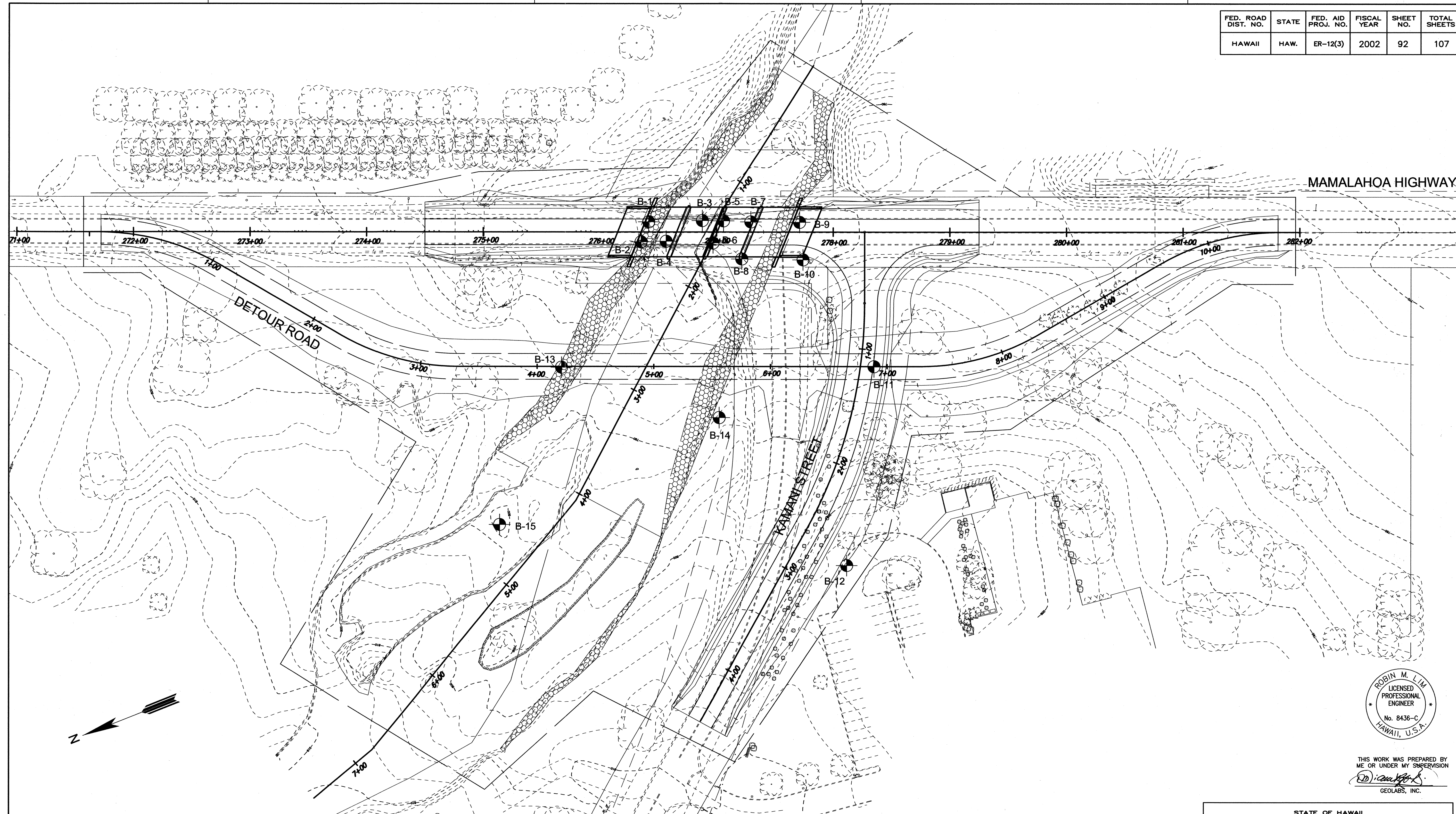


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(3)	2002	92	107



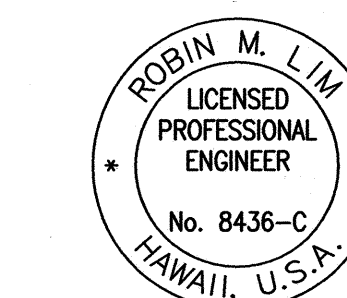
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ORIGINAL PLAN	DATE
NOTED BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
NO.	

