ENGINEERING INDEX PROPERTIES
Minnehaha County, South Dakota

Engineering Index Properties table gives the engineering classifications and the range of index properties for the layers of each soil in the survey area. Depth to the upper and lower boundaries of each layer is indicated. Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. Loam, for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, gravelly. Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998). The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection. If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in Engineering Index Properties table.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AcA:												
Alcester--------	0-8	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	8-50	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	50-80	Silty clay loam	CL, ML	A-6, A-7	0	0	95-100	95-100	85-100	75-100	30-50	10-20
AcB:												
Alcester--------	0-8	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	8-50	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	90-100	35-50	10-25
	50-80	Silty clay loam	CL, ML	A-6, A-7	0	0	100	95-100	95-100	85-100	35-50	10-25
Ar:												
Arlo----------	0-10	Loam	CL, ML	A-6, A-7	0	0	100	95-100	85-100	60-85	35-50	10-25
	10-30	Loam		A-4, A-7, A-6	0	0	95-100	90-100	60-95	40-75	30-45	5-20
	30-80	Stratified very gravelly sand to loamy sand	SC, SM, CL, ML	A-2, A-1, A-3	0	0-5	60-100	40-95	35-65	5-35	15-35	NP-10
Ba:												
Baltic---------	0-7	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-50	15-25
	7-55	Silty clay	CH, MH	A-7	0	0	100	95-100	90-100	85-100	50-70	20-40
	55-80	Silty clay loam	CH, ML, CL, MH	A-7, A-6	0	0	100	95-100	80-100	65-95	35-70	15-35
Bb:												
Baltic---------	0-7	Silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	85-100	35-50	15-25
	7-38	Silty clay	MH, CH	A-7	0	0	100	95-100	90-100	85-100	50-70	20-40
	38-80	Silty clay loam	CL, CH, ML, MH	A-6, A-7	0	0	100	95-100	80-100	65-95	35-70	15-35
BcA:												
Benclare--------	0-8	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	85-100	45-60	20-35
	8-31	Silty clay	CH, MH, ML, CL	A-7	0	0	100	100	95-100	85-100	45-65	15-35
	31-42	Silty clay	CL, MH, CH, ML	A-7	0	0	100	100	95-100	85-100	45-65	15-35
	42-80	Clay	CL, CH	A-7	0	0	100	100	90-100	80-100	40-60	20-35
Corson---------	0-6	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-75	20-41
	6-16	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	16-49	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	49-80	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
BeE:												
Betts----------	0-5	Loam	CL	A-6	0-1	0-5	90-100	80-100	75-100	60-75	30-40	10-20
	5-26	Clay loam	CL	A-7, A-6	0-1	0-5	90-100	85-100	75-100	50-85	30-45	10-25
	26-80	Clay loam	CL	A-7, A-6	0-1	0-5	90-100	85-100	75-100	50-85	30-45	10-25
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
BfA:												
Blendon--------	0-12	Fine sandy loam	SM	A-4	0	0	100	90-100	60-100	35-50	20-30	NP-5
	12-28	Fine sandy loam	SC, CL, ML, SM	A-4, A-2	0	0	100	85-100	60-100	20-60	20-33	NP-10
	28-80	Loamy fine sand		A-4, A-2	0	0	85-100	75-100	50-100	10-45	15-30	NP-10
BhB:												
Blendon--------	0-12	Fine sandy loam	SM	A-4	0	0	100	90-100	60-100	35-50	20-30	NP-5
	12-28	Fine sandy loam	SM, SC, CL, ML	A-2, A-4	0	0	100	85-100	60-100	20-60	20-33	NP-10
	28-80	Loamy fine sand		A-2, A-4	0	0	85-100	75-100	50-100	10-45	15-30	NP-10
Henkin---------	0-9	Fine sandy loam	SM, SC, CL, ML	A-4	0	0-5	90-100	80-100	65-100	35-55	15-30	NP-10
	9-25	Fine sandy loam	SM, SC, CL, ML	A-4	0	0-5	90-100	80-100	65-100	35-60	15-30	NP-10
	25-46	Fine sandy loam	SM, SC, CL, ML	A-2, A-4	0	0-5	90-100	80-100	65-90	30-60	15-30	NP-10
	46-80	Stratified fine sand to clay loam	SC, SP-SM, SC-SM, SM	A-1, A-3, A-2, A-4	0	0-5	90-100	80-100	35-95	5-50	15-35	NP-10
Bo:												
Bon----------	0-39	Loam	CL, CL-ML	A-4, A-6	0	0	100	95-100	80-95	55-85	25-40	5-15
	39-80	Stratified loamy fine sand to silty clay loam		A-4, A-7, A-6	0	0	95-100	95-100	75-95	45-95	25-45	3-22
Cb:												
Chancellor-----	0-12	Silty clay loam	CH, ML, CL, MH	A-7, A-6	0	0	100	100	95-100	85-100	35-55	15-25
	12-31	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	31-80	Silty clay loam	MH, CL, ML, CH	A-6, A-7	0	0	100	100	85-100	70-100	35-55	15-25
Cc:												
Chancellor-----	0-12	Silty clay loam	CL, CH, ML, MH	A-6, A-7	0	0	100	100	95-100	85-100	35-55	15-25
	12-31	Silty clay	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	31-80	Silty clay loam	MH, ML, CL, CH	A-7, A-6	0	0	100	100	85-100	70-100	35-55	15-25
Tetonka--------	0-16	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	100	95-100	80-100	27-50	8-20
	16-20	Silt loam	CL	A-6, A-7	0	0	95-100	95-100	90-100	80-100	30-50	10-25
	20-45	Silty clay	ML, CH, MH, CL	A-7	0	0	95-100	95-100	85-100	65-100	40-70	15-35
	45-80	Silty clay	CH, CL	A-7, A-6	0	0	95-100	95-100	80-100	55-95	30-60	11-30

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Cd:												
Chaska---------	0-6	Loam	ML, CL	A-6, A-4	0	0	100	100	85-100	60-75	25-40	5-15
