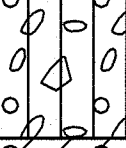
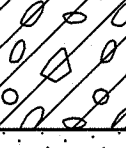
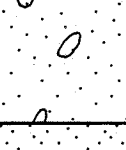
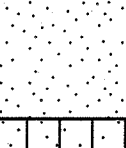
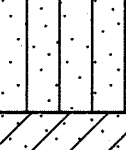
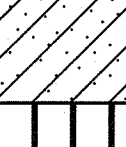
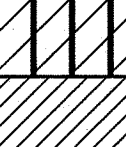
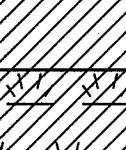
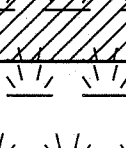


Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS		TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
		MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE	SANDS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
		MORE THAN 12% FINES		SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND

- 2-INCH O.D. STANDARD PENETRATION TEST
- 3-INCH O.D. MODIFIED CALIFORNIA SAMPLE
- SHELBY TUBE SAMPLE
- GRAB SAMPLE
- CORE SAMPLE

- 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, Kamehameha Highway Drainage Improvements, Vicinity of Kahuku Hospital and Replacement of Kii Bridge, Project No. NH-083-1(46), Koolauloa, Oahu, Hawaii" dated November 21, 2003 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 1.
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.

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

RODIN M. LIM
LICENSED PROFESSIONAL ENGINEER
No. 8436-C
HAWAII, U.S.A.

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

SIGNATURE

4-30-04
EXPIRATION DATE OF THE LICENSE
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND & NOTES

KAMEHAMEHA HIGHWAY DRAINAGE IMPROVEMENTS
Vicinity of Kahuku Hospital and Replacement of Kii Bridge
Federal Aid Project No. NH-083-1(46)
Date: April 2004

SHEET No. 2 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(46)	2002	70	89

GEOLABS, INC. Geotechnical Engineering						KAM. HWY. DRAINAGE IMPROV., VICINITY OF KAHUKU HOSP. & REPLACEMENT OF KII BRIDGE KOOLAULO, OAHU, HAWAII					Log of Boring 1
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): 14 *	
										Description	
LL=85 PI=53	17	97			69				SW	2.5-inch ASPHALTIC CONCRETE	
	21				17				GW	4-inch Whitish tan CORALLINE GRAVELLY SAND with silt, dense, dry (fill)	
									CH	Brownish orange with tan mottling CORALLINE SANDY GRAVEL in a clayey silt matrix, dense, moist (fill)	
	38	73			31	3.5	5		CH	Dark reddish brown SILTY CLAY with coralline sand and gravel, very stiff, moist (fill) grades with some cobbles	
									CH	Reddish brown with multi-color mottling SILTY CLAY with rounded coarse sand, hard (alluvium)	
									CH	Dark brown with gray mottling SILTY CLAY, soft to medium stiff (alluvium)	
									CH	Reddish orange with gray mottling SILTY CLAY with traces of organic material, medium stiff (alluvium)	
	48	66			36	2.5				grades to very stiff	
										grades to reddish brown with some very fine sand, hard	
										grades to stiff to very stiff	
										grades to stiff	
									CH	Brown with black mottling SILTY CLAY with some organic material, hard (alluvium)	
									CH	Brownish orange with black mottling SILTY CLAY, very stiff (alluvium)	
											
	57					16	2.0				
Date Started: August 15, 2002										Water Level: ∇ 7.3 ft. 8/16/02 1500 HRS	
Date Completed: August 16, 2002											
Logged By: Y. Chiba											
Total Depth: 102 feet											
Work Order: 4926-10(A) & (B)											
Drill Rig: CME-75G										Driving Energy: 140 lb. wt., 30 in. drop	
Drilling Method: 4" Auger, 5" Auger & PQ Coring											

