

94 DUNE ROAD
EAST QUOGUE, NY

GEOTECHNICAL REPORT

94 DUNE ROAD EAST QUOGUE, NEW YORK

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PWGC Project Number: DRH2101

MARCH 2025



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1.0 INTRODUCTION

1.1. Purpose

This report presents the results of a Geotechnical Investigation prepared by P.W. Grosser Consulting (PWGC) for the proposed residential structures located at 94 Dune Rd, East Quogue, NY. The purpose of the assessment is to provide recommendations of the design parameters for foundations and other geotechnical aspects of the proposed construction.

1.2. Summary of Findings

The onsite soils were found to consist of tan and grey, fine to coarse grained sands with underlain by a 10' to 15' thick layer of organic silts and silty sands. Underneath the organic silts and silty sands the soils transitioned back to tan sands found down to the deepest depths investigated. The depths investigated were as deep as 42' below grade surface (bgs) borings. The onsite soils were generally loose to medium dense in terms of relative compaction.

Groundwater was found in the soil borings and monitoring wells to be between approximate elevations of El +0.77' NAVD88 to El. +2.07' NAVD88.

The recommended present Design Groundwater Elevation is El. +2.10' NAVD88 and the future Design Groundwater Elevation is El. +3.60' NAVD88 in 30 years. The present condition is recommended for consideration of construction-phase activities. The future Design Groundwater Elevation of +3.60' NAVD88 is recommended for foundation design elements and consideration of waterproofing.

PWGC recommends founding the proposed structures and pool on driven timber pile foundations. Discussion and recommendations on timber piles can be found in Section 6.2, along with calculations in Appendix C. PWGC recommends using a 12" diameter Class B treated timber pile driven with a minimum embedment length of 32 ft to provide a 15-ton allowable axial capacity or a minimum embedment length of 42 ft to provide 20-ton allowable axial capacity. Recommended embedment lengths take into account the soft organic silts (Stratum 2) encountered at 25'-40' bgs in the northern portion of the project area (borings SB003 and SB004).

2.0 PROJECT DESCRIPTION

2.1. Proposed Development

PWGC's understanding of the proposed scope is based on the following documents:

- Existing Site Survey, by Raynor, Marcks & Carrington Surveying, dated 4/14/2022.
- Site Plans, by PW Grosser Consulting, dated 9/12/2024.

The proposed development will consist of constructing quantity 25 2-story residential structures with ground level parking, a Sewage Treatment Plant (STP), a cabana accessory structure and a swimming pool. The proposed residential structures have a First Floor Elevation (FFE) of El. +14.55' – 14.65' NAVD88 and a Ground Floor Elevation (GFE) of El. +7.15' NAVD88.

The proposed structures are located within FEMA Flood Zone AE-12 and seaward of the Limit of Moderate Wave Action (LiMWA). The proposed finished floor elevations appear to be above the Design Flood Elevations (DFE), inclusive of freeboard above the Base Flood Elevation (BFE).

If the proposed construction differs from the preliminary design plans, PWGC should be notified so that the changes can be reviewed to determine if the recommendations presented in this report are still applicable.

2.2. Site Description

The property is currently developed with a commercial marina and restaurant, asphalt parking lot and an unpaved parking lot. The existing dwellings are planned to be remain and will not be demolished prior to construction of the proposed structures.

The site's topography is roughly flat with a gradual slope from south down to the north towards a canal that connects into Shinnecock Bay.

3.0 GEOTECHNICAL INVESTIGATION AND TESTING

3.1. Subsurface Investigation Procedure

The field investigation to determine the engineering characteristics of the subsurface materials included a reconnaissance of the project site, drilling of soil borings, performing standard penetration tests (SPT), obtaining disturbed split-spoon samples, classifying materials, and recording the depth to water.

The drilling consisted of five (5) soil borings (SB001, SB002, SB003, SB004 and SB005) and three (3) monitoring wells (MW001, MW002 and MW003).

Soil borings SB001 and SB002 and the monitoring wells were drilled on 1/14/2022. The drilling was conducted using a Geoprobe rig equipped with a DH-100 Auto Drop Hammer pneumatic hammer with a split-spoon sampling unit contracted from Land Air and Water Environmental located in Center Moriches, New York.

Soil borings SB003, SB004 and SB005 were drilled on 2/07/2025. The drilling was conducted using a Geoprobe rig equipped with a DH-100 Auto Drop Hammer pneumatic hammer with a split-spoon sampling unit contracted from PG Environmental located in Hauppauge, New York.

Boring locations are shown in the provided site plan in **Appendix A**.

Soil samples were obtained continuously down to 12' below grade surface (bgs) and then at 5' intervals below that. Soil boring samples were characterized using the Unified Soil Classification System (ASTM D-2487). Disturbed soil samples were obtained in general accordance with ASTM D-1586 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. Soil samples were identified according to project number, boring number and depth.

During the sampling, SPTs were performed in the borings in conjunction with the split-barrel sampling. The standard penetration value (N) is defined as the number of blows of a 140-pound hammer, falling thirty inches, required to advance the split-spoon sampler two feet into the soil (ASTM D-1586). The sampler is lowered to the bottom of the drill hole and the number of blows is recorded for each of the four successive increments of six inches of penetration. The "N" value is the sum of the number of blows required to advance the sampler through the second and third six-inch increment. The results of the standard penetration test indicate the relative density and comparative consistency of the soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components.

A log was prepared for each soil boring and monitoring well. The log contains information concerning the boring method, samples attempted and recovered, and indications of the presence of various materials such as clay, silt, sand, or gravel, as well as observations of groundwater. The finalized logs are included in **Appendix B**.

Upon completion of the boreholes, they were backfilled with native material and packed gravel.

4.0 SUBSURFACE CONDITIONS AND INVESTIGATION FINDINGS

4.1. Stratigraphy

A generalized profile describing the typical soil conditions encountered during the subsurface investigation can be found below. Detailed description of the type of soils found during drilling is given in the borehole logs in **Appendix B**.

