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GEOLOGICAL SURVEY  
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SAND AND GRAVEL RESOURCES  
IN CLARK COUNTY, SOUTH DAKOTA

by

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Prepared in cooperation with the  
United States Geological Survey,  
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## INTRODUCTION

This pamphlet is the first in a series of reports being completed on the geology and hydrology of Clark County, South Dakota. Its purpose is to indicate areas in which to search for sources of coarse aggregate material. The quality of the deposits encountered was not analyzed nor the quantity of available reserves measured. These would require a larger auger in order to obtain a more representative sample, prior knowledge of the material specifications for each intended use, and more extensive drilling.

Other upcoming reports include "Geology and Water Resources of Clark County, South Dakota" and "The Major Aquifers in Clark County, South Dakota." The first of these two contains the technical aspects of the study. It defines and explains the distribution of landforms in the County and answers questions of geologic and hydrologic interest. The other report shows the areal distribution of major glacial aquifers, discusses the bedrock aquifers, and contains a generalized evaluation of their expected yield and quality.

## EXPLANATION OF TABLES

Table 1 is a list of test holes drilled in Clark County along with their locations. Most of them have been drilled by the South Dakota Geological Survey. Logs of the rest have been supplied by the United States Geological Survey, private drillers, the Water Rights Commission, or the Bureau of Reclamation. Only that part of the log which indicates sand and/or gravel has been included in this table in order to reduce the amount of extraneous information.

Table 2 is a list of sand and gravel pits on file with the South Dakota Department of Highways. Where the information is available, it also includes the average thickness of the sand and/or gravel being removed, the average thickness of overburden, and the type of material it contains. Average thickness values with a plus sign after them mean that the bottom of the pit is still in sand or gravel. In some cases the depth of the pit is determined by the water table and in others it is due to the predominance of medium to fine sand.

## EXPLANATION OF MAP

The map shows the location of test holes, gravel pits, a few land marks, and the areas of good, fair, and poor probability of finding sand and gravel. Test holes are indicated by a filled circle (●), a filled square (■), or an unfilled circle (○). The unfilled circle represents a location where no sand and/or gravel was encountered in the upper 25 feet of drilling. As such they are not numbered because they are not listed in the tables. The other two symbols refer to holes which did encounter sand and/or gravel in this interval. A filled circle represents locations with 0 to 5 feet of overburden and a filled square 6 to 25 feet of overburden. The numbers

beside each symbol refer to table 1 which lists the amount of sand and/or gravel present.

Gravel pits are designated by crossed pick and shovel (⚡). Those with numbers are listed in table 2 and have additional data on file with the District Highway Office of the South Dakota Department of Highways in Aberdeen, South Dakota. No attempt has been made to differentiate the active from the inactive pits.

Using the test holes, gravel pit locations, topographic maps, air photos, and field observations, the County has been divided into three types of areas describing the probability of finding sand or gravel--good, fair, and poor. Each area designated as either good or fair has been assigned a capital letter and is discussed in some detail below.

An area designated as "good" contains deposits that are generally (1) fairly thick--25 feet, (2) covered by little overburden--2.5 feet, and (3) encompass an extensive area, or are quite thick but less continuous laterally. Area B is this latter type. There have been a number of good productive gravel pits but the deposits do not, in general, cover the interstream divides. In some places this is due to erosion since their deposition. Area F is characterized by hummocky topography with gravel, sand, and clay deposits interspersed. Area C is the most consistent of the "good" areas. South of Crocker it is rather discontinuous as it crosses the ridge but most of the rest of the way it is traceable. It has been separated from Area D on the basis of coarser material and more abundant gravel pits.

An area designated as "fair" contains deposits that are fairly thick--15 feet but are covered by about 6 feet of overburden. Seldom can they be traced for a great distance. Areas H, I, and K appear to be coarse, terrace gravels which have been later cut into by stream action. Thus, they now are small deposits sitting up on the sides of the stream valleys. Area A deposits are concentrated mainly along stream systems but in a few cases are found on the divides. Areas D and L are fairly continuous but generally medium to fine aggregate. Area E is very variable in that it is thin to thick, coarse to fine, and clean to clayey. Area G has numerous good coarse gravel deposits but are generally thin and discontinuous. Area J is so unpredictable that description is useless at this point. Local attempts to map it have found coarse rock in one locality and fine sand 20 feet away. As yet no consistent pattern has been found. Area M deposits are terrace material that has been laid down around Cherry Lake.

An area designated as "poor" contains few sand and gravel pits. Some may be very productive but the deposits are localized and difficult to find without intensive exploration. A couple of possibilities for exploration would be further upstream east of Area B and along some of the streams northwest of Area I.

**TABLE 1. List of test holes in Clark County, South Dakota, which contain sand and/or gravel in the upper 25 feet**

Lithologic descriptions, as listed, have been condensed from data contained in driller's logs on file at the South Dakota Geological Survey office.

Vermillion, South Dakota, and contain only information which has been deemed most useful for this study.

Test Hole No.	Location	Lithologic Description	From-to Feet
1	NE NE NE NE 6-119-59	Silt and very fine sand, light-tan	0- 4
		Sand, medium-brown, fine	4- 17
		Sand, medium-brown, fine, clayey; saturated	17- 20
		Sand, gray, medium, very clayey; unoxidized, few pebbles	20- 22
		Gravel, fine, sandy, clayey	22- 23
2	NW NE NW NE 5-119-59	Sand, fine to medium, gravelly	0- 2
3	SW NW NW NW 1-119-59	Sand, medium to coarse, gravelly	1- 6
		Sand, fine to coarse, gravelly	6- 28
4	NE NE NE NE 12-119-59	Sand, medium to coarse, gravelly	1- 15
		Sand, medium	15- 20
		Sand, fine; some silt and clay	20- 27
		Sand, fine, very silty; oxidized, moist	27- 39
5	SE SE SE SE 13-119-59	Gravel, medium to coarse; abundant shale pebbles	0- 14
6	SW SW SW SE 20-119-59	Gravel and sand, medium; some silt, dirty	1- 13
		Gravel and sand, medium; saturated, some silt, dirty	13- 17
7	SE SE SE SE 29-119-59	Sand, fine to medium, very gravelly	0- 5
		Sand, medium, very gravelly	5- 9
		Sand, medium to coarse, very gravelly	9- 11
		Sand, medium to coarse; saturated, slightly clayey	11- 14
		Sand, medium to coarse, very clayey; saturated	14- 19
8	SW SE NW NE 32-119-59	Sand, fine; some coal	22- 30
		Sand, fine and gravel; some coal	30- 40
		Sand, coarse and gravel	40- 70
		Sand, medium to coarse and gravel	70- 80
		Sand, medium to coarse	80-110
9	NE NE NE NE 3-119-58	Sand, medium to coarse	1- 3
10	SW SW NW NW 18-119-58	Sand, coarse, gravelly	0- 2
		Sand, medium to coarse, gravelly	2- 10
		Sand, fine to coarse, gravelly	10- 17
11	NW NW NW NW 17-119-58	Sand, medium to coarse, gravelly	0- 4
		Sand, fine; some silt and clay	10- 13
12	SW SW NW SW 17-119-58	Sand, dark, silty (topsoil)	0- 2
		Sand, medium to gravel, fine	2- 7
		Gravel, coarse	7- 8

