Information Pamphlet No. 25

SAND AND GRAVEL RESOURCES IN HANSON COUNTY, SOUTH DAKOTA

by

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INTRODUCTION

This pamphlet is the first of a series of reports describing the geology and hydrology of Hanson County. It is designed to be a tool in the search for sand and gravel deposits by focusing the reader’s attention upon the most promising areas.

Other reports in the series include:


The first report describes the yield, quality, and location of major aquifers (water-bearing deposits) in a short, easy-to-read pamphlet. The second report is a more technical and exhaustive investigation of the geology and hydrology of the counties. All basic data used to complete these reports are available from the South Dakota Geological Survey’s open file.

GEOLOGIC OVERVIEW

Most sand and gravel deposits in Hanson County were deposited by glaciers which covered the region several thousand years ago. Others have been deposited by streams since the glaciers retreated. A short description of the types of earth materials found in Hanson County follows.

Till

The glaciers that once covered this region were full of debris picked up by the ice earlier in its route. Some of this mixture of boulders, sand, gravel, clay, and silt was deposited directly from the ice. Till, the term used to describe this mixture, is often called “blue clay” or “boulder clay” and covers much of Hanson County. Although till is not considered a source of sand and gravel, small isolated gravel hills or lenses may occur within till deposits. Gravel pits in section 25, Township 101 North, Range 59 West are examples of these random deposits.

Outwash

Glacial outwash is the term geologists use to describe any deposit of glacial debris which has been washed and sorted by flowing glacial meltwater. Outwash grain size depends upon the
velocity of the water depositing it and the type of materials being carried by the water. A lake or slowly flowing stream usually contains silt and clay. Faster water may leave streams composed entirely of boulders. Most outwash, however, is made up of an assortment of sand and gravel with minor amounts of finer and coarser materials. Most of the shaded areas shown on the map in this publication represent outwash deposits.

Alluvium

Alluvium is the term used to describe the material deposited by streams since the retreat of the glacier. Grain size of alluvial deposits is governed by the same factors as outwash. Alluvium occurs in the valleys of present day streams, and can often be a good sand and gravel source.

Bedrock

Bedrock is the older, consolidated rocks beneath the glacial deposits. In Hanson County the bedrock consists of shale, sandstone, chalk, and quartzite (locally known as "pink granite"). Bedrock is exposed along portions of Twelve Mile Creek, Enemy Creek, Johnson Creek, Wolf Creek, Pierre Creek, and the James River. Quartzite is the most abundant bedrock exposed at the surface. Quartzite outcrops were mapped during this study because they are potential sources of high-quality aggregate. Generally, however, when bedrock appears at the surface or in a test hole, no sand or gravel can exist below that point.

Sand and gravel can exist as small hills within a valley, or as natural terraces along the valley walls above the bedrock. Examples of both occur in the northwest quarter of section 14, Township 102 North, Range 58 West.

Explanation of Tables

Table 1 is a compilation of test holes which encountered sand or gravel in the upper 25 feet, or quartzite in the upper 10 feet. This table lists: (a) location of the test hole, (b) depth, and (c) description of sand, gravel, and quartzite intervals. The complete set of drill logs are on file at the office of the South Dakota Geological Survey in Vermillion. The South Dakota Geological Survey, United States Geological Survey, South Dakota Division of Water Rights, United States Bureau of Reclamation, and private drillers contributed to this list.

Table 2 is a list of gravel pits on file in 1978 with the South Dakota Division of Highways. The owner, thickness of overburden, thickness of sand and gravel being mined, and aggregate type have been listed. The actual thickness of a deposit may be greater than that mined, because depth to the water table...
The map shows the location of quarries, gravel pits, test holes, and a few landmarks. Test holes are represented by a system of map symbols. A dot (•) represents a test which revealed sand or gravel within 25 feet of the land surface with 0 to 5 feet of overburden. A square (□) indicates that sand or gravel was encountered within 25 feet of land surface with 5 or more feet of overburden. Those holes with quartzite less than 10 feet below land surface are labeled by a slash (/) through the map symbol. These symbols are numbered and referred to in Table 1. An open circle (○) indicates that no sand or gravel was found in the upper 25 feet. Gravel pits are labeled with a crossed pick and shovel (✘). Those that are numbered are listed in Table 2. Additional information is on file at the Division of Highways District Office in Mitchell.

To help illustrate the most promising locations, the map has been divided into area types indicating "good," "fair," or "poor" probability of finding economic deposits of sand or gravel. These areas have been delineated by use of test drilling, gravel pit locations, topographic map and aerial photo interpretation, and field observations. Areas labeled as "good" and "fair" have been assigned a letter on the map corresponding to their identification in the following text. In addition, quartzite outcrops are mapped to assist the prospector's search for quarry sites.

Sand and gravel deposits in areas labeled "Good" are comparatively thick with thin overburden and underlie large tracts of land. "Fair" areas, on the other hand, lack one or more of these advantages.

Sand and Gravel

Areas "A" and "B" (labeled "fair") occupy narrow valleys in the northeastern quadrant of Hanson County. Sand and gravel deposits exist as discontinuous remnants of natural terraces (up to 20 feet thick) on the valley walls and a thin (5 feet) patchy veneer in the valley floors. Area "B" shows the best potential in this portion of the County.

Areas "C", "E", and "G" contain discontinuous terrace deposits along the valleys of the James River and Enemy Creek. Deposits cover relatively little area and are generally less than 10 feet thick.

Area "G" (good) represents the most abundant supply of gravel in the County. Terrace deposits 20 feet thick are common along the James Valley and up to 40 feet thick at the junction of the...
James River and Johnson Creek. Deposits thin upstream along Johnson Creek and Pierre Creek toward Quartzite outcrops northeast of Fulton and Alexandria.

Area "MP" (labeled "fair") is the downstream edge of a large outwash body along Twelve Mile Creek in Davison County. Although deposits are discontinuous over very shallow chalk bedrock, a few tests revealed aggregate thicknesses of up to 15 feet near Ethan Lake.