Table 1 – Generalized Stratigraphy

Stratum	Approximate Depth to Bottom of Stratum (feet)	Soil Encountered	General Consistency/ Relative Density
<u>Stratum 1:</u> Tan Sand (SP, SP-SM)	25'	Tan/gray/brown, fine to coarse grained Sand, little to no silt, trace to no gravel	Very loose to medium dense
<u>Stratum 2:</u> Organic Sandy Silt (OL, SM)	40'	Grey organic silt, some sand, organic odor. Encountered in borings SB003 and SB004 (northern portion of site)	Soft to very soft (OL) very loose (SM)
<u>Stratum 3:</u> Gray Silty Sand (SM, SP-SM)	30'-42'+	Grey, fine to coarse grained, Sand, some to little silt. Encountered in boring SB004 and SB005.	Loose to medium dense
<u>Stratum 4:</u> Gray Sand (SP)	42'+	Gray, fine to coarse grained Sand, little to no silt, trace to no gravel	Loose

4.2. Groundwater

Three (3) monitoring wells were installed on-site. MW001 was located furthest north in the location of the proposed pool. MW002 and MW003 were located in the existing parking lot, with MW003 being near the southwest corner and MW002 located between MW001 and MW003. Depth to water readings were measured in each monitoring well on the day of

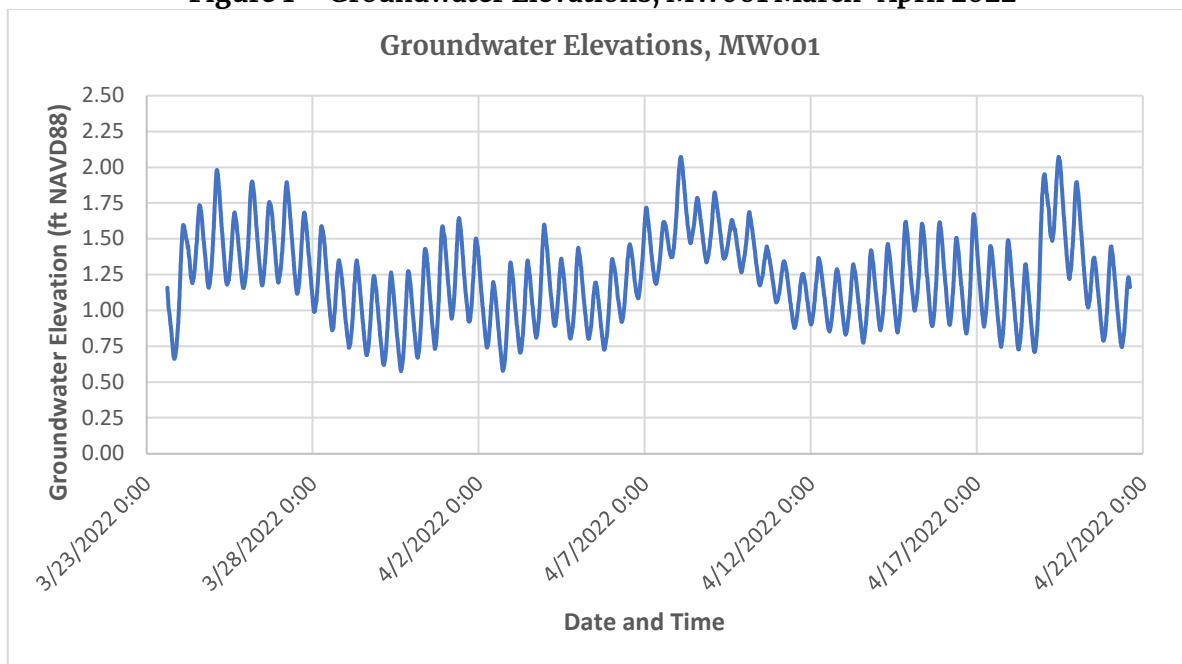
installation. The table below lists the manual depth-to-water readings taken at various dates.

Table 2 – Groundwater Monitoring Well Readings

MW Number	Surface Elevation (ft NAVD88)	Depth to Water Below Existing Grade (ft)	Groundwater Elevation (ft NAVD88)	Date
MW001	+5.30	4.23	+1.07	1/14/2022
MW001	+5.30	4.14	+1.16	3/23/2022
MW002	+6.00	5.23	+0.77	1/14/2022
MW002	+6.00	5.22	+0.78	2/07/2025
MW003	+6.35	4.80	+1.55	1/14/2022
MW003	+6.35	4.85	+1.50'	2/07/2025

A data logger was installed on March 23, 2022 in MW001 for a period of 28-days. The data logger continuously recorded fluctuations in groundwater levels due to tidal patterns and precipitation. The data logger recorded a high groundwater elevation of El. +2.07' NAVD88 on 4/8/2022. Regular, 12-hr tidal patterns caused groundwater to fluctuate by approximately 0.75'.

Figure 1 – Groundwater Elevations, MW001 March-April 2022



Groundwater levels are subject to fluctuations due to tidal periods, lunar cycles, precipitation events and changes in land use.

PWGC recommends considering the effects of future sea level rise with respect to future groundwater levels. For the Long Island area, the Medium projection over the next 30 years in the New York Codes, Rules and Regulations (6 NYCRR) is a rise of **18 inches**. Per the State, Part 490 establishes projections of sea-level rise over various time intervals but does not impose any requirements on any entity.

Combined with the data collected above, PWGC recommends considering the present Design Groundwater Elevation to be **El. +2.10' NAVD88** and the future Design Groundwater Elevation **El. 3.60' NAVD88** in 30 years. This is based on the shallowest depth that the groundwater was encountered during the field investigation (MW001) and sea level rise projection (future only).

The present condition is recommended for consideration of construction-phase activities. The future Design Groundwater Elevation of **El. +3.60' NAVD88** is recommended for foundation design elements and determination of waterproofing.

5.0 RECOMMENDATIONS

The geotechnical recommendations presented in this report are based on the information available regarding the proposed construction, the results obtained from the soil test borings, and PWGC's experience with similar projects. Because the soil test borings represent a very small statistical subsurface sampling, conditions encountered during construction may differ substantially from those indicated by the soil test borings. The soil that was sampled may differ from what is found during construction. If unexpected conditions are discovered, adjustments to design and construction may be necessary.

This geotechnical report is based on the provided Site Plan, field testing results and project information developed by PWGC and the assumptions stated in this report. Changes in the proposed location or design of the structures can have significant effects on the conclusions and recommendations of the geotechnical report. PWGC should be contacted in the event of such changes.

5.1. Soil Properties and Design Parameters

5.1.1. Bearing Capacity

The results of the SPT testing and USCS soil classifications indicates a maximum allowable bearing pressure varying between 0.33 and 1.50 tsf (tons per square foot) at typical foundation bearing depths (4' bgs). The allowable bearing pressures refer to the bearing pressure at foundation level in excess of the surrounding overburden pressure and does not include footing weight, backfill weight, or slab weight.

The recommended soil bearing capacity includes a factor of safety of three against shear failure.

5.1.2. Soil Design Parameters

Table 3 below summarizes engineering design parameters for the generalized soil layers described in Table 1. These parameters were evaluated based on a combination of the soil descriptions from the boring logs, calculations and engineering judgement.

