

FED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	310	452

Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

	MAJOR DIVISION	S	US	CS	TYPICAL DESCRIPTIONS
	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
COARSE- GRAINED	OTAVELO	LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
SOILS	MORE THAN 50% OF COARSE FRACTION	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	RETAINED ON NO. 4 SIEVE	MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS	CLEAN SANDS	0	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
MORE THAN 50% OF MATERIAL	SANDS	LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
RETAINED ON NO. 200 SIEVE	50% OR MORE OF COARSE FRACTION PASSING	SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
	THROUGH NO. 4 SIEVE	MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
	CII TC			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE- GRAINED SOILS	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 MORE OF MATERIAL PASSING THROUGH NO. 200	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		СН	INORGANIC CLAYS OF HIGH PLASTICITY
SIEVE				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
ŀ	HIGHLY ORGANIC SOI	LS	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	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

LL LIQUID LIMIT
PI PLASTICITY INDEX

TV TORVANE SHEAR (tsf)

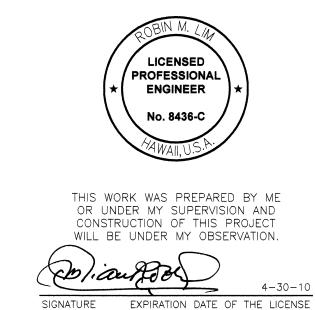
PEN POCKET PENETROMETER (tsf)

UC UNCONFINED COMPRESSION (psi)

WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

- 1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Kaumualii Highway Widening, Phase 1A, Vicinity of Anonui Street to Lihue, Island of Kauai, Hawaii" dated July 17, 2008 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.
- 2. For boring locations, see Sheet Nos. G-1.01 thru G-1.05.
- 3. 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.
- 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 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 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.



GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOG LEGEND AND NOTES

KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS Date: February 2009

SHEET No. G-2 OF G-2 SHEETS



FED. ROAD STATE FED. AID FISCAL SHEET TOTAL SHEETS

HAWAII HAW. NH-050-1(31) 2009 311 452

•		e Start		•	/6/98		·	_	Drill Rig: Mobile B-80 Drilling Method: 4" Auger
		e Com ged By	_		I. Chen				Driving Energy: 140 lb. wt., 30 in. drop
	Tot	al Depl	ih:	2	21.5 feet				
th, ft	e le	ist.	LAI	SORAT PLATE TO TENTE	Press. OBA	L		†S+	DESCRIPTION
Depth,	Sam	2 8 2 0		<u> </u>	Comp Stri Ksf	Other	Data	Pen,	Approximate Surface Elevation (ft): 336*
	X	75	93	27				4.0	3-inch ASPHALT CONCRETE Tannish brown SANDY GRAVEL (GW) with silt, very dense, damp (fill)
	X	29	78	33				2.5	
5,*	X	40	90	34				4.5	NXI
10-	H	25	80	35				4.2	
15 -	X	19	68	51				1.2	grades to stiff, very moist
20-		16	68	52				1.7	
				:					Boring terminated at 21.5 feet
25 -									Groundwater not encountered
					·	·			
30-									
35 -									
k	(r.	.] 10M .6\10M . J							
					, IN		_	KA	OG OF BORING 21 JUMUALII HIGHWAY WIDENING JUE TO WEST OF MALUHIA ROAD
WO	RK (ORDER	NO. 3	3869-0	0 KH	N D	ec 00	ISL	AND OF KAUAI, HAWAII

		e Start		•	/6/98	·			rill Rig:	
		te Com	•		/6/98				rilling Method: _	·
		ged By			. Chen			C	riving Energy: _	140 lb. wt., 30 in. drop
		al Dept			1.5 fee					
+		FIELD	LA	BORAT				+8+		DESCRIPTION
Depth,	ample	esist Ious/	2 E 45	oistu	Compress Strength ksf	Other	Data	Pen, †	Annrovina	te Surface Elevation (ft): 304*
<u>5</u>	Š	750	000	<u> 운영 %</u>	ទូ ខ្	Ó	Ö	<u>a</u>		
	X	39	78	39				3.8		ASPHALT CONCRETE ay SANDY GRAVEL (GW), damp
	X	57	81	35		LL=79 Pl=51		3.4	Reddish very moi:	brown SILTY CLAY (CH), very stiff, st
5 -	X	70	79	40				4.0	grades w	rith trace gravel
				,						· · · · · · · · · · · · · · · · · · ·
0-	X	28	72	47				2.8		· .
	\prod					·				
5 -	M	26	71	51				3.4		
•										
:o-		46	70					0.0	grades to	a atiff
	M	16	72	44			,	8.0		
	1			Ī					Boring te	rminated at 21.5 feet
!5 -									Groundw	ater not encountered
.5										
	-									
ю—						·.				
	1									
35 -	1									·
\ <u>\</u>		LĴIGBI . D\IOM . I	·							
		G E /	\ I A	De	.			LC	G OF BORI	NG 22
		GEC			-			KAI	JMUALII HIGHW	AY WIDENING
		Geo	techni	ical Eng	gineerir	ng	LIHUE TO WEST OF MALUHIA ROAD			



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

GEOLABS, INC.

state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS - 1

KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.01 OF G-3.26 SHEETS

311

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR		
HAWAII	HAW.	NH-050-1(31)	2009	312	452

		e Starte		٠.	/6/98		·		orill Rig: Orilling Method: _	Mobile B-80 4" Auger	
		e Com			/6/98	,			".		
	_	ged By			Chen			E	riving Energy:	140 lb. wt., 30 in. drop	
		al Dept			1.5 feet						
_	F	IELD	LA	BORAT	ORY						
+		#. #	.	2+	t SS			+8+		DESCRIPTION	
Ê	3 6	str S	5 i +	를	5 E	Ĺ	,			•	
Depth,	Samp	Pene Resi Blou		SO.×	Comp Stre Ksf	Other	Data	Pen,		te Surface Elevation (ft): 248*	
-	H	119	77	32				>4.5	71/M 1	brown CLAYEY SILT (MH), hard,	
-		- 							1221		
-	V	56	81	32				>4.5	grades to	o moist	
5 -	H								HEAD .	•	
•	M	49	78	38				4.2	14.41		
-	\prod								144		
-	1			, ,					1921		
L://\`									1323		
iU	N	20	68	50				2.0	grades to	very stiff, very moist	
-	H						,		12	3	
-	1										
	$\{\ \}$								1441		
15 -	H	21	74	45					1921		
-	A								1921		
•]									\$	
•									144	19	
20	\coprod	~		40					HAN .		
	M	25	75	40			•				
•	$\{ \ \ \}$								Boring te	rminated at 21.5 feet	
•	† 								Groundw	rater not encountered	
ne ·] [1						
25 -].								
	$\mid \mid$										
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	1									•	
30 —	1										
,	1										
,]							,			
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35 -						•					
k	r	.]KIN. D\XXX. (•							
			·					10	G OF BORI	NG 23	
		GE() L A	BS	, IN	C.		1	UMUALII HIGHW		
•		Geo	otechn	ical En	gineerin	g				·	
								LIHUE TO WEST OF MALUHIA ROAD			
WOI	RK (ORDEF	NO.	3869-0	0 KH	N D	ec 00	ICLAND OF VALIAL HAWAII			

	Dat	te Starte te Com ged By	pleted:	4					Orill Rig: Mobile B-80 Orilling Method: 4" Auger, HQ Coring Oriving Energy: 140 lb. wt., 30 in. drop
	Tol	al Dept	h:	1	02.5 fe	et			
+ +	FIELD LABORATORY							†sf	DESCRIPTION
Depth,	Sample	Peneti Resis Blows	Dens.	Moist Conte	Compri Stren ksf	Other	Data	Pen,	Approximate Surface Elevation (ft): 148*
	X	49	74	24					Brown and yellow CLAYEY SILT (ML) with sand and gravel, very stiff, damp (fill) Tannish brown SANDY SILT (ML), very stiff,
	∇	15	76	35				1.5	damp
5 -	X	11	79	29				0.8	Reddish brown CLAYEY SILT (MH), soft to medium stiff, moist to very moist
10-	-	_	آ ا						
	X	7	68	52					Dark gray ORGANIC SILTY CLAY (CH/OH), soft
15 -	X	3	46	115					
20-		10	72	52					
	A	- - -					•		Gray and brown CLAYEY SILT (MH) with gravel, soft to medium stiff
25 -		57	71	54				1.5	Yellowish brown SANDY SILT (ML) with gravel, stiff
	1								
30-	X	17	68	53				2.2	grades to grayish brown with clay
35 -	1			:	·				
eo l		L) IOM.D\IOM.I		:				10	G OF BORING 24
		GE C			, IN gineerin			KAI	UMUALII HIGHWAY WIDENING UE TO WEST OF MALUHIA ROAD
WO		ORDER	NO 4	0000	0 KH	IN D	ec 00		AND OF KAUAI, HAWAII



SIGNATURE EXPRATION DATE OF THE LICENS

GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 2

KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.02 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	313	452

	FIE	LD	LA	3ORAT	ORY							F	IELD	LA	BORAT	ORY	
Depth, ft	Sample Penetra	Resist. Blows/ft	Dry Density ocf	to isture Content	Compress. Strength ksf	Other	Data	en, tsf		(Continued from previous plate)	Depth, ft	amp le	enetra. lesist. Ilous/ft	ry ensity ef	Moisture Content %	Compress. Strength ksf	Other Date
-	X	40	73	50				2.6		Gray to reddish brown SANDY SILT (ML) with clay and gravel, very stiff		5		.	EGX	0 04	RUN 7
40-		37		47				1.6			80-		-				REC=98% RQD=48%
45 -		50		49				3.5			85 -						RUN 8 REC=100% RQD=50%
50-						RUN REC= RQD=	-67%			Brown vugular BASALT, severely fractured, highly to extremely weathered, soft with seams of clay (weathered basalt formation)	90-	-			•		RUN 9 REC=100% RQD=92%
55 -						RUN : REC= RQD=	-47%		パーパーパー		95 -			·			RUN 10 REC=100% RQD=100%
60-						RUN : REC= RQD=	-72%		14-14-14-14-14-14-14-14-14-14-14-14-14-1	Gray vesicular BASALT, moderately fractured, moderately weathered, medium	100-			-			RUN 11 REC=100% RQD=93%
65 —						RUN REC= RQD=	-98%		スシン	hard (basalt formation) Gray dense BASALT, slightly fractured, slightly weathered, hard (basalt formation)	105 -						
70-							5 = 100% = 100%		12-12-12		110-	-		-			
75						RUN REC= RQD			11/2/	-	115 -	-					
				· ·													· · · · · · · · · · · · · · · · · · ·
	G				, IN			KAU	UMI	OF BORING 24 UALII HIGHWAY WIDENING TO WEST OF MALUHIA ROAD			G E C		BS ical Eng		,
WOR	K O	RDER	NO.	3 869 -0	o Ki	IN D	ec 00			D OF KAUAI, HAWAII	WO	RK	ORDER	NO.	3869-0	D KH	IN Dec 00

<u>.</u>	F	IELD	LAE	BORAT	ORY			
apth, ft	e di	retra. Fist. Ms/ft	si ty	isture itent	ipress. ength f		i, tsf	DESCRIPTION
Dep	Sail	Per Res Blo	688	ទទ្ធ~	Comp Stre ksf	Other Data	Pen,	(Continued from previous plate)
80-						RUN 7 REC=98% RQD=48%		Gray and tan vugular BASALT, closely to severely fractured, highly weathered, soft to medium hard (basalt formation) grades to moderately fractured
85 -				; ,		RUN 8 REC=100% RQD=50%		Gray vesicular BASALT, slightly fractured, moderately to slightly weathered, medium hard (basalt formation)
•				; -				hard (basalt formation)
90				·		RUN 9 REC=100% RQD=92%		grades to dark gray
95						RUN 10 REC=100% RQD=100%		Gray vesicular BASALT, slightly fractured to massive, moderately weathered, hard
- - 100			-			RUN 11 REC=100% RQD=93%		grades to slightly weathered
-								Boring terminated at 102.5 feet
105 — -								Groundwater level at: <u>Depth Hours</u> 8.2 ft. 0800 4/13/98
110								·
1								
115 –			<u> </u>		1		<u> </u>	L
					***************************************		10	G OF BORING 24
		GEC	LA	BS	, I N	C.		JMUALII HIGHWAY WIDENING

LIHUE TO WEST OF MALUHIA ROAD

ISLAND OF KAUAI, HAWAII



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

EXPIRATION DATE OF THE LICENSE

HIGHWAYS DIVISION

GEOLABS, INC. state of hawaii department of transportation

BORING LOGS - 3

KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u>

FEDERAL-AID PROJECT NO. NH-050-1(31) Scale: NTS

Date: February 2009

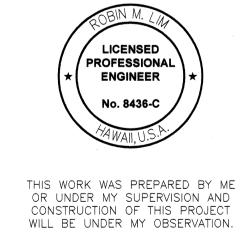
SHEET No.G-3.03 OF G-3.26 SHEETS

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	314	452

	Dat	e Starte	ed:		/8/98	•		Drill Rig: Mobile B-80
	Dat	e Com	pleted	:4	/9/98	***		Drilling Method: 4" Auger, HQ Coring
	Log	ged By	/: <u></u>		. Chen			Driving Energy: 140 lb. wt., 30 in. drop
	Tot	al Dept	h:	1	00.0 fe	et		
	·F	IELD	LA	BORAT	ORY		-	
epth, ft	p e	etra. ist. us/ft	sity	sture	press. ength	و م	tsf,	DESCRIPTION
	Sam	Pen Res Blo		₹0% 20%	Com Str ksf	Other Data	Pen,	Approximate Surface Elevation (ft): 146*
	X	34	76	43			4.0	Reddish brown and gray CLAYEY SILT (MH), very stiff, very moist
,	X	19	76	42			1.5	grades to stiff
5 -	X	12	67	48			1.2	grades with gravel
10-	X	6	59	56				Dark gray ORGANIC SILTY CLAY (CH/OH), soft
15 -	X	3	48	90				Greenish gray SILTY CLAY (CH), soft
: 0—	S	**	56	77		TV=0.13 tsf LL=86 PI=49		
25 -	X	8	61	61			1.0	KXU
,								Dark gray SILTY CLAY (CH) with sand and gravel, soft to medium stiff Brown vugular BASALT, severely fractured,
30 —	X	14	83	46				highly weathered, soft with pockets of clay (weathered basalt formation)
35 -								
<u> </u>		GEC		BS	. IN		1	OG OF BORING 25
	· <u></u>				gineerir			UMUALII HIGHWAY WIDENING IUE TO WEST OF MALUHIA ROAD
WOI	RK (ORDER	NO.	3869-0	O KI	IN Dec 00	ISL	AND OF KAUAI, HAWAII

· · · · · · · · · · · · · · · · · · ·	FIELD LABORATOR	DRATORY		·						
epth, ft	a cu	netra. isist. ous/ft	wasity	isture Intent	mpress. rength :f	Other Data	Pen, tsf	DESCRIPTION		
<u>å</u>	S	4 % 9	568		Comp Stre Ksf	5 8	9	(Continued from previous plate)		
40-		56	77	46		RUN 1 REC=75% RQD=0%		Brown vugular BASALT, severely fractured, highly weathered, soft with pockets of clay (weathered basalt formation)		
						RUN 2 REC=85% RQD=18%		Dark gray vesicular BASALT, closely fractured, moderately weathered, medium hard (basalt formation)		
45 -	Н					RUN 3		KI .		
50						REC=60% RQD=8%		Brown vesicular BASALT, severely fractured, highly weathered, medium hard with a pocket of clay (weathered basalt formation)		
						RUN 4 REC=93% RQD=93% RUN 5		Gray vesicular to dense BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)		
55 -		·				REC=100% RQD=77% RUN 6 REC=100% RQD=93%		grades to slightly weathered		
60-		·		·		RUN 7 REC=100% RQD=93%		grades to dense, massive, slightly fractured, hard		
65 -						RUN 8 REC=80% RQD=0%		Brown vesicular BASALT, severely		
70-						RUN 9 REC=90% RQD=0%		fractured, highly weathered, soft to medium hard (weathered basalt formation)		
75 -							1			
		GEC) L A	BS	. IN	IC.		G OF BORING 25		
Geotechnical Engineering								UMUALII HIGHWAY WIDENING		
							LIHUE TO WEST OF MALUHIA ROAD ISLAND OF KAUAI, HAWAII			
WOF	tK.	ORDER	NO.	3869-0	D KI	IN Dec 00	_ IOL	niu di Ividalj ikaliali		



SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS - 4

KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Date: February 2009

SHEET No.G-3.04 OF G-3.26 SHEETS

Scale: NTS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	315	452

	F	IELD	LAI	BORAT	ORY				
epth, ft	amp le	enetra. Esist. ous/ft	ensity	oisture ontent	ompress. trength sf	Other	Data	Pen, tsf	Continued from provious piets)
ă	S	<u>v</u> <u>v</u> v	55 K	žűx	CO SA±	RUN REC= RQD=	10 =90%	ď	Brown vesicular BASALT, severely fractured, highly weathered, soft to medium hard (weathered basalt formation)
80						RUN REC= RQD=	=100%		
85 - -						RUN REC= RQD=	-77%		Gray vugular BASALT, moderately to closely fractured, moderately weathered, medium hard (basalt formation)
90-		·				RUN REC= RQD=	=100%		grades to vesicular, slightly fractured, slightly weathered, medium hard
95 -						RUN REC= RQD=	89%		
100								·	Boring terminated at 100 feet Groundwater level at:
105 -									Depth Hours Date 9.2 ft. 1000 4/10/98
110-									
115 -									
I GEOLABS INC.									G OF BORING 25
Geotechnical Engineering							_		JMUALII HIGHWAY WIDENING UE TO WEST OF MALUHIA ROAD
WORK ORDER NO. 3869-00 KHN Dec 00							ec 00	ISL	AND OF KAUAI, HAWAII

	Dat	e Start	ed:		5/12/98		•	5	orill Rig: Mobile B-80			
	Dat	e Com	pleted:		5/12/98				Prilling Method: 4" Auger			
		ged By	_		J. Chen			D	Priving Energy: 140 ib. wt., 30 in. drop			
	Tot	al Dept	h:		45.0 fee l			- 				
		FIELD		BORAT	ORY							
th, ft	a l d	etra. ist. us/ft	si tu	sture tent	press. ength		đ	tsf,	DESCRIPTION			
Depth,	Sam	Per Se	292	₽8×	Com Str ksf	Oth	Data	Pen,	Approximate Surface Elevation (ft): 147*			
						·			2-inch GRASS LAWN			
	M	76	89	12				3.9	Brown CLAYEY SILT (MH-ML) with gravel, very stiff, damp			
	X	42	75	44		,		>4.5				
5 -	X	47	69	39				>4.5				
10-		22	67	45				3.2				
		·	7. 7						grades to very moist			
15 -	X	22	62	54		·		2.0				
	4				•				Brown CLAYEY SILT (MH-ML) with fine sand, stiff			
20-	X	16	63	54				1.5				
25 -	X	17	66	53				8.0				
30-		14	66	57				1.5	grades to tannish brown			
35 -	<u> </u>											
<u>160 </u>			LA		, IN				G OF BORING 26 JMUALII HIGHWAY WIDENING			
		Gec	otecnni	cai En	gineerin	g		LIHUE TO WEST OF MALUHIA ROAD				
WO	WORK ORDER NO. 3869-00 KHN Dec 00								ISLAND OF KAHAL HAWAII			



WILL BE UNDER MY OBSERVATION.

4-30-10

SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

BORING LOGS - 5

KAUMUALII HIGHWAY WIDENING
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL-AID PROJECT NO. NH-050-1(31)

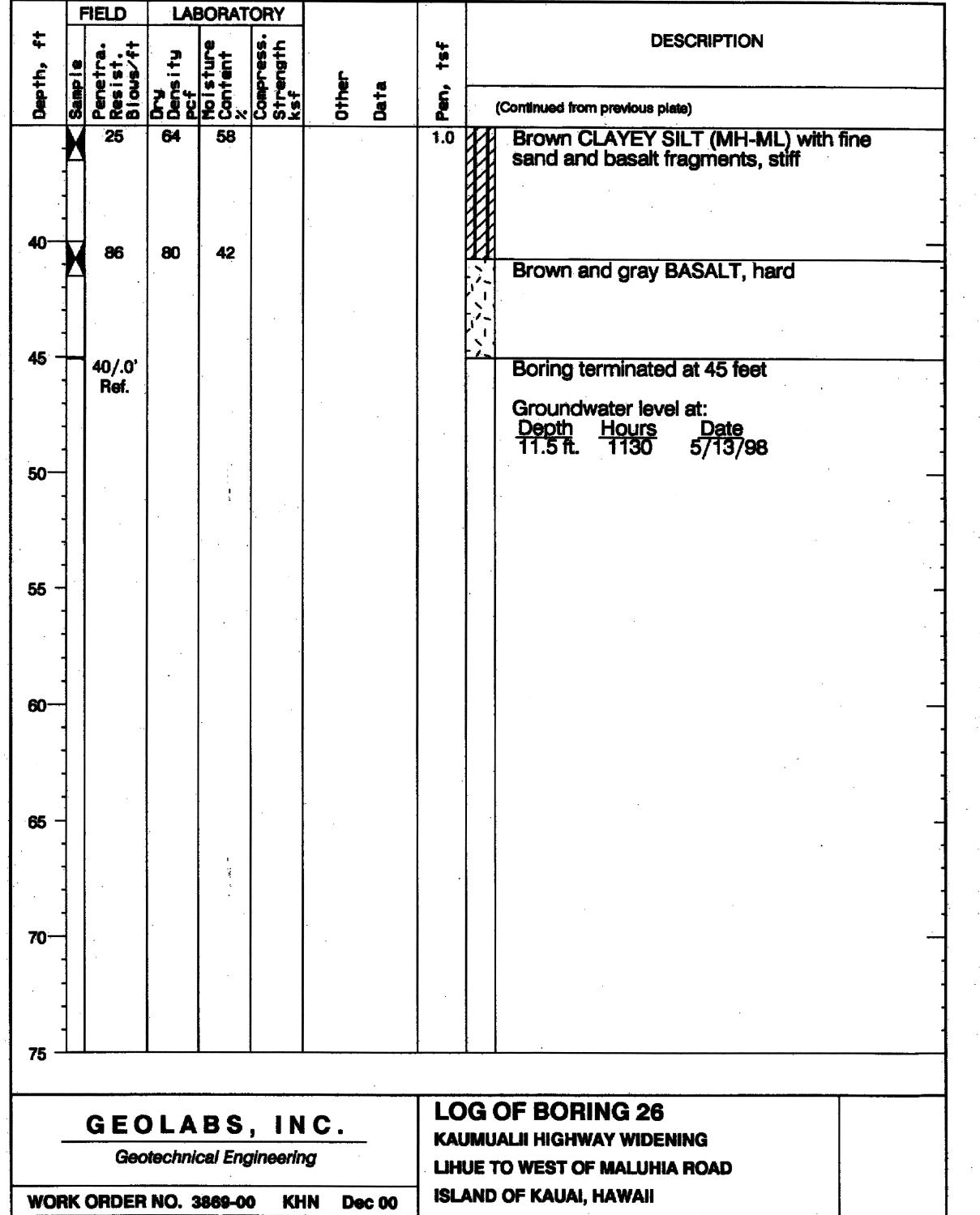
Scale: NTS

Date: February 2009

SHEET No.G-3.05 OF G-3.26 SHEETS

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FED. ROAD DIST. NO. FISCAL SHEET TOTAL YEAR NO. SHEETS FED. AID PROJ. NO. NH-050-1(31) 2009 316



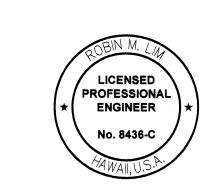
E : : : :

SURVEY PLOTTE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

		te Start			//26/99			rill Rig: Mobile B-53 rilling Method: 4" Auger	
	Lo	te Com gged By	/ :		//26/99 /. Chiba i1.5 feet			riving Energy: 140 lb. wt., 30 in. drop	
	·	tal Dept		BORAT					
Depth, ft	ple	sist.	Seity 1	sture tent	press.	ē e	i, tsf	DESCRIPTION	
	San	Per Res Blo	29.5	돌양~	S t s	Othe Data	Pen,	Approximate Surface Elevation (ft): 208.2*	
	X	41	99	31			4.0	Reddish brown mottled with brown CLAYEY SILT (MH), very stiff, damp (fill)	
5 -	X	52/.5' +45/.3' Ref.	79	37		LL=80 Pl=41	>4.5	grades to brown mottled with brownish orange, very hard (residual)	
	4					•		Brownish orange mottled with brown CLAYEY SILT (MH), very stiff, damp	
10-	X	39	105	32			4.0		-
15 -	X	32	72	39		LL=68 Pl=30	4.0	grades to grayish brown with multi-color mottling	
20-	X	52	78	44			3.5	grades to moist	-
25 -	- X	58	. 77	48			>4.5	grades to reddish brown, very hard	
30	- X	66	68	69			3.0	Bright reddish brown SILTY CLAY (CH), very hard, damp to moist	_
35 -	4					7 7 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		grades to brownish orange, damp	
eo l	•	GE C	LA		, IN		KAUI	G OF BORING 27 MUALII HIGHWAY WIDENING TE TO WEST OF MALUHIA ROAD	

ISLAND OF KAUAI, HAWAII

WORK ORDER NO. 3869-00 KHN Dec 00



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 6

<u>Kaumualii Highway Widening</u> <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.06 OF G-3.26 SHEETS

316

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	}	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	317	452

<u> </u>	F	IELD	LA	BORAT	ORY								
Depth, fi	al dan	metra. sist. ous/ft	Les it	isture	Impress. Trength	į.	Data	Pen, tsf	DESCRIPTION				
ŏ	S V	64	56 X 76	£ 3 ×	Ω ល ភ	#	<u>.</u>	4.0	(Continued from previous plate) Brownish orange SILTY CLAY (CH), very				
	A								hard, damp				
40-	X	18	87	62				1.0	Reddish brown with multi-color mottling CLAYEY SILT (MH), stiff, moist to very moist				
	1												
45 -	X	31	64	58				1.0					
50-						-			grades to dark grayish brown with multi-color mottling with friable sand that				
	M	29	81	64				3.0	breaks down to clayey silt (MH) by fingers, — wet				
	-								Boring terminated at 51.5 feet Groundwater not encountered				
55 -	-	:							<u>-</u>				
60-									-				
65 -					-								
	1					,							
70-													
	1												
75 -							······································						
								·					
	• (GEC			- ,		_	1	JMUALII HIGHWAY WIDENING				
		Geo	techni	cal Eng	gineerin	ng .			UE TO WEST OF MALUHIA ROAD				
WOI	WORK ORDER NO. 3869-00 KHN Dec 00								IOI AND OF KAILAL MANAU				

		e Start			//27/99	<u> </u>		Drill F	Rig: ng Method:		
		e Com			/27/99		· ,·	 	iå wetuoo:	4" Auger	
		ged By			/. Chiba			— Drivir	ng Energy:	140 lb. wt., 30 in. dr	ф
		al Depl			1.5 feet						
	F	FIELD	LAE	SORAT	ORY					· ·	
Depth, ft	e d	netra. iist. ws/ft	si ty	sture	press. ength	, L	ď	- +s+		DESCRIPTION	
	Sail	2 2 0 2 2 0	688	₽ <u>\$</u> %	Str Str Ast	Other	Data	Pen,	Approximate	Surface Elevation (ft): 20	8.8*
-	X	15	57	34			· · · · · · · · · · · · · · · · · · ·	>4.5	Brown CLA rootlets, sti	AYEY SILT (MH) with rooiff, damp	ots/
5 -	×	40/.3'	101	34				>4.5	grades to v	very hard	
-		Ref.							•		1.5 -
10—	X	78	82	34		LL=80 PI=37		>4.5	grades to d	orangish brown mottled	with tan -
15 -	X	74	104	40				>4.5	Brownish o	ray with multi-color mot	tlina
-										gray with multi-color mot ILT (MH), very hard, mo	ist S
20—	X	32						2.5	grades to v	very stiff	-
- - 25 - -	X	88	100	42				>4.5	grades to v	very hard	
30—	X	51/.5' +30/.3'	85	40				>4.5	Reddish br hard, mois	rown SILTY CLAY (CH), t	very
35 -		Ref.		·					grades to b	brownish orange	·•
eo l a	<u> </u>	_] mat .9\100.;									
		GFſ) A	BS	, IN	C		1.	OF BORIN		
-				•	-	, '	-	KAUMU	ALII HIGHWAY	Y WIDENING	
		UB(<i>xecnni</i>	vai EN(gineerin	y		LIHUET	O WEST OF M	MALUHIA ROAD	
WOE	ORK ORDER NO. 3869-00 KHN Dec 00							ISLAND	OF KAUAI, HA	NAM	



SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

state of hawaii Department of transportation HIGHWAYS DIVISION

BORING LOGS - 7

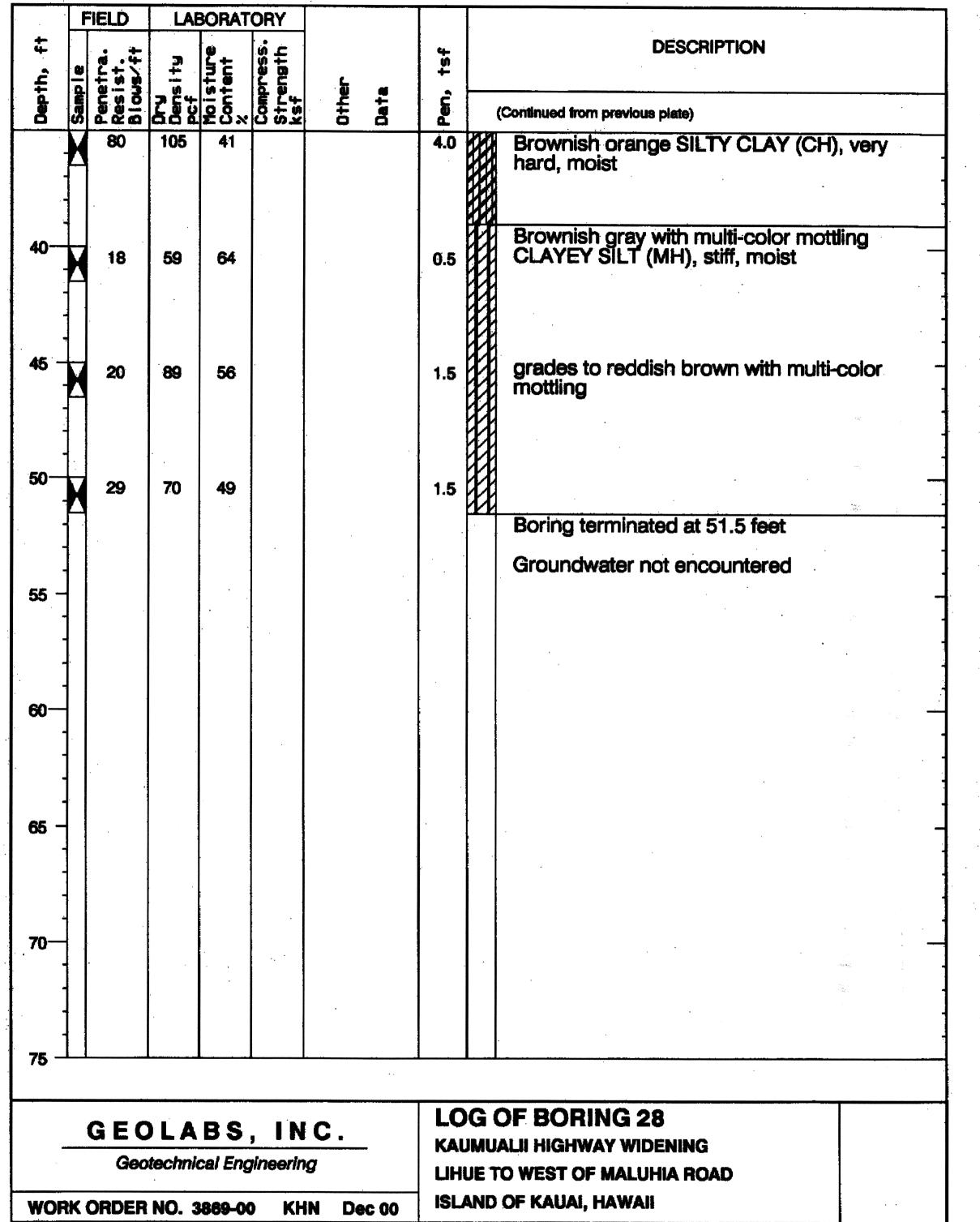
KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009 SHEET No.G-3.07 OF G-3.26 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	318	452