Area "M" is designated as "good" because deposits are locally thick (15 feet) and are covered by 2 feet or less of overburden. Prospects for economic deposits are best in the northern portion of this unit.

Area "I" (labeled "fair") represents sand and gravel deposits in the valley of Plum and Elm Creeks. Although these deposits range up to 20 feet thick, they exist only as small knolls and terrace remnants along the valley walls making them more difficult to locate. Deposits in area "I" are mainly medium to coarse sand although a few holes penetrated gravel layers 5 feet thick or less.

The valley of Wolf Creek between Emery and Spencer has been labeled area "J" (fair). Many small gravel pits expose thin (10 feet or less) lenses of gravel along the valley.

Areas "K," "L," and "M" (fair) display thin gravel veneers along the upstream portions of Johnson and Pierre Creeks. Area "L" contains primarily valley bottom deposits averaging 5 feet thick with about 1 foot of overburden. Area "K" deposits also occupy the valley floor but average 9 feet in thickness with about 4 feet of overburden. Deposits in area "M" are quite sandier, terraces 15 to 20 feet thick with thin overburden (less than 2 feet).

The areas designated as poor do contain sand and gravel deposits. However, because these deposits are widely scattered and generally small, efforts should first be concentrated in the "good" and "fair" areas.

Quartzite

Quartzite outcrops occur along Emery Creek, Johnson Creek, Pierre Creek, Plum Creek, Wolf Creek, and the James River. As displayed on the map, many of these outcrops cover large tracts of land. These areas have been mapped as possible quarry sites.

Nearby survey tests suggest that Quartzite exists under additional several hundred acres of surrounding land at shallow (less than 10 feet) depths.

Some of the geologic factors to consider in selecting quarry sites include: overburden thickness, outcrop size, jointing or...
the rock, rock quality, and local water level.

Outcrops in Hanson County display vertical joint patterns outlining blocks ranging from just under 1 foot to about 3 feet on each side. Rocks exposed are composed of extremely well-cemented, hard, fine-grained sand, which often fractures across individual grains. There are, however, some poorly-cemented and coarsely-grained beds in section 9, Township 102 North, Range 59 West.

Most of the outcrops occur along the various drainageways but large volumes of rock exist well above stream levels and can probably be mined without major dewatering problems. Flowing test holes and natural springs in the outcrop area near Fulton suggest that the water is under some local artesian pressure in the fracture system of the quartzite. This could prove to be a problem to quarry operations at this particular site.

ECONOMIC CONSIDERATIONS

Further development of aggregate in Hanson County depends upon economic conditions in the future. Prospectors should carefully compare material specifications, development costs, transportation economics, and future markets for several aggregate sources before selecting a mining site.
<table>
<thead>
<tr>
<th>Test Hole</th>
<th>Location</th>
<th>Lithology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SE SE NW SE sec. 29, T. 104 N., R. 59 W.</td>
<td>2-5 Sand, medium to coarse, silty, pebbly</td>
</tr>
<tr>
<td>2</td>
<td>SE SE SW SE sec. 20, T. 104 N., R. 59 W.</td>
<td>1-6 Gravel, coarse, sandy, silty</td>
</tr>
<tr>
<td>3</td>
<td>NW NW NE NW sec. 21, T. 104 N., R. 59 W.</td>
<td>4-10 Sand, brown, silty, pebbly</td>
</tr>
<tr>
<td>4</td>
<td>NE NE NE NE sec. 16, T. 104 N., R. 59 W.</td>
<td>12-20 Gravel, red-brown, medium, very clayey, sandy</td>
</tr>
<tr>
<td>5</td>
<td>SW SE SW SE sec. 10, T. 104 N., R. 59 W.</td>
<td>1-4 Sand, dark-brown, medium to coarse, very silty</td>
</tr>
<tr>
<td>6</td>
<td>SW NW SE SE sec. 10, T. 104 N., R. 59 W.</td>
<td>1-5 Sand, fine, silty, clayey</td>
</tr>
</tbody>
</table>
| 7         | NE NW SE SE sec. 10, T. 104 N., R. 59 W. | 1-3 Gravel, brown, fine to coarse, sandy
|           |          | 13-17 Sand, brown, fine, silty, well-sorted |
Test Hole 8
Location: SE NE NE NW sec. 11, T. 104 N., R. 59 W.
0- 2  Sand, brown, fine to medium, pebbly
5- 7  Sand, yellow-brown, fine, silty

Test Hole 9
Location: NE NW NE NW sec. 12, T. 104 N., R. 59 W.
0- 5  Sand, brown, fine to medium, pebbly

Test Hole 10
Location: SW SE SW SE sec. 12, T. 104 N., R. 59 W.
2- 4  Sand, yellow, fine, silty, pebbly

Test Hole 11
Location: NE NE NE SE sec. 13, T. 104 N., R. 59 W.
4- 6  Sand, brown, fine to medium, silty; moist

Test Hole 12
Location: SW SE SW SE sec. 24, T. 104 N., R. 59 W.
4- 9  Sand, brown, medium to very coarse

Test Hole 13
Location: NE SE NE NE sec. 35, T. 104 N., R. 59 W.
9-14  Sand, red-brown, fine, clayey

Test Hole 14
Location: SW NW SW NW sec. 35, T. 104 N., R. 59 W.
1- 9  Sand, brown, pebbly, very clayey
9-13  Gravel, fine to medium, clayey; moist

Test Hole 15
Location: SW SW SW SW sec. 34, T. 104 N., R. 59 W.
1-21  Gravel, fine to coarse

Test Hole 16
Location: SE SE SW SW sec. 34, T. 104 N., R. 59 W.
5- 7  Sand, brown, fine, silty; moist
Test Hole 18 -- continued.

