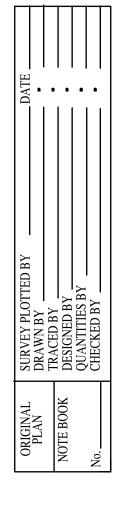


WATER LEVEL OBSERVED IN BORING AFTER DRILLING

WATER LEVEL OBSERVED IN BORING OVERNIGHT

		EOLABS, IN					Soil Log Legend
		UNIFIED	SOIL	CLASSI	FICA	ΓΙΟΝ	SYSTEM (USCS)
		MAJOR DIVISION	S		US	SCS	TYPICAL DESCRIPTIONS
		GRAVELS		EAN VELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
COARS		GRAVELS		THAN 5% NES	°0 °0 0 0 0	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
GRAIN SOIL		MORE THAN 50% OF COARSE	GRAVELS WITH FINES MORE THAN 12% FINES			GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		FRACTION RETAINED ON NO. 4 SIEVE				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
		CANDO	CLEAN	I SANDS	° 0	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THA OF MATE		SANDS		THAN 5% NES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
RETAINED (200 SIE		50% OR MORE OF COARSE FRACTION PASSING	SANDS WITH FINES MORE THAN 12% FINES			SM	SILTY SANDS, SAND-SILT MIXTURES
		THROUGH NO. 4 SIEVE				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
						ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE GRAIN SOIL	IED	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50			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
						МН	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
50% OR MC MATERIAL P. THROUGH N SIEVE	ASSING NO. 200	SILTS AND CLAYS		D LIMIT R MORE		СН	INORGANIC CLAYS OF HIGH PLASTICITY
						ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HI	GHLY ORGANIC SC	DILS		<u> </u>		PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
<i>NOTE: DUAL</i> LEGEND	. SYMBC	OLS ARE USED TO INL	DICATE B	ORDERLIN	E SOIL	CLASS	IFICATIONS
(2-INC	CH) O.D.	STANDARD PENETR	RATION TI	EST		LL	LIQUID LIMIT (NP=NON-PLASTIC)
(3-IN)	CH) O.D.	MODIFIED CALIFOR	NIA SAMF	PLE		PI	PLASTICITY INDEX (NP=NON-PLASTIC)
S SHEL	_BY TUB	E SAMPLE				TV	TORVANE SHEAR (tsf)
G GRA	B SAMPI	_E				UC	UNCONFINED COMPRESSION OR UNIAXIAL COMPRESSIVE STRENGTH
∎_∎ ⊈ WATE		LE EL OBSERVED IN BOF	RING AT T	IME OF		TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)
- DRILI	LING				10		



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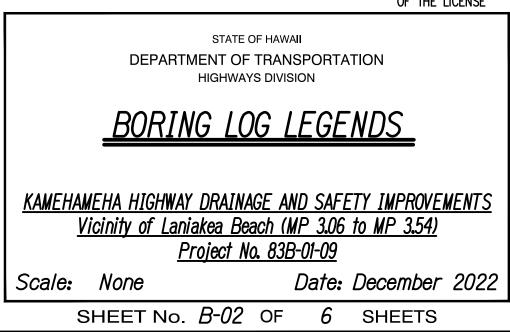


	Geotecnnical Engineering GEOLABS GEOLABS GRANULAR SOIL (- #200 <50%)						FED. ROAD			FISCAL	SHEET	TOTAL
							DIST. NO.	STATE	PROJ. NO.	YEAR	NO.	SHEETS
							HAWAII	HAW.	83B-01-09	2023	18	228
					cation Log Kos from ASTM D2488	-						
		GEOLABS, INC										
	· · · ·				√E SOIL (- #200 ≥ 5							
percent of the	soil mass. Primary c	onstituents are			ents are based on pla pitalized and bold (i.e							
 SECONDARY percentage le mass consists cohesive cons otherwise, a g SANDY) provi consists of 20 Secondary co SANDY GRAY 	Constituents are constituents are constituents are constituent or more sof 12 percent or more stituent is used (SILT) ranular constituent is ided that the secondat percent or more of the nstituents are capital VEL, CLAYEY SAND	nposed of a constituent. If the soil re fines content, a Y or CLAYEY); s used (GRAVELLY o ary constituent ne soil mass. ized and bold (i.e.,	less than of the so and bold	the prima il mass. So (i.e., SAN	stituents are compose ary constituent, but mo econdary constituents IDY CLAY, SILTY CLA rimary constituent.	are capitalized						
 accessory des with some: >1 with a little: 5 with traces of: accessory des Primary and S 	scriptions compose o 2% - 12% <5% scriptions are lower c Secondary Constituen	ased and follow the	with som with a litt with trace accessor Primary a	ie: >12% le: 5 - 12% es of: <5% ry descript and Secor								
EXAMPLE: Soil	Containing 60% Gra	vel, 25% Sand, 15%	Fines. Described a	as: SILTY	GRAVEL with some s	and						
		RELATIVE DEN	SITY / CONSIST	ENCY								
	Granular Soils				Cohesive Soils							
N-Value (SPT	,	Relative Density	N-Value (I SPT	Blows/Foo	<u> </u>	Consistency						
0 - 4		Very Loose	0 - 2	0 - 4	` ´ ´ ´	Very Soft						
4 - 10	7 - 18	Loose	2 - 4	4 - 7	7 < 0.5	Soft						
10 - 30		Medium Dense	4 - 8	7 - 1		Medium Stiff						
30 - 50		Dense	8 - 15	15 - 2		Stiff						
> 50	> 91	Very Dense	15 - 30 > 30	27 - 5		Very Stiff Hard						
L	1	1	- 30		, <u> </u>							
MOISTU	JRE CONTENT DE	FINITIONS		GRA	IN SIZE DEFINITIO	N						
Dry: Absence of	of moisture, dry to the	touch	Descrip	otion	Sieve Number	and / or Size						
Moist: Damp but	no visible water		Bould		> 12 inches	, ,						
Wet: Visible free	e water		Cobb Grav		3 to 12 inches (75- 3-inch to #4 (75-n	,				ERAL	DY. SE	
	ABBREVIATION	S	Coarse Coarse C	Gravel	3-inch to 3/4-inch (7 3/4-inch to #4 (19-						*	
WOH: Weight of	Hammer		San		#4 to #200 (4.75-m					121	5635-C	
WOR: Weight of	Drill Rods		Coarse		#4 to #10 (4.75-						<u>AII, U.S.</u>	
SPT: Standard	Penetration Test Spl	lit-Spoon Sampler	Medium		#10 to #40 (2-mn	,				THIS WORK WA	S PREPARED	
	·		Fine S	and	#40 to #200 (0.425-	mm to 0.075-mm)				Un 4	L.n	1/2024

								FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
								HAWAII	HAW.	83B-01-09	2023	18	228
									//////•	050 01 05	2023	10	220
	GELECEADS, INC. Geotechnical Engineering GEOLABS, INC. GEOLABS, Primary Constituents are optialized and bold (i.e., GRAVEL, SAND) CONDARY constituents are capitalized and bold (i.e., NDY) provided that the secondary constituent insists of 20 percent or more of the soil mass. CONDARY CONSTITUENTS AND) and precede the mary constituent. Cessory descriptions compose of the following: it some: >12% INTERCONTENT Case of : 5% GEORIALY Constituents ACCS MACS Dense					ation Log K from ASTM D248							
		GEOLABS, INC	C. C	LASSIFICA	TION*								
GRA		· · · · ·				E SOIL (- #200 ≥	50%)						
percent of the	soil mass. Primary c	onstituents are				nts are based on platistication of the state							
percentage les mass consists cohesive cons otherwise, a gr SANDY) provis consists of 20 Secondary cor SANDY GRAV	ss than the primary co of 12 percent or mor tituent is used (SILT) ranular constituent is ded that the seconda percent or more of the nstituents are capitalion (EL, CLAYEY SAND)		less than t of the soil and bold (he primary mass. Sec i.e., SAND	y constituent, but m condary constituent	ed of a percentage ore than 20 percent s are capitalized AY, CLAYEY SILT)							
with some: >12 with a little: 5 - with traces of: accessory des Primary and S	2% 12% <5% criptions are lower ca econdary Constituen	ased and follow the		with some with a little with traces accessory Primary ar	: >12% e: 5 - 12% s of: <5% descriptio nd Second	ns compose of the ns are lower cased ary Constituents ith some sand)							
EXAMPLE: Soil	Containing 60% Grav	vel, 25% Sand, 15%	Fine	s. Described as	SILTY G	RAVEL with some	sand						
		RELATIVE DEN	ISITY	Y / CONSISTE	ENCY								
	Granular Soils				С	Cohesive Soils							
•	, , , , , , , , , , , , , , , , , , , ,	Relative	-	N-Value (BI SPT	ows/Foot) MCS	PP Readings (tsf)	Consistency						
0 - 4		Very Loose		0 - 2	0 - 4		Very Soft						
4 - 10	7 - 18	Loose		2 - 4	4 - 7	< 0.5	Soft						
10 - 30		Medium Dense		4 - 8	7 - 15		Medium Stiff						
				8 - 15	15 - 27		Stiff						
> 50	> 91	Very Dense		15 - 30 > 30	27 - 55 > 55	2.0 - 4.0 > 4.0	Very Stiff Hard						
MOISTU					GRAIN	I SIZE DEFINITIO							
				Descript			and / or Size						
•	-			Boulder		> 12 inches							
•				Cobble	s	3 to 12 inches (75	, , ,						
		<u> </u>		Grave Coarse Gr		3-inch to 3/4-inch (D Y. SET CENSED FESSIONAL	
WOH: Weight of		3		Fine Gra Sand		3/4-inch to #4 (19						NGINEER 5635-C	
-	0 - 4 0 - 7 Very Loose 4 - 10 7 - 18 Loose 10 - 30 18 - 55 Medium Der 30 - 50 55 - 91 Dense > 50 > 91 Very Dense MOISTURE CONTENT DEFINITIONS ry: Absence of moisture, dry to the touch oist: Damp but no visible water et: Visible free water					#4 to #200 (4.75-) #4 to #10 (4.75					YA W	411, U.S.P.	//
-		4 On a c		Coarse S Medium S		#10 to #40 (2-m	,				THIS WORK WA	S PREPARED	
SPT: Standard	Penetration Test Spl	It-Spoon Sampler		Fine Sa	nd	,	-mm to 0.075-mm)				1	MY SUPERVIS	