SURVEY PLOTTE DRAWN BY TRACED BY DESIGNED BY QUANTITIES BY CHECKED BY

,	Dat	e Start	ed:	7	7/27/99			rill Rig:		· · · · · · · · · · · · · · · · · · ·
		•	-		7/28/99		C	rilling Method:	4" Auger	·
	_	ged By			'. Chiba	•	C	riving Energy:	140 lb. wt., 30 ln. drop	
		al Dept			51.5 feet					
	F	FIELD	LAI	BORAT	ORY			·		
epth, ft	anp le	esist. ous/ft	Sens its	oisture ontent	ompress. trength	Other Data	Pen, tsf	A	DESCRIPTION	
ă	S	<u> </u>	227	₹Ö%	202	6 6	4	Approximate Surfa		
	H	11	64	37			3.5		T CONCRETE	
		• •		0,			0.5	dense, damp	LTY SAND (SM), medium	
	1						:		CLAY (CH), stiff, damp	
Ė-	\perp			İ					•	
J	H	41	101	40].		4.0			
	干							aradas ta mat	lad with aranga	
	+	,						GIACIES IO MOTI	led with orange	
	1							23		
10-	N	28	81	37			>4.5			•
	H							REG		
								Tannish brown	mottled with grayish brov AYEY SILT (MH), very stil	MU.
	 							damp	ATET SILI (MITI), VERY STI	п,
15 -	V	22	76	38		•	4.0		•	
	A			i .				11		
]		· .					11		
	┧┃							33		
20-	H	35	75	42			2.5	grades to tenni	ish grav with multi-color	
	M	JJ .	15	74			2.5	mottling, damp	ish gray with multi-color to moist	
	1					•		11		
	1							11	•	
25 -				1				33		
Z J -	K	43	89	43		LL=69	3.5	331		
	H			ļ.		PI=30				
	$\left\{ \ \right $							12 1		
	1							1	brown with mucht below	
30-	N	31	77	45		•	4.0	grades to dark mottling	brown with multi-color	-
	H							1/4		
	4			*				Reddish brown	SILTY CLAY (CH), very	
	4						+	hard, moist		
35 -			<u> </u>	<u> </u>	<u> </u>	, , , , , , , , , , , , , , , , , , ,	1			7.71-1.4
eo i i	2 tr] 1904. B\1944. F								
		ų.		D C		^	LO	G OF BORING 2	29	
					<u>, IN</u>		KAUMUALII HIGHWAY WIDENING			
		Geo	techni	cal Eng	gineerin	g	LIHUE TO WEST OF MALUHIA ROAD			
WORK ORDER NO. 3869-00 KHN Dec 00							ICLAND OF VALIAL HAWAII			



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SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 8

KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

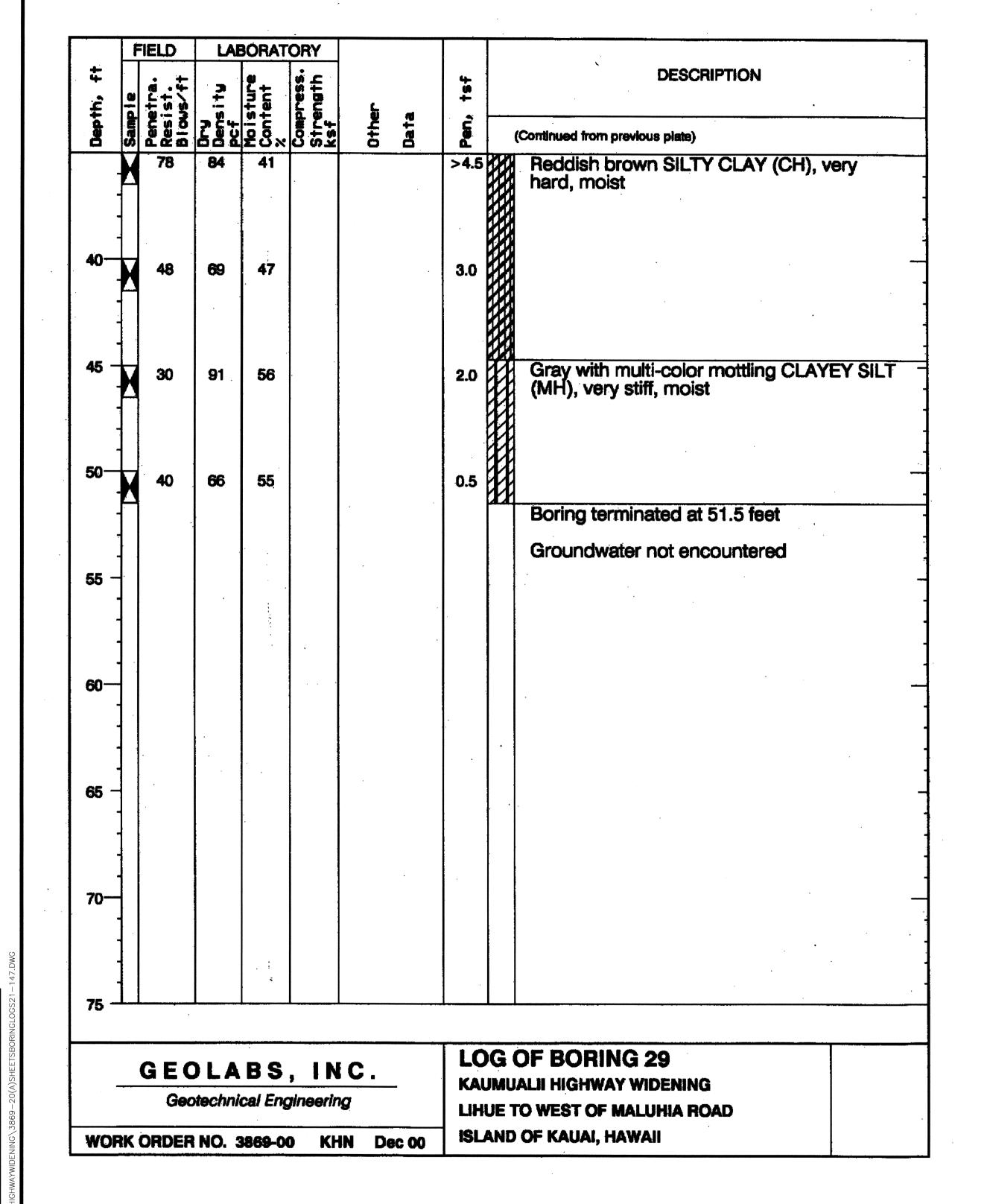
FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.08 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	319	452



PROFESSIONAL ENGINEER No. 8436-C

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GEOLABS, INC.

state of Hawaii Department of transportation HIGHWAYS DIVISION

BORING LOGS - 9

KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009 SHEET No.G-3.09 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	320	452

					3S, IN			K	AUMUALII HIGHWAY WIDENING B	og of oring		
Other Tests	Moisture Content (%)	ry Unit Veight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)- Sample	Graphic USCS	Approximate Ground Surface Elevation (feet MSL): 270 * Description		Other Tests	9 Moisture P Content (%)
0	≥0		OR		Wt. of Hamme	*		o ⊃ MH- OH	Dark grayish brown CLAYEY ORGANIC SILT soft (alluvium)	, very	0	≥ 0
	83	54			2	0.0	5		grades with sand and gravel			51
LL=250 PI=155	79	50			4	0.0	10			-		116
	52				13 41		15	МН	Brownish gray CLAYEY SILT, stiff to very stiff (residual soil)	- - - - -	LL=68 PI=29	55
					41		20			- - -		54
	50	73			50/.4' Ref.		25	7-7-	Brownish gray BASALT, severely fractured, h weathered, soft to medium hard (basalt formation)			50
			100 81	50 31	85/.0'		30		grades to moderately fractured, slightly weath very hard	ered,		
			48	25			35	\\ -\\ -\\ -\\ \\ \\ \\ \\ \\ \\ \\ \\ \	Reddish brown BASALT, closely fractured, hi	ghly		
	46		65	13	50/.5' Ref.		40	- / - / - / - / -	weathered, soft (basalt formation)			
			75	42			45		Brownish gray dense BASALT, moderately fractured, slightly to moderately weathered, h (basalt formation)	ard		
							50		Boring terminated at 50 feet			
							55			-		
							60			-		
		:					65			-		
							70				GDT 7/5/07	
Date Sta					9, 2004		75		Water Level: 0.1 ft. 10/19/04 1755 HRS 0.ft. 10/20/04 1755 HRS		Date Sta	
Date Col Logged I Total De Work Or	By: pth:			tronic et	9, 2004				O ft. 10/20/04 1755 HRS Drill Rig: CONCORE Drilling Method: 3" Auger, Drag Bit & Casing & NQ O Driving Energy: 140 lb. wt., 30 in. drop	Coring	Date Co Logged Total De Work Or	By: epth:

ATE ...

					3S, IN I Engine				KA	KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 120			
Other Tests	9 Moisture A Content (%)	GDry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	nd H Penetration so B Resistance o C (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	() Sample	O M USCS	Approximate Ground Surface Elevation (feet MSL): 272 * Description Dark brown CLAYEY ORGANIC SILT, very standard (alluvium)	soft		
LL=68 PI=29	5111655	75 67		•	5 Wt. of Hamme	r 1.5	10- 15- 20-	X	MH	grades with some sand grades to dark gray Brown CLAYEY SILT, stiff to very stiff (residusoil)	ual		
	54		73 69	13	28	2.5	25 30 35			Brownish gray BASALT, severely fractured, moderately weathered, soft to medium hard formation) grades to closely fractured, hard	-		
			32 88	53	20/.0' Ref.		45			Reddish brown BASALT, severely fractured, weathered, soft (basalt formation) Brownish gray BASALT, moderately fractured slightly to moderately weathered, medium hard (basalt formation)	d,		
							50 55 60			Boring terminated at 50 feet	-		
							65				· .		
Date Sta		***************************************			2, 2004		70 75-			Water Level: □ 0 ft. 10/22/04 1415 HRS			
Date Cor Logged E Total De Work Ord	Зу: pth:		Octob S. La 50 fe 3869	tronic et	3, 2004					O ft. 10/23/04 1050 HRS Drill Rig: CONCORE Drilling Method: 3" Casing, 3" Drag Bit & NQ Coring Driving Energy: 140 lb. wt., 30 in. drop	3		



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SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS - 10

KAUMUALII HIGHWAY WIDENING <u> Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u>

FEDERAL-AID PROJECT NO. NH-050-1(31) Scale: NTS

Date: February 2009

SHEET No.G-3.10 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR		TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	321	452

Section Sect	GEOLABS, INC. Geotechnical Engineering									KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 121				
100 44 65 64 2 0.0 MH Grayish brown CLAYEY SILT with some gravel and organics, very soft (alluvium) grades with some sand MH Grayish brown CLAYEY SILT, stiff (residual soil) grades with some sand, very stiff grades to stiff to very stiff 46 45 2.5 25 30 30 30 30 30 30 30 30 30 30 30 30 30	6		Geo								13LAND OF RADAI, HAVVAII 12			
100 44 65 64 2 0.0 MH Grayish brown CLAYEY SILT with some gravel and organics, very soft (alluvium) grades with some sand MH Grayish brown CLAYEY SILT, stiff (residual soil) grades with some sand, very stiff grades to stiff to very stiff 46 45 2.5 25 30 30 30 30 30 30 30 30 30 30 30 30 30	ier Tests	isture Itent (%	Unit ight (pcf	e covery (%	(%) Q	netration sistance ws/foot)	ket Pen)	oth (feet	nple	SS				
organics, very soft (alluvium) grades with some sand MH Grayish brown CLAYEY SILT, stiff (residual soil) grades with some sand, very stiff grades to stiff to very stiff Gray dense BASALT, moderately fractured, sligh weathered, very hard (basalt formation) Reddish brown BASALT, severely fractured, high weathered, soft (basalt formation) Sale Started: October 21, 2004 To Date Started: October 21, 2004 Water Level: \$\frac{1}{2}\$ \$	O#	© 0 0 0	V Ve Ve	Cor	RQ	Per Res (blc	Poc (tsf)	Dek	Sar)SO	-			
grades with some sand 20 1.0 10 MH Grayish brown CLAYEY SILT, stiff (residual soil) 53 68 48 3.5 15 M grades with some sand, very stiff 64 13 1.5 20 grades to stiff to very stiff 46 45 2.5 25 M grades to stiff to very stiff 47 46 48 2.5 30 M grades to stiff to very stiff 48 49 28 2.5 30 M grades to stiff to very stiff 49 40 M grades to stiff to very stiff 60 M grades to stiff to very stiff 61 40 M grades to stiff to very stiff 62 28 2.5 30 M grades to stiff to very stiff 63 49 M grades to stiff to very stiff 64 40 M grades to stiff to very stiff 65 M grades to stiff to very stiff 66 M grades to stiff to very stiff 67 M grades to stiff to very stiff 68 M grades to stiff to very stiff 69 M grades to stiff to very stiff 60 M grades to stiff to very stiff 60 M grades to stiff to very stiff 60 M grades to stiff to very stiff 61 M grades with some sand, very stiff 62 M grades with some sand, very stiff 63 M grades with some sand, very stiff 64 M grades with some sand, very stiff 65 M grades with some sand, very stiff 66 M grades with some sand, very stiff 67 M grades to stiff to very stiff 68 M grades to stiff to very stiff 69 M grades to stiff to very stiff 60 M grades to stiff to very stiff 61 M grades with some sand, very stiff 62 M grades to stiff to very stiff 63 M grades to stiff to very stiff 64 M grades with some sand, very stiff 65 M grades to stiff to very stiff 65 M grades to stiff to very stiff 66 M grades with some sand, very stiff 67 M grades to stiff to very stiff 67 M grades to stiff to very stiff 67 M grades to stiff to very stiff 68 M grades to stiff to very stiff 69 M grades to stiff to very stiff 60 M grades to stiff to very stiff 61 M grades to stiff to very stiff 62 M grades to stiff to very stiff 63 M grades to stiff to very stiff 64 M		100	44			2	0.0			MH				
58		65	64			2	7	5			grades with some sand			
grades to stiff to very stiff 13		58				20	1.0	10		МН	Grayish brown CLAYEY SILT, stiff (residual soil			
46 46 47 48 48 48 48 48 48 48 48 48		53	68			48	3.5	15			grades with some sand, very stiff			
44 100 50 507.5' Ref. 35 A.5 45 Sept. 10/21/04 1815 HRS 2.5 30 Sept. 10/22/04 1135 HRS 2.5 30 Sept. 10/22/04 1135 HRS		64				13	1.5	20			grades to stiff to very stiff			
44 100 50 50/.5′ Ref. 22 10 Ref. 22 10 Ref. 35 Ref. 36 Ref. 37 Ref. 40 Reddish brown BASALT, severely fractured, high weathered, soft (basalt formation) 37 Reddish brown BASALT, severely fractured, high weathered, soft (basalt formation) 38 Brownish gray BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation) 38 Brownish gray BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation) 39 grades to hard 30 Brownish gray BASALT, closely to moderately fractured, moderately fractured, moderately weathered, medium hard (basalt formation) 39 grades to hard 30 Brownish gray BASALT, closely to moderately fractured, mode		46				45	2.5	25						
weathered, very hard (basalt formation) Reddish brown BASALT, severely fractured, highweathered, soft (basalt formation) State Started: October 21, 2004 October 22, 2004 Weathered, very hard (basalt formation) Reddish brown BASALT, severely fractured, highweathered, soft (basalt formation) Grades to medium hard (basalt formation) Brownish gray BASALT, closely to moderately fractured, moderately weathered, medium hard (basalt formation) Grades to hard Boring terminated at 55.5 feet Water Level: St. 10/21/04 1815 HRS October 22, 2004 Water Level: St. 10/21/04 1815 HRS October 22, 2004		46				28	2.5	30						
Reddish brown BASALT, severely fractured, high weathered, soft (basalt formation) 55		44		100	50			35						
grades to medium hard 50 Shape Started: October 21, 2004 Date Started: October 22, 2004 Shape Started: October 22, 2004				22	10			40						
95 27 fractured, moderately weathered, medium hard (basalt formation) grades to hard Boring terminated at 55.5 feet 70- Oate Started: October 21, 2004 Date Completed: October 22, 2004 Water Level: 5 ft. 10/21/04 1815 HRS 0.5 ft. 10/22/04 1135 HRS		55		58	8	53	>4.5	45			grades to medium hard			
Boring terminated at 55.5 feet 60				95	27			50			fractured, moderately weathered, medium hard			
00-1								55	- ()		<u>_</u>			
05									-		Boring terminated at 55.5 feet			
70- Date Started: October 21, 2004 Date Completed: October 22, 2004 Water Level: □ 5 ft. 10/21/04 1815 HRS □ 0.5 ft. 10/22/04 1135 HRS		:						60						
75 Date Started: October 21, 2004 Date Completed: October 22, 2004 Date Completed: October 22, 2004 Date Completed: October 22, 2004 Date Completed: October 22, 2004								65	-					
Date Started: October 21, 2004 Water Level: ▼ 5 ft. 10/21/04 1815 HRS Date Completed: October 22, 2004 0.5 ft. 10/22/04 1135 HRS								70	-					
Date Completed: October 22, 2004 0.5 ft. 10/22/04 1135 HRS								75						
	Date Cor	nplete	ed:	Octob	per 22	2, 2004					0.5 ft. 10/22/04 1135 HRS			
Total Depth: 55.5 feet Drilling Method: 3" Casing, 3" Drag Bit & NQ Coring Work Order: 3869-20 Driving Energy: 140 lb. wt., 30 in. drop	Total Dep	oth:		55.5	feet						Drilling Method: 3" Casing, 3" Drag Bit & NQ Coring			

