FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1E-01-11M	2012	46	49

LEGEND:

Approximate Boring Location

TRUE NORTH
SCALE: 1"=20'

Aiea Shopping Center

TMK: 9-9-042: 059

TMK: 9-9-042: 057

TMK: 9-9-042: 034

TMK: 9-9-042: 027

TMK: 9-9-042: 029

TMK: 9-9-042: 030

H-1 FREEWAY

Laka Place

AIEA STREAM

Slope Repair Area

B-1 B-2 B-3

305+00 305+50 306+00 306+50 304+50

1"=20' 20 0 20 40
SCALE IN FEET

ORIGINAL PLAN	SURVEY PLOTTED BY ____ DATE ____
	DRAWN BY ____
NOTE BOOK	TRACED BY ____
	DESIGNED BY ____
	QUANTITIES BY ____
	CHECKED BY ____
	No. ____

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 04/30/12 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOCATION PLAN

INTERSTATE ROUTE H-1
AIEA STREAM EROSION CONTROL
Project No. H1E-01-11M

Scale: 1"=20' Date: September 2011

SHEET No. BL-1 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1E-01-11M	2012	47	49

GEOLABS, INC.
Geotechnical Engineering

Soil Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS (MORE THAN 50% OF MATERIAL RETAINED ON NO. 200 SIEVE)	GRAVELS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (MORE THAN 12% FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (50R MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE)	CLEAN SANDS (LESS THAN 5% FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		FINES (MORE THAN 12% FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS (50R MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE)	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
	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	LL	LIQUID LIMIT (NP=NON-PLASTIC)
	(3-INCH) O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX (NP=NON-PLASTIC)
S	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)
G	GRAB SAMPLE	PEN	POCKET PENETROMETER (tsf)
	CORE SAMPLE	UC	UNCONFINED COMPRESSION (psi)
	WATER LEVEL OBSERVED IN BORING	UU	UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

Plate A-0.1

LOG LEGEND FOR SOIL 5395-00(D).GPJ GEOLABS.GDT 6/28/10

GEOLABS, INC.
Geotechnical Engineering

Rock Log Legend

ROCK DESCRIPTIONS

	BASALT		FINGER CORAL
	BOULDERS		LIMESTONE
	BRECCIA		SANDSTONE
	CLINKER		SILTSTONE
	COBBLES		TUFF
	CORAL		VOID/CAVITY

ROCK DESCRIPTION SYSTEM

ROCK FRACTURE CHARACTERISTICS

The following terms describe general fracture spacing of a rock:

Massive:	Greater than 24 inches apart
Slightly Fractured:	12 to 24 inches apart
Moderately Fractured:	6 to 12 inches apart
Closely Fractured:	3 to 6 inches apart
Severely Fractured:	Less than 3 inches apart

DEGREE OF WEATHERING

The following terms describe the chemical weathering of a rock:

Unweathered:	Rock shows no sign of discoloration or loss of strength.
Slightly Weathered:	Slight discoloration inwards from open fractures.
Moderately Weathered:	Discoloration throughout and noticeably weakened though not able to break by hand.
Highly Weathered:	Most minerals decomposed with some corestones present in residual soil mass. Can be broken by hand.
Extremely Weathered:	Saprolite. Mineral residue completely decomposed to soil but fabric and structure preserved.

HARDNESS

The following terms describe the resistance of a rock to indentation or scratching:

Very Hard:	Specimen breaks with difficulty after several "pinging" hammer blows. Example: Dense, fine grain volcanic rock
Hard:	Specimen breaks with some difficulty after several hammer blows. Example: Vesicular, vugular, coarse-grained rock
Medium Hard:	Specimen can be broked by one hammer blow. Cannot be scraped by knife. SPT may penetrate by ~25 blows per inch with bounce. Example: Porous rock such as clinker, cinder, and coral reef
Soft:	Can be indented by one hammer blow. Can be scraped or peeled by knife. SPT can penetrate by ~100 blows per foot. Example: Weathered rock, chalk-like coral reef
Very Soft:	Crumbles under hammer blow. Can be peeled and carved by knife. Can be indented by finger pressure. Example: Saprolite

Plate A-0.2

LOG LEGEND FOR ROCK 5395-00(D).GPJ GEOLABS.GDT 6/28/10

GEOTECHNICAL NOTES

1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Aiea Stream Bank Erosion, Aiea, Oahu, Hawaii" dated June 30, 2010 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 BL-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.
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.

