bedrock <40" (limited)	0.79	~slope (limited)	0.83	~shrink-swell (very limited)	1.00	~depth to bedrock (moderately limited)	0.53
	~slope (slightly limited)	0.15	~shrink-swell (limited)	0.65	~wetness (limited)	0.60	~wetness (limited)	0.60	~droughty (moderately limited)	0.33
Balltown-----	Very limited ~large stones (very limited)	1.00	Very limited ~hard bedrock <40" (very limited)	1.00	Very limited ~large stones (very limited)	1.00	Not Rated Not Rated		Very limited ~large stones >30% (very limited)	1.00
	~depth to bedrock (limited)	0.99	~large stones (very limited)	1.00	~slope (very limited)	1.00	~large stones (very limited)	1.00	~droughty (very limited)	1.00
	~slope (limited)	0.83	~slope (limited)	0.83	~depth to bedrock (limited)	0.99	~depth to bedrock (limited)	0.99	~depth to bedrock (limited)	0.99
94F:										
Kanima-----	Very limited ~slope (very limited)	1.00	Very limited ~slope (very limited)	1.00	Very limited ~slope (very limited)	1.00	Not Rated Not Rated		Very limited ~slope (very limited)	1.00
							~slope (very limited)	1.00	~too clayey (moderately limited)	0.60
									~droughty (moderately limited)	0.59
95B:										
Brazilton-----	Very limited ~shrink-swell (very limited)	1.00	Very limited ~shrink-swell (very limited)	1.00	Very limited ~shrink-swell (very limited)	1.00	Not Rated Not Rated		Not limited	
							~shrink-swell (very limited)	1.00		
96:										
Pits-----	Not rated		Not rated		Not rated		Not rated		Not rated	

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Map symbol and soil name	Dwellings without basements		Dwellings with basements		Small commercial buildings		Local roads and streets		Lawns and landscaping	
	Rating class and limiting features	Value								
M-W: Water-----	Not Rated									
	Not Rated		Not Rated				Not Rated		Not Rated	
W: Water-----	Not Rated									
	Not Rated		Not Rated				Not Rated		Not Rated	