Geotechnical Investigation

116 Cliff Ave
Bradley Beach, NJ

By:

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1. SUMMARY

One soil boring and Standard Penetration Test to a depth of 20 ft was performed on September 14, 2022 at 116 Cliff Ave, Bradley Beach NJ. Soil sampling was performed per the International Building Code and in accordance with ASTM D1586, Specification for Penetration Test and Split Barrel Sampling of Soils. Samples were classified in accordance with ASTM D2488, Practice for Classification of Soils for Engineering Purposes, Visual Manual Method.

The boring found very loose poorly graded sand with some clay (SP-SC and SP) to a depth of 3 ft below grade (fbg). From 3 to 7.5 ft loose poorly graded sand with some clay (SP and SP-SC) was found. From 7.5 to 8 ft medium dense poorly graded sand (SP) was found. From 8 to 10 ft stiff clay (CL) was found. From 13 to 14 ft stiff clay (CL) was found. From 14 to 20 ft medium dense poorly graded sand (SP) was found. Water was encountered at 6 ft below grade and the past seasonal high is estimated at 5 ft.

The project consists of building a new home. **Because the soil found below grade is suitable for bearing footings may be used to support the foundation.** The bearing layer begins at approximately 3 ft below grade and has an allowable bearing capacity of 1,500 psf. Recommended soil properties for design may be found below and on the test boring log.

International Building Code 2018, NJ Edition
Report Summary Requirements per Section 1803.6
Foundation and Soil Investigation Reports

No.	Item	Comment
1	Plot Showing The Location Of Test Boring	Location Plan in Appendix
2	Complete Record Of Soil Samples	See Photos & Boring Log
3	Record Of The Soil Profile	See Boring Log in Appendix
4	Water Elevation Past Seasonal High Estimate	6 fbg 5 fbg
5	Recommendations for Foundation Type	Spread Footings
5a	Allowable Bearing Capacity at Bearing Layer	1,500 psf at 3 ft
6	Expected Total and Differential Settlement	Less than 1.0 in. and 0.5 in.
7	Deep Foundation Info. Per IBC 1803.5.5	N.A.
8	Provisions For Footings On Expansive Soils	Place footings on 6 in. gravel
9	Compacted Fill Material Properties and Testing in Accordance W/ IBC 1803.5.8	Use IBC 1804.5 and table 1704.7. Use gravel or NJ DOT I-8 for fill if needed.
10	Controlled low-strength material properties and testing in accordance with IBC 1803.5.9	Not applicable

2. BACKGROUND ON GEOTECHNICAL SOIL BORINGS

Soil borings consist of two parts, excavation and sampling. During excavation a 3 in. diameter open hole is made to the elevation of where sampling is to begin. For this work the method of excavation was by hollow stem auger and, beyond 20 ft, mud rotary drilling . Sampling was performed in accordance with ASTM D1586. This sampling method is also known as the Standard Penetration Test (SPT) and is a standardized procedure for driving a split barrel sampler to obtain a representative soil sample and measure the resistance of the soil to the penetration of the sampler. The sampler is driven with a 140 lb. safety hammer dropped from a height of 30 in. The measure of resistance is designated as "N" and is also known as the "blow counts". The number of blows on the sampler is recorded in four 6 in. increments for a total penetration depth of 24 in. The sum of blows for the middle 12 in. is the blow count. Soil samples were classified in accordance with the Unified Soil classification System (USCS) using visual methods, specifically ASTM D2488. The classifications are found on the boring log in the appendix.

Definitions of Soil Properties found in boring log:

Dry Dens (#/ft^3):   The estimated dry density of the soil in pounds per cubic ft.

Phi: The estimated angle of internal friction of the soil in degrees.

C (kip/ft^2):   The estimated cohesion of the soil in kips per square ft.

K (#/in^3):   The estimated modulus of subgrade in pounds per cubic in.
                       This parameter is used in lateral load analysis.

