
APPENDIX A

APPENDIX A

Field Exploration

We explored the subsurface conditions at the project site by drilling and sampling nine borings, designated as Boring Nos. 1 through 9, extending to depths ranging from about 26.5 to 45.6 feet below the existing pavement surface. The approximate boring locations are shown on the Site Plans, Plates 2.1 through 2.6. The borings were drilled using a truck-mounted drill rig equipped with continuous flight augers and coring tools.

Our geologist classified the materials encountered in the borings by visual and textural examination in the field in general accordance with ASTM D2488, Standard Practice for Description and Identification of Soils, and monitored the drilling operations on a near-continuous (full-time) basis. These classifications were further reviewed visually and by testing in the laboratory. Soils were classified in general accordance with ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), as shown on the Soil Log Legend, Plate A-0.1. Deviations made to the soil classification in accordance with ASTM D2487 are described on the Soil Classification Log Key, Plate A-0.2. Rock cores were described in general accordance with the Rock Description System, as shown on the Rock Log Legend, Plate A-0.3. The Rock Description System is based on the publication "Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses" by the International Society for Rock Mechanics (March 1977). Graphic representations of the materials encountered are presented on the Logs of Borings, Plates A-1 through A-9.

Relatively "undisturbed" soil samples were obtained in general accordance with ASTM D3550, Ring-Lined Barrel Sampling of Soils, by driving a 3-inch O.D. Modified California sampler with a 140-pound hammer falling 30 inches. In addition, some samples were obtained from the drilled borings in general accordance with ASTM D1586, Penetration Test and Split-Barrel Sampling of Soils, by driving a 2-inch O.D. standard penetration sampler using the same hammer and drop. The blow counts needed to drive the sampler the second and third 6 inches of an 18-inch drive are shown as the "Penetration Resistance" on the Logs of Borings at the appropriate sample depths. The penetration resistance shown on the Logs of Borings indicates the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.

Core samples of the rock materials encountered at the project site were obtained by using diamond core drilling techniques in general accordance with ASTM D2113, Diamond Core Drilling for Site Investigation. Core drilling is a rotary drilling method that uses a hollow bit to cut into the rock formation. The rock material left in the hollow core of the bit is mechanically recovered for examination and description.

Recovery (REC) may be used as a subjective guide to the interpretation of the relative quality of rock masses, where appropriate. Recovery is defined as the actual length of material recovered from a coring attempt versus the length of the core attempt.

For example, if 3.7 feet of material is recovered from a 5.0-foot core run, the recovery would be 74 percent and would be shown on the Logs of Borings as REC = 74%.

The Rock Quality Designation (RQD) is also a subjective guide to the relative quality of rock masses. RQD is defined as the percentage of the core run in rock that is sound material in excess of 4 inches in length without any discontinuities, discounting any drilling, mechanical, and handling induced fractures or breaks. If 2.5 feet of sound material is recovered from a 5.0-foot core run in rock, the RQD would be 50 percent and would be shown on the Logs of Borings as RQD = 50%. Generally, the following is used to describe the relative quality of the rock based on the "Practical Handbook of Physical Properties of Rocks and Minerals" by Robert S. Carmichael (1989).

<u>Rock Quality</u>	<u>RQD</u> (%)
Very Poor	0 – 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	90 – 100

The excavation characteristic of a rock mass is a function of the relative hardness of the rock, its relative quality, brittleness, and fissile characteristics. A dense rock formation with a high RQD value would be very difficult to excavate and probably would require more arduous methods of excavation.



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Soil Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS		TYPICAL DESCRIPTIONS		
COARSE-GRAINED SOILS	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES		
		LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES		
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES		
		MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		
	SANDS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
		LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
		SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES		
		MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES		
FINE-GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY		
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS		
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
				CH	INORGANIC CLAYS OF HIGH PLASTICITY		
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
			HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND



(2-INCH) O.D. STANDARD PENETRATION TEST



(3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE



SHELBY TUBE SAMPLE



GRAB SAMPLE



CORE SAMPLE



WATER LEVEL OBSERVED IN BORING AT TIME OF DRILLING



WATER LEVEL OBSERVED IN BORING AFTER DRILLING



WATER LEVEL OBSERVED IN BORING OVERNIGHT

LL LIQUID LIMIT (NP=NON-PLASTIC)

PI PLASTICITY INDEX (NP=NON-PLASTIC)

TV TORVANE SHEAR (tsf)

UC UNCONFINED COMPRESSION OR UNIAXIAL COMPRESSIVE STRENGTH

TXUU UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

Plate

A-0.1



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Soil Classification Log Key

(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR SOIL (- #200 <50%)

