



July 23, 2020

Santa Rosa County School District
6544 Firehouse Road
Milton, Florida 32570

Attn: Mr. Joseph B. Harrell
Assistant Superintendent for Administrative Services

Subject: Preliminary Geotechnical Engineering Report
SRCSD VANDENBERG SITE
Santa Rosa County, Florida
NOVA Project Number 10116-2020118

Dear Mr. Harrell:

NOVA Engineering and Environmental LLC (NOVA) has completed the authorized Preliminary Geotechnical Engineering Report for the proposed school campus to be located in Santa Rosa County, Florida. The work was performed in general accordance with NOVA Proposal Number 016-20206973, dated July 7, 2020. This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our preliminary findings, conclusions, and recommendations.

The primary objective of this study was to provide a preliminary geotechnical exploration of the near surface soils within potential foundation, pavement, and stormwater management system (SMS) areas across the area of study. The authorized geotechnical engineering services included performing eight (8) Standard Penetration Test (SPT) borings (designated B-1 through B-8), each drilled to depth of about 25 feet below existing grade (BEG), as well as limited laboratory classification testing.

Project Description

We understand that the proposed development could potentially include a two-story school building with associated paved entrance drives and parking areas and a Stormwater Management System (SMS) desired to consist of a conventional shallow dry retention basin.

Site Location and Description

The proposed educational facility is proposed to be located along the east side of Chumuckla Highway, approximately ½ mile south of Archie's Way, in the Chumuckla area of Santa Rosa County, Florida.

The property is comprised of two (2) adjacent parcels identified by the Santa Rosa County Property Appraiser as Parcels 31-3N-29-0000-0502-0000 and 31-3N-29-0000-0504-0000. A Site Location Map is included in Appendix A.

At the time of our preliminary field exploration, the subject property consisted of timberland vegetated with mature trees and dense underbrush. Several off-road trails traversed the site. Areas of surface water were observed to be flowing across the site due to recent/on-going rainfall events. The site was bordered by Chumuckla Highway to the west, a private driveway to the south, a church, utility structures, and timberland to the north, and timberland to the east.

Subsurface Conditions

Our field exploration at the subject site included performing eight (8) Standard Penetration Test (SPT) borings across the area of study. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards. The Test Boring Records and a summary of laboratory soil testing results are provided in the attached Appendix.

Beneath up to 24 inches of topsoil, the test borings generally encountered mixed strata of loose to dense fine-grained silty sands to clayey sands (USCS classifications of SM and SC) with isolated zones of very stiff to hard low-plasticity clays (CL) to depths varying between approximately 8 feet to 16½ feet BEG (in Borings B-3 and B-4 only), underlain by medium dense to dense fine-grained slightly silty sands (SP-SM) to the maximum depth explored of about 25 feet below existing grade (BEG).

A stabilized groundwater table was not encountered in the test borings within the maximum depth explored of about 25 feet BEG at the time of our field exploration, which occurred during a period of relatively normal seasonal rainfall and concurrent with several significant rainfall events. However, we note that areas of perched groundwater were encountered in several of the borings, as the rainfall appeared to be accumulating on the low-permeability silty to clayey sands and sandy clay strata.

Based on comparisons of current annual monthly rainfall data to historical rainfall data extending back 50+ years in time, we estimate that the normal permanent seasonal high groundwater (SHGW) table for this site will remain at a depth greater than 25 feet BEG, during the wet season.

We note that groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors. Groundwater levels in the northern Santa Rosa County area are typically lowest in the late fall to winter and highest in the early spring to mid-summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times.

Preliminary Site Discussion

The following preliminary conclusions and design considerations are based on our understanding of the proposed development, our site observations, our evaluation and interpretation of the field and laboratory data obtained during this exploration, our experience with similar subsurface conditions in the region, and generally accepted geotechnical engineering principles and practices.

Based on the results of our field exploration, the subsurface conditions encountered beneath this site (to the maximum depth drilled of about 25 feet BEG) appear to be feasible employing conventional site preparation practices. Vibratory compaction of the exposed subgrade soils is not recommended due to the presence of underlying moisture-sensitive silty and clayey sands, which could become unstable given the presence of perched groundwater found in several of the test borings and require further undercutting if a vibratory roller is employed.

Based on our recent experience with other similar developments in the very near vicinity to this project site, we note that the soils present within the upper 4± feet of the soil horizon could potentially be overly wet and unstable at the time of construction following site stripping and initial site preparation activities and subsequent to inclement weather, which would require either undercutting or stabilization prior to installing fill soils, pavement elements, or building foundations.

Based on visual examination of the recovered soil samples as well as the results of limited laboratory soil testing, the existing surficial silty sand (SM) soils encountered during this exploration appear to be adaptable for reuse as structural fill but will require strict moisture control, and the fine-grained clayey sands (SC) encountered as well may or may not be suitable depending on their fines contents and moisture contents when they are excavated. Prior to construction, bulk samples of the proposed fill materials should be laboratory tested to confirm their suitability.

Apparent groundwater is not expected to impact the development of this property. However, the aforementioned shallow perched/laterally flowing groundwater conditions should be expected to be present during construction. These soil conditions will be exacerbated following site stripping operations, particularly if the site is not properly graded during construction to prevent the accumulation of stormwater runoff during and shortly following significant rain events from perching on the underlying low permeability silty/clayey sand to sandy clay soils.

Maintaining proper grades (i.e., positive drainage paths) during the construction phase of this project will be critical to avoid the development of “bird baths”, which would degrade the underlying silty to clayey sand soils and require undercutting to more firm underlying soils.

A further, more extensive, geotechnical exploration should be performed in proposed structure and pavement areas after a Site Plan has been established for this project.

Structures

Shallow spread footing foundations for the planned school structures should be appropriate with the employment of “typical” site preparation operations. A design soil bearing pressure on the order of **1,500 to 2,000 psf** should be obtainable for the planned building foundations, depending on the type/size of construction equipment utilized during the site preparation phase of construction.

Pavements

Typical asphalt pavement sections designed for a 20-year design life should be appropriate for this site with the employment of “typical” site preparation operations.

Preliminary SMS Design Considerations

NOVA understands that a stormwater management system consisting of a conventional shallow dry retention basin is desired for the treatment and disposal of stormwater runoff associated with the planned improvements to the property.

Based upon the results of the test borings, the subsurface conditions encountered appear (preliminarily, subject to confirmation of the soil conditions and design parameters presented herein with borings performed within the actual SMS footprint once a proposed Site Plan is available) to be unsuitable for employing this desired SMS due to the presence of low-permeability silty to clayey sands and possibly relatively impermeable sandy clay encountered at and below the anticipated pond bottom elevation.

However, the SMS appears to be adaptable for incorporating a shallow basin with an underlying sand chimney feature or an over-excavated (deeper) basin designed to intercept the deeper, more permeable, slightly silty sands encountered beginning at depths varying between about 8 feet to 16½ feet BEG that extended to the maximum depth explored of roughly 25 feet BEG.