Seasonal High Water
Excluding extreme weather events, the water table elevation usually varies. The seasonal high-water estimate is based on soil colors, staining and mottling, and is an estimate of the past high-water table during the season. It is used to help determine the geotechnical suitability of the soil.

General
The conclusions and recommendations in the report are based on information obtained from the soil boring. The possibility remains that unexpected conditions may be encountered during construction due to the nature of underground construction. An allowance should be established to account for possible extra costs that may be required. Additional costs may be incurred for various reasons including uncovering unsuitable soils, in-ability to use onsite soils, variations of soil conditions, water runoff conditions, requirements for the support of excavation, etc.

3. APPENDIX

a. Photographs

b. Soil Boring Log

c. ASTM D2488 Soil Classification Definitions
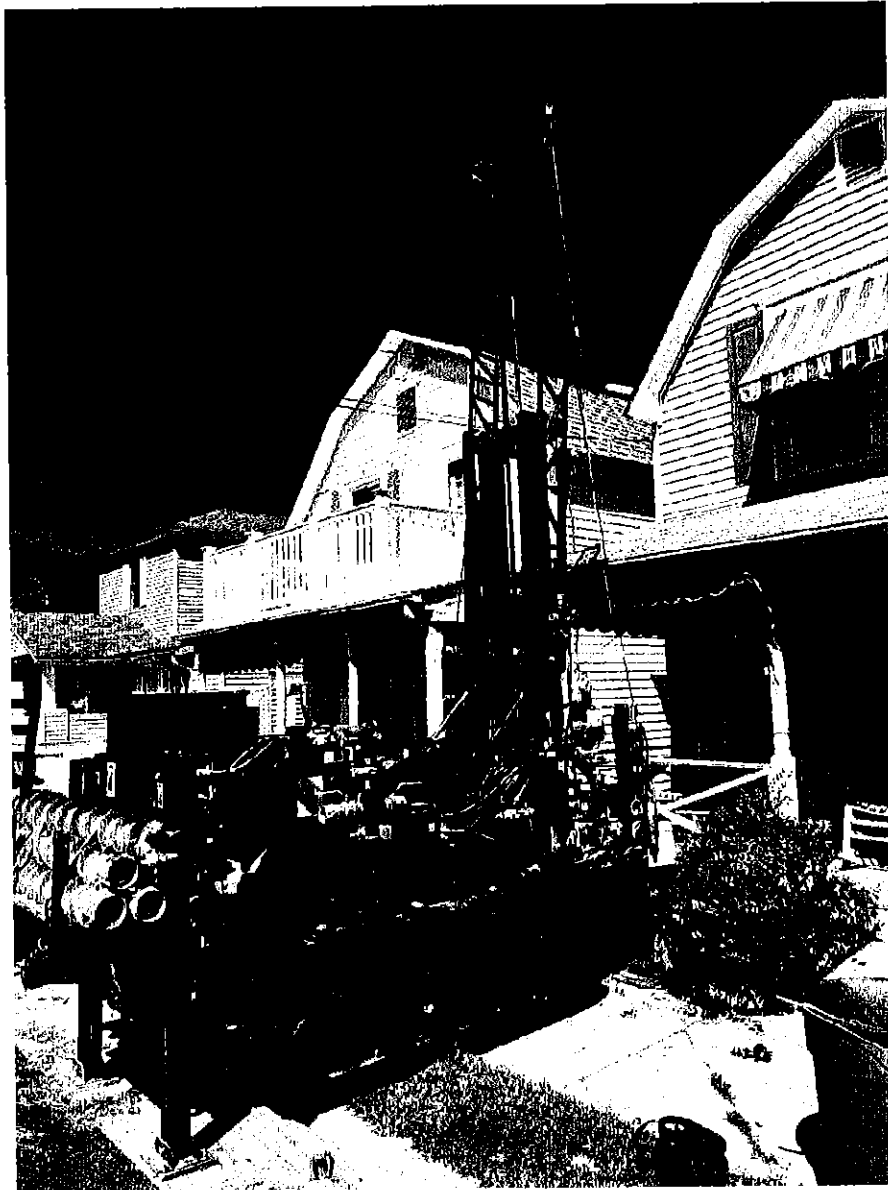
d. Location Plan

