

SOR CONSULTING ENGINEERS, INC.

Geotechnical Engineering - Materials Testing - Forensic Studies

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GEOTECHNICAL INVESTIGATION REPORT PROPOSED RESIDENTIAL DEVELOPMENTS WEST ORANGE, NEW JERSEY

FOR

**GARDEN HOMES
SHORT HILLS, NEW JERSEY**

**Prepared by: Sor Consulting Engineers, Inc.
98 Sand Park Road
Cedar Grove, New Jersey 07009**

**Report No. 21-C-12
Job No. 21-C-01
April 19, 2021**

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April 19, 2021
Job No. 21-C-01
Report No. 21-C-12

Garden Homes
820 Morris Turnpike, Suite 301
Short Hills, NJ 07078

Attention: Mark Hoffman
E-Mail: MarkH@gardenhomes.com

Re: Geotechnical Investigation Report
Proposed Residential Development
West Orange, New Jersey

INTRODUCTION

Sor Consulting Engineers, Inc. (SCE) is pleased to present the results of a subsurface investigation performed for a proposed residential development to be constructed at a West Essex Highlands site in West Orange, New Jersey. The subject site is identified as Lot 32, Block 179 on the municipal tax maps.

Based on concept plan dated February 10, 2021, the proposed development will reportedly include the construction of four large apartment complexes, recreation building and pool, maintenance building, pump station, dog park, access roads, parking and stormwater management facilities. The apartment complexes will be 4-stories in height and will contain a one-story parking under the buildings. The total structures will cover a combined footprint area of approximately 200,000 square feet.

AVAILABLE SITE DATA

A feasibility geotechnical investigation was prepared by our office on June 30, 2004. A total of 25 test pits were performed for this study. The test pits revealed that the subject site is mantled by a 6 to 18 inches thick layer of topsoil/vegetation. Natural residual soils consisting of sandy silt to clayey silt were encountered beneath the topsoil. Silty gravelly sand with cobbles/boulders were encountered beneath sandy

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silt/clayey silt. Basalt bedrock was usually encountered at a depth of 8 feet or lower. However, at near the center of the property bedrock was encountered at depths of 2 to 4 feet beneath the ground surface.

The site was found to be suitable from a geotechnical point of view and buildings can be supported by conventional wall and spread foundations.

PURPOSE AND SCOPE OF WORK

The purpose of this study was to:

- explore the subsurface soil, rock, and groundwater conditions within the proposed buildings, stormwater management and pavement areas;
- estimate the geotechnical engineering properties of the encountered subsurface materials including soil permeability;
- evaluate the foundation requirements for the structures considering the anticipated structural loads and encountered subsurface conditions;
- recommend an appropriate type of foundation for support of the proposed structures and present geotechnical related foundation design and installation criteria, including shallow and/or deep foundation design parameters and seismic site class;
- present recommendations relative to the support of slabs to be constructed on-grade, including modulus of subgrade reaction (K_v);
- estimate the post-construction performance of the recommended floor and foundation systems;
- recommend lateral earth pressure and drainage criteria for use in the design of below-grade and site retaining walls;
- recommend an appropriate pavement section for the proposed parking and roadway facilities; and
- discuss appropriate earthwork operations or considerations consistent with the proposed construction and encountered subsurface conditions.

To accomplish this, a subsurface exploration program consisting of fifteen (15) test borings and twenty-seven (27) test pits was conducted at the site on March 25, 26,

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29, 30, 31 and April 1, 2021. The borings were advanced using narrow gauge rubber track mounted drilling equipment and extended to a maximum depth of 11 feet beneath the existing ground surface. Soil samples suitable for identification and laboratory testing purposes were extracted from the borings in accordance with the procedures of the Standard Penetration Test (ASTM-D1586). The test pits were excavated with a conventional rubber tire and track backhoe outfitted with an extendahoe boom. Test pit explorations extended to a maximum depth of 13 feet below existing grade. Tube and bulk soil samples were obtained from selected test pits performed in stormwater basin and parking/roadway areas for laboratory testing purposes. Upon completion the boring and test pit explorations were backfilled so as not to leave any open holes.

The borings were performed by Environmental Technical Drilling, Inc. and the test pits by Willis Excavating, Inc. under the direct technical observation of a geologist and a licensed geotechnical engineer from Sor Consulting Engineers. Our representative prepared logs of the explorations as the drilling and excavation proceeded and supervised the soil sampling operations so as to obtain the appropriate subsurface information. The locations of the explorations were staked in the field by others and are shown relative to the existing and proposed site features on the Exploration Location Plan contained in Appendix I of this report. Detailed descriptions of the encountered subsurface conditions are presented on the individual boring and test pit logs contained in Appendix II. The soils encountered in the borings and test pits were visually classified in accordance with the Burmeister Soil Classification System also included in Appendix II.

The soils encountered in the test pits performed in the proposed subsurface stormwater infiltration areas were described in general accordance with the terminology described in N.J.A.C. 7:9A. Ground surface elevations at the exploration locations were determined by interpolation between existing ground contours depicted on the site plan provided to us by your office.

All soil samples were brought to our AASHTO and ACOE accredited soil mechanics laboratory where they were further examined. Moisture content, grain size distribution, California Bearing Ratio (CBR) and Proctor tests were performed on selected samples to assist in soil identification and estimation of their engineering soil

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properties. Mechanical grain size distribution and falling head permeability tests were performed on selected samples obtained from the stormwater basin study test pits. Laboratory test results are presented in Appendix III.

The results of the subsurface exploration and laboratory testing programs as well as our visual examination of the boring and test pit samples have provided the basis for our engineering analyses and geotechnical recommendations. The following discussions of our findings and recommendations are subject to the limitations contained in Appendix IV of this report.

SITE CONDITIONS

Geologic Overview: The subject site is located within New Jersey Piedmont Physiographic Province. The province is primarily a low rolling plain divided by a series of higher ridges formed by intruding magma of Jurassic age. Locally, glacial till deposits can be found deposited directly by glacial ice during the Wisconsinian glaciation. The bedrock underlying the site is composed of a Jurassic aged basalt formation called the Preakness Basalt, a fine to coarse grained basalt that composes the second Watchung Mountain.

Surface Features: The entire property is currently moderately to heavily wooded and contains some areas of rock outcrops. Large boulders are scattered throughout the site. Several areas identified as wetlands traverse the property in a general northeast to southwest orientation. Surface grades throughout the site reportedly range from a high of Elevation +630 feet in the extreme northern section to Elevation +530 feet along the townhomes. Within the proposed Building "A" area, surface grades range from approximately +364 feet to +590 feet; proposed Building "B" area surface grades range from +586 feet to +596 feet; proposed Building "C" area the surface grades range from +602 feet to +617 feet; and proposed Building "D" area the surface grades range from +596 feet to +610 feet.

Subsurface Conditions: The subsurface conditions encountered in the explorations performed at this study is illustrated in soil profile sections AA, BB and CC included in Appendix I of this report. The subsurface profiles presented herein is our best professional judgement of the subsurface soil, bedrock and groundwater conditions

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and may not necessarily represent the actual variations between the boring and test pit explorations. Individual strata consist of the following generalized materials in order of increasing depths:

- 1) Surface Material: Approximately 4 to 24 inches of topsoil/vegetation was revealed at the ground surface.
- 2) Fill: Fill consisting of silty gravelly sand was encountered in Test Pit 20. The fill was in a medium dense to dense condition and extended to a depth of 13 feet. Test Pit 19 was excavated on top of soil mound and extended to a depth of 8 feet. Brown to dark brown sandy silty clay type soil was encountered. The fill was mixed with asphalt/concrete pieces, wood fragments and cobbles/boulders. The fill at the mound was in a soft condition.
- 3) Clayey Silt/Sandy Silt: Natural residual soils consisting of yellowish brown to gray and yellowish brown sandy silt and clayey silt were generally encountered beneath the topsoil in the majority of the explorations. The sandy silt/clayey silt generally ranged from 1 to 5 feet in thickness. Standard Penetration Test (N) values obtained from the borings indicate that the sandy silt/clayey silt are in a soft to firm consistency.
- 4) Silty Gravelly Sand: Brown silty gravelly sand containing numerous cobbles and frequent large boulders as well as occasional pockets of clay was encountered either beneath the topsoil or clayey silt in a majority of the explorations. This stratum was in a medium dense to dense condition. Test Pits 10, 16, 22, 23, 26 and 27 were terminated within this layer at depths of 10 to 13 feet below surface grades.
- 5) Bedrock: Basalt bedrock was encountered in the explorations and is anticipated to underlie the entire site at depths generally ranging from 4 to 12 feet beneath the surface. However, bedrock was encountered at depths of 1.5 to 3 feet beneath the ground surface in Test Pits 3, 4, 5, 9, 11, 18, 21 and Borings 5 and 10. Basalt is a very dense fine grained igneous rock. The backhoe and drill rig used for this study was unable to excavate/drill to any measurable extent into the bedrock.

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Groundwater was not encountered in the majority of the explorations performed for this study. However, where encountered, slight water seepage was observed at depths ranging from 2 to 9 feet below surface. Due to the substantial topographic relief, it should be anticipated that groundwater levels at the site will vary significantly and may experience fluctuation due to seasonal variations in precipitation, temperature and/or surface runoff. In addition, groundwater seepage may be localized occurring along the bedrock surface.

CONCLUSIONS AND RECOMMENDATIONS

General: Based on our evaluation of the encountered subsurface conditions, the natural residual soils, new controlled compacted fill and basalt bedrock will provide suitable support for the foundations and slabs of the proposed structures. Following the site preparation procedures presented in this report, the columns and walls of the proposed structure may be supported on conventional spread foundations. Slabs may be constructed on grade. Discussions of these and other geotechnical items considered relevant to the proposed construction are presented in the following sections of this report.

Site Preparation and Earthwork: All trees, topsoil and vegetation should be completely removed from within and at least 5 feet beyond the proposed construction limits. Following the removing of all surface vegetation and topsoil, excavation should continue as required to reach the proposed construction subgrade levels. Any unsuitable fill encountered should also be removed. Based on the topography of the site, we anticipate that excavation into bedrock will likely be required. Basalt is very dense, fine grained igneous rock. Typically, the upper 1 foot of the rock may be somewhat weathered and fractured, and capable of being excavated using heavy construction equipment. Below this, however, the rock is less weathered and less fractured. Consequently, excavations extending more than 1 foot into rock as well as excavations in confined areas such as foundation and utility excavations, will likely require drilling and splitting, blasting, pneumatic hammering or other specialized techniques for rock removal.

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In order to achieve the desired site grades, we anticipate that fill will also be required to reach the proposed construction subgrade levels. Prior to the placement of any fill, the soils exposed after the removal of all surface vegetation and topsoil and after excavating to proposed construction subgrade should be thoroughly proofrolled and compacted to a dense and unyielding condition by numerous passes of a large vibrating steel drum compactor. Any localized areas that cannot be compacted to a dense and unyielding condition such as soft clayey soils should be excavated to expose suitable subsoils and backfilled with controlled compacted fill. After proofrolling, fill may be placed as required to reach the desired construction subgrade levels. Fill material may consist of either suitable portions of the on-site soils or imported well-graded sand and gravel containing less than 15 percent by weight passing a U.S. Standard No. 200 sieve. The natural sandy silt and clayey silt soils encountered directly below the surficial topsoil are highly moisture-sensitive and their suitability for immediate use as controlled fill or backfill within building and pavement areas will be dependent upon their moisture content at the time of construction. If the moisture content is even slightly above optimum as determined by the ASTM D-1557 test procedure, these soils will be difficult if not impossible to compact. As such, the sandy silt and clayey silt soils are considered marginal for reuse as controlled fill or backfill within structural areas. These soils would, however, be suitable for use as fill within landscaped areas or berms. Cleaner silty gravelly sandy soils were often found below the sandy silt and clayey silt. These soils are generally less sensitive to changes in moisture and would therefore be more suitable for use as controlled fill or backfill within building and pavement areas. During extensive excavations, the silty gravelly sand should be segregated and reserved for future use as controlled fill. Rock fragments resulting from excavation operations may also be used as fill provided that the fragments are less than 6 inches in maximum dimension and adequately placed to preclude the formation of voids in the fill. Fill containing significant quantities of rock fragments should remain at least 4 feet below finished building and slab subgrade levels so as not to interfere with subsequent foundation and utility installation. In addition, depending upon the gradation characteristics of the rock fill, it may be necessary to place a layer of geotextile fabric between the rock fragments and overlying layers of soil fill in order to prevent migration

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of fines into the fragments. The need for the placement of a geotextile fabric should be determined in the field at the time of construction.

All structural fill and backfill placed within building areas should be installed under the technical observation of a geotechnical engineer. Controlled soil fill materials should be spread in layers on the order of 12 inches in loose thickness and compacted to at least 95 percent of maximum dry density as determined by the ASTM D-1557 test procedure. Layers of rock fill may be somewhat greater than 12 inches compatible with the appropriate compaction equipment and should also be compacted to a visually dense condition.

Groundwater is not anticipated to present significant problems during construction. We recommend that surface grades be maintained during construction to prevent the inundation of the subgrade soils from surface water runoff. Any water seepage that may occur should be immediately collected and removed from the construction excavations by pumping from sumps established within or adjacent to excavations.

All excavations should be in accordance with OSHA requirements. For this site, the soils are considered to be Type C which limits excavation sides to 1 vertical to 1½ horizontal. Steeper slopes should be adequately protected with sheeting, shoring, and bracing. Permanent embankment slopes should be no steeper than 1 vertical to 3 horizontal for erosion control and maintenance purposes.

Foundation Design Criteria: The proposed buildings may be supported on conventional spread foundations. Foundations may be supported directly on the controlled backfill, competent natural soils or clean ¾-inch size crushed stone placed over these materials or basalt bedrock. We recommend that the foundation subgrades be observed by a qualified geotechnical engineering firm to ensure that competent bearing soils are present and the subgrade should be recompacted or undercut as directed. The exposed foundation subgrade soils will likely consist of sandy silt/clayey silt, silty gravelly sand, or basalt bedrock. These sandy silt or clayey silt soils were in a soft condition and are susceptible to further disturbance during construction activities, especially in the presence of excess water. Care should be exercised during foundation excavation and construction to limit disturbance of the subgrade soils. If the exposed

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foundation subgrade is soft or becomes wet, it should be over-excavated by 6 inches or more and replaced with compacted $\frac{3}{4}$ -inch crushed stone. Layer of clean $\frac{3}{4}$ -inch size crushed stone over the foundation subgrade soils would provide a stable working surface during foundation construction and limit the potential for soil disturbance and resulting loss of soil strength. Foundations established on the competent bearing controlled fill, natural sandy silt/clayey silt or silty gravelly sand or clean $\frac{3}{4}$ -inch size crushed stone placed over these soils may be proportioned to impose a maximum allowable net bearing pressure of up to 4000 pounds per square foot. However, wall foundations should be at least 24 inches in width and column foundations at least 3 feet by 3 feet in plan dimensions. The bottoms of all exterior or exposed foundations should be established at least 3 feet below the adjacent exterior grades to provide protection from frost penetration. Interior foundations in permanently heated portions of the buildings may be established at convenient depths beneath the floor slab provided they reach the intended bearing stratum. Foundations deriving their support from the competent basalt bedrock may be proportioned to impose a maximum allowable net bearing pressure of up to 8 tons per square foot.

