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

by

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United States Geological Survey  
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## CONTENTS

	Page
INTRODUCTION .....	1
EXPLANATION OF TABLES .....	1
EXPLANATION OF MAP .....	1

## TABLES

1. List of test holes in Hamlin County, South Dakota, which contain sand and/or gravel in the upper 25 feet .....	2
2. List of sand and gravel pits in Hamlin County, South Dakota, which are on file at the District Office, South Dakota Department of Highways, Huron, South Dakota .....	27

## ILLUSTRATION

Map showing test holes, gravel pits, and sand and gravel deposits in Hamlin County .....	31
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## INTRODUCTION

This pamphlet is one of a series of reports completed on the geology and hydrology of Hamlin County, South Dakota. The purpose of this report is to indicate areas in which to search for sources of aggregate material. The quality of the deposits mapped was not analyzed nor the quantity of available reserves measured. These would require considerable more drilling and prior knowledge of the material specifications for each intended use.

Two other reports are part of this series. The first is a comprehensive, three-part publication entitled the "Geology and Water Resources of Deuel and Hamlin Counties, South Dakota." It contains the technical aspects of the study along with the basic data. It should be used in conjunction with this report as it defines and explains the distribution of earth materials in Hamlin County. It will also help answer questions of geologic and hydrologic interest.

The second report is an information pamphlet entitled "The Major Aquifers in Deuel and Hamlin Counties, South Dakota." It shows the areal distribution of major glacial aquifers and gives their expected yields and quality. It also discusses the bedrock aquifers and their yields and quality.

## EXPLANATION OF TABLES

Table 1 is a list of test holes drilled in Hamlin County along with their locations. Most of them have been drilled by either the South Dakota Geological Survey or the United States Geological Survey. A few have been supplied by private drillers or the State Highway Department. Only that part of the log which showed sand and/or gravel has been included in this table in order to reduce the amount of extraneous information. The complete log can be found in the basic data portion of the comprehensive report. The numbers correspond to the numbered test hole symbols on the map.

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. The numbers refer to the numbered gravel pit symbols on the map.

## 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 triangle (▲), 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 contain no numbers because they are not listed in the tables. The other three symbols refer to holes which did hit sand and/or gravel in the upper 25 feet. A filled circle means that there was from 0-4 feet of overburden, a filled triangle stands for one which has 5-10 feet of overburden, and a filled square represents a location with 11-24 feet of overburden. The numbers beside each symbol refer to the test hole list in table 1 which tells 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 Huron, 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 observation, the County has been divided into three types of areas describing the probability of finding sand or gravel—good, fair, and poor. An area with a designation "good" has deposits that are fairly thick (14 feet or more) over a large area and covered by little overburden or are less consistent areally but are very thick. An area with a designation "fair" has deposits which (1) are not very thick or (2) have excessive overburden. An area with a designation "poor" has few deposits of sand and gravel. This does not mean there are no deposits in these areas. Some very productive pits are located in the "poor" areas, but the deposits are localized and difficult to locate without intensive exploration.

**TABLE 1. List of Test Holes in Hamlin 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 7-115-55	Sand and gravel	2- 4
2	NE NE NW NW 16-115-55	Sand, light-brown, medium; saturated, some clay	7- 15
3	SW SW NW NW 11-115-55	Sand, brown, coarse	4- 6
4	NE NE NE SW 12-115-55	Sand, yellowish-gray, very fine Gravel, brown; some clay	0- 5 5- 10
5	SE SE NE SW 13-115-55	Sand, brown, fine to medium	5- 17
6	NW NW SE NW 24-115-55	Gravel, reddish-brown; some clay	5- 19
7	SW SW SE NW 24-115-55	Gravel, reddish-brown	6- 12
8	NE NE NW NE 25-115-55	Sand, yellowish-brown	2- 10
9	SW SW SW SW 33-115-55	Sand, medium; dry clean	1- 8
10	NE NE SE SE 34-115-55	Sand, medium; some silt and clay, hard	12- 13
11	SE SE NE 35-115-55	Sand, medium; saturated, some clay, silt gravel, poorly graded	7- 9
12	NW SW NW NW 16-115-54	Sand, light-brown, medium; saturated, some clay	7- 17
13	SW SW NW SW 15-115-54	Sand, coarse to medium, gravelly; some clay and silt	2- 23
14	SE SE SW SE 15-115-54	Sand	4- 10
15	NE SW SW SW 35-115-54	Sand, brown	3- 8
16	SE NE NE NE 35-115-54	Sand and gravel, brown; moist Sand, gray, medium, clayey; saturated	4- 8 8- 30
17	NW NW NW NW 2-115-53	Sand, brown, medium; hit rock	0- 7
18	SE NE NE NE 2-115-53	Sand, yellow-brown, medium; dry	4- 8
19	SE SE SE SE 3-115-53	Sand, medium to coarse, clayey; oxidized, saturated to 10 feet Sand, clayey; unoxidized, saturated	5- 15 15- 20
20	SE NE SE SE 2-115-53	Gravel, light-brown, fine; dry Sand, yellow, medium; dry Sand, coarse and gravel, fine; dry, some scattered cobbles, sand collapsed, had to back augers out, impassable	0- 6 6- 9 9- 39
21	NE NE NE SE 10-115-53	Sand, brownish-gray, very silty; saturated Gravel and sand, medium; saturated	7- 9 9- 12

Test Hole No	Location	Lithologic Description	From-to Feet
22	NE NE NE NE 15-115-53	Sand and gravel; saturated at 5 feet	0- 6
23	NW NE NE NE 21-115-53	Sand	0- 5
24	SW SW NW NW 22-115-53	Gravel, clayey	2- 8
25	SW SE SE SE 29-115-53	Sand, brown, very fine, silty; saturated	4- 12
26	SE SE SE SE 1-115-53	Sand, reddish-brown, gravelly; dry Gravel and sand; dry, dirty Sand, reddish-brown, medium; dry Sand and gravel, fine; saturated Sand, brown, medium to coarse; some gravel, dirty Sand, gray, medium to coarse; some gravel, dirty Gravel and sand	2- 3 3- 8 8- 15 15- 17 17- 25 25- 30 30- 31
27	SE SW SE SW 13-115-53	Gravel	4- 10
28a	SW SE SE SE 13-115-53	Sand, dark-brown, very coarse, clayey; saturated, dirty	4- 5
28b	SE SE SE SE 13-115-53	Sand, brown, medium; dry, uniform	0- 5
29	SE SE SE NE 26-115-53	Sand, rusty-brown, gravelly, rocks; hit rock, impassable	2- 42
30	NW NW NW NW 6-115-52	Gravel and sand; dry Sand, grayish-brown; saturated, dirty Sand	2- 3 6- 7 14- 17
31	NE NE NE NW 6-115-52	Gravel and sand, light-brown, silty; dry Gravel and sand, brown, medium; very silty and clayey, dry	1- 4 4- 7
32	SW SW SW SE 6-115-52	Sand, brown, medium to coarse, gravelly; dry	3- 17
33	NE NE NW NE 7-115-52	Sand, fine to coarse; moist	2- 7
34	NE NE NE NE 8-115-52	Sand and gravel, medium to coarse; some clay	8- 22
35	NW NW NW NW 3-115-52	Sand, brownish-gray, fine to medium, silty; some very coarse	9- 16
36	NE NE NE NW 3-115-52	Sand and gravel, fine to medium, silty, clayey; dry Sand and gravel, brown, fine to medium; saturated at 8 feet Sand and gravel, coarse Sand and gravel, brown, fine to medium, silty	2- 4 4- 13 13- 15 15- 18
37	SE SW SW SW 3-115-52	Sand, brown, fine to medium, silty, clayey; saturated Sand, brown, fine to medium, silty Sand and gravel, brown, fine Sand and gravel, brown, clayey, silty	2- 5 5- 8 8- 19 19- 22
38	NW NE NE NE 3-115-52	Sand, brown, medium; dry, dirty Sand, very coarse and gravel, fine; dry	2- 4 6- 12

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand, very coarse and gravel, fine; saturated, very clean	12- 27
		Gravel, very coarse, rocky	27- 29
39	NW NW NE NW 2-115-52	Gravel and sand, brown, medium, silty; dry	5- 8
		Sand, brown, fine to medium; dry	8- 12
		Sand and gravel, brown, fine to medium; saturated at 14 feet	12- 17
		Sand, brown, medium to very coarse, gravelly	17- 30
		Sand, gray, medium to very coarse, gravelly	30- 39
40	NE SE NE SE 3-115-52	Sand, white, very coarse and gravel, fine; saturated, clean	4- 7
		Sand, very coarse; saturated, some fine gravel, clean	7- 19
		Gravel, very coarse, rocks	19- 20
41	NW NW NW NE 10-115-52	Gravel, brown, silty, sandy; moist	1- 2
		Sand and gravel, brown, fine to medium; saturated	2- 10
42	SW SW SW SW 2-115-52	Sand and gravel, light grayish-brown, fine to medium, silty; saturated	1- 7
		Gravel and sand, gray, fine to medium	7- 23
43	SE SE SE SW 2-115-52	Sand, brown, very fine to fine, silty; dry	2- 8
		Sand and gravel, brown, fine; dry	8- 10
		Sand and gravel, brown, fine; saturated at 14 feet, few coarse gravel streaks	10- 20
		Sand, brown, medium to very coarse, gravelly	20- 30
44	NW NE NE NW 15-115-52	Gravel and sand, light-brown, medium, silty; dry	2- 4
		Gravel and sand, brown, medium to coarse	4- 12
		Gravel and sand, brown, fine to medium; saturated	12- 17
		Sand, brown, very coarse, clayey, gravelly	17- 23
		Sand and gravel, brown, fine to medium	23- 31
		Sand and gravel, brownish-gray, fine to medium, clayey, silty	31- 34
45	NW NW NE NE 15-115-52	Gravel, black, fine; saturated, clean	5- 19
		Sand, brown, fine; saturated, clean	19- 22
		Gravel, gray, fine; saturated, very clean	22- 25
46	NE NE NW NW 22-115-52	Sand, dark reddish-brown, medium; saturated at 3 feet, dirty	2- 4
		Gravel and sand, fine to medium; saturated, very dirty	4- 7
		Sand, medium, gravelly; dirty	7- 15
47	NE NE NE NE 29-115-52	Sand, coarse; saturated	5- 7
		Sand, fine; saturated, sorted	7- 23
48	SE SE SE SE 21-115-52	Sand, fine to medium; well sorted, dirty	7- 15
		Sand, fine to medium; saturated, well sorted, dirty	15- 18
		Sand, medium to coarse; saturated	18- 22
		Sand, coarse; saturated, some gravel	22- 24
49	NE NE NE NW 1-115-52	Gravel and sand, light-brown, medium, very silty; dry	3- 9
		Gravel and sand, brown, medium to coarse, silty; dry	9- 15