11-13  Sand, brown, medium to coarse, silty

Test Hole 17
Location: SW NW SW NW sec. 8, T. 104 N., R. 58 W.
15-23  Sand, red-brown, medium, silty, pebbly; moist

Test Hole 18
Location: SW SE SW sec. 8, T. 104 N., R. 58 W.
3-5  Sand, brown, fine to medium; dry

Test Hole 19
Location: SE SE NE SE sec. 4, T. 104 N., R. 58 W.
6-16  Sand, yellow, pebbly; moist

Test Hole 20
Location: SW SW SW NW sec. 2, T. 104 N., R. 58 W.
2-5  Gravel, dark-brown, coarse, sandy

Test Hole 21
Location: NE NE NE NE sec. 2, T. 104 N., R. 58 W.
15-16  Sand, medium
15-18  Rock
16-27  Gravel, fine, and sand

Test Hole 22
Location: SE SE SW SE sec. 36, T. 105 N., R. 58 W.
0-5  Sand, brown, clayey, pebbly; moist
5-11  Gravel, fine, clayey

Test Hole 23
Location: NW NE NW NE sec. 29, T. 104 N., R. 58 W.
2-4  Sand, light-brown, silty, clayey; moist
Test Hole 24
Location: SE SE SE SE sec. 33, T. 104 N., R. 58 W.
17-25 Sand, fine, with gray clay

Test Hole 25
Location: SE SW SE SE sec. 27, T. 104 N., R. 58 W.
1-5 Sand, light-brown, fine to medium, silty, clayey; moist

Test Hole 26
Location: SW SW NW sec. 25, T. 104 N., R. 58 W.
1-6 Sand, red-brown, pebbly; dry

Test Hole 27
Location: NE SE SE SE sec. 31, T. 105 N., R. 57 W.
0-7 Sand, red-brown, medium, pebbly

Test Hole 28
Location: NW NW NE NE sec. 5, T. 104 N., R. 57 W.
2-10 Sand, dark-brown, medium to coarse, clayey, pebbly

Test Hole 29
Location: NW NW NE NE sec. 5, T. 104 N., R. 57 W.
0-1 Sand, medium to coarse, pebbly, silty; moist
2-5 Gravel, fine, very sandy; clayey

Test Hole 30
Location: SW NW SW NW sec. 3, T. 104 N., R. 57 W.
2-18 Sand, medium to coarse, silty; moist

Test Hole 31
Location: SW NW NW SW sec. 8, T. 104 N., R. 57 W.
0-4 Sand, brown, fine to coarse
Test Hole 32
Location: NW NW NW NW sec. 11, T. 104 N., R. 57 W.
0-16 Sand and fine gravel, very silty

Test Hole 33
Location: NE NW NW NW sec. 17, T. 104 N., R. 57 W.
1= 5 Sand, brown, very pebbly; moist
5-15 Gravel, fine, very clayey; moist

Test Hole 34
Location: SW SW NW NW sec. 10, T. 104 N., R. 57 W.
11-15 Sand, brown, pebbly; clayey; moist

Test Hole 35
Location: NW NW SW SW sec. 10, T. 104 N., R. 57 W.
17-20 Sand, red-brown, medium, a few pebbles

Test Hole 36
Location: NW NW SE SE sec. 14, T. 104 N., R. 57 W.
12-18 Sand, brown, fine

Test Hole 37
Location: NE NE NE NE sec. 25, T. 104 N., R. 57 W.
9-13 Sand, medium to coarse, some brown clay
13-15 Gravel, fine to medium, sandy, clayey

Test Hole 38
Location: SE SE SE SE sec. 36, T. 104 N., R. 57 W.
2-10 Sand, fine to medium

Test Hole 39
Location: SW NW NW Sec. 6, T. 103 N., R. 59 W.
1= 3 Sand, light-brown, medium, very clayey, pebbly

Test Hole 40
Location: SW NW NW NW sec. 3, T. 103 N., R. 59 W.
6- 9 Sand, medium to coarse, pebbly, clayey; wet
Test Hole 41
Location: SE SW SW sec. 4, T. 103 N., R. 59 W.
4-6 Gravel, medium, sandy; dry

Test Hole 42
Location: NW NW NW sec. 17, T. 103 N., R. 59 W.
2-8 Sand, brown, fine; moist

Test Hole 43
Location: NW SW SW sec. 7, T. 103 N., R. 59 W.
2-5 Sand, very fine, pebbly, clayey; dry

Test Hole 44
Location: SW SE SE sec. 30, T. 103 N., R. 59 W.
1-5 Sand, yellow, very fine, silty, pebbly; dry
5-11 Sand, brown, fine, silty, pebbly; dry

Test Hole 45
Location: SE NE SE sec. 31, T. 103 N., R. 59 W.
7-15 Sand, brown, medium, very clayey

Test Hole 46
Location: NW SW SW sec. 33, T. 103 N., R. 59 W.
0-6 Sand, coarse, pebbly; dry
8-10 Gravel, medium to fine, some clay

Test Hole 47
Location: SW NW NW sec. 34, T. 103 N., R. 59 W.
9-14 Sand, brown, medium, gravelly, slightly clayey; moist

Test Hole 48
Location: NW NW NW sec. 34, T. 103 N., R. 59 W.
18-23 Sand, some brown clay

Test Hole 49
Location: SE NE SE SE sec. 35, T. 103 N., R. 59 W.
3-9 Sand, brown, medium to coarse, pebbly; moist
Test Hole 50
Location: NE NE SE SE sec. 35, T. 103 N., R. 59 W.
3-4 Sand, brown, medium to fine; moist
9-11 Sand, brown, fine to medium; clayey

Test Hole 51
Location: SE SE SE SW sec. 25, T. 103 N., R. 59 W.
2-4 Gravel, coarse; sandy

Test Hole 52
Location: SW SE SW SW sec. 25, T. 103 N., R. 59 W.
4-10 Sand, brown; clayey; pebbly

Test Hole 53
Location: SE SE SW SW sec. 25, T. 103 N., R. 59 W.
0-6 Gravel, coarse; sandy; dry

Test Hole 54
Location: NE SE NE NE sec. 25, T. 103 N., R. 59 W.
0-4 Gravel, light-brown; sandy; dry

