June 7th, 2016

Mr. Todd Glaser
PO Box 402249

RE: SFR
503 E Dilido Dr. Miami Beach, FL 33139

To whom it may concern,

This letter presents the results of All State Engineering & Testing Consultants, Inc. (ASETC) Geotechnical Engineering Study for the above referenced project. The purpose of the geotechnical engineering study was to evaluate the site subsurface conditions and provide foundation recommendations for the project.

Project Description

Our understanding of the site is based on our observations during our subsurface investigation. Information you provided to us indicates the project consists of the construction of a SFR.

Test Method and Subsurface Investigation

The borings were conducted in accordance with procedures outlined for Standard Penetration Test and split spoon sampling of soils by ASTM Method D-1586.

Two (2) feet long, two (2) inches O.D. split spoon sampler was driven into the ground by successive blows with a 140 lbs hammer dropping thirty (30) inches. The soil sampler was driven two (2) feet at a time (continuous method) then extracted for visual examination and classification of the soil samples.

The number of blows required for one (1) foot penetration of the sample is designated as "N" (known as the standard Penetration Resistance Value). The N Value provides an indication of the relative density of non-cohesive soils and the consistency of cohesive soils. A general evaluation of soils is made from the established correlation between "N" and the relative density or consistency of soils. This dynamic method of soil testing has been widely accepted by foundation engineers and architects to conservatively evaluate the bearing capacity of soils.

The subsurface investigation consisted of performing three (3), 30-ft deep Standard Penetration Test (SPT) borings (B-1, B-2, and B-3). The borings were performed on June 6, 2016.

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Based on the information obtained from the SPT borings, Boring B-1 comprised of Topsoil from 0'-0" to 0'-2", Tan medium Beach Sand with Shells from 0'-2" to 3'-0" with N values ranging from 4 to 8, Grey Beach Sand with Shells from 3'-0" to 6'-0" with N values ranging from 2 to 4, Peat from 6'-0" to 11'-0" with N values ranging from 6 to 12, Grey medium Beach Sand with Shells from 11'-0" to 18'-0" with N values ranging from 6 to 32, Tan Lime Sand and Lime Stone from 18'-0" to 30'-0" with N values ranging from 57 to 104.

Boring B-2 comprised of Topsoil from 0'-0" to 0'-2", Tan medium Beach Sand with some Rocks and Shells from 0'-2" to 3'-0" with N values ranging from 4 to 7, Tan Beach Sand mixed with Silt from 3'-0" to 7'-6" with N values ranging from 2 to 4, Grey medium Beach Sand with Peat from 7'-6" to 12'-0" with N values ranging from 3 to 13, Grey medium Beach Sand from 12'-0" to 17'-6" with N values ranging from 12 to 28, Tan Lime Stone from 17'-6" to 30'-0" with N values ranging from 28 to 102.

Boring B-3 comprised of Topsoil from 0'-0" to 0'-2", Black medium Sand with Roots from 0'-2" to 0'-6", Tan medium Beach Sand from 0'-6" to 3'-0" with N value 6, Silt from 3'-0" to 4'-8" with N value 6, Grey medium Beach Sand with Shells and Peat traces from 4'-8" to 11'-0" with N values ranging from 3 to 21, Grey medium Beach Sand with Shells from 11'-0" to 18'-0" with N values ranging from 21 to 35, Tan Lime Rock from 18'-0" to 30'-0" with N values ranging from 47 to 104.

Detailed subsurface information is provided in the attached SPT Soil Boring Reports.

Groundwater Conditions

The groundwater table was first encountered approximately 3'-2" below the existing ground surface during the performance of the borings. The groundwater elevation is expected to change with seasonal and tidal fluctuations, and during storm/hurricane events. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Foundation Evaluation and Recommendations

Based on the encountered subsurface conditions, we have evaluated a number of foundation systems for the project. Special consideration in the analysis was given due to the location of the property being in an area classified as a Special Flood Hazard Zone. Additionally, there exists the unsuitable soil strata of Silt (B-1: 3'-0" to 6'-0"; B-2: 3'-0" to 7'-6"; B-3: 3'-0" to 4'-8") and the unsuitable organic layer of Peat (B-1: 6'-0" to 11'-0"; B-2: 7'-6" to 12'-0"; B-3: 4'-8" to 11'-0") which have N values that classify the soil's relative density as Loose.