						BS, IN Engine			KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 122					
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	D (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SS	Approximate Ground Surface Elevation (feet MSL): 330 *			
l	S	No.	Nei Vei	Sore Rec	RQD	Sen Res Ses Ses	Poc (tsf)	Эер	San Gra	nscs	Description			
t	į.									МН	Brown CLAYEY SILT, stiff, moist (residual soil	l)		
		36				13	3.0					,		
		37	86			40	4.0	5			grades to stiff to very stiff			
	\$	47				14	2.3	10						
		52	73			13	1.0	15			grades to medium stiff, very moist			
		58				8	1.0	20						
7/5/07) / /-	58	66			18	2.5	25			grades to stiff Boring terminated at 26 feet			
GEOLABS.GDT	A ^r							30-						
-20.GPJ	Date Sta	rted:		Septe	mbei	r 16, 200	 4	SU.			Water Level: Not Encountered			
3869	Date Co					r 16, 200								
G DO	Logged I	Зу:		S. Lat	ronic	,					Drill Rig: CME-75			
07 J	Total De	pth:		26 fee	et						Drilling Method: 4" Auger			
30RII	Work Or	der:		3869-	20						Driving Energy: 140 lb. wt., 30 in. drop			



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GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 11

KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009

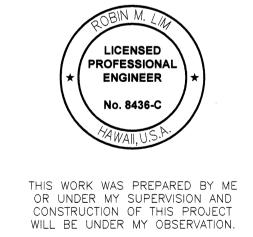
SHEET No.G-3.11 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	322	452

	LABS, INC.	į	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 123			GEOL Geotechn			g	K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 124
Other Tests Other Tests Other Tests Other Tests 2 Moisture Content (%) 2 Moisture Content (%) Core	RQD (%) RQD (%) RQD (%) RQD (%) STATE OF THE	Depth (feet) Sample Graphic Sample Graphic	Approximate Ground Surface Elevation (feet MSL): 318 * Description Reddish brown CLAYEY SILT, hard, damp (residual soil) grades to stiff to very stiff, moist	Other Tests	31 37 Content (%)	9 Dry Unit Weight (pcf) Core Recovery (%	RQD (%) Penetration C T T Resistance	2.7 >5.0		MH	Approximate Ground Surface Elevation (feet MSL): 320 * Description Reddish brown CLAYEY SILT, medium stiff to stiff, moist (residual soil) grades to very stiff to hard
57	17	10			49		11		10		grades with multi-color mottling and sand, medium stiff
70 59 	4	20	grades to soft		58 57		13		-		Grayish brown with orange mottling CLAYEY SILT, stiff to very stiff, very moist (residual soil) Reddish brown CLAYEY SILT, medium stiff (residual soil)
65 63	7	25 SM	Reddish brown SILTY SAND, loose (residual soil)	LL=60 PI=16		61	8		25		(residual soil)
62			Reddish brown CLAYEY SILT, soft (residual soil)		57		13		30		
65		40	grades to stiff to very stiff		21		10		35		
69 57		45	grades with gravel		4958		19		45		grades with gravel
60	26	50	Boring terminated at 51.5 feet		56		9		50		Boring terminated at 51.5 feet
		55							55		
		65							65		
Sell frau.		70-		.GDT 7/5/07					70		
3)	ust 18, 2004 ust 19, 2004	75	Water Level: 7 ft. 8/19/04 1400 HRS 14 ft. 8/23/04 0855 HRS	Date S		·····	t 17, 2004 t 17, 2004		75		Water Level: Yes Yes
Logged By: B. B. Total Depth: 51.5	achelder feet 9-20		Drill Rig: CONCORE Drilling Method: 4" Auger Driving Energy: 140 lb. wt., 30 in. drop	Logge Total D Work (d By: Depth:	B. Bac 51.5 fe 3869-2	helder eet				Drill Rig: CME-75 Drilling Method: 4" Auger Driving Energy: 140 lb. wt., 30 in. drop

ATE

SURVEY PLOTTE
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY



SIGNATURE EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 12

KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009

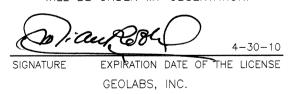
SHEET No.G-3.12 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	323	452

					3S, IN		1		KA	Log of Boring ISLAND OF KAUAI, HAWAII 125
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 336 * Description
38.GDT 7/5/07	39 36 37 44 54	75 86			21 13 29 5	1.5 2.0 3.5 1.0 0.8	5 10 15 20		MH	Brown CLAYEY SILT with some gravel, stiff, moist (fill) Brown CLAYEY SILT, stiff, moist (residual soil) grades to very stiff grades to medium stiff grades with weathered gravel grades to very moist Boring terminated at 21 feet
Date Sta Date Co Logged Logged Total De Work Or	mplet By: epth:	ed:		uary 8 tronic et	3, 2005 3, 2005		30	-		Water Level: Not Encountered Drill Rig: CME-55 Drilling Method: 4" Auger Driving Energy: 140 lb. wt., 30 in. drop

	GEOLABS, INC. Geotechnical Engineering							KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 126						
ests	%	G				Pocket Pen. (tsf)				Approximate Ground Surface				
Other Tests	Moisture Content (Unit	e over	RQD (%)	Penetration Resistance (blows/foot)	ket	Depth (feet)	Sample	SS	Elevation (feet MSL): 307 *				
Oth	Mo So So So	Ve Ve	Core	RQ	Res (blo	Poc (tsf)	Dep	San	USCS	Description				
	32	88				>5.0			∄MH-	Reddish brown CLAYEY SILT with organics, v	very			
	39				16	0.0			OH	stiff, moist (alluvium)				
	39	77			29		5				-			
	39	/ /			29									
							7							
	43				10	¥	10		MH	Reddish brown CLAYEY SILT, medium stiff				
						,				(alluvium)				
							15							
LL=74 PI=31	71				6					grades to soft				
P1-31														
	66				4		20							
							25]						
	47	72			29		25		MH	Reddish brown CLAYEY SILT with weathered				
										gravel, stiff to very stiff (residual soil)				
	64				12		30							
	04				12									
	40	69			30		35							
							40							
	56				30		10		MH	Bluish gray with black mottling CLAYEY SILT stiff (residual soil)	, very			
										Still (103idual 30il)				
	50				19/.5'	>5.0	45			grades to hard				
					+35/.3'									
							50	-						
	63				19	0.5	30	-		grades to stiff				
										Boring terminated at 51.5 feet				
							55]						
							00							
							60	-						
								-						
							65							
								-						
							70	-						
								1						
							75							
Date Sta					, 2004					Water Level: ☑ 9.5 ft. 8/17/04 1545 HRS				
Date Co Logged		ted:		ist 17 achelo	, 2004 der					Drill Rig: CME-75				
Total De			51.5	·	a-C1					Drilling Method: 4" Auger				
Work O	rder:		3869	-20						Driving Energy: 140 lb. wt., 30 in. drop				





STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 13

KAUMUALII HIGHWAY WIDENING

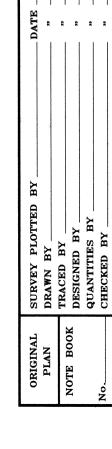
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.13 OF G-3.26 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	324	452

					3S, IN		3		K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 127
Other Tests	Moisture Content (%)	6 Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration G Resistance (blows/foot)	V Pocket Pen. (1sf)	Depth (feet)	Sample	SOSU H	Approximate Ground Surface Elevation (feet MSL): 315 * Description Brown CLAYEY SILT with gravel, very stiff, moist (fill)
	2928				32 41	3.5 >4.5	5		MH	1
	39				18	2.5	10			BASALTIC BOULDER grades to stiff
	65	58			5	0.8	15		МН	grades to medium stiff Brown CLAYEY SILT, soft (residual soil)
	72	60			5	0.5	20			
	7061	62			13 11	0.5	30	- - - -	ML- GM	
	68	57			19		35	-		grades with more gravel
	57				22		40			
	25	85			18		45		МН	grades with clay at 46 feet Grayish brown CLAYEY SILT with weathered
	61				8	0.8	50			basaltic gravel, medium stiff (residual soil) Boring terminated at 51 feet
							55			
							60	-		
							70			
Date Star			***************************************		, 2005		75			Water Level: 14 ft. 2/9/05 1040 HRS
Date Con Logged B	By:	1	S. Lat	ronic	, 2005					13.8 ft. 2/9/05 1230 HRS Drill Rig: CME-55
Total Dep Work Orc			51 fee 3869-							Drilling Method: 4" Auger Driving Energy: 140 lb. wt., 30 in. drop

Log of Boring		۵.				BS, IN				ł		JMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 128
127	8		Geot			Engine				T		128
	Other Tests	Moisture Content (%	Dry Unit Weight (pc	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen (tsf)	Depth (feet)	Sample	USCS		Approximate Ground Surface Elevation (feet MSL): 302 * Description
f, moist		33	73			22 12	>5.0		X	MF	1	Reddish brown with orange mottling CLAYEY SILT very stiff to hard, moist (alluvium)
idual		44	76			29	2.7	5				
		57				4	1.0	10			ç	grades to soft to medium stiff
		67	57			6		15		SC	1	Dark brown CLAYEY SAND, loose to medium dense (alluvium)
- - - - -		43				42		20		MF	- 1	Reddish brown CLAYEY SILT with weathered gravel, very stiff (residual soil)
asaltic	estano e	61	62			30		25	X			
		65				7		30		MF		Reddish brown with black mottling CLAYEY SILT, medium stiff (residual soil)
		65	54			11		35				
		ic.				35		40		MF	- 1	Reddish brown with black mottling CLAYEY SILT, stiff to very stiff (residual soil)
ed		62	64			14		45				
		57				18		50		MF		Bluish gray with multi-color mottling CLAYEY SILT stiff (residual soil) Boring terminated at 51.5 feet
-								55				boning terminated at 01.0 leet
								60				
		±						65				
	LABS.GDT 7/5/07	8,	ner:				-	70	-			
	Date Sta					2004 2004		75-	1 1			Water Level: ♀ 9 ft. 8/18/04 1310 HRS
	Logged I Total De	By: pth:	-6	B. Ba 51.5 f	cheld eet		:					Drill Rig: CME-75 Drilling Method: 4" Auger
	🖁 Work Or	der:		<u> 3869-</u>	20							Driving Energy: 140 lb. wt., 30 in. drop



GEOLABS, INC.

state of hawaii Department of transportation HIGHWAYS DIVISION

BORING LOGS - 14

KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u>

Scale: NTS

FEDERAL-AID PROJECT NO. NH-050-1(31) Date: February 2009

SHEET No.G-3.14 OF G-3.26 SHEETS

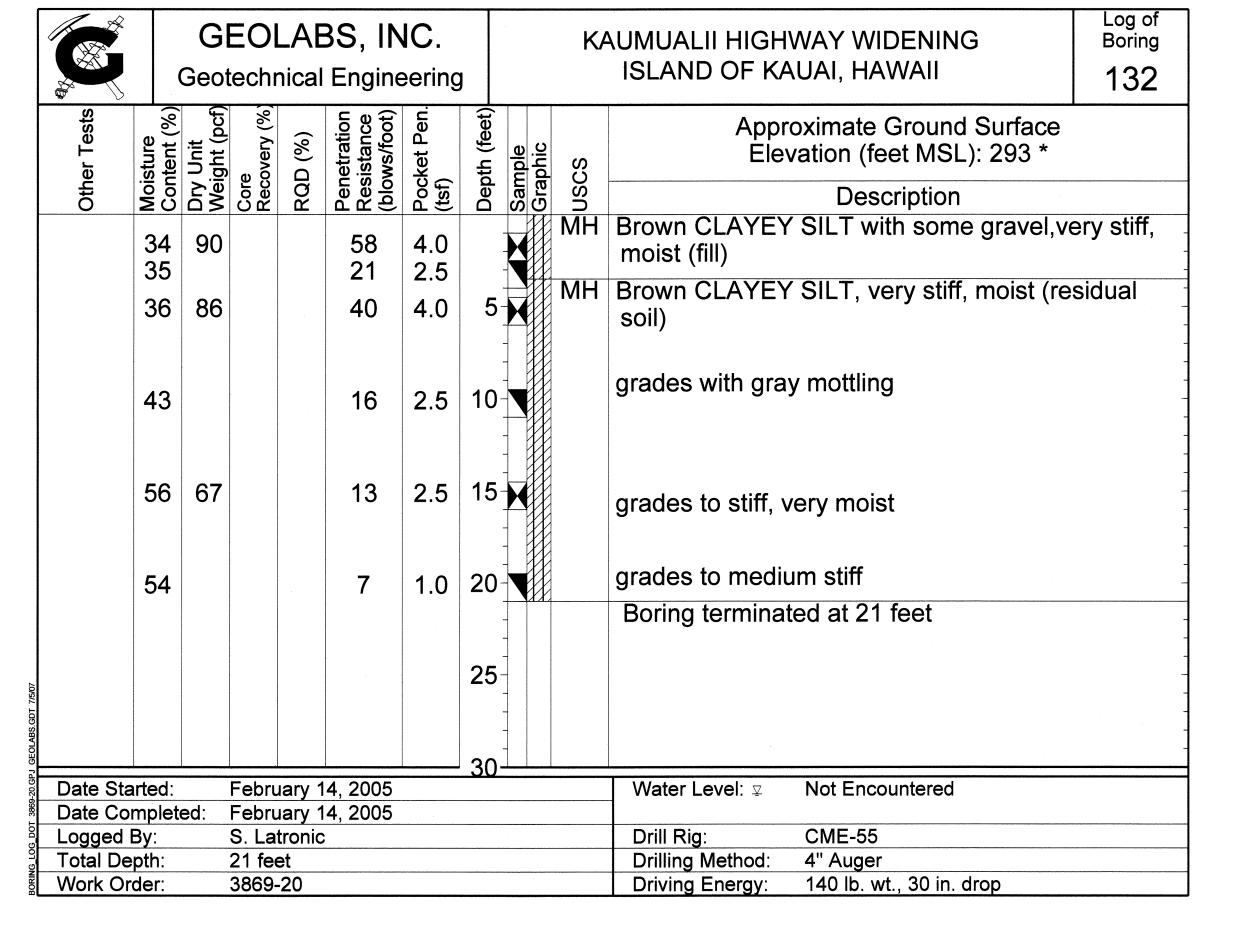
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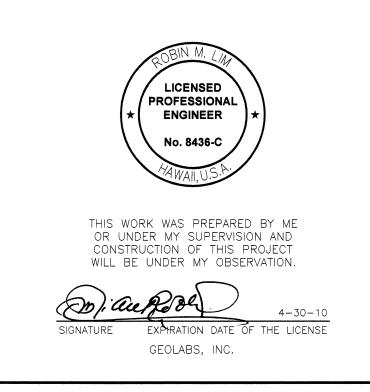
					BS, IN Engine				K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 129
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 314 *
	<u>ဗိ</u> ပိ	چَے	လူ	RG	Re (D	Po (ts)	De 0	S S	SO	Description (CIII)
LL=58	34	78			24	4.0			МН	Brown CLAYEY SILT, stiff, moist (fill)
PI=20	46				16	2.5	-		MH	Brown CLAYEY SILT, stiff to very stiff, moist
	41	80			31	3.0	5			(residual soil)
	38				9	1.0	10			grades to medium stiff, very moist
	56	67			16	1.5	15			
	52				7	1.0	20-		МН	grades with weathered gravel Brown and black CLAYEY SILT with sand and weathered basaltic gravel, medium stiff, very mo to wet (saprolite)
							25			Boring terminated at 21 feet
Date Sta	rtod:		Eobr:	ion, 1	0.2005		30_			Wotor Ovol: = 17.9 ft 2/10/05 00/10 LIDS
Date org	***************************************				0, 2005 0, 2005					│ Water Level: ☑ 17.8 ft. 2/10/05 0940 HRS
Date Cor	ubler	Cu.			O, 2000					
Date Cor Logged I			S. La							Drill Rig: CME-55