We recommend that you consider the soil parameters presented on the following page in Table 1 – Preliminary SMS Soil Design Parameters, for preliminary design of the SMS at the subject project site.

Once a site design has been established for the project, a more comprehensive SMS evaluation should be conducted to establish confining stratum depths as well as estimated seasonal high and low groundwater tables for the basin(s).

Table 1 –Preliminary SMS Soil Design Parameters	
Estimated Depth to Confining Stratum, BEG <i>Assuming a sand chimney is constructed beneath the eastern half of the pond bottom as recommended herein, and cannot exceed the maximum depth explored on the site.</i>	Below 25 feet
Measured Vertical Hydraulic Conductivity Rate at Chimney Bottom (Kv)	12 feet/day
Calculated Horizontal Hydraulic Conductivity at Chimney Bottom (Kh)	18 feet/day
Estimated In-Situ Infiltration Rate (DRI)	4 inches/hour
Maximum Area for Unsaturated Infiltration (ft ²) – to be determined by designer, based on the outflow required, but the value must equal the chimney footprint.	
Estimated Embedment Depth for Vertical Sand Chimney to Key Into Underlying More Permeable Strata, BEG (depending on the SMS location)	15 feet to 25 feet
Estimated Depth of Seasonal High Groundwater Table, BEG	Below 25 feet

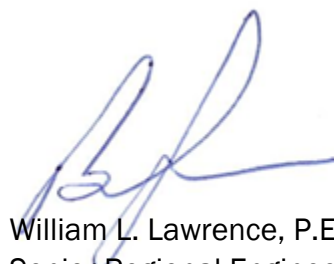
Conclusion

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

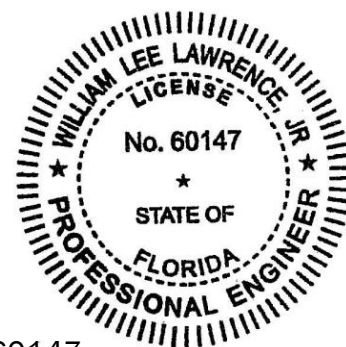
Sincerely,
NOVA Engineering and Environmental LLC



Jesse A. James E.I.
Assistant Branch Manager
Florida Certificate No. 1100019359



William L. Lawrence, P.E.
Senior Regional Engineer
Florida Registration No. 60147



APPENDIX A

Figures and Maps



APPROXIMATE SITE LOCATION

197

Chumuckla Hwy

191

Base map provided by *Google Earth*

Scale: Not To Scale

Date Drawn: July 23, 2020

Drawn By: S. San Filippo

Checked By: W. Lawrence



140-A Lurton Street
Pensacola, Florida 32505
850.607.7782 ♦ 850.249.6683

PROJECT LOCATION MAP

SRCS D Vandenberg Site

Santa Rosa County, Florida

NOVA Project Number 10116-2020118

Soil Map—Santa Rosa County, Florida
(10116-2020118 SRCSD Vandenberg Site)



Soil Map may not be valid at this scale.

Map Scale: 1:6,970 if printed on A portrait (8.5" x 11") sheet.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

7/20/2020
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Rosa County, Florida

Survey Area Data: Version 17, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 25, 2017

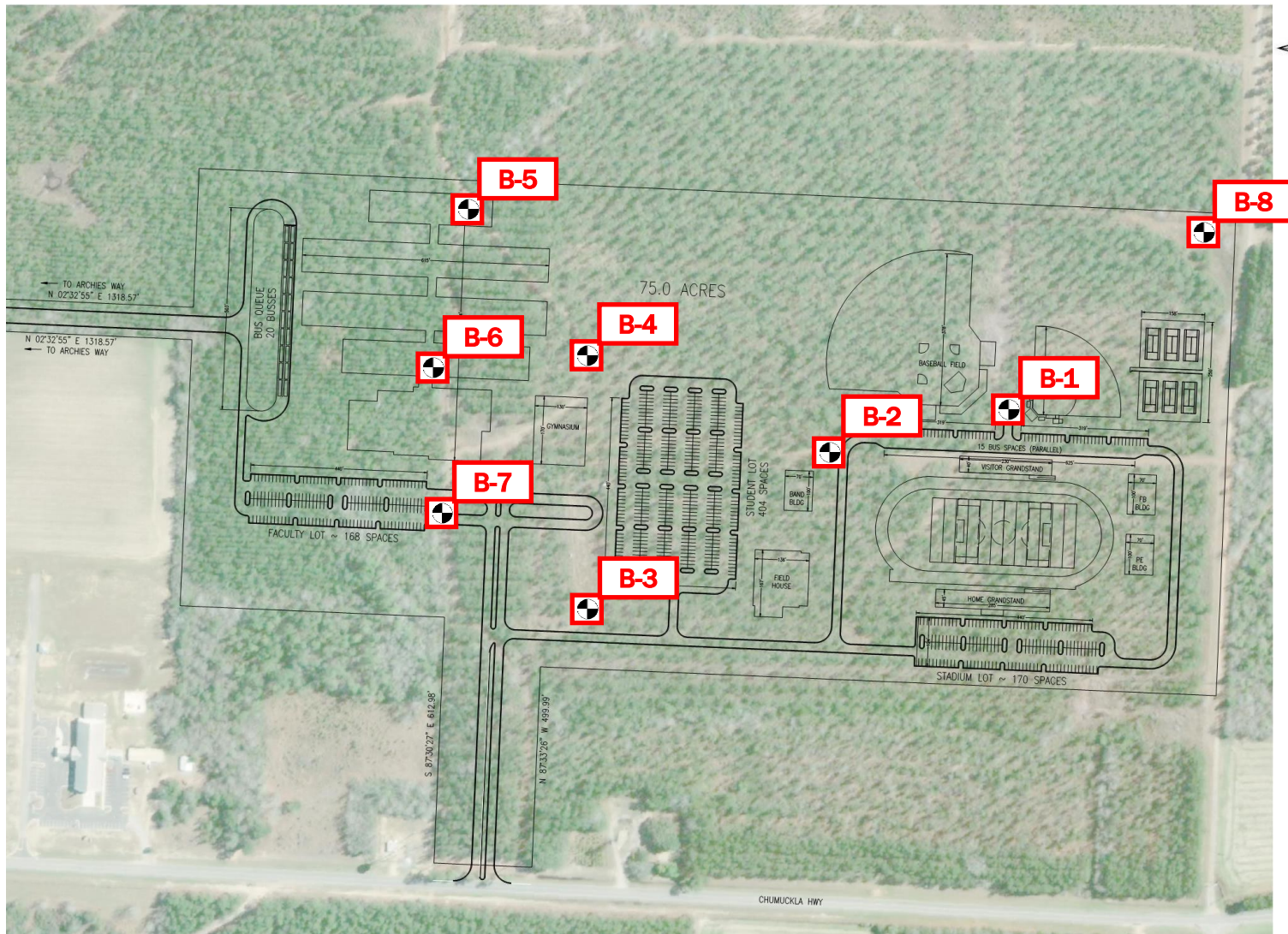
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Albany loamy sand, 0 to 5 percent slopes	0.9	1.2%
5	Bonifay loamy sand, 0 to 5 percent slopes	0.3	0.4%
8	Dothan fine sandy loam, 0 to 2 percent slopes	1.1	1.5%
9	Dothan fine sandy loam, 2 to 5 percent slopes	43.7	56.5%
14	Fuquay loamy sand, 0 to 5 percent slopes	28.6	37.0%
25	Lucy loamy sand, 0 to 5 percent slopes	0.8	1.1%
31	Orangeburg sandy loam, 2 to 5 percent slopes	0.9	1.2%
37	Rains fine sandy loam	0.8	1.1%
Totals for Area of Interest		77.3	100.0%


APPENDIX B

Subsurface Data



Note: Boring Locations are Approximate.