Test Hole 55
Location: NE NW NW NE sec. 25, T. 103 N., R. 59 W.
6-8 Gravel, coarse; sandy; very clayey

Test Hole 56
Location: NW NW SE SW sec. 13, T. 103 N., R. 59 W.
1-14 Gravel, coarse; clayey; well-sorted; moist

Test Hole 57
Location: NN NE NE NE sec. 6, T. 103 N., R. 59 W.
1-2 Sand, brown; medium; pebbly; clayey; moist
9-11 Sand, brown; fine; silty
13-15 Gravel, light-brown; fine to medium; sandy; moist
Test Hole 58
Location: SW SW SW NW sec. 9, T. 103 N., R. 58 W.
2+ Quartzite

Test Hole 59
Location: NE NE SE SE sec. 9, T. 103 N., R. 58 W.
5+ Quartzite

Test Hole 60
Location: NE SW NE SW sec. 16, T. 103 N., R. 58 W.
0-4 Sand, light-tan, medium, pebbly; dry
4-6 Gravel, coarse, sandy, silty

Test Hole 61
Location: NW NW NW NW sec. 20, T. 103 N., R. 58 W.
2-13 Sand, brown, medium to coarse, pebbly, clayey; moist

Test Hole 62
Location: SE SE SW SW sec. 19, T. 103 N., R. 58 W.
1-4 Sand, brown, medium, pebbly, clayey; moist

Test Hole 63
Location: SE SW SW SW sec. 19, T. 103 N., R. 58 W.
5-9 Sand, gray-brown, medium to fine; very clayey

Test Hole 64
Location: NW NW NW NW sec. 30, T. 103 N., R. 58 W.
1-14 Sand, light-brown, medium to coarse; very gravelly

Test Hole 65
Location: SW SW SW NW sec. 29, T. 103 N., R. 58 W.
0-16 Sand, brown, medium to coarse, pebbly; wet
Test Hole 66
Location: SE NW NE NW sec. 24; T. 103 N.; R. 89 W.
3-5 Gravel, brown, medium, sandy; dry

Test Hole 67
Location: NW NW NE NW sec. 36; T. 103 N.; R. 89 W.
5 Quartzite

Test Hole 68
Location: SE NE NE SE sec. 25; T. 103 N.; R. 88 W.
2 Quartzite

Test Hole 69
Location: SW SW SE SE sec. 24; T. 103 N.; R. 88 W.
1-4 Gravel, red-brown, coarse, sandy
4-11 Sand, tan, fine to coarse, pebbly; moist

Test Hole 70
Location: NW NW NW NW sec. 5; T. 103 N.; R. 87 W.
6-8 Gravel, brown, fine, sandy, silty; moist
8-22 Sand, brown, medium to very coarse, pebbly; moist

Test Hole 71
Location: NW NE NW NW sec. 9; T. 103 N.; R. 87 W.
4-5 Gravel, brown, fine; very moist
5-8 Sand, red-brown, medium; well-sorted; very moist

Test Hole 72
Location: NW NW SW NW sec. 8; T. 103 N.; R. 87 W.
4-15 Sand, brown, medium; pebbly; moist

Test Hole 73
Location: NW SW SW NW sec. 3; T. 103 N.; R. 87 W.
2-5 Sand, brown, medium to coarse, pebbly, silty

14
Test Hole 74
Location: NW NW NE NE sec. 18, T. 103 N., R. 57 W.
5-9  Sand, brown, fine to very coarse, pebbly, silty, wet

Test Hole 75
Location: SE SE SW SW sec. 19, T. 103 N., R. 57 W.
2-8  Gravel, brown, sandy, pebbly, moist

Test Hole 76
Location: NE NE NW NW sec. 30, T. 103 N., R. 57 W.
2+  Quartzite

Test Hole 77
Location: SE SE SE SE sec. 26, T. 103 N., R. 57 W.
9+  Quartzite

Test Hole 78
Location: SE SW SE SW sec. 25, T. 103 N., R. 57 W.
0-2  Gravel, brown, sandy

Test Hole 79
Location: SW SW SW SW sec. 24, T. 103 N., R. 57 W.
6-7  Gravel, brown, medium
10-11+ Quartzite, pink, hard

Test Hole 80
Location: SE NW SE NW sec. 24, T. 103 N., R. 57 W.
6+  Quartzite

Test Hole 81
Location: SE SE SE SE sec. 12, T. 103 N., R. 57 W.
12-17 Gravel, fine, clayey

Test Hole 82
Location: SW SW SW SW sec. 18, T. 102 N., R. 59 W.
7-6  Sand, medium
Test Hole 43  
Location: NW SW NW sec. 16, T. 102 N., R. 59 W.  
2-6  Sand, tan, medium, very clayey; moist

Test Hole 44  
Location: NW SE NE NE sec. 17, T. 102 N., R. 59 W.  
0-7  Sand, brown, fine to medium, very clayey; moist

Test Hole 85  
Location: NW NW SW NW sec. 9, T. 102 N., R. 59 W.  
0-2  Sand, yellow, fine, very silty; dry  
2-7  Sand, brown, medium, pebbly, silty; moist

Test Hole 86  
Location: NW NW SW NW sec. 9, T. 102 N., R. 59 W.  
0-19  Sand, brown, medium to fine; moist

Test Hole 87  
Location: SW SW NW SW sec. 4, T. 102 N., R. 59 W.  
0-4  Sand, light-brown, very pebbly

Test Hole 88  
Location: NW NW SW NW sec. 3, T. 102 N., R. 59 W.  
4-10  Sand, medium to fine, silty  
15-23 Sand, light-brown, fine to coarse, clayey; moist; very gravelly from 20 to 23 feet

Test Hole 89  
Location: NW SE NE SW sec. 10, T. 102 N., R. 59 W.  
2-5  Sand, brown, fine, clayey; moist

