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Report of Subsurface Exploration & Geotechnical Engineering Evaluation

9 Monmouth Terrace
Block 71 , Lot 2
Borough of Deal
Monmouth County, New Jersey

Submitted to:

Mr. Elliot Tamir
595 Madison Avenue
37th Floor
New York, N.Y. 10022



September 25, 2018
FPA No. 13874.001



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September 25, 2018

Mr. Elliot Tamir
595 Madison Avenue, 37th Floor
New York, N.Y. 10022

RE: Report of Subsurface Exploration &
Geotechnical Engineering Evaluation
Tamir Residence
9 Monmouth Terrace
Block 71, Lot 2
Borough of Deal, Monmouth County, New Jersey
FPA Project No. 13874.001R1

Dear Mr. Tamir:

INTRODUCTION

This report presents the results of our Subsurface Exploration & Geotechnical Engineering Evaluation performed in connection with the proposed improvements planned for construction at 9 Monmouth Terrace in the Borough of Deal, Monmouth County, New Jersey. The project site is designated as Block 71, Lot 2 on the Borough of Deal Tax Map. The regional location of the project site is presented on Drawing No. 1, "Regional Location Plan."

The existing project site consists of a 2-story single-family residence, concrete driveway, wood deck, stone seawall and retaining walls. The existing site mildly slopes from west to east with grades ranging from +28 feet along Monmouth Terrace to +18 feet at the top of the seawall. The finished floor elevation of the existing dwelling is +31.71 feet. Plans depicting the proposed site development were not yet available at the time of our subsurface investigation. However, it is our understanding that the existing residence will likely be demolished and a new residence constructed in its place. Other site development will likely include an in-ground swimming pool, surrounding patio areas, decking and landscaping. We further understand that modification of the existing seawall is not planned at this time.

The purpose of our participation on the project at this time was to explore the subsurface soil and groundwater conditions in the vicinity of the proposed residence and to develop geotechnical engineering recommendations toward the design and construction of the proposed improvements. Our scope of work included the advancement of four test borings, engineering evaluation of the acquired data and the development of the recommendations presented in this report. Our scope of work has been performed in accordance with our proposal dated August 8, 2018.



SUBSURFACE EXPLORATION

The subsurface conditions within the immediate vicinity of the proposed site development were explored on September 6, 2018 through the advancement of four test borings. The field work was performed by a test boring subcontractor while under the full-time technical observation by a representative of French & Parrello Associates (FPA). The borings were field located by our representative through correlation with the existing site features and the proposed development shown on the Topographic Verification Plan & Street Utility Survey prepared by French & Parrello Associates and dated August 22, 2018. The approximate as-drilled boring locations are presented on Drawing No. 2, "Test Boring Location Plan."

The test borings, designated as B-1 through B-4, were advanced to depths of approximately 27 feet below the existing grade using mud rotary drilling procedures. Soil samples were typically obtained by advancing a standard two-inch diameter split-spoon sampler in accordance with ASTM Test Method D-1586, The Standard Penetration Test. All soil samples were classified in the field using the Burmister Soil Classification System. The soil samples were returned to our in-house soils laboratory for further review. The samples will be stored for a period of 60 days from the date of this report.

The depth to groundwater was estimated based on the moisture content of the retrieved soil samples. Indications of seasonal high groundwater, such as soil mottling, were also monitored in the borings. Details of the drilling procedures, soil classifications, groundwater depths and Standard Penetration Test results are presented on the boring logs in Appendix A.

SITE CONDITIONS

Regional Geology

Based on our review of the published geologic literature pertaining to the area, the subsurface conditions at the project site consist of stratified alluvial soils deposited during the Quaternary period underlain by marine deposits. The alluvial soils are referred to as the Cape May formation on the Geologic Map of New Jersey and typically consist of uniform sand and silty sand with some gravel scattered throughout the profile. The surficial soils at the eastern limits of the project site consist of stratified marine soils deposited through both wave and wind action. This deposit is referred to as Beach Sand and Gravel on the Geologic Map of New Jersey. The marine soils are composed primarily of well-rounded medium to coarse sand with gravel and occasional shell fragments. The depth to bedrock is reported to be greater than 100 feet throughout eastern Monmouth County.

Subsurface Conditions

The subsurface soils encountered in the test borings generally consisted of a surficial layer of granular fill extending to depths of approximately 2 feet to 10 feet below the existing ground surface. The fill consists of medium to fine sand with moderate amounts of silt and clayey silt that was likely placed as backfill behind the existing seawall to raise and level site grades. Below the fill, the borings encountered native marine soils consisting of coarse to fine sands with minor amounts of silt and fine gravel. Below depths of approximately 12 feet to 15 feet, the sand



generally became coarser in texture and the gravel content increased. Based on the results of the Standard Penetration Testing, the relative density of the surficial fill varied from very loose to medium dense. The relative density of the underlying native marine soils was medium dense to very dense.