LEGEND:

B-7  APPROXIMATE BORING LOCATION AND NUMBER

REFERENCE: GENERAL PLAN TRANSMITTED BY AKINAKA & ASSOCIATES ON FEBRUARY 15, 2001.



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 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

BORING LOCATION PLAN



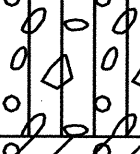

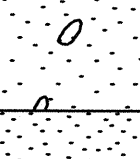
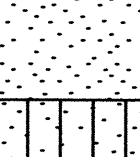
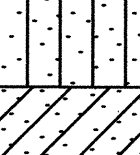
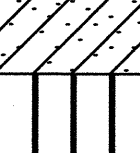
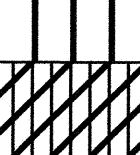
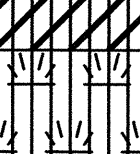
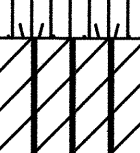
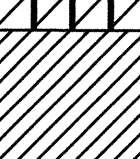
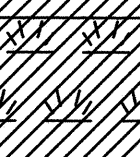
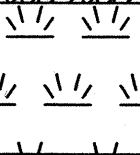

MAMALAHOA HIGHWAY
 EMERGENCY REPLACEMENT OF PAUUAU STREAM BRIDGE,
 IMPROVEMENTS AT KAMANI STREET, AND
 REHABILITATION OF VARIOUS BRIDGES
 FEDERAL AID PROJECT NO. ER-12(3)
 Scale: As shown Jan. 2002

SHEET NO. 1 OF 10 SHEETS

Boring Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(3)	2002	93	107

MAJOR DIVISIONS			USCS		TYPICAL DESCRIPTIONS	
COARSE-GRAINED SOILS	GRAVELS	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	
		MORE THAN 12% FINES		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	
	SANDS	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
		LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
		50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

LEGEND

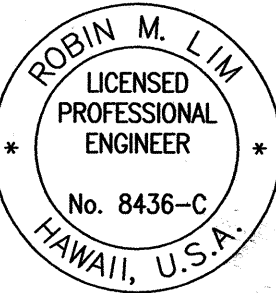


2-INCH O.D. STANDARD PENETRATION TEST
3-INCH O.D. MODIFIED CALIFORNIA SAMPLE
SHELBY TUBE SAMPLE
GRAB SAMPLE
CORE SAMPLE

LL LIQUID LIMIT
PI PLASTICITY INDEX
TV TORVANE SHEAR (tsf)
PEN POCKET PENETROMETER (tsf)
∇ WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

- A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Mamalahoa Highway, Emergency Replacement of Paaau Stream Bridge, Federal Aid Project No. ER-12(3), District of Kau, Island of Hawaii" dated April 2001 has been prepared by Geolabs, Inc. A copy of the report is on file at the office of the Engineer for review by the Contractor.
- For boring locations, see Sheet G1.
- The information presented in the logs of borings depict the subsurface conditions encountered at that specified location and at the time of the field exploration only. Variations of subsoil conditions from those depicted in the logs of borings may occur between and beyond the borings.
- The penetration resistance shown on the logs of borings indicate the number of blows required for the specific sampler type used. The blow counts may need to be factored to obtain the Standard Penetration Test (SPT) blow counts.
- The data given is for general information only. Bidders shall examine the site and the boring data and draw their own conclusions therefrom as to the character of materials to be encountered. The Engineer will not assume responsibility for variations of subsoil quality or conditions other than at the boring locations shown and at the time the borings were taken.