LEGEND

 B-x = 25-foot Structural SPT Boring

Scale: Not To Scale

Date Drawn: July 23, 2020

Drawn By: J. James

Checked By: W. Lawrence



140-A Lurton Street
Pensacola, Florida 32505
850.607.7782 ♦ 850.249.6683






PROPOSED BORING LOCATION PLAN

SRCSD Vandenberg Site

Santa Rosa County, Florida

NOVA Project Number 10116-2020118

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays	
		OL	Organic silts and organic silty clays of low plasticity	
	SILTS AND CLAYS Liquid limit greater than 50%	MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts	
		CH	Inorganic clays or clays of high plasticity, fat clays	
		OH	Organic clays of medium to high plasticity	
		PT	Peat, muck and other highly organic soils	

*Based on the material passing the 3-inch (75 mm) sieve

** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY

(Sands and Gravels)

Very loose – Less than 4 Blows/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY

(Silts and Clays)

Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Medium Stiff – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS

(Limestone)

Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample

Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample

Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample

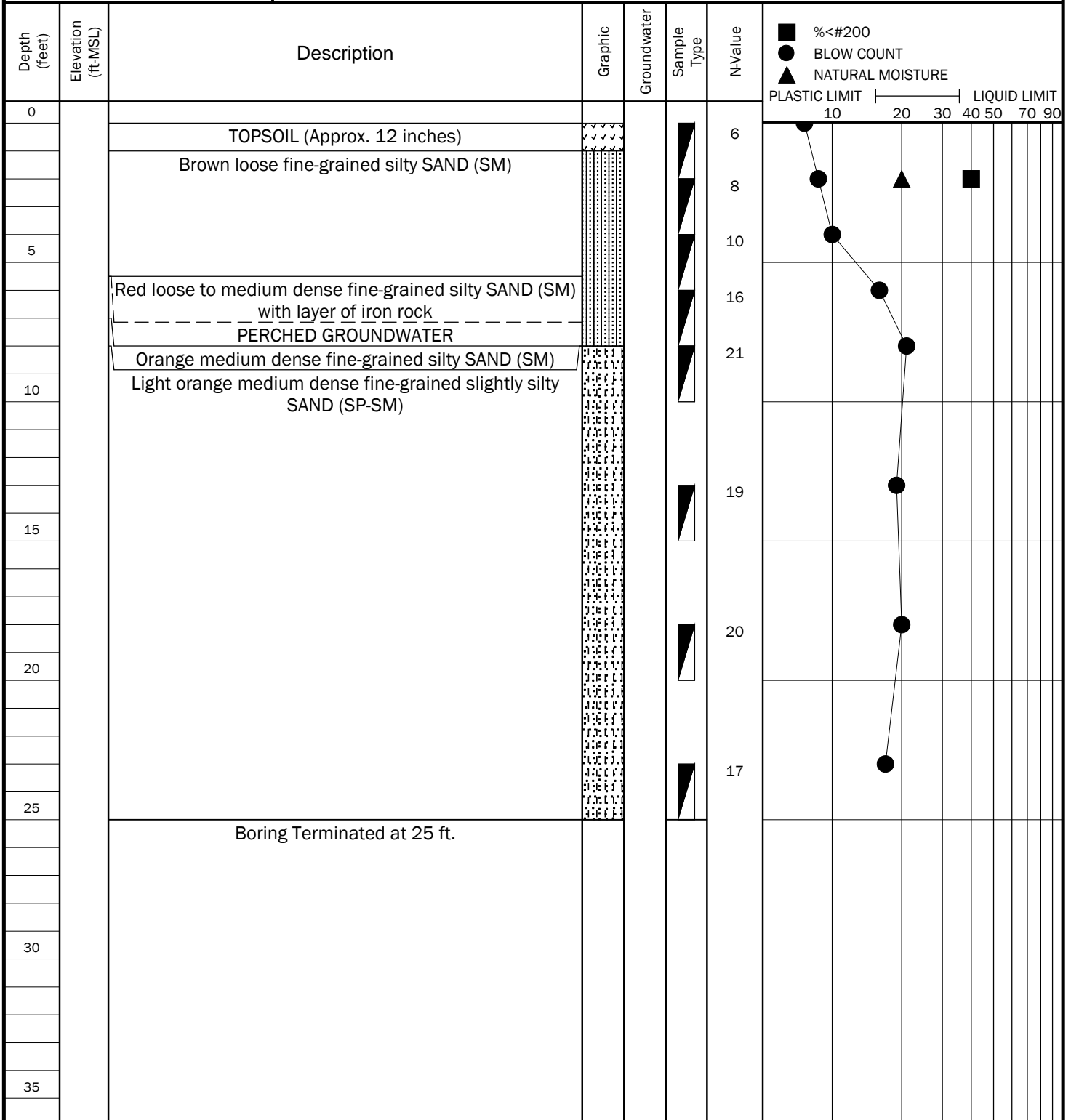
Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%



TEST BORING RECORD B-1

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 16, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE* AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



NOTE: Perched groundwater encountered at 5.5 feet to 8 feet BEG.