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

		Geot	techr	nical	3S, IN Engine				K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 131			
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SOSO	Approximate Ground Surface Elevation (feet MSL): 311 * Description			
-	37 35 33	78 92			26 21 41	3.0 2.5 2.5		5	MH				
	52 49	66			9	1.0	15			grades to stiff, very moist grades with light brown mottling, medium stiff			
							25			Boring terminated at 21 feet			
Date Sta	mplet	ed:	Febru	uary 1	0, 2005					Water Level: Not Encountered OME 55			
Logged I Total De			S. Lat 21 fee							Drill Rig: CME-55 Drilling Method: 4" Auger			
Work Or	der:		3869-	-20						Driving Energy: 140 lb. wt., 30 in. drop			

			echr		BS, IN				KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 130				
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 319 *			
ğ	<u> </u>	<u>Š</u>	ပ္သန္ထ	<u> </u>	교육교	Pc (ts	صّ	S	S	Description			
	32 33	94			52 26	>4.5 >4.5			МН	Brown SILTY CLAY with some gravel and organics, very stiff to hard, damp (fill)	-		
	38	83			48	>4.5	5		МН	Brown CLAYEY SILT, very stiff, moist (residual)	dual		
	36				13	2.5	10	-		grades to stiff	- - -		
	45	71			15	2.5	15			grades to very moist	- - -		
	47				12	1.5	20	-		grades with black mottling	- - -		
										Boring terminated at 21 feet	-		
75/07							25	-			- - -		
PJ GEOLABS.GI							30	-			-		
Date Sta					0, 2005					Water Level: ☑ Not Encountered			
Date Cor			Febru S. Lat	E	0, 2005					Drill Rig: CME-55			
Total De	E		3. Lai							Drilling Method: 4" Auger			
Work Or			3869-							Driving Energy: 140 lb. wt., 30 in. drop			





STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 15

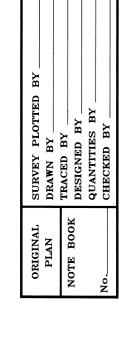
KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS Date: February 2009

SHEET No.G-3.15 OF G-3.26 SHEETS



Work Order:

3869-20

FISCAL SHEET TOTAL YEAR NO. SHEETS

2009 325

FED. ROAD STATE

FED. AID PROJ. NO.

NH-050-1(31)

					3S, IN Engine		3		K	Log of Boring ISLAND OF KAUAI, HAWAII 133
Other Tests	(%) Woisture 2	8 4 Dry Unit 8 6 Weight (pcf)	Core Recovery (%)	RQD (%)	Resistance (blows/foot)	0.5 S. C.	Depth (feet)	-	MH MH	Approximate Ground Surface Elevation (feet MSL): 276 * Description Brown CLAYEY SILT with traces of gravel, very stiff, moist (fill) Brown CLAYEY SILT, very stiff, moist (residual soil)
	52	70			18	2.5	15			grades with tan mottling
Order (Annual Page)	52				12	1.5	20 25	-		grades to stiff, very moist Boring terminated at 21 feet
Date Star	rted:		Febru	ary 1	4, 2005		30			Water Level: ☑ Not Encountered
Date Con Logged B		ed:		ary 1	4, 2005					Drill Rig: CME-55
Total Dep	oth:		21 fee	∍t						Drilling Method: 4" Auger
Work Orc	der:		<u> 3869-</u>	20						Driving Energy: 140 lb. wt., 30 in. drop

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Approximate Ground Surface Elevation (feet MSL): 258 *
₹	ဗိုလိ	V _O	Cor	RQ	Pel Re (blc	Poor (tsf	De	Sar Gra	US	Description
	34 30	80			28 12	4.0	-	X	МН	Brown CLAYEY SILT with traces of sand, very stiff, moist (fill) grades to stiff
	39	87			28	2.5	5-		МН	Brown CLAYEY SILT, stiff to very stiff, moist (residual soil)
	35				17	2.5	10			
,	44	72			39	3.5	15	X		
	40				17	2.0	20			Boring terminated at 21 feet
OLABS.GDT 7/5/07							25	-		
GB GE							30-			
Date St					6, 2005 6, 2005					Water Level: ☑ Not Encountered
Logged			S. Lat							Drill Rig: CME-55
Total D			21 fee			***************************************				Drilling Method: 4" Auger
Work O			<u> 3869-</u>	20						Driving Energy: 140 lb. wt., 30 in. drop

KAUMUALII HIGHWAY WIDENING

ISLAND OF KAUAI, HAWAII

GEOLABS, INC.

Geotechnical Engineering

Log of Boring

134

LL=62 35 PI=22 40 40 8 49 7 44	Core	Recovery (%)	Penetration 2 2 2 3 Resistance (blows/foot)	(Jst) 2.5 4.0 3.0	Depth (feet)-	E H H Conduction	Approximate Ground Surface Elevation (feet MSL): 228 * Description Brown CLAYEY SILT with rootlets, stiff, moist (topsoil/fill) Brown CLAYEY SILT, stiff, moist (residual soil) grades to very stiff
LL=62 35 PI=22 40 40 8 44 4 52 7	81		24 15 62 26	2.5 2.5 4.0	5	MH	Brown CLAYEY SILT with rootlets, stiff, moist (topsoil/fill) Brown CLAYEY SILT, stiff, moist (residual soil)
52 49 7 44 52 7	82		31				
52 7	70		13	1.5	20-		grades with light gray mottling grades to stiff, very moist grades with weathered basaltic gravel
	73		38	2.0	30-	MH	Gray CLAYEY SILT with some weathered basaltic gravel, stiff to very stiff, very moist (saprolite) grades with weathered basaltic gravel at 25.5 fee
	73		10		35 X		grades to medium stiff Boring terminated at 41 feet
Date Started:		ebruary 16			50		Water Level: ☑ 31.3 ft. 2/16/05 1125 HRS
Date Completed: Logged By: Total Depth: Work Order:		ebruary 16	D, ZUUD				Drill Rig: CME-55 Drilling Method: 4" Auger Driving Energy: 140 lb. wt., 30 in. drop

FED. ROAD DIST. NO. STATE FED. AID PROJ. NO. FISCAL SHEET TOTAL YEAR NO. SHEETS HAWAII HAW. NH-050-1(31) 2009 326 452



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

GEOLABS, INC.

state of hawaii Department of transportation HIGHWAYS DIVISION

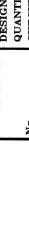
BORING LOGS - 16

KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009

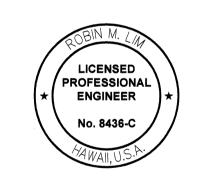
SHEET No.G-3.16 OF G-3.26 SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	327	452

		GI	ΞΟΙ	_AE	BS, IN	IC.			KA	AUMUALII HIGHWAY WIDENING E	og of Boring
		Geot		nical	Engine	ering)			ISLAND OF KAUAI, HAWAII	136
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 205 *	
Ō	<u>ა</u> პ	ā≥ 72	28	<u>×</u>	<u>සීසීම</u> 10	Pc (ts	۵	S J	≝ MH	Description Brown CLAYEY SILT with some organics, m	edium
	36	· —			31	2.0	5		МН		ıal
					36	>4.5	5	X		soil)	
	43				11	1.5	10-			grades to stiff	-
	5 0	00			40	Z	⁷ 15		МН	grades to gray Brown with gray mottling CLAYEY SILT, stiff	VOTV
	58	66			16		. •			moist (saprolite)	, very
	63				18	1.5	20				-
15/07	49				10	2.5	25				1
OLABS.GDT 7										Boring terminated at 26.5 feet	-
D - 1 - O1 -			L		E 2005		30-				
Date Sta Date Cor					5, 2005 6, 2005		·····			│ Water Level: ☑ 14.5 ft. 2/16/05 1440 HRS	
Logged E			S. Lat							Drill Rig: CME-55	
Total De		26.5 feet								Drilling Method: 4" Auger	
Work Ord	der:									Driving Energy: 140 lb. wt., 30 in. drop	

	1	Geot	techr		BS, IN Engine				K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 137
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	(%) Qi	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SOSA	Approximate Ground Surface Elevation (feet MSL): 223 *
LL=66 PI=34	42 34 35	65 88	Cor	RQD	16 40 88	>4.5 >4.5 >4.5	<u>ө</u> О		MH MH	Description Brown CLAYEY SILT, stiff, moist (fill) Brown CLAYEY SILT, very stiff, moist (residual soil)
	36				17	2.0	10			grades with weathered basaltic gravel grades to stiff to very stiff
	42	70			24	4.0	15			
	51				11	1.5	20			grades with gray mottling grades to stiff, very moist
	31	84			81	>4.5	25		МН	Brown with gray mottling CLAYEY SILT, very stiff, moist (saprolite) grades more saprolitic at 24 feet
	33				45	>4.5	30			Boring terminated at 31 feet
							35 40	-		
							45			
Date Sta					6, 2005 6, 2005		50			Water Level: ♀ Not Encountered
Logged E Total De Work Ore	pth:		S. Lat 31 fee 3869-	∍t	,					Drill Rig: CME-55 Drilling Method: 4" Auger Driving Energy: 140 lb. wt., 30 in. drop



SIGNATURE EXPIRATION DATE OF THE LICEN

GEOLABS, INC.

state of hawaii department of transportation highways division

BORING LOGS - 17

<u>KAUMUALII HIGHWAY WIDENING</u>

<u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u>

<u>FEDERAL—AID PROJECT NO. NH—050—1(31)</u>

Scale: NTS

Date: February 2009

SHEET No.G-3.17 OF G-3.26 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	328	452

			echr	nical	BS, IN				K	Log of Boring ISLAND OF KAUAI, HAWAII 138
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SS	Approximate Ground Surface Elevation (feet MSL): 167 *
Oth	S S S	Ory We	Cor Rec	RQ	Per Res (blc	Poc (tsf)	Dep	Sar Gra	nscs	Description
	38 43	75			20/.0' Ref. 9		5-		МН	Dark brown CLAYEY SILT with roots and organics medium stiff, moist (fill)
	70	70			18	2.5	- - -		МН	Brown with reddish brown mottling CLAYEY SILT, very stiff, moist (residual soil)
	47				9	1.5	10- - -			grades to medium stiff to stiff
	46				16	1.0	15-	X		
	60				7	0.8	20-		MH	Brown with reddish brown mottling CLAYEY SILT, medium stiff to stiff (residual soil)
					15	8.0	25	X		
	74				11	1.0	30-			
	63	64			28	1.5	35-			grades with weathered basaltic gravel grades to stiff to very stiff
	68				32	1.0	40			Boring terminated at 41.5 feet
							45			
Date Sta	rted:		Febru	ary 1	16, 2005		50-	1		Water Level: 17.5 ft. 2/16/05 1645 HRS
Date Cor	mplet	ed:	Febru	ıary 1	16, 2005					
Logged E Total De			S. Lat 41.5 f						***************************************	Drill Rig: CME-55 Drilling Method: 4" Auger
Work Or			3869-					Park		Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine		9		K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII	Log of Boring 139
Other Tests	Moisture Content (%)		Core Recovery (%)	D (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SS	Approximate Ground Surface Elevation (feet MSL): 173 *	
₽	ဗိုပိ	Me We	Cor	RQD	Pel Re Di	Poc (tsf	De	Sar	E NSCS	Description Brown CLAYEY SILT with gravel, medium	etiff
	34				9					moist (fill)	
					13	2.5	5		MH	Reddish brown CLAYEY SILT, stiff, moist soil)	residual :
	43				14	2.0	10				- - - -
	43	76			38	>4.5	15			grades to very stiff	- - - -
	45				11	2.0	20			grades to stiff	- -
	44	75			10	7	25		МН	Brown with multi-color mottling CLAYEY S weathered basaltic gravel, medium stiff, vo (saprolite)	ery moistī
	59		100		12	1.0	30			grades with decomposed basaltic gravel at feet	t 23.5
			100				35	- - - - -			- - - -
	60		100		13	1.0	40				- - - -
			60				45				- - - -
	64		100		17	1.0	50				- - - -
			35				55	-			- - - -
	49		50		46	2.5	60		МН	Brown with gray mottling CLAYEY SILT, vo (saprolite)	ery stiff
			100				65				- - - -
	50		100	0	34		70			Brown/gray BASALT, severely fractured, e weathered, soft (basalt formation)	extremely
Date Sta					7, 2005		75			Water Level: 23.5 ft. 2/17/05 1050 HRS	
Date Cor Logged E			Febru S. Lat		7, 2005					24.1 ft. 2/17/05 1525 HRS Drill Rig: CME-55	
Total Dep			85 fee							Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt., 30 in. drop	



SIGNATURE EXPIRATION DATE OF THE LICENSE

GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 18

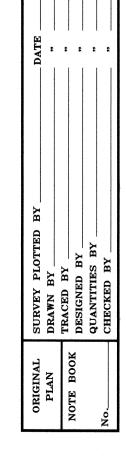
KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS Date: February 2009

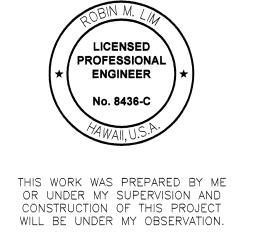
SHEET No.G-3.18 OF G-3.26 SHEETS

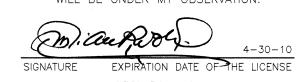


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	329	452

		Geot	echr	nical	3S, IN Engine			KAUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 139					
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Co	ntinued from previous plate) Description		
			50	0			80 85 90			grades to soft to			
Date Sta					7, 2005		100-			Water Level: ♀	23.5 ft. 2/17/05 1050 HRS 24.1 ft. 2/17/05 1525 HRS		
Date Cor Logged F			Febru S. Lat		7, 2005	***************************************				Drill Rig:	CME-55		
Total De			85 fee							Drilling Method:	4" Auger & HQ Coring		
Work Or	L		3869-				******			Driving Energy:	140 lb. wt., 30 in. drop		

					3S, IN		1		KA	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII	Log of Boring
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	USCS	Approximate Ground Surface Elevation (feet MSL): 147 *	1
*		₩ Z	Col	RG			De	Sal	S _N MH	Description Brown CLAYEY SILT with gravel, stiff, m	oist (fill)
	27				15	2.0					
	37				8	1.0	5.	-		grades to medium stiff	
	61	63			3	0.0	10		CH-	grades to soft Dark brown to gray ORGANIC CLAY with	n gravel.
	54				2		4 =		ОН	very soft (alluvium)	. g. a. e.,
	400	4.5					15	-		grades with less gravel	
	102	45			4		20		SM	Brownish gray SILTY SAND, loose (alluv	ium)
	56				12	1.5	25 ⁻		МН	Grayish brown CLAYEY SILT with sand, very stiff (saprolite)	stiff to
	52	75			29	2.0	30			grades with weathered gravel	
	50				18	2.3	35				
	41	79			28		40				
	55				28		45				
	46		100 40	58 17	50/.5' Ref.		50			Gray vugular BASALT, moderately fractusting slightly weathered, hard to very hard (bate formation)	•
			95	48	20/.0'		55			Brownish gray vesicular BASALT, closely fractured, highly weathered, soft to medi (basalt formation)	
					Ref.		60	-		grades to moderately fractured, moderate weathered, medium hard to hard	ely
			90	48			- 3			Gray dense BASALT, slightly fractured, s	
			100	88			65			weathered, hard to very hard (basalt forr	nauUN)
			83	70			70				
Date Sta					r 21, 200		75	1		Water Level: 9 ft. 9/21/04 1010 HRS	
Date Cor Logged I	By:		S. La	tronic		4				8.1 ft. 9/22/04 1415 HRS Drill Rig: CME-55	
Total De	pth:		100.5	feet -20				***		Drilling Method: 4" Auger, 3" Casing & HQ Col Driving Energy: 140 lb. wt., 30 in. drop	ring