Test Hole No.	Location	Lithologic Description	From-to Feet
50	NE NE NE NE 1-115-52	Gravel, cobble, rocks; dry, some clay, impassable	0- 2
51	NE NE NE NW 12-115-52	Gravel and sand, brown, medium to coarse, silty; dry	7- 12
52	SE SE SE SW 11-115-52	Sand, brown, coarse; saturated, fairly clean Sand, very coarse and gravel, fine; saturated, very clean Gravel, very coarse, rocks	5- 15 15- 26 26- 27
53	SW SW SW SW 12-115-52	Sand, brown, medium, clayey; moist	1- 3
54	NW NE NE NW 22-115-52	Gravel, light-brown, silty, sandy Gravel and sand, brown, medium; dry Gravel and sand, reddish-brown, fine to medium; dry Gravel and sand, brown, fine to medium; saturated at 11 feet Gravel, brown, coarse; saturated	0- 1 1- 5 5- 9 9- 20 20- 21
55	SW SW SE SE 15-115-52	Gravel, brown; saturated, dirty	1- 6
56	SE SE SE SE 15-115-52	Gravel, coarse	2- 24
57	NW NW NW NE 27-115-52	Sand, brown, fine to medium; dry Sand and gravel, brown, fine to medium; dry Sand, brown, medium to very coarse, gravelly; saturated Sand and gravel, gray, medium	3- 7 7- 15 15- 18 18- 27
58a	SE SE SE SE 22-115-52	Sand, fine to coarse Sand, coarse; saturated, some 1-inch pebbles Gravel, medium; saturated Sand; unoxidized, saturated, some silt	3- 10 10- 15 15- 25 25- 48
58b	SE SE SE SE 22-115-52	Sand and gravel; unsorted, dirty Sand, fine to coarse; saturated, dirty Sand, gray, coarse; sorted, dirty	3- 11 11- 19 19- 29
59	NW NE NE NE 27-115-52	Gravel, medium to coarse; dry Sand and gravel, brown, medium to coarse; dry Sand and gravel, brown, fine to medium; saturated Sand and gravel, gray, fine to medium	0- 3 3- 6 6- 12 12- 24
60	NE NW NW NW 34-115-52	Sand, light-brown, fine to medium, silty, gravelly; dry Sand, reddish-brown, medium to coarse, gravelly; dry Sand and gravel, brown, fine to medium; saturated at 11 feet	1- 4 4- 9 9- 25
61	SE SE SE SW 27-115-52	Gravel and sand, brown, medium Gravel and sand, gray; some interbedded clay	2- 23 23- 28
62a	SE SE SE SE 27-115-52	Sand, black, fine to coarse; saturated Sand and gravel, brown, fine to medium	10- 17 17- 25

Test Hole No.	Location	Lithologic Description	From-to Feet
62b	SE 27-115-52	Sand, clayey Sand, medium	3- 5 5- 15
63	NE NW NW NW 35-115-52	Sand, brown, fine to medium Sand and gravel, gray, fine to medium	3- 7 7- 17
64	NW NE NW NW 35-115-52	Sand, black, fine to medium, silty, clayey Gravel and sand, medium to coarse	6- 15 15- 20
65	NE NE NE SE 26-115-52	Sand, brown, coarse and gravel, fine; saturated, fairly clean	5- 10
66	NW NW NW NE 35-115-52	Gravel and sand, light-brown, medium, silty; dry Gravel and sand, light-brown, fine to coarse, silty; saturated at 12 feet Gravel and sand, dark-brown, medium to coarse Gravel and sand, brown, fine to medium	1- 7 7- 17 17- 18 18- 22
67	SE SE SE SW 34-115-52	Sand, gravelly; dirty Gravel and sand	6- 12 12- 32
68a	SW SW SW SW 35-115-52	Sand, fine to medium; dry Gravel, fine to coarse, sandy; saturated at 6 feet	0- 4 4- 17
68b	SW SW SW SW 35-115-52	Sand, brown, fine to medium; dry, slightly gravelly Sand, brown, gravelly; moist Sand, brown, fine to medium, gravelly; saturated, dirty Gravel, dark-brown, fine to medium, sandy; saturated, dirty Gravel, gray, fine to medium, sandy	0- 4 4- 6 6- 7 7- 12 12- 20
69	SW NW NW NW 36-115-52	Sand, brown, gravelly; dry	3- 5
70	SW SW SW SE 35-115-52	Sand and gravel, light-brown, fine to medium; dry Sand and gravel, brown, fine; saturated at 9 feet Sand and gravel, brown, fine; saturated, few coarse gravel streaks Gravel, gray, medium	1- 7 7- 10 10- 17 17- 21
71	NE NE NE NE 36-115-52	Sand, reddish-brown, medium	2- 3
72	SW SW SW SE 36-115-52	Sand, brown, medium; dry, dirty Gravel, brown, medium to coarse, sandy; dirty Gravel, coarse; dry, dirty, hit boulder, impassable	2- 6 6- 20 20- 25
73	SW SW NW SW 7-115-51	Sand, rusty-brown, medium; oxidized	2- 7
74	NW NW NW NW 4-115-51	Gravel Gravel	2- 3 13- 14
75	NE NE NE NE 8-115-51	Sand and gravel	2- 6
76	NW SE NW NW 10-115-51	Gravel, light-brown to light-gray; some boulders	2- 6



Test Hole No.	Location	Lithologic Description	From-to Feet
77	SE SE NW NW 10-115-51	Gravel, light-brown to light-gray; some boulders	2- 23
78	NW NW SW NW 11-115-51	Gravel, cobble, rocks; impassable	0- 2
79	SE SE SE NW 10-115-51	Gravel	2- 12
80	NE NW NW NW 15-115-51	Gravel, cobble, rocks; dirty, impassable	0- 2
81	NE NE NE NE 20-115-51	Sand, brown, gravelly; dry Gravel and sand, medium to coarse; dry Gravel and sand, fine to medium; saturated Gravel and sand, fine to medium; saturated, dirty	1- 3 3- 8 8- 12 12- 14
82	NE NE NE NE 14-115-51	Gravel, medium	20- 29
83	SW SW SE SW 28-115-51	Gravel and sand, fine to coarse; dry, some boulders Gravel and sand, medium; dry Gravel, very coarse, sandy; dry Gravel, very coarse, sandy; saturated, dirty	0- 6 6- 7 7- 14 14- 19
84	NE NE SE SE 31-115-51	Gravel, light-tan; saturated Sand and gravel, fine	11- 22 22- 45
85	SW SW SW SW 32-115-51	Sand, fine to coarse and gravel; dry Sand, medium to coarse; saturated, few pebbles Gravel, cobble; saturated, difficult drilling Sand, coarse; saturated	3- 12 12- 16 16- 25 25- 30
86	SE SE SW SE 32-115-51	Sand, medium to coarse; saturated Gravel, medium; clean Sand, clayey; unoxidized, saturated	2- 5 5- 8 8- 22
87	NW NW NW SW 4-114-55	Gravel, fine, clayey; some coarse sand Sand, medium to coarse; some fine gravel, firm	19- 20 20- 23
88	NE NE NE NE 19-114-55	Sand; clean	20- 23
89	NW NW NW SW 1-114-55	Gravel, cobble; saturated, hard drilling	16- 20
90	NW NW SW SE 1-114-55	Sand, fine to silt; moist Gravel, coarse; saturated, dirty Gravel, cobble; saturated, hard drilling	1- 4 4- 9 9- 15
91	NE NE NE NE 12-114-55	Sand, fine; moist Sand, coarse; saturated, dirty Gravel, coarse; saturated, dirty, some cobbles	3- 6 6- 8 8- 15
92	SE SE SE SE 12-114-55	Gravel, medium to coarse	2- 8
93a	SE SE SE SE 5-114-54	Sand, fine; saturated Gravel and sand, silty; dirty	10- 15 15- 20
93b	NW NW NW NW 20-114-54	Gravel, coarse; dry	2- 8