Test Hole 90  
Location: NW NW SW NE sec. 10, T. 102 N., R. 59 W.  
1-20  Gravel, fine, very coarse; sandy; poorly-sorted, moist
Test Hole 91
Location: NW NE NE SE sec. 10, T. 102 N., R. 59 W.
5-10 Sand, brown, medium to coarse, pebbly; moist

Test Hole 92
Location: SW NW SW NW sec. 11, T. 102 N., R. 59 W.
1-4 Gravel, fine, sandy

Test Hole 93
Location: NE SW NE NW sec. 11, T. 102 N., R. 59 W.
1-4 Sand, white, fine to medium, pebbly; moist
4-8 Gravel, brown, medium, very sandy; moist

Test Hole 94
Location: SW NW NW NE sec. 11, T. 102 N., R. 59 W.
2-6 Sand, brown, fine; moist
6-10 Gravel, tan, medium, sandy; moist

Test Hole 95
Location: SE SW NW NE sec. 11, T. 102 N., R. 59 W.
1-3 Sand, light-brown, fine; moist

Test Hole 96
Location: SE SW SE SE sec. 2, T. 102 N., R. 59 W.
3-7 Gravel, dark-brown, coarse, clayey, sandy; moist

Test Hole 97
Location: NW NW SW NW sec. 1, T. 102 N., R. 59 W.
1-10 Gravel, coarse to fine, sandy

Test Hole 98
Location: NW SE SW NW sec. 1, T. 102 N., R. 59 W.
11-15 Sand, medium to coarse, very clayey; wet

Test Hole 99
Location: NE SW SW SE sec. 1, T. 102 N., R. 59 W.
2-9 Sand, brown, medium to very coarse, pebbly
Test Hole 100
Location: SE NE NE NE sec. 1, T. 102 N., R. 59 W.
0-4 Sand, brown, coarse to medium, pebbly, silty
4-6 Gravel, brown, fine, clayey, sandy, moist

Test Hole 101
Location: NW NW SE SW sec. 11, T. 102 N., R. 59 W.
0-5 Sand, light-brown, pebbly; moist

Test Hole 102
Location: NE NW SE SW sec. 11, T. 102 N., R. 59 W.
1-20 Sand, brown, fine; moist
20-30 Sand, brown, medium, clayey, pebbly; moist

Test Hole 103
Location: NE NW NW NW sec. 14, T. 102 N., R. 59 W.
1-2 Sand, gray-brown, medium, pebbly; moist
2-13 Sand, tan, fine, pebbly; moist

Test Hole 104
Location: NE SE NE NE sec. 14, T. 102 N., R. 59 W.
11-13 Sand, yellow-brown, fine; moist

Test Hole 105
Location: SE NE SE NE sec. 14, T. 102 N., R. 59 W.
1-2 Gravel, brown, medium, sandy; moist
2-23 Sand, light-brown, fine; moist

Test Hole 106
Location: SW NE SE SW sec. 14, T. 102 N., R. 59 W.
0-2 Sand, brown, fine, silty; dry
2-12 Sand, light-brown, fine to medium, very pebbly; cobble layer at 4 to 5 feet

Test Hole 107
Location: NE NE NE NW sec. 23, T. 102 N., R. 59 W.
2-12 Gravel, medium, very poorly-sorted, sandy clayey
Test Hole 108
Location: SW NE NW NE sec. 23, T. 102 N., R. 59 W.,
1-3 Sand, tan, fine to very coarse, very pebbly
14-20 Sand, brown, fine to very fine, silty, moist

Test Hole 109
Location: NW NW NW SW sec. 23, T. 102 N., R. 59 W.,
0-3 Sand, light-brown, fine, clayey, moist

Test Hole 110
Location: SE NW NE SE sec. 23, T. 102 N., R. 59 W.,
1-19 Sand, brown, medium to fine, moist

Test Hole 111
Location: SE SE SE SE sec. 36, T. 102 N., R. 59 W.,
20-26 Gravel, sandy, clayey

Test Hole 112
Location: NW NE NW NW sec. 6, T. 102 N., R. 58 W.,
0-2 Sand, light-brown, fine to coarse
2-3 Gravel, medium, slightly silty
3-5 Sand, brown, medium to very coarse, silty, pebbly, moist

Test Hole 113
Location: SW SW SW SW sec. 19, T. 102 N., R. 58 W.,
16-22 Gravel, medium to coarse
22-25 Sand, coarse, gravelly

Test Hole 114
Location: NW SW NE NW sec. 31, T. 102 N., R. 58 W.,
0-15 Gravel, coarse, sandy
15-38 Sand, yellow-brown, fine, moist

Test Hole 115
Location: SE NE SE SE sec. 33, T. 102 N., R. 58 W.,
0-4 Sand, light-brown, fine, moist
Test Hole 115
Location: SW NW NW NW sec. 33 T. 102 N. R. 58 W. 6
6- 6 Sand, brown, medium, silty; moist

Test Hole 117
Location: SW SW NW NW sec. 29 T. 102 N. R. 58 W. 10
10-12 Sand, brown, medium, clayey; moist

Test Hole 118
Location: SW SW NE NE sec. 30 T. 102 N. R. 58 W. 3
0-10 Gravel, coarse, abandoned hole on boulder

Test Hole 119
Location: NW SE NE NE sec. 30 T. 102 N. R. 58 W. 10
0-10 Gravel, brown, coarse, sandy; moist

Test Hole 120
Location: SW NW NE SE sec. 30 T. 102 N. R. 58 W. 3
0-10 Gravel, brown, coarse, sandy; moist

Test Hole 121
Location: SE NE SE NE sec. 19 T. 102 N. R. 58 W. 3
0- 9 Sand, coarse to fine, pebbly; moist

Test Hole 122
Location: NE SE NE SE sec. 19 T. 102 N. R. 58 W. 3
0- 3 Sand, medium to coarse, very gravelly; moist

Test Hole 123
Location: SE SW SE SW sec. 29 T. 102 N. R. 58 W. 3
3- 5 Sand, brown, medium; moist