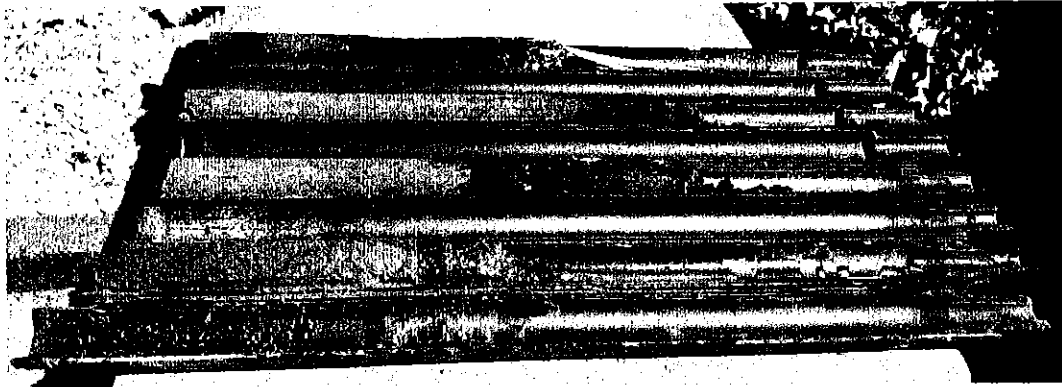# Photographs

Photo 1: Drill Rig Setup

Photo 2: Samples (identified from top to bottom)
0 to 2 ft Sample, SP-SC – Very Loose
2 to 4 ft Sample, SP – Very Loose then Loose
4 to 6 ft Sample, SP-SC then SP – Loose
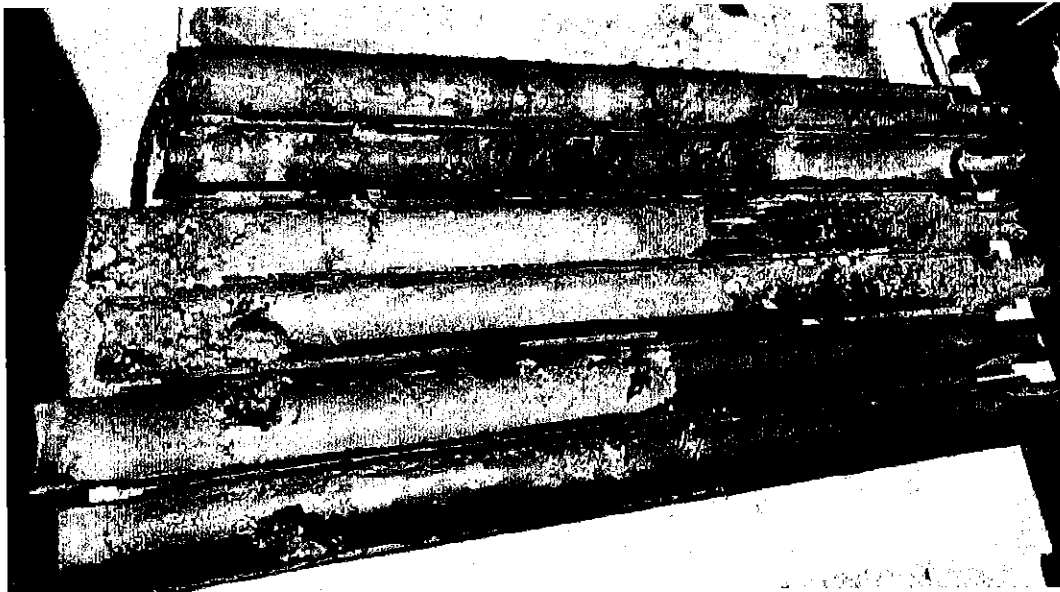6 to 8 ft Sample, SP – Loose then Medium Dense