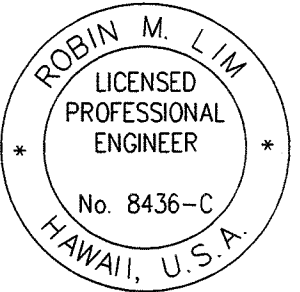
GEOLABS, INC. Geotechnical Engineering							KAM. HWY. DRAINAGE IMPROV., VICINITY OF KAHUKU HOSP. & REPLACEMENT OF KII BRIDGE KOOLAULO, OAHU, HAWAII					Log of Boring 1	
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	(Continued from previous plate)			
											Description		
	65	61			13	1.0	60		CH	grades to stiff			
	76				9	0.5	65			grades to medium stiff			
	66	60			26	2.5	70			grades to very stiff			
	33		100		40		75			Dark gray with multi-color mottling highly to extremely weathered BASALTIC COBBLES AND GRAVEL with sand and some clay, dense (older alluvium)			
	48		95		66		80						
	55		100		58		85			grades to dark gray			
	58		100		79		90		SC	Orangish brown with multi-color mottling CLAYEY SAND with rounded gravel and cobbles, very dense (older alluvium)			
	55		100		23/.5' +30/.3' Ref.		95			Dark gray with multi-color mottling highly to extremely weathered BASALTIC BOULDERS AND COBBLES in a clayey sand matrix, very dense (older alluvium)			
			100	0	20/.1' Ref.		100			Brownish gray with white and black mottling vesicular BASALT, closely fractured, highly to extremely weathered, hard (basalt formation)			
					10/.0' Ref.		105			Boring terminated at 102 feet			
							110			* Elevations estimated from Topographic Plan transmitted by Wesley R. Segawa & Associates, Inc. on September 13, 2002.			
Date Started: August 15, 2002							Water Level: ± 7.3 ft. 8/16/02 1500 HRS						
Date Completed: August 16, 2002													
Logged By: Y. Chiba							Drill Rig: CME-75G						
Total Depth: 102 feet							Drilling Method: 4" Auger, 5" Auger & PQ Coring						
Work Order: 4926-10(A) & (B)							Driving Energy: 140 lb. wt., 30 in. drop						

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-1(46)	2002	71	89

GEOLABS, INC. Geotechnical Engineering							KAM. HWY. DRAINAGE IMPROV., VICINITY OF KAHUKU HOSP. & REPLACEMENT OF KII BRIDGE KOOLAULOA, OAHU, HAWAII				Log of Boring 2	
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): 7.5 *		
										Description		
TV=0.3 tsf	13				92				SW-SM	5-inch ASPHALTIC CONCRETE		
	16				11					Tan GRAVELLY SAND with some clayey silt, very dense, damp (fill) grades to medium dense, wet grades to gray to brown with coralline and basaltic cobbles, dense		
	21	100			50/4'		5			CH	Gray-brown SILTY CLAY with traces of shell fragments, very soft (lagoonal)	
TV=0.4 tsf	74	57			3	0.3						
			100				10					
TV=0.2 tsf												
							15					
TV=1.1 tsf	42	82			48				CH	Brown CLAY, very stiff (alluvium)		
			100				20					
			58				25					
TV=1.0 tsf												
							30			GC	Tan-brown CORALLINE GRAVEL with some sand and clay, medium dense (coralline debris/reef detritus/alluvium)	
	21				24		35					
LL=105 PI=66 TV=0.9 tsf												
	18				24		40					
							45			CH	Tan-white CORAL, moderately fractured, slightly weathered, medium hard to hard (coral formation) Brown SILTY CLAY with coralline gravel, very stiff (alluvium)	
	49	69			40							
		100					50					
			27						MH-CH	Brown and gray CLAYEY SILT with coralline gravel and cobbles, very stiff (alluvium)		
							55					
Date Started: September 5, 2002							Water Level: ± 5 ft. 9/5/02 1500 HRS 4.8 ft. 9/6/02 0935 HRS					
Date Completed: September 6, 2002												
Logged By: S. Latronic							Drill Rig: CME-55					
Total Depth: 78.5 feet							Drilling Method: 4" Auger & PQ Coring					
Work Order: 4926-10(A) & (B)							Driving Energy: 140 lb. wt., 30 in. drop					