Test Hole 124
Location: SW SW SW NW sec. 21 T. 102 N. R. 58 W. 3
0- 1 Sand, brown, fine; moist
1- 6 Gravel, coarse, sandy

20
Test Hole 125
Location: SW SE SE SW sec. 16, T. 102 N., R. 58 W.
10-13 Sand, light-brown; moist

Test Hole 126
Location: NW NW SW NW sec. 22, T. 102 N., R. 58 W.
4-6 Gravel, brown, fine, silty, sandy; dry

Test Hole 127
Location: SE NE NE NW sec. 22, T. 102 N., R. 58 W.
0-4 Gravel, coarse, sandy, silty; dry

Test Hole 128
Location: NE NE NE NE sec. 15, T. 102 N., R. 58 W.
20-53 Sand, coarse; rocks at 51 to 52 feet

Test Hole 129
Location: NW SW NW NW sec. 14, T. 102 N., R. 58 W.
3-6 Sand, brown, fine, silty; moist

Test Hole 130
Location: NW NE NW NW sec. 14, T. 102 N., R. 58 W.
0-1 Gravel, brown, sandy, clayey
1-3 Sand, red-brown, fine, silty; moist; could not penetrate large rocks at 3 feet

Test Hole 131
Location: NE NW NE NW sec. 14, T. 102 N., R. 58 W.
10-12 Sand, brown, medium to coarse, pebbly

Test Hole 132
Location: SW NE SE SE sec. 10, T. 102 N., R. 58 W.
0-6 Sand, light-brown, very fine to medium, silty

Test Hole 133
Location: NW NW NW NE sec. 2, T. 102 N., R. 58 W.
7-15 Sand, light-brown, fine, silty; moist
Test Hole 134
Location: SE NE SE NE sec. 3, T. 102 N., R. 57 W.
4-6 Gravel, red-brown, medium, sandy, clayey

Test Hole 135
Location: NW NW NW SW sec. 19, T. 102 N., R. 57 W.
15-17 Sand, brown, very fine, silty

Test Hole 136
Location: SW SW SW SW sec. 31, T. 102 N., R. 55 W.
21-24 Sand, medium to coarse, and gravel, medium

Test Hole 137
Location: SW SW NW NW sec. 31, T. 102 N., R. 56 W.
0-4 Sand, light-brown, medium, pebbly; moist

Test Hole 138
Location: SE SW SW SE sec. 23, T. 102 N., R. 57 W.
11-13 Sand, brown, medium; moist

Test Hole 139
Location: NW SW SW SW sec. 23, T. 102 N., R. 57 W.
8-10 Gravel, fine, clayey

Test Hole 140
Location: NE NE NE NE sec. 23, T. 102 N., R. 57 W.
0-2 Sand, light-brown; moist

Test Hole 141
Location: NE NW NW NW sec. 24, T. 102 N., R. 57 W.
19-23 Gravel, brown, medium, sandy; moist

Test Hole 142
Location: SW NW NW SW sec. 1, T. 102 N., R. 57 W.
1-5 Gravel, coarse, sandy

22
Test Hole 142
Location: SW NW NE SE sec. 2, T. 102 N., R. 57 W.
          4-10 Gravel; light-brown; coarse; sandy; dry

Test Hole 144
Location: NE NW NW NE sec. 1, T. 102 N., R. 57 W.
          2-5 Gravel; medium to coarse; sandy

Test Hole 145
Location: NE NE SE NE sec. 9, T. 101 N., R. 59 W.
          15-17 Sand; brown; fine; pebbly; moist

Test Hole 146
Location: NW SW SW NW sec. 5, T. 101 N., R. 59 W.
          3-5 Sand; light-brown; fine to very fine; moist
          5-11 Sand; medium; clayey below 9 feet

Test Hole 147
Location: NW NE NE NW sec. 8, T. 101 N., R. 59 W.
          7-9 Sand; brown; fine; moist

Test Hole 148
Location: NE NE NW NE sec. 7, T. 101 N., R. 59 W.
          5-10 Sand; brown; fine; clayey; moist

Test Hole 149
Location: NW SW NW NW sec. 8, T. 101 N., R. 59 W.
          6-9 Sand; brown; medium; clayey; pebbly

Test Hole 150
Location: NE NE SE SE sec. 12, T. 101 N., R. 59 W.
          3-8 Gravel; yellow-brown; sandy; clayey; moist

Test Hole 151
Location: NW NW NE NW sec. 18, T. 131 N., R. 59 W.
          3-15 Gravel; brown; medium; sandy; moist
Test Hole 151
Location: SW NW SW NW sec. 17, T. 101 N., R. 59 W.
3-5 Sand, red-brown, medium, clayey

Test Hole 152
Location: NW NW NW NE sec. 17, T. 101 N., R. 59 W.
20-22 Gravel, brown, coarse, sandy, moist

Test Hole 154
Location: SW SW SW sec. 17, T. 101 N., R. 59 W.
3-18 Sand, red-brown, fine to medium, well-sorted, moist

Test Hole 155
Location: SW SW SW SE sec. 17, T. 101 N., R. 59 W.
4-7 Sand, brown, medium to fine, clayey, moist

Test Hole 156
Location: NE NE NE NE sec. 21, T. 101 N., R. 59 W.
20-24 Gravel, medium to coarse, subangular

Test Hole 157
Location: NW NW SW sec. 30, T. 101 N., R. 59 W.
5-6 Sand
15-16 Sand

Test Hole 158
Location: SE SE SE sec. 36, T. 101 N., R. 60 W.
18-24 Sand, red-brown, medium, subrounded

Test Hole 159
Location: SE SE SE sec. 29, T. 101 N., R. 59 W.
7-9 Gravel, brown, medium, sandy, moist

Test Hole 160
Location: SW SW SW sec. 34, T. 101 N., R. 59 W.
2-16 Gravel, fine to coarse, sandy
Test Hole 161
Location: NW NW NW NW sec. 7, T. 100 N., R. 59 W.
0-7 Sand, light-brown, fine, pebbly
7-9 Gravel, brown, sandy; moist