											ED. ROAD	STATE	PROJ. NO.	FISCAL	SHEET			
											DIST. NO.	HAW.	83B-01-09	YEAR 2023	NO. 18	SHEETS 228		
											// (/// 111	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		2020	10	220		
4		GEOLABS,	INC.		Soil C	lassifi	cation I	l oa Ke	έV									
		Geotechnical Engi	neering				from AST	•										
Γ			GEOLABS	, INC. C	LASSIFICA	TION*												
	GF						/E SOIL (-	#200 ≥ 50	0%)									
	percent of t	he soil mass. Primary c					-	sticity. Primary , CLAY, SILT)										
	 SECONDAl percentage mass consi cohesive co otherwise, a SANDY) pro consists of Secondary SANDY GR 	RY constituents are con less than the primary c sts of 12 percent or mor onstituent is used (SILT) a granular constituent is ovided that the seconda 20 percent or more of the constituents are capital RAVEL, CLAYEY SAND	nposed of a onstituent. If the re fines conter Y or CLAYEY) used (GRAVI ary constituent ne soil mass. ized and bold	nt, a ; ELLY or (i.e.,	less than of the soi and bold	the prima I mass. Se (i.e., SAN	ry constitue econdary co	nt, but mor Instituents SILTY CLA	d of a percentage re than 20 percent are capitalized Y, CLAYEY SILT)									
	with some: with a little: with traces accessory of Primary and	>12% 5 - 12% of: <5% descriptions are lower c d Secondary Constituer	ased and follo		with trace accessor Primary a	e: >12% e: 5 - 12% es of: <5% y descripti and Secon	5	ver cased a	Ilowing: Ind follow the									
	GEOLABS, I GRANULAR SOIL (- #200 <50%)						GRAVEL wi	th some sa	and									
		GRANULAR SOIL (- #200 <50%)			Y / CONSIST		Cohesive S	Soile										
	N-Valu		1	ve	N-Value (E			Readings	Consistency									
╞				-	<u>SPT</u> 0 - 2	MCS 0 - 4		(tsf)	Very Soft									
			,		2 - 4	4 - 7		< 0.5	Soft									
	10 - 30	18 - 55	Medium	Dense	4 - 8	7 - 15	5 0.4	5 - 1.0	Medium Stiff									
_					8 - 15	15 - 2		0 - 2.0	Stiff									
	> 50	> 91	Very De	ense	15 - 30 > 30	27 - 5 > 55		0 - 4.0 > 4.0	Very Stiff Hard									
		Primary and Secondary Constituents (i.e., SILTY GRAVEL with a little sand) EXAMPLE: Soil Containing 60% Gravel, 25% Sand, 1 RELATIVE D Granular Soils N-Value (Blows/Foot) Relative Density 0 - 4 0 - 4 0 - 7 Very Loos 4 - 10 7 - 18 Loose 10 - 30 18 - 55 Medium Der 30 - 50 55 - 91 Dense > 50 > 91 Very Dens MOISTURE CONTENT DEFINITIONS ry: Absence of moisture, dry to the touch																
ſ							N SIZE DE											
	-		touch		Descrip				and / or Size									
	Moist: Damp b	ut no visible water			Boulde			12 inches (nches (75-r	mm to 305-mm)									
	Wet: Visible f	ree water			Grave			•	m to 4.75-mm)					GERAL	$\setminus \tau$			
			9		Coarse G			•	5-mm to 19-mm)						CENSED FESSIONAL NGINEER	*		
	WOH: Weight		0		Fine Gra			-	nm to 4.75-mm) m to 0.075-mm)						5635-C			
	WOR: Weight	of Drill Rods			Coarse			•	mm to 2-mm)					AW.	411, U.S.F	<i>/</i>		
	-		it-Spoon Sam	pler	Medium			•	to 0.425-mm)					This work wa or under	S PREPARED MY SUPERVIS			
			1 • • • • • •		Fine Sa	and	#40 to #20	00 (0.425-n	nm to 0.075-mm)					Cin Y	La O			
														SIGNATURE	expiratio of the			
	*Soil descriptior	Geotechnical Engineering GEOLABS, II GEOLABS, II GRANULAR SOIL (- #200 <50%)										DEP	STATE OF HAW/	SPORTATIO	N			
	adove modificat	ions by Geolabs, Inc. to	o the Unified S	on Classific	cauon System (USUS).				HIGHWAYS DIVISION								

18





	GEOLABS, INC. Geotechnical Engineering		Rock Log Legend
	R	OCK DESCRI	PTIONS
	BASALT		CONGLOMERATE
O(BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
	CLINKER	× × × × × × × × × × × × × × × × × × ×	SILTSTONE
	COBBLES		TUFF
[a˜a]	CORAL		VOID/CAVITY

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

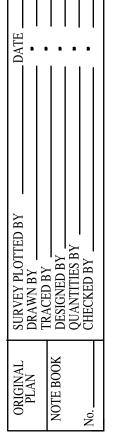
The following terms describe	e general fracture spacing of a rock:
Massive:	Greater than 24 inches apart
Slightly Fractured:	12 to 24 inches apart
Madarataly Fracturady	6 to 10 inches enert

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 no
Highly Weathered:	Most minerals decomposed with some corestones present in
Extremely Weathered:	Saprolite. Mineral residue completely decomposed to soil but
HARDNESS The following terms describe	the resistance of a rock to indentation or scratching:
Very Hard:	Specimen breaks with difficulty after several "pinging" hamme Example: Dense, fine grain volcanic rock

Hard:	Specimen breaks with some difficulty after several hammer blow Example: Vesicular, vugular, coarse-grained rock
Medium Hard:	Specimen can be broked by one hammer blow. Cannot be scra ~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 peel ~100 blows per foot. Example: Weathered rock, chalk-like coral reef
Very Soft:	Crumbles under hammer blow. Can be peeled and carved by k pressure. Example: Saprolite



not able to break by hand.

n residual soil mass. Can be broken by hand. ut fabric and structure preserved.

ner blows.

ows.

raped by knife. SPT may penetrate by

eled by knife. SPT can penetrate by

knife. Can be indented by finger

<u>GEOTECHNICAL NOTES:</u>

- 2. For boring locations, see Sheet B-01.
- 3. The information presented in the logs of borings depict the the time of the field exploration only. Variations of subsoil between and beyond the borings.
- Penetration Test (SPT) blow counts.
- 5. The data given is for general information only. Bidders shall examine the site and the boring data and draw their own locations shown and at the time the borings were taken.