Table 3 - Summary of Estimated Soil Properties

Stratum	Approximate Depth to Bottom of Stratum (feet)	Allowable Bearing Capacity (tsf)	Unit Weight, Saturated (pcf)	Soil Friction Angle, (degrees)	Active Earth Coefficient
<u>Stratum 1:</u> Tan Sand (SP, SP-SM)	25'	0.33 - 1.50 tsf	125	30	0.333
<u>Stratum 2:</u> Organic Silt (OL)	35'	n/a	105	0	n/a
<u>Stratum 3:</u> Gray Silty Sand (SM, SP-SM)	35'-42'+	n/a	115	28	n/a
<u>Stratum 4:</u> Gray Sand (SP)	42'+	n/a	120	30	n/a

5.2. Seismic Conditions

Based on the properties of the soils encountered in the test borings and PWGC's knowledge of geologic conditions in the area of the site, a site class of 'E' (Navg <15 for first 100' bgs) is considered appropriate as determined from Table 1613.5.5 of International Building code (IBC). The subject buildings (including the STP) were assumed to have a risk category of III.

According to the USGS Seismic Design Maps Tool and ASCE 7-16, the suggested ground motion parameters for the site are presented in the table below:

Table 4 - Ground Motion Parameters

PARAMETER	S _s	S ₁	S _{MS}	S _{M1}	S _{DS}	S _{D1}
VALUE	0.161g	0.047g	0.386	0.198	0.257	0.132

5.2.1. Liquefaction Potential

The seismic section of the NYS Building Code requires an evaluation of the liquefaction potential of sand, silt and non-cohesive materials below the ground water table. Evaluation for the potential for liquefaction of soils was assessed based on SPT results and shallow groundwater conditions.

Using the Simplified Method established by Boulanger and Idriss, the factor of safety against liquefaction was calculated for each soil layer. The liquefaction analysis found that the soil profile would not be likely to liquify (factor of safety > 1.0) during a major seismic event (Magnitude 5.5 or greater).

6.0 DESIGN RECOMMENDATIONS

6.1. Foundation Discussion

At the time of writing this report, PWGC has not been provided with structural plans from a project structural engineer or loading conditions. The recommendations may be subject to change as the architectural and structural details of the proposed structures are developed throughout the course of the project.

The results of the investigation indicate that shallow foundations **would not** be suitable for supporting the proposed residential buildings on conventional reinforced concrete spread footings bearing on the underlying native soils materials and/or properly placed structural fill. This is based on the following:

- Low allowable soil bearing capacities found at anticipated foundation depths. The allowable bearing capacities across the soil profile were typically below 1.00 tsf. Exceeding the allowable bearing pressure on the soils would lead to excessive settlement within the soil profile.
- The proposed structures are within the FEMA AE-12 Flood Zone and seaward of the LIMWA.

PWGC recommends that the design team consider supporting the proposed buildings' and pool foundations on deep foundations (such as driven timber piles). Deep foundation piles would provide support through friction developed with the subsurface soils, see Section 6.2.

6.2. Driven Timber Piles

Driven timber piles are slender members made of wood that are hammered or vibrated into place deep in the ground. The natural taper of a timber pile (1'' per 10') increases the friction with the surrounding soil. Timber piles are commonly used in coastal, residential applications. The driven timber piles will be designed to develop their strength through friction with cohesionless soils as a shallow bedrock layer is not present.

Piles are recommended to be spaced at least 4' apart to avoid pile group effect. The recommended lateral capacity design for timber piles should not exceed 10% of the vertical design capacity without the use of batter piles. Timber piles used for this foundation should be treated in accordance with Section 1809.1.2 of the NYSBC.

PWGC used the Allpile software package to size timber piles based on different design capacities. The software uses corrected SPT N values to characterize the in-situ soils. Allowable capacities for both compression (down) and tension (uplift) are given. Submittal reports showing program output can be found in **Appendix C**. Loading conditions for the proposed structures have not been communicated to PWGC at the time of authoring this report.

PWGC based on the pile calculations on the soil conditions and SPT blowcounts found at SB003. SB003 encountered very soft organic silts (Stratum 2) at 25' to 40' bgs. Pile tips are recommended to be installed completely through Stratum 2 to avoid having the tip directly bearing on it.

PWGC made the following assumptions:

- Soil properties based on Boring SB003 as worst case scenario.
- Factor of Safety of 2.0 for Compression (Down) and Tension (Uplift)
- Based on typical timber pile diameters of 12", Class B
- Piles installed at El +6.0' NAVD88.

Table 5 – Timber Pile Calculation Summary, Axial Capacity @ SB003

Design Capacity	Pile Diameter	Minimum Pile Embedment Length	Allowable Capacity, Compression	Allowable Capacity, Tension	Estimated Settlement, at Design Capacity	Notes
	(inches)	(ft)	(kips)	(kips)	(inches)	
15 Tons (30 kips)						
	12" dia	32	30.46	13.72	0.109	
20 Tons (40 kips)						
	12" dia	42	40.68	17.23	0.186	

PWGC recommends the following pile size for a 15-ton pile: 12" diameter, Class B pile with a minimum 32' pile embedment length and, for a 20-ton pile: 12" diameter, Class B pile with a minimum 42' pile embedment length. Additional pile diameter/length options may be requested based on feedback from the structural engineer. Pile group effects for reduction of axial capacity shall not be considered for spacing of lengths greater than 3 pile butt diameters.

Actual pile capacity will vary based on driving conditions and can be calculated using the Engineering News Formula after installation. Timber pile designs are to be in accordance with NYSBC Section 1810.3.2.4. PWGC recommends that the contractor install several test piles across the site prior to ordering the pile material for the project to more accurately calculate the required overall pile lengths. Test piles are recommended to be placed such that they determine the horizontal extents of the Stratum 2 organic silts.

Vibration monitoring is recommended during driven pile installation, see Section 7.3.

7.0 CONSTRUCTION RECOMMENDATIONS

7.1. Site Preparation

Any debris observed during site preparation including new fill and excavation areas, vegetation, topsoil, roots, and other deleterious materials that are deemed unsuitable shall be removed from the proposed construction areas and replaced with controlled fill. Site clearing, grubbing and stripping will need to be performed during dry weather conditions. Operation of heavy equipment on the site during wet conditions could result in excessive rutting and mixing of organic debris with the underlying soils.

7.2. Excavations

Temporary construction slopes should be designed and excavated in strict compliance with the rules and regulations of the Federal Register, Volume 54, No. 209 (October 1989), the

United States Department of Labor, Occupational Safety and Health Administration (OSHA), 29 CFR, Part 1926. This document was prepared to better ensure the safety of workers entering trenches or excavations and requires that all excavations conform to the latest OSHA guidelines.

The contractor is solely responsible for protecting excavations by shoring, dewatering, sloping, benching or other means as required to maintain stability of both the excavation sides and bottom. PWGC does not assume any responsibility for construction site safety or the activities of the contractor.