Test Hole 162
Location: SE SE NE SE sec. 27, T. 101 N., R. 59 W.
1-4 Sand, light-brown, fine; moist

Test Hole 163
Location: NW NE NW NE sec. 26, T. 101 N., R. 59 W.
0-1 Sand, very fine; moist
1-20 Gravel, brown, coarse, sandy; moist

Test Hole 164
Location: SE NW NE NW sec. 25, T. 101 N., R. 59 W.
0-14 Sand, medium, pebbly; moist

Test Hole 165
Location: SE NE NW SW sec. 5, T. 101 N., R. 58 W.
15-20 Sand, yellow-brown; fine; moist

Test Hole 166
Location: SE NW NW NW sec. 5, T. 101 N., R. 58 W.
0-15 Gravel, brown, very coarse; moist

Test Hole 167
Location: NE NE SE SE sec. 8, T. 101 N., R. 58 W.
0-6 Sand, light-brown, fine; moist

Test Hole 168
Location: SW SW NW NW sec. 31, T. 101 N., R. 58 W.
0-2 Sand, brown, fine, pebbly, clayey; moist
Test Hole 169
Location: NE NE SE SE sec. 29, T. 101 N., R. 58 W.
9-7 Sand, light-brown, pebbly; moist
7-14 Brown, brown, sandy; moist

Test Hole 170
Location: SE SW SE SE sec. 33, T. 101 N., R. 58 W.
15-17 Sand, brown, medium; moist

Test Hole 171
Location: SE SE SE SE sec. 35, T. 101 N., R. 58 W.
14-16 Sand, brown, very fine, clayey; moist

Test Hole 172
Location: SW SW SW SW sec. 25, T. 101 N., R. 58 W.
6-9 Sand, brown, fine, clayey, pebbly; moist
9-15 Sand, red-brown, fine, silty; moist
18-26 Sand, brown, fine, clayey; saturated

Test Hole 173
Location: SE SW SE SE sec. 26, T. 101 N., R. 58 W.
0-4 Sand, light-brown, very fine to coarse, pebbly; moist
9-17 Sand, light-brown, very fine to coarse, pebbly, clayey; moist

Test Hole 174
Location: NW NE NE NE sec. 26, T. 101 N., R. 58 W.
3-5 Sand, brown, medium to coarse, clayey, pebbly; moist
8-13 Sand, brown, very fine to fine, silty; moist

Test Hole 175
Location: NW NE NW NW sec. 25, T. 101 N., R. 58 W.
5-16 Gravel, gray-brown, very fine, sandy; moist
17-19 Sand, brown, medium to fine, clayey; moist
19-21 Sand, brown, medium to coarse; clean, moist
Test Hole 176
Location: SW SE SE SE sec. 19, T. 101 N., R. 58 W.
1-6 Gravel, coarse, sandy; moist

Test Hole 177
Location: NE SE SE SE sec. 15, T. 101 N., R. 58 W.
0-9 Gravel, brown; medium; sandy; moist

Test Hole 178
Location: SW SW NW NW sec. 17, T. 101 N., R. 58 W.
2-4 Sand, medium to coarse; silty, pebbly
4-25? Sand, dark-brown; medium to very coarse; pebbly; clayey

Test Hole 179
Location: NE NW NE NE sec. 14, T. 101 N., R. 58 W.
3-6 Sand, brown; medium; clayey; moist

Test Hole 180
Location: NW NW NE NE sec. 16, T. 101 N., R. 58 W.
0-4 Gravel, brown; medium; clayey; sandy; moist

Test Hole 181
Location: NE NE NE SE sec. 9, T. 101 N., R. 58 W.
0-5 Sand, light-brown; fine; moist
5-8 Gravel, brown; coarse; sandy; moist
8-14 Sand, brown; fine; moist

Test Hole 182
Location: NE SE NE NE sec. 9, T. 101 N., R. 58 W.
0-9 Sand, brown; fine; moist

Test Hole 183
Location: SE SW SW SW sec. 3, T. 101 N., R. 58 W.
5-10 Sand, light-brown; fine; moist

27
Test Hole 184
Location: SW SE SW SE sec. 3, T. 101 N., R. 58 W.
5- 7 Sand, brown, fine; moist

Test Hole 185
Location: NW NW NW SW sec. 3, T. 101 N., R. 57 W.
0- 3 Sand, brown, coarse, clayey; pebbly; moist
3- 7 Gravel, brown, very fine, clayey; sandy; wet
9-11 Gravel, brown, medium to coarse, clayey; wet

Test Hole 186
Location: NW NW NW NW sec. 16, T. 101 N., R. 57 W.
0- 5 Sand, light-brown, fine, silty; moist

Test Hole 187
Location: SE NE SE NE sec. 29, T. 101 N., R. 57 W.
5- 8 Gravel, red-brown, coarse, sandy; moist

Test Hole 188
Location: NW NE NW NE sec. 29, T. 101 N., R. 57 W.
1- 3 Sand, red-brown, medium to coarse; moist
4-11 Sand, light-brown, fine, clayey; moist

Test Hole 189
Location: SE SE SE SE sec. 29, T. 101 N., R. 57 W.
9- 5 Gravel, light-brown, coarse to medium, sandy, some clay; moist

Test Hole 190
Location: NW NE NE NE sec. 32, T. 101 N., R. 57 W.
0- 4 Sand, light-brown, medium, pebbly; moist

Test Hole 191
Location: NE NE SE NE sec. 32, T. 101 N., R. 57 W.
0- 4 Gravel, brown, fine, sandy, silty; wet
Test Hole 192
Location: NE NE NE SE sec. 31, T. 101 N., R. 57 W.
2-4 Sand, brown, very fine; moist
9-11 Sand, brown, very fine; clayey; moist

Test Hole 193
Location: NE NE NW NW sec. 34, T. 101 N., R. 57 W.
3-5 Sand, red-brown, medium; clayey; moist