Test Hole No.	Location	Lithologic Description	From-to Feet
94	SE SE SE SE 27-114-54	Gravel, medium; some pebbles Sand, very coarse; oxidized, saturated Gravel, cobble; 1½ to 2 inches, very hard drilling	3- 5 5- 9 9- 16
95	NE NE NE SE 34-114-54	Sand, brown, fine to medium, silty; saturated	15- 26
96	NW NW NW NE 6-114-53	Gravel, rusty-brown, medium; moist	6- 7
97	NE NE SE NE 6-114-53	Sand, dark-brown, medium, clayey; moist Sand, dark-gray, clayey Gravel, rocks; hit rock, impassable	2- 34 34- 55 55- 62
98	NE NE NE NE 7-114-53	Sand, brown, fine to medium, silty; dry, few very coarse grains Sand, medium to coarse, silty; saturated	5- 14 14- 16
99	SW NW SW SW 19-114-53	Sand, clayey; oxidized, moist, saturated in lower part	18- 30
100	SW SW SW SW 3-114-53	Gravel	12- 18
101	SW SW SW SW 9-114-53	Sand, fine to medium; oxidized	2- 5
102	SW SE SE SW 9-114-53	Sand, brown, very fine to medium, silty; saturated Gravel, brown and reddish-brown, medium, sandy, silty Sand and gravel, gray, fine to medium	2- 7 7- 22 22- 35
103	NE NE NE NE 16-114-53	Sand, coarse; oxidized, saturated Sand, coarse; unoxidized, some silt	8- 25 25- 45
104	SE SE SE SE 16-114-53	Sand, brown, gravelly Sand, medium to coarse and gravel, fine to coarse Sand, brown, medium to coarse; some fine gravel Sand, brown, medium to coarse and gravel, fine to coarse Gravel, fine to coarse; some coarse brown sand Sand, brown, coarse and gravel, fine to coarse; some silt Sand, gray-brown, coarse; some silt Sand, gray-brown, very fine; clean Sand, gray-brown, fine to medium Sand, gray-brown, fine to coarse	7- 10 10- 15 15- 20 20- 25 25- 30 30- 40 40- 45 45- 50 50- 60 60- 70
105	NE NE NE NE 20-114-53	Sand, reddish-brown, fine to coarse; dry, slightly gravelly Sand, brown, fine to medium; moist, slightly gravelly Sand and gravel, brown, fine to medium; moist Sand, brown, medium to very coarse; moist Sand and gravel, brown, fine to medium; moist Sand and gravel, brown, fine to medium; saturated Sand, brown, medium to coarse Sand, gray, medium to coarse	2- 9 9- 13 13- 18 18- 23 23- 27 27- 32 32- 44 44- 53

Test Hole No.	Location	Lithologic Description	From-to Feet
106	NW NW NW NW 21-114-53	Sand and gravel	6- 57
107	NW NE NW NW 21-114-53	Sand and gravel	6- 34
108	NW NW NE NW 21-114-53	Sand and gravel	8- 26
109	NE NE NE NW 21-114-53	Gravel, brown, coarse; dry	0- 8
110	SW SW NW NW 21-114-53	Gravel and sand, brown, coarse; dirty Sand, gray, very coarse; saturated, clean Gravel, very coarse, rocks	0- 30 30- 63 63- 65
111	SW NW SW NW 21-114-53	Sand and gravel	6- 36
112	SW SE NE SW 20-114-53	Sand, light-brown, fine to medium; dry Sand, brown, fine to medium; moist, few very coarse grains Sand, brown, fine to medium; saturated, some coarse grains Sand, gray, medium; some fine	2- 9 9- 20 20- 27 27- 44
113	SW SW NW SW 21-114-53	Sand and gravel Sand Sand and gravel	5- 35 35- 40 40- 62
114	SE NW SW SW 21-114-53	Sand and gravel Sand Sand, blue Sand and gravel	2- 25 25- 40 40- 45 45- 53
115a	SW SW SW SW 21-114-53	Sand, brown and gray, very fine to very coarse, silty; saturated Sand, reddish-brown, very fine to medium Sand, gray, fine to medium	2- 7 7- 11 11- 44
115b	NE SW SW SW 21-114-53	Sand and gravel Sand	2- 15 15- 55
115c	SE SW SW SW 21-114-53	Sand and gravel Sand Sand and gravel	4- 23 23- 31 31- 53
116	NW SE SW SW 21-114-53	Sand and gravel Sand, fine Sand and gravel Sand, fine Sand and gravel; clay layers	2- 25 25- 35 35- 58 59- 70 70- 95
117	NW NW NW NW 28-114-53	Gravel, medium; clean Sand; some gravel Gravel, coarse	2- 20 20- 51 51- 52
118	NW NW NW NE 28-114-53	Sand, brown, medium; dry, dirty Sand, brown, very coarse; dirty, scattered rocks Gravel, very coarse, rocks	7- 10 10- 25 25- 27
119	NE SE NW SE 31-114-53	Sand, coarse and gravel, fine Gravel, fine Sand, fine to medium Sand, fine to medium; some clay Sand, fine	5- 6 6- 7 7- 25 25- 28 28- 40

Test Hole No.	Location	Lithologic Description	From-to Feet
120	SW SW SW SW 27-114-53	Sand, brown, fine to very coarse, silty, gravelly; saturated Sand, brown, fine to medium, clayey, silty Sand, gray, very fine to medium, silty; some very coarse grains	2- 10 10- 17 17- 20
121	SW SW NW SW 35-114-53	Sand, brown, fine to coarse, silty; saturated Sand, gray, fine to very coarse, silty, mostly medium to coarse Sand, gray, fine to very coarse, silty, mostly medium to coarse, gravel streaks	5- 28 28- 49 49- 52
122	SE SE SW SW 35-114-53	Sand, medium	18- 35
123	NE NE NE SE 35-114-53	Sand, light-brown, fine to coarse, silty, gravelly; dry Sand, reddish-brown, fine to very coarse, gravelly; dry Gravel and sand, rusty-brown, fine to medium; saturated at 20 feet, some streaks of coarse gravel Gravel, gray, coarse Sand, gray, medium to coarse, gravelly	2- 4 4- 9 9- 33 33- 41 41- 46
124	NW NW NW NW 36-114-53	Sand, medium, clayey Sand, brown, medium	2- 4 4- 13
125	NE NE NE SE 25-114-53	Sand, reddish-brown, fine to very coarse, gravelly, saturated Sand and gravel, gray, fine to coarse Sand, gray, medium to very coarse; gravel streaks	14- 31 31- 40 40- 55
126	SW SW SE SW 5-114-52	Gravel, sandy Sand, gravelly	0- 3 3- 14
127	NW NW NW NW 8-114-52	Gravel Sand	2- 3 3- 11
128	NW NW NW SW 8-114-52	Gravel	3- 10
129	SE SW SW SE 7-114-52	Gravel, cobble, rocks; impassable	3- 7
130	SE SE SW SE 7-114-52	Gravel, cobble, rocks; impassable	0- 2
131	SE SE SE SW 30-114-52	Sand, reddish-brown, fine to medium, gravelly; dry Sand and gravel, reddish-brown, fine; saturated at 21 feet, few interbedded silt layers Sand, gray, medium to very coarse, gravelly; some coarse gravel	11- 14 14- 23 23- 50
132	SE NE SW SW 29-114-52	Sand and gravel	2- 35
133	SE SE SE NE 29-114-52	Sand, reddish-brown, fine to coarse, gravelly Sand, reddish-brown, fine to medium, silty; saturated Sand, brown, medium to very coarse, gravelly Sand, brown, medium, gravelly	5- 7 7- 11 11- 21 21- 26

Test Hole No.	Location	Lithologic Description	From-to Feet
		Gravel and sand, gray, medium to coarse	26- 33
		Sand, gray, medium to very coarse, gravelly	33- 40
134	NE NE SE SE 17-114-52	Sand, light-tan, medium, clayey; saturated	12- 48
135	SE SE SE SE 16-114-52	Sand, brown, fine to coarse, silty	10- 13
		Sand, gray, fine to coarse, silty	13- 18
		Sand, gray, medium to very coarse	18- 23
136	SE SE SE SE 4-114-52	Gravel and sand, brown, fine; dry	4- 5
137	NE NE NE NE 4-114-52	Sand, fine to medium; saturated	3- 15
		Sand, fine to silt; oxidized, saturated	15- 25
138	NW NW NW NW 1-114-52	Sand, fine to medium; dry, dirty	0- 6
		Gravel and sand, brown, medium; saturated, dirty	6- 10
		Gravel and sand, medium to coarse	10- 20
139	NE NE NE NE 1-114-52	Sand, reddish-brown, fine to medium; dry, dirty	0- 3
		Gravel, reddish-brown, medium to coarse, sandy; dry, dirty, hit boulder, impassable	3- 21
140	NW NW NW SW 1-114-52	Sand and gravel, dark grayish-brown, silty	6- 14
141	SE SE SE SE 2-114-52	Sand and silt, dark-brown; saturated	8- 12
		Gravel and sand, gray, fine; dirty	12- 32
		Sand, gray, fine, gravelly	32- 37
		Gravel, gray, coarse, sandy	37- 50
142	SE SE SE NE 1-114-52	Gravel, light-brown, silty, sandy, rocky; dry	2- 5
		Sand and gravel, fine to medium, rocky; dry, some very coarse gravel	5- 9
143	NW SW NE NE 14-114-52	Gravel	4- 6
144	NE SE NW NW 14-114-52	Sand	8- 9
145	NE NE NE NE 22-114-52	Sand and gravel, gray, medium to coarse; some fine gravel, clean	10- 30
146	NW NW SW NW 27-114-52	Sand, reddish-brown, gravelly, silty; dry	4- 5
		Sand, reddish-brown, fine to very coarse, silty; dry	5- 9
		Sand, dark reddish-brown, fine to very coarse, gravelly, silty; saturated at 15 feet	9- 18
		Sand, dark-brown, medium to very coarse, silty, gravelly	18- 33
		Sand, gray, medium to very coarse, gravelly; some medium gravel	33- 47
147	NW NW NW NE 27-114-52	Sand, reddish-brown, fine to medium, silty; dry	2- 3
		Sand, reddish-brown, fine to very coarse; dry, slightly gravelly	3- 13
		Sand, dark reddish-brown, fine to very coarse; saturated at 15 feet	13- 22
		Sand, dark-brown, fine to very coarse, gravelly; saturated	22- 35