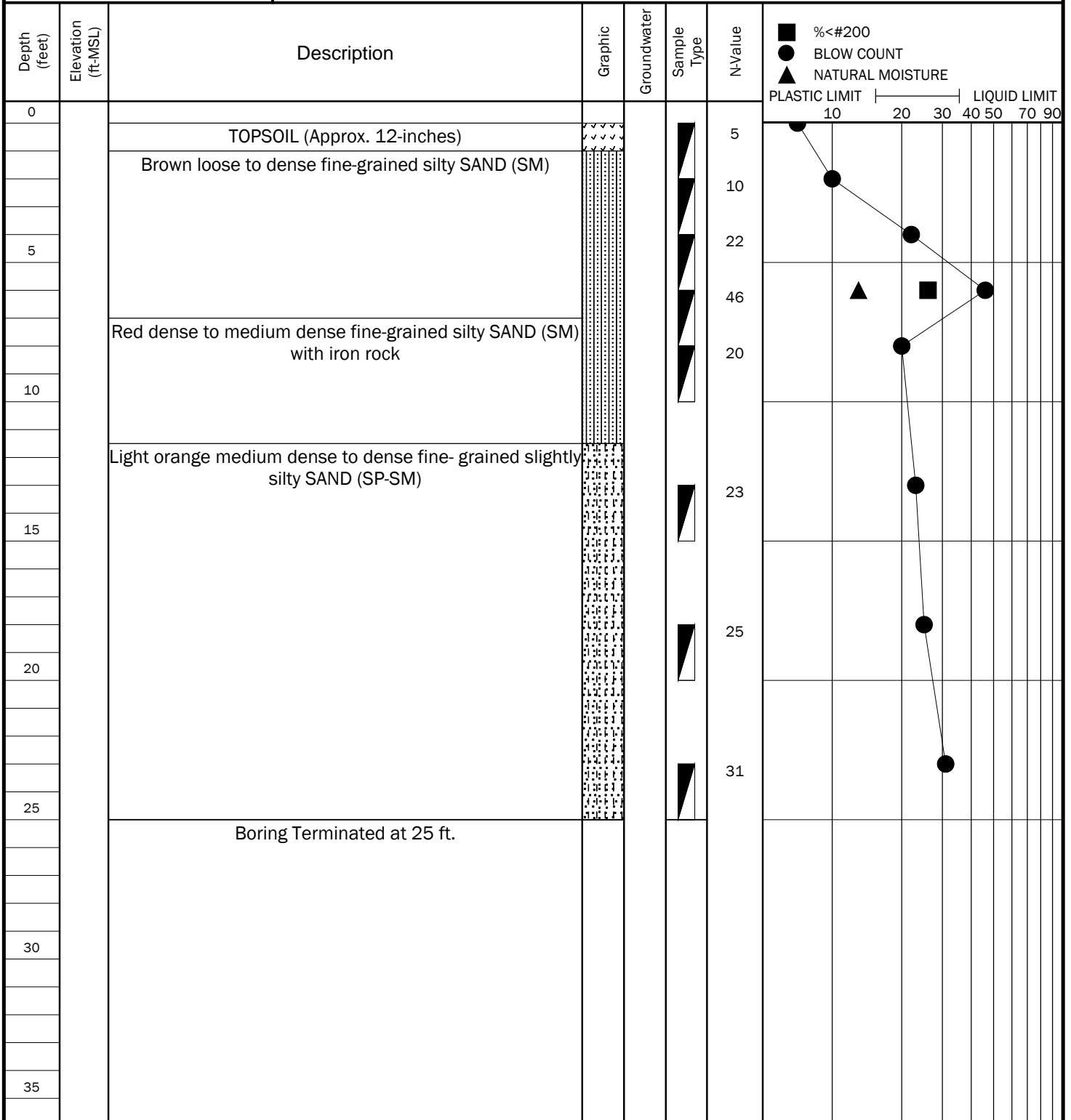
30.72344485° N -87.19264667° W



TEST BORING RECORD B-2

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 17, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



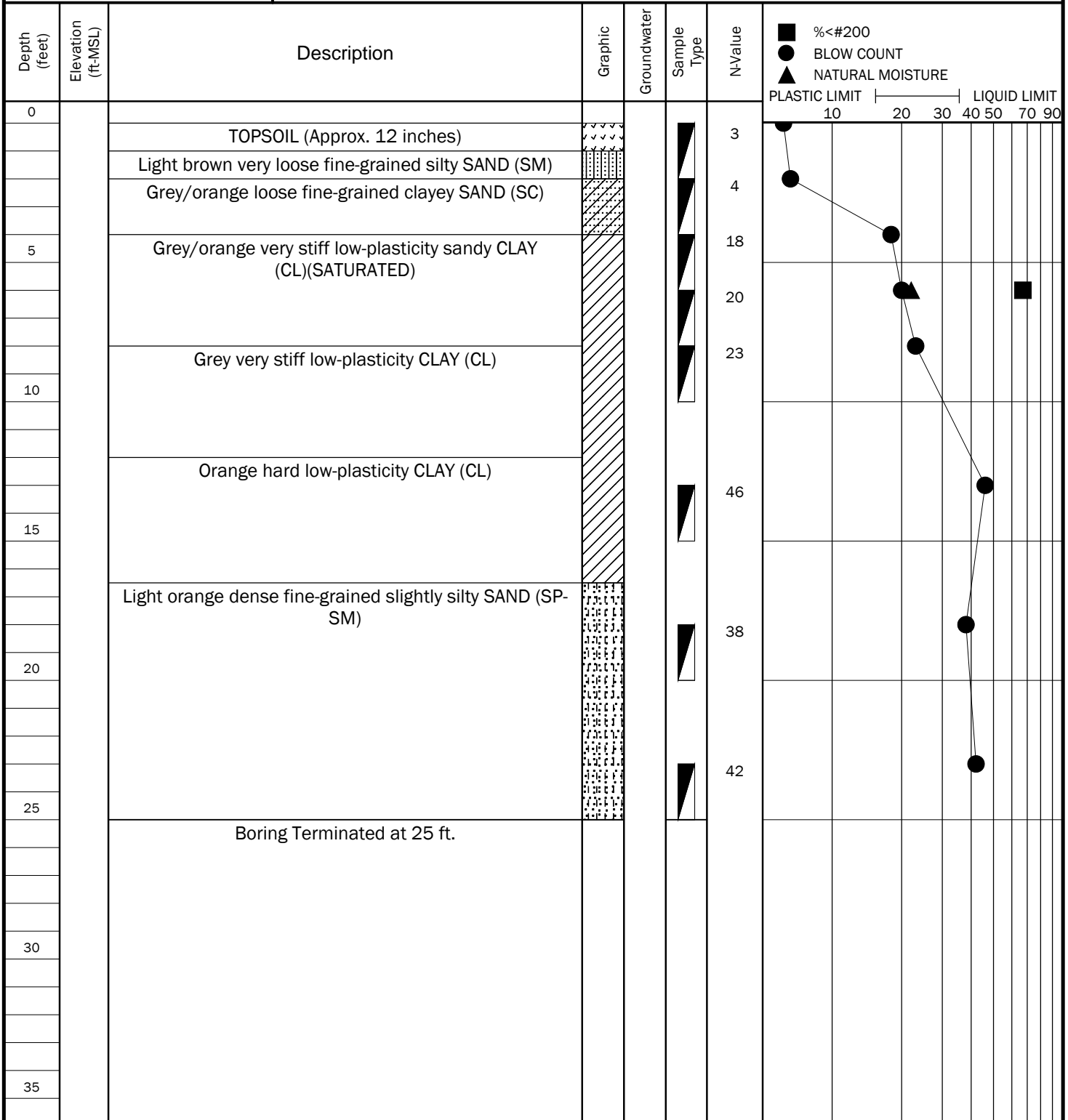
30.72425498° N -87.19271042° W



TEST BORING RECORD B-3

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
 CLIENT: Santa Rosa County School District
 PROJECT LOCATION: Santa Rosa County, Florida
 LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
 DRILLER: S. Ryan LOGGED BY: S. San Filippo
 DRILLING METHOD: SPT Boring DATE: July 17, 2020
 DEPTH TO - WATER> INITIAL: ∇ GNE* AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



NOTE: Perched groundwater encountered from 4 feet to 11 feet BEG.