- **PRIMARY** constituents are composed of the largest percent of the soil mass. Primary constituents are capitalized and bold (i.e., **GRAVEL**, **SAND**)
- **SECONDARY** constituents are composed of a percentage less than the primary constituent. If the soil mass consists of 12 percent or more fines content, a cohesive constituent is used (**SILTY** or **CLAYEY**); otherwise, a granular constituent is used (**GRAVELLY** or **SANDY**) provided that the secondary constituent consists of 20 percent or more of the soil mass. Secondary constituents are capitalized and bold (i.e., **SANDY GRAVEL**, **CLAYEY SAND**) and precede the primary constituent.
- **accessory descriptions** compose of the following:
 - with some: >12%
 - with a little: 5 - 12%
 - with traces of: <5%accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., **SILTY GRAVEL with a little sand**)

COHESIVE SOIL (- #200 ≥50%)

- **PRIMARY** constituents are based on plasticity. Primary constituents are capitalized and bold (i.e., **CLAY**, **SILT**)
- **SECONDARY** constituents are composed of a percentage less than the primary constituent, but more than 20 percent of the soil mass. Secondary constituents are capitalized and bold (i.e., **SANDY CLAY**, **SILTY CLAY**, **CLAYEY SILT**) and precede the primary constituent.
- **accessory descriptions** compose of the following:
 - with some: >12%
 - with a little: 5 - 12%
 - with traces of: <5%accessory descriptions are lower cased and follow the Primary and Secondary Constituents (i.e., **SILTY CLAY with some sand**)

EXAMPLE: Soil Containing 60% Gravel, 25% Sand, 15% Fines. Described as: **SILTY GRAVEL** with some sand

RELATIVE DENSITY / CONSISTENCY

Granular Soils			Cohesive Soils			
N-Value (Blows/Foot)		Relative Density	N-Value (Blows/Foot)		PP Readings (tsf)	Consistency
SPT	MCS		SPT	MCS		
0 - 4	0 - 7	Very Loose	0 - 2	0 - 4		Very Soft
4 - 10	7 - 18	Loose	2 - 4	4 - 7	< 0.5	Soft
10 - 30	18 - 55	Medium Dense	4 - 8	7 - 15	0.5 - 1.0	Medium Stiff
30 - 50	55 - 91	Dense	8 - 15	15 - 27	1.0 - 2.0	Stiff
> 50	> 91	Very Dense	15 - 30	27 - 55	2.0 - 4.0	Very Stiff
			> 30	> 55	> 4.0	Hard

MOISTURE CONTENT DEFINITIONS

Dry: Absence of moisture, dry to the touch

Moist: Damp but no visible water

Wet: Visible free water, usually soil is below water table

ABBREVIATIONS

WOH: Weight of Hammer

WOR: Weight of Drill Rods

SPT: Standard Penetration Test Split-Spoon Sampler

MCS: Modified California Sampler

PP: Pocket Penetrometer

GRAIN SIZE DEFINITION

Description	Sieve Number and / or Size
Boulders	> 12 inches (305-mm)
Cobbles	3 to 12 inches (75-mm to 305-mm)
Gravel	3-inch to #4 (75-mm to 4.75-mm)
Coarse Gravel	3-inch to 3/4-inch (75-mm to 19-mm)
Fine Gravel	3/4-inch to #4 (19-mm to 4.75-mm)
Sand	#4 to #200 (4.75-mm to 0.075-mm)
Coarse Sand	#4 to #10 (4.75-mm to 2-mm)
Medium Sand	#10 to #40 (2-mm to 0.425-mm)
Fine Sand	#40 to #200 (0.425-mm to 0.075-mm)

Plate

A-0.2

*Soil descriptions are based on ASTM D2488-09a, Visual-Manual Procedure, with the above modifications by Geolabs, Inc. to the Unified Soil Classification System (USCS).



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Rock Log Legend

ROCK DESCRIPTIONS

	BASALT		CONGLOMERATE
	BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
	CLINKER		SILTSTONE
	COBBLES		TUFF
	CORAL		VOID/CAVITY

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock:

Massive:	Greater than 24 inches apart
Slightly Fractured:	12 to 24 inches apart
Moderately Fractured:	6 to 12 inches apart
Closely Fractured:	3 to 6 inches apart
Severely Fractured:	Less than 3 inches apart

DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock:

Unweathered:	Rock shows no sign of discoloration or loss of strength.
Slightly Weathered:	Slight discoloration inwards from open fractures.
Moderately Weathered:	Discoloration throughout and noticeably weakened though not able to break by hand.
Highly Weathered:	Most minerals decomposed with some corestones present in residual soil mass. Can be broken by hand.
Extremely Weathered:	Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved.