Test Hole No.	Location	Lithologic Description	From-to Feet
148	NW NW NW NW 26-114-52	Gravel, medium; oxidized, dry Gravel, medium to coarse, clayey; saturated, dirty	1- 12 12- 25
149	SW SW SW NW 26-114-52	Gravel and sand, brown, medium, silty; dry Sand, brown, medium to very coarse, gravelly; saturated at 5 feet	1- 4 4- 11
150	SE SE SE SW 27-114-52	Gravel and sand, light-brown, fine Sand, light-brown, fine to very coarse; saturated at 15 feet, slightly gravelly Sand, brown, medium to very coarse Sand and gravel, brown, medium to coarse Sand and gravel, brown, medium to coarse; some sand layers Sand and gravel, brown, medium to very coarse, cobbles; some sand layers	6- 9 9- 18 18- 46 46- 55 55- 58 58- 71
151	NW NW NW NW 24-114-52	Sand, fine; oxidized, moist Sand, medium to coarse; oxidized, saturated Gravel, cobble; unknown size, difficult drilling	2- 12 12- 15 15- 20
152	NE NE NE NW 24-114-52	Sand and gravel Sand, brown Sand, light brown Sand and gravel	5- 9 9- 17 17- 24 24- 49
153	NE NE NE NE 24-114-52	Sand and gravel	1- 17
154	SE SE SE NE 23-114-52	Sand and gravel	3- 24
155	SE SE SE NW 24-114-52	Sand Sand and gravel	1- 19 19- 86
156	SE SE SE SE 23-114-52	Sand, brown, coarse; dry Sand and gravel, brown; dry Sand and gravel, brown; saturated Gravel, very coarse; saturated Gravel, coarse; saturated	1- 4 4- 12 12- 24 24- 74 74- 86
157	NE NE NE NW 25-114-52	Sand and gravel Sand, fine to medium Sand and gravel	5- 19 19- 24 24- 58
158	NE NE NE NE 25-114-52	Sand, fine Sand and gravel	0- 9 9- 17
159	SW SW SW NW 25-114-52	Sand and gravel	1- 25
160	NE NE NE SW 25-114-52	Sand and gravel Sand, fine to medium	1- 14 14- 27
161a	SE SE SE SE 26-114-52	Gravel, fine to medium and sand, coarse	1- 17
161b	SE SE SE SE 26-114-52	Sand, brown, coarse; dry Sand and gravel; saturated	3- 9 9- 18
162	NW SW SW SE 25-114-52	Sand, light-gray Sand and gravel, dark-gray Gravel, dark-brown	7- 17 17- 24 24- 40

Test Hole No	Location	Lithologic Description	From-to Feet
163	SE SE SE NE 35-114-52	Sand, dark-gray, clayey	1- 16
164	SW SW SW NE 36-114-52	Sand Sand and gravel	5- 9 9- 95
165	NW NW NW NW 7-114-51	Sand, brown, medium Sand, gray, fine	5- 22 22- 25
166	SW NW SW NW 7-114-51	Gravel, light-brown, medium, silty, sandy; saturated at 11 feet Gravel, light-brown, medium to coarse, silty	8- 13 13- 18
167	SW SW NW SW 2-114-51	Gravel, coarse	2- 5
168	SW NE NW 18-114-51	Sand and gravel	2- 18
169	NE NE NE NW 18-114-51	Sand, dark-brown, clayey, silty Sand, dark-brown, silty; moist Gravel, light-brown, very clayey, sandy; saturated Gravel and sand, brown, medium	1- 3 3- 6 6- 9 9- 13
170	NW NE NE 18-114-51	Gravel and boulders	15- 43
171	NE NE NE NE 18-114-51	Sand, fine to coarse; dry	1- 6
172	NW 18-114-51	Sand and gravel	2- 13
173	SW SE SW SE 18-114-51	Sand, gray-brown, very coarse; dry, scattered coarse gravel Gravel, very coarse; some clay below 14 feet and not as coarse Gravel; increasing clay content	1- 3 3- 40 40- 74
174	SE SE SE SE 18-114-51	Sand, brown, medium Gravel, cobble, rocks, impassable	1- 2 14-?
175	NW NW NW SW 19-114-51	Sand, dark-brown, clayey Sand and gravel Sand, fine to medium Gravel	1- 3 3- 40 40- 44 44- 82
176a	NW SW NE NE 20-114-51	Sand and gravel Sand, medium Gravel Sand, medium	3- 21 21- 35 35- 37 37- 43
176b	SW SW NE NE 20-114-51	Sand and gravel	3- 22
177	NW NW NW SW 30-114-51	Sand and gravel Sand, fine to medium	0- 28 28- 38
178	NE NE NE NW 30-114-51	Sand and gravel	10- 19
179	SW SW SW SW 20-114-51	Sand, brown, medium; clean Gravel, very coarse Sand, brown, medium; clean Gravel, gray-brown, fine; some clay Sand, gray, very coarse, clayey	0- 5 5- 9 9- 25 25- 40 40- 52
180	SW 20 114-51	Sand, fine	2- 30

Test Hole No.	Location	Lithologic Description	From-to Feet
181	SE 20-114-51	Sand and gravel	2- 36
182a	NW NW SE SE 20-114-51	Sand and gravel Sand, fine	3- 20 20- 30
182b	NW NW SE SE 20-114-51	Sand and gravel Sand, fine	3- 20 20- 38
183	NE NE NE NE 29-114-51	Gravel, light-brown, medium to coarse, silty, sandy; dry, poorly sorted	0- 10
184	SE SE SE SE 30-114-51	Gravel and sand, reddish-brown, fine to medium, silty; dry Gravel and sand, dark-brown, fine to coarse, silty; saturated Gravel, dark-brown, medium to coarse, sandy Sand, coarse, gravelly Gravel, medium, sandy Silt, yellow brown, sandy Sand, gravelly Gravel, yellow-brown, silty, sandy; inter-layered with silt and sand	0- 6 6- 10 10- 22 22- 28 28- 36 36- 38 38- 42 42- 88
185	NE NE NE NW 31-114-51	Sand and gravel	6- 24
186	NW NW NW NW 31-114-51	Sand, brownish-gray, clayey Sand and gravel	5- 9 9- 14
187	NW 31-114-51	Sand, fine to medium; very dirty Gravel, medium to coarse and sand, coarse; unsorted, dirty Sand, coarse and gravel, fine to medium; unsorted, clean	3- 4 4- 15 15- 28
188	SW SW SW NW 31-114-51	Sand and gravel; some clay Sand and gravel Gravel, coarse	4- 9 9- 34 34-100
189	NE NE NE SE 31-114-51	Sand and gravel, brown, fine to medium; dry Gravel, brown, fine to medium, very sandy; saturated at 9 feet Gravel, gray, fine to medium, very sandy	2- 7 7- 18 18- 24
190	SW SE SW SW 14-114-51	Sand, brown and gravel; saturated	7- 11
191	NW NW NW SW 27-114-51	Sand, silty, gravelly	1- 2
192	SW SW SW SE 28-114-51	Sand, medium to coarse; dirty Sand, coarse, clayey; saturated, dirty Sand, medium; saturated, clean Gravel, cobble Sand, coarse; saturated	2- 5 5- 15 15- 20 20- 30 30- 65
193	NE NE NE NE 32-114-51	Sand, yellow brown, silty, clayey; saturated Sand, brown, medium to coarse, gravelly Gravel and sand, gray Sand, gray, gravelly Sand, medium to coarse Sand; gravel layers Gravel Gravel and sand layers	3- 7 7- 20 20- 25 25- 40 40- 47 47- 52 52- 57 57- 83
194	SW SW SW NW 33-114-51	Sand, dark brown, very fine to medium, silty; saturated	2- 7



Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand and gravel, gray, fine to medium	7- 54
		Sand, gray, very fine, silty	54- 62
195	SE SE SE SE 32-114-51	Sand, brown, coarse; scattered gravel, some clay	1- 12
		Sand, gray, very coarse; unoxidized, some clay, poorly sorted	12- 22
		Sand, brown, medium; fairly clean, sorted	22- 30
196	SE SW SW SE 33-114-51	Gravel, reddish-brown, silty, sandy; dry	1- 2
		Gravel and sand, brown, silty; saturated	2- 6
		Gravel and sand, light-brown, silty	6- 7
		Gravel, brown, fine, silty, sandy	7- 15
		Gravel, brown, medium, sandy	15- 17
		Gravel and sand, gray, fine to medium	17- 34
197	SW SW SW SW 34-114-51	Sand, fine; dry	3- 11
		Sand, fine; saturated	11- 15
		Sand, medium to coarse	15- 30
198	NE NE NE NE 34-114-51	Sand and gravel, yellow-brown, medium	2- 3
199	SW SW SW SW 35-114-51	Gravel, medium; dry	2- 6
200a	NE NE SE SE 36-113-56	Sand and rocks	3- 7
		Sand, medium; clean	25- 34
200b	NE NE SE SE 36-113-56	Sand and rocks	3- 7
201	NE NE NW NE 5-113-55	Sand, fine	2- 10
202	NE NE NE SE 5-113-55	Sand, coarse; dry	1- 8
203	SE SE SE SE 7-113-55	Sand, buff; some clay	0- 15
204a	NE NE NW SW 17-113-55	Sand, clayey	3- 15
204b	NE NE NW SW 17-113-55	Sand, buff, fine, clayey	0- 15
205	NW NW SW SW 20-113-55	Sand, buff, clayey	3- 18
206	SW SW 21-113-55	Gravel	5- 35
207a	SW SW SW NW 32-113-55	Gravel; with limonite pebbles	12- 18
207b	SW SW SW NW 32-113-55	Gravel	4- 6
208	SW SW NW SW 32-113-55	Gravel, medium	6- 12
209a	NW NW SW SW 32-113-55	Gravel, medium	6- 12
209b	SW NW SW SW 32-113-55	Gravel	6- 10
210	NW NW NW NW 33-113-55	Gravel	4- 6
211	NE NE NE SE 32-113-55	Gravel	2- 8
212	NE NE SE SE 32-113-55	Gravel	5- 22
		Sand, very silty	22- 30
214	NW NW NW NW 1-113-54	Sand, reddish-brown, medium to very coarse, gravelly, silty; dry	6- 8
		Sand, light-brown, fine to coarse, silty; saturated	8- 13

