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July 3, 2023

Mr. Charlie Walker
Chippewa County Economic Development Corporation
770 Technology Way
Chippewa Falls, Wisconsin 54729

SUBJECT: Geotechnical Engineering Services
Planned Shovel Ready Certified Building Site
Stanley, Wisconsin
PSI Project No. 00952022 (Revised)

Dear Mr. Walker,

In accordance with your request, the results of the soil borings for the above-referenced project are provided herein. The description of services and authorization to perform this subsurface exploration were in the form of PSI Proposal No. 397836, dated April 19, 2023. The general conditions for the performance of the work were referenced in the proposal. This report has been prepared on behalf of and exclusively for the use of the Chippewa County Economic Development Corporation. The information contained in this report may not be relied upon by any other parties without the express written consent of PSI, and acceptance by such parties of PSI's General Conditions.

The purpose of this project was to perform soil borings to provide subsurface information for general site feasibility and preliminary design planning for the proposed project. Recommendations for structures, and for utilities and pavements, were beyond the scope of this project. Five (5) soil test borings were performed for this project to depths of about 21.5 feet. A representative of the client staked the boring locations and provided ground surface elevations.

The soil test borings were performed with an ATV-mounted drilling rig utilizing continuous flight hollow stem augers to advance the holes. Representative samples were obtained by the Standard Penetration Test (SPT) method using split-spoon sampling procedures in general accordance with ASTM D-1586 procedures. Samples were secured at 2.5-foot intervals to a depth of 10 feet, and then at 5-foot intervals to the end of the borings. The standard penetration value (N) is defined as the number of blows of a 140 pound hammer, falling 30 inches, required to advance the split-spoon sampler 1 foot into the soil. The sampler is lowered to the bottom of the drill hole and the number of blows recorded for each of the three (3) successive increments of 6 inches of penetration. The "N" value is obtained by adding the second and third incremental numbers. The SPT provides a means of estimating the relative density of granular soils and comparative consistency of cohesive soils, thereby providing a method of evaluating the relative strength and compressibility characteristics of the subsoils.

The SPT soil samples were transferred into clean glass jars immediately after retrieval, and returned to the laboratory upon completion of the field operations. Samples will be discarded unless other instructions are received. All soil samples were visually classified by a soils engineer in general accordance with the Unified Soil Classification System (ASTM D-2488-75). After completion of the borings, the auger holes were backfilled to the ground surface with bentonite chips.

A copy of the Soil Boring Logs and Boring Location Diagram (Figure 1) are enclosed. A description of the subsurface conditions encountered at the test boring locations is shown on the Soil Boring Logs. The lines of demarcation shown on the logs represent an approximate boundary between the various soil classifications; however, some variation is expected. It must be recognized that the soil descriptions are considered representative estimates for the specific test hole location, but that variations may occur between and beyond the sampling intervals and boring locations. Soil depths, topsoil and layer thicknesses, and demarcation lines can be utilized for preconstruction planning, but should not be expected to yield exact and final quantities. A summary of the major soil profile components is described in the following paragraphs. The terms and symbols used on the logs are described in the attached General Notes.

The surface of the site at each of the borings was covered with about 4 to 8 inches of silty clay topsoil. The topsoil at the borings was underlain by clay soils, with varying amounts of silt, sand and gravel, to a depth of about 2.5 feet (EL. 1110 to EL. 1133.3) below ground surface. The clay soils may be considered medium stiff to stiff with unconfined compressive strengths of 0.75 to 2.0 tons per square foot.

The clay soils at each of the borings were generally underlain by sand soils, with varying amounts of silt, clay and gravel, to at least the termination depth of B-3 (21.5 feet) and to depths of about 7.5 to 20 feet (EL. 1101.9 to EL. 1107.2) below ground surface at the remaining borings. The sand soils may be considered loose to very dense with standard penetration resistance of 9 to 62 blows per foot. It should be noted that the sand soils encountered at boring B-4 from depths of about 5 to 7.5 feet (EL. 1105.2 to EL. 1107.7) below ground surface were classified as possible weathered sandstone.