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, medium, gravelly	8- 9
		Sand, fine to coarse, gravelly; some silt and clay	9- 11
13	SW SE NE NE 19-119-58	Sand, fine, silty; pebbles	1- 6
		Sand, fine	6- 21
		Sand, fine, silty; pebbles	21- 30
14	SE SE NE NE 19-119-58	Sand, medium, gravelly	0- 2
15	NW NW SW SW 20-119-58	Sand, coarse, gravelly	0- 9
16	NE NE NE NE 31-119-58	Sand, very clayey and silty; pebbles	12- 14
17	NE NW SE SE 15-119-58	Gravel, gray, silty, clayey; dry, very dirty	3- 7
		Sand, brown, fine to medium; dry, dirty	7- 14
		Sand, brown, medium to coarse; dry	14- 26
18	SE NW SE SE 15-119-58	Gravel, brown, clayey; dry, very dirty	6- 8
		Sand, gray, fine, very clayey; dry	8- 9
		Sand, brown, medium to coarse and gravel; dry, little clay	9- 13
		Sand, brown, fine, clayey; dry	13- 22
		Sand, brown, fine to medium, clayey; moist	22- 31
19	NE SE NE SE 13-119-58	Sand	2- 4
20	NE SE SE SE 25-119-58	Gravel, gray-brown; dry, very dirty	2- 6
21	NW NW NW SW 8-119-57	Sand, silty, gravelly (topsoil)	0- 3
22	SE SE SE SE 9-119-57	Sand, black, medium; some clay, finely divided muscovite	1- 5
23	SW NW SW SW 10-119-57	Sand, medium, silty; pebbles, some clay	0- 4
		Sand, medium, gravelly	4- 6
		Sand, medium, very clayey, gravelly	6- 29
24	SE NE NE NE 3-119-57	Sand, medium, gravelly	0- 4
		Sand, medium to coarse, gravelly	4- 12
25	SE NE NE SE 2-119-57	Sand, fine to medium	1- 2
		Sand, medium, pebbly	2- 4
		Sand, fine; few pebbles	4- 5
		Gravel, fine, very sandy	5 6
		Sand, medium to coarse, very gravelly	6- 20
		Gravel, fine, silty, clayey	20- 23
		Gravel, medium, silty, sandy, clayey	23- 25
		Sand, coarse to fine, silty, clayey	25- 27
		Sand, medium, very silty and clayey	27- 30
		Sand, medium, very silty and clayey; saturated	30- 40
		Sand, fine to coarse, very silty and clayey; unoxidized	40- 46
26	SW SW SW SE 2-119-57	Sand, tan, fine, gravelly	0- 2
		Sand, tan, fine, gravelly, very clayey	2- 5

Test Hole No.	Location	Lithologic Description	From-to Feet
27	SE SE SE SE 2-119-57	Sand, fine to gravel, medium	0- 5
		Sand, medium, very gravelly and clayey	5- 9
28	SE SE SW SW 1-119-57	Sand, very fine to fine, pebbly	0- 1
		Silt and sand, very fine	4- 6
29	SE NE SE SE 1-119-57	Sand, fine to gravel, medium	1- 5
		Sand, medium to gravel, coarse	5- 10
		Sand, medium to coarse, very gravelly; slightly clayey	10- 23
		Sand, medium to coarse, gravelly	23- 34
		Sand, fine to medium, very gravelly	34- 40
		Sand, coarse; saturated	40- 48
		Sand, medium to coarse, very clayey; unoxidized	48- 54
30	NW NW NW SW 12-119-57	Sand, light-brown, medium to coarse, very gravelly	0- 6
		Sand, medium-brown, medium to coarse, gravelly, clayey	6- 10
31	SW SW SW SW 12-119-57	Sand, fine to medium, very pebbly	0- 6
		Sand, medium	6- 10
		Sand, medium, very silty and clayey; slightly gravelly	10- 15
32	SW SE SE SW 15-119-57	Sand, yellow-brown, fine to coarse; some fine gravel	2- 6
33	NW NW NE NW 31-119-57	Gravel, brown, coarse, silty; dry	1- 6
		Sand, brown, medium to coarse and gravel; dry, dirty	6- 13
		Sand, brown, very clayey; moist	13- 17
		Gravel, brown, coarse; moist, dirty	17- 33
34	NE SE SE NE 31-119-57	Sand, brown, medium to coarse, clayey; moist	9- 14
		Sand, brown, medium to coarse, gravelly, clayey; moist	14- 18
		Sand, brown, medium to coarse; moist, little clay, fairly clean, caving sides	18- 21
		Sand, brown, medium to coarse; moist, clean	21- 23
		Sand, brown, fine to medium, very clayey; moist	23- 25
35	SW SE SW SW 29-119-57	Sand, red-brown, fine to medium; dry, clean	0- 6
		Sand, red-brown, medium to coarse; moist, clean	6- 12
		Sand, yellow-brown, fine; moist, little clay	12- 14
		Sand, gray, fine to medium; moist, little clay	16- 18
		Sand, yellow-brown, fine; moist, very clean	18- 21
		Sand, brown, fine to medium; moist, very clean	21- 24

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, dark-brown, fine to medium; moist, slightly clayey	24- 26
36	SW SE SE SE 29-119-57	Sand, red-brown and gravel; moist, little clay	0- 4
37	SW NW SW SW 28-119-57	Gravel, light-brown, very clayey; moist Sand, brown, very clayey; saturated	2- 6 15- 25
38	NW SW NW NW 33-119-57	Sand, brown, medium; moist, few small pebbles, clean Gravel, brown, fine and sand; moist Gravel, brown, fine and sand; moist, some clay, harder drilling Sand, brown, medium and gravel, clayey; saturated	0- 7 7- 9 9- 13 13- 20
39	SE SE NE SE 34-119-57	Sand, light grayish-brown, fine Sand, reddish-brown, fine Sand, medium-brown, fine Silt and very fine sand, gray Sand, medium-brown, medium, clayey; oxidized, saturated, few pebbles Sand, fine and silt, medium-brown, very clayey; slightly gravelly Silt and very fine sand, gray, very clayey; unoxidized, few pebbles	0- 2 2- 4 4- 8 11- 14 14- 18 18- 19 19- 21
40	NE NE NE SE 6-119-56	Gravel, fine, very silty Sand, fine, silty, gravelly Sand, medium; slightly gravelly Sand, medium; saturated, slightly gravelly Sand, medium to coarse; some pebbles Sand, medium to coarse; slightly silty and clayey Sand, fine to coarse, very silty and clayey	3- 5 5- 9 9- 10 10- 11 11- 21 21- 25 27- 30
41	SW SW NW NW 5-119-56	Sand, fine to medium, very gravelly Sand, medium, gravelly Sand, medium to coarse, gravelly	0- 2 2- 8 8- 32
42	NW NW NW NW 5-119-56	Sand, medium-brown, fine; calcareous in upper foot	2- 6
43	SE SE SE NE 5-119-56	Gravel, very fine, very silty and clayey Sand, medium to coarse and gravel, clayey; slightly gravelly Sand, medium, very gravelly Gravel, medium, very clayey Sand, fine to medium, gravelly; slightly clayey Sand, coarse, gravelly; slightly silty and clayey, some very fine sand Gravel, fine, sandy; slightly clayey Gravel, medium, very sandy, slightly clayey Sand, fine to medium; slightly gravelly Sand, fine, very silty and clayey	9- 12 12- 14 14- 16 16- 18 18- 22 22- 25 25- 30 30- 32 32- 35 35- 37

Test Hole No.	Location	Lithologic Description	From-to Feet
44	SE SW SW SW 4-119-56	Sand, very light-brown, fine, very gravelly	1- 4
		Sand, fine to gravel, coarse	4- 6
		Sand, fine to gravel, medium	6- 11
		Sand, fine to medium, very gravelly	11- 16
		Sand, fine to medium, very gravelly, clayey	16- 20
		Sand, coarse	20- 24
		Gravel, medium	24- 28
45	NW NW NW NW 3-119-56	Gravel, fine to medium	24- 29
46	SE SW SW SW 10-119-56	Sand, fine, gravelly	1- 4
		Sand, fine, gravelly, clayey	4- 8
		Sand, coarse	8- 14
		Sand, coarse to gravel, medium	14- 18
		Sand, medium to gravel, medium	18- 26
47	NE NE NE NE 15-119-56	Sand, fine to medium, gravelly	0- 4
		Gravel, fine to medium, sandy	4- 7
		Gravel, fine to medium; some clay	13- 17
		Gravel, fine, sandy, clayey	17- 20
		Sand, medium to coarse, gravelly	20- 30
		Sand, medium to coarse, gravelly; slightly clayey	30- 38
		Sand, medium to coarse; moist	38- 50
		Sand, fine to medium; moist, slightly clayey	50- 67
48	SE SE SE NE 14-119-56	Sand, fine to very fine, silty	8- 9
		Gravel, fine, very sandy, silty and clayey	11- 16
		Gravel, fine, very sandy, silty and clayey; saturated	16- 26
		Gravel, medium, very sandy, silty and clayey	26- 29
		Sand, coarse, very clayey and silty	29- 31
		Sand, coarse; slightly clayey	31- 36
		Sand, coarse; unoxidized, slightly clayey	36- 42
		Sand, medium, very silty	44- 45
49	NW SW SW SW 18-119-55	Silt and sand, very fine; slightly gravelly	4- 6
		Sand, fine; slightly gravelly	6- 8
		Sand, fine; saturated, slightly gravelly	8- 9
		Sand, fine, silty, clayey; some pebbles	9- 26
		Sand, fine, silty, clayey, pebbly; unoxidized	26- 28
		Sand, coarse; fairly clean	28- 32
		Sand, medium, very silty and clayey	35- 38
50	SW NW NW NW 19-119-55	Sand, medium to coarse and gravel, fine to medium; clay layer from 26 to 28	0- 36
51	SW SW SW SW 5-118-59	Sand, medium-brown, fine, silty, clayey	1- 6
		Sand, light-tan, fine	6- 8
		Sand, medium-brown, fine to medium; slightly clayey	12- 17
		Sand, gray, fine, very silty and clayey	17- 27