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LEGEND AND NOTES

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF PAAUUA STREAM BRIDGE,
IMPROVEMENTS AT KAMANI STREET, AND
REHABILITATION OF VARIOUS BRIDGES
FEDERAL AID PROJECT NO. ER-12(3)

Scale: As shown Jan. 2002



SHEET NO. 2 OF 10 SHEETS


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LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

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	DRAWN BY	
NOTEBOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

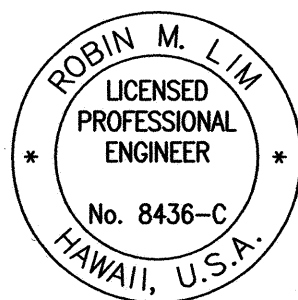
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LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTEBOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	
No.		

 GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF 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: 784*	
	6		75	21	33				ML- GM	Description	
UC=2.8 ksi										4-inch ASPHALT CONCRETE	
										Dark gray SANDY SILT AND BASALT GRAVEL, dense, dry to slightly damp (fill)	
							5			Dark gray vugular BASALT, closely fractured, slightly weathered, hard (basalt formation)	
			100	80			10			Dark gray vugular BASALT, slightly to moderately fractured, slightly weathered, very hard (basalt formation)	
			77	20			15			Gray vugular BASALT, closely to severely fractured, slightly weathered, medium hard to hard (basalt formation)	
			83	20			20			Gray to reddish brown BASALT, severely fractured, slightly to moderately weathered, medium hard (clinker)	
			80	35			25			Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation)	
							30			grades to vesicular	
							35			Reddish brown BASALT FRAGMENTS, severely fractured, slightly weathered, medium hard (clinker)	
			50	13			40			Gray vugular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)	
							45			Reddish brown BASALT FRAGMENTS, severely fractured, slightly weathered, medium hard (clinker)	
			80	40			50			Gray vesicular BASALT, closely fractured, moderately weathered, medium hard (basalt formation)	
										Reddish brown BASALT FRAGMENTS, severely fractured, slightly weathered, medium hard (clinker)	
			60	48						Gray vugular BASALT, slightly to moderately fractured, slightly weathered, very hard (basalt formation)	
										CLINKER SEAM	
									Boring terminated at 41.5 feet		
									* Elevations estimated from Project Plans by KAI Hawaii, Inc. dated January 2001.		
Date Started: January 3, 2001										Water Level: ∅	
Date Completed: January 3, 2001										Not Encountered	
Logged By: K. Gronseth										Drill Rig: MOBILE B-53	
Total Depth: 41.5 feet										Drilling Method: 4" Auger & HQ Coring	
Work Order: 4628-00										Driving Energy: 140 lb. wt., 30 in. drop	

 GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF 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: 784*	
										Description	
			50	20						4-inch ASPHALT CONCRETE	
							5			Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation)	
			100	85						Gray vugular BASALT, slightly to moderately fractured, slightly weathered, very hard (basalt formation)	
			100	83			10				
			60	0			15			Reddish gray vesicular BASALT, severely fractured, slightly weathered, medium hard (clinker)	
			60	18			20			VOID	
							25			Gray vesicular BASALT, moderately fractured, moderately weathered, hard (basalt formation)	
			60	0						Gray and reddish gray vesicular BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)	
			50	19			30				
							35			Gray vesicular BASALT, moderately fractured, slightly weathered, hard (basalt formation)	
			50	30						Brown and gray BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)	
							40			Gray vugular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)	
										Boring terminated at 41 feet	
							45				
							50				
Date Started: January 5, 2001										Water Level: ∅	
Date Completed: January 5, 2001										Not Encountered	
Logged By: K. Gronseth										Drill Rig: MOBILE B-53	
Total Depth: 41 feet										Drilling Method: HQ Coring	
Work Order: 4628-00										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.	ER-12(3)	2002	94	107