Groundwater was encountered in the borings at depths ranging from approximately 15 feet to 17 feet below the existing ground surface corresponding to approximately elevations +6 feet to +11 feet. However, seasonal, tidal and storm related fluctuations in the groundwater level, as well as the potential presence of perched groundwater within the existing site fill, should be anticipated.

Soil mottling or other indicators of seasonal high groundwater were not observed in the recovered soil samples from the borings. As such, it is our opinion that the seasonal high groundwater level coincides with the observed groundwater levels encountered at approximately elevation +6 feet at the eastern end of the property sloping up to approximately elevation +11 feet at the western end. For a more detailed description of the subsurface conditions encountered, please refer to the boring logs in Appendix A.

SEISMIC CONSIDERATION

We have reviewed the guidelines presented in the New Jersey Edition of the 2015 International Building Code (IBC) regarding seismic design. Based upon our review, we offer the following site characterization parameters:

Short Period Spectral Acceleration (S_s)	0.219g
Spectral Acceleration @ 1 Second (S_1)	0.062g
Site Class.....	D

DISCUSSION & RECOMMENDATIONS

Based upon the results of our subsurface exploration program and our geotechnical engineering evaluation, it is our opinion that the proposed residence may be founded on conventional shallow foundations established within the native soils or on compacted fill bearing on the native soils. The results of the test borings indicate that the site is overlain with approximately 2 feet to 10 feet of very loose to medium dense fill materials that were likely place as grading fill during the previous site development. The loose condition of the fill materials is unsuitable for direct support of shallow foundations. As such, new footings should either be designed to extend through the loose fill to bear within the underlying undisturbed native soils or the loose fill should be over excavated and replaced in compacted lifts of 12 inches or less in thickness. Assuming a basement area will be included in the new residence, we expect that the excavation depth for the basement level will remove most of the loose fill that may be encountered within the new building footprint area. In addition, during the demolition activities for the existing residence, the contractor will have the opportunity to recompact the subgrade soils exposed during the removal of the basement foundation walls, footings and floor slab. The resulting excavations from these demolition activities should be backfilled with compacted backfill placed in a controlled manner (i.e., compacted lifts) for support of new foundations and slabs. Detailed recommendations for



subgrade preparation and compacted fill placement for support of new footings is presented further below.

We do not anticipate that the static groundwater table will be encountered within foundation excavations, in-ground pool excavation or subsurface utility trenches. In the event that perched groundwater is encountered in foundation excavations, it is our opinion that the associated dewatering may be accomplished using in-trench sump pumps, placed within crushed stone.

Shallow Foundations, Floor Slabs and Patios

Shallow foundations bearing within native soil deposits or on compacted fill extending to the native soils may be designed for an allowable bearing pressure of 3,000 psf. We recommend that continuous wall footings and individual column footings be designed with minimum widths of 18 inches and 30 inches, respectively. In accordance with the International Building Code regulations for frost protection, we recommend that the bottom of all foundations exposed to outside ambient temperatures extend to a minimum depth of 36 inches below adjacent finished grades.

As previously discussed, the loose fill encountered at the site is unsuitable for direct support of shallow foundations without the risk of settlement that could create undesirable cracking in foundation walls, slabs on grade, masonry block and stone or brick facades. For building areas with slabs on grade (e.g., garage or pool house) and for small building areas without basements (e.g., porches, exterior stairs, decks, pergolas, etc.), we recommend that the loose fill soil within the footprint area and extending approximately 3 feet outside the footprint be over excavated down to the native undisturbed soil. The boring data indicates that the excavation depths may be on the order of several feet or less in the west side of the property and up to approximately 8 feet to 10 feet in the east side of the property. The subgrade should be proof rolled and the excavation backfilled in maximum 12-inch thick lifts and compacted to a minimum of 95 percent of their maximum dry density as determined by ASTM Test Method D-1557, The Modified Proctor Test. Shallow foundations and slabs on grade may then be designed to be supported on the compacted fill.

Our analyses indicate that settlements of less than three-quarters of an inch will occur due to the applied building loads provided foundations are supported on the native soils or compacted structural backfill. Differential settlements across the proposed residence will be less than one-half inch. Since the underlying soils consist predominantly of granular soils, we anticipate that the majority of the total settlements will occur as the building loads are applied during construction.