The sand soils at borings B-1, B-2 and B-4 were underlain by weathered sandstone to at least the termination depth of the borings (21.5 feet). The weathered sandstone may be considered dense to extremely dense with standard penetration resistance of 32 blows per foot to 50 blows per 4 inches of sampler penetration. The sand soils at boring B-5 were underlain by very stiff to hard clay soils with sand to at least the termination depth of the boring (21.5).

Groundwater observations were made during the drilling operations and in the open boreholes at completion. Groundwater was not encountered during auger advancement or upon completion at any of the borings. It must be recognized that groundwater levels fluctuate with time due to variations in seasonal precipitation, lateral drainage conditions, and soil permeability characteristics. Longer term monitoring would be required to further evaluate groundwater levels on this site.

This preliminary exploration has been commissioned to provide subsurface information for general site feasibility and preliminary design planning for the proposed development. The number and spacing of the borings requested are not considered sufficient to serve as a conventional foundation evaluation for future buildings, or for more detailed planning with regard to pavements, utility depths and final surface grades. Additional borings are necessary and recommended across the site to assist in developing surface grades and establishing utility depths (considering the presence of weathered sandstone). Additional borings are also recommended and necessary within each of the proposed building footprints to further evaluate more specific soil conditions and provide subsequent recommendations at each building location.

The soils encountered in the borings are considered to meet the criteria for Seismic Site Class C or D (depending on location) in accordance with 1613.2.5.2 of the International Building Code-2018

(which directs to the simplified design procedure outlined in ASCE 7 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures).

Please call at any time with any questions or comments you may have. PSI appreciates the opportunity to be of service on this project, and looks forward to continuing as your geotechnical consultant during the design and construction phases, as well as your upcoming projects.

Sincerely,

PROFESSIONAL SERVICE INDUSTRIES, INC.