HARDNESS

The following terms describe the resistance of a rock to indentation or scratching:

Very Hard:	Specimen breaks with difficulty after several "pinging" hammer blows. Example: Dense, fine grain volcanic rock
Hard:	Specimen breaks with some difficulty after several hammer blows. Example: Vesicular, vugular, coarse-grained rock
Medium Hard:	Specimen can be broke by one hammer blow. Cannot be scraped by knife. SPT may penetrate by ~25 blows per inch with bounce. Example: Porous rock such as clinker, cinder, and coral reef
Soft:	Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by ~100 blows per foot. Example: Weathered rock, chalk-like coral reef
Very Soft:	Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger pressure. Example: Saprolite

Plate

A-0.3



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FAP NO. NH-0300 (144)
ISLAND OF OAHU, HAWAII

Log of
Boring

1

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
UC= 2460 psi UC= 1810 psi	9									GM	4-inch ASPHALTIC CONCRETE
	16									ML	Gray SILTY GRAVEL (BASALTIC) with some sand (basaltic), moist (fill)
											Brown SANDY SILT with some gravel (basaltic) (fill)
	26	70			53/4"		5				Grayish brown TUFF , medium hard (volcanic tuff)
	38				22/6" +50/2"		10			ML	Brown SANDY SILT with a little gravel, very stiff, moist (weathered volcanic tuff)
											Grayish brown TUFF , moderately to closely fractured, slightly weathered, medium hard (volcanic tuff)
			100 92	100 77			15				
							20				grades to slightly fractured
			100	48							
			92	35			25				Grayish brown TUFF , severely fractured, highly weathered, soft (volcanic tuff)
											Grayish brown TUFF , closely fractured, slightly weathered, medium hard (volcanic tuff)
							30				
											Boring terminated at 31 feet
							35				

Date Started: March 27, 2018

Date Completed: March 27, 2018

Logged By: N. Vaiana

Total Depth: 31 feet

Work Order: 7341-00

Water Level: 11.5 ft. 03/27/2018 1303 HRS

Drill Rig: CME-75DG2

Drilling Method: 4" Solid Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 1



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Log of
Boring

2

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
UC= 1090 psi	12									GM	4-inch ASPHALTIC CONCRETE
	14									GM	Brownish gray SILTY GRAVEL (BASALTIC) with some sand (basaltic), moist (fill)
	31		100	20	10/0" Ref.		5				Brown SILTY GRAVEL (BASALTIC) with some sand (basaltic), moist (fill)
UC= 1410 psi			100	60			10				Grayish brown TUFF , severely to closely fractured, slightly weathered, medium hard (volcanic tuff)
			100	48			15				grades to moderately fractured
			100	5			20				grades to closely fractured
			100	5			25				
			100	5			30				
Boring terminated at 31 feet											

Date Started: March 28, 2018

Date Completed: March 28, 2018

Logged By: N. Vaiana

Total Depth: 31 feet

Work Order: 7341-00

Water Level: 11.0 ft. 03/28/2018 1300 HRS

Drill Rig: CME-75DG2

Drilling Method: 4" Solid Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 2



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Log of
Boring

3

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet): 14.5 *
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
TXUU $S_u = 1.6$ ksf	14	110			48					GP	7-inch ASPHALTIC CONCRETE
	24				17					GM	Gray SANDY GRAVEL (BASALTIC) with a little silt, dense, moist (fill)
										SP	Gray GRAVELLY SAND (BASALTIC) , medium dense, moist (fill)
	32	86			41	2.5	5			GM	Gray with brown mottling SILTY GRAVEL (BASALTIC) , medium dense, moist (fill)
										CH	Gray SILTY CLAY with some gravel (basaltic) and a little cobbles, stiff to very stiff, moist (fill)
LL=110 PI=78 TXUU $S_u = 1.5$ ksf	62				5		10				Dark brown SILTY CLAY , very stiff, wet (alluvium)
											grades to medium stiff
	23	105	19		10		15			GM	Dark gray SILTY GRAVEL (BASALTIC) with some sand, loose, wet (alluvium)
											grades with silty clay pockets locally
	47				6		20			CH	Gray with tan mottling SILTY CLAY with a little gravel (coralline), medium stiff (alluvium w/ coral debris)
	67	61	100		17	3.3	25				grades to very stiff
	56		52		10		30			ML	Gray with brown mottling CLAYEY SILT with some sand, stiff (alluvium)
			64				35				