GEOLABS, INC.

state of hawaii Department of transportation Highways division

BORING LOGS - 19

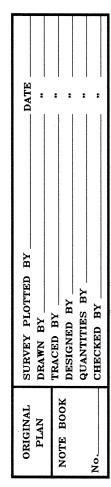
KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

NTS Date: February 2009
SHEET No.**G-3.19** OF **G-3.26** SHEETS



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	330	452

						3S, IN)		K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 140
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description
				8552	0		3.5	80			Reddish brown and gray BASALT, severely fractured, highly weathered, soft (basalt formation)
				87	7			85			grades to medium hard
				100	45			90			Brownish gray vesicular BASALT, moderately fractured, moderately weathered, medium hard (basalt formation)
				100	100			95			Gray dense BASALT, massive, slightly weathered, very hard (basalt formation)
								100-			Boring terminated at 100.5 feet
			-					105	-		-
								110-	-		- - - - -
GEOLABS.GDT 7/5/07								115 120-	- - - -		-
369-20.GPJ	Date Sta		- d			r 21, 200		120-			Water Level: ☑ 9 ft. 9/21/04 1010 HRS 8.1 ft. 9/22/04 1415 HRS
G DOT 3	Date Cor Logged E	·····	eu.	Septe S. La		r 22, 200	+				Drill Rig: CME-55
RING LO	Total De			100.5							Drilling Method: 4" Auger, 3" Casing & HQ Coring
<u>B</u>	Work Or	uer:		3869-	·2U						Driving Energy: 140 lb. wt., 30 in. drop

					3S, IN Engine		,		K/	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 141
Other Tests	Moisture Content (%)		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)		Depth (feet)	Sample	H	Approximate Ground Surface Elevation (feet MSL): 147 * Description Brown CLAYEY SILT with gravel, very stiff, moist
	31	93			45	3.5	_			(fill)
	30				9	7	5			grades with sand, medium stiff
	34				4		10		MH- OH	grades to soft Dark brown to gray CLAYEY ORGANIC SILT, very
LL=55 PI=17	64	65			4	0.1	15		On	soft (alluvium)
	81				2	0.3	20			
	57	66			13	1.0	25		MH	grades with some gravel Reddish brown CLAYEY SILT with sand and
							30		IVIII	gravel, medium stiff to stiff (saprolite)
LL=67 PI=31	64				8	1.0				grades with weathered gravel
	47	75			35	4.0	35			grades to stiff to very stiff
	46				17	1.5	40			
	38		53	0	50/.3' Ref.		45			Grayish brown BASALT, severely fractured, highly to extremely weathered, soft (basalt formation)
			73	7			50			grades to medium hard
			67	30			55			Gray vugular BASALT, moderately fractured, slightly to moderately weathered, hard (basalt
			100	88			60			formation) Gray dense BASALT, slightly fractured, slightly
			100	100			65			weathered, very hard (basalt formation) grades to massive
			58				70			
Date Sta					r 22, 200		75			Water Level: 8.7 ft. 9/22/04 1425 HRS 7.5 ft. 9/22/04 1310 HRS 1.00 HRS 1.0
Date Co Logged		ed:	Septe S. La		r 23, 200 ;	4				7.5 ft. 9/23/04 1310 HRS Drill Rig: CME-55
Total De			101 fo	eet						Drilling Method: 4" Auger, 3" Casing & HQ Coring



SIGNATURE EXPIRATION DATE OF THE LICEN GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 20

KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.20 OF G-3.26 SHEETS

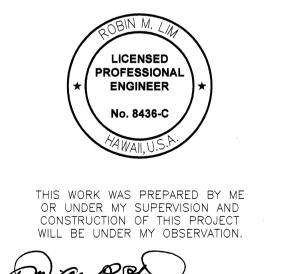
ORIGINAL SUF PLAN DRA NOTE BOOK DES

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	331	452

					3S, IN Engine				K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 141
Other Tests	Moisture		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	NSCS	(Continued from previous plate) Description
			50 85	7			80			Reddish brown and gray BASALT, severely fractured, highly to extremely weathered, soft (basalt formation) grades to medium hard
			92	58			85			
			100	97			90			Brownish gray vugular BASALT, moderately to slightly fractured, slightly to moderately weathered, medium hard to hard (basalt formation) Gray dense BASALT, massive, slightly weathered,
			100	100			95			very hard (basalt formation)
						1	100			Boring terminated at 101 feet
							105	- - -		- - -
						1	110	- - - -		
/NG/ 105							115	- - - -		
GEOLABS:							120			
Date S		·			r 22, 2004 r 23, 2004		IZU			Water Level: 8.7 ft. 9/22/04 1425 HRS 7.5 ft. 9/23/04 1310 HRS
Logged Total C	d By: Depth:		S. La 101 fe	tronic eet						Drill Rig: CME-55 Drilling Method: 4" Auger, 3" Casing & HQ Coring
Work (Order:		3869-	-20					··	Driving Energy: 140 lb. wt., 30 in. drop

					BS, IN Engine		,		K	AUMUALII HIGHWAY WIDENING Boring ISLAND OF KAUAI, HAWAII 142
sts	- %)ct)	%							Approximate Ground Surface
Other Tests		Dry Unit Weight (p	Core Recovery (RQD (%)	Penetration Resistance (blows/foot)	Pocket Po (tsf)	Depth (feet)	Sample	Grapnic USCS	Elevation (feet MSL): 147 * Description
	17		OR	œ	27	2.5		S	MH	Brown CLAYEY SILT with sand and gravel, very stiff, damp (fill)
	62	62			6	0.5	₂ 5		MH	Brown CLAYEY SILT, soft (alluvium)
LL=65 PI=28	59				2		10			
1120	61	62			9	2.0	15		MH	Brown CLAYEY SILT, medium stiff (residual soil)
	69				5	0.8	20			
	65				9	1.3	25			grades with weathered gravel
	56				10	1.3	30			grades to grayish brown
	59				18	1.5	35	-		
	66				6		40	-	MH	Brownish gray CLAYEY SILT with sand and weathered basalt, medium stiff (saprolite)
			30	0	15/.0' Ref.		45		7-7-	Grayish brown BASALT, severely fractured, highly to extremely weathered, soft (basalt formation)
	52		19	0	12	1.0	50			
	41		100	53	50/.4' Ref.		55			Gray dense BASALT, moderately fractured, slight weathered, hard to very hard (basalt formation)
			100	75			60			grades to slightly fractured
			100	60			65			
			60	20			70			
Date Sta				·	3, 2004		75	11.		Water Level: 5.2 ft. 11/3/04 1330 HRS 1.5 ft. 14/4/04 1335 HRS 1.5 ft. 14/4/04 HRS 1.5
Date Col Logged I	Ву:	ed:	S. La	tronic	4, 2004					5.5 ft. 11/4/04 1335 HRS Drill Rig: CME-55 Drilling Method: 4" Auger & Casing 3" Casing & HO Corin
Total De Work Or		***************************************	100.5 3869-							Drilling Method: 4" Auger & Casing, 3" Casing & HQ Corin Driving Energy: 140 lb. wt., 30 in. drop



SIGNATURE EXPIRATION DATE OF THE LICENSE GEOLABS, INC.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

BORING LOGS - 20

KAUMUALII HIGHWAY WIDENING

Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS Date: February 2009

SHEET No.G-3.21 OF G-3.26 SHEETS

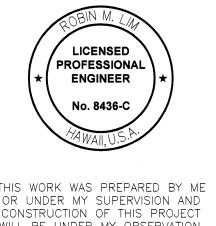
ORIGINAL PLAN NOTE BOOK

ATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	332	452

					3S, IN Engine		9		K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 142
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	G Core C Recovery (%)	O RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)-	Sample Graphic	SOSO	(Continued from previous plate) Description Grayish brown BASALT, severely fractured, highly
			75	13			80			to extremely weathered, soft (basalt formation) grades to medium hard
			100	87			85			Grayish dense BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)
			100	100			90			grades to vugular, massive
			100	87			95 100			grades to vesicular
							105	-		Boring terminated at 100.5 feet
							110 ⁻	- - - - -		
							115 ⁻			
Date Sta	orted:		Nove	mhor	3, 2004		120·			Water Level: 5.2 ft. 11/3/04 1330 HRS
Date Co					4, 2004					5.5 ft. 11/4/04 1335 HRS
Logged I	Ву:		S. La							Drill Rig: CME-55
Total De			100.5						***************************************	Drilling Method: 4" Auger & Casing, 3" Casing & HQ Corin
Work Or	<u>aer:</u>		<u> 3869-</u>	-20	<u> </u>					Driving Energy: 140 lb. wt., 30 in. drop

	GEOLABS, INC. Geotechnical Engineerin							K.	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 143	
Si Si	\dashv								T	
Other Tests	Moisture Content (%		Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	SS	Approximate Ground Surface Elevation (feet MSL): 145 *
Oţ	Moi	Dry Wei	Core	RQ	Pen Res (blo	Poc (tsf)	Dер	San	NSCS	Description
	44	79		O TOTAL CONTRACTOR OF THE PROPERTY OF THE PROP	10/.5'	1.0			MH	Reddish brown with multi-color mottling CLAYEY SILT with sand and gravel, stiff, moist (fill)
					+20/.3'		ı		МН	Reddish brown with multi-color mottling CLAYEY
	43				Ref.	<0.5	5			SILT, soft, moist (fill)
		20					10			
	57	69		THE PERSON NAMED IN COLUMN TO THE PE	6		10			
				- November of the Control of the Con		7	Z		CH- OH	Grayish brown SILTY ORGANIC CLAY with sand, very soft, very moist (alluvium)
TV=0.05	129			The state of the s	2		15		OI I	very soit, very moist (and vidin)
11-86	67	57			4		20			
LL=86 PI=49	וס	01			4		20			
-									ML	Greenish gray with multi-color mottling SANDY
	53				5		25			SILT with clay and weathered gravel, soft
									MH	(saprolite) Tan with multi-color mottling CLAYEY SILT with
	40				40/51		20		1	sand, stiff (saprolite)
	49		34	0	18/.5' +20/.1'		30			
					Ref.					
							35			grades to reddish brown
	55		36	0	15					
	1	Company of the Compan	30				4.0			
	56				10		40			
	<u> </u>		7	0						
							45			
	45		60	0	33		• -			grades to brown, very stiff
			62	0				1		grades to brown, very earl
			53	0			50	1		
							55			Gray vesicular BASALT, moderately fractured,
			87	42						highly weathered, medium hard (basalt formation)
			100	00			60			grades to slightly fractured, moderately weathered,
			100	90						very hard
							05		-	
			60	27			65			
										Brownish tan with multi-color mottling BASALT,
							70			severely fractured, highly to extremely weathered, soft (basalt formation)
			50	0				-		grades to orangish brown
Date Sta	rted:		Nove	<u> </u>	r 8, 2004		<u>75</u>			Water Level:
Date Cor	mplet	ed:	Nove	mber	8, 2004					14.6 ft. 11/9/04 0834 HRS
Logged E Total Der			Y. Ch 100.5							Drill Rig: CME-55 Drilling Method: 4" Auger, 4" Casing & HQ Coring
Work Ord	•		3869-	-20						Driving Energy: 140 lb. wt., 30 in. drop



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION.

GEOLABS, INC.

state of hawaii Department of transportation HIGHWAYS DIVISION

BORING LOGS - 22

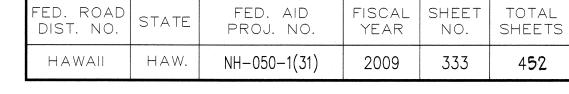
KAUMUALII HIGHWAY WIDENING <u>Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009 SHEET No.G-3.22 OF G-3.26 SHEETS

					BS, IN)		K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII	Log of Boring
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description	
0	ΣÚ	≥ ۵			<u> </u>	<u> </u>	Δ	S O	<u> </u>	grades to reddish brown	
			97	13			80			grades to reddish brown	d
			65	50			85			Dark gray with multi-color mottling BASA moderately fractured, moderately weath (basalt formation)	
			100	100			90			grades to slightly fractured	
			100	93			95			grades to slightly weathered, very hard	
							100			Boring terminated at 100.5 feet	
							105	-			-
							110				- -
GEOLABS.GDT 7/5/07							115				<u>-</u>
Date Sta					8, 2004		120			Water Level: 13.8 ft. 11/8/04 1012 HRS 14.6 ft. 11/9/04 0834 HRS	
Date Co			Nove Y. Ch		8, 2004	····				Drill Rig: CME-55	
Total De			100.5							Drilling Method: 4" Auger, 4" Casing & HQ Co	ring
Work Or										Driving Energy: 140 lb. wt., 30 in. drop	

					3S, IN Engine			KA	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII	Log of Boring
S	Д_									144
Other Tests	Moisture Content (%	Dry Unit Weight (pcf	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet) Sample	Graphic USCS	Approximate Ground Surface Elevation (feet MSL): 145 *	·
#O		P. We	Co Rec	RQ			De	H H US	Description Brown CLAYEY SILT with gravel, very sti	ff, moist
	31	89			24 25	2.52.0			(fill)	
					20	2.0	5		grades with sand	
	72				3	0.1	10	CH- OH	grades to soft, very moist Dark brown to gray SILTY ORGANIC CLA very moist (alluvium)	AY, soft,
LL=189 PI=96					6	0.1	15		very moist (anaviam)	
	69				3	0.3	20			
	64	62			6		25 X	MH	Brown CLAYEY SILT with gravel, soft to r stiff (alluvium)	medium
	47		50	0	50/.5' Ref.		30		grades with boulder and cobbles	
			57	7	11011		35-	MH	Grayish brown CLAYEY SILT with sand a very stiff to hard (saprolite)	ind grave
			68	0			40-			
			33	0						
	40				92		45-			
	40		100	33	92		50		Gray vugular BASALT, moderately fracture slightly to moderately weathered, medium	
			85	45			55		hard (basalt formation)	
			95	65			-1 -1 -1 -1		grades to very hard	
			100	93			60-		grades to slightly fractured, slightly weath	ered
			65	13			65- 70-		Grayish brown BASALT, severely fracture moderately to highly weathered, soft to mard (basalt formation)	
			70	7		4	, <u>, </u>		grades to extremely weathered, soft	
Date Sta	rted.	<u> </u>	Sente	mhe	r 29, 200	4	75 -		Water Level: ⊋ 11.6 ft. 9/29/04 1035 HRS	
Date Cor	mplet		Septe	embe	r 30, 200					
Logged E			S. Lat		,				Drill Rig: CME-55 Drilling Method: 4" Auger, 3" Casing & HQ Cori	ina
Total De Work Or			102 fe		to the state of th				Drilling Method: 4" Auger, 3" Casing & HQ Cori Driving Energy: 140 lb. wt., 30 in. drop	ıı ı <u>y</u>





GEOLABS, INC.

state of hawaii Department of transportation

BORING LOGS - 23

HIGHWAYS DIVISION

KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

Date: February 2009 SHEET No.G-3.23 OF G-3.26 SHEETS



					3S, IN				K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII	Log of Boring 144
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Continued from previous plate) Description	
			80	15			80			grades to highly weathered, soft to mediu	ım hard
			100	42			85			Brownish gray BASALT, moderately fract slightly to moderately weathered, hard (b formation)	
			100	73			90-				
				100			95			grades to slightly fractured, very hard	
			100	82			100			Dering to main stad at 100 feet	
							105	-		Boring terminated at 102 feet	-
							110-	-			
NABS.GDT 7/5/07							115	-			-
Date Star Date Com Logged B	nplete	ed:	Septe		· 29, 200 · 30, 200		120-			Water Level:	
Total Dep Work Ord	th:		102 fe 3869-	eet						Drilling Method: 4" Auger, 3" Casing & HQ Cor Driving Energy: 140 lb. wt., 30 in. drop	ing