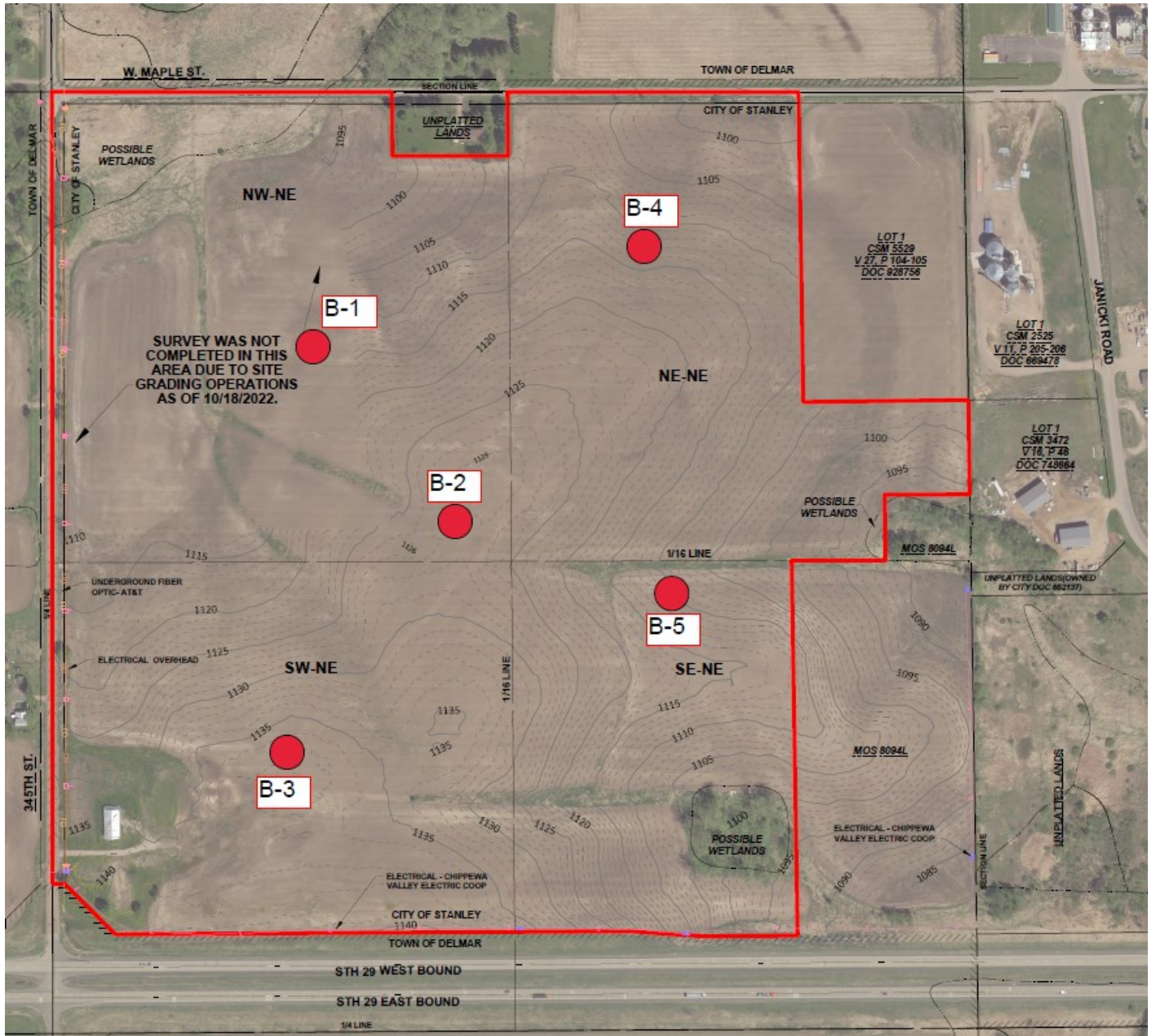


Kalie M. Ress
Staff Geologist



Jeffrey A. Manninen
Branch Manager – Chippewa Falls

Attachments: Figure 1 - Boring Location Diagram
Soil Boring Logs
General Notes



Planned Shovel Ready
 Certified Building Site
 Stanley, Wisconsin

DATE: June 30, 2023

PROJECT NO: 00952022

FIGURE 1 - BORING LOCATION DIAGRAM



SOIL BORING LOG: B - 1

Project: Shovel Ready Certified Building Site

Project No.: 00952022

Location: Stanley, Wisconsin

Drill Date: May 9, 2023

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1112.5	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1111.5	0 - 4" Dark brown silty CLAY, trace sand and root hairs, damp (TOPSOIL)	1-AU	--	0.75		28	
2 1110.5	Pale grayish brown and orange mottled silty CLAY, trace silt seams, moist						
3 1109.5		2-SS	17			9	
4 1108.5							
5 1107.5	Reddish brown clayey SAND, with gravel, moist						
6 1106.5		3-SS	11			11	
7 1105.5							
8 1104.5		4-SS	42			--	
9 1103.5							
10 1102.5							
11 1101.5	White, tan and yellow Weathered SANDSTONE, trace clay seams	5-SS	50/5.5"			--	
12 1100.5							
13 1099.5							
14 1098.5							
15 1097.5							
16 1096.5		6-SS	50/4"			--	
17 1095.5							
18 1094.5	White and pale pink Weathered SANDSTONE, with green clay seams						
19 1093.5							
20 1092.5							
21 1091.5		7-SS	32			--	
22 1090.5	END OF BORING @ 21.5± FEET						
23 1089.5							
24 1088.5							
25 1087.5							

FIELD OBSERVATIONS:

Water Level during drilling: Not Encountered ▼
 Water Level upon completion: Not Present ▼
 Caved at upon completion: 17± feet below ground surface (EL 1095.5±) ↓
 Frost Depth N/A
 Water Level delayed: N/A
 Caved at delayed: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.