Because of these factors, we have selected the use of Augercast Piles and Helical Piles or Pin Piles. A deep foundation would serve to keep the house in place in case of tidal surges/flood event. Also, the use of a foundation system using piling would bypass the unsuitable soils and organics and allow the direct transfer of the proposed structural loads to the limestone layer encountered below, thereby providing a stable foundation. The following pile criteria should be used to design the support of the proposed structure:

Augercast Piles:

The capacity of these piles is essentially developed in tip bearing and side friction. The analysis for this foundation option consisted of determining a pile capacity for a specific size and depth of installation. The relationship obtained is as follows:

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Pile Diameter	Proposed Depth	Allowable Compressive Capacity	Allowable Tensile Capacity	Allowable Lateral Capacity
14"	25'	35 tons	8 tons	2 tons

The Augercast Piles should be installed with a minimum embedment of 3 ft into the limestone layer. Grout strength and steel reinforcement size should be determined by the Structural Engineer. ASETC should be provided with drawings and structural details upon their development for our review. A minimum of three (3) indicator piles should initially be installed at strategic locations in order to verify the suggested pile depth. The pile installation should be inspected to confirm compliance with depth penetration, continuity of grout, and reinforcing details.

Helical Piles:

The capacity of these piles is essentially developed in tip bearing and side friction. The analysis for this foundation option consisted of determining a pile capacity for a specific size and depth of installation. The relationship obtained is as follows:

Type	Shaft Diameter	Proposed Depth	Allowable Compressive Capacity	Allowable Tensile Capacity
Type B Helix Pile	3.5"	25'	15 tons	5 tons

The Helical Piles' helix size/number and required installation torque should be determined by the Structural Engineer. ASETC should be provided with drawings and structural details upon their development for our review. Please refer to the chosen helical pile manufacturer's guide for termination and installation requirements. Helix size/number and/or final depth (shallower or deeper) may need to be adjusted according to torque values obtained during installation. A minimum of three (3) indicator piles should initially be installed at strategic locations in order to verify the suggested pile depth. The pile installation should be inspected to confirm compliance with torque requirements and depth.

Pin Piles:

The capacity of these piles is essentially developed in tip bearing. The analysis for this foundation option consisted of determining a pile capacity for a specific pile size and depth of installation. The relationship obtained is as follows:

Pile O.D.	Proposed Depth	Allowable Compressive Capacity	Allowable Tensile Capacity
4"	25'	5 tons	1 ton

Grout strength and steel reinforcement size should be determined by the Structural Engineer. ASETC should be provided with drawings and structural details upon their development for our review. A minimum of three (3) indicator piles should initially be installed at strategic locations in order to verify the suggested pile depth. The pile installation should be inspected to confirm compliance with depth penetration, continuity of grout, and reinforcing details.

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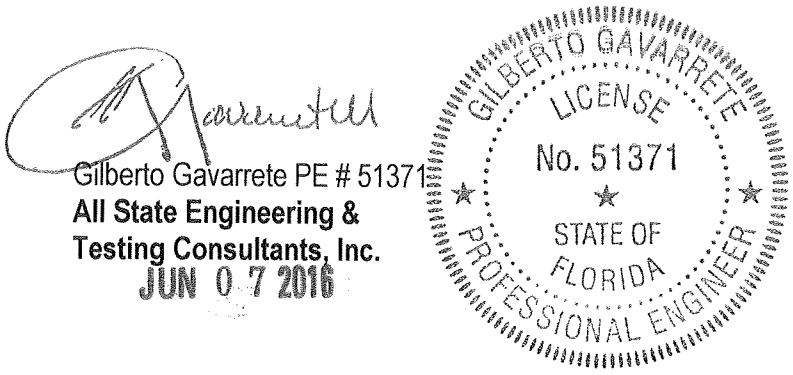
Limitations

Regardless of the thoroughness of our geotechnical exploration there is always a possibility that conditions on the subject project may be different from those at the test locations. Therefore, should any subsoil conditions different from those reported in our boring logs be encountered during construction, All State Engineering and Testing Consultants, Inc. should be notified immediately.