Photo 3: Samples (identified from top to bottom)
8 to 10 ft Sample, CL – Stiff
13 to 15 ft Sample, CL then SP – Stiff then Medium Dense
18 to 20 ft Sample, SP – Medium Dense

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Soil Boring and Standard Penetration Test Log

Location:	116 Cliff Ave	**Boring No:** SB-1
	Bradley Beach, NJ	**Water (fbg):** 6.0
		Past Seasonal High Estimate (fbg): 5.0

Drilling Date:	September 14, 2022
Drilling Rig:	Diedrich D25 Track Rig
Drilling Method:	Hollow Stem Auger
Sampling Method:	ASTM D1586, 140 lb Auto-Hammer, 30 in. Drop, Split Spoon

On Site: R. Simon, PE

Depth ft.	Sample Depth	SPT Blow Counts (per 6 in.)				N Value	Photo No.	USCS Class	Remarks / Soil Properties			
									Dry Dens #/ft^3	Phi	C kip/ft^2	K #/in^3
0	0-2	1	0.5	0.5	2	1	2	SP-SC	Very Loose			
									100	26	0.0	2
2	2-4	1	2	4	4	6	2	SP	Very Loose then Loose			
									110	31	0.0	22
4	4-6	2	3	2	2	5	2	SP-SC	Loose			
								SP	107	29	0.0	18
6	6-8	2	2	2	6	4	2	SP	Loose then Med. Dense			
									105	29	0.0	10
8	8-10	5	6	7	8	13	3	CL	Stiff			
									130	0	1.6	445
10												
12												
	13-15	5	6	7	7	13	3	CL	Stiff then Med. Dense			
14								SP	130	0	1.6	445
									120	34	0.0	70
16												
18	18-20	7	9	8	8	17	3	SP	Med. Dense			
									120	36	0.0	100
20									End Boring at 20 ft			
22												
24												
26												
28												
30												

"w" indicates that the sampler penetrated 6 in. under only the hammer weight, indicating weak soil.

ATSM D 2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

This is a standard soil classification system referenced by the International Building Code (NJ Edition) which is the state adopted building code. It consists of two major categories of soils, Coarse Grained (retained on a No. 200 Sieve) and Fine Grained (passing a No. 200 Sieve). If a soil is more than 50% of either category it is classified in that category. Within the major categories, soil classifications are further refined. Below is a listing and descriptions of the soil classifications.

Coarse Grained Soils

Gravel		Sand	
GW	Well Graded Gravel	SW	Well Graded Sand
GP	Poorly Graded Gravel	SP	Poorly Graded Sand
GW-GM	Well Graded Gravel with Silt	SW-SM	Well Graded Sand with Silt
GW-GC	Well Graded Gravel with Clay	SW-SC	Well Graded Sand with Clay
GP-GM	Poorly Graded Gravel with Silt	SP-SM	Poorly Graded Sand with Silt
GP-GC	Poorly Graded Gravel with Clay	SP-SC	Poorly Graded Sand with Clay
GM	Silty Gravel	SM	Silty Sand
GC	Clayey Gravel	SC	Clayey Sand

Fine Grained Soils

ML	Silt
CL-ML	Silty Clay (Low Plasticity)
CL	Lean Clay (Low Plasticity)
CH	Fat Clay (High Plasticity)
OL	Organic Soil with Low Plasticity
OH	Organic Soil with High Plasticity

N-Values for Coarse Grained Soils

0-4	Very Loose
5-10	Loose
11-29	Medium Dense
30-49	Dense
>50	Very Dense

N-Values for Fine Grained Soils

0-2	Very Soft
3-4	Soft
5-8	Medium
9-15	Stiff
16-30	Very Stiff
>30	Hard

Other Soils

PT	Peat, Highly Organic

Note that OL, OH and PT are not suitable for use as a foundation subgrade.