Test Hole No.	Location	Lithologic Description	From-to Feet
52	SW SE SE SW 5-118-59	Sand, fine, clayey	0- 6
		Sand, medium	10- 14
		Sand, medium; saturated, slightly clayey	14- 18
		Sand, medium to coarse	18- 21
		Sand, medium to coarse; unoxidized	21- 36
53	NE NE NE NE 8-118-59	Gravel, medium to coarse	10- 11
		Sand, medium to coarse	11- 33
54	NE NE NE NE 4-118-59	Silt and very fine sand, very light-tan	1- 3
		Gravel, fine to sand, medium	3- 6
		Sand, medium, very silty and clayey	6- 7
55	NE NE NE NE 12-118-59	Gravel, coarse, rocky	2- 4
56	SE SE SE SW 12-118-59	Sand, very fine to fine	0- 3
57	SW SW NW SW 11-118-59	Sand, medium to coarse; some clay	14- 24
58	NW SW SW NW 14-118-59	Sand, medium to coarse; clean	0- 8
		Sand, fine; saturated	8- 27
		Sand, fine; unoxidized, saturated	27- 30
		Sand, fine, silty, clayey; dirty	30- 40
		Gravel, medium, well sorted	40- 47
59	SW NW NW SW 14-118-59	Sand, dark, gravelly (topsoil)	0- 1
		Sand, medium to gravel, fine; clean	1- 27
		Sand, medium to gravel, fine; some silt and clay, dirty	27- 40
		Sand, medium to gravel, fine, silty, clayey; very dirty	40- 46
		Sand, very fine to fine, silty, clayey, pebbly; very dirty, hit something impenetrable	46- 53
60	NW NW SW SW 14-118-59	Sand, tan, coarse, clayey; dirty	0- 8
61	NE NE SE NE 22-118-59	Sand, tan and rust, fine; slightly gravelly	0- 13
		Sand, rusty-brown, fine; saturated, slightly silty and clayey	13- 15
		Sand, gray, fine; unoxidized, slightly silty and clayey	15- 18
62	NE NE SE SE 16-118-59	Sand, fine; few pebbles	0- 4
		Sand, fine to medium	4- 7
		Sand, medium; saturated, slightly clayey	7- 10
		Sand, medium, gravelly; slightly clayey	10- 14
		Sand, fine, silty	14- 15
63	SE NE NE SE 18-118-59	Sand, fine to medium	2- 5
		Sand, fine to medium, very silty; saturated	15- 21
		Sand, fine to medium, very silty; unoxidized	21- 32
64	SW SW SW SW 19-118-59	Sand, light-brown, fine; moist	0- 3

Test Hole No.	Location	Lithologic Description	From-to Feet
65	SE SE SE SE 28-118-59	Sand, brown, medium Gravel, brown, medium	0- 3 3- 10
66	SE NE SE SE 34-118-59	Sand, coarse to gravel, fine Sand, fine; saturated Sand, fine to medium, very clayey Sand, medium	2- 5 5- 9 9- 12 12- 16
67	SW NW SW SW 3-118-58	Sand, medium to coarse, gravelly	0- 5
68	NW NW NW NW 10-118-58	Sand, medium to gravel, coarse	0- 12
69	NE NE NW NW 10-118-58	Sand, medium to gravel, coarse Sand, medium to gravel, fine Sand, medium to gravel, medium	0- 17 17- 21 21- 27
70	NE NE NE NE 15-118-58	Gravel, sandy; moist Sand, coarse, gravelly; saturated Sand, medium; unoxidized, saturated	0- 4 4- 25 25- 45
71	NE SE SE NE 22-118-58	Gravel, fine, silty	3- 5
72	NW NW NW NW 31-118-58	Sand, and gravel, medium to coarse	25- 28
73	NE NE NE NE 26-118-58	Sand, medium to coarse; dry Sand, medium to coarse; saturated Sand, fine and silt Sand, fine and silt; unoxidized	6- 7 7- 10 10- 18 18- 65
74	SE NW NW NW 36-118-58	Sand, medium to coarse, silty, clayey, pebbles Sand, medium to coarse, gravelly Gravel and sand, medium to coarse Sand, medium to coarse Sand, medium to coarse; saturated Sand, medium; saturated, little silt Sand, fine, silty Sand, medium, silty Sand, medium, silty; unoxidized, saturated	0- 6 6- 9 9- 12 12- 13 13- 18 18- 25 25- 27 27- 34 34- 70
75	SE SE SE SW 36-118-58	Sand, tan, very fine, silty Sand, light-brown, fine to very fine, gravelly Sand, brown, very coarse to fine; little gravel	5- 8 8- 13 13- 24
76	NW NW NW NW 31-118-57	Sand, gray and brown	1- 12
77	NE SE NE NE 3-118-57	Sand, yellow-brown, very fine, very silty; moist Sand, brown, fine to medium, very clayey; moist	0- 11 11- 17
78	SW SW NW NW 1-118-57	Sand, fine	0- 2
79	SE SW SE SE 5-118-56	Gravel, tan; dry, dirty Sand, brown, clayey; dry, dirty	2- 5 5- 7

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, red-brown, medium to coarse; moist, little clay	7- 12
80	SW SE SE SW 4-118-56	Sand, light-brown, medium Sand, light-brown, medium, very gravelly	0- 2 2- 3
81	SW SW SW SE 4-118-56	Sand, medium to coarse, gravelly	0- 2
82	SE SW SE SE 4-118-56	Gravel, very coarse	0- 40
83	SW SE NE SE 3-118-56	Sand, medium-brown, medium, very clayey; slightly gravelly Sand, medium-brown, medium; saturated Gravel, medium-brown, very clayey, silty and sandy Sand, medium, very silty and clayey	3- 12 12- 15 15- 19 19- 22
84	NW SW NW SW 12-118-56	Sand, medium brownish-gray, fine Sand, medium Sand, medium, clayey	0- 4 4- 16 16- 19
85	SE NE SE SE 11-118-56	Sand, dark-brown, very fine, silty, clayey Sand, medium-brown, fine; moist Sand, medium-brown, fine, silty, clayey	3- 7 7- 12 12- 16
86	SE SW SW SW 12-118-56	Sand, fine to medium, gravelly	0- 6
87	SE SE SE SW 20-118-56	Gravel, fine Gravel, fine to medium Gravel, medium	0- 3 3- 6 6- 9
88	NW SW SW SW 29-118-56	Sand, light-tan, fine; slightly gravelly Sand, medium gray-brown, medium; slightly gravelly Sand, medium-brown, medium; moist Sand, medium, very silty; saturated	0- 3 3- 6 6- 12 12- 13
89	SE SE SE NE 29-118-56	Sand, medium-brown, medium, very gravelly Sand, medium-brown, medium, gravelly	1- 3 3- 13
90	NE SE SE NE 26-118-56	Sand, tan, very fine, clayey; dry Gravel, light-brown, clayey; dry, very dirty Sand, brown, medium to coarse; dry, clean Sand, brown, fine to coarse; moist, clean Sand, brown, medium to coarse, clayey; moist	7- 8 8- 10 10- 13 13- 21 21- 26
91	SE SE SE SW 24-118-56	Gravel, brown; dry, very dirty	0- 2
92	SW SW NW NW 7-117-59	Sand, coarse, poorly sorted; some clay	5- 8
93	SW SW SW SW 7-117-59	Sand, brown, clayey Sand, fine Sand, medium Sand, coarse	5- 10 10- 15 15- 20 20- 30