Floor Slabs and Patios

Provided that the required earthwork is accomplished in accordance with the recommendations contained in this report, we recommend that a modulus of subgrade reaction of 150 pounds per cubic inch (pci) be utilized in the structural design of the concrete slabs. The subgrade soils for slabs on-grade, the driveway, patio and walkway areas should be proofrolled with a walk behind vibratory roller to densify the subsoils and delineate unsuitable materials or soft spots. Soft, yielding areas detected by the proof rolling should be removed and replaced as recommended below.



Foundation Excavation and Subgrade Preparation

We anticipate that the Contractor may utilize conventional earth excavating equipment for performing excavations within the in-situ soils. We recommend that all excavations for foundations be hand trimmed, in a workmanlike manner, and that the footing and slab subgrades consisting of granular soil be compacted using a walk-behind, smooth-drum, vibratory roller to densify the subsoils and to delineate soft regions. Any areas exhibiting excessive yielding should be over excavated and backfilled using approved on-site soil or imported Type “G” fill. Fills should be placed in maximum 12-inch thick lifts and compacted to a minimum of 95 percent of their maximum dry density as determined by ASTM Test Method D-1557, The Modified Proctor Test. In the event that foundation excavations are conducted during inclement weather, or if the excavations are left open overnight, we recommend that the foundation subgrades be over-excavated to allow for the placement of a 4-inch thick layer of NJDOT No. 57 coarse graded aggregate. The coarse graded aggregate will serve as a work mat to mitigate disturbance of the subgrade due to construction and inclement weather and will facilitate in-trench dewatering, if necessary. The gradational requirements for NJDOT No. 57 Coarse Graded Aggregate and Type “G” fill are presented in Appendix B.

Stormwater Management Systems

Rigid wall permeability tests (per ASTM D 2434) were conducted on samples obtained from test borings B-1, B-2 and B-3 between depths of approximately 4 feet to 8 feet below the existing ground surface. The laboratory test results indicated an average soil permeability of 3.65 inches/hour. A summary of the individual laboratory permeability test results is included in Appendix C.

Basement Walls and Footing Drains

Below-grade basement walls will need to be designed to resist lateral earth forces and potential hydrostatic pressures from infiltrating stormwater. The lateral earth pressure will be dependent on the type of backfill utilized. To facilitate the design of below-grade walls, we offer the following soil parameters which assume the on-site soil or imported Type “G” soil will be used as backfill:

Total Unit Weight of Soil (γ)	120 pcf
Angle of Soil Internal Friction (Φ)	32°
Active Earth Pressure Coefficient (K_a)	0.31
At-Rest Earth Pressure Coefficient (K_o)	0.47
Passive Earth Pressure Coefficient (K_p)	3.25

Coefficient of Base Friction:

In-Situ Soils (μ)	0.40
Coarse Graded Aggregate (μ)	0.60

Groundwater was observed in the borings at depths ranging from approximately elevation +6 feet at the eastern end of the property sloping up to approximately elevation +11 feet at the western end. Although groundwater should not be an issue for the basement, infiltrating stormwater may periodically collect behind the basement walls during periods of extended precipitation. As such,



it is recommended that the basement walls be damp proofed and a footing drain be installed around the perimeter. The drain should consist of a minimum 4-inch diameter perforated pipe placed within a bedding of NJDOT No. 57 Coarse Graded Aggregate. The No. 57 stone should be surrounded by a non-woven filter fabric.

CLOSING & LIMITATIONS

The recommendations contained herein are contingent upon subsurface conditions remaining consistent with those encountered during our subsurface exploration. They are also contingent upon the basis that all earthwork related and foundation aspects of construction, including controlled fill operations and subgrade preparation be observed by a representative of FPA. This is to observe compliance with the design concepts and specifications and to allow design changes in the event that subsurface conditions differ from those anticipated prior to construction.

The scope of our services did not include any environmental assessment or investigation for the presence or absence of wetlands or hazardous or biologically toxic materials in the soil, surface water, groundwater or air, on or below or around this site.

Services performed by French & Parrello Associates during this project have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty, guarantee, or fiduciary responsibility is included or intended in the services provided.