7.3. Vibration Monitoring

Equipment and vehicles used for driven pile installation during foundation construction will produce vibrations that will be impacted to the soils. Offsite travel of the vibrations is dependent on the construction methods employed and in-situ soil materials.

Construction vibrations are typically recorded as Peak Particle Velocity (PPV) measured in units of inches/second (in/sec). The US Bureau of Mines RI 8507 report is the common reference for establishing safe vibration levels. Acceptable vibration levels for modern, wood-framed residential structures are recommended to be limited to 0.75 in/sec and under for transient, single-event vibrations (such as from impact pile driving).

The anticipated PPV for a given distance can be calculated based on the energy rating of the piling driving equipment and the dampening factor related to the soil materials, see formula below.

$$PPV_{Impact\ Pile\ Driver} = PPV_{Ref} (25/D)^n \times (E_{equip}/E_{Ref})^{0.5} \text{ (in/sec)}$$

Where:

$$PPV_{Ref} = 0.65 \text{ in/sec for a reference pile driver at 25 ft.}$$

$$D = \text{Distance from pile driver to the receiver in ft.}$$

Use D = 200 ft for distance to nearest structure

$$n = \text{Value related to the vibration attenuation rate through ground.}$$

Use n = 1.4 for loose beach sands, organic soils.

$$E_{Ref} = 36,000 \text{ ft-lb (rated energy of reference pile driver)}$$

$$E_{equip} = \text{Rated energy of impact pile driver in ft-lbs.}$$

Use $E_{equip} = 43,500 \text{ ft-lb}$ for Junttan HHK 3SL.

$$PPV_{Impact\ Pile\ Driver} = 0.39 \text{ in/sec}$$

The anticipated PPV for vibrations experienced at the offsite neighboring structures are found to be lower than the 0.75 in/sec vibration threshold. This indicates that the vibrations will likely not cause structural damages. The anticipated vibrations will be perceptible to the occupants within the offsite neighboring structures and may cause movement of wall-mounted items. A vibration monitoring program designed by a Professional Engineer licensed in the State of New York is recommended to be conducted during pile installation to detect vibrations that exceed established thresholds. Vibration exceedances, if detected, would lead to stop of work and immediate adjustments to pile driving energy and/or implementation of vibration mitigation methods.

7.4. Dewatering

Excavations conducted deeper than the recommended Design Groundwater Elevation may require dewatering. Disposal of pumped groundwater should be performed in accordance with all applicable local, State and federal regulations. All permit requirements must be adhered to as specified by the agency providing the permit.

7.5. Structural Fill and Subgrade Preparation

After excavation to the designated subgrade level has been completed and prior to placing compacted fills, PWGC recommends compacting subgrade areas with a minimum of three (3) overlapping coverages of a vibratory roller having a minimum static drum weight of 5 tons. In addition, we recommend that a fully loaded tri-axle dump truck or haul truck be used to proof-roll the subgrade. The purpose of proofrolling is to recompact soil that has become loose or disturbed during excavation. Soils observed to heave or become unstable during proofrolling should be excavated and replaced with compacted structural fill. Proof rolling should be done within the footprints of structures founded on shallow foundations and pavement areas.

Structural engineered fill should be inorganic, clean sands with less than 10% fines (silts and clays) content. Any existing soils with a high organic content (browns, topsoil) are suitable for reuse as fill in landscaping areas only as common fill. Excavated soils may be used as backfill (structural or common) around the site. In-situ soils can be acceptable for use as structural fill if they meet the gradation criteria in Table 8 below. The intent of these recommendations is to reduce the potential for consolidation and settlement of new fills.

Laboratory testing should be performed on fill materials to determine the appropriate moisture density relationship of the fill being placed. Adjustments to the soil moisture by wetting or drying should be made as needed during fill placement.

Suitable fill material should be placed in lifts (lift thickness depends on type of compaction equipment, but in general, lifts of 9-inch maximum loose measurements are recommended). The soil should be compacted by the necessary compaction equipment to meet the specified compaction recommendations.

The bottom of all foundation excavations should be compacted using a minimum of four (4) passes with a vibratory plate, jumping jack, Rammax trench compactor, or similar compactor, and until no further settlement is visible prior to placing structural fill or constructing footings.

Table 7 – Engineered Fill Placement Guidelines

Areas of Fill Placement	Proctor Compaction (Percent of Max. Dry Density)	Moisture Content (Percent of Optimum)	Recommended Compaction Testing Frequency
STRUCTURAL FILL SUPPORTING FOUNDATION	95% ASTM D1557	-2 TO 2%	2,500 SF, per lift
FLEXIBLE/RIGID PAVEMENT BASE. DRIVEWAY BASE	95% ASTM D1557	-2 TO 2%	5,000 SF, per lift
COMMON FILL, LANDSCAPING	92% ASTM D1557	-2 TO 2%	10,000 SF, per lift
UTILITY TRENCHES	92% ASTM D1557	-2 TO 2%	150 LF, per lift

A qualified field representative should periodically observe fill placement operations and perform field density tests at various locations throughout each lift, including trench backfill, to indicate if the specified compaction is being achieved.

Compaction activities should be conducted under full-time inspection with the Rubber Balloon Method (ASTM D2167), Nuclear Density Gauge (ASTM D2922 and D3012), or other moisture/density test methods. Compaction testing should be performed by an experienced geotechnical inspector at sufficient regularity to ensure proper compaction.

Table 8 - Fill Gradation Requirements

Sieve Size	Structural Fill (Percent Passing by Weight)	Common Fill (Percent Passing by Weight)
3 Inches	100	80-100
1/2 Inch	50-100	-
No. 4	30-100	20-100
No. 40	10-70	-
No. 60	5-40	-
No. 200 (Fines)	0-10	0-20

After the evaluations and any required remedial measures are performed, concrete should be placed as quickly as possible to avoid exposure of the foundation sub-soils to wetting, drying or freezing. Footings shall not be constructed on frozen or wet subgrade materials. Frozen or saturated subgrade soils should be removed and replaced with compacted structural fill or clean crushed stone.

8.0 LIMITATIONS

Recommendations provided in this report are based on field observations, subsurface explorations and present knowledge of the site. Soil conditions could possibly vary between or beyond the points sampled. Therefore, soil characteristics in this report are only representative of the overall vicinity of the project.

This report may only be used by the client and for the purposes stated within a reasonable time from its issuance. If the locations of the constructed elements differ from the site plan, or any ancillary structures are proposed, PWGC should be notified so that the changes can be reviewed to determine if the recommendations presented in this report are still applicable. No warranty is expressed or implied.