Test Hole No.	Location	Lithologic Description	From-to Feet
94	NW SW NE NW 18-117-59	Sand, pink, medium	0- 3
		Sand, dark brown, medium to coarse, silty, clayey	3- 5
		Gravel, fine, silty, sandy, very clayey	5- 6
		Sand, dark-brown, medium, very silty and clayey; saturated, gravelly	6- 7
		Sand, gray, medium, very silty and clayey; unoxidized, saturated, gravelly	7- 8
		Silt, gray, very sandy and gravelly	8- 9
		Sand, gray, medium, very silty and clayey; some gravel	9- 14
		Gravel, fine to medium, sandy	14- 19
		Sand, gray, fine; some gravel	19- 35
		Sand, gray, fine, very silty and clayey; some gravel	35- 39
95	SW SW SW SW 4-117-59	Sand, fine to medium	0- 4
		Sand, medium to coarse	4- 7
		Sand, medium to coarse, very clayey	7- 10
96	NE NW NE NE 3-117-59	Sand, fine to medium	0- 2
		Sand, medium to coarse, gravelly	2- 6
		Gravel, medium	6- 7
		Sand, medium to coarse, gravelly, clayey	7- 10
97	SW NE NW NE 1-117-59	Silt and very fine sand, light-tan; coarse gravel on surface	0- 5
		Sand, fine to medium and gravel, fine	5- 6
		Silt and very fine sand, light-tan	6- 11
98	NE NE NW NE 11-117-59	Sand, light-tan, very fine; gravel on surface	0- 4
99	SW NW NW NW 11-117-59	Sand, medium-brown, medium; slightly gravelly and clayey	1- 4
100	NE SE SE SE 10-117-59	Sand, fine	0- 2
		Sand, medium	2- 11
		Sand, medium; saturated, slightly clayey	11- 13
		Sand, fine to medium, clayey	13- 17
101	NW NE NW NW 22-117-59	Sand, fine to coarse, gravelly	2- 4
		Sand, fine, gravelly	4- 9
		Sand, fine to medium, gravelly	9- 12
		Sand, fine to medium, gravelly; saturated	12- 13
102a	SE SE SE SE 16-117-59	Sand, light brown, fine to medium; saturated	13- 14
		Gravel, fine to coarse	20- 22
		Clay intermixed with fine sand, gray	22- 32
		Clay intermixed with gravel	32- 37
102b	SE SE SE SE 16-117-59	Clay and sand, yellow-brown, about 50 percent of each	2- 18
		Gravel, sandy	28- 32
103	NE SE SE SE 18-117-59	Sand, brown, some ferruginous and limestone particles	10- 20

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, gray, fine	20- 30
104a	SW SW SW SW 18-117-59	Gravel, medium; saturated	7- 12
104b	SW SW SW SW 18-117-59	Sand, very fine and silt, clayey	0- 6
		Gravel, fine, silty, sandy, very clayey	6- 11
		Gravel, fine to medium, very clayey	11- 16
105	NW NE NE NW 35-117-59	Sand, very fine; few pebbles	0- 7
		Sand, medium; few pebbles	7- 16
		Sand, medium, silty, clayey; saturated	16- 25
106	SW SE SW SE 25-117-59	Sand, medium to gravel, fine; slightly silty and clayey	2- 5
		Sand, coarse to gravel, fine; slightly silty and clayey	5- 7
		Sand, medium to gravel, fine, silty, clayey	7- 9
107	SW NW SW SW 6-117-58	Sand, fine	0- 1
		Sand, fine to medium, very clayey	1- 4
108	NE NW NE NW 1-117-58	Gravel, very coarse	0- 10
109	NE NE NE NW 1-117-58	Gravel, very coarse	0- 7
		Sand, medium to coarse	7- 10
		Sand, medium to coarse, gravelly	10- 22
		Sand, fine, clayey; oxidized, saturated	22- 38
		Sand, fine, clayey; unoxidized, saturated	38-110
110	NE NW NW NE 1-117-58	Gravel, very coarse	0- 2
		Gravel, fine to sand, coarse	2- 6
		Gravel, medium	6- 11
		Sand, medium to coarse	11- 17
		Sand, medium to coarse; little clay	17- 23
		Sand, medium to coarse; some gravel	23- 27
111	NW NW NE NW 12-117-58	Sand, medium; unoxidized, little clay	23- 28
		Sand, fine to medium; hard packed	28- 33
		Sand, fine to medium; little clay	33- 67
112	SE NW NW NE 31-117-58	Sand, fine to medium, gravelly	0- 2
		Sand, medium to coarse and gravel, fine	2- 8
		Gravel, fine to medium	8- 23
		Gravel, fine to medium, clayey	23- 27
		Gravel, fine to medium, very clayey	27- 35
		Gravel, medium; slightly clayey	35- 38
		Gravel, medium	38- 46
		Gravel, medium; almost entirely limestone	46- 48
		Gravel, medium	48- 51
		Gravel, medium to sand, coarse, gray, very clayey; unoxidized, saturated	51- 57
113	NE NE NE NE 36-117-58	Sand, fine to coarse, gravelly; oxidized	6- 11
		Sand, medium to coarse; oxidized, dry, little clay, difficult drilling	11- 17
		Sand, medium to very coarse; oxidized, saturated, easy drilling	17- 34

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, medium to very coarse; unoxidized, little clay	34- 57
114	SW NW NW NW 18-117-57	Sand, fine to medium, gravelly Sand, medium, clayey; saturated Sand, coarse Sand, coarse; unoxidized, some clay	1- 6 6- 15 15- 18 18- 20
115a	NW NW NW NW 19-117-57	Sand, gray, gravelly	5- 20
115b	NW NW NW NW 19-117-57	Sand, light brown, very fine; moist	8- 13
115c	NW NW NW NW 19-117-57	Sand, medium; oxidized, saturated, little clay, fairly clean Sand, coarse; oxidized, saturated, little clay Sand, medium to coarse, clayey; unoxidized, saturated	7- 12 12- 17 17- 19
116	NW SE SE SE 20-117-57	Sand, medium Sand, dark-gray, medium, very silty Sand, medium-brown, medium, clayey; saturated Sand, brownish-gray, medium, clayey; unoxidized	0- 1 1- 7 15- 21 21- 23
117	SW NW SW SW 22-117-57	Silt and fine sand, brown (topsoil) Silt and fine sand; oxidized, little clay Sand, fine; oxidized, little clay Sand, fine to medium; oxidized, saturated, little clay Sand, fine to medium, clayey; unoxidized, rock at 27	0- 2 2- 7 7- 12 12- 19 19- 41
118	NW NW NW NW 32-117-57	Sand, brown, very fine, silty; moist Silt, gray, much very fine sand; saturated	8- 13 13- 18
119	NE NW SW 31-117-57	Gravel and sand, fine; some clay Gravel Sand, coarse and gravel	4- 14 14- 24 24- 34
120	NE NE SE 31-117-57	Gravel Gravel and sand, coarse Gravel and sand, coarse; moist Sand, coarse; saturated Sand, gray, fine; saturated	0- 4 4- 9 9- 14 14- 19 19- 24
121	SE SE SW 32-117-57	Sand, coarse and gravel Sand, gray, fine; saturated Sand, brown, fine; saturated Sand, gray, fine, clayey	4- 9 14- 19 19- 24 24- 29
122	NW NW NW NW 19-117-56	Sand and gravel	18- 29
123	SW SE SW SE 3-116-59	Sand, medium	0- 5
124	NW SE NW 29-116-59	Gravel	10- 15

Test Hole No.	Location	Lithologic Description	From-to Feet
125	NE NE NE NE 18-116-58	Sand, light-tan, very fine	0- 8
126	NE SE NE 1-116-58	Gravel Gravel and sand Sand, coarse and gravel	0- 4 4- 9 9- 19
127	SE NW SE SE 1-116-58	Sand and gravel, rocks	4- 63
128	NW NW NE 13-116-58	Sand, brown, coarse and gravel, clayey	0- 4
129	SW SW NW SW 21-116-58	Sand, brown, clayey; dry, very dirty Sand, brown, very clayey; moist	1- 3 8- 10
130	NW NE SW SE 31-116-58	Sand	4- 10
131	SW SE SE SE 32-116-58	Sand, very light-tan, fine	0- 4
132	NW NW NE NE 25-116-58	Sand, fine, silty, gravelly Sand, fine, silty, gravelly; oxidized Sand, medium, silty, gravelly Sand, coarse, gravelly; unoxidized Sand, coarse to very coarse; some gravel, rock at 25 Sand, medium to coarse, silty; saturated Sand, fine to medium, silty, clayey; saturated Sand, fine, silty, clayey; saturated, some gravel	3- 7 7- 10 12- 22 22- 25 25- 41 41- 53 53- 60 60-105
133	SE SE SE SE 25-116-58	Sand, medium to coarse; some gravel	9- 50
134	SE SE SE SE 36-116-58	Sand, fine, silty, gravelly Sand, fine, silty, clayey; some gravel	2- 7 7- 14
135	SE NW NW 6-116-57	Sand, coarse; gravel Gravel Sand, brown; saturated Sand, gray, fine; saturated	4- 9 9- 14 19- 29 29- 39
136	NW SW NW 6-116-57	Sand, medium to coarse and gravel Sand, medium to coarse Gravel Sand, fine to medium Sand, fine; saturated Sand, fine, clayey	4- 9 9- 14 14- 19 19- 24 24- 29 29- 34
137	SW NE SW 6-116-57	Soil; gravel and sand Gravel Sand, coarse	0- 4 4- 9 9- 24
138	SE SW SW 6-116-57	Sand, gray, fine; saturated Sand, medium; saturated Sand, medium to coarse; saturated	9- 14 14- 19 19- 34
139	SW SW SE 6-116-57	Sand, gray, medium to coarse Sand, coarse Sand, medium Sand, medium, clayey	4- 9 9- 19 19- 24 24- 29