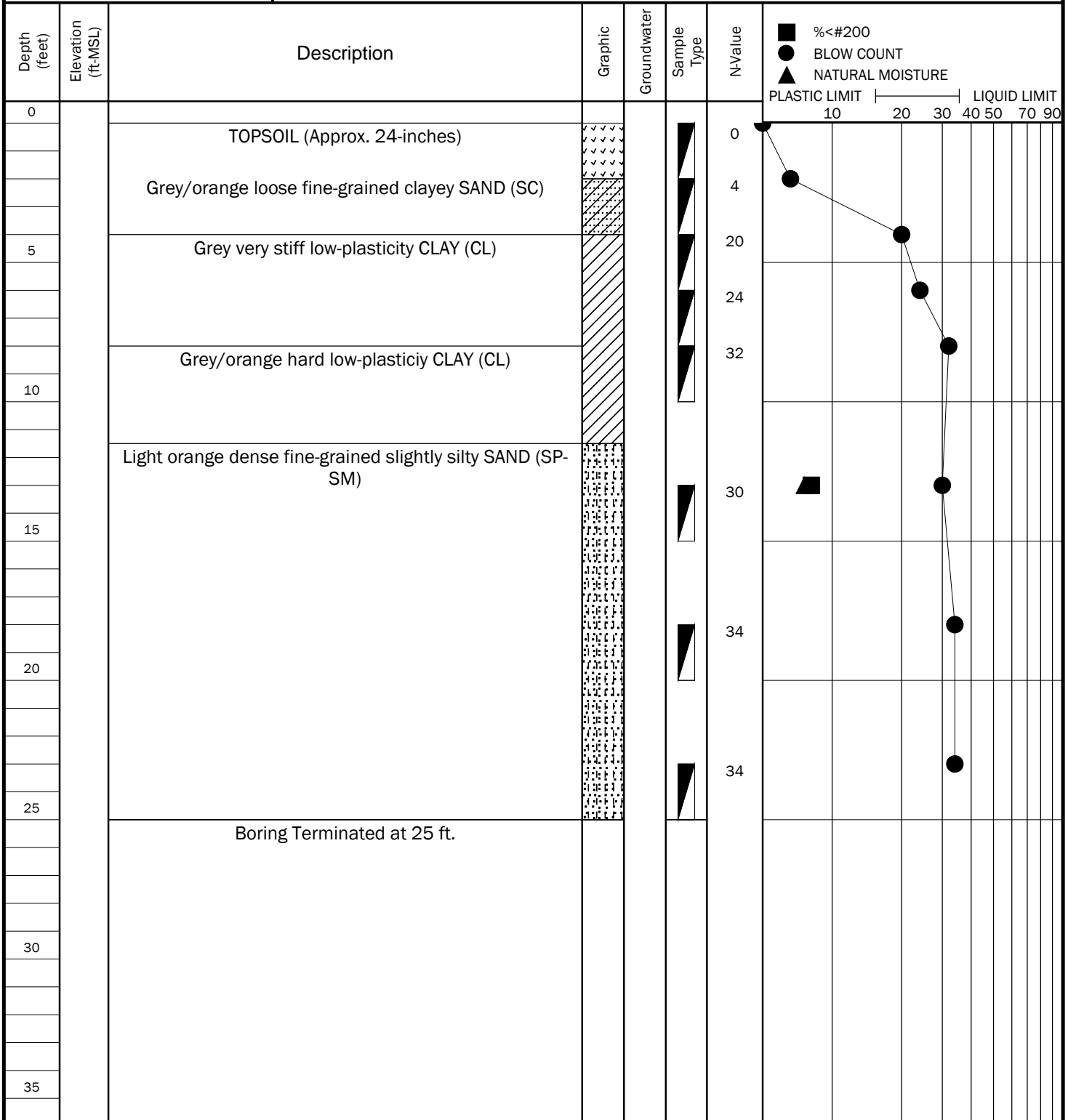
30.72587955° N -87.19396135° W



TEST BORING RECORD B-4

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 17, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



NOTE: Perched groundwater encountered at the ground surface to 4 ft BEG.