	6-17	Stratified loamy fine sand to silt loam	CL, CL-ML	A-6, A-4	0	0	100	100	85-95	60-75	20-40	5-15
	17-80	Stratified fine sand to silty clay loam	SM, ML	A-4	0	0	100	100	85-95	35-75	15-35	NP-7
Ch:												
Chaska---------	0-6	Loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-95	60-75	30-36	11-15
	6-17	Stratified loamy fine sand to silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-95	60-75	20-40	5-15
	17-80	Stratified fine sand to silty clay loam	SM, ML	A-4	0	0	100	100	85-95	35-75	15-35	NP-7
Cm:												
Clamo----------	0-8	Silty clay	CH, MH	A-7	0	0	100	95-100	95-100	85-100	50-75	25-40
	8-25	Silty clay	MH, CL, CH, ML	A-7	0	0	100	95-100	90-100	85-100	45-75	20-40
	25-60	Silty clay	CL, ML, CH, MH	A-7	0	0	100	95-100	90-100	85-100	45-75	20-40
	60-80	Silty clay loam	MH, CH, CL, ML	A-7	0	0	100	95-100	90-100	85-100	45-75	20-40
CoB:												
Corson---------	0-6	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-75	20-41
	6-16	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	16-49	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	49-80	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
CoC:												
Corson---------	0-6	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-75	20-41
	6-16	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	16-49	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	49-80	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
CpC:												
Corson---------	0-6	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-75	20-41
	6-16	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	16-49	Silty clay	MH, CH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
	49-80	Silty clay	CH, MH	A-7	0	0	100	100	95-100	90-100	50-80	20-45
Henkin---------	0-9	Fine sandy loam	SM, SC, CL, ML	A-4	0	0-5	90-100	80-100	65-100	35-55	15-30	NP-10
	9-25	Fine sandy loam	SM, SC, CL, ML	A-4	0	0-5	90-100	80-100	65-100	35-60	15-30	NP-10
	25-46	Fine sandy loam	SM, SC, CL, ML	A-2, A-4	0	0-5	90-100	80-100	65-90	30-60	15-30	NP-10
	46-80	Stratified fine sand to clay loam	SM, SC, SP-SM, SC-SM	A-1, A-3, A-2, A-4	0	0-5	90-100	80-100	35-95	5-50	15-35	NP-10
CrD:												
Crofton--------	0-6	Silt loam	CL, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-50	10-25
	6-80	Silt loam	CL	A-6, A-7	0	0	100	95-100	95-100	95-100	30-50	5-25
Nora----------	0-9	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	12-25
	9-22	Silty clay loam	ML, CL	A-6, A-7	0	0	95-100	95-100	95-100	85-100	35-50	11-20
	22-80	Silt loam	CL-ML, ML, CL	A-4, A-7, A-6	0	0	95-100	95-100	95-100	85-100	27-50	6-20
CrE:												
Crofton--------	0-6	Silt loam	CL, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-50	10-25
	6-80	Silt loam	CL	A-6, A-7	0	0	100	95-100	95-100	95-100	30-50	5-25
Nora----------	0-9	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	12-25
	9-22	Silty clay loam	ML, CL	A-6, A-7	0	0	95-100	95-100	95-100	85-100	35-50	11-20
	22-80	Silt loam	CL-ML, ML, CL	A-4, A-7, A-6	0	0	95-100	95-100	95-100	85-100	27-50	6-20
CsD:												
Crofton--------	0-6	Silt loam	CL, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-50	10-25
	6-80	Silt loam	CL	A-6, A-7	0	0	100	95-100	95-100	95-100	30-50	5-25
Shindler-------	0-8	Clay loam	ML, CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-80	35-45	10-20
	8-14	Clay loam	CL	A-6, A-7	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
	14-80	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
DcA:												
Davis----------	0-8	Loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	80-100	60-85	30-45	5-20
	8-47	Loam	CL, ML	A-6, A-4, A-7	0	0	100	90-100	80-100	60-85	30-45	5-20
	47-80	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	55-90	30-45	5-20
DcB:												
Davis----------	0-8	Loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	80-100	60-85	30-45	5-20
	8-47	Loam	CL, ML	A-6, A-4, A-7	0	0	100	90-100	80-100	60-85	30-45	5-20
	47-80	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	55-90	30-45	5-20
DcC:												
Davis----------	0-8	Loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	80-100	60-85	30-45	5-20
	8-47	Loam	CL, ML	A-6, A-4, A-7	0	0	100	90-100	80-100	60-85	30-45	5-20
	47-80	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	55-90	30-45	5-20

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Dd:												
Davison--------	0-8	Clay loam	CL	A-7, A-6	0	0	100	95-100	90-100	70-80	30-45	10-20
	8-41	Clay loam	CL, CL-ML, SC-SM, SC	A-6, A-4	0	0-5	95-100	95-100	85-100	45-80	25-40	5-20
	41-80	Clay loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	95-100	85-100	60-80	25-40	5-20
Crossplain-----	0-8	Clay loam	ML, CL	A-7, A-6	0	0	100	100	90-100	70-80	35-45	10-20
	8-24	Clay loam	CH, CL	A-7	0	0	100	95-100	90-100	70-90	40-55	15-30
	24-42	Clay loam	CL	A-7, A-6	0	0	95-100	95-100	85-100	60-80	30-45	10-25
	42-80	Clay loam	CL	A-6, A-7	---	0-5	95-100	95-100	85-100	60-80	30-45	10-25
DeA:												
Delmont--------	0-8	Loam			0	0	90-100	90-100	80-95	60-75	28-40	8-20