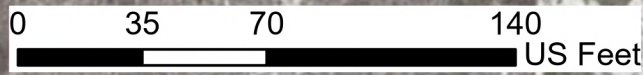
APPENDIX A




Boring Location Plan



GEOTECHNICAL REPORT – 94 DUNE ROAD, WESTHAMPTON BEACH NY

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-  Soil Boring
-  Monitoring Well
-  Site Boundary



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REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	DRH2101	Designed by:	BH
Date:	2/10/2025	Drawn by:	KM
Scale:	AS SHOWN	Approved by:	BH

Soil Boring & Monitoring Well Location Plane

94 Dune Road
East Quogue, NY

FIGURE NO:
1



APPENDIX B

Soil Boring Logs



USCS SOIL CLASSIFICATION GUIDE

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE)	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMITS LESS THAN 50)	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS (LIQUID LIMITS GREATER THAN 50)	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS	
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

RELATIVE DENSITY AND CONSISTENCY CLASSIFICATION

For Sands, Gravels:

Non-Cohesive Soils	N Value (Blows/ft)
Very Loose	0 – 4
Loose	4 – 10
Medium Dense	10 – 30
Dense	30 – 50
Very Dense	50+

For Clays, Silts, Organics:

Cohesive Soils	N Value (Blows/ft)
Very Soft	0 – 2
Soft	2 – 4
Medium (Firm)	4 – 8
Stiff	8 – 15
Very Stiff	15 – 30
Hard	30+

DEFINITIONS OF IDENTIFICATION TERMS FOR GRANULAR SOILS

Main Component (Proper Case)

- Gravel More than 50% of the sample by weight is Gravel
- Sand More than 50% of the sample by weight is Sand
- Silt More than 50% of the sample by weight is Silt

Minor Component (Lower Case)

- gravel Less than 50% of the sample by weight is gravel
- sand Less than 50% of the sample by weight is sand
- silt Less than 50% of the sample by weight is silt

Proportion terms, for Minor Components (Lower Case)

- and Component ranges from 35% to 50% of the sample by weight
- some Component ranges from 20% to 35% of the sample by weight
- little Component ranges from 10% to 20% of the sample by weight
- trace Component ranges from 0% to 10% of the sample by weight

Size of Soil Components


- Boulders
 - Boulders are greater than 12 inches in diameter
- Cobbles
 - Cobbles range from 3 inches to 12 inches
- Gravel
 - Coarse gravel ranges from 3 inches to 3/4 inch
 - Fine gravel ranges from 3/4 inch to No. 4 sieve
- Sand
 - Coarse sand ranges from No. 4 sieve to No. 10 sieve
 - Medium sand ranges from No. 10 sieve to No. 40 sieve
 - Fine sand ranges from No. 40 sieve to No. 200 sieve
- Silt
 - Material which passes the No. 200 sieve
- Clay
 - Material which passes the No. 200 sieve
 - Exhibits varying degrees of plasticity

Common Abbreviations


Term	Abbreviation
Push	P
Weight of Hammer	WOH
Atterberg	ATG
Moisture Content	MC
Sieve Analysis	SA

Gradation Designations


- | | |
|--------------------------|---|
| • Coarse to fine (c-f) | All fractions greater than 10% of the component |
| • Coarse to medium (c-m) | Less than 10% of the component is fine |
| • Medium to fine (m-f) | Less than 10% of the component is coarse |
| • Coarse (c) | Less than 10% of the component is medium and fine |
| • Medium (m) | Less than 10% of the component is coarse and fine |
| • Fine (f) | Less than 10% of the component is coarse and medium |

PROJECT #:	DRH2101		
SITE ADDRESS:	94 Dune Road, East Quogue, NY		
BORING ID:	SB001	BORING DEPTH (FT): 16	BORING DIAMETER (IN): 2
DRILLING CONTRACTOR:	Land, Air, Water Env. Services, Inc.	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:	Direct Push	TIME STARTED: 07:30	TIME FINISHED: 08:10
DRILLING EQUIPMENT:	Geoprobe 7822DT	SURFACE ELEV.: 5.30	GROUNDWATER ELEV.: 0.30
SAMPLING METHOD:	Split Spoon	PROJECT MANAGER: BH	LOGGED BY: WH


DEPTH (feet)	RECOVERY INTERVAL	SAMPLE ID	GRAPHIC LOG	DESCRIPTION SOIL TYPE (USCS): saturation, density, color, texture, Major Component, minor components	ELEVATION (feet)	Field Notes	SPT, N-Values (blows/ft.)								
							0	20	40	60	80				
0				POORLY-GRADED SANDS (SP): light brown, gravel intermixed, dry with no odor	5										
1						spt = 9,8,7,8						15			
2				POORLY-GRADED SANDS (SP): light brown, dry with no odor	3										
3						spt = 8,7,7,6							14		
4				POORLY-GRADED SANDS (SP): light brown, loose, wet with no odor.	1										
5				Groundwater encountered at 5' bgs.	0										2
6				POORLY-GRADED SANDS (SP): brown, wet with no odor	-1										
7						spt = 1,3,7,8								10	
8				POORLY-GRADED SANDS (SP): gray, wet with no odor	-3										
9						spt = 10,14,13,11									27
10															
11						spt = 8,7,7,5									14
12				POORLY-GRADED SANDS (SP): gray, loose, wet with no odor	-7										
13						spt = 4,3,3,4									6
14															
15						spt = 4,4,5,6									9
16															

PROJECT #:	DRH2101		
SITE ADDRESS:	94 Dune Road, East Quogue, NY		
BORING ID:	SB002	BORING DEPTH (FT): 16	BORING DIAMETER (IN): 2
DRILLING CONTRACTOR:	Land, Air, Water Env. Services, Inc.	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:	Direct Push	TIME STARTED: 09:45	TIME FINISHED: 10:45
DRILLING EQUIPMENT:	Geoprobe 7822DT	SURFACE ELEV.: 6.35	GROUNDWATER ELEV.: 1.35
SAMPLING METHOD:	Split Spoon	PROJECT MANAGER: BH	LOGGED BY: WH


DEPTH (feet)	RECOVERY INTERVAL	SAMPLE ID	GRAPHIC LOG	DESCRIPTION SOIL TYPE (USCS): saturation, density, color, texture, Major Component, minor components	ELEVATION (feet)	Field Notes	SPT, N-Values (blows/ft.)													
							0	20	40	60	80									
0				POORLY-GRADED SANDS (SP): brown, gravel with trace sand, loose, dry with no odor	6															
1						spt = 4,4,5,4	◆	9												
2				POORLY-GRADED SANDS (SP): light brown, loose, dry with no odor	4															
3					3	spt = 4,3,3,2	◆	6												
4				POORLY-GRADED SANDS (SP): brown, loose, wet with no odor.	2															
5				Groundwater encountered at 5' bgs.	1															
6				POORLY-GRADED SANDS (SP): brown, loose, wet with no odor	0															
7					-1	spt = 2,2,1,2	◆	3												
8				POORLY-GRADED SANDS (SP): gray, loose, wet with no odor	-2															
9					-3	spt = 2,1,5,5	◆	6												
10				POORLY-GRADED SANDS (SP): gray, wet with no odor	-4															
11					-5	spt = 4,5,6,6	◆	11												
12				POORLY-GRADED SANDS (SP): gray, loose, wet with no odor	-6															
13					-7	spt = 3,3,4,5	◆	7												
14				POORLY-GRADED SANDS (SP): gray, wet with no odor	-8															
15					-9	spt = 4,8,10,11	◆	18												
16																				