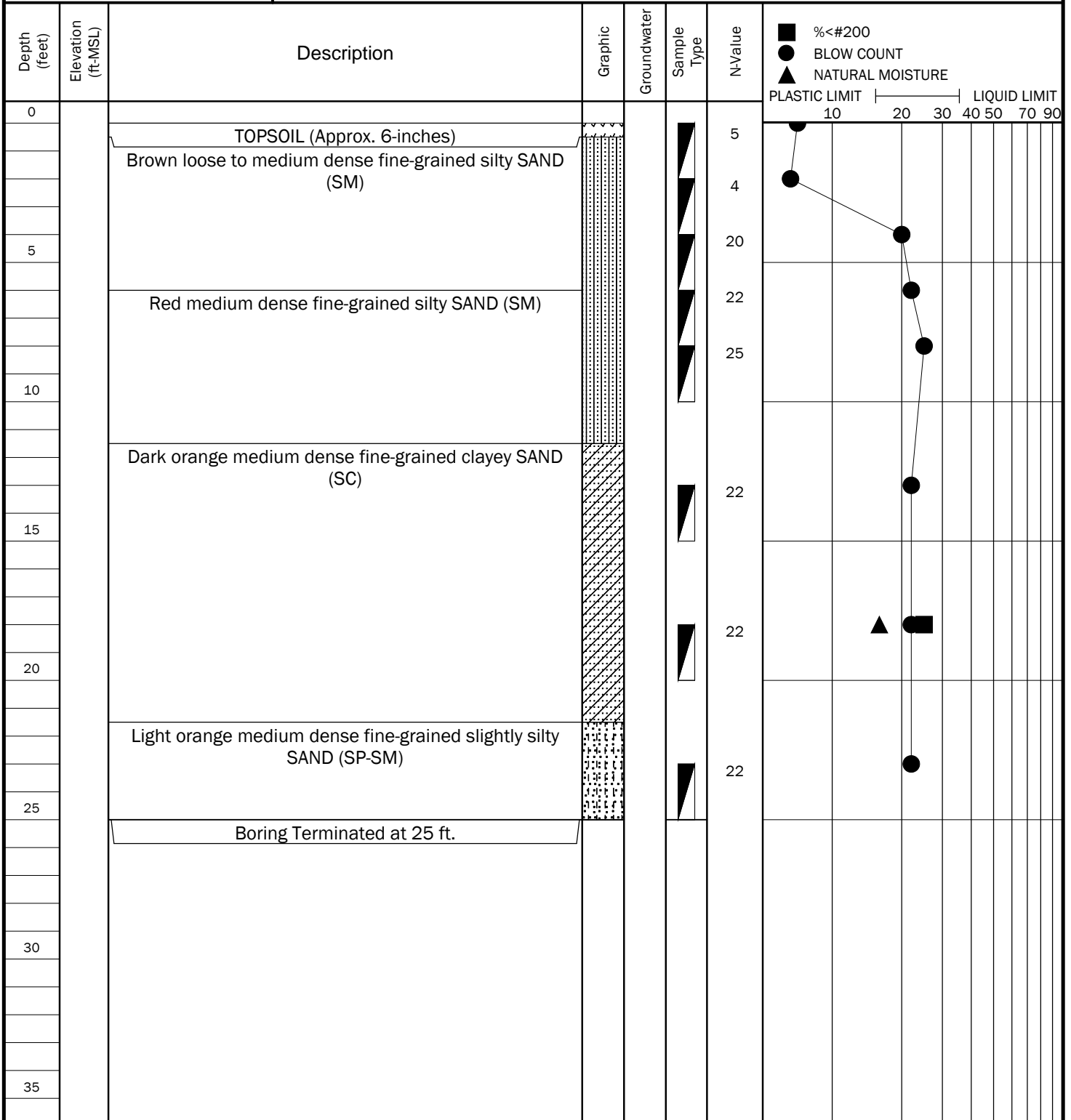
30.72597769° N -87.19212784° W



TEST BORING RECORD B-5

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 17, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



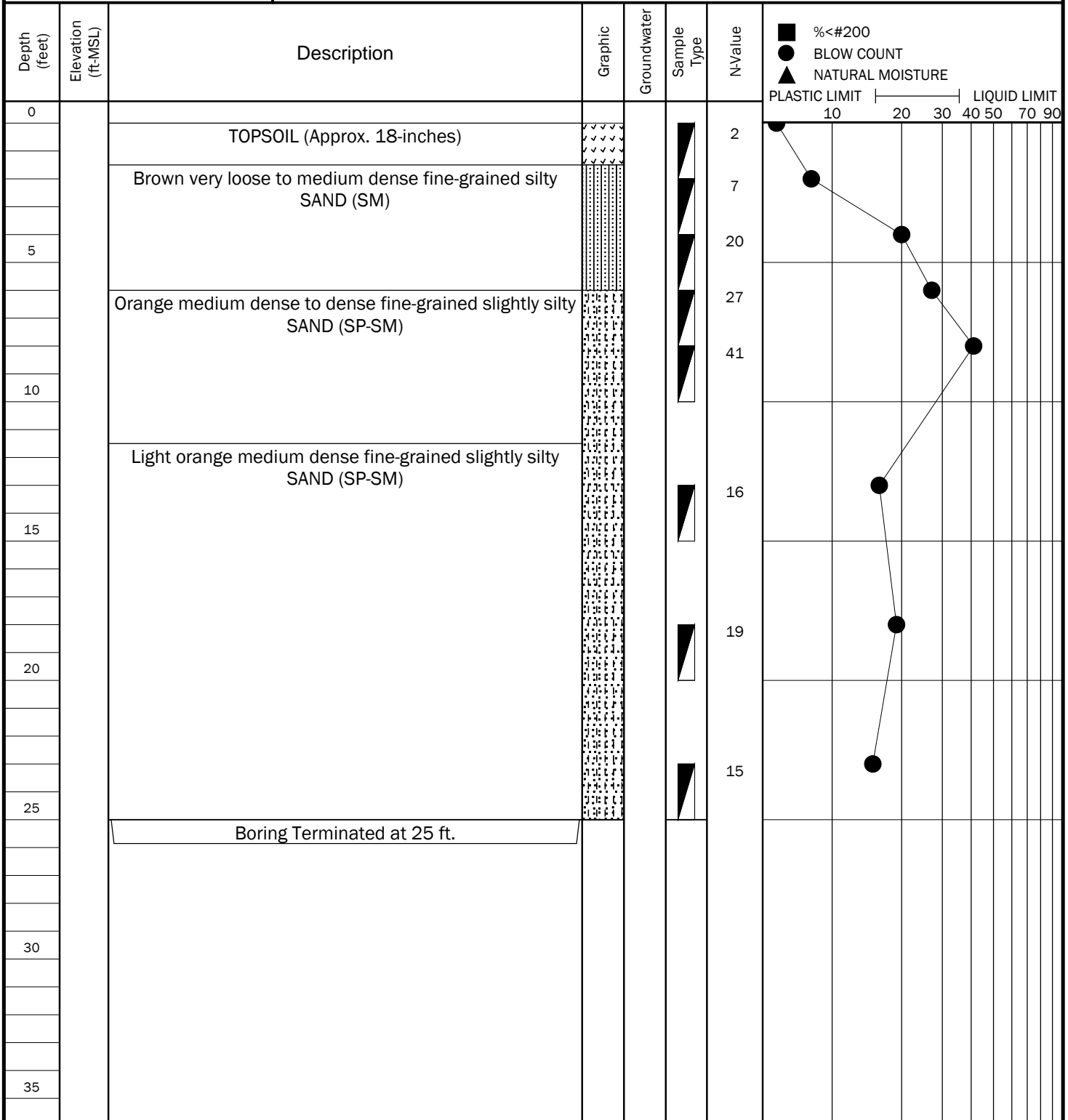
30.72650382° N -87.19102950° W



TEST BORING RECORD B-6

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 17, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE* AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



NOTE: 3-inches of perched groundwater encountered at 4 feet BEG.