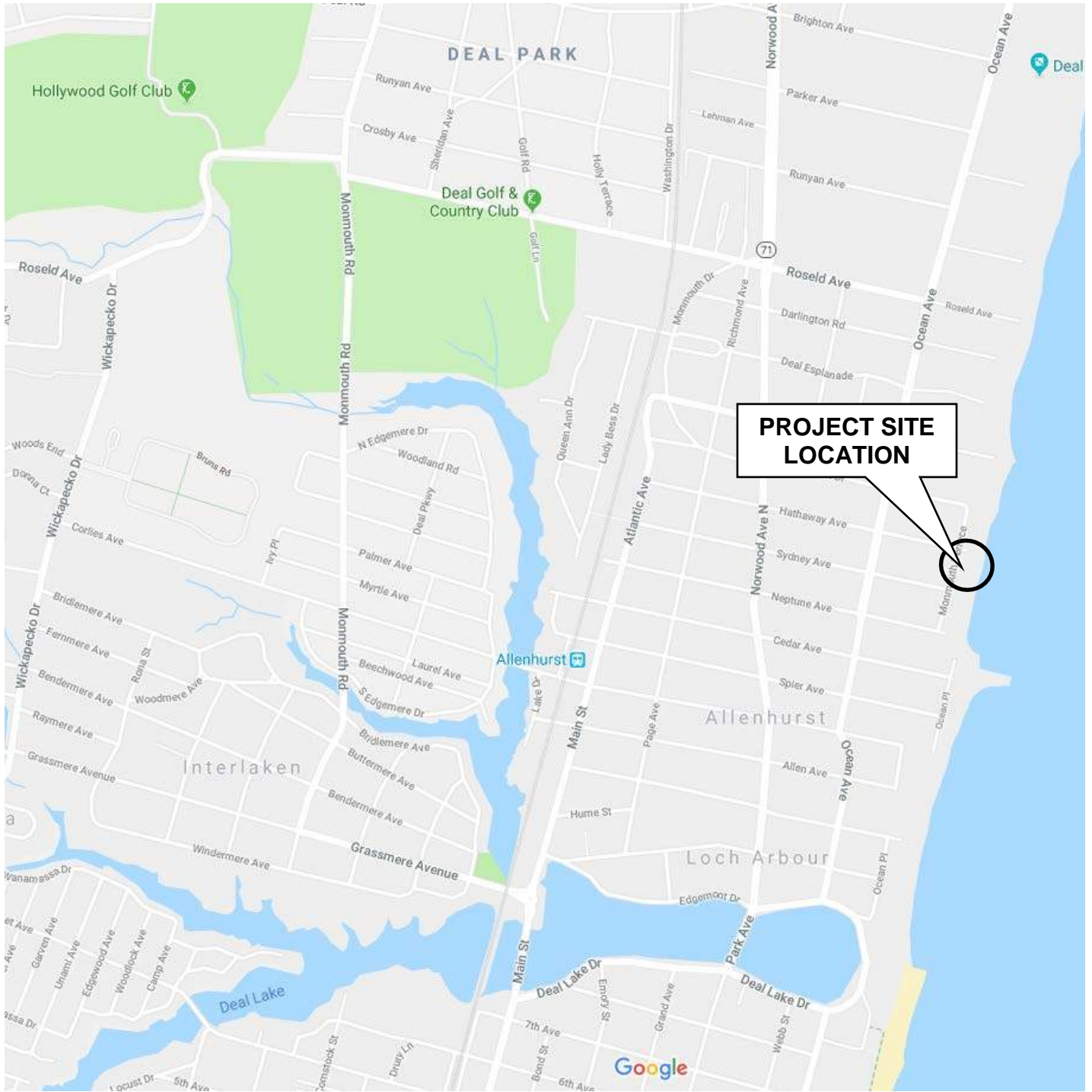
Should you have any questions, please feel free to contact us.

Sincerely,

FRENCH & PARRELLO ASSOCIATES

A handwritten signature in blue ink, appearing to read 'Robert C. Swabsin', is written over a light blue circular stamp.

Robert C. Swabsin, PE
Project Consultant, Geotechnical Services
RCS



REGIONAL LOCATION PLAN

Copyright Google Maps, 2018

**TAMIR RESIDENCE – 9 MONMOUTH TERRACE
 BROROUGH OF DEAL, MONMOUTH COUNTY, NEW JERSEY**

SCALE:

NTS

DATE:

September 2018

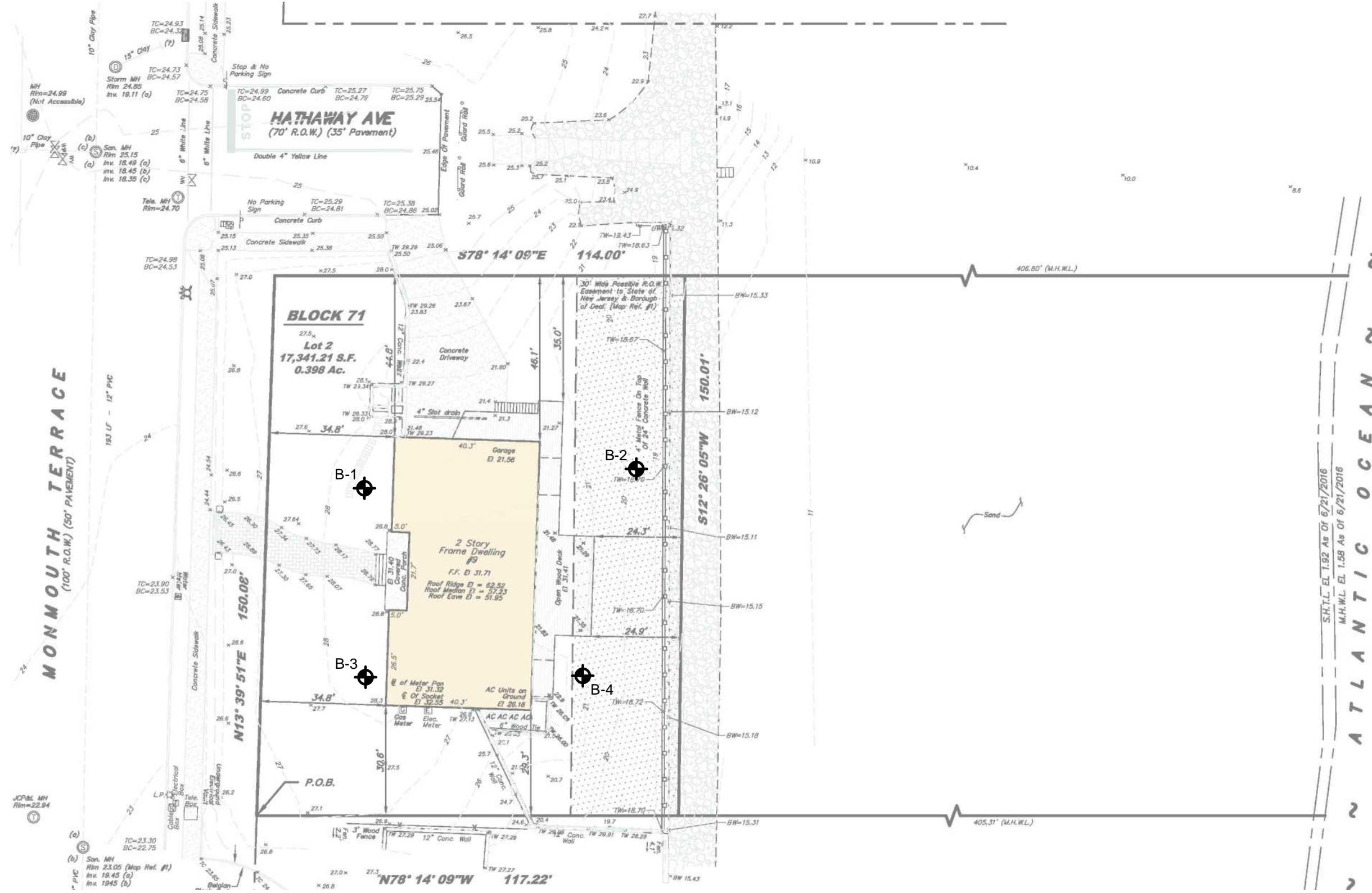
JOB NO.:

13874.001

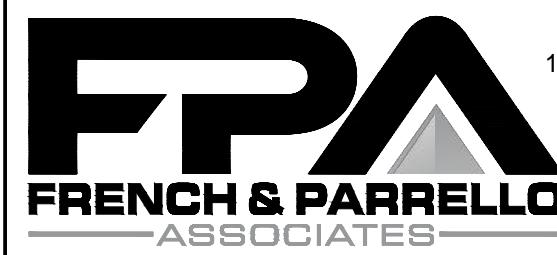
DRAWING NO.:

1

O:\13K\13800\13874 - 9 Monmouth Terrace Plot Plan\CADD\GEO\TECH\13874.001 - BLP 11x17.dwg 11x17
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LEGEND:



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TEST BORING LOCATION PLAN FOR TAMIR RESIDENCE 9 MONMOUTH TERRACE BOROUGH OF DEAL MONMOUTH COUNTY, NEW JERSEY		
DATE: SEPTEMBER 2018	SCALE: APPROX. 1"=30'	DRAWING # 2
DRAWN BY: DMR	PROJECT NUMBER: 13874.001	