Footings deriving their support directly on basalt bedrock may be established at convenient depths beneath the ground level slab.

We estimate that differential settlements between foundations deriving their support from the undisturbed natural soil, compacted fill and basalt bedrock would be approximately $\frac{1}{2}$ of 1 inch. Post-construction settlements of foundations established on bedrock would be negligible. In the event the foundation will be established partially on bedrock and partially on soil, we recommend either over-excavating the bedrock a depth of 12 inches and replacement with controlled compacted fill or providing a construction joint.

Slab-On-Grade Design Criteria: We recommend that immediately prior to slab construction, the exposed subgrade soils be recompact and proofrolled to a dense and unyielding condition by multiple passes of a vibratory steel-drum compactor. Any localized areas that cannot be recompact to a dense and unyielding condition should be removed to expose suitable subsoils and the excavations backfilled with controlled compacted backfill or clean $\frac{3}{4}$ -inch size crushed stone. Following the recompaction and

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proofrolling operations, slabs may be designed using a vertical modulus of subgrade reaction of 200 pounds per cubic inch. We recommend that slabs be underlain by a minimum 4-inch thick layer of clean $\frac{3}{4}$ -inch size crushed stone to provide a capillary break as well as a porous drainage layer beneath the slab.

We estimate that post-construction settlements of slabs designed and supported on material prepared in accordance with our recommendations would be negligible.

Retaining Walls: Any below grade walls required to accommodate grade changes should include provisions for full drainage. Provided the walls are fully drained and backfilled with controlled compacted fill in accordance with previous sections of this report, the following soil parameters are recommended for wall design:

Maximum Allowable Soil Bearing Pressure	4000 psf
Angle of Internal Friction (ϕ)	30 degrees
Total Unit Weight of Soil	125 pcf
Active Earth Pressure Coefficient (K_a)	0.30
Passive Earth Pressure Coefficient (K_p)	3.25
Friction Factor – Concrete on Soil	0.40

Pavement Design Criteria: Site preparation procedures within proposed pavement areas should consist of stripping the surficial topsoil, vegetation, and all debris from within and to a distance of 5 feet beyond the pavement limits. Following general grading, but prior to placing any fill in areas to be raised, the surface should be thoroughly proofrolled and compacted to a dense and unyielding condition by numerous passes of a heavy vibratory compactor. Localized areas that cannot be compacted to a dense and unyielding condition should be removed to expose suitable subsoils and the excavations backfilled with controlled granular fill in accordance with the recommendations presented in previous sections of this report.

Assuming that the pavement subgrade soils are compacted to a dense and unyielding condition immediately prior to construction, pavements may be designed using an estimated California Bearing Ratio (CBR) value of 6 percent. Based on this value, we recommend the following minimum pavement design sections for flexible pavements:

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	Access Roads	Automobile Parking
Bituminous Concrete Surface Course	2 inches	2 inches
Bituminous Concrete Base Course	4 inches	2 inches
Dense Graded Aggregate Subbase	6 inches	6 inches
Total Section Thickness	12 inches	10 inches

For a rigid pavement, a modulus of subgrade reaction of 200 pounds per cubic inch may be used.

Proposed Detention Basins: An exploration program consisting of six backhoe excavated test pits was performed at the site. Four test pits were performed in the proposed basin area. The area of basin is currently grass/vegetation covered. The existing ground surface elevation is approximately +538 to +546 feet. The area of second infiltration area is at TP-14 and 15 locations and is currently grass/vegetation covered or wooded. The existing ground surface elevation is approximately +594 to +598 feet.

The test pits, TP-24, 25, 26 and 27 performed at basin area encountered 8 inches of topsoil. Light brown silt loam to clay loam was encountered beneath the topsoil at test pits and extended to depths of 3 to 5.5 feet below surface. Loam was encountered beneath the silt or clay loam and extended to maximum depths explored, 6 to 13 feet. At TP-25 bedrock was encountered at a depth of 6 feet. Groundwater or seasonal high groundwater was not encountered to the maximum depths explored.

The test pits, TP-14 and 15, performed at the infiltration area encountered 8 to 12 inches of topsoil. Brown loam material was encountered beneath the topsoil and extended to depths of 10 to 11 feet below surface where bedrock was encountered. Water seepage was encountered at a depth of 9 feet in TP-15 location.

The tube samples collected during the field investigation were returned to our soil mechanics laboratory. Five mechanical grain-size analyses and falling head tube permeability tests were performed on the samples. The test results are included with this report. The falling head permeability test results for the basin indicate that the loam has a permeability rate ranging from 0.81 to 1.58 in/hr (K2 soils). Test results on silt loam (TP-25) has a permeability rate of 0.18 in/hr (K0 soils) which is hydraulically restrictive.

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The falling head permeability test results at the infiltration area (TP-14, TP-15) indicate that the loam material has a permeability rate ranging from 0.79 to 1.5 in/hr (K2 soils).

Based on our evaluation of the subsurface conditions encountered in the test pits as well as the results of the laboratory test results, it is our opinion that the loam material encountered beneath the silt/clay loam is favorable for the construction of the detention basins or infiltration systems. The basins or infiltration systems should be designed based on the measured permeability rates for the subsoils encountered at these locations.

Seismic Design Considerations: Structures must be designed in conformance with the applicable seismic design criteria of the New Jersey Edition of the 2015 International Building Code. In accordance with the Code, the subsurface information obtained from the borings and the known geologic conditions in this area, the site is considered to have a rock profile which corresponds to a site class "B". Based on our analysis of the subsurface conditions, the field and laboratory test results and the known geology of this area, the on-site soils are not susceptible to liquefaction in a seismic event and the underlying bedrock is not considered susceptible to solutioning or the formation of sinkholes.

RECOMMENDED SERVICES

It is recommended that Sor Consulting Engineers be provided the opportunity for a general review of the final design and specifications to assure that the foundation and earthwork recommendations are properly interpreted and implemented in the construction documents.

We also recommend that controlled compacted fill and backfill operations as well as foundation and floor slab subgrades be observed by a geotechnical engineer from our firm. This is to ensure compliance with the recommendations contained herein and to address any changes in the subsurface conditions that were not disclosed by the borings and test pits.

Sor Consulting Engineers appreciates the opportunity to be of assistance with this project. Should there be any questions concerning the information provided herein,

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please do not hesitate to contact us. The following appendices are attached and complete this report:

- Appendix I: Exploration Location Plan
Subsurface Profiles AA, BB and CC
- Appendix II: Boring Logs 1 through 15
Test Pit Logs 1 through 27
Burmeister and USDA Soil Classification Systems
- Appendix III: Laboratory Soil Test Results
- Appendix IV: Limitations

Very truly yours,
SOR CONSULTING ENGINEERS, INC

Atilla Sencar, P.E.
Senior Engineer

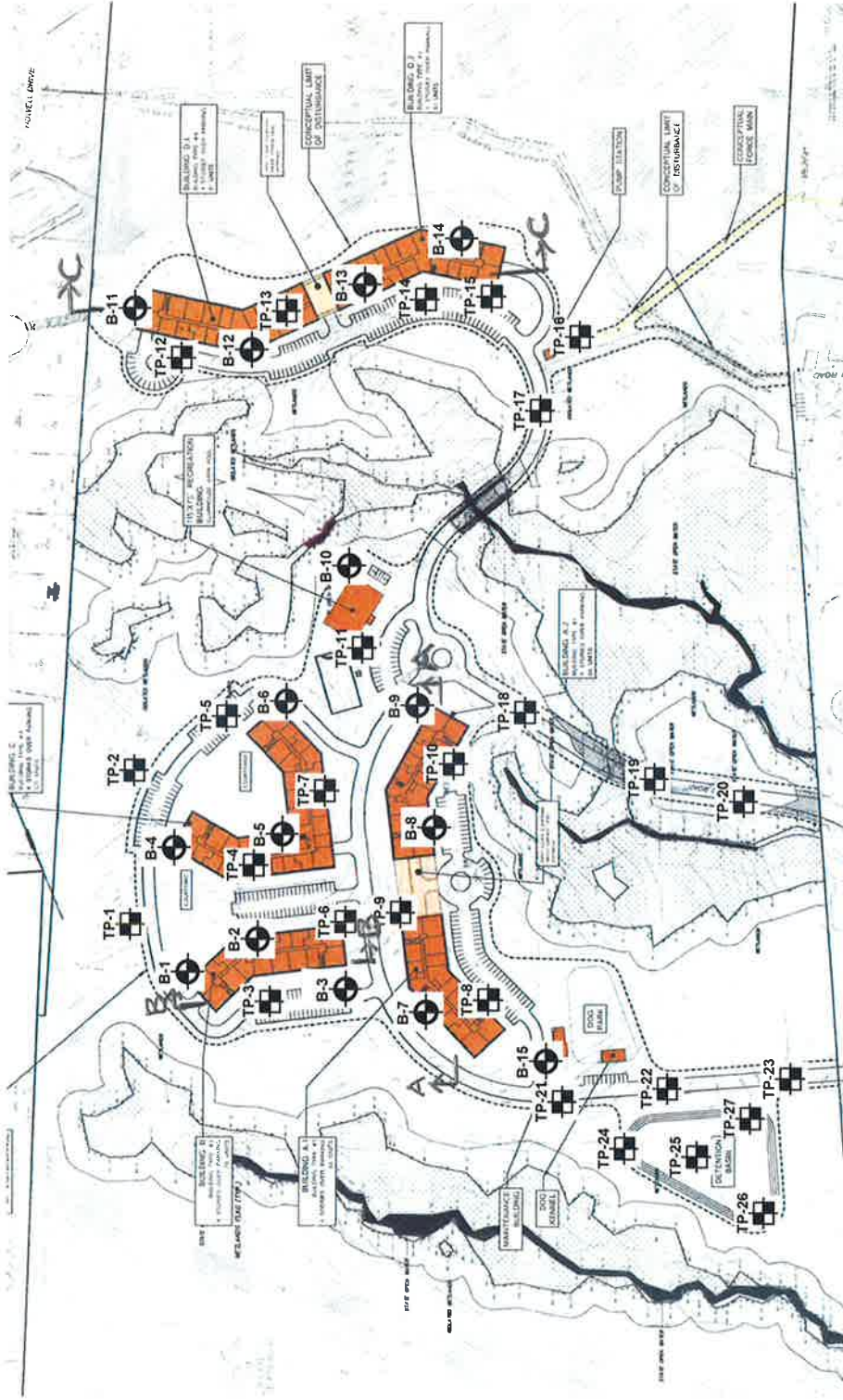
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cc: Anderson Consulting Services, LLC
Attn: Paul Anderson, P.E., P.E., CME
E-Mail: pandersonpe@gmail.com

APPENDIX I

EXPLORATION LOCATION PLAN

SUBSURFACE PROFILES AA, BB AND CC



LEGEND

- TP-1  Number and approximate location of geotechnical test pit performed by SCE for this study.
- B-1  Number and approximate location of geotechnical boring performed by SCE for this study.

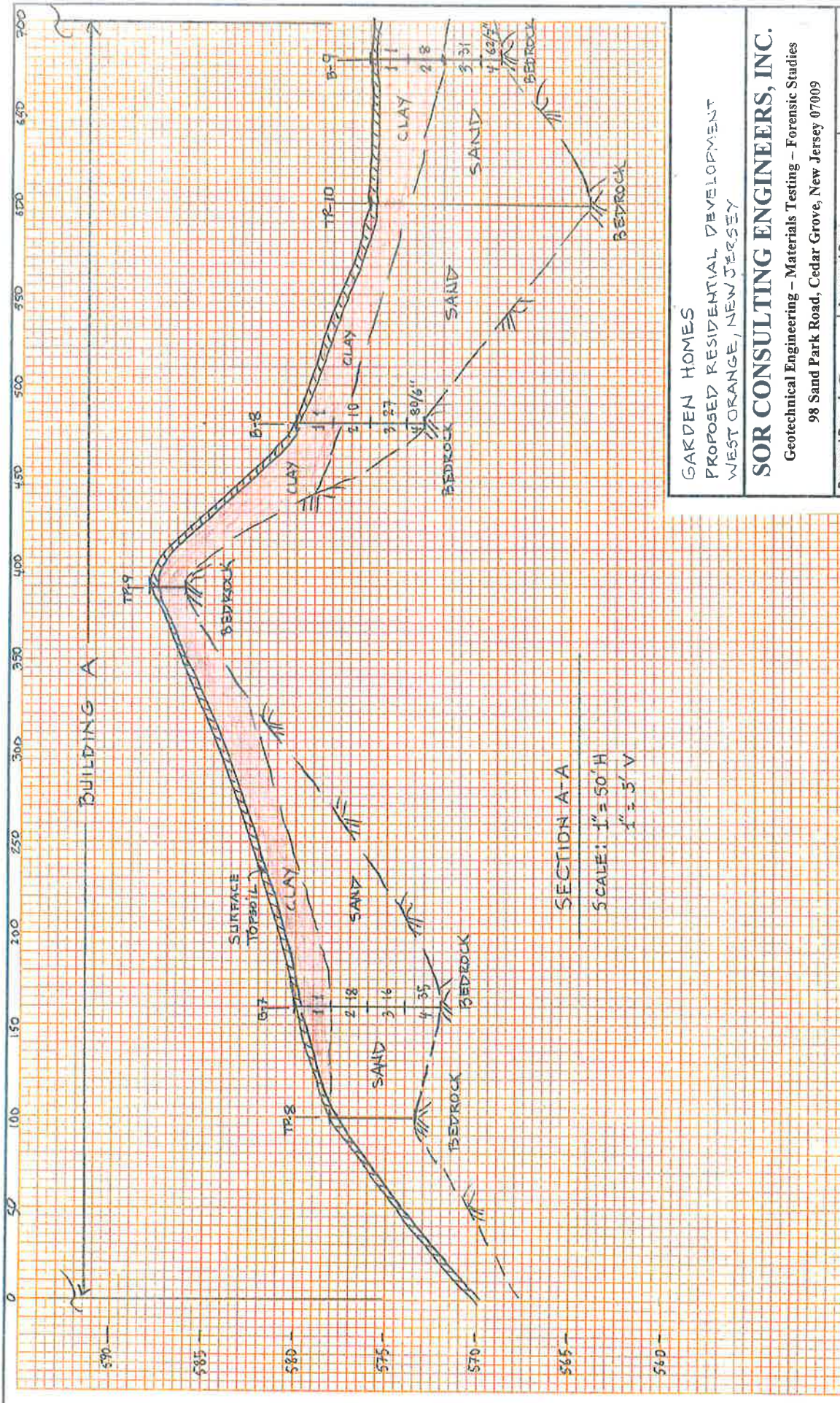
NOTES

1. This drawing is part of Sor Consulting Engineers, Inc. Report No. 21-C-12 and should be read together with the report for complete evaluation.
2. General Layout was obtained from a plan provided by the Client.