	8-15	Loam			0	0	80-100	70-100	50-100	35-70	20-40	5-18
	15-80	Gravelly sand			0	0-5	60-100	40-80	15-50	3-30	15-25	NP-5
Enet----------	0-7	Loam	ML, CL	A-4, A-6	0	0	100	100	85-95	55-80	30-40	5-15
	7-23	Loam	SM, CL, SC, ML	A-4, A-6	0	0	90-100	85-100	70-95	45-75	30-40	5-15
	23-28	Sandy loam	CL, SC, ML, SM	A-4, A-6	0	0	90-100	85-95	60-95	40-75	20-40	3-15
	28-80	Gravelly sand	SW-SM, SC-SM, SW, SM	A-1, A-3, A-2	0	0	60-95	45-90	10-60	0-15	15-25	NP-5
DeB:												
Delmont--------	0-8	Loam			0	0	90-100	90-100	80-95	60-75	28-40	8-20
	8-15	Loam			0	0	80-100	70-100	50-100	35-70	20-40	5-18
	15-80	Gravelly sand			0	0-5	60-100	40-80	15-50	3-30	15-25	NP-5
Enet----------	0-7	Loam	ML, CL	A-4, A-6	0	0	100	100	85-95	55-80	30-40	5-15
	7-23	Loam	SM, CL, SC, ML	A-4, A-6	0	0	90-100	85-100	70-95	45-75	30-40	5-15
	23-28	Sandy loam	CL, SC, ML, SM	A-4, A-6	0	0	90-100	85-95	60-95	40-75	20-40	3-15
	28-80	Gravelly sand	SW-SM, SC-SM, SW, SM	A-1, A-3, A-2	0	0	60-95	45-90	10-60	0-15	15-25	NP-5
DgC:												
Delmont--------	0-8	Loam			0	0	90-100	90-100	80-95	60-75	28-40	8-20
	8-15	Loam			0	0	80-100	70-100	50-100	35-70	20-40	5-18
	15-80	Gravelly sand			0	0-5	60-100	40-80	15-50	3-30	15-25	NP-5
Talmo----------	0-7	Gravelly loam	SC, CL	A-4, A-6	0	0-5	90-100	65-90	35-90	25-80	28-34	9-14
	7-80	Very gravelly loamy sand	SM, SW, GW, GM	A-1, A-2	0	0-10	40-95	20-65	15-35	0-35	15-25	NP-5
DgD:												
Delmont--------	0-8	Loam			0	0	90-100	90-100	80-95	60-75	28-40	8-20
	8-15	Loam			0	0	80-100	70-100	50-100	35-70	20-40	5-18
	15-80	Gravelly sand			0	0-5	60-100	40-80	15-50	3-30	15-25	NP-5
Talmo----------	0-7	Gravelly loam	SC, CL	A-4, A-6	0	0-5	90-100	65-90	35-90	25-80	28-34	9-14
	7-80	Very gravelly loamy sand	SM, SW, GW, GM	A-1, A-2	0	0-10	40-95	20-65	15-35	0-35	15-25	NP-5
DmA:												
Dempster-------	0-9	Silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-90	25-40	6-15
	9-37	Silty clay loam	ML, CL	A-4, A-7, A-6	0	0	100	100	90-100	75-95	30-45	7-20
	37-80			A-2, A-1, A-3	---	0-5	55-90	30-75	20-60	3-30	15-25	NP-5
DmB:												
Dempster-------	0-9	Silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-90	25-40	6-15
	9-37	Silty clay loam	ML, CL	A-4, A-7, A-6	0	0	100	100	90-100	75-95	30-45	7-20
	37-80			A-2, A-1, A-3	---	0-5	55-90	30-75	20-60	3-30	15-25	NP-5
DtB:												
Dempster-------	0-9	Silt loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	70-90	25-40	6-15
	9-37	Silty clay loam	ML, CL	A-4, A-7, A-6	0	0	100	100	90-100	75-95	30-45	7-20
	37-80			A-2, A-1, A-3	---	0-5	55-90	30-75	20-60	3-30	15-25	NP-5
Talmo----------	0-7	Gravelly loam	SC, CL	A-4, A-6	0	0-5	90-100	65-90	35-90	25-80	28-34	9-14
	7-80	Very gravelly loamy sand	SM, SW, GW, GM	A-1, A-2	0	0-10	40-95	20-65	15-35	0-35	15-25	NP-5
Dw:												
Dimo----------	0-7	Clay loam	CL	A-6, A-7	0	0	100	100	85-95	70-85	35-45	12-20
	7-39	Clay loam	CL	A-6, A-7	0	0	90-100	85-100	85-95	50-80	35-45	12-20
	39-80	Gravelly loamy sand	SM, SW-SM, SP-SM, SC-SM	A-1, A-3, A-2	0	0-5	60-90	40-70	20-60	5-30	15-25	NP-5
DxB:												
Dobalt---------	0-8	Loam	ML, CL	A-6, A-4	0	0	100	100	90-100	70-90	30-40	7-15
	8-19	Loam	ML, CL	A-6, A-4	0	0	100	100	90-100	70-90	25-40	3-15
	19-29	Loam	CL, ML	A-6, A-4	0	0	100	100	90-100	70-90	25-40	3-15
DyA:												
Dobalt---------	0-8	Loam	ML, CL	A-6, A-4	0	0	100	100	90-100	70-90	30-40	7-15
	8-19	Loam	ML, CL	A-6, A-4	0	0	100	100	90-100	70-90	25-40	3-15
	19-29	Loam	CL, ML	A-6, A-4	0	0	100	100	90-100	70-90	25-40	3-15
Bonilla--------	0-11	Loam	CL-ML, CL	A-6, A-4	0	0	100	95-100	75-100	50-80	25-40	5-20
	11-32	Clay loam	CL	A-7, A-6	0	0	100	95-100	85-100	60-90	30-50	10-25
	32-45	Clay loam	CL	A-7, A-6	---	0-5	95-100	95-100	85-100	60-90	30-45	10-22
	45-80	Silt loam	CL	A-7, A-6	---	0-5	95-100	95-100	85-100	60-90	30-45	10-22

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EaB:												
Egan----------	0-10	Silty clay loam	ML, CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	10-25
	10-28	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	10-30
	28-43	Clay loam		A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	43-80	Clay loam	CL, ML, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
EeB:												
Egan----------	0-10	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	85-100	35-50	10-25
	10-28	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	10-30
	28-43	Clay loam		A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	43-80	Clay loam	CL, ML, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-6, A-4, A-7	0	0	100	90-100	85-100	70-100	30-45	8-20
EfA:												
Egan----------	0-10	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	85-100	35-50	10-25
	10-28	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	10-30
	28-43	Clay loam		A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	43-80	Clay loam	CL, ML, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-7, A-6, A-4	0	0	100	90-100	85-100	70-100	30-45	8-20
EgB:												
Egan----------	0-10	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	85-100	35-50	10-25