Test Hole No.	Location	Lithologic Description	From-to Feet
		Gravel and sand, brown, medium	13- 18
		Sand, brown, medium to coarse	18- 23
		Sand, gray, medium to very coarse	23- 47
215	SE SE SE NW 1-113-54	Gravel, rusty brown, coarse, sandy; dry	3- 4
		Sand, dark brown, medium to very coarse, gravelly; saturated	4- 18
		Sand, gray, medium to very coarse	18- 37
		Sand, gray, medium to very coarse; some gravel streaks	37- 55
216	SE SE SE SE 2-113-54	Sand, gray, very coarse, clayey; saturated	10- 20
217	NE NE NE NE 11-113-54	Sand, fine and silt	3- 6
		Gravel, fine	6- 8
		Sand, coarse, clayey	10- 19
218	SE SE SE NE 12-113-54	Gravel, reddish-brown, sandy, silty; saturated	6- 12
		Sand, brown, fine to very coarse, silty	12- 18
		Sand, gray, medium to very coarse, gravelly	18- 30
		Sand and gravel, gray, fine to medium	30- 40
		Sand and gravel, gray, fine to medium; some coarse streaks	40- 46
219	NE NE NE NE 14-113-54	Gravel, very coarse, rocks; impassable	5- 12
220	NW NW NW NW 14-113-54	Sand and gravel; clayey from 10-22 feet	6- 58
221	SE SE SE SE 15-113-54	Gravel, coarse; saturated	6- 8
		Gravel, cobble, boulders; saturated, impassable	8- 15
222	NE NE SE SE 21-113-54	Sand, dark brown, coarse, many rocks; saturated, impassable	4- 13
223	SE SE SE SE 22-113-54	Sand, fine to medium; oxidized, saturated	18- 20
224	SE SE SE SE 27-113-54	Sand, medium to coarse; saturated	5- 18
		Sand, fine to medium, clayey, silty	18- 24
225	NE NE NE NE 13-113-54	Sand, fine to coarse; dry	2- 20
		Sand, medium to coarse; saturated	20- 30
		Sand, medium to coarse; unoxidized, saturated	30- 50
226	SW SW SW SW 13-113-54	Gravel, brown, very coarse, rocks; dry	5- 10
		Sand, brown changing to gray, very coarse; saturated, fairly clean	10- 41
227	SE SE SW SW 13-113-54	Gravel and sand	3- 9
		Sand and gravel; some clay lenses	9- 12
		Sand, medium; some clay lenses	12- 18
		Sand and gravel; some clay lenses	18- 19
		Gravel, fine	19- 23
		Sand, coarse	23- 49
228	SW SW SW SE 13-113-54	Gravel, fine and sand; mostly ¼ to ½-inch size	3- 7
		Sand and silt; some gravel	16- 24
229	NW SE SW SE 13-113-54	Sand and gravel	0- 4
		Sand and gravel; with thin clay lenses	4- 9

Test Hole No.	Location	Lithologic Description	From-to Feet
		Sand and gravel; with clay Sand; with clay	9- 14 14- 19
230	SW SW SW SW 24-113-54	Gravel, very coarse; impassable, pit shows 20 feet	0- 4
231	SE SE SE SE 24-113-54	Sand, fine to medium; saturated Sand, medium to coarse; unoxidized, saturated	3- 15 15- 35
232	NE SE NE NE 35-113-54	Sand, brown, very coarse, clayey; saturated	5- 7
233	NE NE NE NE 36-113-54	Gravel, medium to coarse Sand, medium to coarse; saturated	1- 4 8- 20
234	SE SE SE SE 35-113-54	Gravel, cobble, rocks; saturated at 4 feet, impassable	13-?
235	SE SE SE SE 36-113-54	Gravel, fine to medium Sand, very fine, oxidized, saturated	1- 2 4- 5
236	NW NW NW NW 6-113-53	Gravel and sand, rusty-brown, medium, silty; dry Sand, rusty-brown, medium to very coarse; saturated Sand, gray, fine to medium	4- 8 8- 18 18- 30
237	NW NW NW NE 5-113-53	Gravel, coarse Sand and gravel, medium; some clay	8- 11 13- 30
238	SW SW SW NW 5-113-53	Sand, dark-brown, very fine, silty; dry, bottom is silt, dark-brown, coarse; moist Sand, brown, fine to medium, silty; saturated at 21 feet, minor gravel Gravel and sand, brown, fine, silty Sand, gray, fine to very coarse, gravelly Sand, gray, fine to coarse Sand, gray, fine to coarse; streaks of coarse gravel Sand, medium to very coarse, gravelly Sand and gravel, gray, medium to coarse	12- 14 14- 23 23- 30 30- 38 38- 43 43- 52 52- 55 55- 65
239	SE NE SE SE 5-113-53	Sand, dark-brown; saturated at 20 feet, some coarse gravel, very dirty	10- 30
240	SE SE SE SE 5-113-53	Sand and gravel, coarse Sand, brown, coarse; some fine gravel Sand, brown, coarse, silty; some fine gravel Sand, coarse and gravel, fine, silty Gravel, coarse	10- 15 15- 20 20- 30 30- 35 35- 40
241	SE SE SE SW 4-113-53	Sand, reddish-brown, fine to coarse, silty; dry, few pebbles Sand, brown, medium to very coarse, gravelly; saturated Sand and gravel, gray, fine to medium	2- 14 14- 21 21- 38
242	NE NE NW NE 9-113-53	Sand, coarse and gravel, fine Sand, medium to coarse; some clay Sand, medium; oxidized, some clay Sand, medium; unoxidized, some clay	5- 11 11- 13 13- 21 21- 27

Test Hole No.	Location	Lithologic Description	From-to Feet
243	NE NE NE NE 9-113-53	Sand, reddish-brown, fine to medium; dry, few pebbles Gravel and sand, brown; dry, dirty Gravel and sand, brown; saturated, dirty Sand, brown, gravelly; dirty Gravel and sand, brown, medium; dirty	2- 8 8- 10 10- 12 12- 17 17- 24
244	NE NE NE SW 9-113-53	Sand, brown, very fine, silty Sand, brown, fine Sand, brown, medium Sand, medium; some clay	1- 13 13- 19 19- 26 26- 49
245	NE NE SE SW 8-113-53	Sand, coarse; some clay Sand, brown, very coarse; some clay Sand, coarse	3- 21 21- 26 26- 50
246	SW SW SW SE 8-113-53	Sand, brown, fine to medium, silty; saturated Sand, brown, fine to medium; some very coarse grains Sand, gray, very fine to fine, silty	6- 7 7- 22 22- 55
247	SE SE NE NW 17-113-53	Sand, brown, medium, clayey	7- 30
248a	NE NE NE NE 18-113-53	Sand, coarse; oxidized, dry Sand, medium to coarse; unoxidized, saturated	0- 33 33- 50
248b	NE NE NE NE 18-113-53	Sand, fine to medium	17- 40
249	SW SW NW SW 17-113-53	Gravel, fine; ¼- to ½ inch size Sand, medium	7- 10 10- 11
250	SE SE SE SW 18-113-53	Gravel, brown, fine, clayey; ¼- to ½-inch size Gravel, fine and sand, coarse Sand, fine to medium Sand, fine, clayey	5- 7 7- 8 8- 20 20- 27
251	SW SW SW NW 19-113-53	Sand, brown; some gravel	6- 27
252	SE SE SE NW 19-113-53	Gravel	5- 8
253	NE SE SE SW 17-113-53	Sand, dark gray brown, silty	5- 20
254	SW NW SE 17-113-53	Gravel; saturated	8- 29
255a	SE SW NE 17-113-53	Gravel Gravel, coarse	0- 5 5- 30
255b	SE SE SW NE 17-113-53	Sand, medium; oxidized Sand, brown, very coarse; some clay Sand, brown, medium; some clay	4- 5 5- 8 8- 29
256	NW NW NW SW 2-113-53	Sand and gravel Sand, coarse Sand and gravel	0- 3 3- 12 12- 13
257	NE SE NE SE 2-113-53	Gravel, rusty brown, coarse, silty, sandy; saturated	5- 13
258	SW SW SW SW 2-113-53	Sand; oxidized, saturated, some clay	15- 18
259	SW SW SE SE 9-113-53	Sand, coarse and gravel, fine; some clay Sand, fine to medium; some clay	2- 9 14- 31