EXPLORATION LOCATION PLAN GARDEN HOMES PROPOSED RESIDENTIAL DEVELOPMENT WEST ORANGE, NEW JERSEY

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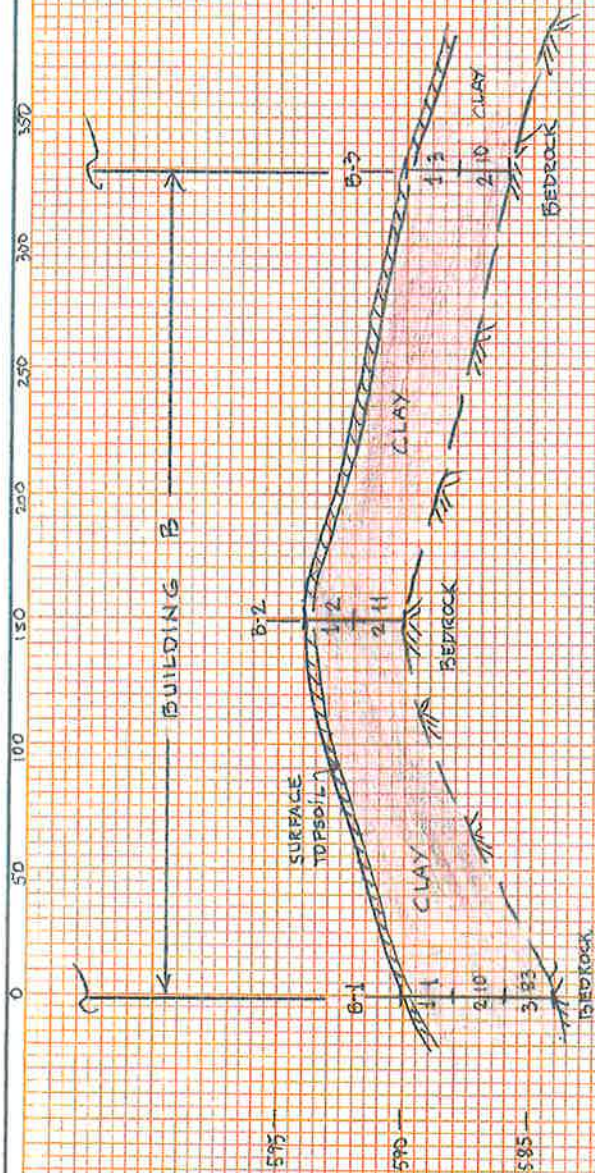
Prepared By : A.S.	Approved By :	DRAWING NO.
Date : 4/8/2021	Date :	21-C-01-1
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Prepared By: A.S.	Approved By: _____	DRAWING NO. 21-C-01 Sheet No. 1 of 2
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SECTION B-B

SCALE: 1" = 50' H

1" = 5' V

GARDEN HOMES

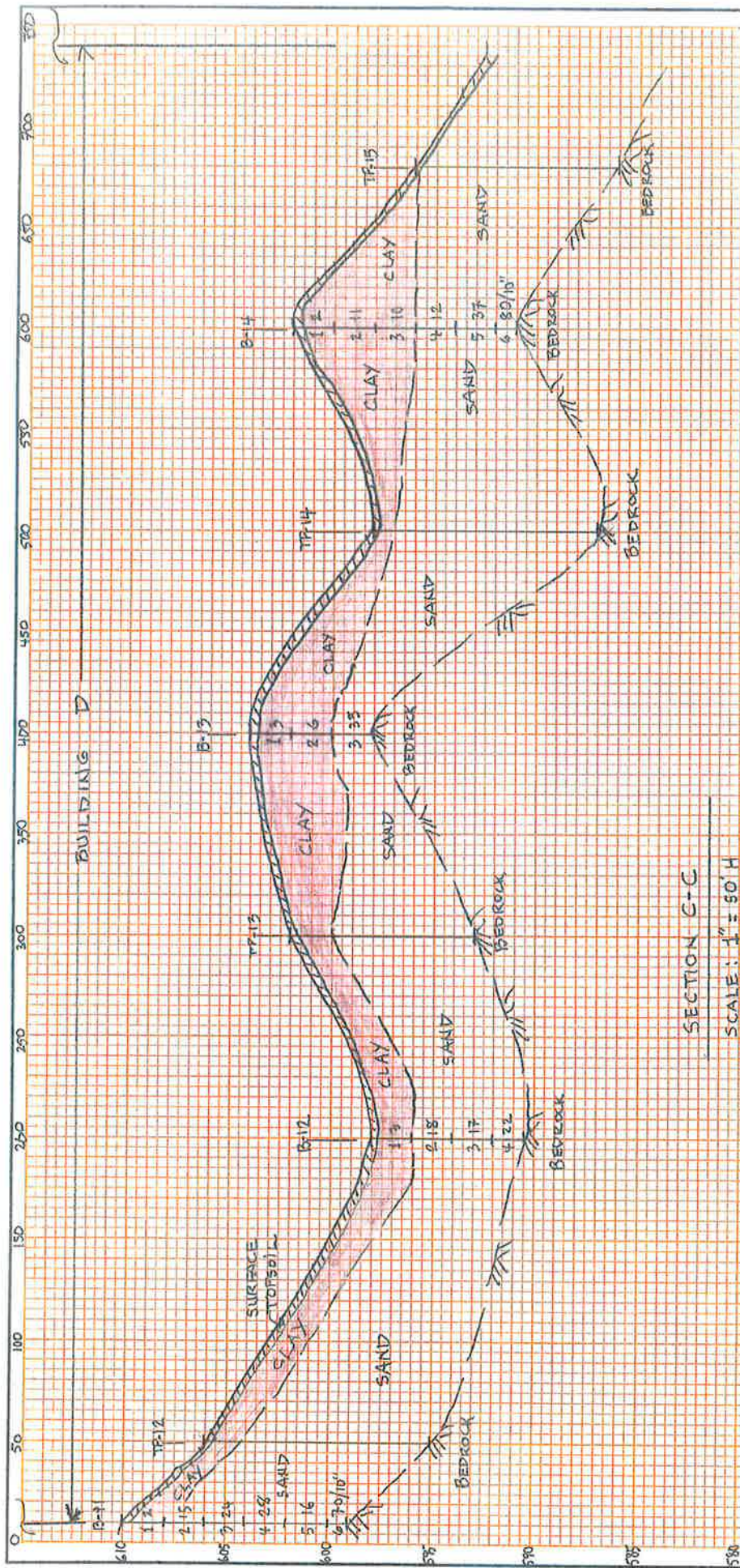
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Date: 4/19/21	Date:	21-C-01
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APPENDIX II

BORING LOGS 1 THROUGH 15

TEST PIT LOGS 1 THROUGH 27

BURMEISTER AND USDA SOIL CLASSIFICATION SYSTEMS

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 1	
CLIENT Garden Homes								GSE	+590' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/31/21
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH	3/31/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	WOH	1	Topsoil/Vegetation 6"	
2				WOH		Light brown Clayey SILT, some coarse to fine Sand	
				1			
				2			
3		S-2	2'-4'	6	10	Same	
4				6			
				4			
4				10			
5		S-3	4'-6'	8	83	Same with Rock fragments	
6				33			
				50			
6				50/4"			
7						Test Boring Completed at 6'-0"	
8						(Refusal on Bedrock)	
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 2	
CLIENT Garden Homes								GSE	+594' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/31/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/31/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS	
1		S-1	0-2'	1	2	Topsoil/Vegetation 12"		
				1				
				1				
2				2		Light Brown Clayey SILT, little medium to fine Sand		
3		S-2	2'-4'	5	11	Same		
				4				
				7				
4				17				
				50/0"				
5		S-3	4'			Test Boring Completed at 4'-0"		
						(Refusal on Bedrock)		
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
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19								
20								
21								
22								
23								
24								
25								

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 3	
CLIENT Garden Homes								GSE	+590' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/31/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/31/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	3	Topsoil/Vegetation 6"	
				1		Brown Clayey SILT, little medium to fine Sand, trace fine Gravel	
2				2			
				1			
3		S-2	2'-4'	6	10	Same	
				4			
				6			
4				50			
		S-3	@ 4;	50/0"		Test Boring Completed @ 4'-0"	
5							
6						(Refusal on Bedrock)	
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 4	
CLIENT Garden Homes								GSE	+616' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/30/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/30/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/30/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	3	Topsoil/Vegetation 8"	
				1			
				2		Light brown Clayey SILT, little medium to fine Sand	
2				3			
				6			
3		S-2	2'-4'	7	13	Same	
				6			
4				7			
				10			
5		S-3	4'-6'	11	51	Same with Rock fragments	
				40			
6				50/3"			
7						Test Boring Completed at 6'-0"	
						(Refusal on Bedrock)	
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 5	
CLIENT Garden Homes							GSE +612' (±)		
PROJECT Proposed Residential Development							DATUM Ground Surface		
LOCATION West Orange, New Jersey							DATE START 3/30/21		
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/30/21	
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/30/21		NE		DIA.	3"	2" OD		JOB NO. 21-C-01	
				WT.		140 lbs		REPORT NO. 21-C-12	
				FALL		30"		SHEET NO. 1 of 1	

depth, ft	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	1	Topsoil 6"	
				0		Light brown Clayey SILT, little coarse to fine Sand	
2				1			
				2			
3		S-2	2'-3'	1	3	Same	
				2			
				50/0"		Test Boring Completed at 3'-0"	
4							
5						(Refusal on Bedrock)	
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 6	
CLIENT Garden Homes								GSE	+610' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/30/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/30/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/30/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	1	Topsoil 6"	
				0		Brown Clayey SILT, little coarse to fine Sand	
2				1			
				1			
3		S-2	2'-4'	1	3	Same	
				2			
4				8			
				12	62/9"	Same with Rock fragments	
5		S-3	4'-5'	50/3"			
6						Test Boring Completed at 5'-0"	
7						(Refusal on Bedrock)	
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 7	
CLIENT Garden Homes								GSE +580' (±)	
PROJECT Proposed Residential Development								DATUM Ground Surface	
LOCATION West Orange, New Jersey								DATE START 4/1/21	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH 4/1/21	
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
4/1/21		NE		DIA.	3"	2" OD		JOB NO. 21-C-01	
				WT.		140 lbs		REPORT NO. 21-C-12	
				FALL		30"		SHEET NO. 1 of 1	

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	1	Topsoil/Vegetation 7"	
				0		Light brown clayey SILT	
				1			
2				1		2'-0"	
				8			
3		S-2	2'-4'	9	18	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel	
				9			
4				8			
				7			
5		S-3	4'-6'	6	16	Same	
				10			
6				26			
				27			
7		S-4	6'-7.5'	20	35	Same	
				15			
8				50/0"		Test Boring Completed at 7'-6"	
9						(Refusal on Bedrock)	
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG					BORING 8	
CLIENT Garden Homes									GSE	+580' (±)
PROJECT Proposed Residential Development									DATUM	Ground Surface
LOCATION West Orange, New Jersey									DATE START	4/1/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH	4/1/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS				
4/1/21		NE		DIA.	3"	2" OD			JOB NO.	21-C-01
				WT.		140 lbs			REPORT NO.	21-C-12
				FALL		30"			SHEET NO.	1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS	
1		S-1	0-2'	1	1	Topsoil/Vegetation 12"		
				0				
				1				
2				2		Brown Clayey SILT		
				2				
3		S-2	2'-4'	2	10	3'-0"		
				2				
				8				
4				10		Brown coarse to fine Sand, and Silt, little coarse to fine Gravel		
				16				
5		S-3	4'-6'	12	27			
				15				
				12				
6				25	80/6"	Same		
				30				
				50/0"				
8						Test Boring Completed at 7'-0"		
						(Refusal on Bedrock)		
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 9	
CLIENT Garden Homes								GSE +576' (±)	
PROJECT Proposed Residential Development								DATUM Ground Surface	
LOCATION West Orange, New Jersey								DATE START 3/31/21	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/31/21	
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD		JOB NO. 21-C-01	
				WT.		140 lbs		REPORT NO. 21-C-12	
				FALL		30"		SHEET NO. 1 of 1	

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	1	Topsoil/Vegetation 6"	
				0		Light brown Clayey SILT	
2				1			
				2			
3		S-2	2'-4'	1	8		
				4			
				4			
4				8		3'-6"	
5		S-3	4'-6'	12	31	Brown coarse to fine Sand, and Silt, little coarse to fine Gravel	
				14			
				17			
6				20			
				30			
7		S-4	6'-7.1'	12	62/7"	Same	
				50/1"			
8						Test Boring Completed at 7'-1"	
9						(Refusal on Bedrock)	
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 10	
CLIENT Garden Homes								GSE +590' (±)	
PROJECT Proposed Residential Development								DATUM Ground Surface	
LOCATION West Orange, New Jersey								DATE START 3/31/21	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/31/21	
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD		JOB NO. 21-C-01	
				WT.		140 lbs		REPORT NO. 21-C-12	
				FALL		30"		SHEET NO. 1 of 1	

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-1.5'	WOH	WOH	Topsoil/Vegetation 8"	
				↓		Light Brown Clayey SILT	
2				50/0"			
3						Test Boring Completed at 1'-6"	
4						(Refusal on Bedrock)	
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 11	
CLIENT Garden Homes								GSE +610' (±)	
PROJECT Proposed Residential Development								DATUM Ground Surface	
LOCATION West Orange, New Jersey								DATE START 3/31/21	
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/31/21	
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		7'-0"		DIA.	3"	2" OD		JOB NO. 21-C-01	
				WT.		140 lbs		REPORT NO. 21-C-12	
				FALL		30"		SHEET NO. 1 of 1	