		GEOLABS, INC. Geotechnical Engineering							KA	AUMUALII HIGHWAY WIDENING	Log of Boring 145
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 161 * Description	
	23		OH		48	2.0		-	MH	Brown CLAYEY SILT with gravel, very stiff, r (fill)	noist
	41	75			11	1.5	5			grades to stiff, very moist	
	39				11		10				
	50	62			22	1.0	15		МН	Brown with gray mottling CLAYEY SILT, stiff (residual soil)	, mois
	57				10	0.8	20			grades to medium stiff, very moist	
	64	60			15	1.0	25			grades more saprolitic	
	62				16	8.0	30	-	МН	Brown CLAYEY SILT with sand and weather basaltic gravel, medium stiff (saprolite)	red
	50	74	50		31	0.5	35		МН	Brown CLAYEY SILT, stiff (saprolite)	
	49		44		23	2.5	40				
	47		5		92	3.0	45			grades to very stiff	
	55		50		30	2.0	50				
			63	13			55	- 			
			75	27			60			Brownish gray vesicular BASALT, closely fractured, slightly to moderately weathered, medium hard to hard (basalt formation)	
			62	20			65				
			67	0			70			Grayish brown BASALT, severely fractured, extremely weathered, soft (basalt formation)	ì
Date Sta					0, 2005		75		1	Water Level: 26.5 ft. 2/10/05 1045 HRS 26.5 ft. 2/14/05 1000 HRS 26.5 ft. 2/14/05 26.5 ft. 2/14/05 26.5 ft. 2/14/05 26.5 ft. 2/14/05 26.5 ft. 2/14/05	
Date Cor Logged I Total De	By:			tronic	0, 2005					25.5 ft. 2/11/05 1200 HRS Drill Rig: CME-55 Drilling Method: 4" Auger, 3" Casing & HQ Coring	
Work Or	•		3869							Driving Energy: 140 lb. wt., 30 in. drop	

FED. ROAD STATE FED. AID FISCAL SHEET TOTAL PROJ. NO. YEAR NO. SHEETS HAWAII HAW. NH-050-1(31) 2009 334 4**52**



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GEOLABS, INC.

state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS - 24

KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

FEDERAL-AID PROJECT NO. NH-050-1(31) Scale: NTS

Date: February 2009

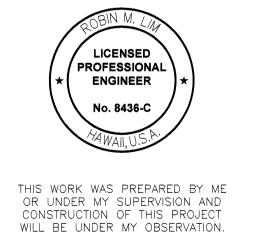
SHEET No.G-3.24 OF G-3.26 SHEETS

334

•	FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	HAWAII	HAW.	NH-050-1(31)	2009	335	452

					3S, IN Engine				K	NUMUALII HIGHWA ISLAND OF KAUA		Log of Boring 145
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core ORecovery (%)	(%) GDU (5)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	(Contir	nued from previous plate)	
Ŏ	<u>≅</u> ö	کۃ	ပ္သည္ဆ	R	8 8 절 (조 점 전	Po (ts	<u> </u>	Sa	30		Description	
			100	45			00				LT, moderately fracture o very hard (basalt form	
							80	-		Boring terminated	l at 80 feet	
							85	-				
							90	- - - -				
							95	-				
							100·					
Date Sta Date Cor					0, 2005						6.5 ft. 2/10/05 1045 HRS 5.5 ft. 2/11/05 1200 HRS	
Logged E	· · · · · · · · · · · · · · · · · · ·		~~~~	tronic	0, 2005	100 Par	y				ME-55	
Total De			30 fee					***************************************			" Auger, 3" Casing & HQ Cori	na
	Work Order: 3869-20										40 lb. wt., 30 in. drop	-3

					BS, IN			KAUMUALII HIGHWAY WIDENING ISLAND OF KALIAL HAWAII					
					Engine				T	ISLAND OF KAUAI, HAWAII 146			
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Sore Recovery (%	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 155 * Description			
	15 18	104			24 38	1.5	1		МH	Brown CLAYEY SILT with gravel, stiff to very stiff moist (fill)			
	42	78			18	2.5	5						
	49				2	0.3	10	•	MH/ OH	Dark gray CLAYEY ORGANIC SILT, soft, very moist (alluvium)			
LL=60 PI=29	47	77			12	0.0	15						
	45				19	3.0	20	•	МН	Brown CLAYEY SILT, stiff (residual soil)			
	63	66			18	2.0	25						
	58				13	1.0	30	•		grades with weathered basaltic gravel			
	56	60			26		35	X .					
	56				19	2.5	40	•					
	50	76			39	2.5	45			grades with gray mottling, very stiff			
	55				25	2.0	50			Boring terminated at 51.5 feet			
						·	55						
							60						
							65						
							70						
							75						
Date Sta					8, 2005 8, 2005					Water Level: ☑ 14 ft. 2/18/05 0920 HRS			
Logged Total De	By:		S. La 51.5	tronic						Drill Rig: CME-55 Drilling Method: 4" Auger & 3" Casing			
Work Or			3869				· · · · · · · · · · · · · · · · · · ·			Driving Energy: 140 lb. wt., 30 in. drop			



GEOLABS, INC.

state of hawaii department of transportation HIGHWAYS DIVISION

BORING LOGS - 25

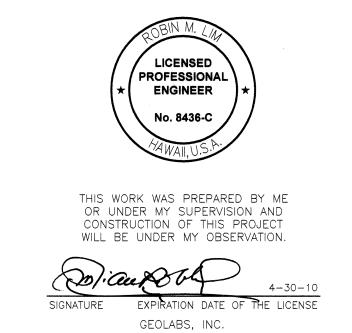
KAUMUALII HIGHWAY WIDENING Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS Date: February 2009

SHEET No.G-3.25 OF G-3.26 SHEETS

FED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	336	452

	. (3S, IN Engine				K	AUMUALII HIGHWAY WIDENING ISLAND OF KAUAI, HAWAII 147
Other Tests	sture ntent (%)	pcf)	(%)		Penetration Resistance (blows/foot)		Depth (feet)	Sample	USCS	Approximate Ground Surface Elevation (feet MSL): 195 * Description
	29	72			25	2.5			MH	Brown CLAYEY SILT with rootlets, very stiff, moist (fill)
	35				33	>4.5	5	-	МН	Brown CLAYEY SILT, very stiff to hard, moist (residual soil)
	32	83			82	>4.5	_z 10			grades with gray mottling perched groundwater?
	57				32	2.0	15		MH	Reddish brown CLAYEY SILT, very stiff to hard (residual soil)
	38	79			50/.3' Ref.	>4.5	20			
	42				62	2.5	25			
	67				11	1.0	30		MH	Grayish brown CLAYEY SILT, stiff (residual soil)
LL=73 PI=32	51	69			26	2.0	35			grades to very stiff
	53				13	1.0	40			grades to stiff Boring terminated at 40.5 feet
							45			
							50			
							55			
							60			
		(漆			·		65			
							70	-		
Date Sta				~~~~	1, 2004		75			Water Level: 10.4 ft. 9/2/04 1120 HRS Druft 9/10/04 1110 HRS
Date Co Logged I Total De	By:		Septe S. La 40.5	tronic	2, 2004					Dry ft. 9/10/04 1110 HRS Drill Rig: CONCORE Drilling Method: 3" Casing, 3" Drag Bit



STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS - 26

KAUMUALII HIGHWAY WIDENING

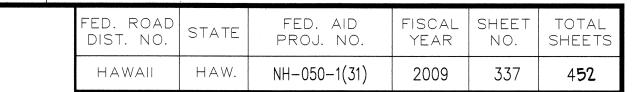
Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge

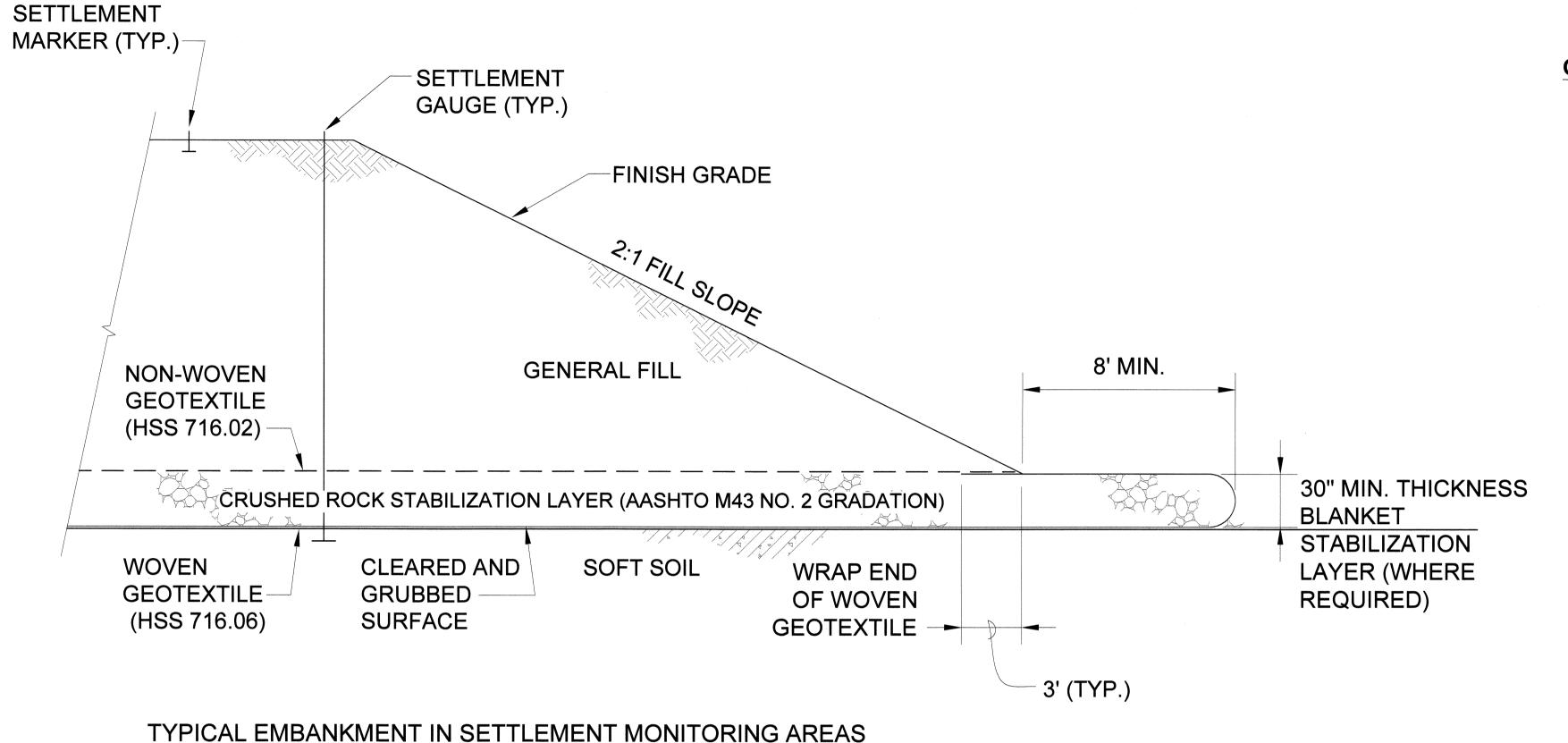
FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-3.26 OF G-3.26 SHEETS

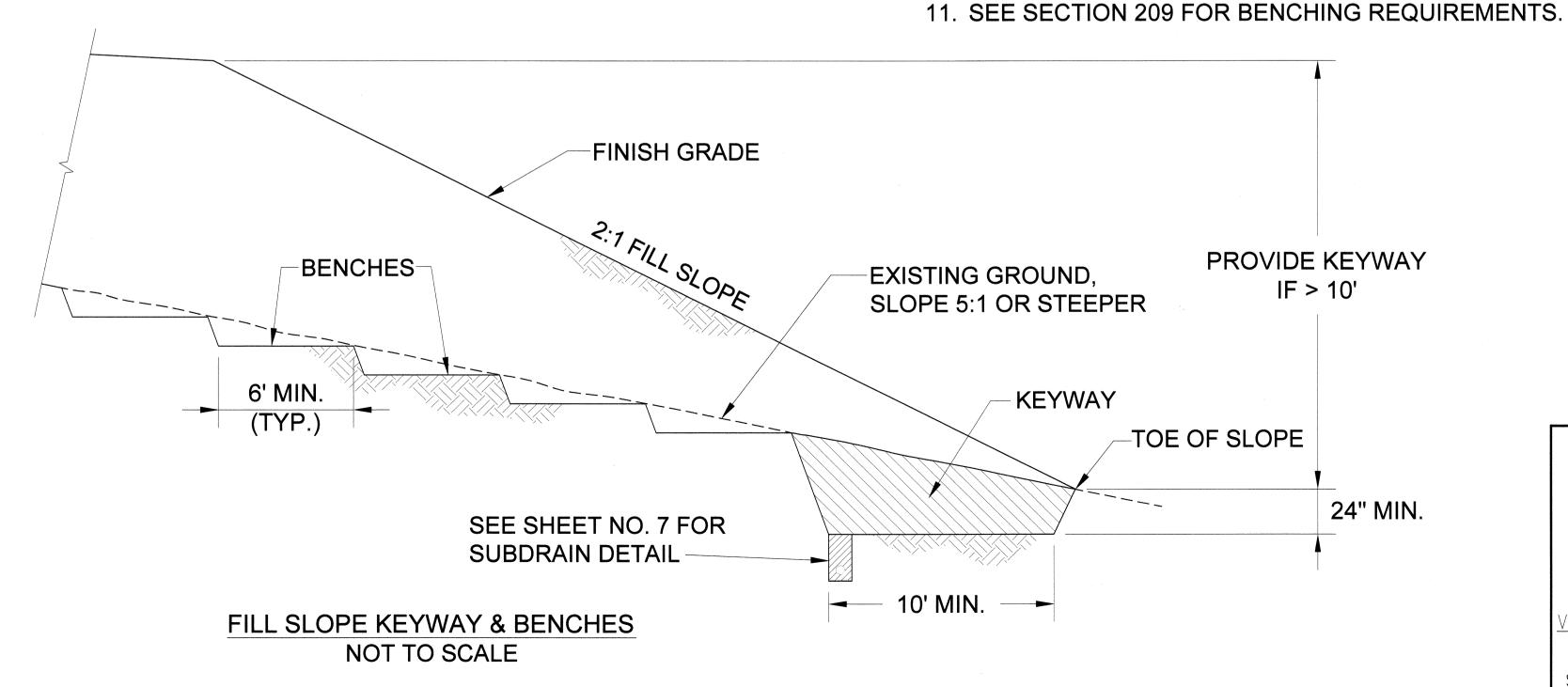




NOT TO SCALE

GENERAL EMBANKMENT NOTES IN SETTLEMENT MONITORING AREAS

- 1. FOR INFORMATION REGARDING SOIL CONDITIONS IN GENERAL AREAS OF WORK, SEE BORING LOGS SHOWN ON SHEETS G-3.01 THRU G-3.17. THE LOCATIONS OF THE BORING LOGS ARE SHOWN ON SHEETS G-1.01 THRU G-1.05. ALSO SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.
- 2. AREAS REQUIRING SETTLEMENT MONITORING ARE SHOWN ON SHEETS GP1 THRU GP11.
- 3. BLANKET STABILIZATION LAYER SHALL BE PROVIDED PRIOR TO FILLING IN AREAS WHERE PUMPING CONDITIONS OCCUR.
- 4. THE CONTRACTOR SHALL CONSTRUCT EMBANKMENT SUCH THAT FINISHED GRADE **ELEVATIONS ARE AS SHOWN ON PLANS.**
- 5. THE CONTRACTOR SHALL INSTALL DRAINAGE FACILITIES SUCH THAT FINISHED GRADE ELEVATIONS ARE AS SHOWN ON PLANS. FOR REMOVAL AND REPLACEMENT OF SOFT SOILS UNDER DRAINAGE FACILITIES, SEE SHEETS G-5.01 AND G-5.02.
- 6. FILL HEIGHTS ARE ELEVATION DIFFERENCES BETWEEN TOP OF FILLS AND TOE OF FILLS.
- 7. FOR FILL SLOPE KEYWAY AND BENCHING DETAIL, SEE DETAIL ON THIS SHEET
- 8. FOR SETTLEMENT GAUGE/MARKER DETAILS, SEE SHEET G-4.02. ALSO REFER SECTION
- 9. FOR EROSION CONTROL REQUIREMENTS, SEE SHEETS 5 THRU 9.
- 10. FILL SLOPE FACE SHALL BE TRACK-ROLLED WITH A BULLDOZER PER BMP MANUAL.