The conclusions provided by All State Engineering & Testing Consultants, Inc. are based solely on the information presented in this report. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

We appreciate the opportunity to have been of service to you. Please feel free to contact us if there are any questions or comments pertaining to this report.

Sincerely,



Gilberto Gavarrete PE # 51371
All State Engineering &
Testing Consultants, Inc.
JUN 07 2016

ATTACHMENT 1.0 – BORING LOG
ATTACHMENT 2.0 – BORING LOCATION MAP

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ATTACHMENT 1.0 – BORING LOG

ALL STATE ENGINEERING

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TESTING LABORATORIES-ENGINEERS-INSPECTION SERVICES-CHEMIST-DRILLING-ENIVIRONMENTAL SERVICES

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SPT SOIL BORING REPORT

CLIENT:	Todd Glaser	**Page:**	1 of 3
CLIENT ADDRESS:	PO Box #402249	**Report #:**	1
PROJECT:	SFR	**Boring #:**	B-1
PROJECT ADDRESS:	503 E Dilido Dr. Miami Beach, FL 33139	**Date:**	6/6/16
BORING LOCATION:	See the attached Boring Location Map	**Driller:**	AG

DEPTH (FEET)	DESCRIPTION OF MATERIALS	Sample No.	Hammer blows on sampler		"N" Value
1	0'-0" to 0'-2" Topsoil				
2	0'-2" to 3'-0" Tan medium Beach Sand with Shells	0'-2'	4 / 3	5 / 2	8
3					
4	3'-0" to 6'-0" Grey Beach Sand with Shells and Silt	2'-4'	2 / 1	3 / 1	4
5					
6		4'-6'	1 / 1	1 / 1	2
7	6'-0" to 11'-0" Peat				
8		6'-8'	2 / 3	3 / 4	6
9					
10		8'-10'	4 / 6	6 / 5	12
11					
12	11'-0" to 18'-0" Grey medium Beach Sand with Shells	10'-12'	3 / 4	2 / 6	6
13					
14		12'-14'	6 / 8	7 / 9	15
15					
16		14'-16'	11 / 12	10 / 11	22
17					
18		16'-18'	10 / 19	13 / 22	32
19	18'-0" to 30'-0" Tan Lime Sand and Lime Stone				
20		18'-20'	25 / 29	28 / 31	57
21					
22		20'-22'	30 / 31	32 / 30	63
23					
24		22'-24'	36 / 39	34 / 43	73
25					
26		24'-26'	41 / 42	40 / 45	82
27					
28		26'-28'	43 / 40	42 / 46	82
29					
30		28'-30'	48 / 51	53 / 61	104

End of Boring @ 30'-0"

WATER TABLE: 3'-4" below surface

GILBERTO GAVARRETE LICENSE No. 51371 STATE OF FLORIDA PROFESSIONAL ENGINEER

Respectfully Submitted:

JUN 07 2016

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SPT SOIL BORING REPORT

CLIENT:	Todd Glaser	**Page:**	2 of 3
CLIENT ADDRESS:	PO Box #402249	**Report #:**	1
PROJECT:	SFR	**Boring #:**	B-2
PROJECT ADDRESS:	503 E Dilido Dr. Miami Beach, FL 33139	**Date:**	6/6/16
BORING LOCATION:	See the attached Boring Location Map	**Driller:**	AG