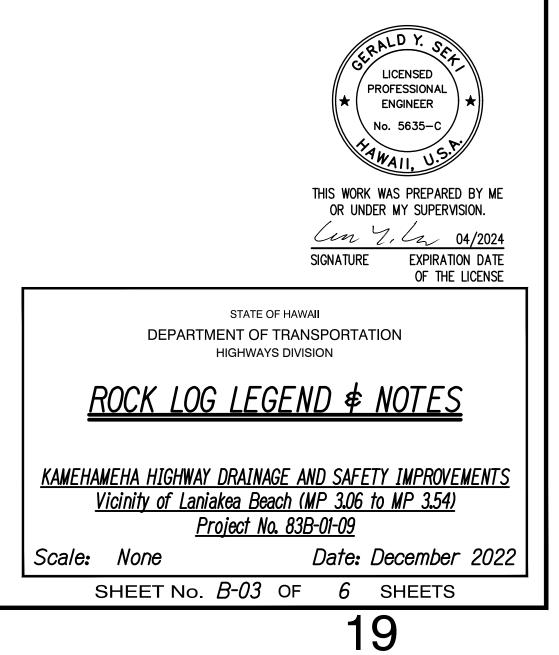
FED. ROAD DIST. NO.STATEPROJ. NO.FISCAL YEARSHEET NO.TOTAL SHEETSHAWAIIHAW.83B-01-09202319228						
HAWAII HAW. 83B-01-09 2023 19 228		STATE	PROJ. NO.			
	HAWAII	HAW.	83B-01-09	2023	19	228

1. A geotechnical engineering report entitled "Geotechnical Engineering" Exploration, Kamehameha Highway Drainage and Safety Improvements, Vicinity of MP 3.06 to 3.54, Waialua, Oahu, Hawaii" dated November 30, 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.

subsurface conditions encountered at that specified location and at conditions from those depicted in the logs of borings may occur

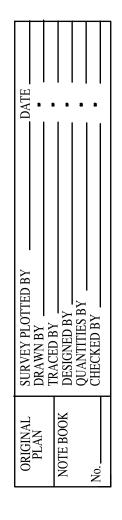
4. The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard

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

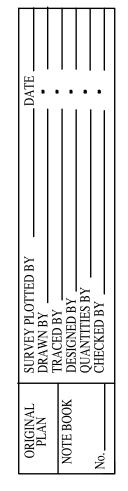


														FED. ROAD DIST. NO.	STATE PROJ. NO	D. FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	GEOLAB	S INC	KAI	MEHAMEHA HIGHWAY DRAINAGE	Log of Boring										HAW. 83B-01-0			228
	Geotechnical	•	V	AND SAFETY IMPROVEMENTS /ICINITY OF MP 3.06 TO MP 3.54	1		GEO	AR	S, INC.		KAN		Log of Boring					
sts	Ocf)	en <u>ce</u>		WAIALUA, OAHU, HAWAII Approximate Ground Surface	· ·				Engineering		V	AND SAFETY IMPROVEMENTS ICINITY OF MP 3.06 TO MP 3.54	3					
er Te	sture Itent (Unit ght (<u></u> overy 0 (%)	istani istani ws/fo ws/fo ket P	phic CS	Elevation (feet): 16 *		sts				et)		WAIALUA, OAHU, HAWAII Approximate Ground Surface						
Oth	Moi Dry Con Cor Nei Rec	Penetr Resista (blows, Pocket (tsf)	<u>Sampl</u> Graphi USCS			er Te	Moisture Content (' Dry Unit Weight (p Core Recovery ((%) C	ietrati istan ws/fo ws/fo ket P	oth (fe	Graphic USCS	Elevation (feet): 13 *						
	13 95	40	- SM	8-inch ASPHALTIC CONCRETE Brown with some gray SILTY SAND with	n a little	Oth		RQI	Pen Res (blo Poc (tsf)	Dep		Description	dmita					
	14	40	N SM	│gravel (basaltic), medium dense, moist (□Light tan with traces of brown SILTY SAI			2		8		SP-	Brown fine SILTY SAND, medium dense, moist (recent alluvium)	- A					
			5 SP	(CORALLINE) with some gravel, mediur	m dense,					5-	- SM	Light tan poorly graded fine SAND (CORA with a little silt, loose, dry to moist (beach	LLINE)]					
Sieve - #200 =	6 89			Brownish tan fine SILTY SAND, medium	i dense,	Direct	23 114		9			grades coarser locally	-					
1.5%			-	Tan poorly graded SAND (CORALLINE)	with	Shear	0			- 10-								
				traces of silt and gravel, loose, moist (be			27		12			grades to medium dense, wet						
	5 93	8		deposit)	_		28			- - 15-		grades to medium dense, wet						
				Boring terminated at 11.5 feet	-		28 89		40			grades with fine gravel	-					
				* Elevations estimated from Roadway P Profile dated May 2022 transmitted by			100					Gray subrounded BOULDERS (BASALTIC	C), very					
5DT 8/4/22			5-	USA.	-	LL=53	43		7	20-		Brown SILTY CLAY with some sand (base						
GEOLABS.C					-	PI=29	61					a little gravel, medium stiff (recent alluviur	n) -					
1-00(A).GPJ					-		47 71 00		50/4"	25- -		grades with cobbles (basaltic) locally	-					
	,		0	Water Level: Vot Encountered			99	16	50/4"	- 30-		Gray with traces of brown vugular BASAL moderately to closely fractured, slightly	T, -					
Date Cor	By: S. Latronic)22		Drill Rig: CME-55D		UC=	100	47		30-		weathered, hard to very hard (a'a basalt)	-					
Total Dep				Drilling Method:6" Hollow-Stem AugerDriving Energy:140 lb. wt., 30 in. drop		12820												
						psi	57	20		35-								
	GEOLAB	•		MEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS	Log of Boring			20				Gray with some brown subangular SAND						
	Geotechnical	Engineering	V	/ICINITY OF MP 3.06 TO MP 3.54 WAIALUA, OAHU, HAWAII	2					40-		GRAVEL (BASALTIC) with some cobbles (clinker)	, dense -					
Tests	ure nit (% ery (%	ration ance s/foot) t Pen		Approximate Ground Surface Elevation (feet): 14 *			38			-								
Other	Moisture Content Dry Unit Weight Core Recover RQD (%	² enetr Resist blows blows blows blows tsf)	Sampl Sraph JSCS	Description					50	45-	°0 ⊨ 0 ↓ 0 ↓	Brown with some gray SILTY GRAVEL (BASALTIC) with some sand, dense to ve (clinker)	ry dense-					
			- * GW	7-inch ASPHALTIC CONCRETE		Sieve - #200 =			52									
	12 91	25	SM	Light tan SANDY GRAVEL (CORALLINE little silt, dense, moist (fill) Brownish tan fine to medium SILTY SAN	, la	13.9%				50- - -		grades with cobbles (basaltic) locally	-					
	7	16		Brownish tan fine to medium SILTY SAN medium dense, moist (recent alluvium)		UC= 8500 ps		50		-		Gray vugular BASALT, moderately fracture	ed					
	5 96	30	5	Tan poorly graded SAND (CORALLINE)						55-		slightly weathered, hard to very hard (a'a	basalt) 1					
				dense, moist (beach deposit)	-		100	28			SM	Reddish brown with some gray SILTY SAI (BASALTIC) with some gravel, slightly cer	ND 1 mented.			GUR	LD Y. SET	
			-		-					60-		dense (clinker) Gray dense BASALT, moderately to close	7				OFESSIONAL ENGINEER	r)
	6 99	26			-		100	15				fractured, unweathered to slightly weather				THAT I	o. 5635-C	/
				Boring terminated at 11.5 feet	-					65-		hard (a'a basalt)	-				VAS PREPARED E R MY SUPERVISIO	
							100	72					1				EXPIRATION	/2024
8/4/22			5-		-	GDT 8/16/2.				70-			1	Γ			OF THE LI	
OLABS.GDT						J GEOLABS						Boring terminated at 71.5 feet			DEPARTMENT OF	F HAWAII TRANSPORTATI S DIVISION	ON	
M).GPJ_GE					-	Date Sta	arted: lunc	7, 202		75		Water Level: ♀ 12.4 ft. 06/08/2022 1250 HRS			BORING			
	rted: June 13, 20	20	0	Water Level: Vot Encountered		Date Co	mpleted: June	8, 202				Water Level: ▼ 12.4 ft. 06/08/2022 1250 HRS 12.3 ft. 06/08/2022 1805 HRS Drill Rig: CME-55D						
Date Cor	mpleted: June 13, 20	022		Drill Rig: CME-55D		Logged Total De Work Or	epth: 71.5					Drilling Method: 4" Solid-Stem Auger & PQ Cori	ng		<u>EHA HIGHWAY DRAINA</u> ainity of Laniakaa Baa			<u>ents</u>
Total Dep Work Ord	pth: 11.5 feet			Drilling Method:6" Hollow-Stem AugerDriving Energy:140 lb. wt., 30 in. drop			<u>uci. 7001</u>	<u> </u>				Driving Energy: 140 lb. wt., 30 in. drop				<u>83B-01-09</u>		
	<u></u>													Scale:	<i>None</i> HEET No. <i>B-04</i>		ecember Sheets	2022
																20		
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																		FED. ROAD DIST. NO. ST.	ATE PROJ. N	IO. FIS	SCAL SHEE EAR NO	
	G	EOLA	ABS, II	NC.		KAMI A	EHAMEHA HIGHWAY DRAINAGE ND SAFETY IMPROVEMENTS	Log of Boring										HAWAII HA	W. 83B-01-	-09 20	023 20) 228
ts			al Engin			νίϊ T	CINITY OF MP 3.06 TO MP 3.54 WAIALUA, OAHU, HAWAII	1					S, INC. Engineering			MEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS ICINITY OF MP 3.06 TO MP 3.54	Log of Boring					
ther Tes	ontent (⁹ ontent (⁹ ry Unit /eight (po	ore ecovery (Penetratio Resistance (blows/foo	Pocket Pe (tsf)	Depth (fee <u>Sample</u>	scs	Approximate Ground Surfac Elevation (feet): 16 * Description	:е	Tests		(pcf) y (%)	()	nce nce oot) Pen.	feet)) U	WAIALUA, OAHU, HAWAII Approximate Ground Surface	3					
0	<u>≥∪</u> ⊃≤ 13 95		40			SM	8-inch ASPHALTIC CONCRETE Brown with some gray SILTY SAND wi	th a little	Other ⁻	Moistu Conter Drv Un	Weight Core Recove	RQD (Penetra Resista (blows/f Pocket (tsf)	Depth	USCS	Elevation (feet): 13 * Description	druta					
	14 6 89		9		5	SM SP	gravel (basaltic), medium dense, mois Light tan with traces of brown SILTY S (CORALLINE) with some gravel, medi moist (fill)	AND		2			8	5-	SP-	Brown fine SILTY SAND, medium dense, moist (recent alluvium) Light tan poorly graded fine SAND (CORA with a little silt, loose, dry to moist (beach	ALLINE)					
200 = .5%					- M - - -		Brownish tan fine SILTY SAND, mediu moist (recent alluvium) Tan poorly graded SAND (CORALLINE traces of silt and gravel, loose, moist (l	E) with	Direct Shear		14 0		9	10-		grades coarser locally	-					
	5 93		8				deposit) Boring terminated at 11.5 feet	-		27	28		12	- 15-		grades to medium dense, wet grades with fine gravel						
					15-		* Elevations estimated from Roadway Profile dated May 2022 transmitted b USA.		LL=53	28 8	100		40	20-	O CH	Gray subrounded BOULDERS (BASALTI dense (recent alluvium) Brown SILTY CLAY with some sand (base	altic) and					
									PI=29		61			25		a little gravel, medium stiff (recent alluviu grades with cobbles (basaltic) locally	m) - - -					
Date Star		June 13 June 13			20		Water Level: Vot Encountered			47 7	⁷¹ 99	16	50/4"	- - 		Gray with traces of brown vugular BASAL moderately to closely fractured, slightly	-					
ogged B otal Dep /ork Ord	/: th:	S. Latro 11.5 fee 7651-00	nic t				Drill Rig:CME-55DDrilling Method:6" Hollow-Stem AugerDriving Energy:140 lb. wt., 30 in. drop		UC= 12820 psi		100	47		35-		weathered, hard to very hard (a'a basalt)	-					
			ABS, II al Engin	eering		A	EHAMEHA HIGHWAY DRAINAGE ND SAFETY IMPROVEMENTS CINITY OF MP 3.06 TO MP 3.54 WAIALUA, OAHU, HAWAII	Log of Boring 2			57	20		40- -		Gray with some brown subangular SAND GRAVEL (BASALTIC) with some cobbles (clinker)						
Other Tests	Content (% Dry Unit Weight (pcf	Core Recovery (%	Penetration Resistance (blows/foot)	Pocket Pen (tsf)	Depth (feet Sample	Graphic USCS	Approximate Ground Surfac Elevation (feet): 14 * Description 7-inch ASPHALTIC CONCRETE	e	Sieve		38		52	45-		Brown with some gray SILTY GRAVEL (BASALTIC) with some sand, dense to ve (clinker)	ery dense					
	12 91		25			SM	Light tan SANDY GRAVEL (CORALLIN little silt, dense, moist (fill)	ý la	- #200 = 13.9% UC=		57 63	50		50- - -		grades with cobbles (basaltic) locally	-					
	7 5 96		16 30		5		Brownish tan fine to medium SILTY SA medium dense, moist (recent alluvium Tan poorly graded SAND (CORALLINE) []	8500 ps	si				55-		Gray vugular BASALT, moderately fractures slightly weathered, hard to very hard (a'a	basalt)					
							dense, moist (beach deposit)				100	28		- - 60-	SM ب،	Reddish brown with some gray SILTY SA (BASALTIC) with some gravel, slightly ce dense (clinker)	ND emented,			*	GERALD Y. G LICENSED PROFESSIONA ENGINEER	^{AL})★
	6 99		26				Boring terminated at 11.5 feet	-			100			65-		Gray dense BASALT, moderately to close fractured, unweathered to slightly weathe hard (a'a basalt)	ן עי				No. 5635-0 WAIL, US VORK WAS PREPA	ARED BY N
					15-			-	.GDT 8/16/22		100	72		- - 70-			-		~~	Cen SIGNAT	n Y, La IURE EXPIR	
									0(A).GPJ GEOLABS					75		Boring terminated at 71.5 feet	-		DEPARTMENT OF	YS DIVISION		
ate Star	ed:	June 13	, 2022		20		Water Level: Vot Encountered		Date St Date Co Date Co	ompleted			2			Water Level: ▼ 12.4 ft. 06/08/2022 1250 HRS 12.3 ft. 06/08/2022 1805 HRS Drill Rig: CME-55D			<u>BORIN</u>	<u>G LOG -</u>	- 1	
ate Com ogged B otal Dep	pleted: /: th:	June 13 S. Latro 11.5 fee	, 2022 nic t				Drill Rig:CME-55DDrilling Method:6" Hollow-Stem Auger		Total De Work O	epth:	71.5 f					Drilling Method:4" Solid-Stem Auger & PQ CorDriving Energy:140 lb. wt., 30 in. drop	ring		<u>HIGHWAY DRAIN</u> ty of Laniakea Be <u>Project N</u>		<u>06 to MP 3.5</u>	
Vork Ord	er:	7651-00	(A)				Driving Energy: 140 lb. wt., 30 in. drop]										Scale: No SHE		Date	e: Decemb S Sheet	
																					20	