Test Hole No.	Location	Lithologic Description	From-to Feet
260	SW SE SE SE 9-113-53	Sand, very coarse and sand, fine to medium Sand, very coarse; some clay Sand, fine to medium; some clay	2- 5 5- 7 10- 31
261	NW NW NW NW 15-113-53	Sand, brown, medium, clayey; saturated Sand, brown, medium to coarse; dirty Sand and gravel, gray, fine	5- 8 11- 23 23- 29
262	SW SW NW SW 16-113-53	Sand, coarse; some clay Sand, fine to medium Sand, dark-brown, fine; some clay	4- 7 7- 10 15- 16
263	SE SE SW SW 16-113-53	Gravel, coarse; some sand and clay Gravel, fine	0- 5 5- 10
264	NE SE SE SE 16-113-53	Sand, black, very coarse; clean Gravel, coarse, rocks, clayey Gravel, black, fine, very clayey; saturated	1- 15 15- 17 17- 30
265	NW NW NW NE 21-113-53	Sand, brown, fine; some clay	12- 21
266	NE SE SW NE 20-113-53	Sand and silt; many thin gravel layers	15-120
267	NE NE NE SW 21-113-53	Gravel, dark-brown, fine; some clay	5- 7
268	NE SE SE SE 20-113-53	Sand	8- 11
269	SE SE SE SE 30-113-53	Sand, fine to medium; oxidized; saturated	18- 20
270	SE SE SE SE 11-113-53	Sand, fine to medium, clayey; oxidized, saturated	11- 25
271	NE NE SW SE 15-113-53	Gravel Sand, medium to coarse and gravel, fine; some clay	3- 5 5- 42
272	SE NW SE SE 15-113-53	Sand, yellow, fine Sand, brown, fine; some silt Gravel, dark-gray, fine; some clay Sand, fine; some silt and clay	1- 2 2- 3 7- 11 11- 20
273	SE NE NE NE 22-113-53	Sand, buff, fine to medium, silty; saturated Sand, buff, fine to medium, silty, clayey; saturated, slightly gravelly Sand, buff, clayey, gravelly Sand and gravel, brown; dirty Sand and gravel, gray; dirty Sand, gravelly; dirty Sand and gravel	0- 5 5- 8 12- 17 17- 47 47- 62 62- 67 67- 72
274	SW SE SW NW 22-113-53	Gravel Gravel	1- 3 5- 8
275	SE SE SE NE 22-113-53	Gravel, fine and sand, coarse; some silt	1- 5
276	NW NW NW SE 22-113-53	Gravel, fine to medium	2- 4
277	NE NE NE NE 13-113-53	Sand, fine to medium; oxidized, saturated	1- 8
278	SE SE SE SE 13-113-53	Gravel, fine to medium Sand, medium to coarse	1- 3 3- 15
279	NE NE NE SE 23-113-53	Sand, yellow, fine to medium, clayey	4- 10

Test Hole No.	Location	Lithologic Description	From-to Feet
		Gravel, fine and sand, coarse	10- 12
		Sand, blue gray, medium to coarse, clayey	15- 20
280	SE SE SE SE 23 113-53	Sand and gravel	2- 50
281	SE NW NW SE 26 113-53	Sand, dark-brown and silt	0- 2
		Sand, light-brown, fine and silt	2- 4
		Gravel, fine to very coarse	4- 19
282	SE SE SE SW 26 113 53	Gravel, cobble, rocks; impassable	15- 18
283	NW SW SW SW 26 113-53	Sand, fine to medium; oxidized, moist	1- 6
		Sand, medium to coarse; oxidized, saturated	6- 20
		Sand, medium to coarse; unoxidized, saturated	20- 34
		Sand, very fine; unoxidized, saturated	34- 45
284	SW SW SW SW 34-113 53	Sand, fine; oxidized, saturated	15- 20
		Sand, fine to medium; oxidized, saturated	20- 30
		Sand, fine to medium; unoxidized, saturated	30- 50
285	NE NW SE SW 25 113-53	Sand, dark grayish-brown, very fine to medium, silty; saturated at 5 feet	3- 8
		Sand, brown, very fine to medium, silty	8- 22
		Sand, gray, fine to coarse, gravelly	22- 26
286	NE SW NE NE 36 113 53	Sand and gravel	1- 20
287	NW SW SE NE 36 113-53	Sand, brown, very coarse; fairly clean	2- 11
		Sand, blackish brown, very coarse and gravel, fine, clayey	11- 22
288	SW SW SE SW 36 113-53	Sand, dark-brown, very fine to medium, silty; saturated	15- 30
		Sand, gray, medium to coarse, gravelly	30- 33
289	NW NW NW NE 6 113-52	Sand and gravel	1- 30
290	NW NE NE NE 4 113-52	Gravel, coarse, cobbles; saturated, impassable	1- 9
291	SW SW SW SE 8 113-52	Gravel, cobble, rocks; impassable	8-?
292	SE SE SE SE 18 113-52	Sand, brown, silty; saturated	6- 7
		Sand and gravel, dark-brown; dirty	7- 8
		Sand and gravel, gray; dirty	9- 17
293	NE NE NE NE 19 113-52	Gravel, coarse	2- 10
294	NE NE NE NW 19 113 52	Sand, dark-brown, fine to medium, silty, gravelly; dry	2- 4
295	NW NW NW SW 19-113 52	Gravel, dark grayish-brown, coarse, very silty, clayey, sandy; moist	5- 7
		Sand, dark grayish-brown, medium to coarse, silty, gravelly; saturated at 9 feet	7- 16
		Sand, gray, medium to coarse, gravelly	16- 26
296	NW NW NW NW 30-113 52	Sand, brown, medium; dry	1- 2
		Gravel, brown, fine; dry, poorly sorted	2- 9
297	NW NW NW NW 29 113-52	Sand and gravel	3- 13
		Sand and gravel	19- 32

Test Hole No.	Location	Lithologic Description	From- To- Feet
298	NE NE NE SE 19-113-52	Sand and gravel, dark-brown, fine to coarse, silty; dry Gravel, dark-brown, coarse, sandy; dry Sand, gray, medium to coarse, gravelly	1- 9 9- 12 12- 16
299	NW NW NW NW 21-113-52	Sand, medium to coarse; oxidized, dry Gravel, medium; oxidized, dry Sand, medium to coarse; oxidized, saturated Sand, fine to medium; unoxidized, saturated	1- 6 6- 16 16- 23 23- 40
300	SE SE NE SE 17-113-52	Sand and gravel, brown, medium, silty; dry	6- 7
301	SE SE SE SE 9-113-52	Sand, yellow-brown, fine, very silty; saturated Sand, light-brown, very fine and silt, coarse Gravel and sand, brown, medium	4- 13 13- 17 17- 19
302	SW SW SW SW 10-113-52	Sand Sand and gravel	1- 13 18- 78
303	SW SE SW SW 10-113-52	Sand	0- 16
304	NE NW NE NW 15-113-52	Sand, fine to coarse	0- 28
305	NE NE NW NE 15-113-52	Sand and gravel Sand and gravel	0- 14 22- 32
306	NW SE NW NW 14-113-52	Sand, fine to coarse Sand with clay Sand and gravel	0- 27 27- 37 37-123
307	SE SE SE SW 2-113-52	Sand and gravel Sand and gravel Sand and gravel; some clay	1- 4 19- 24 24- 34
308	NE NE NW NW 2-113-52	Sand and gravel Sand and clay Sand, brown, very coarse	7- 15 15- 17 17- 36
309	NW NW NW NE 1-113-52	Sand, very dark-gray, fine to coarse, silty Sand, very dark-gray, fine to coarse, silty, gravelly Sand and gravel, gray Sand, gray, fine to medium, silty Gravel, medium to very coarse	20- 30 30- 38 38- 47 47- 55 55- 70
310	NE NE NE NE 1-113-52	Sand, gray, medium; saturated, some clay Sand, dark-gray, fine to medium; some coarse Sand, gray, coarse to very coarse; coal Sand, light-brown, coarse to very coarse; coal Gravel, brown Gravel, very coarse, rocks	10- 15 15- 20 20- 29 29- 34 34- 50 50- 58
311	SE SE SE NE 1-113-52	Sand Sand and gravel	1- 4 4- 14
312	SW SW SW NE 1-113-52	Sand and gravel Sand, fine Sand and gravel	5- 12 12- 29 29- 52

Test Hole No.	Location	Lithologic Description	From-to Feet
313	SE SE SE SE 1-113-52	Sand, brown, very coarse Sand and gravel	4- 12 12- 21
314	NW NW NW NW 12-113-52	Sand and gravel, brown Sand, grayish-brown, very coarse Sand and gravel, light-brown	15- 39 39- 49 49- 73
315	NE SE NE NE 12-113-52	Sand and gravel	1- 21
316	NE SE SE NE 12-113-52	Gravel and sand Sand, brown Sand; some gravel	10- 14 14- 19 19- 24
317	NW NW NE SE 12-113-52	Sand and gravel	3- 7
318a	NW NE NE SE 12-113-52	Sand and gravel	6- 16
318b	NW NE NE SE 12-113-52	Sand and gravel	3- 11
319	SE NW NE SE 12-113-52	Sand and gravel	2- 11
320	NW NW NW SW 12-113-52	Sand Sand and gravel Gravel Sand and gravel	14- 19 19- 24 24- 34 34- 76
321	SW SW SW SW 12-113-52	Sand Sand and gravel	15- 50 50- 80
322	SW SE SW SE 12-113-52	Sand and gravel	7- 22
323	NW NW NW NE 13-113-52	Sand and gravel	6- 28
324	SW NW SW NW 13-113-52	Sand, brown, gravelly	0- 1
325	SE SE NE NE 14-113-52	Gravel, very coarse; impassable	0- 3
326	NE NE NE SE 14-113-52	Sand, coarse, big boulders; impassable	11- 13
327	SW SE SE SE 23-113-52	Gravel and sand, dark-brown; dry, very dirty Sand, dark-brown, clayey; saturated Sand, dark-brown, gravelly; dirty Sand, dark-brown, gravelly, clayey; dirty Sand, gray, clayey; very dirty Sand, gray, clayey, gravelly; very dirty Sand and gravel, medium; dirty	2- 6 8- 12 12- 19 19- 22 22- 27 27- 37 37- 44
328	SE SE SE SE 24-113-52	Sand and gravel, yellow-brown, silty Sand and gravel, gray, sandy, clayey	4- 13 18- 77
329	SW SW SW SW 35-113-52	Sand, coarse; unsorted Sand, coarse; saturated	1- 8 8- 13
330	NW NW SW NW 6-113-51	Sand and gravel, blue	14- 23
331	NE NE NW NW 5-113-51	Sand, medium; dry Gravel, fine to medium; saturated Sand, very coarse; saturated, clean	2- 9 9- 25 25- 30
332	NW SW NW SW 4-113-51	Sand, brown, gravelly, silty; dry Sand and gravel, brown, fine to medium, silty; saturated Sand and silt, interbedded Sand and gravel, fine to medium	0- 3 3- 22 22- 24 24- 30