DEPTH (FEET)	DESCRIPTION OF MATERIALS	Sample No.	Hammer blows on sampler		"N" Value
1	0'-0" to 0'-2" Topsoil				
2	0'-2" to 3'-0" Tan medium Beach Sand with some Rocks and Shells	0'-2'	4	3	7
3			4	5	
4	3'-0" to 7'-6" Tan Beach Sand mixed with Silt	3	3	2	4
5			2	1	
6		4'-6'	1	1	2
7			1	1	
8	7'-6" to 12'-0" Grey medium Beach Sand with Peat	6'-8'	1	1	3
9			2	3	
10		8'-10'	3	4	7
11			3	2	
12		10'-12'	2	7	13
13	12'-0" to 17'-6" Grey medium Beach Sand		6	5	
14		12'-14'	5	6	12
15			6	7	
16		14'-16'	8	7	16
17			9	11	
18	17'-6" to 30'-0" Tan Lime Stone	16'-18'	10	13	28
19			15	18	
20		18'-20'	17	22	51
21			29	31	
22		20'-22'	30	32	63
23			31	30	
24		22'-24'	30	31	63
25			32	30	
26		24'-26'	34	41	83
27			42	43	
28		26'-28'	45	46	94
29			48	53	
30		28'-30'	51	50	102
			52	51	

End of Boring @ 30'-0"

WATER TABLE: 3'-4" below surface

Respectfully Submitted:

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SPT SOIL BORING REPORT

CLIENT:	Todd Glaser	**Page:**	3 of 3
CLIENT ADDRESS:	PO Box #402249	**Report #:**	1
PROJECT:	SFR	**Boring #:**	B-3
PROJECT ADDRESS:	503 E Dilido Dr. Miami Beach, FL 33139	**Date:**	6/6/16
BORING LOCATION:	See the attached Boring Location Map	**Driller:**	AG

DEPTH (FEET)	DESCRIPTION OF MATERIALS	Sample No.	Hammer blows on sampler		"N" Value
1	0'-0" to 0'-2" Topsoil				
2	0'-2" to 0'-6" Black medium Sand with Roots	0'-2'	3	2	6
3	0'-6" to 3'-0" Tan Medium Beach Sand		4	3	
4	3'-0" to 4'-8" Silt	2'-4'	2	5	6
			1	1	
5	4'-8" to 11'-0" Grey medium Beach Sand with Shells and Peat traces				
6		4'-6'	1	1	3
7			2	3	
8		6'-8'	4	5	11
9			6	7	
10		8'-10'	7	8	17
11			9	10	
12	11'-0" to 18'-0" Grey medium Beach Sand with Shells	10'-12'	9	11	21
13			10	11	
14		12'-14'	12	13	25
15			12	15	
16		14'-16'	14	16	34
17			18	17	
18		16'-18'	19	17	35
19	18'-0" to 30'-0" Tan Lime Rocks		18	17	
20		18'-20'	15	22	47
21			25	31	
22		20'-22'	30	32	65
23			33	32	
24		22'-24'	31	30	64
25			34	33	
26		24'-26'	32	35	70
27			35	43	
28		26'-28'	41	40	82
29			42	40	
30		28'-30'	44	53	104
			51	52	

End of Boring @ 30'-0"

WATER TABLE: 3'-2" below surface

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JUN 07 2016

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ATTACHMENT 2.0 – BORING LOCATION MAP

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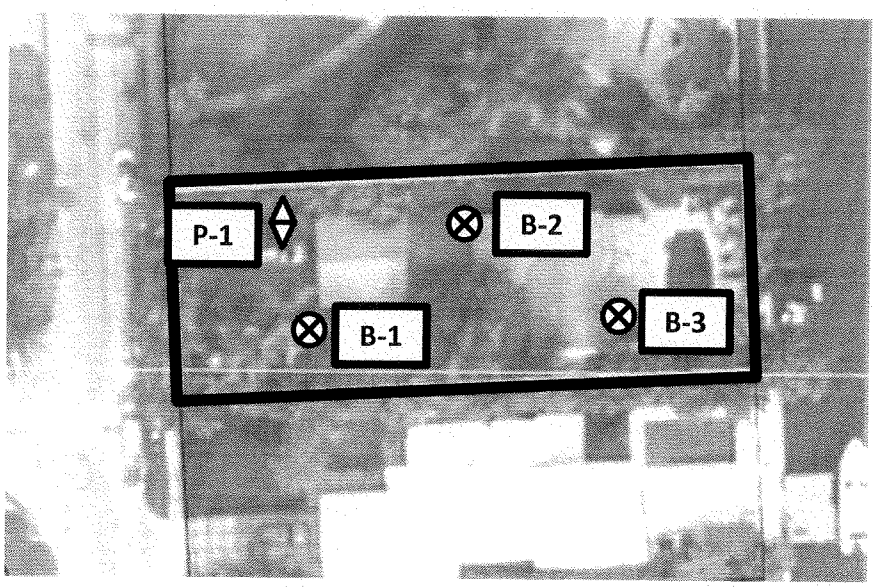
Boring Location Map
503 E Dilido Dr. Miami Beach, FL 33139