	10-28	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	10-30
	28-43	Clay loam		A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	43-80	Clay loam	CL, ML, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
Wentworth------	0-10	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	11-25
	10-26	Silty clay loam	CH, ML, CL, MH	A-7, A-6	0	0	100	100	95-100	80-100	35-55	10-30
	26-55	Silty clay loam	CL, ML	A-6, A-4, A-7	0	0	100	95-100	85-100	60-100	30-50	5-25
	55-80	Silt loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	85-100	55-85	30-50	10-25
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-6, A-4, A-7	0	0	100	90-100	85-100	70-100	30-45	8-20
EnA:												
Enet----------	0-7	Loam	ML, CL	A-4, A-6	0	0	100	100	85-95	55-80	30-40	5-15
	7-23	Loam	SC, ML, SM, CL	A-4, A-6	0	0	90-100	85-100	70-95	45-75	30-40	5-15
	23-28	Sandy loam	CL, SC, ML, SM	A-4, A-6	0	0	90-100	85-95	60-95	40-75	20-40	3-15
	28-80	Gravelly sand	SW-SM, SC-SM, SW, SM	A-1, A-3, A-2	0	0	60-95	45-90	10-60	0-15	15-25	NP-5
EoA:												
Enet----------	0-7	Loam	ML, CL	A-4, A-6	0	0	100	100	85-95	55-80	30-40	5-15
	7-23	Loam	SM, CL, SC, ML	A-4, A-6	0	0	90-100	85-100	70-95	45-75	30-40	5-15
	23-28	Sandy loam	CL, SC, ML, SM	A-4, A-6	0	0	90-100	85-95	60-95	40-75	20-40	3-15
	28-80	Gravelly sand	SW-SM, SC-SM, SW, SM	A-1, A-3, A-2	0	0	60-95	45-90	10-60	0-15	15-25	NP-5
Dimo----------	0-7	Clay loam	CL	A-6, A-7	0	0	100	100	85-95	70-85	35-45	12-20
	7-39	Clay loam	CL	A-6, A-7	0	0	90-100	85-100	85-95	50-80	35-45	12-20
	39-80	Gravelly loamy sand	SM, SW-SM, SP-SM, SC-SM	A-1, A-3, A-2	0	0-5	60-90	40-70	20-60	5-30	15-25	NP-5
EpD:												
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
Betts----------	0-5	Loam	CL	A-6	0-1	0-5	90-100	80-100	75-100	60-75	30-40	10-20
	5-26	Clay loam	CL	A-6, A-7	0-1	0-5	90-100	85-100	75-100	50-85	30-45	10-25
	26-80	Clay loam	CL	A-6, A-7	0-1	0-5	90-100	85-100	75-100	50-85	30-45	10-25

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EsE:												
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-4, A-7, A-6	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
Clarno---------	0-10	Loam	CL, CL-ML	A-4, A-6	5-20	20-50	95-100	90-100	80-95	55-85	25-40	5-15
	10-22	Loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-100	55-85	30-45	10-20
	22-44	Loam	CL	A-6, A-7	0-1	0-5	95-100	90-100	80-100	55-85	30-45	10-20
	44-80	Clay loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	80-100	55-85	30-45	10-20
EtD:												
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
Clarno---------	0-10	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	95-100	85-100	55-85	25-40	5-20
	10-22	Loam	CL	A-7, A-6	0	0-5	95-100	90-100	80-100	55-85	30-45	10-20
	22-44	Loam	CL	A-7, A-6	0-1	0-5	95-100	90-100	80-100	55-85	30-45	10-20
	44-80	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-85	30-45	10-20
EuC:												
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
Egan----------	0-10	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	85-100	35-50	10-25
	10-28	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	10-30
	28-43	Clay loam		A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	43-80	Clay loam	CL, ML, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
ExC:												
Ethan----------	0-9	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	55-85	25-40	5-20
	9-39	Clay loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	80-100	55-80	30-50	10-25
	39-80	Clay loam	CL	A-6, A-4, A-7	0-3	0-5	90-100	85-100	75-100	50-95	28-45	8-20
Egan----------	0-10	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	85-100	35-50	10-25
	10-28	Silty clay loam	CH, CL, MH, ML	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	10-30
	28-43	Clay loam		A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	43-80	Clay loam	CL, ML, CH, MH	A-7, A-6	0	0-5	95-100	80-100	70-100	60-85	30-55	10-25
FaA:												
Flandreau------	0-7	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	65-95	25-40	5-20
	7-33	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	65-95	30-45	5-20
	33-39	Sandy loam	SM, SC, SC-SM	A-4	0	0	100	95-100	60-70	35-45	15-30	NP-10
	39-78	Loamy sand	SC-SM, SW-SM, SM	A-2	0	0	100	100	50-75	10-30	15-25	NP-5
	78-80	Clay loam	CL-ML, CL	A-6, A-4	0	0-5	95-100	95-100	85-100	65-95	25-40	5-20
FaB:												
Flandreau------	0-7	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	65-95	25-40	5-20
	7-33	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	65-95	30-45	5-20
	33-39	Sandy loam	SM, SC, SC-SM	A-4	0	0	100	95-100	60-70	35-45	15-30	NP-10
	39-78	Loamy sand	SC-SM, SW-SM, SM	A-2	0	0	100	100	50-75	10-30	15-25	NP-5
	78-80	Clay loam	CL-ML, CL	A-6, A-4	0	0-5	95-100	95-100	85-100	65-95	25-40	5-20
FtB:												
Flandreau------	0-7	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	65-95	25-40	5-20
	7-33	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	65-95	30-45	5-20
	33-39	Sandy loam	SM, SC, SC-SM	A-4	0	0	100	95-100	60-70	35-45	15-30	NP-10