SOIL BORING LOG: B - 2

Project: Shovel Ready Certified Building Site

Project No.: 00952022

Location: Stanley, Wisconsin

Drill Date: May 9, 2023

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1127.2	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS	
1	1126.2	0 - 7" Dark brown silty CLAY, trace sand and root hairs, damp (TOPSOIL)		1-AU	--	1.75	20	
2	1125.2	Brown and reddish brown mottled sandy CLAY, trace sand seams and gravel, damp						
3	1124.2							
4	1123.2	2-SS	13	1.5		13		
5	1122.2							
6	1121.2	3-SS	11			11		
7	1120.2							
8	1119.2	4-SS	11			13		
9	1118.2							
10	1117.2							
11	1116.2	5-SS	9			15		
12	1115.2	Reddish brown clayey SAND, trace gravel, moist						
13	1114.2							
14	1113.2							
15	1112.2							
16	1111.2	6-SS	13			13		
17	1110.2							
18	1109.2							
19	1108.2							
20	1107.2							
21	1106.2	7-SS	63/10"			--		
22	1105.2	END OF BORING @ 21.5± FEET						
23	1104.2							
24	1103.2							
25	1102.2							

FIELD OBSERVATIONS:

Water Level during drilling: Not Encountered ▼
 Water Level upon completion: Not Present ▼
 Caved at upon completion: 15± feet below ground surface (EL 1112.2±) ↓
 Frost Depth: N/A
 Water Level delayed: N/A
 Caved at delayed: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.



SOIL BORING LOG: B - 3

Project: Shovel Ready Certified Building Site

Project No.: 00952022

Location: Stanley, Wisconsin

Drill Date: May 9, 2023

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1135.8	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS						
1	1134.8	0 - 7" Dark brown silty CLAY, trace sand and root hairs, damp (TOPSOIL)		1-AU	--	0.75	22						
2	1133.8	Pale grayish brown and orange mottled silty CLAY, trace silt seams, moist											
3	1132.8												
4	1131.8							2-SS	12			11	
5	1130.8												
6	1129.8							3-SS	20			10	
7	1128.8												
8	1127.8	Reddish brown clayey SAND, trace gravel, moist											
9	1126.8							4-SS	18			--	
10	1125.8												
11	1124.8							5-SS	27			12	
12	1123.8												
13	1122.8	Reddish brown SAND, with silt, clay and gravel, damp											
14	1121.8												
15	1120.8												
16	1119.8							6-SS	62			4	
17	1118.8												
18	1117.8	END OF BORING @ 21.5± FEET											
19	1116.8												
20	1115.8												
21	1114.8	7-SS	47			6							
22	1113.8												
23	1112.8												
24	1111.8												
25	1110.8												

FIELD OBSERVATIONS:

Water Level during drilling: Not Encountered ▼
 Water Level upon completion: Not Present ▼
 Caved at upon completion: 16± feet below ground surface (EL 1119.8±) ↓
 Frost Depth N/A
 Water Level delayed: N/A
 Caved at delayed: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an **approximate** boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.



SOIL BORING LOG: B - 4

Project: Shovel Ready Certified Building Site

Project No.: 00952022

Location: Stanley, Wisconsin

Drill Date: May 9, 2023

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1112.7	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1	1111.7	0 - 8" Dark grayish brown silty CLAY, trace sand, root hairs and corn stubble, very moist (TOPSOIL)		1-AU	--	2.0	22
2	1110.7	Grayish brown and reddish brown mottled sandy CLAY, trace sand seams and gravel, damp					
3	1109.7			2-SS	13		13
4	1108.7	Reddish brown clayey SAND, trace gravel, damp					
5	1107.7			3-SS	15		4
6	1106.7	Yellowish tan SAND, very moist (Possible Weathered SANDSTONE)					
7	1105.7			4-SS	59		--
8	1104.7						
9	1103.7			5-SS	50/5"		--
10	1102.7						
11	1101.7	White and tan Weathered SANDSTONE					
12	1100.7						
13	1099.7						
14	1098.7						
15	1097.7			6-SS	50/5"		--
16	1096.7						
17	1095.7						
18	1094.7	White and tan Weathered SANDSTONE, trace clay seams					
19	1093.7						
20	1092.7			7-SS	50/5.5"		--
21	1091.7						
22	1090.7	END OF BORING @ 21.5± FEET					
23	1089.7						
24	1088.7						
25	1087.7						

FIELD OBSERVATIONS:

Water Level during drilling: Not Encountered ▼
 Water Level upon completion: Not Present ▼
 Caved at upon completion: 17± feet below ground surface (EL 1095.7±) ↓
 Frost Depth: N/A
 Water Level delayed: N/A
 Caved at delayed: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.