Test Hole No.	Location	Lithologic Description	From-to Feet
140	SE NW SE 6-116-57	Sand, coarse; saturated	4- 19
141	NE NE SE 6-116-57	Sand, brown and gray, fine Sand, fine to medium; saturated Sand, fine to medium	4- 9 9- 14 14- 19
142	SW NE NE 6-116-57	Sand, medium and gravel Sand, coarse and gravel Sand, coarse; moist Sand, coarse; saturated	4- 9 9- 14 14- 19 19- 24
143	NW NE NE NE 6-116-57	Gravel and sand	3- 16
144	NE NE NW NE 5-116-57	Sand, medium to very coarse, silty; oxidized, little clay Sand, medium to coarse; saturated, little clay Sand, medium; unoxidized, saturated, little clay Sand, medium, clayey; unoxidized, saturated Sand, fine to medium, clayey	1- 7 7- 15 15- 26 26- 41 41- 61
145	SW SE SW NW 7-116-57	Sand, gray	17- 21
146	NW NW SE 7-116-57	Sand, light-brown, fine, clayey	4- 9
147	SW SW SE SE 7-116-57	Sand, black (topsoil) Sand, fine, silty; oxidized Sand, very fine, silty, clayey; oxidized, few pebbles Sand, fine; oxidized, some clay Sand, gray, fine, clayey; unoxidized	0- 1 1- 2 2- 10 10- 15 15- 26
148	SW NE SW 7-116-57	Sand, yellow, fine to medium Sand, dark-gray, fine to medium Sand, gray, fine; saturated	4- 14 14- 19 19- 29
149	SE SW SW 7-116-57	Sand, brown, very fine; saturated Sand, brown, fine, clayey Sand, gray, very fine	9- 14 14- 19 19- 24
150	NW SW SW NW 30-116-57	Sand and gravel	1- 55
151	SW NW SW SE 29-116-57	Sand, fine to medium, clayey; oxidized, saturated Sand, fine to medium, clayey; unoxidized, saturated	3- 27 27- 49
152	SE SW SE SW 32-116-57	Sand, very fine; clean, little clay Sand, very fine; some clay Sand, very fine; saturated, little clay	4- 8 8- 11 11- 14
153	NE NE NE NE 33-116-57	Gravel, fine	12- 16
154	NE NW NW NE 26-116-57	Sand, very light-tan, very fine	0- 1



Test Hole No.	Location	Lithologic Description	From-to Feet
155	SW NW NW NW 7-116-56	Sand, yellow-brown, fine to medium	2- 13
156	NE NE SW NW 7-116-56	Gravel, brown Sand, medium to coarse	4- 18 18- 30
157	SE SE SE SE 4-116-56	Gravel, medium, sandy	13- 17
158	SW SE SE 1-115-60	Gravel	0- 5
159	SW NW NE NE 8-115-59	Gravel Sand, blue, fine Gravel, coarse	0- 10 10- 54 54- 64
160	SW SW SW SW 18-115-59	Sand, brown, medium to very coarse, clayey; saturated	19- 27
161a	NE NE NE NE 21-115-59	Sand, fine to medium, very clayey; saturated Sand, medium, very clayey, pebbles	11- 17 26- 36
161b	NW NE NE NE 21-115-59	Sand, fine to medium, silty Sand, fine to medium and fine gravel	1- 3 20- 23
162	SE SW NW SW 31-115-59	Gravel, very coarse	3- 7
163	NE NW SE NW 34-115-59	Sand	20- 25
164	SE SE SE SE 6-115-58	Gravel, medium to coarse	18- 28
165	NW NW NE NE 5-115-58	Sand, medium, gravelly	0- 6
166	NE NE NW NW 20-115-58	Sand, fine	1- 8
167	NW SW NW SW 20-115-58	Sand, light-tan, fine to medium Gravel, medium, sandy Sand, medium, silty, clayey Sand, medium-brown, coarse and fine gravel, silty, clayey; saturated Sand, gray, medium, silty, clayey; unoxidized	1- 3 3- 4 4- 8 8- 10 10- 13
168	NW NW NE NW 21-115-58	Sand, medium, gravelly Sand, medium, clayey Sand, medium, very clayey	0- 8 8- 16 16- 23
169	NW NE NE NW 28-115-58	Sand, light-tan, fine Sand, medium, gravelly; calcareous Gravel, fine, sandy Sand, medium; slightly gravelly Sand, medium; saturated, slightly gravelly Sand, gray, medium; unoxidized, slightly gravelly	0- 1 1- 4 4- 7 7- 16 16- 23 23- 30
170	NE NE NW NW 27-115-58	Sand, fine, gravelly Sand, medium Sand, medium, gravelly, clayey	0- 1 4- 11 11- 19

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, medium, clayey; saturated	19- 32
		Sand, medium, clayey; unoxidized	32- 40
171	SW SW SW SW 27-115-58	Sand, medium to coarse, gravelly	0- 12
		Sand, medium to coarse, clayey	12- 17
		Gravel, fine, very clayey; saturated	17- 22
		Gravel, fine, very clayey; unoxidized	22- 29
172	NW NE NW NW 34 115-58	Sand, very light-tan, fine	1- 3
		Sand, medium-brown, medium; slightly clayey	3- 6
		Gravel, medium	6- 7
173	NW NW NW NW 7-115-57	Sand, medium, gravelly	0- 17
		Sand, medium, gravelly; saturated, some silt	17- 19
		Sand, medium to coarse, silty	19- 22
		Sand, medium and gravel, fine, silty; some well-sorted medium gravel	22- 28
		Sand, medium and gravel, fine, silty; unoxidized, some well-sorted medium gravel	28- 48
174	SW SW NW SW 7-115-57	Sand, medium to coarse, gravelly	0- 11
		Gravel, fine; some medium to coarse sand	11- 13
		Sand, medium to coarse and gravel, fine	13- 15
		Sand, medium to coarse; some gravel	15- 32
		Sand, medium to coarse and gravel, fine; saturated, some well-sorted medium gravel	32- 39
		Sand, fine to medium; unoxidized, saturated	39- 51
175	NE NE NW NW 18-115-57	Sand, medium to coarse, gravelly	0- 11
		Sand, medium; some gravel	11- 18
		Sand, medium; saturated, some gravel	18- 24
		Sand, medium; unoxidized, saturated, some gravel	24- 30
		Sand, fine to medium; some gravel	30- 42
176	NW NW SW SW 18-115-57	Sand, medium to coarse, gravelly	0- 8
		Sand, medium to coarse, gravelly; saturated	8- 30
		Sand, fine to medium; unoxidized, saturated, some silt and clay	30- 35
		Sand, fine to medium, very clayey; some gravel	35- 40
177	SW SW SW SW 18-115-57	Gravel, coarse	2- 7
		Sand, coarse to gravel, coarse	12- 30
178	NW NW NE NW 17-115-57	Sand, medium	1- 3
		Sand, medium; some layers of clayey silt	3- 7
179	NE NE NE NE 17-115-57	Sand (topsoil)	0- 1
		Sand, medium; some clay and gravel	1- 7
		Sand, fine; some clay and gravel	7- 20
		Sand, very fine; some clay and gravel	20- 22
		Sand, very fine, clayey; unoxidized, saturated, some gravel	22- 26