Test Hole 194
Location: NE NW NE NW sec. 34, T. 101 N., R. 57 W.
6-7 Sand, medium to coarse, silty; very moist
9-11 Sand, brown, medium to coarse; saturated
| Pit 1 | Landowner: R. N. Graham | Location: NW 1/4 sec. 32, T. 103 N., R. 59 W. | Aggregate Type: Gravel | Deposit thickness (ft): 9.0 | Overburden thickness (ft): 2.0 |
| Pit 2 | Landowner: Martin Bloomer - Fulton | Location: SE 1/4 NW 1/4 sec. 4, T. 103 N., R. 58 W. | Aggregate Type: Gravel | Deposit thickness (ft): 6.7 | Overburden thickness (ft): 1.5 |
| Pit 3 | Landowner: P. J. Schladweiler - Farmer | Location: NW 1/4 sec. 5, T. 103 N., R. 57 W. | Aggregate Type: Gravel | Deposit thickness (ft): 7.0 | Overburden thickness (ft): 2.5 |
Pit 5

- Landowner: Spencer Quarries – Spencer
- Location: NE 1/4 sec. 24, T. 103 N., R. 57 W.
- Aggregate Type: Fill, local sand, and quartzite
- Deposit thickness (ft): ---
- Overburden thickness (ft): ---

Pit 6

- Landowner: Homer Backlund – Mitchell
- Location: NW 1/4 sec. 18, T. 102 N., R. 59 W.
- Aggregate Type: Gravel
- Deposit thickness (ft): 7,0
- Overburden thickness (ft): 2,5

Pit 7

- Landowner: Tony Metz – Mitchell
- Location: SW 1/4 sec. 14, T. 102 N., R. 59 W.
- Aggregate Type: Gravel
- Deposit thickness (ft): ---
- Overburden thickness (ft): ---

Pit 8

- Landowner: Jerome Kaufman – Mitchell
- Location: SE 1/4 sec. 10, T. 102 N., R. 59 W.
- Aggregate Type: Gravel
- Deposit thickness (ft): 9,5
- Overburden thickness (ft): 2,5

Pit 9

- Landowner: Rosedale Colony – Alexandria
- Location: NW 1/4 SE 1/4 sec. 11, T. 102 N., R. 59 W.
- Aggregate Type: Gravel
- Deposit thickness (ft): 15,0
- Overburden thickness (ft): 2,0

Pit 10

- Landowner: Hanson County
- Location: NW 1/4 sec. 14, T. 102 N., R. 59 W.
- Aggregate Type: Sand
- Deposit thickness (ft): ---
- Overburden thickness (ft): ---

Pit 11

- Landowner: Rosedale Hutterian Brethren, Inc. – Mitchell
- Location: SW 1/4 sec. 23, T. 102 N., R. 59 W.
- Aggregate Type: Gravel
- Deposit thickness (ft): 8,0
- Overburden thickness (ft): 2,5

31
Pit 12
a. Landowner: Rockport Colony - Alexandria
b. Location: NE 1/4 NW 1/4 sec. 31, T. 102 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): 13.0
e. Overburden thickness (ft): 1.0

Pit 13
a. Landowner: Tony Metz - Alexandria
b. Location: NE 1/4 sec. 30, T. 102 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 14
a. Landowner: Hill Brothers - Alexandria
b. Location: SW 1/4 sec. 29, T. 102 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): 6.8
e. Overburden thickness (ft): 3.1

Pit 15
a. Landowner: Matt Schroeder - Alexandria
b. Location: SE 1/4 sec. 29, T. 102 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): 7.0
e. Overburden thickness (ft): 1.7

Pit 16
a. Landowner: Walter Friedrichs - Alexandria
b. Location: SW 1/4 NW 1/4 sec. 21, T. 102 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 17
a. Landowner: ----
  b. Location: SW 1/4 sec. 22, T. 102 N., R. 58 W.
c. Aggregate Type: Filler
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 18
a. Landowner: Hill Brothers - Alexandria
b. Location: NW 1/4 sec. 22, T. 102 N., R. 58 W.
c. Aggregate Type: Sand
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----
Pit 19
a. Landowner: Tobin Quarries, Inc. = Alexandria
b. Location: NW 1/4 sec. 14, T. 102 N., R. 56 W.
c. Aggregate Type: Filler
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 20
a. Landowner: Hanson County
b. Location: NE 1/4 sec. 9, T. 101 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 21
a. Landowner: Huron College = Huron, SD
b. Location: SE 1/4 NE 1/4 sec. 9, T. 101 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): 8.5
e. Overburden thickness (ft): 2.0

Pit 22
a. Landowner: Mrs. Mary LaDue = Alexandria
b. Location: SE 1/4 sec. 9, T. 101 N., R. 58 W.
c. Aggregate Type: Gravel
d. Deposit thickness (ft): 9.0
e. Overburden thickness (ft): 2.5

Pit 23
a. Landowner: ----
b. Location: NE 1/4 sec. 20, T. 101 N., R. 58 W.
c. Aggregate Type: Filler
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----

Pit 24
a. Landowner: ----
b. Location: SE 1/4 sec. 32, T. 101 N., R. 58 W.
c. Aggregate Type: Sand
d. Deposit thickness (ft): ----
e. Overburden thickness (ft): ----
Good probability of finding sand or gravel deposits.

Fair probability of finding sand or gravel deposits.

Poor probability of finding sand or gravel deposits.

Quartzite exposures:

Letters A through M designate areas described in the text.

117
- Test hole containing sand or gravel in upper 25 feet with 0-5 feet of overburden.

118
- Test hole containing sand or gravel in upper 25 feet with 6-25 feet of overburden.

79
- Test hole containing quartzite in upper 10 feet.

- Test hole containing no sand or gravel in upper 25 feet.

(7)
Gravel pit or quarry; those with a number are listed in table 2.

- Approximate boundary

Map showing sand, gravel, and quartzite deposits in Hanson County.