



September 17, 2021

Mr. Maurice Rudolph
HYDRY Company, LLC
4314 Pablo Oaks Court
Jacksonville, Florida 32224

ECS Project No. 35:29020-A1
Client ID: 3524

Reference: Preliminary Report of Geotechnical Exploration
River Landing Lot 46
Nocatee, St. Johns County, Florida

Dear Mr. Rudolph:

ECS Florida, LLC (ECS) has completed the requested preliminary geotechnical exploration in general accordance with our Proposal No. 35:17711-GPR dated April 5, 2021. The exploration was performed to explore the general subsurface conditions within the proposed lot area and to provide preliminary recommendations for foundation support.

Additional field testing should be performed to formulate detailed foundation design and site preparation and earthwork construction recommendations prior to final design. Once more detailed information regarding the proposed structure is developed, we should be given the opportunity to review and develop a supplemental design-phase scope of services.

PROJECT INFORMATION

The general site location is shown on the Site Location Diagram (Figure 1). At the time of our exploration, the site was undeveloped, with ground surface cover consisting of brush and trees. Surface water was not observed near the planned building area at the time of our exploration.

You provided a copy of a site plan for the subject site. This plan indicates the boundary limits for the property and the existing roadways adjacent to the site. However, we note the location of the proposed structure(s) was not available to our office at the time of this report preparation.

The following information explains our assumptions of the planned development.

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
# of Stories	3 stories above grade
Usage	Residential
Column Loads ⁽¹⁾	50 kips
Wall Loads ⁽¹⁾	3 kips per linear foot (klf) maximum
Floor Loads ⁽¹⁾	150 pounds per square foot (psf) maximum
Fill and Cut Heights	Assumed a maximum of 3 feet of fill and only minor cuts, from existing site grades

(1) If actual structural loads differ from these assumed loads ECS must be contacted immediately in order to revise building foundation recommendations and settlement calculations, as needed.

FIELD EXPLORATION

We performed a field exploration on July 23, 2021 and July 27, 2021. The approximate boring locations are indicated on the attached Field Exploration Diagram (Figure 2). Our personnel determined the boring locations using a handheld Global Positioning System (GPS) unit. The boring locations on the referenced Field Exploration Diagram should be considered accurate only to the degree implied by the method of measurement used.

We located and performed two Standard Penetration Test (SPT) borings, drilled to depths of approximately 25 feet below the existing ground surface, in general accordance with the methodology outlined in ASTM D 1586 and two auger borings, drilled to depths of approximately 10 feet below the existing ground surface in general accordance with the methodology outlined in ASTM D 1452 to explore the subsurface conditions within the lot area. Soil samples recovered during performance of the borings were visually classified in the field and representative portions of the samples were transported to our laboratory for further evaluation. Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures.

VISUAL CLASSIFICATION

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System (USCS)). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

GENERAL SUBSURFACE CONDITIONS

A graphical presentation of the generalized subsurface conditions is presented on Figure 3. It should be understood that the soil conditions will vary between the boring locations and in areas of the site not explored during our visit. The following table summarizes the soil conditions encountered.

Typical Depth (ft)		Stratum	Description
From	To		
Existing Ground Surface	0.5 – 1	N/A	Topsoil
0.5 – 1	2 – 6	I	Very Loose to Medium Dense FINE SAND (SP) and FINE SAND WITH SILT (SP-SM), With Shell Fragments, Moist
2 – 6	25	II	Loose to Very Dense FINE SAND (SP), FINE SAND WITH SILT (SP-SM), FINE SAND WITH CLAY (SP-SC), CLAYEY FINE SAND (SC), Moist to Wet

As an exception, Boring NB66 encountered a layer of organic material (silty fine sand with organic fines) at a depth between approximately 4 feet to 4 ½ feet below existing grades, respectively. We do not consider this layer suitable to remain in place below proposed structures.

A graphical presentation of the subsurface conditions is shown on the Generalized Subsurface Soil Profiles in Appendix A.