GEOLABS, INC. Geotechnical Engineering							KAM. HWY. DRAINAGE IMPROV., VICINITY OF KAHUKU HOSP. & REPLACEMENT OF KII BRIDGE KOOLAULOA, OAHU, HAWAII				Log of Boring 2	
Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	(Continued from previous plate)		
										Description		
UC=980 psf TV=0.6 tsf	62	60	62		37	3.0	55		MH- CH			
UC=990 psf	114	54	30		13	80	60		CH	Brown and gray SILTY CLAY with coralline cobbles and gravel, very stiff (alluvium)		
			65	grades to stiff with some organic material								
			70	grades to hard to very hard								
			75									
			78.5	grades to stiff								
			80	Boring terminated at 78.5 feet								
							85					
							90					
							95					
							100					
							105					
							110					
Date Started: September 5, 2002							Water Level: ± 5 ft. 9/5/02 1500 HRS					
Date Completed: September 6, 2002							4.8 ft. 9/6/02 0935 HRS					
Logged By: S. Latronic							Drill Rig: CME-55					
Total Depth: 78.5 feet							Drilling Method: 4" Auger & PQ Coring					
Work Order: 4926-10(A) & (B)							Driving Energy: 140 lb. wt., 30 in. drop					

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
NOTED BY	
CHECKED BY	
IN.	



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

SIGNATURE: *Robin M. Lim* EXPIRATION DATE OF THE LICENSE: 4-30-04
GEOLABS, INC.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG - 2

KAMEHAMEHA HIGHWAY DRAINAGE IMPROVEMENTS
Vicinity of Kahuku Hospital and Replacement of Kii Bridge
Federal Aid Project No. NH-083-1(46)

Date: April 2004

SHEET No. 4 OF 5 SHEETS

AS-BUILT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-083-II(46)	2002	72	89

GEOLABS, INC. Geotechnical Engineering							KAM. HWY. DRAINAGE IMPROV., VICINITY OF KAHUKU HOSP. & REPLACEMENT OF KII BRIDGE KOOLAULOA, OAHU, HAWAII							Log of Boring 3	
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): 7.5 *					
										Description					
UC=2190 psf	8				18				GW	5-inch ASPHALTIC CONCRETE					
	14	96			56				GM	Tan CORALLINE SANDY GRAVEL with silt, medium dense, damp (fill)					
	9		31		20/.5' +50/.2' Ref.		5		SM	Tan SILTY CORALLINE SAND with gravel, dense, moist (fill)					
										Brown to gray SILTY SAND, medium dense, moist (fill)					
									MH	BASALTIC AND CORALLINE COBBLES, loose (fill)					
	66				3		10			Dark gray SILTY CLAY with traces of shell fragments, very soft (lagoonal)					
	6	103			64		15			Tan to grayish white CORAL, severely fractured, slightly weathered, medium hard to hard (coral formation)					
			50												
	17				44		20								
			62												
			20												
	15	86			28		30		GM	Tan-brown SILTY CORALLINE GRAVEL with some clay, medium dense (coralline debris/reef detritus/alluvium)					
			43												
	44				18	2.5	35		CH	Brown SILTY CLAY with some coralline gravel, very stiff (alluvium)					
			52												
			35			2.8	40								
	52	64			25		45								
			24						GM	Tan-brown SILTY CORALLINE GRAVEL with some clay, medium dense (coralline debris/reef detritus/alluvium)					
	23				15		50								
		24					55								
Date Started: September 4, 2002							Water Level: 4.9 ft. 9/5/02 0840 HRS								
Date Completed: September 4, 2002							5.5 ft. 9/4/02 1245 HRS								
Logged By: S. Latronic							Drill Rig: CME-55								
Total Depth: 78 feet							Drilling Method: 4" Auger & PQ Coring								
Work Order: 4926-10(A) & (B)							Driving Energy: 140 lb. wt., 30 in. drop								

GEOLABS, INC. Geotechnical Engineering										KAM. HWY. DRAINAGE IMPROV., VICINITY OF KAHUKU HOSP. & REPLACEMENT OF KII BRIDGE KOOLAULOA, OAHU, HAWAII										Log of Boring 3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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