PROJECT #:	DRH2101		
SITE ADDRESS:	94 Dune Road, East Quogue, NY		
BORING ID:	SB003	BORING DEPTH (FT): 42	BORING DIAMETER (IN): 4.5
DRILLING CONTRACTOR:	PG Environmental Services, Inc.	DATE STARTED: 02/07/2025	DATE FINISHED: 02/07/2025
DRILLING METHOD:	Direct Push	TIME STARTED: 07:45	TIME FINISHED: 09:39
DRILLING EQUIPMENT:	Geoprobe 7822DT	SURFACE ELEV.: 7.00	GROUNDWATER ELEV.: 1.00
SAMPLING METHOD:	Split Spoon	PROJECT MANAGER: BH	LOGGED BY: KM

DEPTH (feet)	RECOVERY INTERVAL	SAMPLE ID	GRAPHIC LOG	DESCRIPTION SOIL TYPE (USCS): saturation, density, color, texture, Major Component, minor components	ELEVATION (feet)	Field Notes	SPT, N-Values (blows/ft.)				
							0	20	40	60	80
0				Dry, loose, tan, coarse to fine grained SAND (SP), trace gravel	6	Hand Clear					
2					4	Hand Clear					
4				Dry, loose, tan, medium to fine grained SAND (SP)	2	spt = 4,3,3,2	◆	6			
6				Wet, very loose, tan/brown, coarse to fine grained SAND (SP-SM), little organic silts	0	spt = 1,1,1,4	◆	2			
8				Groundwater encountered at 6' bgs	-2	spt = 4,3,10,13	◆	13			
10				Wet, medium-dense, tan/gray, coarse to fine grained SAND (SP-SM), trace silt	-4	spt = 8,12,7,5	◆	19			
12				Wet, medium-dense, tan/gray, medium to fine grained SAND (SP)	-6						
14					-8						
16					-10	spt = 18,7,9,10	◆	16			
18					-12						
20				Wet, medium-dense, tan/gray, coarse to fine grained SAND (SP)	-14	spt = 6,10,12,13	◆	22			
22					-16						
24					-18						
26				Wet, soft, gray, organic SILT (OL), organic odor	-20	spt = 4,2,3,5	◆	5			
28					-22						
30				Wet, very soft, gray, organic SILT (OL), organic odor	-24	spt = 1,W.O.H.,W.O.H., W.O.H.	◆	0			
32					-26						
34					-28						
36				Wet, very loose, gray, coarse to fine grained SAND (SM), some silt	-30	spt = 1,W.O.H.,1,5	◆	1			
38					-32						
40				Wet, medium-dense, tan/brown, coarse to fine grained SAND (SP-SM), little silts, trace gravel	-34	spt = 3,5,6,9	◆	11			
42											

PROJECT #:	DRH2101		
SITE ADDRESS:	94 Dune Road, East Quogue, NY		
BORING ID:	SB004	BORING DEPTH (FT): 42	BORING DIAMETER (IN): 4.5
DRILLING CONTRACTOR:	PG Environmental Services, Inc.	DATE STARTED: 02/07/2025	DATE FINISHED: 02/07/2025
DRILLING METHOD:	Direct Push	TIME STARTED: 10:00	TIME FINISHED: 11:45
DRILLING EQUIPMENT:	Geoprobe 7822DT	SURFACE ELEV.: 6.00	GROUNDWATER ELEV.: 2.00
SAMPLING METHOD:	Split Spoon	PROJECT MANAGER: BH	LOGGED BY: KM

DEPTH (feet)	RECOVERY INTERVAL	SAMPLE ID	GRAPHIC LOG	DESCRIPTION SOIL TYPE (USCS): saturation, density, color, texture, Major Component, minor components	ELEVATION (feet)	Field Notes	SPT, N-Values (blows/ft.)				
							0	20	40	60	80
0				Dry, loose, tan/brown, coarse to fine grained SAND (SP-SM), little silt, trace gravel	6	Hand Clear					
2				Dry, loose, tan, coarse to fine grained SAND (SP), trace gravel	4	Hand Clear					
4				Wet, loose, tan/gray, coarse to fine grained SAND (SP), trace organic silts	2	spt = 1,W.O.H.,1,3	◆	1			
6				Groundwater encountered at 4' bgs	0	spt = 3,3,1,1	◆	4			
8				Wet, loose, tan/brown, coarse to fine grained SAND (SP)	-2	spt = W.O.H.,W.O.H., W.O.H.,1	◆	0			
10				Wet, very loose, tan, medium to fine grained SAND (SP)	-4	spt = 2,5,7,5	◆	12			
12					-6						
14					-8						
16				Wet, loose, tan, medium to fine grained SAND (SP)	-10	spt = 3,3,4,6	◆	7			
18					-12						
20				Wet, loose, gray, coarse to fine grained SAND (SP)	-14	spt = 1,2,5,4	◆	7			
22					-16						
24					-18						
26				Wet, medium-dense, gray, coarse to fine grained SAND (SP-SM), little silt	-20	spt = 4,9,10,12	◆	19			
28					-22						
30				Wet, very loose, gray, coarse to fine grained SAND (SM), some silt	-24	spt = 7,1,W.O.H.,1	◆	1			
32					-26						
34					-28						
36				Wet, very loose, gray/brown, medium to fine grained SAND (SM), some silt	-30	spt = 3,1,W.O.H.,W.O.H.	◆	1			
38					-32						
40				Wet, loose, tan/gray, coarse to fine grained SAND (SP), trace gravel	-34	spt = 4,4,5,7	◆	9			
42					-36						

PROJECT #:	DRH2101		
SITE ADDRESS:	94 Dune Road, East Quogue, NY		
BORING ID:	SB005	BORING DEPTH (FT): 42	BORING DIAMETER (IN): 4.5
DRILLING CONTRACTOR:	PG Environmental Services, Inc.	DATE STARTED: 02/07/2025	DATE FINISHED: 02/07/2025
DRILLING METHOD:	Direct Push	TIME STARTED: 12:30	TIME FINISHED: 14:30
DRILLING EQUIPMENT:	Geoprobe 7822DT	SURFACE ELEV.: 6.00	GROUNDWATER ELEV.: 2.00
SAMPLING METHOD:	Split Spoon	PROJECT MANAGER: BH	LOGGED BY: KM