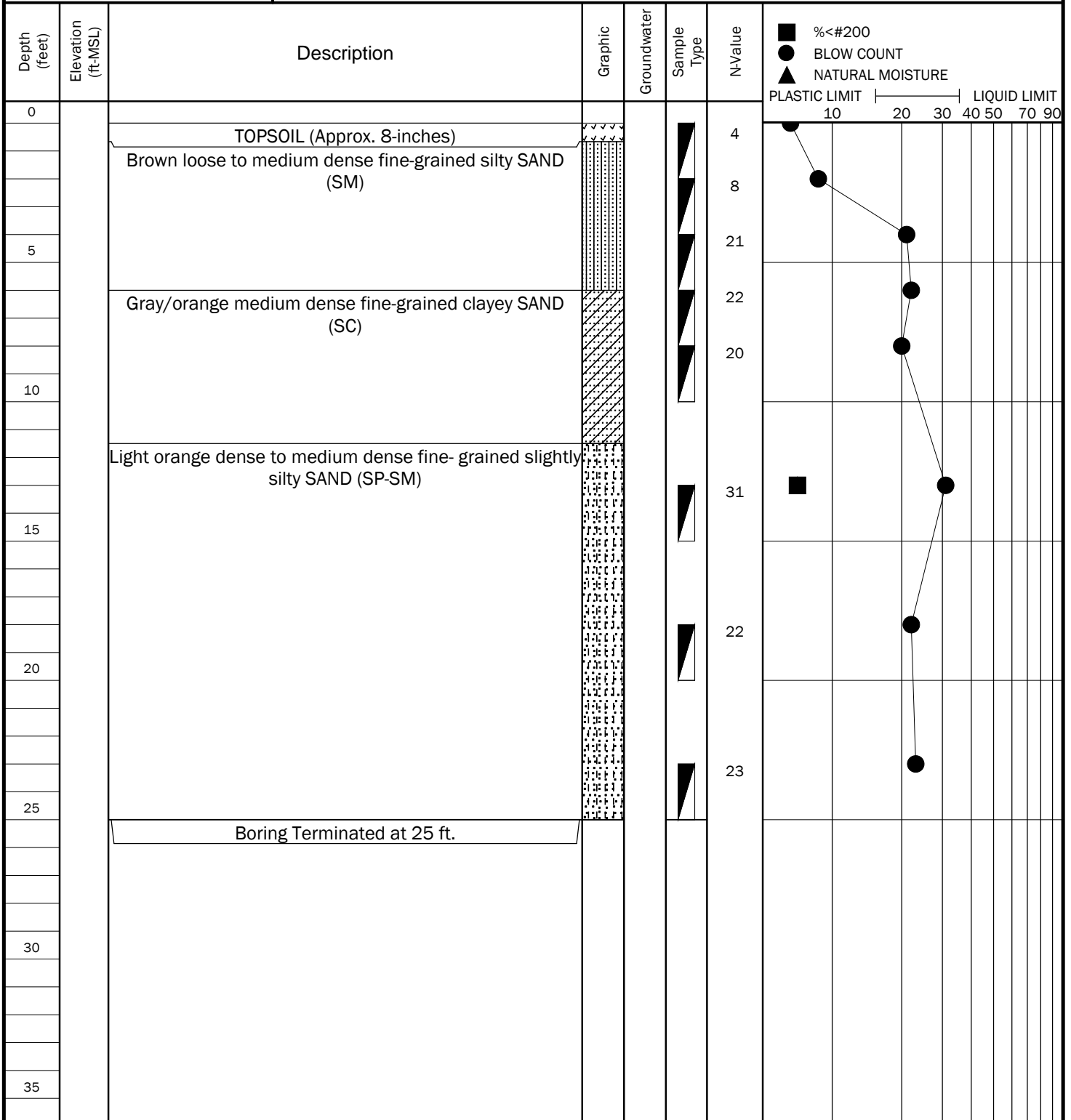
30.72681867° N -87.19206054° W



TEST BORING RECORD B-7

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 17, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



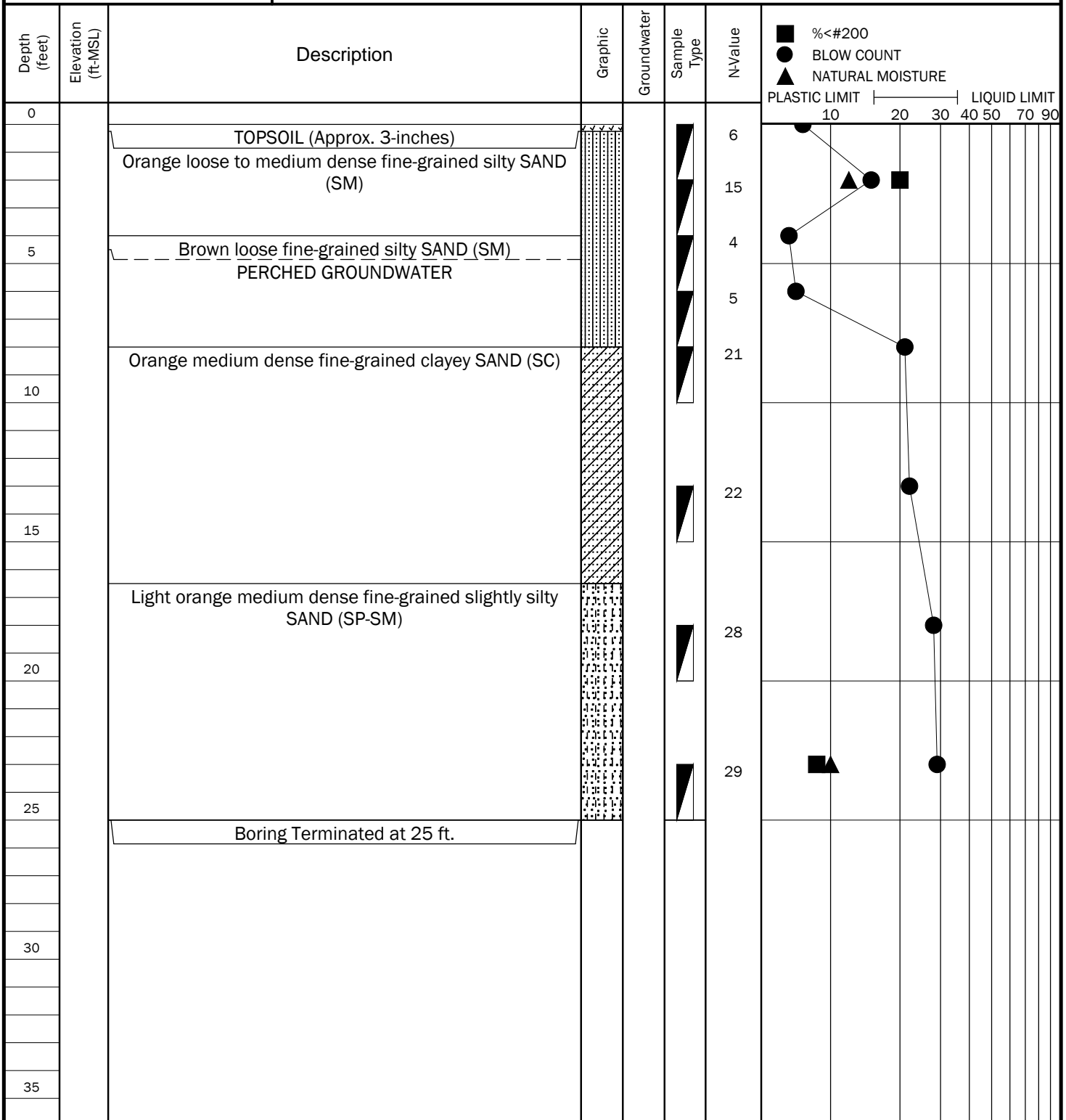
30.72678049° N -87.19308236° W



TEST BORING RECORD B-8

PROJECT: SRCSD Vandenberg Site PROJECT NO.: 10116-2020118
CLIENT: Santa Rosa County School District
PROJECT LOCATION: Santa Rosa County, Florida
LOCATION: Per Boring Location Plan ELEVATION: Existing Grade
DRILLER: S. Ryan LOGGED BY: S. San Filippo
DRILLING METHOD: SPT Boring DATE: July 17, 2020
DEPTH TO - WATER> INITIAL: ∇ GNE* AFTER 24 HOURS: ∇ CAVING> C

This information pertains only to this boring and should not be interpreted as being indicative of the site.