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GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
<u>BORING LOGS</u>
MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE, IMPROVEMENTS AT KAMANI STREET, AND REHABILITATION OF VARIOUS BRIDGES FEDERAL AID PROJECT NO. ER-12(3)
Scale: As shown Jan. 2002
SHEET NO. 3 OF 10 SHEETS

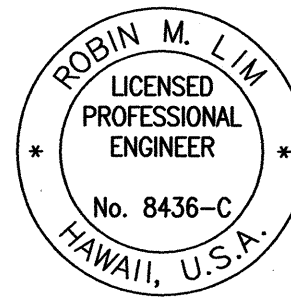
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	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
NOTEBOOK	QUANTITIES BY	
	CHECKED BY	
No.		

	GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF 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: 783*
											Description
											5-inch ASPHALT CONCRETE
											20-inch CONCRETE
											SPACE BELOW BRIDGE (AIR)
								5			
								10			Gray vugular BASALT, slightly fractured, slightly to unweathered, very hard (basalt formation)
			100	100				15			
			100	100							
								20			grades to closely fractured (vertically), slightly weathered
											grades to slightly fractured
			50	20				25			Reddish brown BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)
											VOIDS at 24.1 and 25.1 feet
			90	8							Gray vugular BASALT, moderately fractured, slightly weathered, hard (basalt formation)
								30			Gray and brown vesicular BASALT, closely to severely fractured, slightly weathered, medium hard (clinker)
			80	16							Gray vugular BASALT, closely to moderately fractured, slightly weathered, hard to very hard (basalt formation)
								35			Gray to reddish gray vesicular BASALT, severely fractured, moderately weathered, medium hard to hard (basalt formation with clinker seams)
			60	6				40			VOID
								45			Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation)
								50			Boring terminated at 43.1 feet
Date Started: January 12, 2001						Water Level: ∅					
Date Completed: January 12, 2001						Not Encountered					
Logged By: K. Gronseth						Drill Rig: MOBILE B-53					
Total Depth: 43.1 feet						Drilling Method: HQ Coring					
Work Order: 4628-00						Driving Energy: 140 lb. wt., 30 in. drop					

	GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII		Log of Boring 4						
	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: 783*
											Description
											5-inch ASPHALT CONCRETE
											20-inch CONCRETE
											SPACE BELOW BRIDGE (AIR)
								5			
								10			Gray vugular BASALT, slightly fractured, unweathered, very hard (basalt formation)
				100	80			15			
								20			Reddish brown BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)
											Gray vesicular BASALT, closely fractured, slightly weathered, hard (clinker)
								25			Gray vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)
								30			Gray vesicular BASALT, closely to severely fractured, moderately weathered, medium hard (basalt formation with many clinker seams)
								35			
								40			Boring terminated at 38.2 feet
								45			
								50			
Date Started: January 13, 2001						Water Level: ∅					
Date Completed: January 13, 2001						Not Encountered					
Logged By: K. Gronseth						Drill Rig: MOBILE B-53					
Total Depth: 38.2 feet						Drilling Method: HQ Coring					
Work Order: 4628-00						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.	ER-12(3)	2002	95	107





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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<u>BORING LOGS</u>	
MAMALAHOA HIGHWAY	
EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE, IMPROVEMENTS AT KAMANI STREET, AND REHABILITATION OF VARIOUS BRIDGES FEDERAL AID PROJECT NO. ER-12(3)	
Scale: As shown	Jan. 2002
SHEET NO. 4 OF 10 SHEETS	

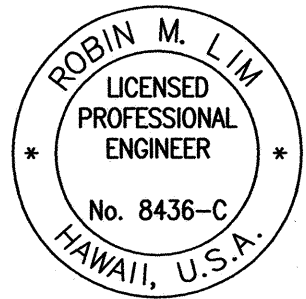
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LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

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NOTED	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	
No.		

		GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII										Log of Boring 5	
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: 783*					
										Description					
UC=4.0 ksi			60	13			5			4-inch ASPHALT CONCRETE					
										Gray and brown vugular BASALT, closely to severely fractured, slightly weathered, hard (basalt formation with clinker seams)					
			93	52						Gray vugular BASALT, slightly fractured, unweathered, very hard (basalt formation)					
			100	90						Reddish brown BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)					
			60	30						Gray vesicular BASALT, closely to moderately fractured, slightly weathered, hard (basalt formation with thin clinker seams)					
			68	25						Reddish gray to gray vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
			70	18						Gray vugular BASALT, closely fractured, slightly weathered, hard (basalt formation)					
			60	8						Gray vugular BASALT, moderately fractured, slightly weathered, hard to very hard (basalt formation)					
			40	17						Reddish brown BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)					
										Boring terminated at 41 feet					
Date Started: January 3, 2001										Water Level: ∅					
Date Completed: January 3, 2001										Not Encountered					
Logged By: K. Gronseth										Drill Rig: MOBILE B-53					
Total Depth: 41 feet										Drilling Method: 4" Auger & HQ Coring					
Work Order: 4628-00										Driving Energy: 140 lb. wt., 30 in. drop					

		GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII										Log of Boring 6	
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: 783*					
										Description					
4					29		5		ML	4-inch ASPHALT CONCRETE					
										Dark gray GRAVELLY SANDY SILT, very stiff, very damp to slightly moist (fill)					
										Gray strongly vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
										Gray vugular BASALT, closely fractured, slightly weathered, hard (basalt formation)					
										Gray massive, vugular BASALT, moderately to slightly fractured, slightly weathered, very hard (basalt formation)					
										Gray vesicular BASALT, closely to moderately fractured, slightly weathered, hard (basalt formation with thin clinker seams)					
										Reddish brown BASALT FRAGMENTS, severely fractured, moderately weathered, medium hard (clinker)					
										Brownish gray vesicular BASALT, closely fractured, moderately weathered, hard (basalt formation)					
										Brown and gray vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
										Gray vugular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)					
Date Started: January 3, 2001										Water Level: ∅					
Date Completed: January 3, 2001										Not Encountered					
Logged By: K. Gronseth										Drill Rig: MOBILE B-53					
Total Depth: 41 feet										Drilling Method: 4" Auger & HQ Coring					
Work Order: 4628-00										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.	ER-12(3)	2002	96	107









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GEOLABS, INC.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<u>BORING LOGS</u>	
MAMALAHOA HIGHWAY	
EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE, IMPROVEMENTS AT KAMANI STREET, AND REHABILITATION OF VARIOUS BRIDGES FEDERAL AID PROJECT NO. ER-12(3)	
Scale: As shown	Jan. 2002
SHEET NO. 5 OF 10 SHEETS	

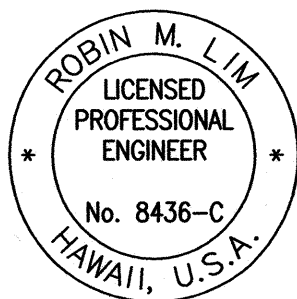
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CURRENT TIME: Mar 26, 2002 - 6:12pm
LAST SAVED BY: SCALE: 1=1
LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
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	QUANTITIES BY	
NOTEBOOK	CHECKED BY	
	No.	

		GEOLABS, INC. Geotechnical Engineering							EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII				Log of Boring 7	
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: 782*				
										Description				
UC=1.6 ksi	8				17				ML	4-inch ASPHALT CONCRETE				
	7				13		5			Dark gray SANDY SILT with gravel, stiff to very stiff, damp to slightly moist (fill)				
			93	93						Gray vugular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)				
			100	55			10							
							15							
			53	28			20			Reddish gray vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)				
			100	48						Gray vugular BASALT, moderately fractured, slightly weathered, hard (basalt formation)				
			100	53			25			Reddish gray vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)				
							30			Gray vugular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)				
			70	8						Gray vugular BASALT, closely fractured, slightly weathered, hard (basalt formation)				
		100	60			35				Gray vesicular BASALT, closely to severely fractured, slightly weathered, medium hard to hard (clinker)				
						40				Gray vugular BASALT, slightly fractured, slightly weathered, very hard (basalt formation) grades to moderately weathered at 39 feet				
										Boring terminated at 41.5 feet				
							45							
							50							
Date Started: January 4, 2001									Water Level: ∅					
Date Completed: January 4, 2001									Not Encountered					
Logged By: K. Gronseth									Drill Rig: MOBILE B-53					
Total Depth: 41.5 feet									Drilling Method: 4" Auger & HQ Coring					
Work Order: 4628-00									Driving Energy: 140 lb. wt., 30 in. drop					