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	2	Topsoil 4"	
				1		Brown Clayey SILT, little coarse to fine Sand	
2				1			
				1			
3		S-2	2'-4'	1	15	Same	3'-0"
				14			
4				16			
				9			
5		S-3	4'-6'	9	24	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel	
				15			
6				13			
				7			
7		S-4	6'-8'	11	28	Same (wet)	
				17			
8				21			
				3			
9		S-5	8'-10'	5	16	Same with CLAY pockets	
				11			
10				25			
				20			
11		S-6	10'-11'	50/4"	70/10"	Same with Rock fragments	
						Test Boring Completed at 11'-0"	
12						(Refusal on Bedrock)	
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 12	
CLIENT Garden Homes								GSE	+598' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/31/21
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH	3/31/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	3	Topsoil 4"	
				0		Brown Clayey SILT, little coarse to fine Sand	
				3			
2				3			2'-2"
				12			
3		S-2	2'-4'	8	18	Brown coarse to fine Sand, some Clayey Silt, little medium to fine Gravel	
				10			
4				10			
				7			
5		S-3	4'-6'	8	17	Same	
				9			
6				8			
				9			
7		S-4	6'-7.5'	10	22	Same	
				12			
8				50/0"		Test Boring Completed at 7'-6"	
						(Refusal on Bedrock)	
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
- DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 13	
CLIENT Garden Homes								GSE	+604' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/31/21
GROUND WATER				CAS.	SAMP.	CORE	TUBE	DATE FINISH	3/31/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	3	Topsoil/Vegetation 9"	
				0		Brown Clayey SILT, little coarse to fine Sand	
				3			
2				3	6	Same	
				1			
3		S-2	2'-4'	0			
				6			
4				8	35	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel	
				12			
5		S-3	4'-6'	16			
				19			
6				50			
7						Test Boring Completed at 6'-0"	
8						(Refusal on Bedrock)	
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 14	
CLIENT Garden Homes								GSE	+602' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	3/31/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH 3/31/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
3/31/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	2	Topsoil/Vegetation 6"	
				0		Light brown Clayey SILT, little coarse to fine Sand, trace medium to fine Gravel	
2				2			
				1			
3		S-2	2'-4'	2	11	Same	
				4			
4				7			
				10			
5		S-3	4'-6'	10	10	Same	
				5			
6				5			
				6			
7		S-4	6'-8'	6	12	Brown coarse to fine Sand, some Silt, little medium to fine Gravel	
				6			
8				8			
9		S-5	8'-10'	14	37	Same	
				12			
10				25			
				36			
11		S-6	10'-11'	30	80/10"	Same with Rock fragments	
				50/4'			
12						Test Boring Completed at 11'-0"	
13						(Refusal on Bedrock)	
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.				TEST BORING LOG				BORING 15	
CLIENT Garden Homes								GSE	+560' (±)
PROJECT Proposed Residential Development								DATUM	Ground Surface
LOCATION West Orange, New Jersey								DATE START	4/1/21
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH 4/1/21
DATE	TIME	DEPTH	CASING	TYPE	FJ	SS			
4/1/21		NE		DIA.	3"	2" OD			JOB NO. 21-C-01
				WT.		140 lbs			REPORT NO. 21-C-12
				FALL		30"			SHEET NO. 1 of 1

depth, ft.	casing blows	sample type/no.	depth	sampler blows per 6"	N value	DESCRIPTION	REMARKS
1		S-1	0-2'	1	1	Topsoil/Vegetation 8"	
				0			
2				1		Light brown Clayey SILT, little medium to fine Sand	
				2			
3		S-2	2'-4'	3	20	Same	
				5			
				15			
4				50			
				50/0"		Test Boring Completed at 4'-0"	
5						(Refusal on Bedrock)	
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: Environmental Technical Drilling, Inc.
DRILLING EQUIPMENT: Geoprobe 7822DT
SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-1	
CLIENT: Garden Homes				GSE +602' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/25/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil 8"	*Water seepage @ 3'
2			Olive brown Clayey Silt, some medium to fine Sand	
3			2'-0"	
4	Medium Dense	Moist	Brown coarse to fine Sand, some Silt, little coarse to fine Gravel	
5				
6				
7				
8				
9			Bedrock at 8'	Test Pit Completed at 8'-0"
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Atilla Sencar/Tim Maravegias

SOR CONSULTING ENGINEERS, INC.	TEST PIT LOG	TEST PIT NO. TP-2
CLIENT: Garden Homes		GSE +622' (±) WATER LEVEL NE
PROJECT: Proposed Residential Development		DATE 3/25/2021
LOCATION: West Orange, New Jersey		JOB NO. 21-C-01 REPORT NO. 21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	
2			Yellow brown medium to fine Sand and Silt	
3			3'-0"	
4	Dense	Moist	Brown coarse to fine sand, some Silt, little coarse to fine Gravel	
5			Bedrock @ 5'	
6			Test Pit Completed at 5'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Atilla Sencar/Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-3	
CLIENT: Garden Homes				GSE	+584' (±)
PROJECT: Proposed Residential Development				WATER LEVEL	NE
LOCATION: West Orange, New Jersey				DATE	3/29/2021
				JOB NO.	21-C-01
				REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 12"	
2			Light brown Clayey Silt, little coarse to fine Sand, little coarse to fine Gravel	
3	Dense	Moist	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders Bedrock @ 3'	
4			Test Pit Completed at 3'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.	TEST PIT LOG	TEST PIT NO. TP-4
CLIENT: Garden Homes		GSE +610' (±)
PROJECT: Proposed Residential Development		WATER LEVEL *
LOCATION: West Orange, New Jersey		DATE 3/25/2021
		JOB NO. 21-C-01
		REPORT NO. 21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	*Water seepage 2'
2			Brown coarse to fine Sand, some Silt, little coarse to fine Gravel	
3			Bedrock @ 2'	
4			Test Pit Completed at 2'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-5	
CLIENT: Garden Homes				GSE	+614' (±)
PROJECT: Proposed Residential Development				WATER LEVEL	NE
LOCATION: West Orange, New Jersey				DATE	3/25/2021
				JOB NO.	21-C-01
				REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	
2			Brown Clayey SILT, some medium to fine Sand	
3			Bedrock @ 2'	
4			Test Pit Completed at 2'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-6	
CLIENT: Garden Homes				GSE +595' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 12"	*Water seepage at 4'-0"
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel with occasional boulders/cobbles	
3				
4				
5			Bedrock @ 5'	
6			Test Pit Completed at 5'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-7	
CLIENT: Garden Homes				GSE +602' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/30/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 12"	*Water seepage at 5'-0"
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles	
3				
4				
5				
6				
			Bedrock @ 6'	
7			Test Pit Completed at 6'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-8	
CLIENT: Garden Homes				GSE +578' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 8"	*Water seepage at 3'-0"
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles	
3				
4				
5			Bedrock at 4.5'	Test Pit Completed at 4'-6"
6				
7				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-9	
CLIENT: Garden Homes				GSE	+588' (±)
PROJECT: Proposed Residential Development				WATER LEVEL	NE
LOCATION: West Orange, New Jersey				DATE	3/26/2021
				JOB NO.	21-C-01
				REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	soft	Moist	Topsoil 8"	
2			Light brown Clayey Silt, some medium to fine Sand	
3			Bedrock at 18"	
4			Test Pit Completed at 1'-6"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-10	
CLIENT: Garden Homes				GSE +576' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 12"	*Water seepage at 3'-0"
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13			Test Pit Completed at 12'-0"	
14				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG	TEST PIT NO. TP-11
CLIENT: Garden Homes		GSE	+590' (±)
PROJECT: Proposed Residential Development		WATER LEVEL	NE
LOCATION: West Orange, New Jersey		DATE	3/30/2021
		JOB NO.	21-C-01
		REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	
2			Light brown Clayey Silt, little coarse to fine Sand, little coarse, to fine Gravel, occasional cobbles	
3			Bedrock at 18"	
4			Test Pit Completed at 1'-6"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-12	
CLIENT: Garden Homes				GSE +606' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/25/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	*Water seepage at 4'
2			Brown Clayey SILT, some medium to fine Sand	
3	Medium Dense	Moist	2'-0"	
4			Brown coarse to fine Sand, and Silt, some coarse to fine Gravel	
5				
6				
7				
8				
9				
10				
11				
	Bedrock at 11'			
12			Test Pit Completed at 11'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.	TEST PIT LOG	TEST PIT NO. TP-13
CLIENT: Garden Homes		GSE +602' (±) WATER LEVEL *
PROJECT: Proposed Residential Development		DATE 3/25/2021
LOCATION: West Orange, New Jersey		JOB NO. 21-C-01 REPORT NO. 21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil 8"	
2			Brown Clayey Silt, some coarse to fine Sand, little coarse to fine Gravel	
3	Medium Dense	Moist	Red brown coarse to fine Sand, and Silt, with cobbles/boulders	
4				
5				
6				
7				
8				
9				
10			Test Pit Completed at 9'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-14	
CLIENT: Garden Homes				GSE +598' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL NE	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 8"	Permeability @ 4' K=0.79 in/hr (K2)
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders (LOAM)	
3				
4				
5				
6				
7				
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9				
10				
11			Bedrock at 11'	
12			Test Pit Completed at 11'-0"	
13				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.	TEST PIT LOG	TEST PIT NO. TP-15
CLIENT: Garden Homes		GSE +596' (±) WATER LEVEL *
PROJECT: Proposed Residential Development		DATE 3/26/2021
LOCATION: West Orange, New Jersey		JOB NO. 21-C-01 REPORT NO. 21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 12"	Permeability @ 3' K=1.5 in/hr (K2) Water seepage at 9'
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders (LOAM)	
3				
4				
5				
6				
7				
8				
9				
10			Bedrock at 10'	
11			Test Pit Completed at 10'-0"	
12				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-16	
CLIENT: Garden Homes				GSE +580' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	12" Topsoil/Vegetation 12", boulders near surface	*Water seepage at 5'
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12			Test Pit Completed at 11'-0"	
13				
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16				
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19				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-17	
CLIENT: Garden Homes				GSE +564' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL NE	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 12"	Boring moved due to boulders at surface
2			Yellow brown Clayey Silt, some medium to fine Sand	
3	Medium Dense	Moist	2'-6"	
4			Brown coarse to fine sand, some Silt, some coarse to fine Gravel	
5				
6			Pockets of Gray Clay @ 5'-6"	
7			Bedrock at 7'	
8			Test Pit Completed at 7'-0"	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-18	
CLIENT: Garden Homes				GSE +563' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL NE	
LOCATION: West Orange, New Jersey				DATE 3/30/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	
2			Light brown Clayey Silt, some coarse to fine Gravel, little coarse to fine Sand, occasional cobbles	
3			Bedrock at 3'	
4			Test Pit Completed at 3'-0"	
5				
6				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-19	
CLIENT: Garden Homes				GSE +560' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL NE	
LOCATION: West Orange, New Jersey				DATE 3/29/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Brown, dark brown Clayey Silt, some coarse to fine Sand, some coarse to fine Gravel, occasional cobbles/boulders, asphalt pieces, concrete (Fill)	Switched to mini-excavator due to slippery conditions on slope
2				
3				
4				
5				
6				
7				
8				
9			Test Pit Completed at 8'-0" (Limit of Excavations)	
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-20	
CLIENT: Garden Homes				GSE	+532' (±)
PROJECT: Proposed Residential Development				WATER LEVEL	NE
LOCATION: West Orange, New Jersey				DATE	3/29/2021
				JOB NO.	21-C-01
				REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Dense	Moist	Topsoil/vegetation 6"	
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel (Fill)	
3			Red brown coarse to fine SAND, some coarse to fine Gravel (Fill)	
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14			Test Pit Completed at 13'-0"	
15				
16				
17				
18				
19				
20				

EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-21	
CLIENT: Garden Homes				GSE	+558' (±)
PROJECT: Proposed Residential Development				WATER LEVEL	NE
LOCATION: West Orange, New Jersey				DATE	3/26/2021
				JOB NO.	21-C-01
				REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 6" Brown coarse to fine Sand, some Silt, some coarse to fine Gravel Bedrock at 18"	
2			Test Pit Completed at 1'-6"	
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4				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-22	
CLIENT: Garden Homes				GSE +550' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/26/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 8"	*Water seepage at 5'
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13			Test Pit Completed at 12'-6"	
14				
15				
16				
17				
18				
19				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Backhoe

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-23	
CLIENT: Garden Homes				GSE +536' (±)	
PROJECT: Proposed Residential Development				WATER LEVEL *	
LOCATION: West Orange, New Jersey				DATE 3/29/2021	
				JOB NO. 21-C-01	
				REPORT NO. 21-C-12	

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Medium Dense	Moist	Topsoil/Vegetation 12"	*Water seepage at 2'
2			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders	
3				
4				
5				
6				
7				
8				
9				
10				
11				
12			Test Pit Completed at 11'-0"	
13				
14				
15				
16				
17				
18				
19				
20				

EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.	TEST PIT LOG	TEST PIT NO. TP-24
CLIENT: Garden Homes		GSE +546' (±)
PROJECT: Proposed Residential Development		WATER LEVEL NE
		DATE 3/29/2021
LOCATION: West Orange, New Jersey		JOB NO. 21-C-01
		REPORT NO. 21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	Permeability @ 5.5' K=0.81 in/hr (K2)
2			Light brown Clayey Silt, some coarse to fine Gravel, little coarse to fine sand (SILT LOAM)	
3				
4				
5				
6	Dense	Moist		
7			Brown coarse to fine Sand, some Silt, some coarse to fine Gravel (LOAM)	
8				
9			Bedrock at 8'	Test Pit Completed at 8'-0"
10				
11				
12				
13				
14				
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16				
17				
18				
19				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG		TEST PIT NO. TP-25	
CLIENT: Garden Homes				GSE	+544' (±)
PROJECT: Proposed Residential Development				WATER LEVEL	NE
LOCATION: West Orange, New Jersey				DATE	3/29/2021
				JOB NO.	21-C-01
				REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft to Firm	Moist	Topsoil/Vegetation 8"	Permeability @ 4' K=0.18 in/hr (K0)
2			Light brown Clayey Silt, some coarse to fine Gravel, little coarse to fine Sand (SILT LOAM)	
3				
4				
5				
6				
6			Bedrock at 6'	
7			Test Pit Completed at 6'-0"	
8				
9				
10				
11				
12				
13				
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17				
18				
19				
20				

EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG	TEST PIT NO. TP-26
CLIENT: Garden Homes		GSE	+538' (±)
PROJECT: Proposed Residential Development		WATER LEVEL	NE
LOCATION: West Orange, New Jersey		DATE	3/29/2021
		JOB NO.	21-C-01
		REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	
2			Light brown Clayey Silt, little coarse to fine Sand, some coarse to fine Gravel, Clay lumps (CLAY LOAM)	
3			3'-0"	
4	Dense	Moist	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles/boulders (LOAM)	
5				
6				
7				
8				
9				
10				
11				
12				
13				
14			Test Pit Completed at 13'	
15				
16				
17				
18				
19				
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EXCAVATOR: D. Willis Excavating

EQUIPMENT: _____

SCE REPRESENTATIVE: Tim Maravegias

SOR CONSULTING ENGINEERS, INC.		TEST PIT LOG	TEST PIT NO. TP-27
CLIENT: Garden Homes		GSE	+543' (±)
PROJECT: Proposed Residential Development		WATER LEVEL	NE
LOCATION: West Orange, New Jersey		DATE	3/29/2021
		JOB NO.	21-C-01
		REPORT NO.	21-C-12

DEPTH FT.	DENSITY	MOISTURE	DESCRIPTION	REMARKS
1	Soft	Moist	Topsoil/Vegetation 8"	Permeability @ 4' K=1.58 in/hr (K2)
2			Light brown Clayey Silt, little medium to fine Sand, some coarse to fine Gravel, Clay lumps (CLAY LOAM)	
3			3'-0"	
4	Dense	Moist	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, occasional cobbles (LOAM)	
5				
6				
7				
8				
9				
10				
11				
12				
13			Bedrock at 13'	
14			Test Pit Completed at 13'-0"	
15				
16				
17				
18				
19				
20				

EXCAVATOR: D. Willis Excavating

EQUIPMENT: Mini-Excavator

SCE REPRESENTATIVE: Tim Maravegias

VISUAL IDENTIFICATION OF SAMPLES

The samples were identified in accordance with the American Society for Engineering Education System of Definition described by Professor Donald M. Burmeister in ASTM Special Technical Publication 479, 5th Edition, 1970.

