























		GEOLABS, INC. Geotechnical Engineering	Soil Log Legend	
UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)				
MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	GRAVELS	CLEAN GRAVELS LESS THAN 5% FINES	 GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES	 GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			 GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SANDS	CLEAN SANDS LESS THAN 5% FINES	 GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
			 SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	SANDS WITH FINES MORE THAN 12% FINES	 SP
 SM	SILTY SANDS, SAND-SILT MIXTURES			
FINE-GRAINED SOILS 50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS		LIQUID LIMIT LESS THAN 50	 SC
		 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
	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE	 OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
			 MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			 CH	INORGANIC CLAYS OF HIGH PLASTICITY
HIGHLY ORGANIC SOILS		 OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
			 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	LL	LIQUID LIMIT (NP=NON-PLASTIC)	
	(3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX (NP=NON-PLASTIC)	
	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)	
	GRAB SAMPLE	UC	UNCONFINED COMPRESSION OR UNIAXIAL COMPRESSIVE STRENGTH	
	CORE SAMPLE	TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)	
	WATER LEVEL OBSERVED IN BORING AT TIME OF DRILLING			
	WATER LEVEL OBSERVED IN BORING AFTER DRILLING			
	WATER LEVEL OBSERVED IN BORING OVERNIGHT			



GEOLABS, INC.

Geotechnical Engineering

Soil Classification Log Key

(with deviations from ASTM D2488)

GEOLABS, INC. CLASSIFICATION*

GRANULAR SOIL (- #200 <50%)	COHESIVE SOIL (- #200 >50%)
<ul style="list-style-type: none">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:<ul style="list-style-type: none">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)	<ul style="list-style-type: none">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:<ul style="list-style-type: none">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)
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	Soft
10 - 30	18 - 55	Medium Dense	4 - 8	7 - 15	Medium Stiff
30 - 50	55 - 91	Dense	8 - 15	15 - 27	Stiff
> 50	> 91	Very Dense	15 - 30	27 - 55	Very Stiff
			> 30	> 55	Hard

MOISTURE CONTENT DEFINITIONS

Dry: Absence of moisture, dry to the touch

Moist: Damp but no visible water

Wet: Visible free water

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)

ABBREVIATIONS

WOH: Weight of Hammer


WOR: Weight of Drill Rods





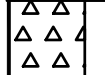
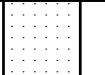
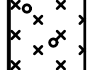
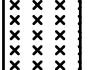



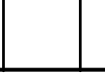
SPT: Standard Penetration Test Split-Spoon Sampler

MCS: Modified California Sampler

PP: Pocket Penetrometer

*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).

	GEOLABS, INC. Geotechnical Engineering	Rock Log Legend
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ROCK DESCRIPTIONS			
	BASALT		CONGLOMERATE
	BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
	CLINKER		SILTSTONE
	COBBLES		TUFF
	CORAL		VOID/CAVITY

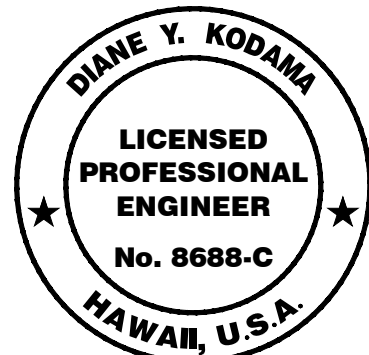
ROCK DESCRIPTION SYSTEM	
ROCK FRACTURE CHARACTERISTICS	
The following terms describe general fracture spacing of a rock:	
Massive:	Greater than 24 inches apart
Slightly Fractured:	12 to 24 inches apart
Moderately Fractured:	6 to 12 inches apart
Closely Fractured:	3 to 6 inches apart
Severely Fractured:	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 broken 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

GEOTECHNICAL NOTES:

- A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Kekaulike Avenue Emergency Repairs, Kula, Maui, Hawaii" dated March 31, 2022 has been prepared by Geolabs, Inc. A copy of the report is on file at the office of the Engineer for review by the Contractor.
- For boring locations, see Sheet 21.
- The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.
- The penetration resistance shown on the logs of borings indicate 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.
- The data given is for general information only. Bidders shall examine the site and the boring data and draw their own conclusions therefrom as to the character of materials to be encountered. The Engineer will not assume responsibility for variations of subsoil quality or conditions other than at the boring locations shown and at the time the borings were taken.

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

PROJECT NAME: USCS Project Log Key (2023) 11/16/2023 11:46 am PLOT DATE: 11/16/2023 11:46 am PLOT DATE: 11/16/2023 11:46 am



LICENSE EXPIRES 4/30/24.

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION

(Signature)

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
BORING LOG LEGEND AND NOTES	
KEKAULIKE AVENUE, EMERGENCY REPAIRS	
M.P. 8.2	
Federal-Aid Project No. ER-25(001)	
Scale: As Noted	Date: March 2023
SHEET No. 1 OF 2 SHEETS	