		G	EOI	_AE	3S, IN	۱C.		KA	MEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS	Log of Boring			GEULADS, INC.				KAMEHAMEHA HIGHV AND SAFETY IMPR VICINITY OF MP 3.0 WAIALUA, OAHL 9 a 93 Eleving 93 Freeent alluvium) 11 SM SP Irecent alluvium) Light tan with some medium SAND (C dense, dry to mois Image: SP Irecent alluvium) Light tan with some medium stiff, mois Brown to reddish to medium stiff, mois Brownish gray GR (BASALTIC) with s wet (recent alluviu Boring terminated Image: SP Image: C Drilling Method: 6" Image: Drill Rig: C Drill Rig: C Image: Drill Rig: C Mathematical Alloghy Approxi Image: Drill Rig: Drill Rig: C Mathematical Alloghy Image: Drill Rig: Drill Rig: C Mathematical Alloghy			
sts					Engin				VICINITY OF MP 3.06 TO MP 3.54 WAIALUA, OAHU, HAWAII	4	Tests	ure ent (%)	nit nt (pcf)	(%)	tration tance s/foot)	et Pen.	ו (feet)	ole Dic	(0	Approx
ë	isture ntent (%	Dry Unit Weight (po	re covery (⁹	ND (%)	netratio sistance ows/foo	Pocket Pe (tsf)	Depth (feet)	Sample Graphic LISCS			Other	Moist Conte	Dry Unit Weight (p Core	RQD	Pene Resis (blow	Pocket Pe (tsf)	Depth	Sample Graphic		Brownish tan SII T
Other	0 V O	Ω Δ Δ	Col Re	RQD	Pen Res (blo	Po (tsl	De					1	84		17					(recent alluvium)
	7		57		25/2"		-	SF	(CORALLINE) with a little cobbles (bas medium dense, moist (fill)			3			11		· ·			medium SAND (C
Direct	20	105	0		29		5-	SI				6	82		12		5-			
Shear TXUU Su=2.4			0			Ī	7 410-		little silt and traces of gravel, medium d moist to wet (beach deposit)											
ksf Sieve	21		44		12	Ī	Z -		grades with brown sandy silt pockets lo			33	78		4		10-			
#200 = 6.8%	36				34		15-		Gray with traces of brown subrounded (COBBLES (BASALTIC), dense (recent								¥ .			medium stiff, mois
			28				20-	M	Reddish brown with some gray SILTY Constraints of the some gravel (basaltic), hard (recent all		8						15-			(BASALTIC) with
_L=60 PI=28	60	66	98	62	20	2.0	-	M		YEY SILT	LABS.GDT 8/4/2									
TXUU Su=2.4			65				25-	- SI	alluvium) Brown with reddish brown mottling CLA	YEY SILT	-00(A) GPJ GEO						· ·			
ksf UC= 10460							- 30-		with some sand and a little gravel (basa (recent alluvium)	, 	Date Sta			e 15, 2 e 15, 2			20-			Water Level: ¥ 1
psi			57				-	°°°GV	Gray vugular BASALT, slightly fractured /- weathered, hard (a'a basalt) / Brown and gray SILTY SAND (BASALT		Logged Total De	By: pth:	S. L 12 f	atronio eet	>					Drilling Method: 6
	31				20		35-		Brownish gray vugular BASALT, severe	,	Work Or	der:	765	1-00(A	.)					
	01		22				40-		fractured, moderately weathered, medi						BS, IN				A	AND SAFETY IMPF
	21	114	9		48/6" +50/4		40-		Brown and gray SANDY GRAVEL (BAS with a little cobbles and traces of silt, m	/ /	ssts	(%)	Geotech হি			eering	set)			
	21						45-		dense (clinker) Brown with some gray SILTY SAND (B/ with some gravel and a little cobbles, ve	/	ther Te	loisture ontent	Dry Unit Weight (Core	QD (%	enetrat esistar olows/fo	ocket F sf)	epth (fe	ample traphic	SCS	
UC= 24070	21		100	71	50/5"		-		(clinker) Reddish brown with some gray cemente	Ţ					<u> </u>					
psi UC= 13280			100	73			50-		BASALT, moderately fractured, moderately weathered, hard (welded clinker)		LL=59 PI=29	24	76		32 45	4.0				Brown SILTY CLA
psi			4.0.0				55-		Gray dense BASALT, moderately fractus slightly weathered, very hard (a'a basal	-		18			23/6"		5-			
			100	60			-								+25/1'					
UC=			100	75			60-			-							. 10-			
25730 psi							65-			-										
							-		Boring terminated at 66 feet											
							70-			-	5.GDT 8/4/22						15-			
							75			-	A).GPJ GEOLAB									
Date Sta Date Cor Logged I	mplet	ed:	<u>June</u> June S. La	9, 20	22				Water Level: ✓ 12.4 ft. 06/09/2022 1030 H ✓ 9.9 ft. 06/09/2022 1535 HF Drill Rig: CME-55D	Ś	Date Sta	arted:	June	e 15, 2	022		20-			Water Level: ┸ N
Total De Work Or	pth:		66 fee 7651-	et					Drilling Method: 4" Solid-Stem Auger & PQ C Driving Energy: 140 lb. wt., 30 in. drop	Coring	Date Co	mplet	ed: Jun	e 15, 2 atronio	022					
					1						Total De	-	6.1							ě – – – – – – – – – – – – – – – – – – –



		FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HWAY DRAINAGE	Log of	HAWAII	HAW.	83B-01-09	2023	21	228
PROVEMENTS 3.06 TO MP 3.54	Boring						
AHU, HAWAII	5						
oximate Ground Surface Elevation (feet): 14 *							
Description	se, moist						
n) ome white poorly graded f (CORALLINE), loose to n noist (beach deposit)							
	-						
h brown SILTY CLAY, sof oist (recent alluvium) GRAVELLY COBBLES	ft to						
th some clayey silt, mediu ivium) ted at 12 feet	ım dense,						
	-						
11.8 ft. 06/15/2022 0905 HRS	6						
CME-55D							
6" Hollow-Stem Auger 140 lb. wt., 30 in. drop							
HWAY DRAINAGE PROVEMENTS 3.06 TO MP 3.54 AHU, HAWAII	Log of Boring 6						
oximate Ground Surface Elevation (feet): 14 *							
Description							
AND with traces of clay, n	nedium						
ecent alluvium) LAY with a little cobbles (I	/ pasaltic).						
d, moist (recent alluvium)							
ulders (basaltic) ted at 6.1 feet					GERAL	DY. SET	
						CENSED FESSIONAL NGINEER 5635-C 411, U.S.	*
	-				THIS WORK WA		
					Cin Y. SIGNATURE	EXPIRATION OF THE	
	-		DEP	STATE OF HAW/ ARTMENT OF TRAN HIGHWAYS DIVIS	SPORTATIO	N	
	-		<u>B</u>	ORING LOO	<u> 35 - 2</u>		
Not Encountered						זווחהאייר	
CME-55D 6" Hollow-Stem Auger 140 lb. wt., 30 in. drop			/icinity of	IWAY DRAINAGE AI Laniakea Beach (I <u>Project No. 83E</u>	<u>IP 3.06 to</u> 3-01-09	<u>MP 3.54)</u>	
	J	Scale:	None Sheet N	No. <i>B-05</i> OF	Date: De	HEETS	2022
					<u>21</u>		