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GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

EMBANKMENT IN SETTLEMENT MONITORING AREAS - 1

KAUMUALII HIGHWAY WIDENING licinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

SHEET No.G-4.01 OF G-4.02 SHEETS



NOTES:

1. PROVIDE BENCHES FOR ALL EMBANKMENTS TO BE

STEEPER MEASURED PERPENDICULAR TO THE

2. PROVIDE KEYWAY WITH SUBDRAIN AT THE TOE OF

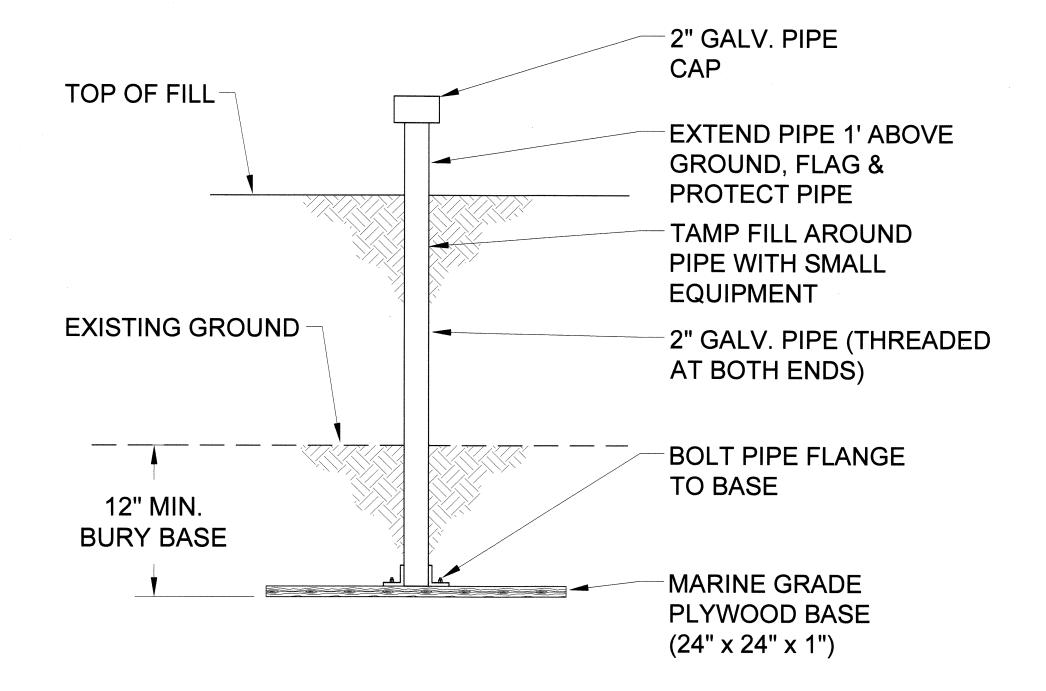
ALL KEYED EMBANKMENTS WITH A VERTICAL HEIGHT

ROADWAY CENTERLINE.

GREATER THAN 10 FEET.

CONSTRUCTED ON EXISTING GROUND SLOPES 5:1 OR

Date: February 2009



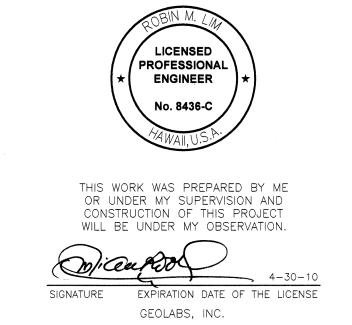
NOTE: SETTLEMENT GAUGES SHALL BE SET INTO EXISTING GROUND AS DETAILED. SETTLEMENT MARKERS SHALL BE SET INTO THE TOP OF FILL AT THE BEGINNING OF THE SETTLEMENT WAITING PERIOD.

SETTLEMENT GAUGE / MARKER NOT TO SCALE

	SETTLEMENT MONITORING AREAS													
AREA NO.	SHEET NO.	MAX. FILL HEIGHT (FEET)	ESTIMATED SETTLEMENT WAITING PERIOD (MONTHS)	NO. OF SETTLEMENT GAUGES	NO. OF SETTLEMENT MARKERS									
1	GP2/GP3	10	4 - 6	1	2									
2	GP2/GP3	15	4 - 6	1	2									
3	GP3/GP4	6	1 - 2	2	0									
4	GP4	13	4 - 6	1	2									
5	GP5	12	4 - 6	1	2									
6	GP5/GP6	6	1 - 2	2	0									
7	GP6/GP7	3	1 - 2	3	0									
8	GP11	17	4 - 6	1	2									

SETTLEMENT MONITORING NOTES:

- 1. FOR GENERAL EMBANKMENT NOTES IN SETTLEMENT MONITORING AREAS, SEE SHEET G-4.01.
- 2. SETTLEMENT WAITING PERIOD SHALL BE OBSERVED IN AREAS DESIGNATED ON SHEETS GP1 THRU GP11 PRIOR TO FINAL GRADING AND CONSTRUCTION OF PAVEMENT STRUCTURES, DRAINAGE STRUCTURES AND OTHER APPURTENANCES. ACTUAL DURATION OF SETTLEMENT WAITING PERIODS SHALL BE BASED ON MEASURED SETTLEMENT RATES. SETTLEMENT WAITING PERIODS MAY BE ADJUSTED AS DETERMINED BY THE ENGINEER. FOR SETTLEMENT MONITORING AND WAITING PERIOD REQUIREMENTS, SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008 AND SPECIAL PROVISIONS SECTION 664. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.
- 3. SETTLEMENT WAITING PERIODS MAY BE REDUCED BY SURCHARGING FILL EMBANKMENT OR OTHER METHODS. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS, INCLUDING HEIGHT OF SURCHARGING, FOR REVIEW AND ACCEPTANCE BY THE ENGINEER PRIOR TO EMBANKMENT CONSTRUCTION.
- 4. SETTLEMENT GAUGE/MARKER SHALL BE PROTECTED BY ERECTING ORANGE PLASTIC FENCE WITH POSTS.



STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

EMBANKMENT IN SETTLEMENT MONITORING AREAS - 2

KAUMUALII HIGHWAY WIDENING

'icinity of Anonui Street to Vicinity of Lihue Mill Bridge

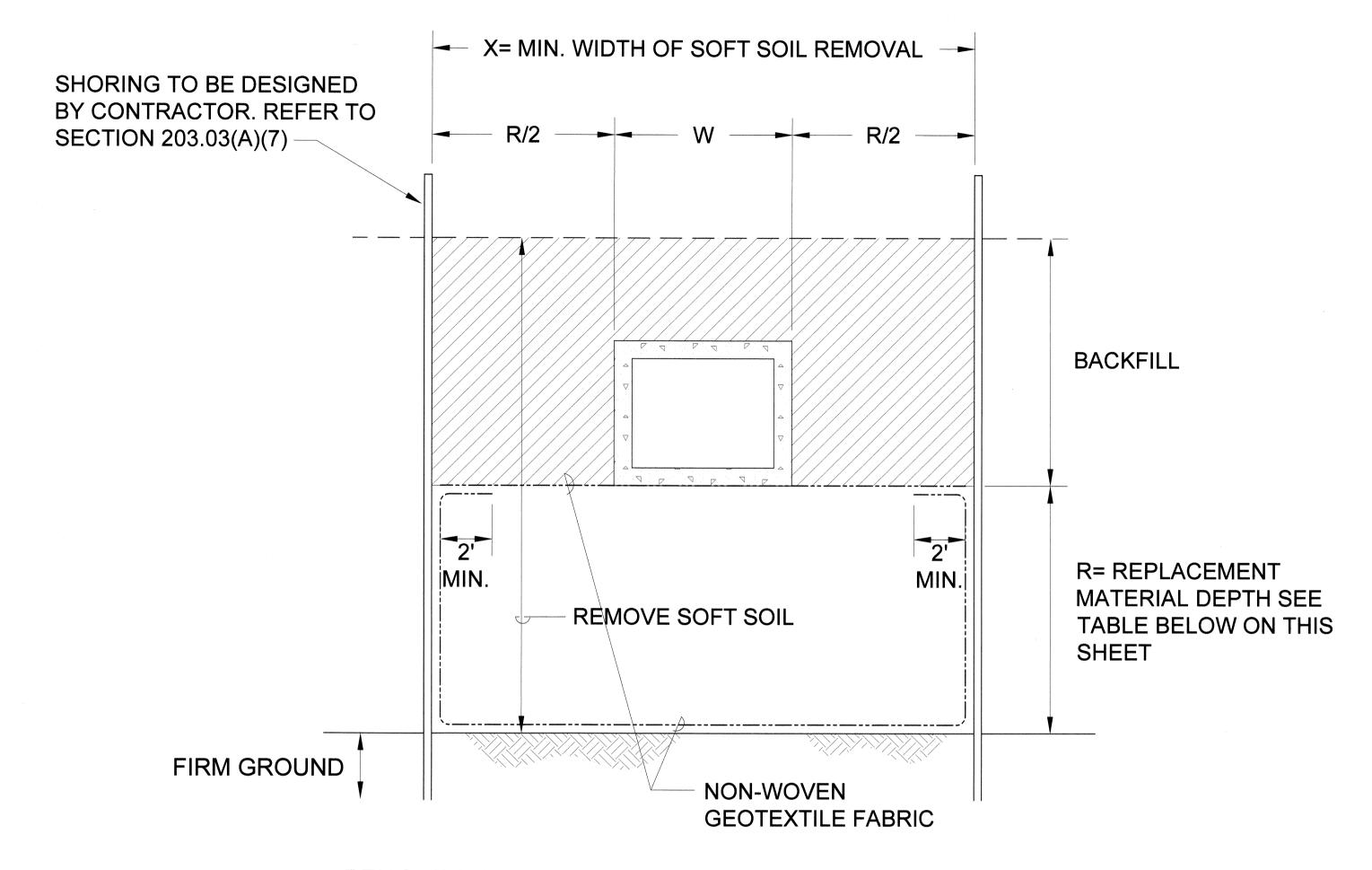
FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-4.02 OF G-4.02 SHEETS

FED. ROAD	STATE	FED. AID	FISCAL	SHEET	TOTAL
DIST. NO.		PROJ. NO.	YEAR	NO.	SHEETS
HAWAII	HAW.	NH-050-1(31)	2009	339	452



REMOVE AND REPLACE SOFT SOIL	UNDER BOX CULVERT DETAIL
NOT TO S	CALE

ESTIMATED SOFT SOIL REMOVAL UNDER BOX CULVERTS						
DRAIN LINE NO.	STATION NO.	R (FEET)	W (FEET)	X (FEET)		
5	287+50	20	10	30		
7	307+30	17	6	23		
8	310+60	17	12	29		

BOX CULVERT CONSTRUCTION NOTES:

- 1. CONTRACTOR SHALL REMOVE AND REPLACE ALL SOFT SOILS UNDER BOX CULVERT AS SHOWN ON "REMOVE AND REPLACE SOFT SOILS UNDER BOX CULVERT DETAIL" ON THIS SHEET. A STABILIZATION LAYER CONSISTING OF CRUSHED ROCK (AASHTO M43 NO. 2 GRADATION) WRAPPED AROUND BY NON-WOVEN GEOTEXTILE FABRIC (HSS SECTION 716.02) SHALL BE PROVIDED AT BOTTOM OF EXCAVATION, IF NECESSARY, PRIOR TO BACKFILLING WITH SUITABLE REPLACEMENT MATERIAL.
- 2. FOR BIDDING PURPOSES, CONTRACTOR SHALL ASSUME REPLACEMENT MATERIAL DEPTH AS SHOWN ON THIS SHEET. ACTUAL DEPTH OF SOFT SOIL REMOVAL SHALL BE DETERMINED IN THE FIELD. WIDTH OF SOFT SOIL REMOVAL SHALL BE AS INDICATED ON THIS SHEET REGARDLESS OF ACTUAL DEPTH OF SOFT SOIL REMOVAL. LENGTH OF SOFT SOIL REMOVAL SHALL BE AS INDICATED ON SHEETS D1.11, D1.12, AND D1.13 REGARDLESS OF ACTUAL LENGTH OF SOFT SOIL REMOVAL.
- 3. CONTRACTOR SHALL NOTIFY ENGINEER A MINIMUM OF 48 HOURS PRIOR TO BACKFILLING EXCAVATION. ENGINEER SHALL OBSERVE BOTTOM OF EXCAVATION. CONTRACTOR SHALL COMMENCE WITH BACKFILLING ONLY UPON REVIEW AND ACCEPTANCE OF ENGINEER.
- 4. REPLACEMENT MATERIALS SHALL BE CRUSHED ROCK (AASHTO M43 NO. 2 GRADATION), WRAPPED ON ALL SIDES WITH NON-WOVEN GEOTEXTILE (HSS SECTION 716.02). SEAMS OF GEOTEXTILE SHALL BE STITCHED.
- 5. FOR INFORMATION REGARDING SOIL CONDITIONS IN GENERAL AREAS OF WORK, SEE BORING LOGS SHOWN ON SHEETS G-3.01 THRU G-3.17. THE LOCATIONS OF THE BORING LOGS ARE SHOWN ON SHEETS G-1.01 THRU G-1.05. ALSO SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.



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SIGNATURE EXPIRATION DATE

GEOLABS, INC.

TYPICAL CULVEDT DETAILS

STATE OF HAWAII Department of transportation

TYPICAL CULVERT DETAILS OVER SOFT SOILS

<u>KAUMUALII HIGHWAY WIDENING</u> Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge FEDERAL—AID PROJECT NO. NH—050—1(31)

Scale: NTS

Date: February 2009

SHEET No.G-5.01 OF G-5.02 SHEETS

DRAIN LINE FACILITIES WITHIN SETTLEMENT MONITORING AREA NOTES:

1. WHERE NEW DRAIN LINE FACILITIES ARE LOCATED WITHIN OR NEAR SETTLEMENT MONITORING AREAS, SETTLEMENT WAITING PERIOD SHALL BE OBSERVED PRIOR TO CONSTRUCTION OF NEW DRAIN LINE FACILITIES. ESTIMATED SETTLEMENT WAITING PERIODS ARE SHOWN ON SHEET G-4.02. ACTUAL DURATION OF SETTLEMENT WAITING PERIODS SHALL BE BASED ON MEASURED SETTLEMENT RATES. FOR DETAILS OF SETTLEMENT MONITORING REQUIREMENTS, SEE GEOTECHNICAL ENGINEERING REPORT ENTITLED "GEOTECHNICAL ENGINEERING EXPLORATION, KAUMUALII HIGHWAY WIDENING, PHASE IA, VICINITY OF ANONUI STREET TO LIHUE, ISLAND OF KAUAI, HAWAII" PREPARED BY GEOLABS, INC. DATED JULY 17, 2008 AND SHEETS G-4.01 AND G-4.02. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.

2. AFTER EMBANKMENT FILL HAS SETTLED, CONTRACTOR SHALL INSTALL NEW DRAIN LINE FACILITIES.

3. DRAIN LINES REQUIRING SETTLEMENT MONITORING PRIOR TO CONSTRUCTION ARE SUMMARIZED ON THE TABLE ON THIS SHEET AND SHOWN ON SHEETS D1.1 THRU D1.10. A COPY OF THE REPORT IS ON THE FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.

DRAIN LINES REQUIRING SETTLEMENT

 \bigwedge

T.

MONITORING PRIOR TO CONSTRUCTION						
SETTLEMENT MONITORING	DRAIN LINE NO.	DRAIN LINE STATION NO.				
AREA NO.		BEGIN	END			
1	F1	0+00	0+63.7			
2	F1	0+63.7	2+93.8			
2	F2	0+00	0+53			
4	G1	1+63	5+23.1			
4	G5	0+00	0+53			
4	G6	0+00	0+40.8			
5	G1	0+00	0+33			
5	H1	0+00	1+22.9			
6	H1	3+73.2	4+21.2			
7	J1	42+93.4	51+19.5			
7	J3	0+00	1+80			
7	J4	0+00	0+46			
7	J6	0+00	0+48			

FED. ROAD DIST. NO.		FED. AID PROJ. NO.	FISCAL YEAR		TOTAL SHEETS
HAWAII HAW.		NH-050-1(31)	2009	ADD.340	452



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GEOLABS, INC.

Revised Table and Notes 1 and 2 REVISION

> STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

TYPICAL DRAIN LINE DETAILS OVER SOFT SOILS

KAUMUALII HIGHWAY WIDENING <u> Vicinity of Anonui Street to Vicinity of Lihue Mill Bridge</u> FEDERAL-AID PROJECT NO. NH-050-1(31)

Scale: NTS

SHEET No.G-5.02 OF G-5.02 SHEETS