		GEOLABS, INC. Geotechnical Engineering					EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII				Log of Boring 8				
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: 782*					
										Description					
	20				18				ML	7-inch ASPHALT CONCRETE					
							5			Orange-brown SANDY SILT with basalt gravel, very stiff, damp to very damp (fill)					
			100	0						Gray vugular BASALT, closely fractured, slightly weathered, very hard (basalt formation)					
			100	30						Gray vugular BASALT, slightly fractured, slightly weathered, very hard (basalt formation)					
			100	95						VOID					
			30	0						Reddish gray vesicular BASALT, severely fractured, moderately weathered, medium hard (clinker)					
			47	0	50/.3'					Gray and brown vugular BASALT, closely fractured, slightly to moderately weathered, hard (basalt formation with thin clinker seams)					
			93	0											
			22	13						Gray vugular BASALT, moderately fractured, slightly weathered, very hard (basalt formation)					
			100	57	50/.4'					Boring terminated at 42 feet					
										45					
										50					
Date Started: January 6, 2001										Water Level: ∅					
Date Completed: January 6, 2001										Not Encountered					
Logged By: K. Gronseth										Drill Rig: MOBILE B-53					
Total Depth: 42 feet										Drilling Method: 4" Auger & HQ Coring					
Work Order: 4628-00										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.	ER-12(3)	2002	97	107



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS

MAMALAHOA HIGHWAY
EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE,
IMPROVEMENTS AT KAMANI STREET, AND
REHABILITATION OF VARIOUS BRIDGES
FEDERAL AID PROJECT NO. ER-12(3)

Scale: As shown Jan. 2002

SHEET NO. 6 OF 10 SHEETS


BORING LOG DOT 4628-00.GPJ GEOLABS.GDT 3/2/01CORRORING LOG DOT 4628-00.GPJ GEOLABS.GDT 3/2/01


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SHEET NO. 7 OF 10 SHEETS

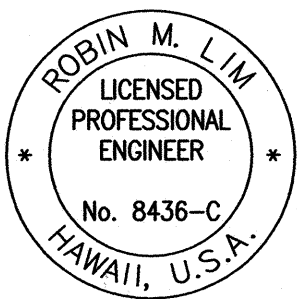
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LAST SAVED BY:
LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

ORIGINAL PLAN	DATE	
NOTED	BY	
DESIGNED BY		
QUANTITIES BY		
CHECKED BY		
No.		

		GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII										Log of Boring 11	
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: 789*					
										Description					
			20	0					ML	Brown GRAVELLY SILT, loose, damp (fill)					
							5			Gray BASALT FRAGMENTS, severely fractured, slightly weathered, medium hard (clinker)					
			100	45	50/2'					Gray vugular BASALT, slightly to moderately fractured, slightly weathered, hard to very hard (basalt formation)					
			100	70			10								
							15			VOID					
			100	60						Grayish red vesicular BASALT, moderately fractured, slightly to moderately weathered, medium hard (clinker)					
							20			Gray vugular BASALT, slightly to moderately fractured, slightly weathered, hard (basalt formation)					
										grades to very hard					
										Boring terminated at 21 feet					
Date Started: February 6, 2001												Water Level: ∞			
Date Completed: February 6, 2001												Not Encountered			
Logged By: K. Gronseth												Drill Rig: MOBILE B-53			
Total Depth: 21 feet												Drilling Method: 4" Auger & HQ Coring			
Work Order: 4628-00												Driving Energy: 140 lb. wt., 30 in. drop			

		GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII										Log of Boring 12	
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: 804*					
										Description					
	14	84			34				ML	1.5-inch ASPHALT CONCRETE					
	2				10				GP-GM	Brown mottled black and orange GRAVELLY SILT, very stiff, damp (fill)					
	13	114	100	70	30/.1'		5			Gray-brown SILTY BASALT GRAVEL with sand, loose, damp (clinker)					
			83	20						Gray vesicular BASALT, slightly fractured, slightly weathered, hard (basalt formation)					
			80	68			10			Gray vugular BASALT, slightly to moderately fractured, slightly weathered, hard to very hard (basalt formation)					
			78	40			15			Grayish red vesicular BASALT, closely to severely fractured with multiple small voids, slightly to moderately weathered, medium hard (clinker)					
							20			Gray with red vesicular BASALT, closely to moderately fractured with small voids, slightly weathered, medium hard (basalt formation)					
										Boring terminated at 22 feet					
Date Started: February 7, 2001												Water Level: ∞			
Date Completed: February 7, 2001												Not Encountered			
Logged By: K. Gronseth												Drill Rig: MOBILE B-53			
Total Depth: 22 feet												Drilling Method: 4" Auger & HQ Coring			
Work Order: 4628-00												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.	ER-12(3)	2002	99	107





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Robin M. Lim
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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<u>BORING LOGS</u> MAMALAHOA HIGHWAY EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE, IMPROVEMENTS AT KAMANI STREET, AND REHABILITATION OF VARIOUS BRIDGES FEDERAL AID PROJECT NO. ER-12(3) Scale: As shown Jan. 2002 SHEET NO. 8 OF 10 SHEETS	

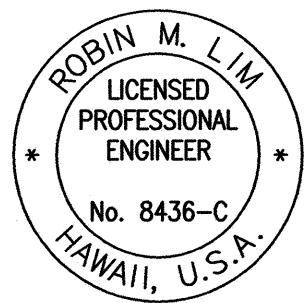
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LAST SAVED BY:
LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
NOTEBOOK	CHECKED BY	
	No.	

	GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII		Log of Boring 13							
	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): 793 *	Description
UC=13.0 ksi UC=13.2 ksi	12					50/.2' 41 15				SM- GM		Brown SILTY SAND with basalt rock fragments, medium dense, dry (fill)
	11					21		5		SM		Orangish brown SILTY SAND with some basalt gravel, medium dense, damp (volcanic ash)
	11		79	79		20/.0' Ref.						Gray vesicular BASALT, slightly fractured, slightly weathered, hard to very hard (basalt formation)
								10				grades to vugular, closely to moderately fractured
								15				Reddish gray scoriaceous BASALT, severely to closely fractured, moderately weathered, soft to medium hard (clinker)
				82	40							VOID/CAVITY
								20				Gray vugular BASALT, closely fractured, slightly weathered, medium hard (basalt formation) grades to vesicular, severely fractured
												Boring terminated at 20 feet
								25				
								30				
								35				
								40				
								45				
								50				
Date Started: April 2, 2001											Water Level: ∇ Not Encountered	
Date Completed: April 2, 2001												
Logged By: G. Barut											Drill Rig: CONCORE	
Total Depth: 20 feet											Drilling Method: 4" Auger & NX Coring	
Work Order: 4628-00											Driving Energy: 140 lb. wt., 30 in. drop	

	GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII		Log of Boring 14							
	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): 792 *	Description
UC=3.2 ksi UC=3.3 ksi	32	58				26				ML		Dark brown SANDY SILT with traces of gravel and roots, medium stiff, damp to moist (alluvium/fill)
	67					7						
	7					27						
			95	80		60/.9' Ref. 25/.0' Ref.		5		ML		Orangish brown SANDY SILT with traces of gravel, stiff, moist (volcanic ash)
												Gray vugular BASALT, closely to moderately fractured, slightly weathered, hard to very hard (basalt formation)
								10				grades to severely fractured grades to closely fractured
								15				Reddish brown BASALT FRAGMENTS, moderately weathered, soft to medium hard (clinker with small voids)
								20				Gray vugular BASALT, slightly fractured, unweathered, very hard (basalt formation)
												Boring terminated at 21.9 feet
								25				
								30				
								35				
								40				
								45				
								50				
Date Started: April 3, 2001											Water Level: ∇ Not Encountered	
Date Completed: April 4, 2001												
Logged By: G. Barut											Drill Rig: CONCORE	
Total Depth: 21.9 feet											Drilling Method: 4" Auger & NX Coring	
Work Order: 4628-00											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.	ER-12(3)	2002	100	107




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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<u>BORING LOGS</u>	
MAMALAHOA HIGHWAY	
EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE, IMPROVEMENTS AT KAMANI STREET, AND REHABILITATION OF VARIOUS BRIDGES FEDERAL AID PROJECT NO. ER-12(3)	
Scale: As shown	Jan. 2002
SHEET NO. 9 OF 10 SHEETS	

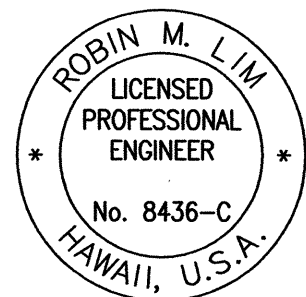
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LAST SAVED BY:
LAST MODIFIED: Tue, 22 Jan 2002 - 6:18pm

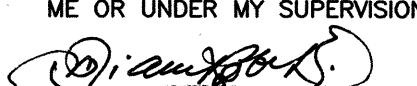
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	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	
NOTEBOOK	QUANTITIES BY	
	CHECKED BY	
No.		

BORING LOG DOT 4628-00P1 GEOLABS.GDT 4/1/01

	GEOLABS, INC. Geotechnical Engineering		EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE DISTRICT OF KAU, ISLAND OF HAWAII		Log of Boring 15					
	Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS
UC=3.0 ksi	27	64				21			ML	Dark brown SANDY SILT, medium stiff, moist (alluvium)
	17		94	65		21			SM	Brown mottled orange SILTY FINE SAND with basalt rock fragments, loose to medium dense, moist (alluvium)
UC=1.8 ksi								5		Gray vesicular BASALT, closely fractured, slightly weathered, medium hard (clinker)
										Dark gray vesicular BASALT, slightly fractured, unweathered, very hard (basalt formation)
								10		small void at 8 feet Dark gray vugular BASALT, slightly fractured, unweathered, very hard (basalt formation)
								15		Grayish red strongly vesicular BASALT, severely fractured, slightly weathered, hard (clinker)
										Dark gray with some red coloration vugular BASALT, slightly fractured, unweathered, hard to very hard (basalt formation)
								20		Boring terminated at 20 feet
								25		
								30		
								35		
								40		
								45		
								50		
Date Started:		March 28, 2001			Water Level: ∅		Not Encountered			
Date Completed:		March 30, 2001			Drill Rig:		CONCORE			
Logged By:		K. Gronseth			Drilling Method:		4" Auger & NX Coring			
Total Depth:		20 feet			Driving Energy:		140 lb. wt., 30 in. drop			
Work Order:		4628-00								

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER-12(3)	2002	101	107



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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
<u>BORING LOGS</u>	
MAMALAHOA HIGHWAY	
EMERGENCY REPLACEMENT OF PAAUUAU STREAM BRIDGE, IMPROVEMENTS AT KAMANI STREET, AND REHABILITATION OF VARIOUS BRIDGES FEDERAL AID PROJECT NO. ER-12(3)	
Scale: As shown	Jan. 2002
SHEET NO. 10 OF 10 SHEETS	