I. Definition of Soil Components and Fractions

MATERIAL	SYMBOL	FRACTION	SIEVE SIZE	DEFINITION
Boulders	Bldr	--	9" +	Material retained on 9" sieve.
Cobbles	Cbl	--	3" to 9"	Material passing the 9" sieve and retained on the 3" sieve.
Gravel	G	Coarse (c) Medium (m) Fine (f)	1" to 3" 3/8" to 1" No. 10 to 3/8"	Material passing the 3" sieve and retained on the No. 10 sieve.
Sand	S	Coarse (c) Medium (m) Fine (f)	No.30 to No. 10 No.60 to No. 30 No.200 to No. 60	Material passing the No. 10 sieve and retained on the No. 200 sieve.
Silt	\$	--	Passing No. 200 (0.074 mm)	Material passing the No. 200 sieve that is non-plastic in character and exhibits little or no strength when air dried.

Organic Silt (O\$)

Material passing the No. 200 sieve which exhibits plastic properties within a certain range of moisture content, and exhibits fine granular and organic characteristics.

		PLASTICITY	PLASTICITY INDEX	CLAY-SOIL
Clayey SILT	Cy\$	Slight (sl)	1 to 5	Material passing the No. 200 sieve which can be made to exhibit plasticity and clay qualities within a certain range of moisture content, and which exhibits considerable strength when air-dried.
SILT & CLAY	\$&C	Low (l)	5 to 10	
CLAY & SILT	C&\$	Medium (m)	10 to 20	
Silty CLAY	\$yC	High (h)	20 t 40	
CLAY	C	Very High (vh)	40 plus	

II. Definition of Component Proportions

COMPONENT	WRITTEN	PROPORTIONS	SYMBOL	PERCENTAGE RANGE BY WEIGHT*
Principal	CAPITALS	--		50 or more
Minor	Lower Case	and some little trace	a.	35 to 50
			s.	20 to 35
			l.	10 to 20
			t.	1 to 10

*Minus sign (-) lower limit, plus sign (+) upper limit, no sign middle range.

III. Glossary of Modifying Abbreviations

CATEGORY	SYMBOL	TERM	SYMBOL	TERM	SYMBOL	TERM
A. Borings	U/D	Undisturbed	B	Exploratory	A	Auger
B. Samples	C D O.E.	Casing Denison Open End	L S	Lost Spoon	U W	Undisturbed Wash
C. Colors	bk bl br gr	black blue brown gray	gn or rd tn	green orange red tan	wh yw dk lt	white yellow dark light
D. Organic Soils	dec dec'g lig	decayed decaying lignite	o rts ts	organic roots topsoil	veg pt	Vegetation peat
E. Rocks	LS Gns	Limestone Gneiss	rk SS	rock Sandstone	Shst Sh	Schist Shale
F. Fill and Misc. Material	bldr(s) brk(s) cndr(s)	boulder(s) brick(s) cinder(s)	cbl (s) wd dbr	cobble (s) wood debris	gls misc rbl	glass miscellaneous rubble
G. Misc. Terms	do el, El fgmt (s) frqt lrg mtld no rec pen	ditto elevation fragment(s) frequent large mottled no recovery penetration	pp P.I. P pc(s) rec or R	pocket penetrometer Plasticity Index pushed pressed piece(s) recovered	ref sm W.L. W.H. W.R.	refusal small water level weight of hammer weight of rods
H. Stratified Soils	alt thk thn w prt seam lyr stra vvd c pkt Ins occ freq	alternating thick thin with parting seam layer stratum varved Clay pocket lens occasional frequent	-) to 1/16" thickness - 1/16 to 1/2" thickness - 1/2 to 12" thickness - greater than 12" thickness - alternating seams or layers of sand, silt and clay - small, erratic deposit, usually less than 1 foot - lenticular deposit - one or less per foot of thickness - more than one per foot of thickness			

IV. Other Descriptive Criteria

A. Relative density of coarse-grained soils and non-plastic silts.

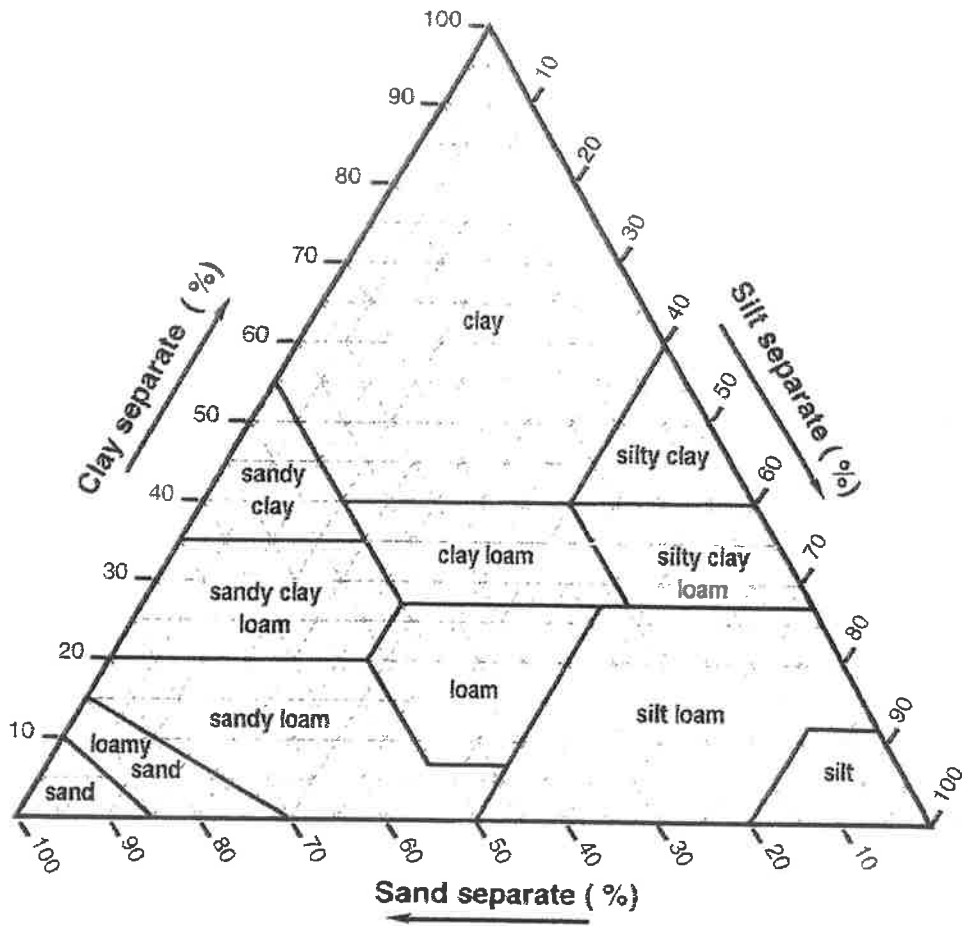
N-VALUE	DESCRIPTIVE TERM	RELATIVE DENSITY (%)
0-4	Very Loose	0-15
4-10	Loose	15-45
10-30	Medium Dense	45-70
30-50	Dense	70-85
50+	Very Dense	85-100

B. Consistency of fine-grained soils with some plasticity.

N-VALUE	DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (tsf)
0-2	Very Soft	Less than 0.25
2-4	Soft	0.25-0.50
4-8	Medium	0.50-1.00
8-16	Stiff	1.00-2.00
16-32	Very Stiff	2.00-4.00
32+	Hard	4.00+

Texture Triangle:

Fine Earth Texture Classes (———)



USDA SOIL CLASSIFICATION SYSTEM

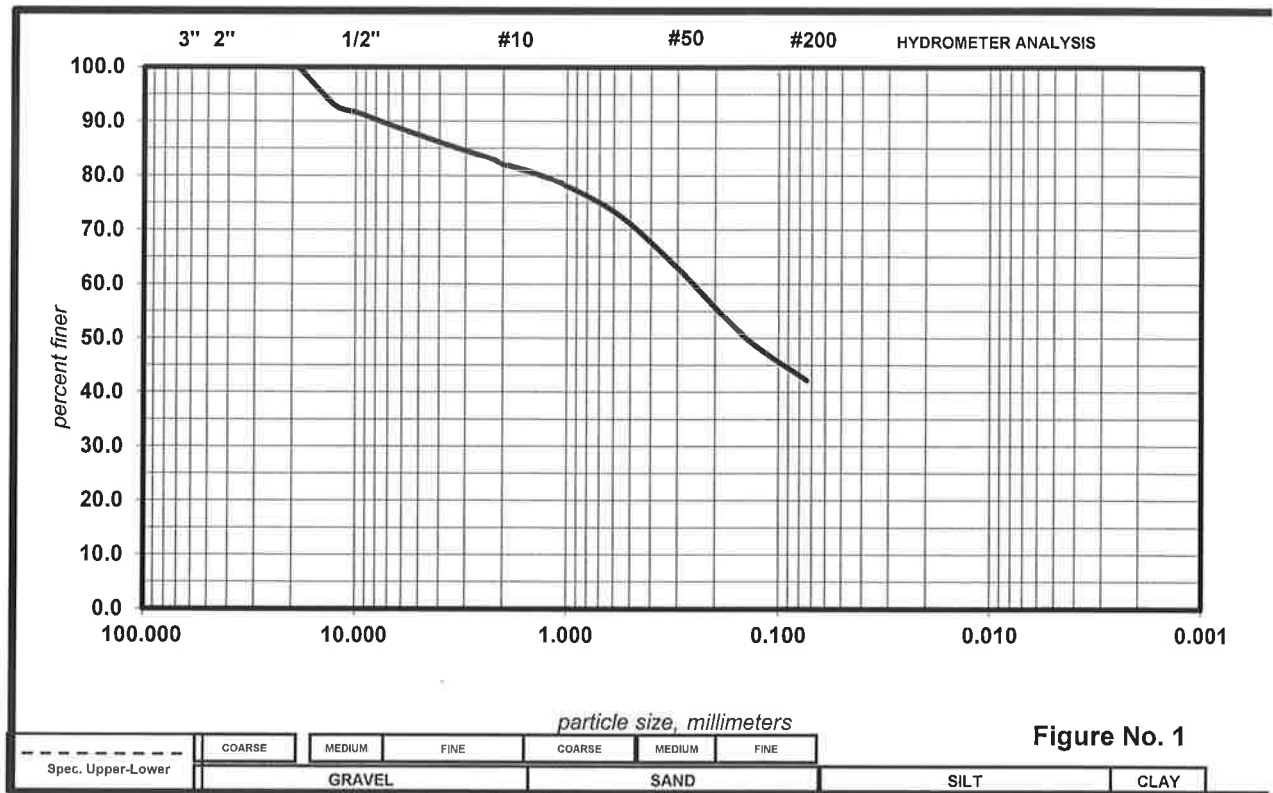
APPENDIX III

LABORATORY SOIL TEST RESULTS

SOR TESTING LABORATORIES, INC.

98 Sand Park Road - Cedar Grove, NJ 07009
Tel.: (973) 239-6001 Fax: (973) 239-8380 <http://www.sorlabs.com>

PARTICLE SIZE DISTRIBUTION TEST REPORT

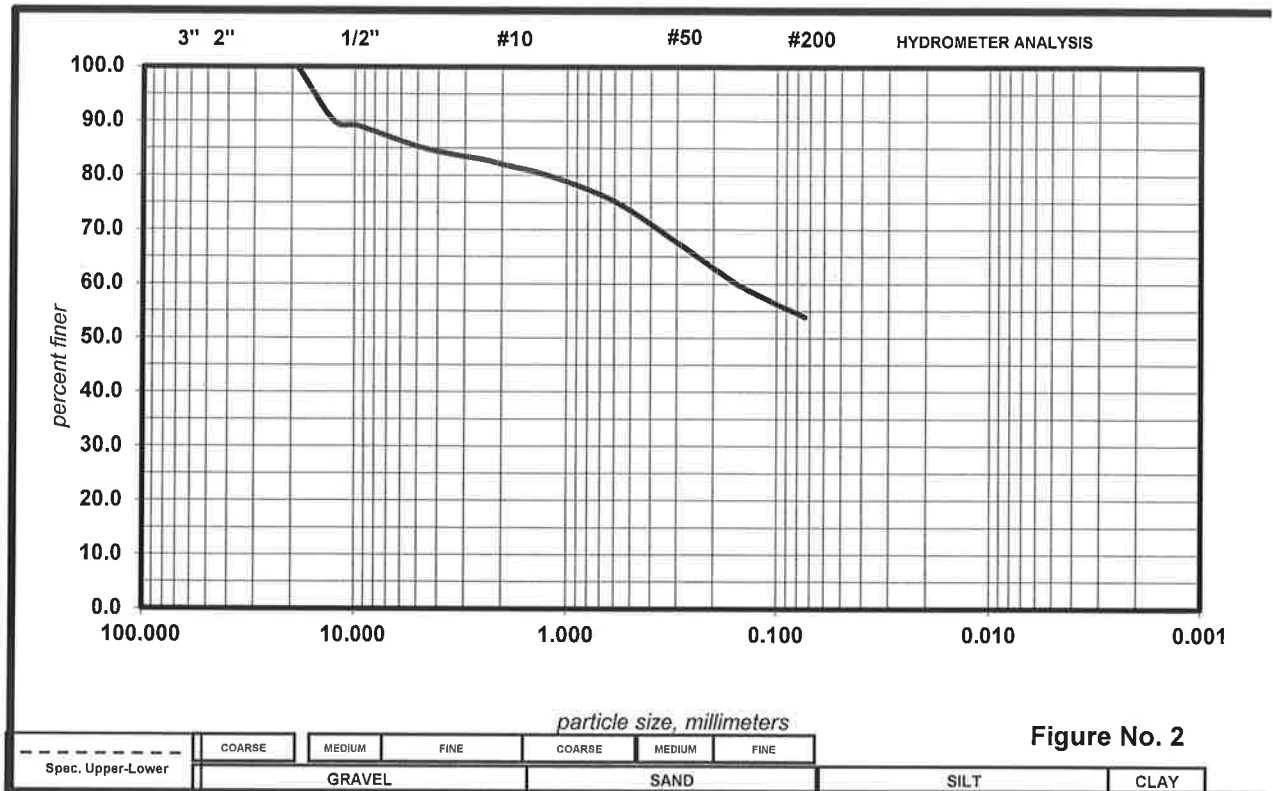


Specification*				Sample Identification		
Sieve Size	% Finer	Min.(%)	Max.(%)	Sample No.: TP-24		
3" (75 mm)				Lab No.: A21-040-01		
2 1/2" (63 mm)				Source/Location: 5.5'- 6.5'		
2" (50 mm)				Description:		
1 1/2" (38.1 mm)				Reddish Brown of Sand, and Silt, little mf Gravel		
1" (25 mm)				<i>sample description in accordance with Burmister System</i>		
3/4" (19 mm)	100.0			LL :	PL :	PI :
5/8" (16 mm)				As received Moisture Content: %		
1/2" (12.5 mm)	93.1			Classification:		
3/8" (9.5 mm)	91.4			USCS: [SM]		
5/16" (8 mm)				AASHTO:		
1/4" (6.3 mm)				Remarks:		
#4 (4.75 mm)	87.1			Sample received in lab on March 31, 2021		
#6 (3.35 mm)				Permeability, k: 5.6 x 10 ⁻⁴ cm/s (0.81 in/hr) K2		
#8 (2.36 mm)	83.2			Permeability, k: 5.7 x 10 ⁻⁴ cm/s (0.82 in/hr) K2		
#10 (2 mm)				Client: Garden Homes		
#14 (1.4 mm)				Project: Proposed Residential Development		
#16 (1.18 mm)	79.3			Location: West Orange, New Jersey		
#20 (850 µm)				Date: 5-Apr-21		
#30 (600 µm)	73.2			Job No.: 21-C-01		
#40 (425 µm)				Report No.: 21-C-12		
#50 (300 µm)	62.8					
#60 (250 µm)						
#100 (150 µm)	50.6					
#200 (75 µm)	42.2					