	39-78	Loamy sand	SC-SM, SW-SM, SM	A-2	0	0	100	100	50-75	10-30	15-25	NP-5
	78-80	Clay loam	CL-ML, CL	A-6, A-4	0	0-5	95-100	95-100	85-100	65-95	25-40	5-20
Thurman--------	0-10	Fine sandy loam	SM	A-4	0	0	100	100	70-100	35-50	15-20	NP-5
	10-31	Fine sandy loam	SM, SP-SM	A-2, A-4, A-3	0	0	100	100	90-100	5-40	15-20	NP-5
	31-80	Fine sand	SM, SP-SM	A-3, A-2	0	0	100	100	50-95	5-35	15-20	NP-5
GrA:												
Graceville-----	0-18	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	11-20
	18-52	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	100	90-100	70-90	30-45	8-20
	52-80	Gravelly sand	GM, SW-SM, GW-GM, SM	A-1, A-2	0	0	40-80	30-70	20-50	5-30	15-25	NP-5
GsB:												
Grovena--------	0-9	Loam	ML, CL	A-4, A-6	0	0	100	95-100	90-100	60-85	30-40	7-15
	9-13	Silt loam	ML, CL	A-4, A-7, A-6	0	0	100	95-100	90-100	60-85	30-45	8-17
	13-30	Silt loam	SC-SM, CL-ML, ML	A-6, A-4	0	0	100	95-100	85-100	45-75	20-40	3-15
	30-36	Loam	SC, CL, SM, ML	A-6, A-4	0	0	95-100	95-100	90-100	45-80	30-40	5-15
	36-80	Stratified sandy loam to silt loam	CL-ML, CL	A-6, A-4	0	0	95-100	95-100	85-100	50-80	25-40	5-15

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GvA:												
Grovena--------	0-9	Loam	ML, CL	A-4, A-6	0	0	100	95-100	90-100	60-85	30-40	7-15
	9-13	Silt loam	ML, CL	A-4, A-7, A-6	0	0	100	95-100	90-100	60-85	30-45	8-17
	13-30	Silt loam	SC-SM, CL-ML, ML	A-6, A-4	0	0	100	95-100	85-100	45-75	20-40	3-15
	30-36	Loam	SC, CL, SM, ML	A-6, A-4	0	0	95-100	95-100	90-100	45-80	30-40	5-15
	36-80	Stratified sandy loam to silt loam	CL-ML, CL	A-6, A-4	0	0	95-100	95-100	85-100	50-80	25-40	5-15
Bonilla--------	0-11	Loam	CL-ML, CL	A-4, A-6	0	0	100	95-100	75-100	50-80	25-40	5-20
	11-32	Clay loam	CL	A-6, A-7	0	0	100	95-100	85-100	60-90	30-50	10-25
	32-45	Clay loam	CL	A-6, A-7	---	0-5	95-100	95-100	85-100	60-90	30-45	10-22
	45-80	Silt loam	CL	A-6, A-7	---	0-5	95-100	95-100	85-100	60-90	30-45	10-22
HoB:												
Houdek---------	0-6	Clay loam	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	30-45	10-20
	6-17	Clay loam	CL, ML	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	35-50	10-25
	17-33	Clay loam	CL, ML	A-6, A-7	0-1	0-10	95-100	95-100	85-100	60-80	35-50	10-25
	33-80	Clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-100	55-80	30-50	10-25
HsC:												
Houdek---------	0-6	Clay loam	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	30-45	10-20
	6-17	Clay loam	CL, ML	A-7, A-6	0	0-5	95-100	95-100	85-100	60-80	35-50	10-25
	17-33	Clay loam	CL, ML	A-6, A-7	0-1	0-10	95-100	95-100	85-100	60-80	35-50	10-25
	33-80	Clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-100	55-80	30-50	10-25
Shindler--------	0-8	Clay loam	ML, CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-80	35-45	10-20
	8-14	Clay loam	CL	A-6, A-7	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
	14-80	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
HsD:												
Houdek---------	0-6	Clay loam	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	30-45	10-20
	6-17	Clay loam	CL, ML	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	35-50	10-25
	17-33	Clay loam	CL, ML	A-6, A-7	0-1	0-10	95-100	95-100	85-100	60-80	35-50	10-25
	33-80	Clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-100	55-80	30-50	10-25
Shindler--------	0-8	Clay loam	ML, CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-80	35-45	10-20
	8-14	Clay loam	CL	A-6, A-7	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
	14-80	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
HtD:												
Houdek---------	0-6	Clay loam	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	30-45	10-20
	6-17	Clay loam	CL, ML	A-7, A-6	0	0-5	95-100	95-100	85-100	60-80	35-50	10-25
	17-33	Clay loam	CL, ML	A-6, A-7	0-1	0-10	95-100	95-100	85-100	60-80	35-50	10-25
	33-80	Clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-100	55-80	30-50	10-25
Talmo----------	0-7	Gravelly loam	SC, CL	A-4, A-6	0	0-5	90-100	65-90	35-90	25-80	28-34	9-14
	7-80	Very gravelly loamy sand	SW, GW, GM, SM	A-1, A-2	0	0-10	40-95	20-65	15-35	0-35	15-25	NP-5
HuA:												
Huntimer-------	0-7	Silty clay loam	CH, ML, CL, MH	A-7	0	0	100	100	95-100	90-100	45-60	15-30
	7-18	Silty clay	ML, CH, MH, CL	A-7	0	0	100	100	95-100	90-100	45-70	20-35
	18-38	Silty clay loam	CH, CL, ML, MH	A-7	0	0	100	100	95-100	90-100	40-65	15-30
	38-80	Stratified very fine sandy loam to silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	95-100	85-100	35-60	15-30
HuB:												
Huntimer-------	0-7	Silty clay loam	CH, ML, CL, MH	A-7	0	0	100	100	95-100	90-100	45-60	15-30
	7-18	Silty clay	ML, CH, MH, CL	A-7	0	0	100	100	95-100	90-100	45-70	20-35
	18-38	Silty clay loam	CH, CL, ML, MH	A-7	0	0	100	100	95-100	90-100	40-65	15-30
	38-80	Stratified very fine sandy loam to silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	95-100	85-100	35-60	15-30
IhA:												
Ihlen----------	0-11	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	85-95	34-50	10-25
	11-25	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-25