APPENDIX A
Test Boring Logs

BURMISTER SOIL CLASSIFICATION SYSTEM

A. Cohesionless Soils: Particle Size Definitions

Soil	Fraction	U.S. Standard Sieve	Actual Sizes
Gravel	coarse	3 in. to 1 in.	76 mm to 25 mm
	medium	1 in. to 3/8 in.	25 mm to 9.5 mm
	fine	3/8 in. to No. 10	9.5 mm to 2.0 mm
Sand	coarse	No. 10 to No. 30	2.0 mm to 0.6 mm
	medium	No. 30 to No. 60	0.6 mm to 0.25 mm
	fine	No. 60 to No. 200	0.25 mm to 0.075 mm
Silt		< No. 200	< 0.075 mm

B. Terms Describing Gradation of Cohesionless Soils

Written Description	Symbol/Designation	Defining Proportions
coarse, medium to fine	cmf	all fractions > 10%
coarse to medium	cm	< 10% fine
medium to fine	mf	< 10% coarse
coarse	c	< 10% medium and fine
medium	m	< 10% coarse and fine
fine	f	< 10% coarse and medium

Note: Use (+) for upper limit and (-) for lower limit.

C. Cohesive Soils: Terms Describing Plasticity

Soil	Plasticity Index	Workability	Plasticity Description
SILT	0	--	Non-Plastic
Clayey SILT	1 to 5	1/4 in. thread	Slightly Plastic
SILT & CLAY	5 to 10	1/8 in. thread	Low Plasticity
CLAY & SILT	10 to 20	1/16 in. thread	Medium Plasticity
Silty CLAY	20 to 40	1/32 in. thread	High Plasticity
CLAY	>40	1/64 in. thread	Very High Plasticity

D. Terms Describing Overall Composition of Soil

Written Proportion	Proportion Symbol	Proportion Percent by Weight
and	a	35 to 50
some	s	20 to 35
little	l	10 to 20
trace	t	1 to 10

Note: Use (+) for upper limit and (-) for lower limit.



TEST BORING LOG

**TAMIR RESIDENCE – 9 MONMOUTH TERRACE
BOROUGH OF DEAL, MONMOUTH COUNTY, NEW JERSEY
(FPA PROJECT NO. 13874.001)**

**BORING NO.: B-1
SHEET 1 OF 1**

DATE STARTED: 9/6/2018
DATE FINISHED: 9/6/2018

DEPTH OF WATER: 17'±
LOCATION: See Plan

GROUND ELEVATION: +28'±
GROUND WATER ELEV.: +11'±

DRILLING TECHNIQUE: Mud Rotary
HAMMER TYPE: 140 lb. Automatic Trip Hammer, 30 Inch Drop

DEPTH FEET	SAMPLE DEPTH	SPT BLOW COUNTS (PER 6")	STRATA	DESCRIPTION OF SOIL
---	S-1 0-2'	2 – 2 – 2 – 2		S-1 TOP 6" : Brown cmf SAND , some Silt. BOT 18" : Orange-Brown cmf SAND , little Silt.
	S-2 2-4'	3 – 3 – 4 – 6		S-2 Orange-Brown cmf SAND , little Silt.
--- 5' ---	S-3 4-6'	6 – 8 – 9 – 11		S-3 Orange-Brown cmf SAND , little Silt.
	S-4 6-8'	11 – 13 – 11 – 10		S-4 Orange-Brown cmf SAND , little Silt.
--- 10' ---	S-5 8-10'	8 – 11 – 9 – 11		S-5 Orange-Brown cmf SAND , little Silt.
	S-6 10-12'	10 – 11 – 10 – 14		S-6 Orange-Brown cmf SAND , little Silt.
---	S-7 15-17'	15 – 33 – 32 – 38		S-7 Yellow-Brown cmf SAND , little ⁺ mf Gravel, trace Silt.
---	S-8 20-22'	15 – 26 – 20 – 21		S-8 Light Grey cmf SAND , little mf Gravel, trace Silt.
---	S-9 25-27'	15 – 18 – 22 – 26		S-9 Light Grey mf SAND , trace Silt.
---			END OF BORING @ 27'	

SOILS ENGINEER: R. SWABSIN, PE
DRILLING INSPECTOR: C. KROSCINSKI, PE

CONTRACTOR: CRAIG TEST BORING
DRILLER: M. GORSKI

The information shown hereon indicates the subsurface conditions encountered at the specific boring location on the date(s) of drilling. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.