116 Cliff Ave
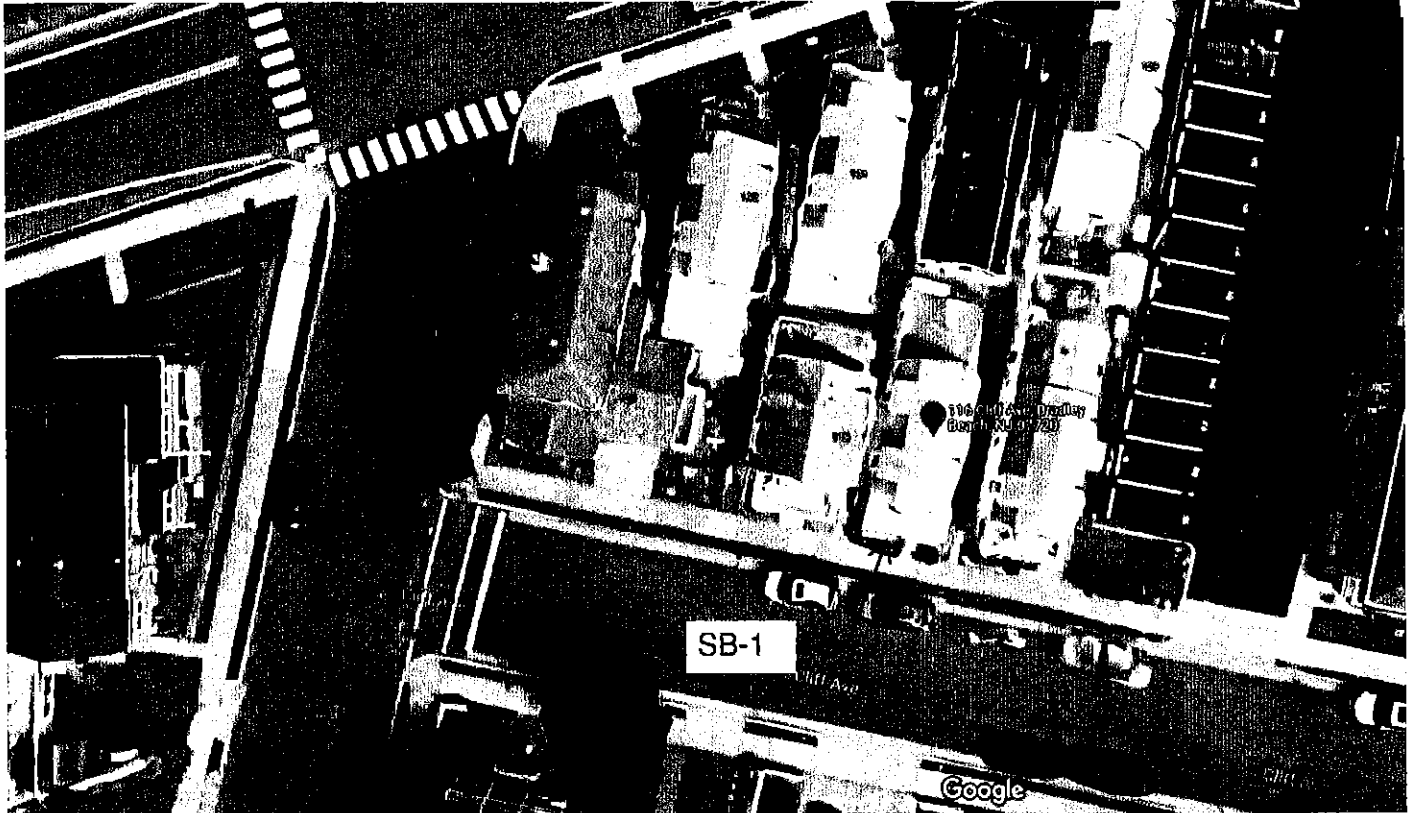
116 Cliff Ave
Building

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📍 116 Cliff Ave, Bradley Beach, NJ 07720

Photos