	25-35	Silt loam	CL, ML	A-4, A-6	0	0	100	100	90-100	85-100	30-40	8-15
	35-80	Unweathered bedrock			---	---	---	---	---	---	---	---
IrB:												
Ihlen----------	0-11	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	85-95	34-50	10-25
	11-25	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-25
	25-35	Silt loam	CL, ML	A-4, A-6	0	0	100	100	90-100	85-100	30-40	8-15
	35-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock Outcrop, Hard----------	0-80	Unweathered bedrock	GP, GP-GM	A-1-a	50-85	0-5	0-5	0-5	0-5	0-5	---	NP

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
IrE:												
Ihlen----------	0-11	Silty clay loam	CL, ML	A-6, A-7	0	0	100	100	95-100	85-95	34-50	10-25
	11-25	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	15-25
	25-35	Silt loam	CL, ML	A-4, A-6	0	0	100	100	90-100	85-100	30-40	8-15
	35-80	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock Outcrop, Hard----------	0-80	Unweathered bedrock	GP, GP-GM	A-1-a	50-85	0-5	0-5	0-5	0-5	0-5	---	NP
Ja:												
Janude---------	0-19	Fine sandy loam	SM	A-4	0	0	100	100	75-90	36-50	15-25	NP-8
	19-43	Fine sandy loam	ML	A-4	0	0	100	100	85-95	60-75	20-34	NP-7
	43-80	Fine sandy loam	SC, ML, SM, CL	A-4, A-6	0	0	100	100	70-100	40-100	20-35	3-15
La:												
Lamo----------	0-7	Silty clay loam	CL, CH	A-4, A-7, A-6	0	0	100	100	95-100	80-95	25-55	8-25
	7-80	Silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	85-95	30-55	11-25
Lb:												
Lamo----------	0-7	Silty clay loam	CL, CH	A-4, A-7, A-6	0	0	100	100	95-100	80-95	25-55	8-25
	7-80	Silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	85-95	30-55	11-25
MdB:												
Moody----------	0-11	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	13-25
	11-35	Silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	85-100	32-55	11-33
	35-50	Silt loam	CL-ML, CL, ML	A-4, A-7, A-6	0	0	100	100	95-100	85-100	20-45	3-20
	50-80	Silt loam	CL, ML, CL-ML	A-6, A-4, A-7	0	0	100	100	95-100	85-100	20-45	3-20
MgA:												
Moody----------	0-11	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	13-25
	11-35	Silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-100	32-55	11-33
	35-50	Silt loam	CL-ML, CL, ML	A-4, A-7, A-6	0	0	100	100	95-100	85-100	20-45	3-20
	50-80	Silt loam	CL, ML, CL-ML	A-6, A-4, A-7	0	0	100	100	95-100	85-100	20-45	3-20
Gayville-------	0-2	Silt loam	CL, ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	3-15
	2-13	Silty clay	CL	A-6, A-7	0	0	100	100	95-100	85-100	35-50	12-25
	13-26	Silty clay loam	CL	A-4, A-7, A-6	0	0	100	100	95-100	85-100	30-45	8-20
	26-80	Clay loam		A-4	0	0	100	100	95-100	70-85	15-25	NP-7
MnB:												
Moody----------	0-11	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	13-25
	11-35	Silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-100	32-55	11-33
	35-50	Silt loam	CL-ML, CL, ML	A-4, A-7, A-6	0	0	100	100	95-100	85-100	20-45	3-20
	50-80	Silt loam	CL, ML, CL-ML	A-6, A-4, A-7	0	0	100	100	95-100	85-100	20-45	3-20
Nora----------	0-9	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	12-25
	9-22	Silty clay loam	ML, CL	A-6, A-7	0	0	95-100	95-100	95-100	85-100	35-50	11-20
	22-80	Silt loam	CL-ML, ML, CL	A-4, A-7, A-6	0	0	95-100	95-100	95-100	85-100	27-50	6-20
MnC:												
Moody----------	0-11	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	13-25
	11-35	Silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-100	32-55	11-33
	35-50	Silt loam	CL-ML, CL, ML	A-4, A-7, A-6	0	0	100	100	95-100	85-100	20-45	3-20
	50-80	Silt loam	CL, ML, CL-ML	A-6, A-4, A-7	0	0	100	100	95-100	85-100	20-45	3-20
Nora----------	0-9	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	12-25
	9-22	Silty clay loam	ML, CL	A-6, A-7	0	0	95-100	95-100	95-100	85-100	35-50	11-20
	22-80	Silt loam	CL-ML, ML, CL	A-4, A-7, A-6	0	0	95-100	95-100	95-100	85-100	27-50	6-20
MtA:												
Moody----------	0-11	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	90-100	35-50	13-25
	11-35	Silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	85-100	32-55	11-33
	35-50	Silt loam	CL-ML, CL, ML	A-4, A-7, A-6	0	0	100	100	95-100	85-100	20-45	3-20
	50-80	Silt loam	CL, ML, CL-ML	A-7, A-6, A-4	0	0	100	100	95-100	85-100	20-45	3-20
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-6, A-4, A-7	0	0	100	90-100	85-100	70-100	30-45	8-20
NcC:												
Nora----------	0-9	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	95-100	35-50	12-25
	9-22	Silty clay loam	ML, CL	A-6, A-7	0	0	95-100	95-100	95-100	85-100	35-50	11-20
	22-80	Silt loam	ML, CL, CL-ML	A-4, A-7, A-6	0	0	95-100	95-100	95-100	85-100	27-50	6-20
Crofton--------	0-6	Silt loam	CL, ML	A-6, A-7	0	0	100	100	95-100	95-100	35-50	10-25
	6-80	Silt loam	CL	A-6, A-7	0	0	100	95-100	95-100	95-100	30-50	5-25
Ob:												
Obert----------	0-13	Silty clay loam	CL, CH	A-6, A-7	0	0	100	100	95-100	90-100	35-55	15-35
	13-52	Silty clay loam	CL, CH	A-4, A-7, A-6	0	0	100	100	95-100	85-100	20-55	7-35
	52-80	Silty clay loam	CL, CL-ML	A-6, A-4	0	0	100	100	80-100	75-95	25-45	7-25
Og:												