TEST BORING LOG

**TAMIR RESIDENCE – 9 MONMOUTH TERRACE
BOROUGH OF DEAL, MONMOUTH COUNTY, NEW JERSEY
(FPA PROJECT NO. 13874.001)**

BORING NO.: B-2
SHEET 1 OF 1

DATE STARTED: 9/6/2018
DATE FINISHED: 9/6/2018

DEPTH OF WATER: 15'±
LOCATION: See Plan

GROUND ELEVATION: +21'±
GROUND WATER ELEV.: +6'±

DRILLING TECHNIQUE: Mud Rotary
HAMMER TYPE: 140 lb. Automatic Trip Hammer, 30 Inch Drop

DEPTH FEET	SAMPLE DEPTH	SPT BLOW COUNTS (PER 6")	STRATA	DESCRIPTION OF SOIL
--- 5' ---	S-1 0-2'	2 – 6 – 4 – 5		S-1 Brown & Orange-Brown mf SAND , little Clayey Silt. (Fill)
	S-2 2-4'	4 – 2 – 1 – 2		S-2 Orange-Brown & Green-Brown cmf SAND , little Clayey Silt. (Fill)
	S-3 4-6'	1 – 1 – 1 – 1		S-3 TOP 12" : Same as S-2 BOT 12" : Light Brown cmf SAND , trace f Gravel, trace Silt. (Fill)
	S-4 6-8'	1 – WOH – 1 – WOH		S-4 Brown cmf SAND , little Silt. (Fill)
	S-5 8-10'	1 – 2 – 2 – 2		S-5 Brown cmf SAND , little Silt. (Possible Fill)
--- 10' ---	S-6 10-12'	3 – 5 – 8 – 8		S-6 Light Brown cmf SAND , trace mf Gravel, trace Silt.
	S-7 15-17'	8 – 8 – 9 – 10		S-7 Light Grey cmf SAND , trace f Gravel, trace Silt.
--- 20' ---	S-8 20-22'	10 – 12 – 12 – 10		S-8 Light Brown cmf SAND , trace Silt.
--- 25' ---	S-9 25-27'	4 – 9 – 10 – 10		S-9 Orange-Brown c+m SAND , little Silt. (with one 1" thick Light Brown Silty Clay lense)
--- 30' ---				END OF BORING @ 27'
--- 35' ---				
--- 40' ---				

SOILS ENGINEER: R. SWABSIN, PE
DRILLING INSPECTOR: C. KROCHINSKI, PE

CONTRACTOR: CRAIG TEST BORING
DRILLER: M. GORSKI

The information shown hereon indicates the subsurface conditions encountered at the specific boring location on the date(s) of drilling. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.



TEST BORING LOG

**TAMIR RESIDENCE – 9 MONMOUTH TERRACE
BOROUGH OF DEAL, MONMOUTH COUNTY, NEW JERSEY
(FPA PROJECT NO. 13874.001)**

**BORING NO.: B-3
SHEET 1 OF 1**

DATE STARTED: 9/6/2018
DATE FINISHED: 9/6/2018

DEPTH OF WATER: 17'±
LOCATION: See Plan

GROUND ELEVATION: +28'±
GROUND WATER ELEV.: +11'±

DRILLING TECHNIQUE: Mud Rotary
HAMMER TYPE: 140 lb. Automatic Trip Hammer, 30 Inch Drop

DEPTH FEET	SAMPLE DEPTH	SPT BLOW COUNTS (PER 6")	STRATA	DESCRIPTION OF SOIL
	S-1 0-2'	2 – 2 – 2 – 2		S-1 TOP 12" : Brown cmf SAND , some Clayey Silt. BOT 12" : Brown cmf SAND , little Silt. (Possible Fill)
	S-2 2-4'	5 – 6 – 6 – 5		S-2 Orange-Brown cmf SAND , little Silt.
--- 5' ---	S-3 4-6'	4 – 5 – 5 – 6		S-3 Orange-Brown cmf SAND , little Silt.
	S-4 6-8'	8 – 9 – 10 – 10		S-4 Orange-Brown cmf SAND , little Silt.
	S-5 8-10'	10 – 9 – 8 – 9		S-5 Orange-Brown cmf SAND , little Silt.
--- 10' ---	S-6 10-12'	11 – 15 – 16 – 20		S-6 Orange-Brown cmf SAND , little Silt.
--- 15' ---	S-7 15-17'	13 – 19 – 22 – 26		S-7 Brown c+m SAND , little+ mf Gravel, trace+ Silt.
--- 20' ---	S-8 20-22'	8 – 16 – 16 – 18		S-8 Light Brown cmf SAND , little f Gravel, trace Silt.
--- 25' ---	S-9 25-27'	13 – 17 – 20 – 24		S-9 Light Grey cmf SAND , trace Silt.
--- 30' ---				END OF BORING @ 27'
--- 35' ---				
--- 40' ---				

SOILS ENGINEER: R. SWABSIN, PE
DRILLING INSPECTOR: C. KROSCINSKI, PE

CONTRACTOR: CRAIG TEST BORING
DRILLER: M. GORSKI

The information shown hereon indicates the subsurface conditions encountered at the specific boring location on the date(s) of drilling. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.