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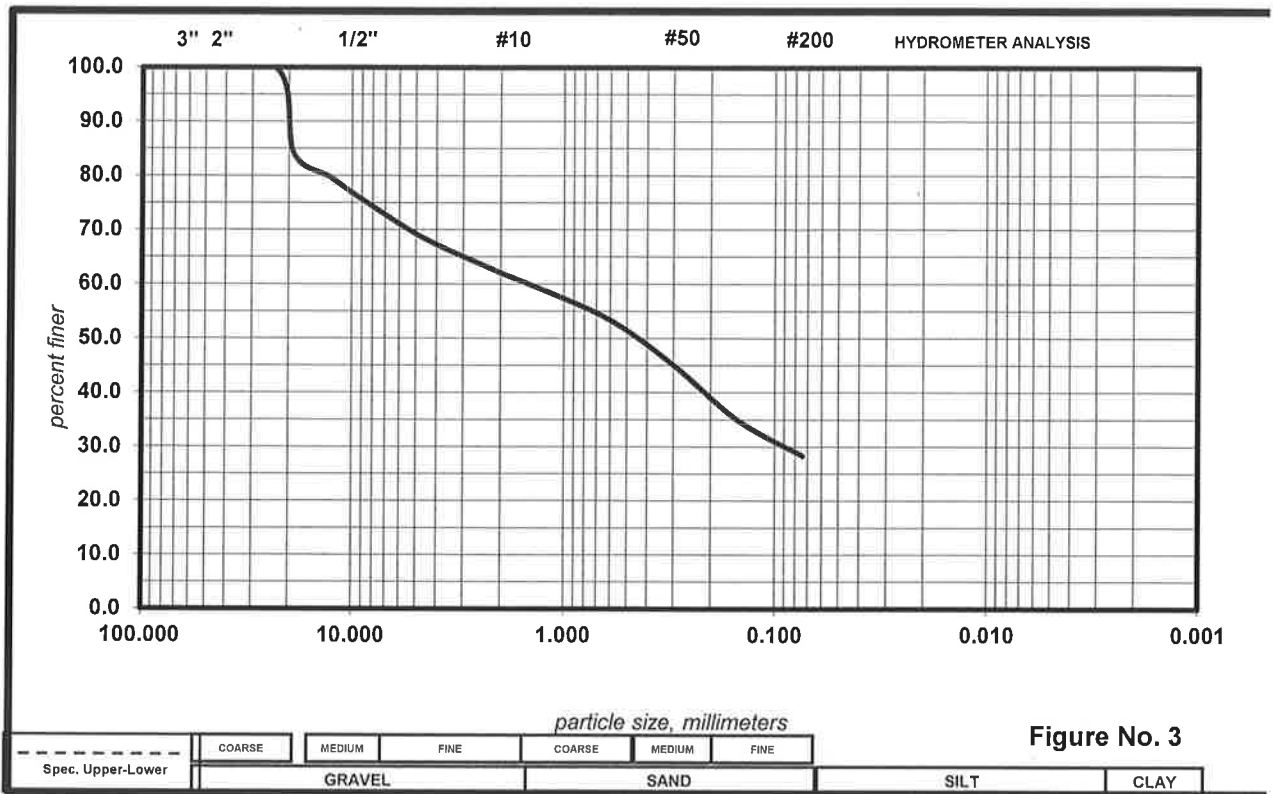
Specification*

Sieve Size	% Finer	Min.(%)	Max.(%)	Sample Identification		
3" (75 mm)				Sample No.: TP-25 Lab No.: A21-040-02 Source/Location: 4'-5' Description: reddish Brown Clayey SILT and, cf Sand, little mf Grav sample description in accordance with Burmister System LL : PL : PI : As received Moisture Content: % Classification: USCS: [ML] AASHTO: Remarks: Sample received in lab on March 31, 2021 Permeability, k: 1.5x 10⁻⁴ cm/s (0.18 in/hr) K0 Permeability, k: 1.6 x 10⁻⁴ cm/s (0.19 in/hr) K0 Client: Garden Homes Project: Proposed Residential Development Location: West Orange, New Jersey Date: 5-Apr-21 Job No.: 21-C-01 Report No.: 21-C-12		
2 1/2" (63 mm)						
2" (50 mm)						
1 1/2" (38.1 mm)						
1" (25 mm)						
3/4" (19 mm)	100.0					
5/8" (16 mm)						
1/2" (12.5 mm)	90.0					
3/8" (9.5 mm)	89.0					
5/16" (8 mm)						
1/4" (6.3 mm)						
#4 (4.75 mm)	85.1					
#6 (3.35 mm)						
#8 (2.36 mm)	82.8					
#10 (2 mm)						
#14 (1.4 mm)						
#16 (1.18 mm)	79.9					
#20 (850 μm)						
#30 (600 μm)	75.1					
#40 (425 μm)						
#50 (300 μm)	67.6					
#60 (250 μm)						
#100 (150 μm)	59.7					
#200 (75 μm)	54.0					
-						

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PARTICLE SIZE DISTRIBUTION TEST REPORT

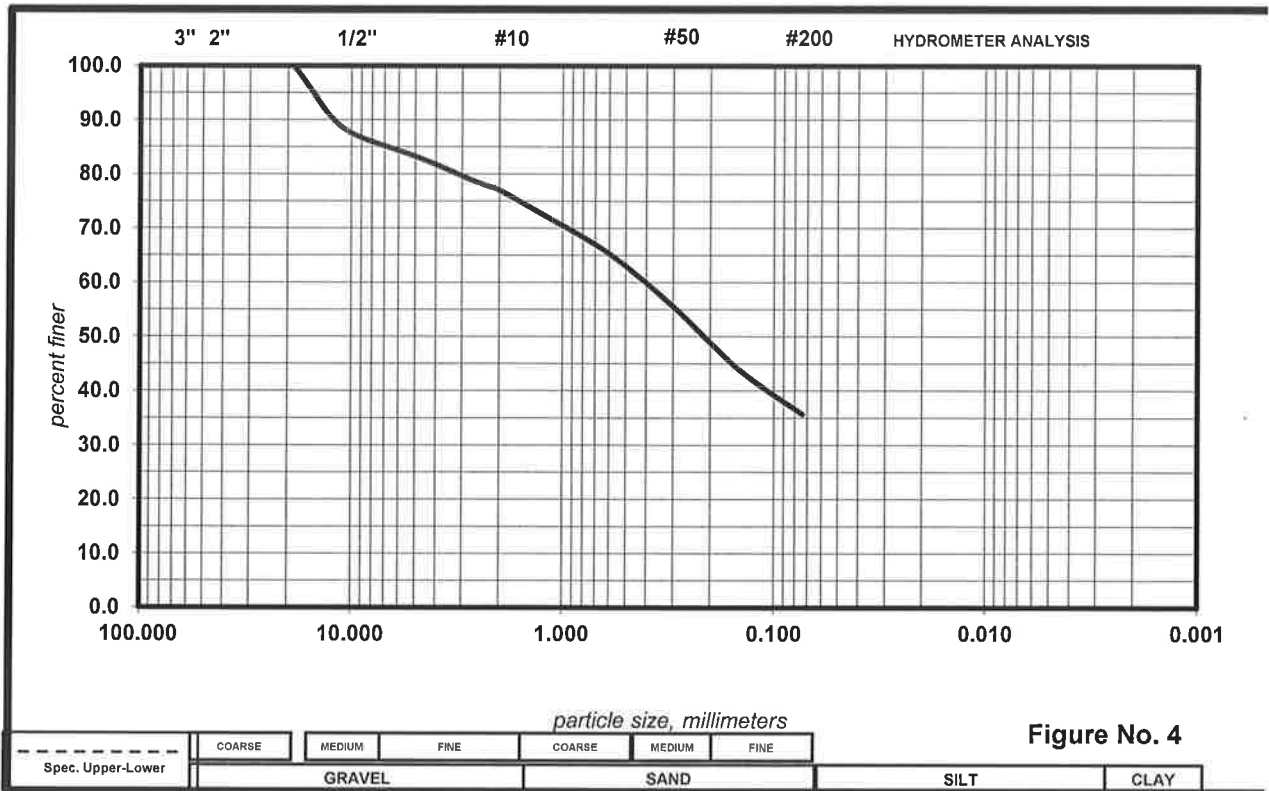


Specification*				Sample Identification		
Sieve Size	% Finer	Min.(%)	Max.(%)	Sample No.:	TP-27	
3" (75 mm)				Lab No.:	A21-040-03	
2 1/2" (63 mm)				Source/Location:	4'-5'	
2" (50 mm)				Description:	Reddish Brown of Sand, some Silt, and mf Gravel	
1 1/2" (38.1 mm)						
1" (25 mm)	100.0					
3/4" (19 mm)	84.2					
5/8" (16 mm)				sample description in accordance with Burmister System		
1/2" (12.5 mm)	79.7			LL :	PL :	PI :
3/8" (9.5 mm)	76.3			As received Moisture Content: %		
5/16" (8 mm)				Classification:		
1/4" (6.3 mm)				USCS: [SM]		
#4 (4.75 mm)	68.7			AASHTO:		
#6 (3.35 mm)				Remarks:		
#8 (2.36 mm)	63.3			Sample received in lab on March 31, 2021		
#10 (2 mm)				Permeability, k: 1.1 x 10-3 cm/s (1.58 in/hr) K2		
#14 (1.4 mm)				Permeability, k: 1.2 x 10-3 cm/s (1.73 in/hr) K2		
#16 (1.18 mm)	58.5			Client: Garden Homes		
#20 (850 µm)				Project: Proposed Residential Development		
#30 (600 µm)	53.2			Location: West Orange, New Jersey		
#40 (425 µm)				Date: 5-Apr-21		
#50 (300 µm)	44.9			Job No.: 21-C-01		
#60 (250 µm)				Report No.: 21-C-12		
#100 (150 µm)	34.8					
#200 (75 µm)	28.4					
-						

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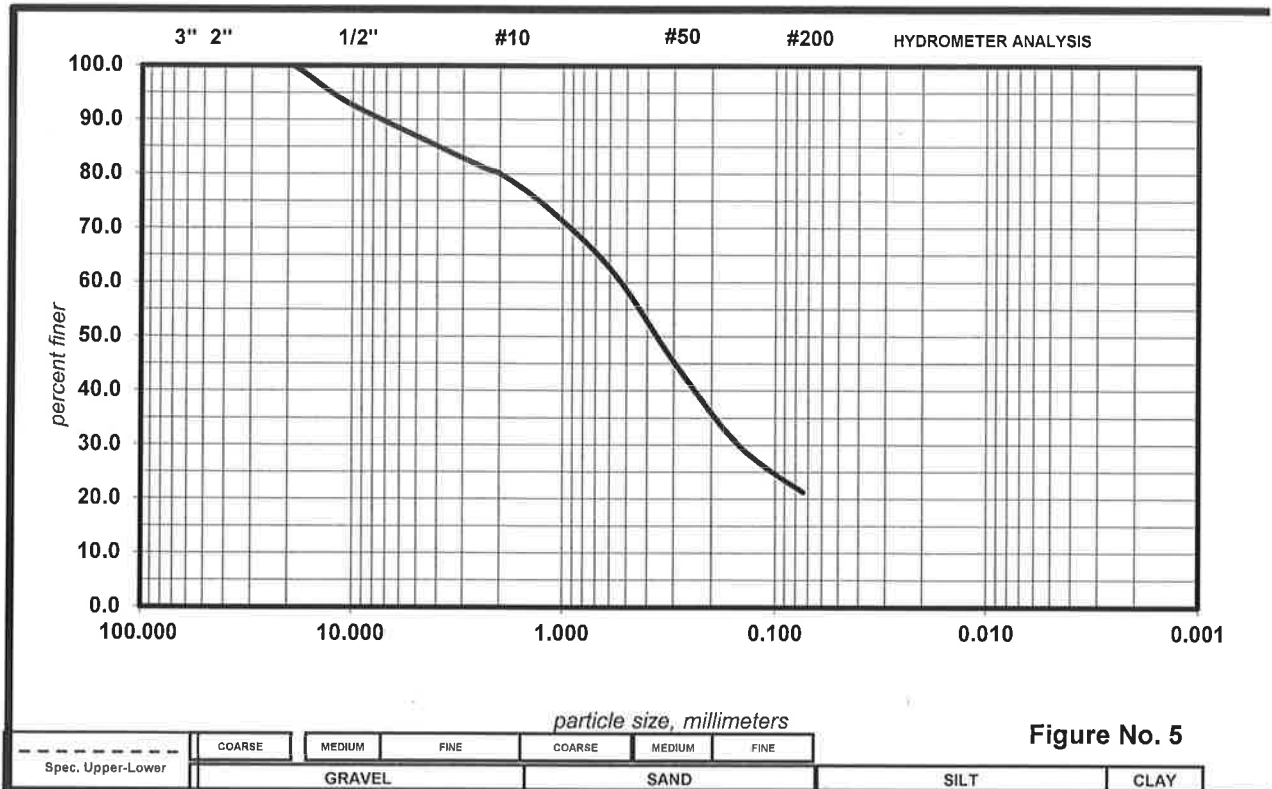