SOIL BORING LOG: B - 5

Project: Shovel Ready Certified Building Site

Project No.: 00952022

Location: Stanley, Wisconsin

Drill Date: May 9, 2023

DEPTH/EL. (feet)	VISUAL SOIL CLASSIFICATION GROUND SURFACE ELEVATION: 1116.9	SAMPLE NO.	N (bpf)	Qp (tsf)	Qu (tsf)	MC (%)	REMARKS
1 1115.9	0 - 4" Dark brown silty CLAY, trace sand, root hairs and corn stubble, very moist (TOPSOIL)	1-AU	--			21	
2 1114.9	Brown and orange mottled silty CLAY, damp						
3 1113.9		2-SS	34			10	
4 1112.9							
5 1111.9							
6 1110.9	Reddish brown clayey SAND, with gravel, moist	3-SS	11			10	
7 1109.9							
8 1108.9		4-SS	12			12	
9 1107.9							
10 1106.9							
11 1105.9		5-SS	23			2	
12 1104.9	Tan SAND, damp						
13 1103.9							
14 1102.9							
15 1101.9							
16 1100.9		6-SS	33			11	
17 1099.9							
18 1098.9	Brown CLAY, with sand, damp						
19 1097.9							
20 1096.9		7-SS	28			11	
21 1095.9							
22 1094.9	END OF BORING @ 21.5± FEET						
23 1093.9							
24 1092.9							
25 1091.9							

FIELD OBSERVATIONS:

Water Level during drilling: Not Encountered ▼
 Water Level upon completion: Not Present ▼
 Caved at upon completion: 14± feet below ground surface (EL 1102.9±) ↓
 Frost Depth N/A
 Water Level delayed: N/A
 Caved at delayed: N/A

ADDITIONAL COMMENTS:

Note: Lines of stratification represent an approximate boundary between soil types. Variations may occur between sampling intervals and/or boring locations. Transitions may also be gradual.



GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

- SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.
- HSA: Hollow Stem Auger - typically 3¼" or 4¼ I.D. openings, except where noted.
- M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry
- R.C.: Diamond Bit Core Sampler
- H.A.: Hand Auger
- P.A.: Power Auger - Handheld motorized auger
- ☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
- ST: Shelby Tube - 3" O.D., except where noted.
- ▮ RC: Rock Core
- ⬇ TC: Texas Cone
- ☞ BS: Bulk Sample
- ☒ PM: Pressuremeter
- CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

- N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
- N₆₀: A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
- Q_u: Unconfined compressive strength, TSF
- Q_p: Pocket penetrometer value, unconfined compressive strength, TSF
- w%: Moisture/water content, %
- LL: Liquid Limit, %
- PL: Plastic Limit, %
- PI: Plasticity Index = (LL-PL),%
- DD: Dry unit weight, pcf
- ▽, ▽, ▼ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS ANGULARITY OF COARSE-GRAINED PARTICLES

Relative Density	N - Blows/foot
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

Description	Criteria
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

Component	Size Range
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (¾ in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to ¾ in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

Description	Criteria
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

Descriptive Term	% Dry Weight
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%



GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

<u>Q_u - TSF</u>	<u>N - Blows/foot</u>	<u>Consistency</u>
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

<u>Description</u>	<u>Criteria</u>
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

<u>Description</u>	<u>Criteria</u>	<u>Description</u>	<u>Criteria</u>
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick	Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick	Lensed:	Inclusion of small pockets of different soils
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing	Layer:	Inclusion greater than 3 inches thick (75 mm)
Slickensided:	Fracture planes appear polished or glossy, sometimes striated	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
		Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

<u>Q_u - TSF</u>	<u>Consistency</u>
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

<u>Description</u>	<u>Criteria</u>
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

<u>Voids</u>	<u>Void Diameter</u>
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

<u>(Typically Sedimentary Rock)</u>	
<u>Component</u>	<u>Size Range</u>
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

<u>Rock Mass Description</u>	<u>RQD Value</u>
Excellent	90 -100
Good	75 - 90
Fair	50 - 75
Poor	25 -50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.