Groundwater was encountered at each boring location and recorded at the time of drilling at depths varying from 7.4 feet to 7.8 feet below the existing ground surface. We note that groundwater levels will fluctuate due to seasonal climatic variations, surface water runoff patterns, construction operations, and other interrelated factors. The groundwater depth at each boring location is noted on the Generalized Subsurface Profiles and on the Log of Boring records.

PRELIMINARY DESIGN RECOMMENDATIONS

Our geotechnical engineering evaluation of the site and subsurface conditions at the property, with respect to the planned construction and our recommendations for earthwork and foundation support, are based on (1) our site observations, (2) the field and laboratory test data obtained, (3) our understanding of the project information and structural conditions as presented in this report, and (4) our experience with similar soil and loading conditions.

Additional field testing should be performed to formulate detailed foundation design and site preparation and earthwork construction recommendations prior to final design. Also, the discovery of any site or subsurface conditions during construction that deviate from the data obtained during this geotechnical exploration should also be reported to us for our evaluation.

Based on the above preliminary evaluation of the site and subsurface conditions at the borings with respect to the anticipated construction, it appears the proposed structure can be constructed on a conventional shallow foundation system provided the organic-containing soils are removed from below the structure.

Conventional Shallow Foundation Support – (Option 1)

The planned residential structure can be supported by a conventional shallow foundation system (“spread footings”) provided the site is properly prepared. As described previously, one boring encountered organic containing material at a depth of 4 feet to 4 ½ feet below the existing ground surface. While the overlying sands with shell fragments appear suitable for structural fill, we do not recommend that this organic-containing material be left in-place below the planned structure. We therefore recommend that this material be removed from within and 5-feet beyond planned structural areas. The overlying sands with shell fragments can be replaced in the resulting excavation and compacted in lifts. We recommend additional

test pits be performed prior to or concurrent with over-excavation to better delineate the horizontal extents of materials requiring removal. Subsequent to these site preparation activities, we expect that shallow spread foundations can be designed for an allowable bearing capacity of 2,500 psf.

Deep Foundation Support – (Option 2)

The organic-containing soils can be left in-place if the proposed structure (including the floor slabs) is supported by deep foundations. There are several types of deep foundations; however, based on our experience with similar projects and soil conditions, Auger Cast In-Place (ACIP) piles are applicable. ACIP piles are constructed by drilling into the subsurface material with a continuous flight auger which is pulled upward (after achieving the required length) while cement grout is pumped under pressure through the auger. Based on our experience with similar soil conditions, we expect that a 14-inch ACIP bearing 25-feet below the existing grades may develop an axial capacity on the order of 18 tons.

REPORT LIMITATIONS

Our geotechnical exploration has been performed, our findings obtained, and our recommendations prepared, in accordance with generally accepted geotechnical engineering principles and practices. ECS is not responsible for any independent conclusions, interpretation, opinions, or recommendations made by others based on the data contained in this report. Additional field testing should be performed to formulate detailed foundation design and site preparation and earthwork construction recommendations prior to final design.

Respectfully Submitted

ECS FLORIDA, LLC

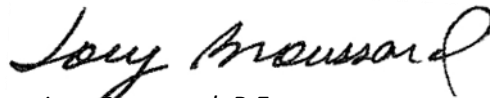


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APPENDICES

Appendix A – Drawings & Reports

- Figure 1 - Site Location Diagram
- Figure 2 - Field Exploration Diagram
- Figure 3 – Generalized Subsurface Profiles