Specification*				Sample Identification		
Sieve Size	% Finer	Min.(%)	Max.(%)	Sample No.: TP-15		
3" (75 mm)				Lab No.: A21-037-02		
2 1/2" (63 mm)				Source/Location: 3'-4'		
2" (50 mm)				Description:		
1 1/2" (38.1 mm)				Reddish Brown of Sand, and Silt, some mf Gravel		
1" (25 mm)				sample description in accordance with Burmister System		
3/4" (19 mm)	100.0			LL :	PL :	PI :
5/8" (16 mm)				As received Moisture Content: %		
1/2" (12.5 mm)	90.8			Classification:		
3/8" (9.5 mm)	87.1			USCS: [SM]		
5/16" (8 mm)				AASHTO:		
1/4" (6.3 mm)				Remarks:		
#4 (4.75 mm)	82.9			Sample received in lab on March 29, 2021		
#6 (3.35 mm)				Permeability, k: 1.0 x 10-3 cm/s (1.5 in/hr) K2		
#8 (2.36 mm)	78.0			Permeability, k: 1.1 x 10-3 cm/s (1.6 in/hr) K2		
#10 (2 mm)				Client: Garden Homes		
#14 (1.4 mm)				Project: Proposed Residential Development		
#16 (1.18 mm)	72.1			Location: West Orange, New Jersey		
#20 (850 µm)				Date: 1-Apr-21		
#30 (600 µm)	65.1			Job No.: 21-C-01 Report No.: 21-C-12		
#40 (425 µm)						
#50 (300 µm)	55.4					
#60 (250 µm)						
#100 (150 µm)	44.1					
#200 (75 µm)	35.7					

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PARTICLE SIZE DISTRIBUTION TEST REPORT

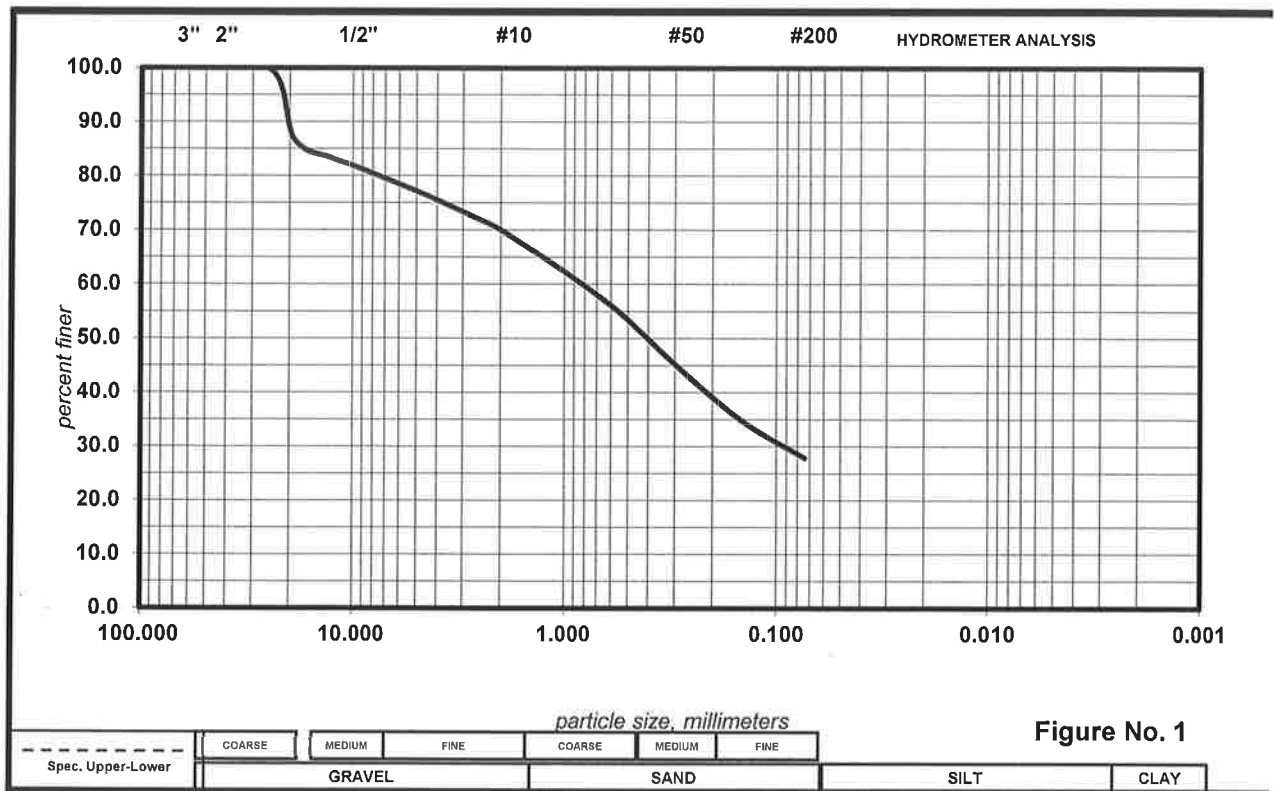


Specification*				Sample Identification		
Sieve Size	% Finer	Min.(%)	Max.(%)	Sample No.: TP-14		
3" (75 mm)				Lab No.: A21-037-01		
2 1/2" (63 mm)				Source/Location: 4'-5'		
2" (50 mm)				Description:		
1 1/2" (38.1 mm)				Reddish Brown of SAND, some Silt, little mf Gravel		
1" (25 mm)				<i>sample description in accordance with Burmister System</i>		
3/4" (19 mm)	100.0			LL :	PL :	PI :
5/8" (16 mm)				As received Moisture Content: %		
1/2" (12.5 mm)	95.1			Classification:		
3/8" (9.5 mm)	92.2			USCS: [SM]		
5/16" (8 mm)				AASHTO:		
1/4" (6.3 mm)				Remarks:		
#4 (4.75 mm)	86.5			Sample received in lab on March 29, 2021		
#6 (3.35 mm)				Permeability, k: 5.5 x 10 ⁻⁴ cm/s (0.79 in/hr) K2		
#8 (2.36 mm)	81.0			Permeability, k: 5.7 x 10 ⁻⁴ cm/s (0.82 in/hr) K2		
#10 (2 mm)				Client: Garden Homes		
#14 (1.4 mm)				Project: Proposed Residential Development		
#16 (1.18 mm)	73.8			Location: West Orange, New Jersey		
#20 (850 µm)				Date: 1-Apr-21		
#30 (600 µm)	62.3			Job No.: 21-C-01		
#40 (425 µm)				Report No.: 21-C-12		
#50 (300 µm)	45.1					
#60 (250 µm)						
#100 (150 µm)	29.9					
#200 (75 µm)	21.3					

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PARTICLE SIZE DISTRIBUTION TEST REPORT



Specification*				Sample Identification		
Sieve Size	% Finer	Min.(%)	Max.(%)	Sample No.: TP-20 Lab No.: A21-040-04 Source/Location: Description: Reddish Brown of Sand, some Silt, some mf Gravel sample description in accordance with Burmister System LL :PL :PI : As received Moisture Content: % Classification: USCS: [SM] AASHTO: Remarks: Sample received in lab on March 31, 2021 Client: Garden Homes Project: Proposed Residential Development Location: West Orange, New Jersey Date: 5-Apr-21 Job No.: 21-C-01 Report No.: 21-C-12		
3" (75 mm)						
2 1/2" (63 mm)						
2" (50 mm)						
1 1/2" (38.1 mm)						
1" (25 mm)	100.0					
3/4" (19 mm)	86.7					
5/8" (16 mm)						
1/2" (12.5 mm)	83.3					
3/8" (9.5 mm)	81.6					
5/16" (8 mm)						
1/4" (6.3 mm)						
#4 (4.75 mm)	76.8					
#6 (3.35 mm)						
#8 (2.36 mm)	71.6					
#10 (2 mm)						
#14 (1.4 mm)						
#16 (1.18 mm)	64.3					
#20 (850 μm)						
#30 (600 μm)	55.8					
#40 (425 μm)						
#50 (300 μm)	45.0					
#60 (250 μm)						
#100 (150 μm)	35.0					
#200 (75 μm)	27.8					

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Report for:	Garden Homes	Lab. No.:	A21-040-04	Date:	4/5/21
Project:	Proposed Residential Development, West Orange, New Jersey	Job No.:	21-C-01		
Source:		Report No.:	21-147		

MOISTURE - DENSITY RELATIONS TEST

Sample No.:	TP-20	Material:	Reddish Brown of Sand, some Silt, some mf Gravel	[SM]
Test performed in accordance with:	ASTM D 1557, Method 'C' - AASHTO T180			Sp. Gr. (assumed)
Fraction used for test:	- 3/4"	Rammer:	Mechanical	
Diameter of mold:	6"	No. of layers:	5	Blows per layer:
			56	

Maximum Dry Density (lbs. per cu.ft.)	125.1	Optimum Moisture Content	8.9	%
Gravel Corrected Maximum Dry Density (lbs. per cu.ft.) (ASTM D 4719)	129.0	Optimum Moisture Content	8.0	%

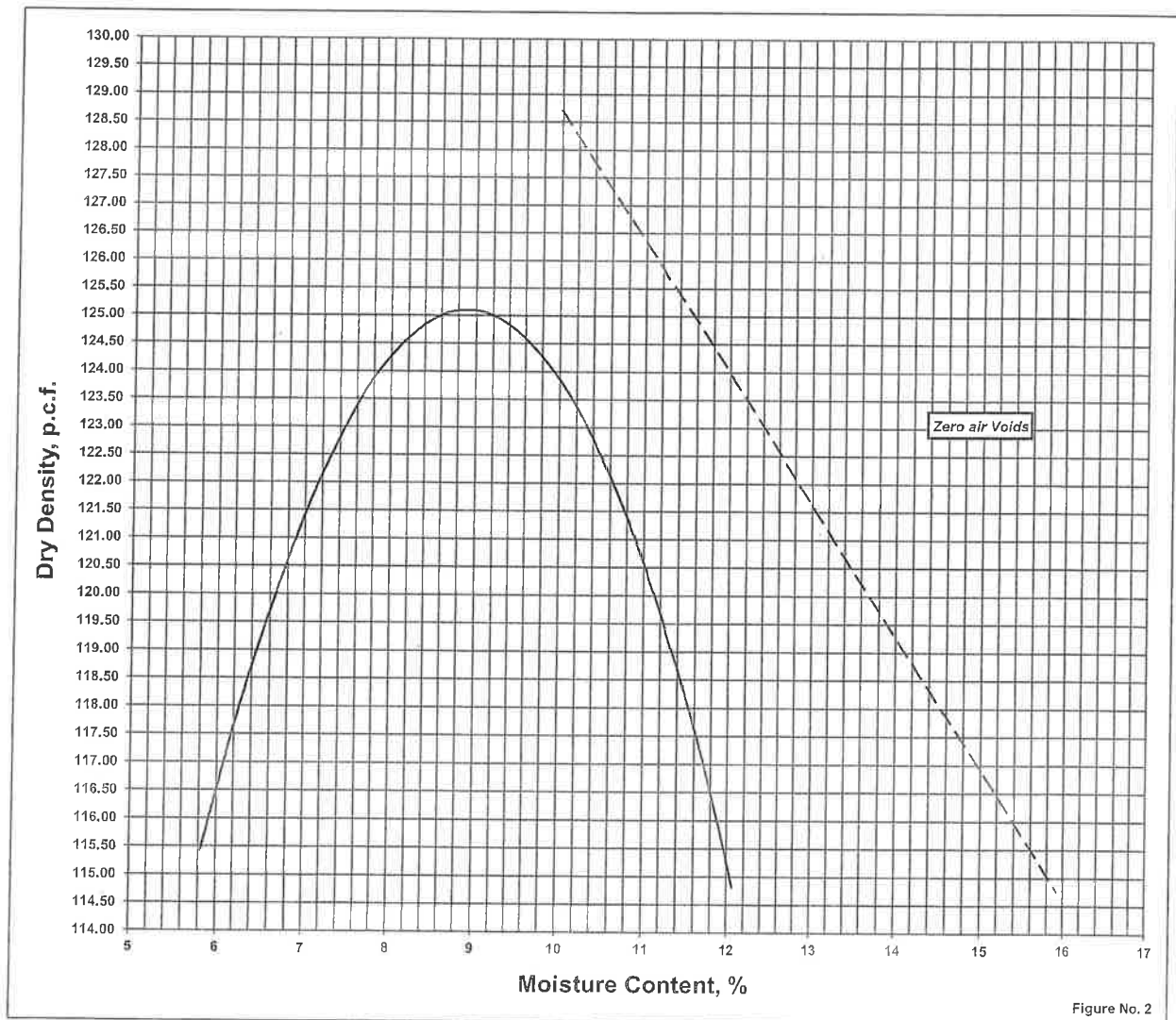


Figure No. 2

SOR TESTING LABORATORIES, INC.

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(973) 239 6001 Fax: (973) 239 8380

Client	Garden Homes	Date	04/19/21	Lab No.	A21-040-04
Project	Proposed Residential Development, West Orange, NJ			Report No.	21-C-12
Sample No.	TP-20	Depth		Job No.	21-C-01
Description of Sample	Reddish Brown cf Sand, some Silt, some mf Gravel				

Compaction Method ASTM D-1557 Method 'C' - AASHTO T193 and T180

Sample Condition Soaked 96 Hours

Sample Dry Density Before Soak (p.c.f.)	119.9	Sample Moisture Content Before Soak (%)	6.6%
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Sample Dry Density After Soak (p.c.f.)	115.4	Sample Moisture Content After Soak (%)	10.7%
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Swell (%)	0.00	Bearing Ratio (%)	6 @ 0.1" 8 @ 0.2"
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CBR (California Bearing Ratio) (ASTM D-1883)