Test Hole No.	Location	Lithologic Description	From-to Feet
333	SE NE SE 3-113-51	Sand and gravel; some clay	2- 52
334	SW SW SW SW 2-113-51	Sand and gravel, light-brown, fine to medium, silty; dry Sand, brown, medium to coarse, gravelly; dry Sand, dark-brown, medium to coarse, gravelly; saturated Sand, reddish-brown, medium to coarse	0- 7 7- 19 19- 22 22- 62
335	NW NW NW NE 10-113-51	Sand and gravel, light-brown, fine to medium, silty; dry Sand, brown, medium to very coarse, gravelly; saturated at 8 feet Sand, very dark-brown, medium to very coarse, silty Gravel, gray, medium to coarse	1- 4 4- 15 15- 28 28- 29
336	NE NE NE NE 9-113-51	Sand, reddish-brown, medium, silty; saturated Sand, brown, fine to coarse Sand and gravel, gray, fine to medium	3- 6 6- 14 14- 22
337	SE SE SE NE 8-113-51	Sand and gravel, gray, fine to coarse	0- 25
338	NE NE NE NE 17-113-51	Sand and gravel, brown Sand and gravel, light-gray; saturated Sand?	0- 6 6- 15 25- 34
339	NE NE NE NW 17-113-51	Sand, fine Sand and gravel	4- 9 18- 34
340	NW NW NW NW 17-113-51	Sand and gravel, dark-brown, coarse; dry Sand, dark-brown, medium to very coarse; moist, some coarse gravel Sand, grayish-brown, coarse to very coarse; some coarse gravel Gravel, very coarse, sandy	0- 6 7- 19 19- 28 28- 35
341	SW SW SW NW 17-113-51	Sand, brown, medium to coarse Sand, brown, medium Sand and gravel, brown, very coarse to medium Gravel, gray, medium to coarse	6- 11 11- 24 24- 36 36- 46
342	NE NE NE SE 19-113-51	Sand, coarse and gravel, brown Sand, brown, medium; some clay, clay increasing at 13 feet Sand, gray, fine, clayey Sand, gray, medium Sand, gray, very coarse and gravel Sand, gray, coarse to very coarse Sand, fine to very fine; some clay	0- 9 9- 15 15- 20 20- 25 25- 40 40- 52 52- 66
343	SW SW SW SW 16-113-51	Sand and gravel, rusty brown; dry	5- 11
344	NE NE NE NE 16-113-51	Sand, brown, clayey, silty, gravelly Sand and gravel, brown, fine to medium, silty, clayey; saturated Sand, brown, medium to coarse, silty, gravelly Sand and gravel, brown, fine to medium, silty Sand and gravel, gray, fine to medium	1- 2 2- 7 7- 27 27- 42 42- 53

Test Hole No.	Location	Lithologic Description	From-to Feet
345	NW NW NW NW 15-113-51	Sand and gravel	5- 44
346	NW NW NW NE 1-113-51	Sand and gravel, fine to medium	12- 41
347	NE NE NE NE 1-113-51	Gravel, medium; dry Gravel, cobble; dry, unknown size Gravel, cobble; hit boulder, impassable	3- 6 6- 9 9- 10
348	NE NE NE NE 11-113-51	Gravel, light-brown, medium to coarse, silty, sandy; dry Gravel, reddish-brown, medium to coarse, very silty, sandy; saturated Gravel, brown, coarse, silty, sandy Gravel, reddish-brown, clayey, silty	3- 6 6- 13 13- 21 21- 27
349	SE SE SE SE 11-113-51	Gravel and sand, dark-brown, very silty and clayey; moist Gravel, light-brown, fine to medium, sandy, silty; saturated Gravel, dark-brown, medium, very clayey Gravel, dark-brown, medium to coarse, very silty and clayey	1- 3 3- 8 8- 17 17- 22
350	NW NW NW NW 14-113-51	Gravel, light-brown, medium to coarse, silty, sandy; dry Gravel, reddish-brown, medium to coarse, sandy; saturated Sand, olive-gray, medium to coarse, very silty, gravelly	0- 9 9- 20 20- 25
351	SE SE NE SE 16-113-51	Sand, gray, medium to coarse; moist, some clay and gravel pebbles Sand, gray, medium to very coarse; saturated	4- 9 9- 24
352	NE SE NE NE 21-113-51	Sand and gravel, rusty-brown, medium to very coarse; dry, some coarse gravel Sand, brown, very coarse; moist Sand and gravel, brown, very coarse; some coarse gravel	3- 8 8- 11 11- 18
353	NW NW NW SW 21-113-51	Sand, light-brown, medium to very coarse, gravelly; dry Sand and gravel, reddish brown, fine; dry Sand, reddish-brown, fine to coarse; saturated at 20 feet	6- 8 8- 15 15- 21
354	SE SE SE SE 19-113-51	Gravel, medium and sand, coarse to very coarse, brown Sand, light-gray, medium to very coarse; some clay and gravel	9- 27 27- 41
355	SE NE SE NE 30-113-51	Sand, fine and clay Sand, medium to coarse; some clay Gravel, medium; some clay Gravel; well sorted Sand, light-gray, fine to coarse Sand, brown, medium to coarse Sand, brown, medium to very coarse; some fine gravel	7- 11 11- 14 14- 19 19- 27 27- 32 32- 44 44- 49
356	SW SW SW SW 30-113-51	Sand, medium to coarse; dry Gravel, cobble; difficult drilling Sand, medium to coarse, clayey; oxidized, saturated Sand, medium; unoxidized, saturated	1- 14 14- 21 21- 30 30- 65

Test Hole No.	Location	Lithologic Description	From-to Feet
357	SW SW SW SW 22-113-51	Sand	2- 5
358	SW SW SW SE 22-113-51	Sand, brownish-black, silty, pebbly Gravel and sand, light-brown, fine to medium; dry Gravel and sand, brown, fine to medium; saturated at 5 feet Gravel, brown, fine	0- 1 1- 3 3- 14 14- 24
359	NW NW NW NW 26-113-51	Sand, brown, silty, gravelly; dry Sand, dark-brown, silty, gravelly; saturated Gravel, brown, medium to coarse, silty, sandy Sand and gravel, brown, fine to medium	2- 6 6- 8 8- 17 17- 41
360	NE NE SW 23-113-51	Gravel, coarse Sand, fine Gravel	7- 9 9- 18 18- 35
361	SW SW SW SW 13-113-51	Gravel, medium to coarse and sand; saturated, clean	3- 28
362	NE NE NE NE 13-113-51	Sand, medium to coarse; dry	2- 5
363	NW NW NW NE 24-113-51	Gravel, brown, very coarse and sand; dry, hit rocks, impassable	0- 20
364	SW SW SW SW 24-113-51	Sand, brown, medium; dry, dirty Sand, very coarse and gravel, fine, brown; saturated, clean below 15 feet	0- 5 5- 33
365	NE NE NE NE 26-113-51	Sand and gravel	1- 25
366	NE SW NE 26-113-51	Sand and gravel Sand, coarse and gravel	1- 8 8- 35
367	NE NE NE NE 25-113-51	Sand, brown, coarse; saturated, clean Sand, very coarse and gravel, fine; saturated, clean	4- 9 9- 32
368	SE SE SE SE 25-113-51	Sand, brown, gravelly; moist, dirty Gravel, sandy; saturated, dirty Sand, light-brown, gravelly Gravel and sand, fine to medium	1- 6 6- 12 12- 17 17- 29
369	SE SE SE SE 26-113-51	Sand, light-brown; dry, dirty Sand, brown, gravelly; dry, dirty Gravel and sand, brown, fine to medium; saturated, dirty Gravel and sand, gray, fine to medium	0- 2 2- 6 6- 23 23- 27
370	NW NW NW NE 35-113-51	Sand, grayish-brown, fine to medium, gravelly; dry Sand, reddish-brown, medium, gravelly; dry Sand, medium to coarse, gravelly; saturated at 5 feet, some gravel layers Sand and gravel, light-gray, fine to medium	0- 1 1- 4 4- 7 7- 22
371	NW NW NW NW 35-113-51	Sand, very coarse and gravel, fine; saturated, clean Sand, coarse; saturated, clean	8- 36 36- 63
372	SE SE SE SE 28-113-51	Sand, medium, uniform; saturated, clean	11- 55

Test Hole No.	Location	Lithologic Description	From-to Feet
373	SE SE SE SE 32-113-51	Sand, coarse and gravel, brown; dry	5- 12
		Sand, very coarse and gravel, fine; saturated, clean	12- 27
374	SE SE SE SW 33-113-51	Sand, reddish-brown, medium to coarse, gravelly; dry	3- 8
		Sand, medium to very coarse; saturated at 10 feet, few pebbles	8- 13
		Sand, grayish-brown, medium to very coarse, fine gravelly	13- 27
375	NW NW NW SW 34-113-51	Gravel and sand, light-brown, fine to medium, very silty; dry	4- 8
		Gravel and sand, reddish-brown, fine to medium; saturated at 10 feet	8- 13
		Sand, brown, medium to very coarse, gravelly	13- 21
376	SW SW SW SW 34-113-51	Sand, medium to coarse; saturated	4- 13
		Sand, fine to medium; unoxidized, saturated	13- 25
		Sand, fine; saturated	25- 30
		Sand, coarse; saturated	30- 35
377	SE SE SW SW 36-113-51	Sand, brown, gravelly; dry, dirty	0- 2
		Sand and gravel, brown, fine to medium; saturated, dirty	2- 7
		Gravel and sand, medium to coarse	7- 13
		Gravel and sand, brown, medium	13- 22
		Gravel and sand, gray, medium	22- 31
378	SE SE SE SE 36-113-51	Sand, very coarse and gravel, fine; saturated, clean	6- 20
		Sand, brown, very coarse; saturated, clean	20- 32
379	NE NE NE NE 1-112-56	Gravel, yellow	2- 7
380	NW NW NW NW 4-112-53	Sand, very fine; some clay	2- 5