SURVEY PLOTTED BY ____ DATE
DRAWN BY . . . . .
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

ORIGINAL PLAN | NOTE BOOK | No.

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE | 04/30/12 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND & NOTES

INTERSTATE ROUTE H-1
AIEA STREAM EROSION CONTROL
Project No. HIE-01-11M

Scale: NTS Date: September 2011

SHEET No. BL-2 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1E-01-11M	2012	48	49

GEOLABS, INC.
Geotechnical Engineering

AIEA STREAM BANK EROSION
AIEA, OAHU, HAWAII

Log of Boring 1

Approximate Ground Surface Elevation (feet MSL): 58 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	41	72			34	>4.5				GP	3-inch ASPHALTIC CONCRETE
										SW	Gray GRAVEL (fill)
LL=60 PI=26	45				15	2.0				MH	Grayish tan GRAVELLY SAND (CORALLINE), medium dense, damp (fill)
Direct Shear	30	90			43	>4.5	5				Brown CLAYEY SILT with some fine sand, very stiff, moist (alluvium)
											grades to stiff at 2.5 feet
	29				50	>4.5	10			CH	grades with some gravel, hard at 5 feet
										CH	Brown with gray CLAY with some sand and cobbles, very hard, moist (alluvium)
	21	104			94	>4.2	15				Brown and gray SILTY CLAY with gravel, cobbles, and boulders, very hard, moist (alluvium)
	33				54	>4.5	20				
					10/0" Ref.		25				
	31				52		30				
											Gray vesicular BASALT, severely to moderately fractured, moderately weathered, very hard
UC= 9322 psi			100	48	10/0" Ref.		35				
UC= 5889 psi			77	27			40				Tannish gray CLINKER, severely fractured, highly weathered, medium hard
UC= 6021 psi							45				Reddish gray vesicular BASALT, closely fractured, moderately to highly weathered, medium hard to hard
							50				Boring terminated at 46 feet
							55				
							60				* Elevations estimated from Topographic Survey Map transmitted by PB Americas on 2/18/10.
							65				
							70				
							75				

Date Started:	February 19, 2010	Water Level: ▽	Not Encountered
Date Completed:	February 19, 2010		
Logged By:	D. Gremminger	Drill Rig:	CME-45
Total Depth:	46 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	5395-00(D)	Driving Energy:	140 lb. wt.,30 in. drop

GEOLABS, INC.
Geotechnical Engineering

AIEA STREAM BANK EROSION
AIEA, OAHU, HAWAII

Log of Boring 2

Approximate Ground Surface Elevation (feet MSL): 62 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
	28	91			76	>4.5				MH	2-inch ASPHALTIC CONCRETE
	50				49					CH	Brown GRAVELLY SILT with clay and sand, very stiff, damp (fill)
Direct Shear	32	76			42	>4.5	5			ML	Brown SILTY CLAY with some weathered gravel, very hard, damp (alluvium)
										CH-CL	Light brown SANDY SILT with clay, hard, dry (alluvium)
LL=50 PI=24	29				43	3.0	10				Brown SILTY CLAY with some gravel, cobbles, and boulders, hard, damp (alluvium)
Direct Shear	31	88			64	>4.5	15				grades to very hard
LL=53 PI=22	20				53	>4.5	20			MH	Orangish brown GRAVELLY SILT with clay and some sand and cobbles, very hard, moist (alluvium)
	18	92			26/3"	>4.5	25				COBBLES AND BOULDERS (BASALTIC) (alluvium)
LL=55 PI=21	32				71	>4.5	30			MH	Brown with gray mottling SILTY CLAY with sand and some weathered gravel, very hard, damp (alluvium)
	32	88			44/6" +28/3"	>4.5	35				
	32				26	3.5	40				grades to very stiff, wet
Direct Shear	50	72			53	4.0	45				grades to hard
	46				37/4"		50				grades to very hard
											Boring terminated at 50.8 feet
							55				
							60				
							65				
							70				
							75				