Test Hole No.	Location	Lithologic Description	From-to Feet
180	NW NW NW SW 3-115-57	Sand, brown, fine; dry Sand, brown, fine to medium; moist	2- 9 9- 13
181	NW SW SW SW 15-115-57	Sand, brown, silty, clayey; (loess)	0- 17
182	NE NE SW SE 21-115-57	Gravel, brown	4- 10
183	NE SE SE NE 20-115-57	Sand, brown, fine to medium; dry, clean Sand, yellow-brown, very fine, clayey; moist Sand, gray, clayey; saturated, abandoned in sand	9- 13 13- 14 23- 24
184	NE NE NE NE 29-115-57	Sand, very fine, very silty; saturated Sand, very fine, very clayey; saturated	7- 12 12- 15
185	NE NE NW NW 29-115-57	Sand, black (topsoil) Sand, medium Sand, fine, clayey Sand, fine, clayey; saturated Sand, fine, clayey; unoxidized, saturated	0- 1 1- 12 12- 18 18- 22 22- 24
186	SE SE SE SE 19-115-57	Sand, medium to coarse, very gravelly Sand, medium to coarse, gravelly; satu- rated, some clay Sand, medium to coarse, gravelly; unoxidized, saturated, some clay	0- 7 7- 10 10- 11
187	NW SW SW NW 30-115-57	Silt and sand, very fine; some gravel Silt and sand, very fine; saturated, some gravel Sand, very fine and silt, very clayey	3- 12 12- 13 17- 21
188	NE NE NE NE 31-115-57	Sand, reddish-brown, medium to coarse; saturated, some gravel Sand, medium; unoxidized, saturated Sand, fine to medium, clayey	5- 13 13- 16 16- 28
189	NE SE NE SE 31-115-57	Sand, medium to coarse; few pebbles Sand, fine to medium; saturated, some clay Sand, very fine, clayey; saturated Sand, very fine; saturated, some clay Sand, very fine; unoxidized, saturated, some clay	0- 9 9- 16 16- 20 20- 27 27- 42
190	SE SE SE SE 30-115-56	Sand, medium; oxidized, saturated, dirty Sand, fine to medium; unoxidized, saturated, dirty	15- 23 23- 45
191	SW SW SW SW 33-115-56	Sand, coarse; dry, clean	2- 7
192	SW SW SW SW 34-115-56	Gravel, coarse; dry Sand, fine; oxidized, saturated, dirty	3- 5 25- 58
193	SW SW SW SW 31-114-59	Sand, red-brown, coarse to fine, very gravelly, clayey Gravel, coarse, sandy	2- 4 4- 5

Test Hole No.	Location	Lithologic Description	From-to Feet
194	SW SW SW SW 33-114-59	Sand, light- to medium-brown, coarse to silt, clayey; saturated	22- 26
		Sand, medium; clean	28- 36
		Sand, medium, clayey	40- 46
		Sand, medium to fine; clean	50- 65
195	NW NE NW NE 3-114-58	Sand, medium-brown, very fine	0- 7
		Sand, medium-brown, very fine, clayey; moist	7- 8
196	NW NE NE NW 10-114-58	Sand, medium	0- 5
		Sand, very fine, very clayey; saturated	5- 8
		Sand, medium-brown, medium, very clayey, silty	8- 12
197	NE NE SW SW 10-114-58	Gravel, coarse	19- 20
		Sand, fine to medium	20- 33
198	SW NW NW SW 13-114-58	Sand, fine, gravelly	0- 4
		Sand, fine to medium	4- 11
		Sand, fine to medium; saturated	11- 19
199	NW SW SW NW 25-114-58	Sand, fine, gravelly	0- 1
200	SE SE SE SW 26-114-58	Sand, light-tan, fine	0- 3
		Sand, light-brown, fine	3- 8
		Sand, light-brown, fine; slightly silty and clayey	8- 12
		Sand, light-brown, fine, silty, clayey	12- 13
		Sand, light-brown, fine, silty, clayey; saturated	13- 16
		Sand, gray, fine, silty, clayey; unoxidized	16- 26
		Sand, gray, medium, gravelly	26- 35
201	SE SW NE SE 34-114-58	Sand, medium to fine, silty; saturated, little clay, dense	8- 11
		Sand, medium to coarse; saturated, little silt and clay, very dense	11- 13
		Sand, medium to coarse, gravelly; saturated, little silt and clay, dense	13- 15
202	SW SE SE SW 35-114-58	Sand, medium to coarse, very gravelly	0- 12
		Sand, coarse, very gravelly; saturated	12- 25
		Sand, coarse, very gravelly; unoxidized, saturated	25- 36
203	NW NW NW NW 5-114-57	Sand, black (topsoil)	0- 3
		Sand, medium to coarse, very gravelly; some clay	3- 5
		Gravel, fine, pebbles; some sand	5- 7
		Sand and gravel, fine	7- 13
		Sand and gravel, fine, clayey; saturated	13- 19
204	NW NE NE NW 5-114-57	Sand, medium to coarse, clayey, very gravelly, pebbles	4- 7
		Sand, medium to coarse, clayey, very gravelly, pebbles; saturated	7- 15

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, medium to coarse, silty, abundant pebbles; unoxidized, saturated	15- 20
		Sand, fine to medium, silty	20- 28
		Sand, fine to medium, silty, clayey	28- 32
205	SE SE SE SW 5-114-57	Sand, medium to coarse, clayey, gravelly	4- 7
		Sand, medium to coarse, clayey, gravelly; saturated	7- 14
		Sand, medium to coarse, gravelly; unoxidized, saturated, some clay	14- 44
206	SW SW NW NW 21-114-57	Sand, medium to coarse, gravelly	1- 30
		Sand, medium to coarse; few pebbles, some clay	30- 38
		Sand, medium to coarse, clayey, gravelly; saturated	38- 44
		Sand, medium to coarse, very clayey, very gravelly; saturated	44- 48
		Sand, medium to coarse, very clayey, very gravelly; unoxidized, saturated	48- 54
207	NE NE NW NE 29-114-57	Sand, medium to coarse, very gravelly	0- 4
		Sand, medium; slightly gravelly	4- 7
		Sand, medium to coarse; gravelly	7- 11
		Sand, medium to coarse; saturated, slightly gravelly	11- 24
		Sand, medium to coarse; unoxidized, saturated, slightly gravelly	24- 41
		Sand, medium to coarse, clayey; unoxidized, saturated, slightly gravelly	41- 46
208	SW SE SE SW 21-114-57	Sand, medium to coarse and gravel, fine; little clay and silt, dense	2- 4
		Sand, medium to coarse, silty, clayey; firm	4- 5
		Silt, sandy; little clay, firm	5- 6
		Sand, medium; little silt and clay	6- 21
209	NE NE SE 21-114-57	Sand, medium to fine, clayey	8- 16
210	SE SE SE SE 33-114-57	Sand and gravel	5- 15
		Sand and gravel	19- 32
211	SW SW SW SW 34-114-57	Gravel, yellow	6- 15
		Sand and gravel	15- 30
212	SE SE SE SW 34-114-57	Sand, very fine and silt; few pebbles	4- 12
213	SW SE SW SW 35-114-57	Sand, very fine and silt, very clayey; slightly gravelly	0- 17
214	SE NW NW NW 36-114-57	Silt and sand, very fine; few pebbles	5- 13
215	NE SW NW NW 19-114-56	Silt and fine sand; saturated, little clay, soft	7- 8
		Silt, clayey; some fine sand, moderately firm	8- 13