Appendix B – Field Operations

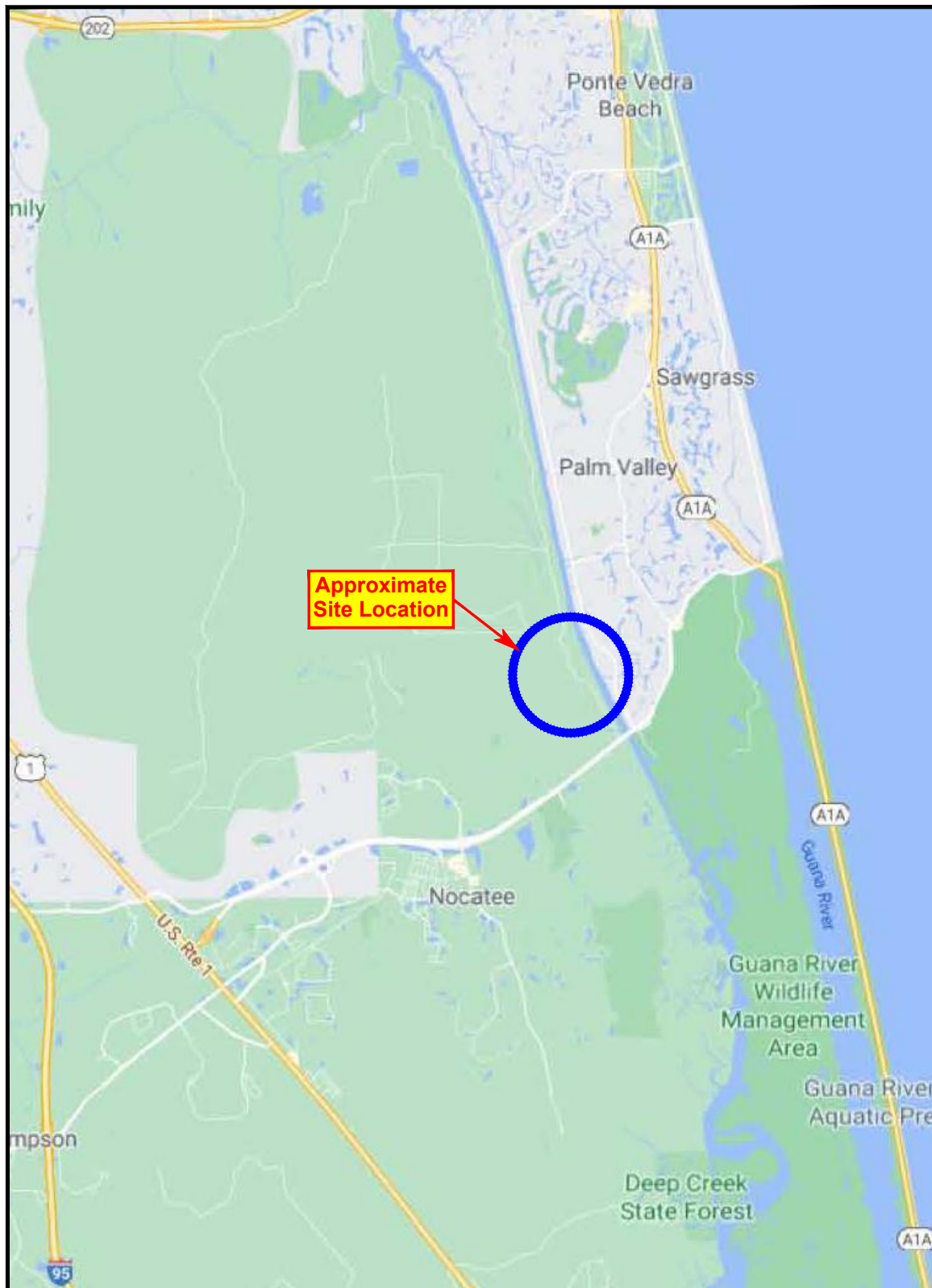
- Reference Notes for Boring Logs
- Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
- Boring Logs

Appendix A – Drawings & Reports

Figure 1 - Site Location Diagram

Figure 2 - Field Exploration Diagram

Figures 3 - Generalized Subsurface Profile



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Site Location Diagram
River Landing Natural Lots - Lot 46
 St. Johns County, Florida