DEPTH (feet)	RECOVERY INTERVAL	SAMPLE ID	GRAPHIC LOG	DESCRIPTION SOIL TYPE (USCS): saturation, density, color, texture, Major Component, minor components	ELEVATION (feet)	Field Notes	SPT, N-Values (blows/ft.)				
							0	20	40	60	80
0				Asphalt, 4" thick	6	Hand Clear					
2				Dry, loose, tan/brown, medium to fine grained SAND (SP)	4	Hand Clear					
4				Dry, loose, tan, medium to fine grained SAND (SP)	2						
6				Wet, loose, tan/brown, medium to fine grained SAND (SP-SM), little silt	0	spt = 2,4,4,5				8	
8				Groundwater encountered at 4' bgs	-2	spt = 5,5,4,4				9	
10				Wet, loose, tan/gray, coarse to fine grained SAND (SP)	-4	spt = 2,W.O.H.,5,6				5	
12				Wet, very loose, tan/brown, medium to fine grained SAND (SP)	-6	spt = 2,2,2,2				4	
16				Wet, loose, tan, medium to fine grained SAND (SP)	-10	spt = 2,4,4,6				8	
22				Wet, medium-dense, tan, coarse to fine grained SAND (SP)	-14	spt = 4,4,8,9				12	
26				Wet, medium-dense, tan/gray, medium to fine grained SAND (SP-SM), little silt	-20	spt = 4,5,7,5				12	
32				Wet, medium-dense, gray, medium to fine grained SAND (SM), some silt	-24	spt = 4,8,10,10				18	
36				Wet, loose, gray/brown, medium to fine grained SAND (SM), some silt	-30	spt = 2,1,4,6				5	
42				Wet, loose, tan/gray, coarse to fine grained SAND (SP)	-34	spt = 4,4,5,7				9	

PROJECT #:	DRH2101
SITE ADDRESS:	96 Dune Rd, East Quogue, NY
BORING ID:	MW001
WELL ID:	MW001
DRILLING CONTRACTOR:	Land Air Water Env Services Inc
DRILLING METHOD:	
DRILLING EQUIPMENT:	Geoprobe 7822 DT
SAMPLING METHOD:	



BORING DEPTH (FT):	10	CORE LENGTH (FT):	NA
BORING DIAMETER (IN):	2	WELL DIAMETER (IN):	NA
DATE STARTED:	01/14/2022	DATE FINISHED:	01/14/2022
TIME STARTED:	07:30	TIME FINISHED:	08:10
LATITUDE:	NA	LONGITUDE:	NA
PROJECT MANAGER:	Brian Heflich	LOGGED BY:	Will Hamilton

DEPTH (feet)	SAMPLE INTERVAL	USCS KEY	RECOVERY (feet)	DESCRIPTION NAME (USCS): color, moist, plasticity, gravel, odor	PID Reading (ppm)	DEPTH (feet)	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0.0						0.0	Well cap
0.5						0.5	
1.0						1.0	
1.5						1.5	
2.0						2.0	4" diameter borehole
2.5						2.5	
3.0						3.0	
3.5						3.5	Bentonite chip seal
4.0						4.0	2" diameter Schedule 40 PVC casing
4.5						4.5	
5.0						5.0	2" diameter, 0.010" slot, Schedule 40 Pre-Pack PVC screen
5.5						5.5	
6.0						6.0	#2/16 filter pack sand
6.5						6.5	
7.0						7.0	
7.5						7.5	
8.0						8.0	
8.5						8.5	
9.0						9.0	
9.5						9.5	2" diameter Schedule 40 PVC end cap
10.0						10.0	

Surface Elevation = 5.20' NAVD88
 Groundwater Readings:
 01/14/2022, 13:00 - 4.23' bgs (Approx. EL +0.97')
 03/23/2022, 14:45 - 4.14' bgs (Approx. EL +1.06')

PROJECT #:	DRH2101
SITE ADDRESS:	96 Dune Rd, East Quogue, NY
BORING ID:	MW002
WELL ID:	MW002
DRILLING CONTRACTOR:	Land Air Water Env Services Inc
DRILLING METHOD:	
DRILLING EQUIPMENT:	Geoprobe 7822 DT
SAMPLING METHOD:	



BORING DEPTH (FT):	10	CORE LENGTH (FT):	NA
BORING DIAMETER (IN):	2	WELL DIAMETER (IN):	NA
DATE STARTED:	01/14/2022	DATE FINISHED:	01/14/2022
TIME STARTED:	09:45	TIME FINISHED:	10:45
LATITUDE:	NA	LONGITUDE:	NA
PROJECT MANAGER:	Brian Heflich	LOGGED BY:	Will Hamilton

DEPTH (feet)	SAMPLE INTERVAL	USCS KEY	RECOVERY (feet)	DESCRIPTION NAME (USCS): color, moist, plasticity, gravel, odor	PID Reading (ppm)	DEPTH (feet)	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0.0						0.0	Well cap
0.5						0.5	
1.0						1.0	
1.5						1.5	
2.0						2.0	4" diameter borehole
2.5						2.5	
3.0						3.0	
3.5						3.5	Bentonite chip seal
4.0						4.0	2" diameter Schedule 40 PVC casing
4.5						4.5	
5.0				Surface Elevation = 6.00' NAVD88 Groundwater Readings: 01/14/2022, 13:00 - 5.23' bgs (Approx. EL +0.77') 02/07/2025, 15:07 - 5.25' bgs (Approx. EL +0.75')		5.0	2" diameter, 0.010" slot, Schedule 40 Pre-Pack PVC screen
5.5						5.5	
6.0						6.0	
6.5						6.5	
7.0						7.0	#2/16 filter pack sand
7.5						7.5	
8.0						8.0	
8.5						8.5	
9.0						9.0	
9.5						9.5	
10.0						10.0	2" diameter Schedule 40 PVC end cap

PROJECT #:	DRH2101		
SITE ADDRESS:	96 Dune Rd, East Quogue, NY		
BORING ID:	MW003	BORING DEPTH (FT): 10	CORE LENGTH (FT): NA
WELL ID:	MW003	BORING DIAMETER (IN): 2	WELL DIAMETER (IN): NA
DRILLING CONTRACTOR:	Land Air Water Env Services Inc	DATE STARTED: 01/14/2022	DATE FINISHED: 01/14/2022
DRILLING METHOD:		TIME STARTED: 11:20	TIME FINISHED: 11:55
DRILLING EQUIPMENT:	Geoprobe 7822 DT	LATITUDE: NA	LONGITUDE: NA
SAMPLING METHOD:		PROJECT MANAGER: Brian Heflich	LOGGED BY: Will Hamilton