Test Hole No.	Location	Lithologic Description	From-to Feet
216	SE SE NW NW 21-114-56	Sand, medium to coarse, gravelly; some clay	6- 11
217	SE SE NW NE 22-114-56	Silt and fine sand; some clay, hard	0- 4
218	NW NW NW NW 31-114-55	Sand, yellow-brown, clayey (loess?)	3- 8
219	NE NE NW SW 8-113-58	Silt and sand, very fine, gravelly	3- 7
		Sand, fine to medium and silt, gravelly	7- 10
		Sand, coarse and gravel, silty	10- 12
		Sand, dark-brown, medium, very silty; saturated, some gravel	12- 13
		Sand, very dark-brown, medium to coarse, silty, clayey	13- 14
		Sand, greenish-gray, medium, silty, clayey	17- 18
		Sand, medium-brown, medium, gravelly, silty, clayey	18- 20
		Sand, dark-gray, medium, gravelly, clayey; unoxidized	20- 26
		Sand, dark gray, medium to coarse, gravelly, clayey	26- 36
		Sand, dark-gray, fine, silty, clayey	36- 47
220	SW NE NW SW 8-113-58	Sand, fine and silt, light-brown	1- 6
		Sand, fine to medium, silty, clayey, gravelly	16- 20
		Sand, fine, silty; saturated	27- 30
		Sand, fine, silty; unoxidized, saturated	30- 39
		Sand, medium to very coarse	39- 40
		Sand, medium to coarse	40- 46
		Sand, medium to coarse, clayey, silty	46- 55
221	NW NW SW SW 8-113-58	Sand, fine to medium, gravelly	1- 2
		Sand, brownish-gray, fine to medium, clayey; unoxidized, saturated	28- 31
		Sand, gray, fine to medium, very clayey; unoxidized, saturated	31- 44
222	SW SW SE SW 8-113-58	Sand, fine to medium	2- 4
223	NW NW NW SW 9-113-58	Sand, medium to coarse, silty	1- 4
224	SE NE NE SE 10-113-58	Sand, medium-brown, medium, very silty and clayey; saturated, some fine gravel	5- 8
		Sand, medium-brown, medium, very silty and clayey	8- 18
		Sand, gray, medium, very silty and clayey	18- 19
		Sand, gray, medium to coarse, silty and clayey	19- 28
		Sand, gray, fine, very silty and clayey	28- 41
225	SE NE NE SE 2-113-58	Sand, light-tan, medium to coarse, gravelly	0- 4
		Sand, reddish-brown, medium to coarse, gravelly	4- 8
		Sand, medium-brown, medium to coarse; saturated	8- 21
		Sand, medium; slightly clayey	21- 32

Test Hole No.	Location	Lithologic Description	From-to Feet
226	NW SW SW SW 12-113-58	Sand, medium	0- 1
		Sand, medium, clayey	10- 14
		Sand, medium; saturated, slightly clayey	14- 26
		Sand, medium; unoxidized, saturated, slightly clayey	26- 37
227	SW SW SW SW 18-113-58	Silt and sand, fine to medium; unoxidized	22- 31
		Silt and sand, fine to medium; unoxidized, saturated, hit rock, impenetrable	31- 38
228	SW SW SW SW 31-113-58	Silt, light-brown and sand, fine to very fine; slightly clayey	18- 22
		Sand, medium-brown, medium, very clayey; saturated, fairly easy drilling	22- 28
229	NE NE SE SE 25-113-58	Sand, fine to medium, silty, clayey	1- 4
		Sand, medium	4- 7
		Sand, fine to medium, silty, clayey; saturated	16- 27
230	NE NE NE NE 4-113-57	Sand, medium to coarse, abundant gravel	0- 11
		Sand, medium to very coarse, abundant gravel; saturated, slightly clayey	11- 25
		Gravel, medium; saturated, slightly clayey	25- 30
		Gravel, medium; unoxidized, saturated, slightly clayey	30- 40
231	NW NE NW NW 3-113-57	Sand, very fine and silt, clayey; few pebbles	0- 9
232	SE SE NE NE 4-113-57	Gravel	3- 6
		Sand, coarse	6- 14
		Gravel, pea	14- 23
		Sand, coarse	25- 41
233	SE SW SE NE 4-113-57	Gravel	2- 7
		Gravel with clay layers	12- 25
234	NE NE SE SE 4-113-57	Sand and gravel	2- 35
235	NW NW NW NW 10-113-57	Sand, medium, gravelly	4- 11
		Sand, medium to coarse, gravelly	11- 26
		Gravel, medium; slightly sandy	26- 31
		Gravel, coarse; slightly sandy and clayey	31- 41
		Sand, fine to medium, very clayey; slightly gravelly	41- 47
		Sand, fine to medium, very clayey; saturated, slightly gravelly	47- 49
236	NW NW SE SE 4-113-57	Sand and gravel	2- 12
		Gravel	22- 35
237	SW 4-113-57	Sand and gravel	2- 15
238	SW SW SE SW 10-113-57	Sand, medium to coarse, gravelly	0- 23
		Sand, medium to coarse, gravelly; saturated, slightly clayey	23- 36

Test Hole No.	Location	Lithologic Description	From-to Feet
239	SE SE NW NW 15-113-57	Sand and gravel	2- 18
240	SW NE NE SW 15-113-57	Sand	2- 23
241	SW SW NE SW 15-113-57	Sand	2- 15
242	NE NW NW NE 22-113-57	Sand, medium to coarse; slightly gravelly	0- 22
		Sand, medium to coarse, gravelly; saturated	22- 27
		Sand, medium to coarse, gravelly, clayey; unoxidized, saturated	27- 42
243	SW SW SW SW 18-113-57	Sand and gravel	3- 5
244	NW 32-113-57	Sand and rocks	4- 10
245	SW SW SW SE 21-113-57	Sand, brown, very coarse and gravel; dry, dirty	0- 8
246	SE SE NW NE 28-113-57	Sand and gravel	2- 23
247	SW SE SW SE 28-113-57	Gravel, clayey	2- 12
248	NE NE NE NW 34-113-57	Gravel, red-brown, coarse, very clayey; moist	7- 9
249	NE NW SW NW 27-113-57	Gravel	2- 10
250	SE NW NW NW 27-113-57	Sand and gravel	2- 15
251	NW SE SE SW 22-113-57	Sand, coarse	0- 17
		Sand	17- 20
		Sand with coal	20- 30
		Sand, coarse	30- 40
		Gravel, coarse and sand; little blue clay	40- 50
		Gravel, coarse with blue clay	50- 60
252	SE SE SW SE 22-113-57	Gravel	8- 17
253	NW NE NE NE 27-113-57	Sand, medium to coarse, very gravelly	3- 6
		Sand, fine to coarse, gravelly	6- 11
		Sand, medium to coarse, very gravelly	11- 13
		Sand, fine to medium; slightly gravelly	13- 22
		Sand, fine to medium; saturated, slightly gravelly	22- 30
		Sand, fine; saturated	30- 34
		Sand, fine; unoxidized, saturated	34- 48
254	SW SE SW NE 23-113-57	Sand and gravel	2- 35
255	SE SE NE SW 26-113-57	Sand and gravel	2- 44
256	SE SE SE SW 26-113-57	Sand, medium to coarse, very gravelly	0- 4
		Gravel, coarse	4- 15
		Sand, medium to coarse, very gravelly	15- 30
		Gravel, medium, very sandy; saturated	30- 37
		Gravel, medium, very sandy; unoxidized, saturated	37- 59



Test Hole No.	Location	Lithologic Description	From-to Feet
257	NE NE NW NW 36-113-57	Sand, very fine and silt; slightly gravelly	4- 7
258	NE NW NE NE 2-112-57	Sand, medium to coarse, very pebbly Sand, medium to coarse, silty, very pebbly; saturated Sand, medium to coarse, very pebbly; unoxidized, saturated, slightly silty	1- 5 5- 30 30- 43

TABLE 2. List of sand and gravel pits in Clark County, South Dakota, which are on file at the District Office, South Dakota Department of Highways, Aberdeen, South Dakota.

Pit No.	Owner and Address	Description	Type	Average Depth in Feet	Average Depth of Stripping in Feet
1	Fahrenwald, Ernest L.	SW $\frac{1}{4}$ SE $\frac{1}{4}$ 5 119-59			
2	O'Conner, Alvin	SW $\frac{1}{4}$ 8-119 59			
3	Lederman, Fred — Crandall	NE $\frac{1}{4}$ 17-119 59	Filter	1.0	7.7
4	Lederman, Fred — Crandall	SE $\frac{1}{4}$ 8-119 59		1.0	7.7
5	Lederman, Fred — Crandall	SW $\frac{1}{4}$ 9-119-59		2.3	5.5
6	Calsen, Raymond — Crandall	SE $\frac{1}{4}$ 2-119 59		2.5	5.8
7	Grimes, Forest — Crandall	SE $\frac{1}{4}$ 1-119-59		1.2	7.1
8	Lederman, Jacob — Crandall	NW $\frac{1}{4}$ 12 119-59		1.6	8.8
9	Mass, Floyd A. and Julia — Conde	S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ 13-119-59	Gravel		
10	Mass, Floyd A. and Julia — Conde	N $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ 13-119-59	Gravel		
11	Imsland, Almer — Crandall	SE $\frac{1}{4}$ 21-119-59	Filler		
12	Imsland, Dagfinn T. — Crandall	NW $\frac{1}{4}$ 21-119-59		1.5	5.7
13	Calsen, Grant M. — Lily	NE $\frac{1}{4}$ 20-119-59		5	6
14	Kettler, O. H. — Platteville, Wisconsin	SE $\frac{1}{4}$ 20-119-59		4.5	8.0
15	Huber, John S. — Raymond	SE $\frac{1}{4}$ 29-119-59		2.4	6.3