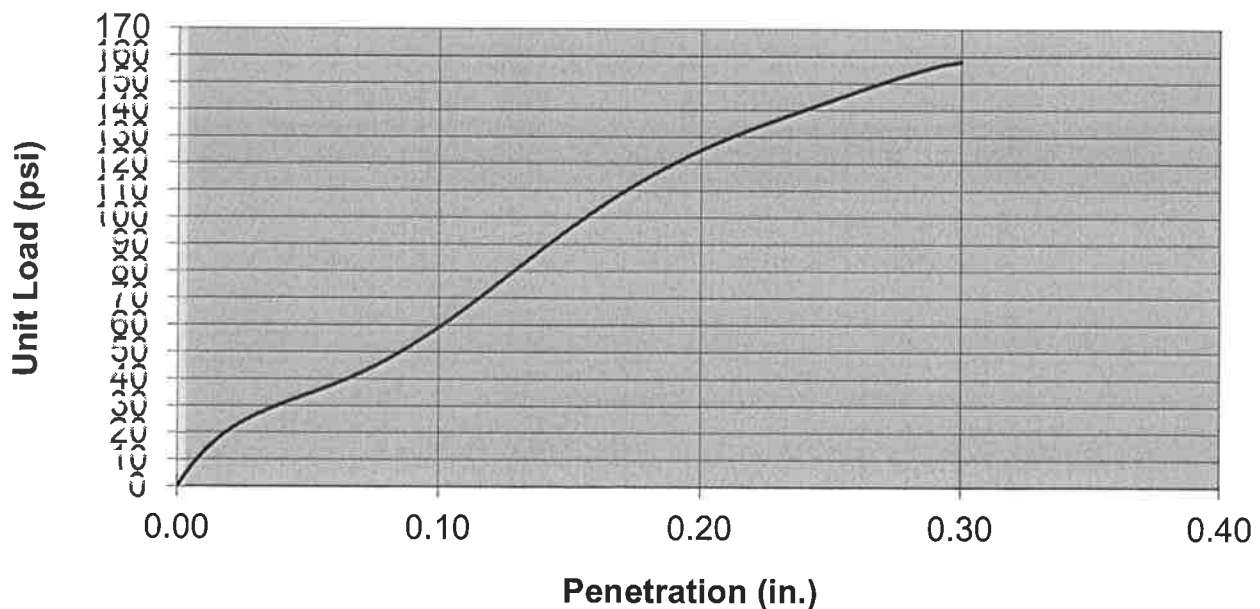
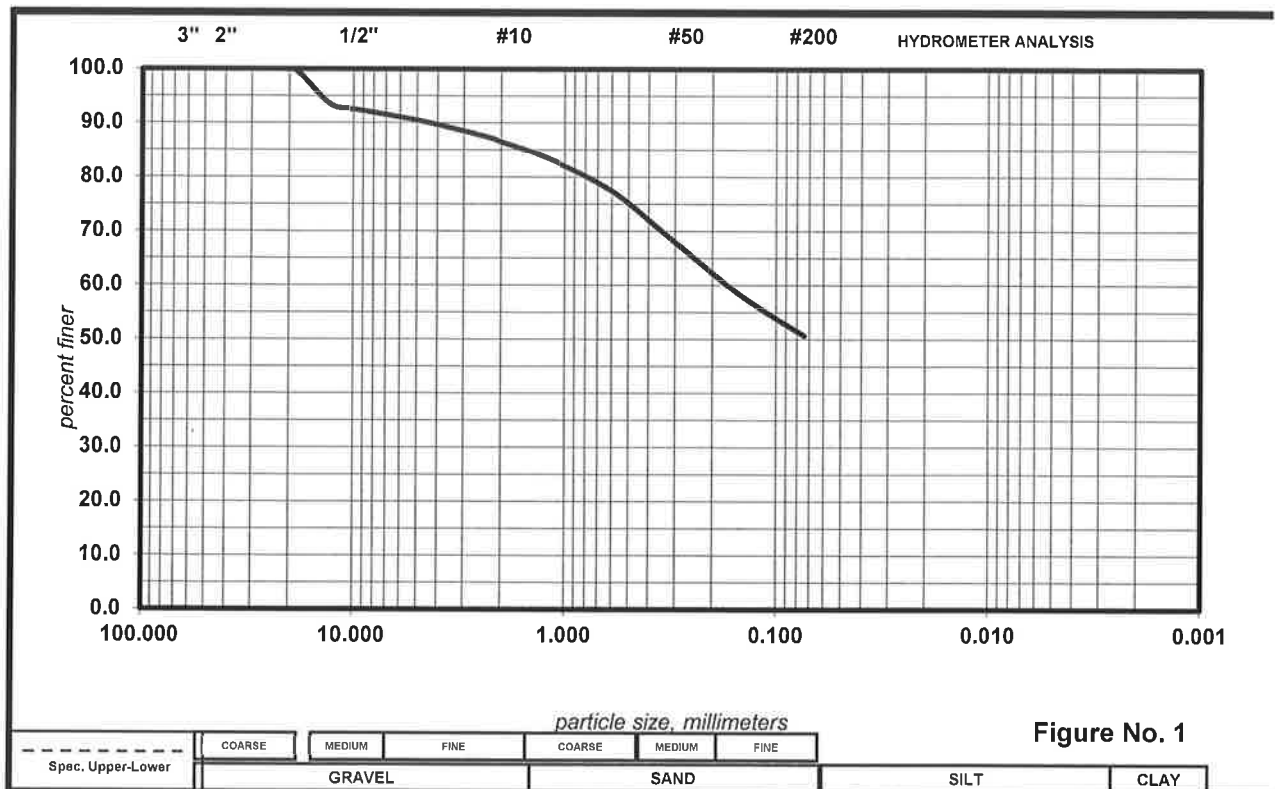


Figure No. 3

SOR TESTING LABORATORIES, INC.

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PARTICLE SIZE DISTRIBUTION TEST REPORT



Specification*				Sample Identification		
Sieve Size	% Finer	Min.(%)	Max.(%)	Sample No.: TP-22		
3" (75 mm)				Lab No.: A21-040-05		
2 1/2" (63 mm)				Source/Location:		
2" (50 mm)				Description:		
1 1/2" (38.1 mm)				Reddish Brown SILT and, cf Sand, little mf Gravel		
1" (25 mm)				<i>sample description in accordance with Burmister System</i>		
3/4" (19 mm)	100.0			LL :	PL :	PI :
5/8" (16 mm)				As received Moisture Content: %		
1/2" (12.5 mm)	93.3			Classification:		
3/8" (9.5 mm)	92.4			USCS: [ML]		
5/16" (8 mm)				AASHTO:		
1/4" (6.3 mm)				Remarks:		
#4 (4.75 mm)	90.3			Sample received in lab on March 31, 2021		
#6 (3.35 mm)				Client: Garden Homes		
#8 (2.36 mm)	87.5			Project: Proposed Residential Development		
#10 (2 mm)				Location: West Orange, New Jersey		
#14 (1.4 mm)				Date: 5-Apr-21		
#16 (1.18 mm)	83.4			Job No.: 21-C-01		
#20 (850 µm)				Report No.: 21-C-12		
#30 (600 µm)	77.2					
#40 (425 µm)						
#50 (300 µm)	67.8					
#60 (250 µm)						
#100 (150 µm)	58.2					
#200 (75 µm)	50.7					

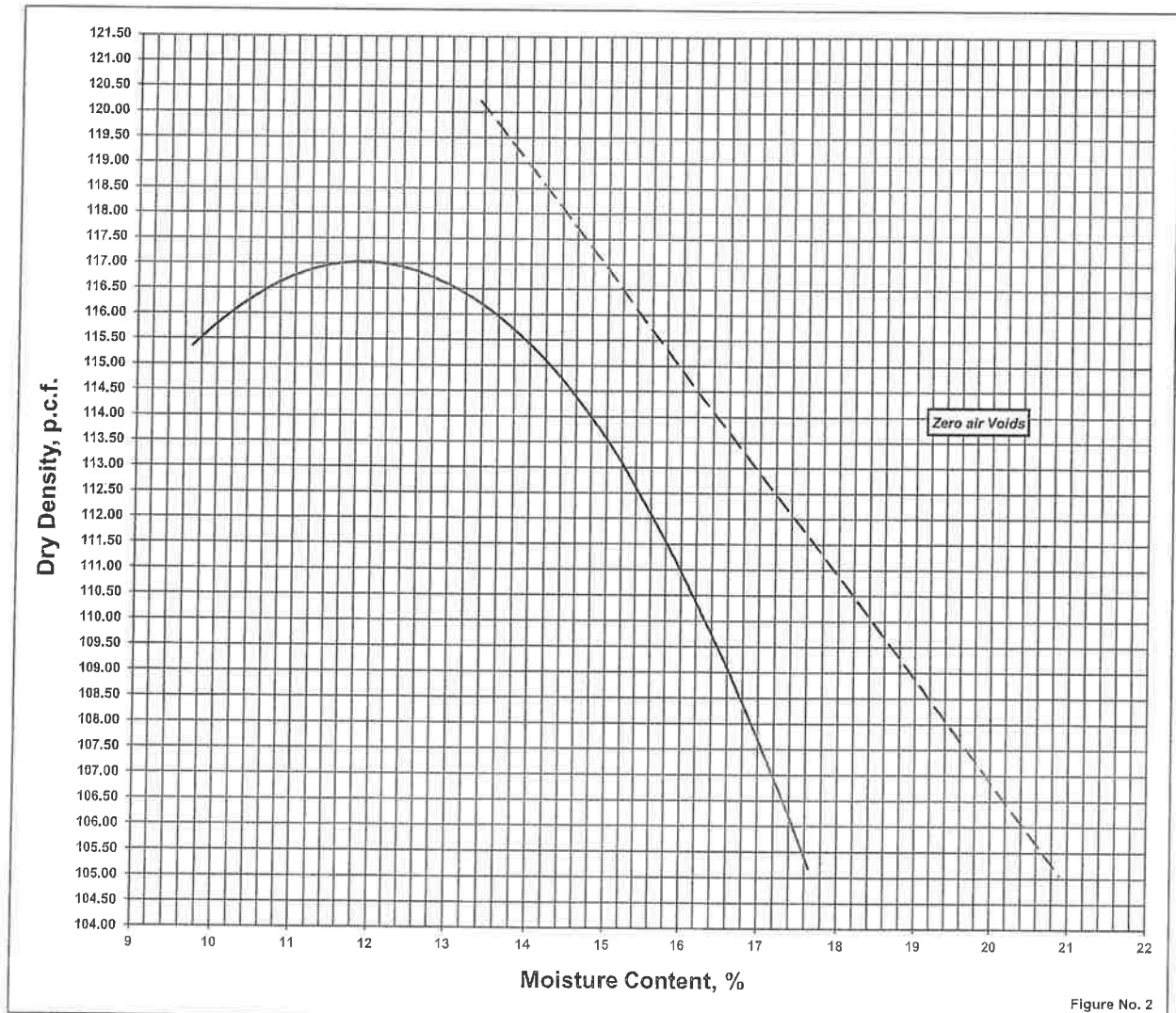
SOR TESTING LABORATORIES, INC.

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Report for:	Garden Homes	Lab. No.:	A21-040-05	Date:	4/5/21
Project:	Proposed Residential Development, , West Orange, New Jersey			Job No.:	21-C-01
Source:				Report No.:	21-147

MOISTURE - DENSITY RELATIONS TEST

Sample No.:	TP-22	Material:	Reddish Brown SILT and, cf Sand, little mf Gravel	[ML]	
Test performed in accordance with:	ASTM D 1557, Method 'C' - AASHTO T180			Sp. Gr. (assumed)	2.60
Fraction used for test:	- 3/4"	Rammer:	Mechanical		
Diameter of mold:	6"	No. of layers:	5	Blows per layer:	56
Maximum Dry Density (lbs. per cu.ft.)	117.0	Optimum Moisture Content	11.9	%	



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Client	Garden Homes	Date	04/19/21	Lab No.	A21-040-05
Project	Proposed Residential Development, West Orange, NJ			Report No.	21-C-12
Sample No.	TP-22	Depth		Job No.	21-C-01
Description of Sample	Reddish Brown SILT and, cf Sand, little mf Gravel				

Compaction Method ASTM D-1557 Method 'C' - AASHTO T193 and T180

Sample Condition Soaked 96 Hours

Sample Dry Density Before Soak (p.c.f.)	111.4	Sample Moisture Content Before Soak (%)	12.0%
---	-------	---	-------

Sample Dry Density After Soak (p.c.f.)	108.5	Sample Moisture Content After Soak (%)	15.0%
--	-------	--	-------

Swell (%)	0.00	Bearing Ratio (%)	6 @ 0.1" 8 @ 0.2"
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CBR (California Bearing Ratio) (ASTM D-1883)

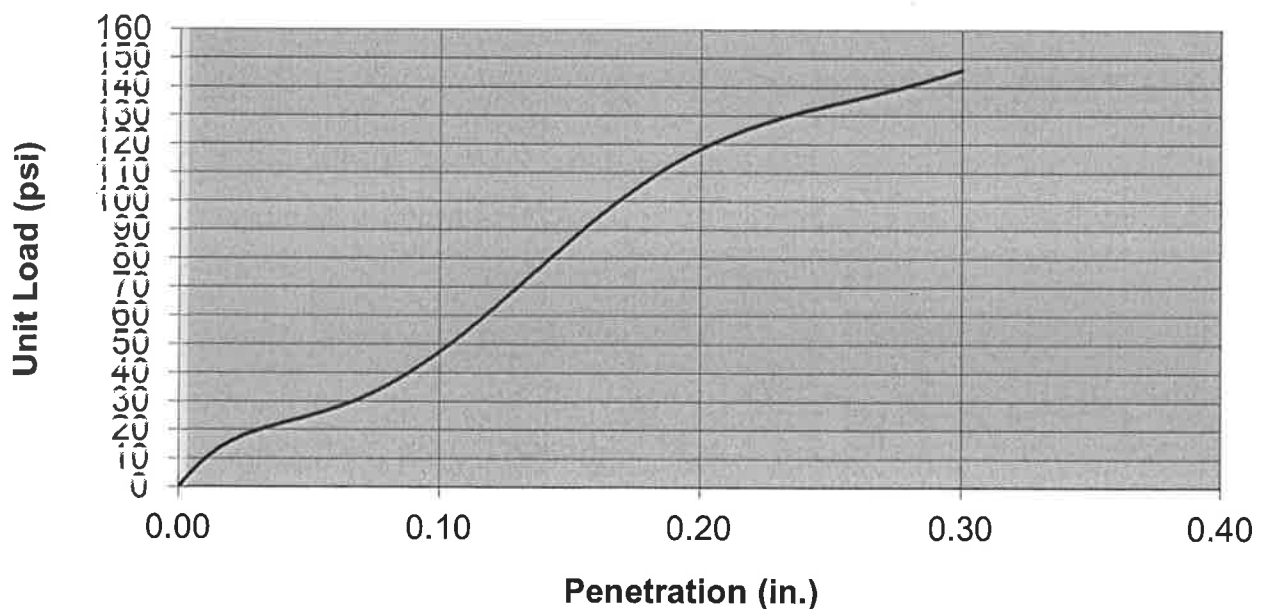


Figure No. 3

APPENDIX IV

LIMITATIONS

SOR CONSULTING ENGINEERS, INC

LIMITATIONS

The conclusions and recommendations contained in this geotechnical report no. 21-C-12 are based upon the applicable standards of our profession at the time this report was prepared.

The analyses and recommendations submitted in this report are based in part upon the data obtained from fifteen widely-spaced test borings and twenty-seven test pits performed for this study. The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types. However, the transition between soil types may be gradual.

In our opinion, the number of explorations performed for this study are adequate for a general understanding of the site subsurface conditions. However, the nature and extent of variations between the explorations may not become evident until construction. If, during construction, variations become evident, it will be necessary to re-evaluate the recommendations of this report.

In the event that any changes in the nature, design or location of the proposed residential development are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

This report may be referred to or included in the project specifications for general information purposes only, but should not be solely used as the technical specifications for the work.

This geotechnical engineering report was prepared for the project by Sor Consulting Engineers, Inc. for design purposes only, and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope is limited to design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

This report has been prepared in accordance with generally accepted geotechnical engineering practices for the exclusive use of Garden Homes and/or their authorized representatives for specific application to the design of the proposed new residential development to be constructed on Lot 32, Block 179 in West Orange, New Jersey. No other warranty, expressed or implied, is made.