Orthents, Gravelly------	0-18	Gravelly sandy loam	SM, GM	A-4, A-2	0	0-5	60-90	50-80	45-70	25-50	20-35	NP-7
	18-80	Gravelly loamy sand	SM, SW-SM, SW	A-1	0	0-10	60-85	45-70	15-45	0-15	15-25	NP-5
Or:												
Orthents, Loamy	0-6	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	75-95	30-45	10-25
	6-80	Clay loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	55-90	25-40	5-20

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Ow:												
Orthents, Gravelly------	0-18	Gravelly sandy loam	GM, SM	A-2, A-4	0	0-5	60-90	50-80	45-70	25-50	20-35	NP-7
	18-80	Gravelly loamy sand	SW-SM, SW, SM	A-1	0	0-10	60-85	45-70	15-45	0-15	15-25	NP-5
Aquents, Gravelly------	0-8	Gravelly loam	SM, GM	A-4, A-2	0	0-5	60-90	50-80	45-70	25-50	20-35	NP-7
	8-80	Gravelly loamy sand	SM, SW, SW-SM	A-1	0	0-10	60-85	45-70	15-45	0-15	15-25	NP-5
Pt:												
Rock Outcrop, Hard----------	0-80	Unweathered bedrock	GP-GM, GP	A-1-a	50-85	0-5	0-5	0-5	0-5	0-5	---	NP
Sa:												
Salmo----------	0-17	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	85-95	30-50	10-25
	17-49	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	85-95	30-45	10-20
	49-80	Clay loam	CH, CL	A-7	0	0	100	95-100	90-100	75-95	40-60	15-35
SdE:												
Shindler-------	0-8	Clay loam	ML, CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-80	35-45	10-20
	8-14	Clay loam	CL	A-6, A-7	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
	14-80	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
Houdek---------	0-6	Clay loam	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	30-45	10-20
	6-17	Clay loam	CL, ML	A-6, A-7	0	0-5	95-100	95-100	85-100	60-80	35-50	10-25
	17-33	Clay loam	CL, ML	A-6, A-7	0-1	0-10	95-100	95-100	85-100	60-80	35-50	10-25
	33-80	Clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-100	55-80	30-50	10-25
SnE:												
Shindler-------	0-8	Clay loam	ML, CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-80	35-45	10-20
	8-14	Clay loam	CL	A-6, A-7	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
	14-80	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
Talmo----------	0-7	Gravelly loam	SC, CL	A-4, A-6	0	0-5	90-100	65-90	35-90	25-80	28-34	9-14
	7-80	Very gravelly loamy sand	SM, SW, GW, GM	A-1, A-2	0	0-10	40-95	20-65	15-35	0-35	15-25	NP-5
SpA:												
Splitrock------	0-9	Silty clay loam	ML, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-50	10-25
	9-34	Silty clay loam	CH, MH, ML, CL	A-6, A-7	0	0	100	95-100	90-100	80-100	35-55	10-30
	34-51	Clay loam	CL, MH, CH, ML	A-6, A-7	0-2	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	51-80	Clay loam	CL, MH, ML, CH	A-6, A-7	0-2	0-5	95-100	80-100	70-100	60-85	30-55	10-25
SpB:												
Splitrock------	0-9	Silty clay loam	ML, CL	A-6, A-7	0	0	100	100	95-100	85-100	35-50	10-25
	9-34	Silty clay loam	CH, MH, ML, CL	A-6, A-7	0	0	100	95-100	90-100	80-100	35-55	10-30
	34-51	Clay loam	CL, MH, CH, ML	A-6, A-7	0-2	0-5	95-100	80-100	70-100	60-85	30-55	10-25
	51-80	Clay loam	CL, MH, ML, CH	A-6, A-7	0-2	0-5	95-100	80-100	70-100	60-85	30-55	10-25
SsF:												
Steinauer------	0-4	Clay loam	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	55-90	30-50	15-25
	4-13	Clay loam	CH, CL	A-6, A-7	0	0-5	95-100	95-100	90-100	70-90	30-55	12-30
	13-80	Clay loam	CH, CL	A-6, A-7	0	0-5	95-100	95-100	90-100	60-75	25-55	10-30
Shindler-------	0-8	Clay loam	ML, CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-80	35-45	10-20
	8-14	Clay loam	CL	A-6, A-7	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
	14-80	Clay loam	CL	A-7, A-6	0-5	0-5	95-100	95-100	85-100	65-80	35-50	15-30
TdE:												
Talmo----------	0-7	Gravelly loam	SC, CL	A-4, A-6	0	0-5	90-100	65-90	35-90	25-80	28-34	9-14
	7-80	Very gravelly loamy sand	SM, SW, GW, GM	A-1, A-2	0	0-10	40-95	20-65	15-35	0-35	15-25	NP-5
Delmont--------	0-8	Loam			0	0	90-100	90-100	80-95	60-75	28-40	8-20
	8-15	Loam			0	0	80-100	70-100	50-100	35-70	20-40	5-18
	15-80	Gravelly sand			0	0-5	60-100	40-80	15-50	3-30	15-25	NP-5
Te:												
Tetonka--------	0-16	Silt loam	CL, ML	A-6, A-4, A-7	0	0	100	100	95-100	80-100	27-50	8-20
	16-20	Silt loam	CL	A-6, A-7	0	0	95-100	95-100	90-100	80-100	30-50	10-25
	20-45	Silty clay	ML, CH, MH, CL	A-7	0	0	95-100	95-100	85-100	65-100	40-70	15-35
	45-80	Silty clay	CH, CL	A-7, A-6	0	0	95-100	95-100	80-100	55-95	30-60	11-30
TfC:												
Thurman--------	0-10	Fine sandy loam	SM	A-4	0	0	100	100	70-100	35-50	15-20	NP-5
	10-31	Fine sandy loam	SM, SP-SM	A-2, A-4, A-3	0	0	100	100	90-100	5-40	15-20	NP-5
	31-80	Fine sand	SM, SP-SM	A-3, A-2	0	0	100	100	50-95	5-35	15-20	NP-5
Flandreau------	0-7	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	65-95	25-40	5-20
	7-33	Loam	CL, ML	A-4, A-7, A-6	0	0	100	95-100	85-100	65-95	30-45	5-20
	33-39	Sandy loam	SM, SC, SC-SM	A-4	0	0	100	95-100	60-70	35-45	15-30	NP-10
	39-78	Loamy sand	SC-SM, SW-SM, SM	A-2	0	0	100	100	50-75	10-30	15-25	NP-5
	78-80	Clay loam	CL-ML, CL	A-6, A-4	0	0-5	95-100	95-100	85-100	65-95	25-40	5-20

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
TgD:												