Date Started:	February 17, 2010	Water Level: ▽	43.0 ft. 02/18/2010 1218 HRS
Date Completed:	February 18, 2010		
Logged By:	D. Gremminger	Drill Rig:	CME-45
Total Depth:	50.8 feet	Drilling Method:	4" Auger
Work Order:	5395-00(D)	Driving Energy:	140 lb. wt.,30 in. drop

BORING LOG DOT 5395-00(D) GEOLABS.GDT 4/29/10

ORIGINAL PLAN SIZE: 24" x 36"
SURVEY PLOTTED BY ____ DATE
DRAWN BY ____
TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____
NOTE BOOK ____ No. ____

GERALD Y. SEKI
LICENSED PROFESSIONAL ENGINEER
No. 5635-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE ____ 04/30/12 EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 1

INTERSTATE ROUTE H-1
AIEA STREAM EROSION CONTROL
Project No. H1E-01-11M

Scale: NTS Date: September 2011

SHEET No. BL-3 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1E-01-11M	2012	49	49

GEOLABS, INC.
Geotechnical Engineering

AIEA STREAM BANK EROSION
AIEA, OAHU, HAWAII

Log of Boring 3

Approximate Ground Surface Elevation (feet MSL): 62 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
										MH	2-inch ASPHALTIC CONCRETE
	30	76			32	3.0				MH	Orangish brown CLAYEY SILT with some sand and gravel, medium stiff to stiff, damp (fill)
LL=55 PI=24	12				47	2.5					
Direct Shear	37	69			43	>4.5	5				Brown CLAYEY SILT, very stiff, damp (alluvium) grades to hard at 2.5 feet grades with fine sand and some gravel at 5 feet
	29				37	4.0	10			MH	Grayish brown CLAYEY SILT with sand, gravel, cobbles, and some boulders, very stiff, moist (alluvium)
	21	80			36/5"		15			CH	Gray-brown CLAY with sand, gravel, and cobbles, very hard, moist (alluvium)
	21				41/6" +10/1"	3.5	20				BOULDERS (BASALTIC)
	23	92			90	>4.5	25			CH	Brown with gray mottling CLAY, very hard, moist (alluvium)
	34				27	2.5	30				grades to very stiff
Direct Shear	31	88			87	>4.5	35			CH	Brown with gray mottling SILTY CLAY, very hard, moist (alluvium)
	36				21	1.5	40			MH	Brown CLAYEY SILT with sand, very stiff, moist (alluvium)
	38	83			41	3.0	45				grades with weathered gravel, hard
	36				43	4.0	50				Boring terminated at 51.5 feet
							55				
							60				
							65				
							70				
							75				

Date Started:	February 17, 2010	Water Level: ▽	49.0 ft. 02/17/2010 1329 HRS
Date Completed:	February 17, 2010		
Logged By:	D. Gremminger	Drill Rig:	CME-45
Total Depth:	51.5 feet	Drilling Method:	4" Auger
Work Order:	5395-00(D)	Driving Energy:	140 lb. wt.,30 in. drop

BORING_LOG_DOT_5395-00(D).GPJ GEOLABS.GDT 2/26/10

SURVEY PLOTTED BY ____ DATE
DRAWN BY .....
TRACED BY .....
DESIGNED BY .....
QUANTITIES BY .....
CHECKED BY .....
ORIGINAL PLAN
NOTE BOOK
No.

GERALD Y. SEKI
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SIGNATURE 04/30/12 EXPIRATION DATE OF THE LICENSE

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HIGHWAYS DIVISION

BORING LOGS - 2

INTERSTATE ROUTE H-1
AIEA STREAM EROSION CONTROL
Project No. H1E-01-11M

Scale: NTS Date: September 2011

SHEET No. BL-4 OF 4 SHEETS