GEULADS, INC.	MEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS /ICINITY OF MP 3.06 TO MP 3.54 7		FED. ROAD DIST. NO.STATEPROJ. NO.HAWAIIHAW.83B-01-09	FISCAL YEARSHEET NO.TC SHI2023222
Other Tests Moisture Content (%) Dry Unit Weight (pcf) Core Recovery (%) Recovery (%) Recovery (%) Penetration Resistance (blows/foot) (blows/foot) (tsf) Depth (feet) (tsf) USCS	WAIALUA, OAHU, HAWAII / Approximate Ground Surface Elevation (feet): 16 * Description			
13 16 Image: GW shape 6 25/1" 5	Brown fine to medium SILTY SAND with some cobbles (basaltic), medium dense, moist (fill) Reddish brown with some gray SILTY CLAY with little gravel (basaltic), very stiff, moist (recent			
	alluvium) Gray BOULDER (BASALTIC), very dense, dry (recent alluvium) Boring terminated at 5.1 feet			
te Started: June 14, 2022 te Completed: June 14, 2022 gged By: S. Latronic tal Depth: 5.1 feet ork Order: 7651-00(A)	Water Level: ▼ Not Encountered Drill Rig: CME-55D Drilling Method: 4" Solid-Stem Auger Driving Energy: 140 lb. wt., 30 in. drop			
GEOLABS, INC.	MEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS /ICINITY OF MP 3.06 TO MP 3.54 WAIALUA, OAHU, HAWAII			
Moisture Content (%) Dry Unit Weight (pcf) Core Recovery (%) RQD (%) RQD (%) Penetration Resistance (blows/foot) Pocket Pen. (tsf) Depth (feet) Carple Carple	Approximate Ground Surface Elevation (feet): 19 * Description			
15 88 80 25/3" GM 38 17 5 CH	Gray with some brown SILTY GRAVEL (BASALTIC) with some cobbles and a little sand, very dense, moist (fill) Gray BOULDERS (BASALTIC), very dense, dry (recent alluvium)			
63 63 SM	Reddish brown SILTY CLAY, very stiff, moist (recent alluvium) Brown with some gray SILTY SAND (BASALTIC) with some rounded gravel, medium dense, moist (recent alluvium)			K RALD Y. SA CERALD Y. SA LICENSED PROFESSIONAL ENGINEER No. 5635−C F WALL N.S.
43 21 15	Brown with gray mottling CLAYEY SILT with trace of decomposed gravel, very stiff, moist (recent alluvium) Boring terminated at 13 feet	es] / /		THIS WORK WAS PREPARED BY N OR UNDER MY SUPERVISION. <u>Con 7, Ca 04/20</u> SIGNATURE EXPIRATION DA OF THE LICEN
te Started: June 14, 2022	Water Level: Vot Encountered		STATE OF HAWA DEPARTMENT OF TRAN HIGHWAYS DIVIS BORING LOC	SPORTATION ION
ate Started.June 14, 2022ate Completed:June 14, 2022gged By:S. Latronicotal Depth:13 feetork Order:7651-00(A)	Water Level. ± Not Encountered Drill Rig: CME-55D Drilling Method: 4" Solid-Stem Auger & PQ Coring Driving Energy: 140 lb. wt., 30 in. drop		<u>KAMEHAMEHA HIGHWAY DRAINAGE AN</u> <u>Vicinity of Laniakea Beach (M</u> <u>Project No. 83B</u> Scale: None SHEET No. <i>B-06</i> OF	<u>IP 3.06 to MP 3.54)</u> 3 <u>-01-09</u> Date: December 20

		FED. ROAD DIST. NO. STATE PROJ. NO. FISCAL SHEET TOT YEAR NO. SHEE
GEOLABS, INC.	KAMEHAMEHA HIGHWAY DRAINAGE Log of AND SAFETY IMPROVEMENTS Boring	HAWAII HAW. 83B-01-09 2023 22 22
GEOLABS, INC. Geotechnical Engineering		
ests e e t t (%) (%) (%) (%) Pen.	\hat{f}	
Other Tes Moisture Content (⁶ Dry Unit Weight (p Core Recovery (Recovery (Recovery (Resistanc (blows/foc (blows/foc (tsf)	Image: State of the state	
13 16	Brownish gray SANDY GRAVEL (BASALTIC) with SM some cobbles, very dense, moist (fill)	
	CH Brown fine to medium SILTY SAND with some	
6 25/1"	5 Cobbles (basaltic), medium dense, moist (fill) Reddish brown with some gray SILTY CLAY with a	
	little gravel (basaltic), very stiff, moist (recent alluvium)	
	Gray BOULDER (BASALTIC), very dense, dry	
	10- Boring terminated at 5.1 feet	
ate Started: June 14, 2022 ate Completed: June 14, 2022	Water Level: V Not Encountered	
ogged By:S. Latronicotal Depth:5.1 feet	Drill Rig: CME-55D Drilling Method: 4" Solid-Stem Auger	
Nork Order: 7651-00(A)	Driving Energy: 140 lb. wt., 30 in. drop	
GEOLABS, INC.	KAMEHAMEHA HIGHWAY DRAINAGE Log of AND SAFETY IMPROVEMENTS Boring VICINITY OF MP 3 06 TO MP 3 54 Image: Constraint of the second	
Tests ure Init (%) (%) (%) (%) (%) tration tration tration et Pen.	Approximate Ground Surface Elevation (feet): 19 *	
Other Tes Moisture Content (Dry Unit Weight (p Recovery Recovery Recovery Resistand (blows/fo (blows/fo		
15 88 25/3"	(BASALTIC) with some cobbles and a little sand,	
	Reddish brown SILTY CLAY, very stiff moist	
63	SM (recent alluvium)	SERALD P. SEF
	Brown with some gray SILTY SAND (BASALTIC) with some rounded gravel, medium dense, moist	★ (PROFESSIONAL ENGINEER No. 5635-C
43 21	10-1 H ML (recent alluvium)	FAWAII, U.S.P.
	of decomposed gravel, very stiff, moist (recent	THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
	Boring terminated at 13 feet	SIGNATURE EXPIRATION DATE
		OF THE LICENSE STATE OF HAWAII
		DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
		<u>BORING LOGS - 3</u>
ate Started: June 14, 2022	20 Vater Level: ▼ Not Encountered	
Date Completed:June 14, 2022ogged By:S. Latronic	Drill Rig: CME-55D	<u>KAMEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS</u> <u>Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)</u>
otal Depth: 13 feet /ork Order: 7651-00(A)	Drilling Method: 4" Solid-Stem Auger & PQ Coring Driving Energy: 140 lb. wt., 30 in. drop	<u>Project No. 83B-01-09</u> Scale: None Date: December 2022
		SHEET NO. B-06 OF 6 SHEETS

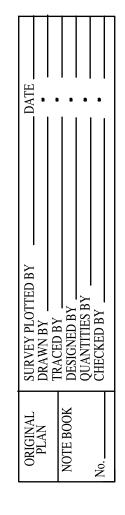


Image: Stress of the stress
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
<u>BORING LOGS - 3</u>
<u>MEHAMEHA HIGHWAY DRAINAGE AND SAFETY IMPROVEMENTS</u> <u>Vicinity of Laniakea Beach (MP 3.06 to MP 3.54)</u> <u>Project No. 83B-01-09</u>
ale: None Date: December 2022
SHEET NO. <i>B-06</i> OF 6 SHEETS
22