Thurman--------	0-10	Fine sandy loam	SM	A-4	0	0	100	100	70-100	35-50	15-20	NP-5
	10-31	Fine sandy loam	SM, SP-SM	A-2, A-4, A-3	0	0	100	100	90-100	5-40	15-20	NP-5
	31-80	Fine sand	SM, SP-SM	A-3, A-2	0	0	100	100	50-95	5-35	15-20	NP-5
Grovena--------	0-9	Loam	ML, CL	A-4, A-6	0	0	100	95-100	90-100	60-85	30-40	7-15
	9-13	Silt loam	ML, CL	A-4, A-7, A-6	0	0	100	95-100	90-100	60-85	30-45	8-17
	13-30	Silt loam	SC-SM, CL-ML, ML	A-6, A-4	0	0	100	95-100	85-100	45-75	20-40	3-15
	30-36	Loam	SC, CL, SM, ML	A-6, A-4	0	0	95-100	95-100	90-100	45-80	30-40	5-15
	36-80	Stratified sandy loam to silt loam	CL-ML, CL	A-6, A-4	0	0	95-100	95-100	85-100	50-80	25-40	5-15
Tr:												
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-6, A-4, A-7	0	0	100	90-100	85-100	70-100	30-45	8-20
W:												
Water----------	---	---	---	---	---	---	---	---	---	---	---	---
Wa:												
Wakonda--------	0-13	Silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	85-100	30-50	10-25
	13-38	Silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	90-100	85-100	30-50	10-25
	38-73	Silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	85-95	60-90	30-50	10-25
	73-80	Loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	85-100	55-85	30-50	10-25
Chancellor-----	0-12	Silty clay loam	MH, CL, CH, ML	A-7, A-6	0	0	100	100	95-100	85-100	35-55	15-25
	12-31	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	31-80	Silty clay loam	CL, CH, MH, ML	A-6, A-7	0	0	100	100	85-100	70-100	35-55	15-25
WcA:												
Wentworth------	0-10	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	11-25
	10-26	Silty clay loam	CH, ML, CL, MH	A-7, A-6	0	0	100	100	95-100	80-100	35-55	10-30
	26-55	Silty clay loam	CL, ML	A-6, A-4, A-7	0	0	100	95-100	85-100	60-100	30-50	5-25
	55-80	Silt loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	85-100	55-85	30-50	10-25
Chancellor-----	0-12	Silty clay loam	ML, MH, CH, CL	A-7, A-6	0	0	100	100	95-100	85-100	35-55	15-25
	12-31	Silty clay	CH, CL	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	31-80	Silty clay loam	CH, CL, MH, ML	A-6, A-7	0	0	100	100	85-100	70-100	35-55	15-25
Wakonda--------	0-13	Silty clay loam	CL	A-7, A-6	0	0	100	100	90-100	85-100	30-50	10-25
	13-38	Silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	90-100	85-100	30-50	10-25
	38-73	Silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	85-95	60-90	30-50	10-25
	73-80	Loam	CL	A-7, A-6	0-3	0-5	95-100	90-100	85-100	55-85	30-50	10-25
WhA:												
Wentworth------	0-10	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	11-25
	10-26	Silty clay loam	CH, ML, CL, MH	A-7, A-6	0	0	100	100	95-100	80-100	35-55	10-30
	26-55	Silty clay loam	CL, ML	A-6, A-4, A-7	0	0	100	95-100	85-100	60-100	30-50	5-25
	55-80	Silt loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	85-100	55-85	30-50	10-25
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-6, A-4, A-7	0	0	100	90-100	85-100	70-100	30-45	8-20
WhB:												
Wentworth------	0-10	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	85-100	35-50	11-25
	10-26	Silty clay loam	CH, ML, CL, MH	A-7, A-6	0	0	100	100	95-100	80-100	35-55	10-30
	26-55	Silty clay loam	CL, ML	A-6, A-4, A-7	0	0	100	95-100	85-100	60-100	30-50	5-25
	55-80	Silt loam	CL	A-6, A-7	0-3	0-5	95-100	90-100	85-100	55-85	30-50	10-25
Trent----------	0-15	Silty clay loam	CH, MH, ML, CL	A-7, A-6	0	0	100	100	95-100	90-100	35-55	10-30
	15-39	Silty clay loam	CL, CH	A-7, A-6	0	0	100	95-100	90-100	80-100	35-55	15-30
	39-46	Silty clay loam	CL	A-6, A-4, A-7	0	0	100	95-100	90-100	80-100	30-50	8-25
	46-52	Silt loam	CL, ML	A-4, A-7, A-6	0	0	100	90-100	85-100	70-100	30-50	8-20
	52-80	Silt loam	CL	A-6, A-4, A-7	0	0	100	90-100	85-100	70-100	30-45	8-20
Wk:												
Whitewood------	0-10	Silty clay loam	ML, CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	10-20
	10-36	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	95-100	80-100	35-55	15-30
	36-50	Silty clay loam	CH, CL	A-7, A-6	0	0	100	100	95-100	80-95	35-55	15-30
	50-80	Silty clay loam	CH, CL	A-6, A-7	0	0	100	95-100	90-100	75-95	35-55	15-30
Wo:												
Worthing-------	0-16	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	16-46	Silty clay	MH, CH	A-7	0	0	100	100	95-100	85-100	50-70	22-35
	46-80	Silty clay loam	CH, MH, CL, ML	A-7	0	0	100	95-100	90-100	70-100	40-65	15-30

ENGINEERING INDEX PROPERTIES--Continued
Minnehaha County, South Dakota

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticit index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Wr:												
Worthing-------	0-16	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	16-46	Silty clay	MH, CH	A-7	0	0	100	100	95-100	85-100	50-70	22-35
	46-80	Silty clay loam	CH, MH, CL, ML	A-7	0	0	100	95-100	90-100	70-100	40-65	15-30
Davison--------	0-8	Clay loam	CL	A-7, A-6	0	0	100	95-100	90-100	70-80	30-45	10-20
	8-41	Clay loam	CL, CL-ML, SC-SM, SC	A-6, A-4	0	0-5	95-100	95-100	85-100	45-80	25-40	5-20
	41-80	Clay loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	95-100	85-100	60-80	25-40	5-20