Legend:

- Property Boundary
- Boring Location
- Percolation Location

N

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PERCOLATION TEST

USUAL OPEN HOLE - CONSTANT HEAD

DATE:	June 6th, 2016	**Test Number:**	P-1.a
CLIENT:	Todd Glaser		
CLIENT ADDRESS:	PO Box #402249		
PROJECT:	SFR		
PROJECT ADDRESS:	503 E Dilido Dr. Miami Beach, FL 33139		
LOCATION OF TEST:	See the attached Boring Location Map		

INTERVAL	ELAPSED TIME (MINUTES)	GPM
1	1:00	9
2	1:00	9
3	1:00	9
4	1:00	9
5	1:00	9
6	1:00	8
7	1:00	8
8	1:00	8
9	1:00	7
10	1:00	7

DEPTH OF HOLE : 5 feet **DIA. OF HOLE :** 0.5 feet **PERC. RATE:** 8.3 GPM

DEPTH OF WATER TABLE BELOW GROUND SURFACE : 3 feet

SATURATED HOLE DEPTH : 2 feet **STABILIZED FLOW RATE:** 0.018492

k-VALUE: 1.04E-03

SUBSURFACE INVESTIGATION

Depth Below Ground Surface	Soil Description
0'-0" to 0'-2"	Topsoil
0'-2" to 0'-6"	Black medium Sand with Shells
0'-6" to 3'-6"	Tan medium Beach Sand with Shells and some Silt
3'-6" to 5'-0"	Peat

Field Technician: AG
Typed by: PO

GILBERTO GAVARRETE LICENSE No. 51371 STATE OF FLORIDA PROFESSIONAL ENGINEER

Respectfully Submitted

JUN 07 2016

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PERCOLATION TEST

USUAL OPEN HOLE - CONSTANT HEAD

DATE:	June 6th, 2016	**Test Number:**	P-1.b
CLIENT:	Todd Glaser		
CLIENT ADDRESS:	PO Box #402249		
PROJECT:	SFR		
PROJECT ADDRESS:	503 E Dilido Dr. Miami Beach, FL 33139		
LOCATION OF TEST:	See the attached Boring Location Map		

INTERVAL	ELAPSED TIME (MINUTES)	GPM
1	1:00	12
2	1:00	12
3	1:00	12
4	1:00	11
5	1:00	11
6	1:00	11
7	1:00	10
8	1:00	10
9	1:00	10
10	1:00	9

DEPTH OF HOLE : 10 feet **DIA. OF HOLE :** 0.5 feet **PERC. RATE:** 10.8 GPM

DEPTH OF WATER TABLE BELOW GROUND SURFACE : 3 feet

SATURATED HOLE DEPTH : 7 feet **STABILIZED FLOW RATE:** 0.024063

k-VALUE: 5.62E-04

SUBSURFACE INVESTIGATION

Depth Below Ground Surface	Soil Description
0'-0" to 0'-2"	Topsoil
0'-2" to 0'-6"	Black medium Sand with Shells
0'-6" to 3'-6"	Tan medium Beach Sand with Shells and some Silt
3'-6" to 7'-8"	Peat
7'-8" to 10'-0"	Grey medium Beach Sand

Field Technician: AG
Typed by: PO

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Respectfully Submitted

JUN 07 2016

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