NOTE: Perched groundwater encountered at 4.5 feet to 8 feet BEG.

30.72132873° N -87.19089065° W

APPENDIX C

Laboratory Data

SUMMARY OF CLASSIFICATION & INDEX TESTING

SRCSD Vandenberg Site
Santa Rosa County, Florida
NOVA Project No. 10116-2020118

SUMMARY OF CLASSIFICATION AND INDEX TESTING						
Boring No.	Sample Depth (ft. BEG)	Natural Moisture (%)	Percent Fines (- #200)	Hydraulic Conductivity		USCS Soil Classification
				K _{vs} (ft/day)	Unit Weight of Sample (pcf)	
B-1	2-4	20	40	—	—	SC
B-2	6-8	13	26	—	—	SC
B-3	6-8	22	67	—	—	CL
B-4	13-25	6	7	14	93	SP-SM
B-5	18-20	16	25	—	—	SC
B-7	13-25	5	5	12	100	SP-SM
B-8	2-4	12	20	—	—	SM
B-8	23-25	10	8	—	—	SP-SM

REMOLDED LABORATORY PERMEABILITY TEST DATA SHEET

PROJECT: SRCS D Vandenberg Site

NOVA PROJECT #: 10116-2020118

DATE: 7/22/2020

ASSIGNED BY: JAJ

TESTED BY: SRS

Sample LOCATION / BORING NO.	B-4
Sample NUMBER / DEPTH	13-25

FALLING HEAD PERMEABILITY (ASTM D 5084)			
No. of LAYERS:	3	Wt. of MOLD (lbs):	4.50
BLOWS/LAYER:	15	Wt. of MOLD/SOIL (lbs):	6.93
HEIGHT (FT)	TRIAL #1 (SEC)	TRIAL #2 (SEC)	PERMEABILITY
7	0.0		5.14E-03
6	2.2		4.99E-03
5	4.7		4.83E-03
4	8.2		5.03E-03
3	12.5		5.19E-03
2	18.4		
1	28.0		
5.0E-03			cm/sec

NUMBER OF INCHES MOLD WAS SHORT? 1.188 INCHES (ZERO INCHES IS DEFAULT)

PERMEABILITY CONSTANT USED WAS → 0.17 (Includes 3/8"ID tubing)

PERMEABILITY TESTING SUMMARY			
PERMEABILITY (K _v)	→	14	ft/day
Corresponding K _h	→	21	ft/day
DRY DENSITY	→	93	lbs/ft ³
MOISTURE CONTENT	→	6	%
-200 FINES CONTENT	→	7	%

MOISTURE CONTENT (ASTM D 2216)	
Pan NUMBER	TT
Wt. of WET SOIL & PAN (g)	247.7
Wt. of DRY SOIL & PAN (g)	242.1
Wt. of PAN (g)	149
Wt. of Water (g)	5.6
Wt. of Dry Soil (g)	93.1
MOISTURE CONTENT (%)	6.0

-200 SIEVE WASH (ASTM D 1140)	
Pan NUMBER	TT
Wt. of DRY SOIL & PAN (g)	242.1
Wt. of WASH SOIL & PAN (g)	235.9
Wt. of PAN (g)	149.0
Wt. of Original Dry Sample (g)	93.1
Wt. of -200 Material (g)	6.2
Wt. of Washed Dry Sample (g)	86.9
-200 FINES CONTENT (%)	6.7



REMOLDED LABORATORY PERMEABILITY TEST DATA SHEET

PROJECT: SRCSO Vandenberg Site

NOVA PROJECT #: 10116-2020118

DATE: 7/22/2020

ASSIGNED BY: JAJ TESTED BY: SRS

Sample LOCATION / BORING NO.	B-7
Sample NUMBER / DEPTH	13-25

FALLING HEAD PERMEABILITY (ASTM D 5084)			
No. of LAYERS:	3	Wt. of MOLD (lbs):	4.50
BLOWS/LAYER:	15	Wt. of MOLD/SOIL (lbs):	8.02
HEIGHT (FT)	TRIAL #1 (SEC)	TRIAL #2 (SEC)	PERMEABILITY
7	0.0		4.26E-03
6	3.5		4.20E-03
5	7.7		4.10E-03
4	13.3		4.21E-03
3	20.1		4.28E-03
2	29.6		
1	45.6		
4.2E-03			cm/sec

NUMBER OF INCHES MOLD WAS SHORT?	0.000	INCHES (ZERO INCHES IS DEFAULT)
----------------------------------	-------	---------------------------------

PERMEABILITY CONSTANT USED WAS → 0.23 (Includes 3/8"ID tubing)

PERMEABILITY TESTING SUMMARY			
PERMEABILITY (K _v)	→	12	ft/day
Corresponding K _h	→	18	ft/day
DRY DENSITY	→	100	lbs/ft ³
MOISTURE CONTENT	→	5	%
-200 FINES CONTENT	→	5	%

MOISTURE CONTENT (ASTM D 2216)	
Pan NUMBER	WV
Wt. of WET SOIL & PAN (g)	277.7
Wt. of DRY SOIL & PAN (g)	271.2
Wt. of PAN (g)	147.6
Wt. of Water (g)	6.5
Wt. of Dry Soil (g)	123.6
MOISTURE CONTENT (%)	5.3

-200 SIEVE WASH (ASTM D 1140)	
Pan NUMBER	WV
Wt. of DRY SOIL & PAN (g)	271.2
Wt. of WASH SOIL & PAN (g)	264.8
Wt. of PAN (g)	147.6
Wt. of Original Dry Sample (g)	123.6
Wt. of -200 Material (g)	6.4
Wt. of Washed Dry Sample (g)	117.2
-200 FINES CONTENT (%)	5.2



APPENDIX D

Qualifications of Recommendations

QUALIFICATIONS OF RECOMMENDATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study, and our previous experience. If additional information becomes available which might impact our geotechnical opinions, it will be necessary for NOVA to review the information, re-assess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings may differ from those encountered at specific boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process has altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to confirm that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observations and testing services.

This report is intended for the sole use of **Santa Rosa County School District** only. The scope of work performed during this study was developed for purposes specifically intended by **Santa Rosa County School District** only, and may not satisfy other users' requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Florida. This warranty is in lieu of all other statements or warranties, either expressed or implied.

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910

Telephone: 301/565-2733 Facsimile: 301/589-2017

e-mail: info@geoprofessional.org www.geoprofessional.org

Copyright 2015 by Geoprofessional Business Association (GBA). Duplication, reproduction, or copying of this document, or its contents, in whole or in part, by any means whatsoever, is strictly prohibited, except with GBA's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of GBA, and only for purposes of scholarly research or book review. Only members of GBA may use this document as a complement to or as an element of a geotechnical-engineering report. Any other firm, individual, or other entity that so uses this document without being a GBA member could be committing negligent or intentional (fraudulent) misrepresentation.