Date Started: April 18, 2018

Date Completed: April 19, 2018

Logged By: S. Latronic

Total Depth: 38 feet

Work Order: 7341-00

Water Level: ∇ 15.0 ft. 04/18/2018 2240 HRS

Drill Rig: CME-45C TRUCK

Drilling Method: 4" Solid Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 3.1



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Log of
Boring

3

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate)
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
	55	67			14	2.0	40			ML	Boring terminated at 38 feet
							45				* Elevations estimated from Topographic Survey Map prepared by Controlpoint Surveying, Inc. dated February 15, 2018.
							50				
							55				
							60				
							65				
							70				

Date Started: April 18, 2018

Date Completed: April 19, 2018

Logged By: S. Latronic

Total Depth: 38 feet

Work Order: 7341-00

Water Level: ∇ 15.0 ft. 04/18/2018 2240 HRS

Drill Rig: CME-45C TRUCK

Drilling Method: 4" Solid Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 3.2



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Log of
Boring

4

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
Sieve - #200 = 11.9%	4	116			61					GW	12-inch ASPHALTIC CONCRETE
	6				12						Gray angular SANDY GRAVEL (BASALTIC) with traces of clayey silt, dense, moist (fill)
	7	74			14		5			SP- SM	Brownish gray GRAVELLY SAND (BASALTIC) with a little silt, medium dense, moist (fill) grades to loose grades to sandy gravel locally
TXUU S _u =5.8 ksf	27		50		23		10			MH	Reddish brown CLAYEY SILT with a little gravel (basaltic), very stiff, moist (residual soil)
			28				15			CH	Reddish brown SILTY CLAY , very stiff to hard, moist (residual soil)
	35	172	100		82	>4.5	20			MH	Dark brown SILTY CLAY with some decomposed gravel, hard, moist (weathered clinker)
	37				74		25			MH	Gray CLAYEY SILT with remnant rock structure, hard, moist (saprolite)
			98	40			30				Gray vugular BASALT , severely to closely fractured, slightly weathered, hard (basalt formation) grades to moderately fractured
Boring terminated at 31.5 feet											

Date Started: April 15, 2018

Date Completed: April 16, 2018

Logged By: S. Latronic

Total Depth: 31.5 feet

Work Order: 7341-00

Water Level: ▼ Not Encountered

Drill Rig: CME-45C TRUCK

Drilling Method: 4" Solid Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 4



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Log of
Boring

5

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
LL=52 PI=14	19	99			37					GW	6-inch ASPHALTIC CONCRETE
	32				48						Gray angular SANDY GRAVEL (BASALTIC) , dense, moist (fill)
	58	64			84		5			MH	Reddish brown CLAYEY SILT with some decomposed gravel, hard, moist (residual soil)
	42				30		10				grades with remnant rock structure
UC= 7270 psi	29	95			31/6" +50/5"	>4.5	15				
			79	29			20				Gray vugular BASALT , closely fractured, slightly weathered, hard (basalt formation)
			100	17			25				
			100	72			30				grades to moderately fractured
Boring terminated at 31.5 feet											

Date Started: April 16, 2018

Date Completed: April 17, 2018

Logged By: S. Latronic

Total Depth: 31.5 feet

Work Order: 7341-00

Water Level: ▼ Not Encountered

Drill Rig: CME-45C TRUCK

Drilling Method: 4" Solid Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 5

Date Started: April 17, 2018	<div> <div>Water Level: ▽ 9.6 ft. 04/17/2018 2220 HRS</div> <div>Plate</div> <div>A - 6</div> </div>
Date Completed: April 18, 2018	
Logged By: S. Latronic	
Total Depth: 26.5 feet	
Work Order: 7341-00	
	<div>Drill Rig: CME-45C TRUCK</div> <div>Drilling Method: 4" Solid Stem Auger & PQ Coring</div> <div>Driving Energy: 140 lb. wt., 30 in. drop</div>



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Log of
Boring

7

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet) : 36 *
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
LL=33 PI=1 TXUU S _u =6.0 ksf	11	77			56						8-inch ASPHALTIC CONCRETE
	36				20					ML SP	Light brown with multi-color mottling SANDY SILT with a little gravel, very stiff to hard, moist (fill)
					77/6" +25/1"		5			ML	Tan GRAVELLY SAND (CORALLINE) , medium dense to dense, moist (fill)
											Brown SANDY SILT with some gravel, hard, moist (alluvium)
Sieve - #200 = 12.4%	36				36		10				
Sieve - #200 = 16.5%	27	77			37		15			SM	Brown with multi-color mottling rounded SILTY SAND with some gravel (basaltic), medium dense, moist (alluvium)
	40				10		20				
	27	104			19		25			GM	Brown SILTY GRAVEL with some sand (basaltic), medium dense (alluvium) grades with some cobbles
	42				18		30				
							35				