16	Lederman, Fred — Crandall	SW¼ 28-119-59		1.5	7.0
17	Nordseth, A. O. — Clark	NW¼ 33-119-59			
18	Lederman, Fred — Crandall	SW¼SW¼ 34-119-59	Sand & Gravel		
19	Lederman, Fred — Crandall	S½NE¼ 34-119-59	Sand & Gravel		
20	Lederman, Fred — Crandall	N½SE¼ 34-119-59	Sand & Gravel	2	7.2
21	Dohman, Wm. — Lily	S½NW¼ 18-119-58		1.8	7.2
22	Regnier, Jesse — Crocker	NE¼ 19-119-58	Filler		
23	Department of School and Public Lands — Pierre	SE¼ 33-119-58		1.8	7.6
24	Olson, Harris — Bradley	SE¼NE¼ 11-119-57		1.2	11.5
25	Fryett, Harry — Bradley	NE¼SE¼ 11-119-57		1.3	11.0
26	Lundholm, Gladys — Bradley	SE¼ 33-119-57		3.5	7.4
27	Bender, Ada M. — Bradley	S½SE¼ 34-119-57	Sand	1.0	11.0
28	Bender, C. H. — Bradley	E½SE¼ 34-119-57		0.8	4
29	Waller, Erick — Webster	SE¼ 6-119-56		0.5	10.5
30	Bauman, Irvin — Bradley	SE¼ 6-119-56		1.5	9
31	Evenson, Orlyn — Lily	SW¼ 5-119-56			
32	Knutson, Rudolph — Lily	SE¼ 5-119-56		2.0	5.6
33	Lee, Alvin — Lily	NW¼ 9-119-56		1.0	11.0
34	Ramsvick, Carrie — Wallace	W½SE¼ 10-119-56			


Pit No.	Owner and Address	Description	Type	Average Depth in Feet	Average Depth of Stripping in Feet
35	Ramsvick, Carrie — Wallace	N½NW¼ 14-119-56		5.0	16+
36	Ramsvick, Orlando J. — Council Bluffs, Iowa	NE¼ 15-119-56		1.0	7
37	Lund, Ingvald — Bradley	SW¼ 26-119-56		0.8	5
38	Calfas, Ernest — Webster	N½SE¼ 26-119-56			
39	Huber, Carter — Raymond	NW¼SE¼ 4-118-59		2.0	3.5
40	Raines, Clyde — Raymond	SE¼ 15-118-59		1.9	7.7
41	Eucker, Wm. — Raymond	SE¼ 28-118-59			
42	Kloster, Louis J. — Clark	NW¼ 10-118-58		1.8	7.6
43	Bowne, Lewis — Clark	S½SW¼ 35-118-58	Gravel		
44	School and Public Lands	SE¼ 36-118-58		1.9	5.4
45	Nass, Ole H. — Bradley	NW¼NW¼ 3-118-57		1.6	5+
46	Nisich, Geo. — Bradley	SW¼SE¼SE¼SE¼ 5-118-56			
47	Robb, Harry — Garden City	S½NW¼ 25-118-56		2.0	5.3
48	Eck, Wm. — Henry	W½NE¼ 25-118-56		3.7	7.7
49	MacTaggart, Glenn — Raymond	N½ 18-117-59			
50	Smith, Robert G. — Clark	W½NE¼ 31-117-58		1.5	7.4
51	Thies, Wm. G. — Clark	NE¼ 1-117-58		2.9	8.6
52	Wika, Melvin — Clark	NW¼SW¼ 30-117-57	Filler	2.9	5.0


53	Clausen, Harold — Clark	NW¼ 31-117-57	0.8	7.8
54	Benson, Max and Genevieve — Clark — The Old Line Life Ins. Co. of America	SW¼ 31-117-57		
55	Benson, Max and Genevieve — Clark — The Old Line Life Ins. Co. of America	SE¼ 31-117-57		
56		NW¼ 18-117-56	Gravel	
57	Kraft, A. B. — Raymond	NE¼ 13-116-59	3.0	6.1
58	Graves, H. V. — Decatur, Illinois	SE¼ 13-116-59	1.3	7.8
59	Ollis, B. — Clark	SE¼ 6-116-58	Filler	
60		SW¼ 7-116-58	Sand & Gravel	
61	Clark County	SE¼ 7-116-58	Filler	
62	Sherwood, Emma — Clark	NE¼ 18-116-58	3.1	7.6
63	Lindberg, Edwin — Clark	NE¼ 1-116-58	2	4
64	Callsen, Raymond — Clark	NE¼ 25-116-58	1.2	10.8
65	Sundvoid, Elmer — Clark	SE¼NE¼ 25-116-58	4.7	9.2
66		SE¼ 19-116-57	Filler	
67	Mathison, M. — Clark	NW¼SE¼ 31-116-56	2.7	11.0
68	Morrison, Orvis — Clark	N½SE¼ 29-116-56	2.4	8.0
69	Fuller, Leonard — Clark	NE¼NW¼ 34-116-56	0.5	4.0+
70	Hill, Marlin W. and Mildred G. — Raymond	S½NE¼ 11-115-59	2.2	8.8

Pit No.	Owner and Address	Description	Type	Average Depth in Feet	Average Depth of Stripping in Feet
71	Fechtelkorter, Wendell	SE¼ 33-115-58		2	9
72	Larson, Ben — Clark	NW¼SW¼ 18-115-57			
73	School and Public Lands	NE¼NW¼ 16-115-57	Sand & Gravel	2.0	7.7
74	Peterson, Clarence — Naples and Rassmussen, Adeline — Clark	NW¼SW¼ 20-115-57		1.0	5.6
75		NW¼ 25 115-56			
76		NE¼ 6-114-58	Gravel		
77	Holborn, Florence J. and George, Sr. — Watertown	SW¼ 26-114-58	Gravel	2	4
78	McGeough, Bernard — Willow Lake	NE¼SE¼ 35-114-58		3.5	5
79	Schmidt, Melvin J. — Willow Lake	SW¼SE¼ 36-114-58		3	8
80	Geise, Edwin — Willow Lake	NW¼ 5-114-57	Gravel		
81	Schmidt, Menno J. (estate) — Willow Lake	NE¼NE¼ 4-114-57			
82	Goering, Gust	NE¼ 20-113-58			
83		NE¼ 4-113-57		3.0	4.4
84	Schmidt, Menno J. (estate) — Willow Lake	SE¼NE¼ 4-113-57			
85	Schmidt, Menno — Willow Lake	SW¼ 4-113-57			

86	Schmidt, Menno — Willow Lake	S½SE¼ 4-113-57	1.7	3.7
87	Schmidt, Menno — Willow Lake	W½ 3-113-57	1.5	10
88	Olsen, O. Erner — Willow Lake	N½NE¼NE¼ 27-113-57	1.5	6.2
89	Olsen, O. Erner — Willow Lake	E½NE¼ 27-113-57	1.5	6.2
90	Hvistendal, Dale — Worthington, Minnesota, Schmidt, Melvin — Willow Lake	NE¼NW¼NW¼ 26-113-57 Sand	1.2	4.8
91	Siebrands, Geo. — Willow Lake	NE¼ 26-113-57	1.0	8.5
92	Hvistendal, Dale — Worthington, Minnesota	SE¼NE¼ 26-113-57		
93	Disrud, Elsie — Huron	NE¼NW¼ 35-113-57	2.7	10.8
94	Anderson, Neil — Willow Lake	NE¼ 35-113-57		
95	Meyers, Ed — Willow Lake	NW¼NW¼ 18-113-56	1.4	4.6
96	Davison	SE¼NE¼ 35-113-56		
97	Gilbertson, Sam — DeSmet	SE¼SE¼ 36-113-56	3.7	6.8+

 Good probability of finding sand or gravel deposits.

 Fair probability of finding sand or gravel deposits.

 Poor probability of finding sand or gravel deposits.

Letters A through M designate areas described in the text.

- Test hole containing sand or gravel in upper 25 feet with 0-5 feet of overburden. Number refers to table 1.
- Test hole containing sand or gravel in upper 25 feet with 6-25 feet of overburden. Number refers to table 1.
- Test hole containing no sand or gravel in upper 25 feet.
- ✕ Gravel pit; those with a number are listed in table 2.

 Approximate boundary



Index map of South Dakota showing location of Clark County



6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Sectionized township

Map showing test holes, gravel pits, and sand and gravel deposits in Clark County.