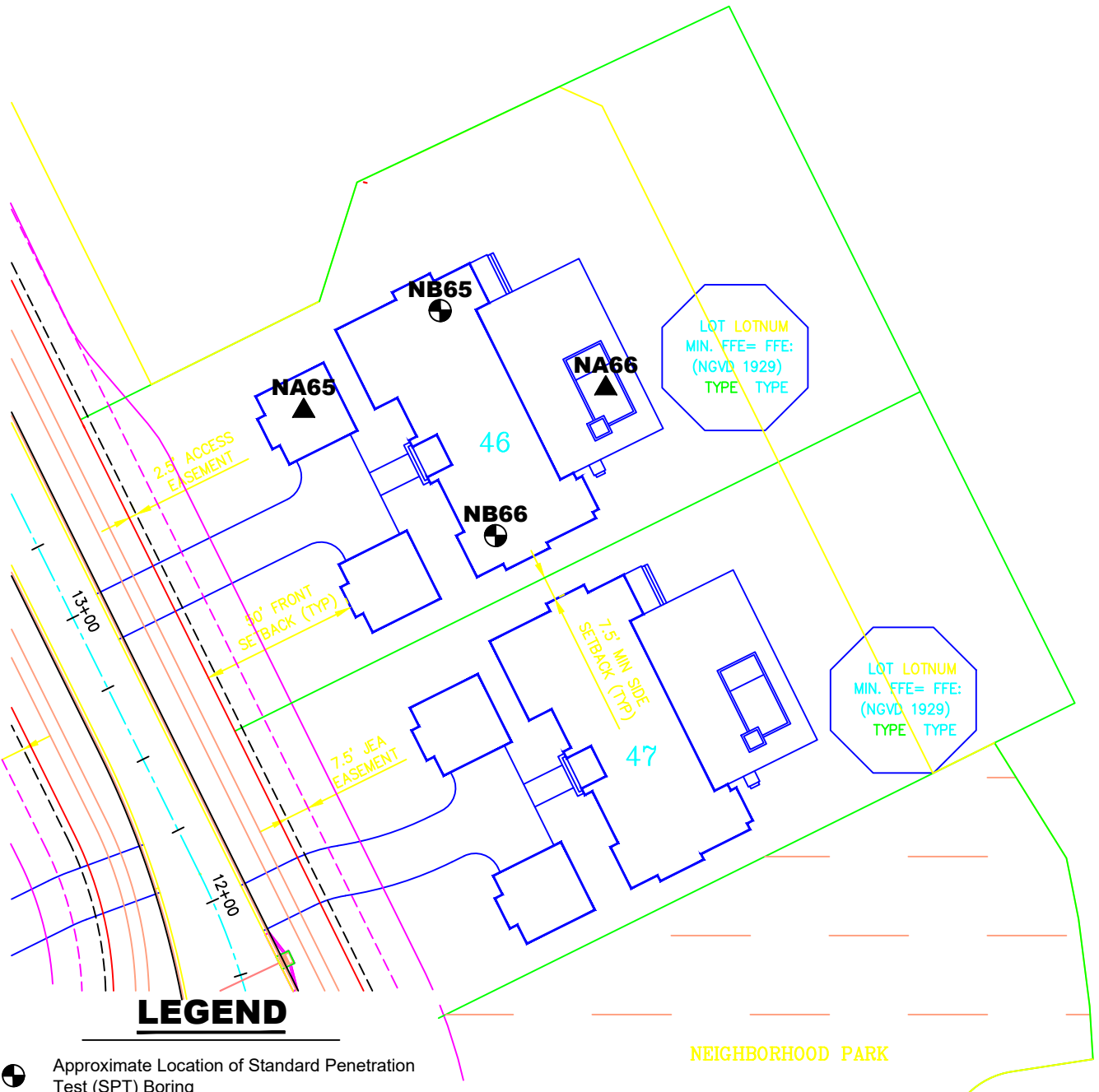
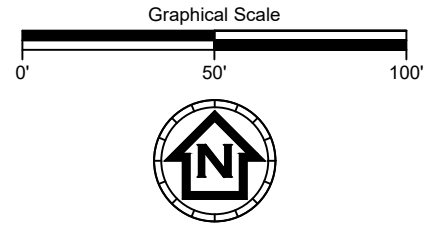