Date Started: January 4, 2022

Date Completed: January 4, 2022

Logged By: B. Aiu

Total Depth: 45.6 feet

Work Order: 7341-00

Water Level: 23.3 ft. 01/04/2022 1115 HRS

Drill Rig: CME-75DG2

Drilling Method: 4" Solid-Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 7.1



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Log of
Boring

7

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	(Continued from previous plate)
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
	48	82			28					GM	grades with a little clay
	42				16/6" +25/1"		40				grades with boulders
	32	85			25/1"		45				Boring terminated at 45.6 feet
							50				* Elevations estimated from Topographic Survey Map prepared by Controlpoint Surveying, Inc. dated February 20, 2018.
							55				
							60				
							65				
							70				

Date Started: January 4, 2022

Date Completed: January 4, 2022

Logged By: B. Aiu

Total Depth: 45.6 feet

Work Order: 7341-00

Water Level: ▼ 23.3 ft. 01/04/2022 1115 HRS

Drill Rig: CME-75DG2

Drilling Method: 4" Solid-Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 7.2



GEOLABS, INC.

Geotechnical Engineering

INTERSTATE ROUTE H-1 AND H-201
DESTINATION SIGN UPGRADE/
REPLACEMENT, PHASE 3
FAP NO. NH-0300 (144)
ISLAND OF OAHU, HAWAII

Log of
Boring

8

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation (feet): 35.5 *
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
LL=NP PI=NP TXUU S _u =4.8 ksf	11	123			99						9-inch ASPHALTIC CONCRETE
	40				51					GM	Reddish brown with gray angular SILTY GRAVEL (BASALTIC) with some sand, very dense, moist (fill)
	18	82			121		5			ML	Brown SANDY SILT , hard, moist (alluvium)
	38				34		10				
Sieve - #200 = 10.1%	19	95			25		15			GW-GM	Brown with multi-color mottling SANDY GRAVEL with a little silt, medium dense, moist (alluvium)
Sieve - #200 = 14.3%	27				28		20				grades with more silt
	38	91			33		25				grades with cobbles and boulders
	16				25/1"		30				Boring terminated at 30.1 feet
											* Elevations estimated from Topographic Survey Map prepared by Controlpoint Surveying, Inc. dated February 20, 2018.

Date Started: January 3, 2022

Date Completed: January 3, 2022

Logged By: B. Aiu

Total Depth: 30.1 feet

Work Order: 7341-00

Water Level: 22.7 ft. 01/03/2022 1035 HRS

Drill Rig: CME-75DG2

Drilling Method: 4" Solid-Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 8



GEOLABS, INC.

Geotechnical Engineering

INTERSTATE ROUTE H-1 AND H-201
DESTINATION SIGN UPGRADE/
REPLACEMENT, PHASE 3
FAP NO. NH-0300 (144)
ISLAND OF OAHU, HAWAII

Log of
Boring

9

Laboratory			Field				Depth (feet)	Sample	Graphic	USCS	Approximate Ground Surface Elevation : N/A
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)					Description
LL=38 PI=16 Sieve - #200 = 37.7%	25	92			18					GP	3-inch ASPHALTIC CONCRETE
	11				109					SC	Brownish gray SANDY GRAVEL (BASALTIC) , moist (fill)
	28	83					5			ML	Reddish brown CLAYEY SAND with some angular gravel, dense, moist (fill)
										SM	Reddish brown SANDY SILT with a little clay, medium stiff, moist (residual soil)
Sieve - #200 = 22.1%	27				34/6" +50/4"		10				Reddish brown and gray SILTY SAND (BASALTIC) with some gravel (basaltic), very dense, moist (saprolite)
UC= 4340 psi			100	21			15				Brownish gray vugular BASALT , severely fractured, moderately weathered, hard (basalt formation)
			100	47							grades to slightly fractured
							20				grades to gray grades to closely to severely fractured
UC= 2910 psi			97	10			25				grades to moderately fractured
			100	63			30				
							35				Boring terminated at 31 feet

Date Started: January 5, 2022

Date Completed: January 6, 2022

Logged By: B. Aiu

Total Depth: 31 feet

Work Order: 7341-00

Water Level:  Not Encountered

Drill Rig: CME-75DG2

Drilling Method: 4" Solid-Stem Auger & PQ Coring

Driving Energy: 140 lb. wt., 30 in. drop

Plate

A - 9