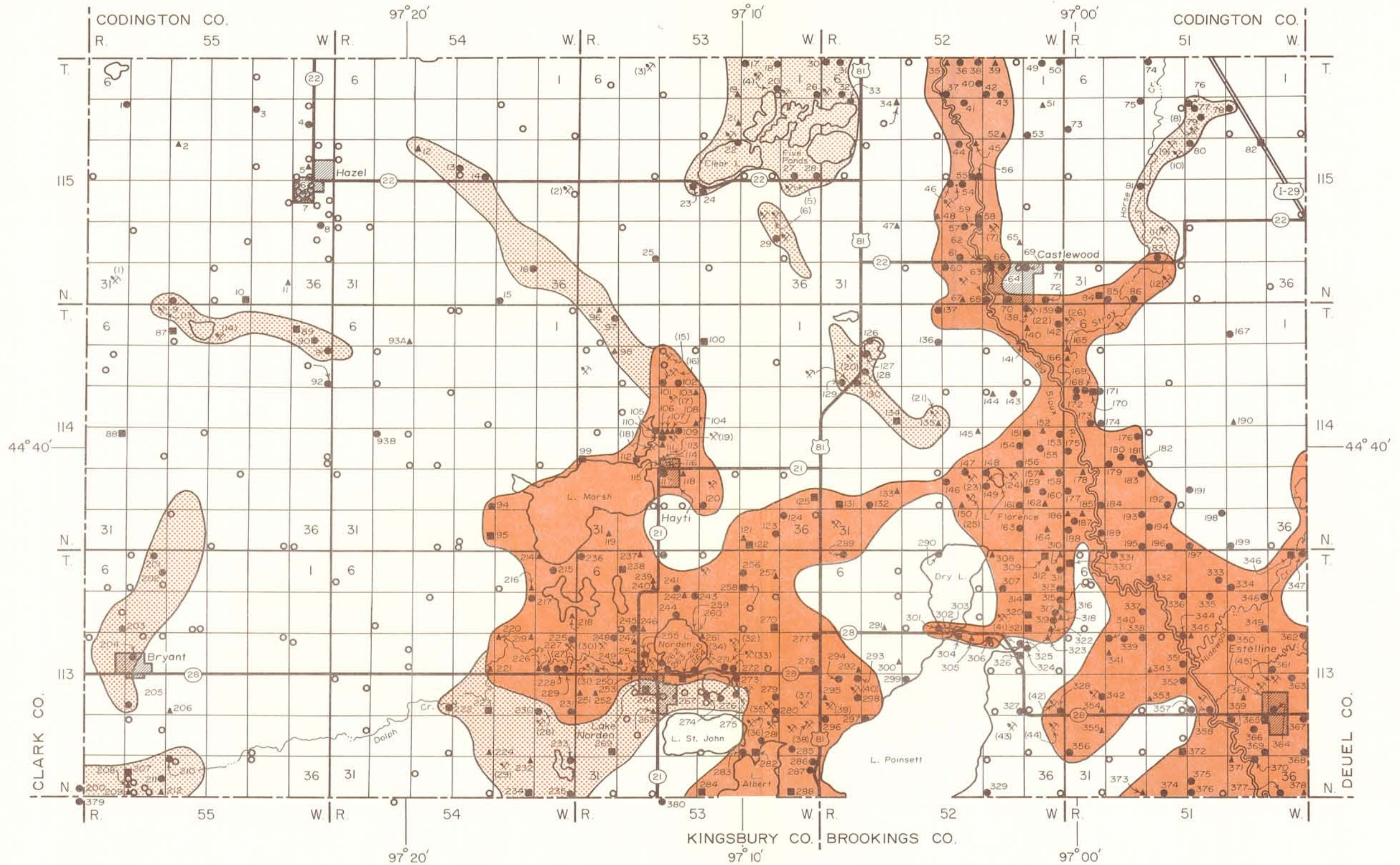
TABLE 2. List of sand and gravel pits in Hamlin County, South Dakota, which are on file at the District Office, South Dakota Department of Highways, Huron, South Dakota

Pit No.	Owner and Address	Description	Type	Average Depth in Feet	Average Depth of Stripping in Feet
1	Six, Fred — Vienna	SW¼ NE¼ 31-115-55	Gravel		
2	Fritz, Carl — Thomas	NE¼ 24-115-54		5.6	1.4
3	Schulke, Gene — Watertown	NE¼ 5 115-53		6.0	3.5
4	Hemp	SE¼ 2-115 53			
5	Dick, Edgar — Castlewood	NW¼ 24-115-53	Gravel	15.1	4.3
6	Dick, Edgar — Castlewood	SE¼ SE¼ 23-115-53	Gravel	12.4+	4.7
7	Ellefson, Harry — Castlewood	NE¼ NW¼ 26-115-52	Filler		
8	Even, Leonard	SW¼ 10-115-51			
9	Ruesink, Ben — Castlewood	N½ NE¼ 16-115-51	Gravel		
10	Vetter, Ralph — Castlewood	SE¼ NE¼ 16-115-51	Gravel	7.0	2.7
11	Van Stryland, William — Castlewood	N½ 28-115-51	Gravel	8.2+	2.3
12	Heemeyer, R. B. — Castlewood	SW¼ NE¼ 33-115-51			
13	Hodges, Ray — DeSmet	NE¼ 5-114-55			
14		SW¼ 3-114-55			
15	Wait, Claude — Watertown	NW¼ 9-114-53	Filler & Gravel		
16	Ringley, J. A., and Stemwedel, E. C. — Hayti	NE¼ SW¼ 9-114-53			
17	Svarvari, Chester — Hayti	E½ NW¼ 16-114-53	Gravel	9.6+	3.0

Table 2 ... continued.

Pit No.	Owner and Address	Description	Type	Average Depth in Feet	Average Depth of Stripping in Feet
18	Hanson, Kenneth — Hayti	NE¼ 20-114-53	Gravel	6.6+	3.5
19	Hanson, Howard — Hayti	SW¼ 21-114-53		12.5+	4.1
20	Korcal, John — Watertown	NE¼ 7-114-52	Sand	6.3	4.3
21	Phillips, William — Watertown	NE¼ SE¼ 16-114-52	Filler		
22	Garvin, George — Mesa, Arizona	NW¼ 1-114-52		6.5	3.9
23	Gilbert, G. A. — Watertown	NE¼ 27-114-52	Gravel	5.6+	3.3
24	Department of Game, Fish and Parks	NW¼ 26-114-52	Gravel	5.5+	3.7
25	Department of Game, Fish and Parks	SE¼ 27-114-52	Gravel	5.0+	3.5
26	Clauson, Oscar — Castlewood	NW¼ 6-114-51	Gravel	15.0+	5.3
27	Kiskanen, Gust — Brush Prairie, Washington	SE¼ 13-113-54			
28	Eckland, Kate et al., Emila Fuchina L. N.	S½ SW¼ 24-113-54	Gravel		
29	Koistenen, J. H. — Erwin	NW¼ 35-113-54			
30	Isaacson, Abraham (Estate) — Lake Norden	NW¼ SW¼ 18-113-53			
31	Fedt, Henry and Koisti, Abe and Hulda, C. — Lake Norden	SE¼ SW¼ 18-113-53			
32	Salo, J. A. — Lake Norden	E½ NE¼ 15-113-53			
33	Pearson, Levi — Lake Norden	SE¼ 15-113-53	Filler		
34	Palm, A. W. — Huron	SW¼ 15-113-53			

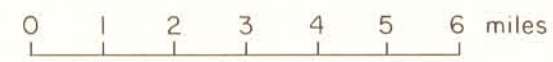
35	Antonen, Adolph — Lake Norden	SE¼ 23-113-53			
36	Saveia, Hilma — Lake Norden	NW¼ 26-113-53			
37	Jacobson, Melvin — Lake Norden	W½ SE¼ 24-113-53	Gravel		
38	Lee, Stanley — Lake Norden	NE¼ 25-113-53	Sand & Gravel	11.5+	2.8
39		SW¼ 19-113-52			
40	Nitterberg, Mrs. Ida — Castlewood	SE¼ NE¼ 19-113-52			
41		NE¼ 14-113-52	Filler		
42	Monson, Christine — Estelline	SE¼ 24-113-52	Sand		
43		NE¼ 26-113-52			
44	Thomas, Johanna — Estelline	NE¼ 25-113-52	Sand		
45	Kuehn, Emma — Estelline	NW¼ 24-113-51		13.4+	0.6



- Good probability of finding sand or gravel.
- Fair probability of finding sand or gravel.
- Poor probability of finding sand or gravel.

- 163 ● Test hole containing sand or gravel in upper 25 feet with 0-4 feet of overburden. Number refers to Table 1.
- 219 ▲ Test hole containing sand or gravel in upper 25 feet with 5-10 feet of overburden. Number refers to Table 1.
- 84 ■ Test hole containing sand or gravel in upper 25 feet with 11-25 feet of overburden. Number refers to Table 1.

- Test hole with no sand or gravel in upper 25 feet.
- (2) ✕ Gravel pit. Number in parentheses refers to Table 2.



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