Date: 09/16/21

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Figure 1

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LEGEND

- Approximate Location of Standard Penetration Test (SPT) Boring
- Approximate Location of Auger Boring



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Field Exploration Diagram River Landing Natural Lots - Lot 46

St. Johns County, Florida

Date: 09/16/21

Project No.: 35-29020-A1

Figure 2

JAS - 35-29020-A1

Appendix B – Field Operations

Reference Notes for Boring Logs

Subsurface Exploration Procedure: Standard Penetration Testing (SPT)

Boring Logs



REFERENCE NOTES FOR BORING LOGS

MATERIAL^{1,2}

	ASPHALT
	CONCRETE
	GRAVEL
	TOPSOIL
	VOID
	BRICK
	AGGREGATE BASE COURSE
	GW WELL-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GP POORLY-GRADED GRAVEL gravel-sand mixtures, little or no fines
	GM SILTY GRAVEL gravel-sand-silt mixtures
	GC CLAYEY GRAVEL gravel-sand-clay mixtures
	SW WELL-GRADED SAND gravelly sand, little or no fines
	SP POORLY-GRADED SAND gravelly sand, little or no fines
	SM SILTY SAND sand-silt mixtures
	SC CLAYEY SAND sand-clay mixtures
	ML SILT non-plastic to medium plasticity
	MH ELASTIC SILT high plasticity
	CL LEAN CLAY low to medium plasticity
	CH FAT CLAY high plasticity
	OL ORGANIC SILT or CLAY non-plastic to low plasticity
	OH ORGANIC SILT or CLAY high plasticity
	PT PEAT highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION	PARTICLE SIZES
Boulders	12 inches (300 mm) or larger
Cobbles	3 inches to 12 inches (75 mm to 300 mm)
Gravel: Coarse	¾ inch to 3 inches (19 mm to 75 mm)
Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand: Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")	<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, QP ⁴	SPT ⁵ (BPF)	CONSISTENCY ⁷ (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	2 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

RELATIVE AMOUNT ⁷	COARSE GRAINED (%) ⁸	FINE GRAINED (%) ⁸
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective (ex: "Silty")	25 - 45	30 - 45

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT ⁵	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

WATER LEVELS⁶

	WL (First Encountered)
	WL (Completion)
	WL (Seasonal High Water)
	WL (Stabilized)

FILL AND ROCK

FILL	POSSIBLE FILL	PROBABLE FILL	ROCK

¹Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

²To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

³Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

⁴Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

⁵Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

⁶The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

⁷Minor deviation from ASTM D 2488-17 Note 14.

⁸Percentages are estimated to the nearest 5% per ASTM D 2488-17.



SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 12 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT test is typically performed for every two to five feet
- Obtain two-inch diameter soil sample



**Drilling Methods May Vary—* The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.



LOG OF BORING

Project No.: 35-29020-A1
Boring No.: NB65
Sheet 1 of 1

Project: River Landing Natural Lots - Lot 46

Client: HyDry Company, LLC

Boring Location: See Field Exploration Plan

Drill Rig: 104A

Driller: C. Morgan

Drill Rod: AWJ

Drill Mud: Super Gel-X

Casing Size:

Length of Casing:

Groundwater Depth: 7.4 ft Time: Drilling Date: 7/27/21

Boring Begun: 7/27/21

Boring Completed: 7/27/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT	MOISTURE CONTENT (%)	LIQUID LIMIT	SHEAR STRENGTH (ksf)
1	0		Topsoil	1							
			LOOSE Light Brown Fine SAND With Shell Fragments (SP)	2							
				3	5						
				4							
2			LOOSE Brown Fine SAND With Silt and Shell Fragments (SP-SM)	5							
				3							
				3	6						
				5							
3	5		LOOSE Gray Fine SAND With Clay and Shell Fragments (SP-SC)	5							
				4							
				4	8						
				6							
4			MEDIUM DENSE to LOOSE Gray Fine SAND With Clay (SP-SC)	5							
				6							
				7	13						
				10							
5				3							
				3							
				4	7						
				4							
6	10										
			LOOSE to MEDIUM DENSE Brown Fine SAND With Silt (SP-SM)	2							
				2							
				3	5						
7	15										
				4							
				7							
				13	20						
8	20										
			VERY DENSE Gray Fine SAND With Shell Fragments (SP)	18							
				28							
				30	58						
	25										

Boring Terminated @ 25 ft.

Remarks



LOG OF BORING

Project No.: 35-29020-A1
Boring No.: NB66
Sheet 1 of 1

Project: River Landing Natural Lots - Lot 46

Client: HyDry Company, LLC

Boring Location: See Field Exploration Plan

Drill Rig: 104A

Driller: C. Morgan

Drill Rod: AWJ

Drill Mud: Super Gel-X

Casing Size:

Length of Casing:

Groundwater Depth: 7.7 ft Time: Drilling Date: 7/27/21

Boring Begun: 7/27/21

Boring Completed: 7/27/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT	MOISTURE CONTENT (%)	LIQUID LIMIT	SHEAR STRENGTH (ksf)
1	0		Topsoil	1							
			VERY LOOSE to MEDIUM DENSE Light Brown Fine SAND With Shell Fragments (SP)	2	4						
2				2							
				4							
				5							
				6	12						
				6							
				7							
3	5		LOOSE Dark Brown Silty Fine SAND With Organic Fines (PT)	6							
			LOOSE Dark Brown Fine SAND With Silt (SP-SM)	3	7						
				4							
				5							
4			LOOSE Light Gray Brown Clayey Fine SAND With Shell Fragments (SC)	3							
				3	7						
				4							
				6							
5			MEDIUM DENSE Gray Fine SAND With Clay (SP-SC)	8							
				9	18						
				9							
	10			10							
6			DENSE Brown Fine SAND With Silt (SP-SM)	6							
				12	33						
	15			21							
7			LOOSE Brown Silty Fine SAND (SM)	1							
				1							
	20			4	5						
8			DENSE Gray Fine SAND With Silt and Shell Fragments (SP-SM)	11							
				16							
	25			23	39						

Boring Terminated @ 25 ft.

Remarks

LOG OF BORING



LOG OF BORING

Project No.: 35-29020-A1
Boring No.: NA66
Sheet 1 of 1

Project: River Landing Natural Lots - Lot 46

Client: HyDry Company, LLC

Boring Location: See Field Exploration Plan

Drill Rig: 104A

Driller: C. Morgan

Drill Rod: Flight Auger

Drill Mud:

Casing Size:

Length of Casing:

Groundwater Depth: 7.8 ft Time: Drilling Date: 7/23/21

Boring Begun: 7/26/21

Boring Completed: 7/26/21

SAMPLE NO.	DEPTH, FEET	SAMPLE TYPE	DESCRIPTION	BLOWS PER 6 IN.	N Value	PERCENT ORGANIC MATERIAL	PERCENT PASSING NO. 200 SIEVE	PLASTIC LIMIT	MOISTURE CONTENT (%)	LIQUID LIMIT	SHEAR STRENGTH (ksf)
	0		Topsoil								
1			Brown Fine SAND With Shell Fragments (SP)								
2	5		Brown Gray Fine SAND (SP)								
3			Gray Brown Clayey Fine SAND (SC)								
4	10		Gray Clayey Fine SAND (SC)								
			Boring Terminated @ 10 ft.								
	15										
	20										
	25										

Remarks