DEPTH (feet)	SAMPLE INTERVAL	USCS KEY	RECOVERY (feet)	DESCRIPTION NAME (USCS): color, moist, plasticity, gravel, odor	PID Reading (ppm)	DEPTH (feet)	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0.0						0.0	Well cap
0.5						0.5	
1.0						1.0	
1.5						1.5	
2.0						2.0	4" diameter borehole
2.5						2.5	
3.0						3.0	
3.5						3.5	Bentonite chip seal
4.0						4.0	
4.5						4.5	2" diameter Schedule 40 PVC casing
5.0						5.0	
5.5						5.5	
6.0						6.0	2" diameter, 0.010" slot, Schedule 40 Pre-Pack PVC screen
6.5						6.5	
7.0						7.0	#2/16 filter pack sand
7.5						7.5	
8.0						8.0	
8.5						8.5	
9.0						9.0	
9.5						9.5	
10.0						10.0	2" diameter Schedule 40 PVC end cap

Surface Elevation = 6.35' NAVD88
 Groundwater Readings:
 01/14/2022, 13:00 - 4.80' bgs (Approx. EL +1.55')
 02/07/2025, 14:49 - 4.85' bgs (Approx. EL +1.50')



APPENDIX C

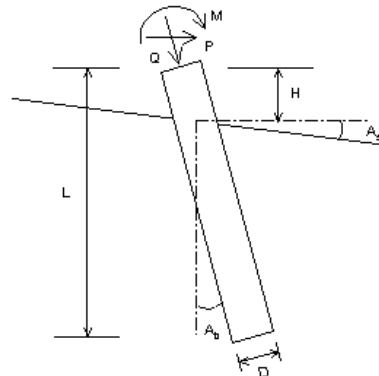
PILE CALCULATIONS



Axial Capacity at SB003 - 12" dia, 15-ton timber pile, 32' length

VERTICAL ANALYSIS

Figure 1



Driving Timber Pile

Loads:

 Load Factor for Vertical Loads= 1.0
 Load Factor for Lateral Loads= 1.0
 Loads Supported by Pile Cap= 0 %
 Shear Condition: Static

(with Load Factor)

Vertical Load, Q= 30.0 -kp

Profile:

 Pile Length, L= 32.0 -ft
 Top Height, H= 0 -ft
 Slope Angle, As= 0
 Batter Angle, Ab= 0

Soil Data:

Depth	Gamma	Phi	C	K	e50 or Dr	Nspt	Depth	Width	Area	Per.	I	E	Weight
-ft	-lb/f3		-kp/f2	-lb/f3	%		-ft	-in	-in2	-in	-in4	-kp/f2	-kp/f
0	109.1	30.6	0.00	20.2	23.30	6	0.0	12	113.1	37.7	1017.9	500	0.055
6	50.3	32.1	0.00	26.0	30.24	8	3.0	12	113.1	37.7	1017.9	500	0.055
25	41.0	0.0	0.21	23.5	2.56	2	32.0	8.3	54.1	26.1	233.0	29000	0.183
40	55.2	34.3	0.00	43.0	41.32	13							

Pile Data:
Vertical Capacity:

 Weight above Ground= 0.00 Total Weight= 0.49-kp *Soil Weight is not included
 Side Resistance (Down)= 60.207-kp Side Resistance (Up)= 26.459-kp
 Tip Resistance (Down)= 0.710-kp Tip Resistance (Up)= 0.000-kp
 Total Ultimate Capacity (Down) Qult= 60.917-kp Total Ultimate Capacity (Up)= 26.946-kp
 Total Allowable Capacity (Down) Qallow= 30.458-kp Total Allowable Capacity (Up) Qallow= 13.717-kp
 OK! Qallow > Q

Settlement Calculation:

 At Q= 30.00-kp Settlement= 0.10859-in
 At Xallow= 1.00-in Q= 99999.00000-kp

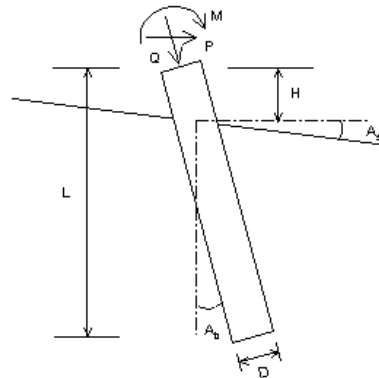
Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.


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Axial Capacity at SB003 - 12" dia, 20-ton timber pile, 42' length

VERTICAL ANALYSIS

Figure 1



Driving Timber Pile

Loads:

 Load Factor for Vertical Loads= 1.0
 Load Factor for Lateral Loads= 1.0
 Loads Supported by Pile Cap= 0 %
 Shear Condition: Static

(with Load Factor)

Vertical Load, Q= 40.0 -kp

Profile:

 Pile Length, L= 42.0 -ft
 Top Height, H= 0 -ft
 Slope Angle, As= 0
 Batter Angle, Ab= 0

Soil Data:

Depth -ft	Gamma -lb/ft ³	Phi	C -kp/ft ²	K -lb/ft ³	e50 or Dr %	Nspt	Depth -ft	Width -in	Area -in ²	Per. -in	I -in ⁴	E -kp/ft ²	Weight -kp/ft
0	109.1	30.6	0.00	20.2	23.30	6	0.0	12	113.1	37.7	1017.9	500	0.055
6	50.3	32.1	0.00	26.0	30.24	8	3.0	12	113.1	37.7	1017.9	500	0.055
25	41.0	0.0	0.21	23.5	2.56	2	42.0	7.3	41.9	22.9	139.4	29000	0.142
40	55.2	34.3	0.00	43.0	41.32	13							

Pile Data:
Vertical Capacity:

 Weight above Ground= 0.00 Total Weight= 0.55-kp *Soil Weight is not included
 Side Resistance (Down)= 69.012-kp Side Resistance (Up)= 33.366-kp
 Tip Resistance (Down)= 12.341-kp Tip Resistance (Up)= 0.000-kp
 Total Ultimate Capacity (Down) Qult= 81.353-kp Total Ultimate Capacity (Up)= 33.914-kp
 Total Allowable Capacity (Down) Qallow= 40.677-kp Total Allowable Capacity (Up) Qallow= 17.231-kp
 OK! Qallow > Q

Settlement Calculation:

 At Q= 40.00-kp Settlement= 0.18637-in
 At Xallow= 1.00-in Q= 99999.00000-kp

Note: If the program cannot find a result or the result exceeds the upper limit. The result will be displayed as 99999.


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