TEST BORING LOG

**TAMIR RESIDENCE – 9 MONMOUTH TERRACE
BOROUGH OF DEAL, MONMOUTH COUNTY, NEW JERSEY
(FPA PROJECT NO. 13874.001)**

BORING NO.: B-4
SHEET 1 OF 1

DATE STARTED: 9/6/2018
DATE FINISHED: 9/6/2018

DEPTH OF WATER: 15'±
LOCATION: See Plan

GROUND ELEVATION: +21'±
GROUND WATER ELEV.: +6'±

DRILLING TECHNIQUE: Mud Rotary
HAMMER TYPE: 140 lb. Automatic Trip Hammer, 30 Inch Drop

DEPTH FEET	SAMPLE DEPTH	SPT BLOW COUNTS (PER 6")	STRATA	DESCRIPTION OF SOIL
	S-1 0-2'	2 – 3 – 2 – 3		S-1 Brown mf SAND , some Clayey Silt, trace f Gravel. (Possible Fill)
	S-2 2-4'	6 – 4 – 4 – 5		S-2 Brown cmf SAND , little Clayey Silt. (Possible Fill)
--- 5' ---	S-3 4-6'	4 – 3 – 3 – 2		S-3 No Recovery. (Rock in tip of spoon)
	S-4 6-8'	3 – 2 – 2 – 2		S-4 No Recovery. (Rock in tip of spoon)
--- 10' ---	S-5 8-10'	2 – 2 – 3 – 4		S-5 Light Brown cmf SAND , little Silt. (Possible Fill)
	S-6 10-12'	5 – 6 – 6 – 8		S-6 TOP 18": Same as S-5 . BOT 6": Light Grey cmf SAND , trace Silt.
--- 15' ---	S-7 15-17'	9 – 14 – 15 – 15		S-7 Light Grey c+m SAND , trace Silt.
--- 20' ---	S-8 20-22'	10 – 12 – 13 – 13		S-8 Light Grey cmf SAND , little f Gravel, trace Silt.
--- 25' ---	S-9 25-27'	10 – 9 – 12 – 16		S-9 Light Grey cmf SAND , little f Gravel, trace Silt.
--- 30' ---				END OF BORING @ 27'
--- 35' ---				
--- 40' ---				

SOILS ENGINEER: R. SWABSIN, PE
DRILLING INSPECTOR: C. KROSCINSKI, PE

CONTRACTOR: CRAIG TEST BORING
DRILLER: M. GORSKI

The information shown hereon indicates the subsurface conditions encountered at the specific boring location on the date(s) of drilling. Subsurface conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

APPENDIX B
Gradational Requirements

Allowable Gradational Envelope

AASHTO M43

Standard Sizes of Coarse Aggregate Size No. 57

U.S. Standard Sieve Size

Percent Finer by Weight

1 1/2"	100
1"	95 - 100
1/2"	25 - 60
No. 4	0 - 10
No. 8	0 - 5

Allowable Gradational Envelope

Type "G" Fill

GRANULAR FILL

<u>U.S. Standard Sieve Size</u>	<u>Percent Finer By Weight</u>
2"	100
1"	80 – 100
3/8"	70 – 100
No. 10	50 – 100
No. 30	30 – 85
No. 60	15 – 65
No. 200	5 - 15

APPENDIX C
Laboratory Test Results



SUMMARY OF LABORATORY TESTING



PROJECT: 9 Monmouth Terrace

PROJECT #: 13874.001

DATE: 9/18

Boring & Sample Number	Depth (ft)	Classification	Natural Water Content %	Atterberg Limits		Unconfined Compression		Unit Dry Weight PCF	Specific Gravity	Permeability inches / hour @ 20 deg C	Compaction	Grain Size	Consolidation	Triaxial	% Passing #200	pH	Organic Content %	
				Liquid Limit	Plastic Limit	Stress TSF	Strain %											
B-1 S-3 - S-4	4 - 8	Orange Brown mf SAND, trace+ Silt	8					96.7		2.74								
B-2 S-3 - S-4	4 - 8	Light Brown cmf SAND, trace+ Silt	9					102.0		5.81								
B-3 S-3 - S-4	4 - 8	Orange Brown mf SAND, trace+ Silt	7					100.1		2.41								

* SEE TEST CURVES