FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(125)	2011	28	55

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
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	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
	50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	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	LL	LIQUID LIMIT
	3-INCH O.D. MODIFIED CALIFORNIA SAMPLE	PI	PLASTICITY INDEX
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

GEOTECHNICAL NOTES

1. A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Castle Hills Access Road, Drainage Improvements, Project No. HWY-0-04-98, Kaneohe, Oahu, Hawaii" dated April 29, 2009 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 11.
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.

ORIGINAL PLAN | NOTE BOOK | No.

SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

CLAYTON S. MIMURA LICENSED PROFESSIONAL ENGINEER No. 4176-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

GEOLABS, INC. APRIL 30, 2012 LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOG LEGEND & NOTES

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
FEDERAL-AID PROJECT NO. STP-0300(125)

Scale: As Shown Date: December 2011

SHEET No. G.1 OF G.4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(125)	2011	29	55

GEOLABS, INC.
Geotechnical Engineering

CASTLE HILLS ACCESS ROAD
DRAINAGE IMPROVEMENTS
PROJECT NO. HWY-0-04-98
KANEOHE, OAHU, HAWAII

Log of Boring 1

Approximate Ground Surface Elevation (feet MSL): 182 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	41	55			25			MH	Brown CLAYEY SILT with traces of highly weathered gravel and sand (basaltic), medium stiff, moist (fill)
	47				8				
LL=99 PI=63	110	38			2	0.0	5	OH	Grayish brown CLAY with traces of roots and organic matter, very soft (peat)
	125				2		10		
	226	22			3		15		
	53				4		20	SM	Dark gray SILTY SAND with some weathered gravel (basaltic), loose (alluvium)
	25				12		25		grades to loose to medium dense
	53				11		30	SW	Dark gray SAND with traces of weathered gravel (basaltic), loose to medium dense (alluvium)
							35		

Date Started:	July 9, 2001	Water Level: ▽	6.3 ft. 07/09/2001 1310 HRS
Date Completed:	July 11, 2001		
Logged By:	E. Shinsato	Drill Rig:	CONCORE
Total Depth:	81.5 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4515-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4515-00.PJ GEOLABS.GDT 4/30/11

GEOLABS, INC.
Geotechnical Engineering

CASTLE HILLS ACCESS ROAD
DRAINAGE IMPROVEMENTS
PROJECT NO. HWY-0-04-98
KANEOHE, OAHU, HAWAII

Log of Boring 1

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	USCS	Description
	70				8			SW	grades to orange-brown with black and gray mottling with some sub-rounded gravel, loose
	32				12		40		grades to dark grayish brown, loose to medium dense
	42				8		45		grades to orange-grayish brown
LL=107 PI=72	37	75			13	0.8	50	CH	Orange-grayish brown CLAY with traces of highly weathered gravel and fine sand (basaltic), medium stiff (residual soil)
	95				13	0.8	55		grades to orange-brown with black and gray mottling, stiff
	75	54			48		60		grades to very stiff
								SW-SM	Grayish brown with red mottling SAND with silt and highly weathered gravel (basaltic), medium dense (residual soil)
	78				15		65		grades to orange-brown with gray seams
							70		

Date Started:	July 9, 2001	Water Level: ▽	6.3 ft. 07/09/2001 1310 HRS
Date Completed:	July 11, 2001		
Logged By:	E. Shinsato	Drill Rig:	CONCORE
Total Depth:	81.5 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4515-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4515-00.PJ GEOLABS.GDT 4/30/11

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

CLAYTON S. MIMURA
LICENSED PROFESSIONAL ENGINEER
No. 4176-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

GEOLABS, INC. — APRIL 30, 2012 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 1

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
FEDERAL-AID PROJECT NO. STP-0300(125)

Scale: As Shown — Date: December 2011

SHEET No. G.2 OF G.4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(125)	2011	30	55

GEOLABS, INC.
Geotechnical Engineering

CASTLE HILLS ACCESS ROAD
DRAINAGE IMPROVEMENTS
PROJECT NO. HWY-0-04-98
KANEOHE, 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
	53	69			23				SW-SM	
	21				35		75		GM	Grayish brown with orange-brown seams SILTY GRAVEL (BASALTIC), medium dense to dense
	48	77			64		80			
										Boring terminated at 81.5 feet * Elevations estimated from Topographic Map provided by ParEn, Inc. dated May 25, 2005.
							85			
							90			
							95			
							100			
							105			

BORING LOG DOT 4515-00.PJ GEOLABS.GDT 4/30/11

Date Started:	July 9, 2001	Water Level: ▽	6.3 ft. 07/09/2001 1310 HRS
Date Completed:	July 11, 2001		
Logged By:	E. Shinsato	Drill Rig:	CONCORE
Total Depth:	81.5 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4515-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

CASTLE HILLS ACCESS ROAD
DRAINAGE IMPROVEMENTS
PROJECT NO. HWY-0-04-98
KANEOHE, 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): 173 * Description
									MH	Brown CLAYEY SILT with some gravel and sand, soft, moist
	40	75			8	0.8			CH	Brown with multi-color mottling CLAY with gravel and traces of roots, slight organic odor, soft to medium stiff, very moist
LL=99 PI=63	51				8					
	46	68			20	1.0	5			
	123				3		10		SM	Dark grayish brown SILTY SAND with gravel and organic matter, very loose (peat)
	42	68			5		15		GM	Dark grayish brown SILTY GRAVEL AND SAND with some organic matter, very loose
	67				1		20		SM	Grayish brown SILTY SAND AND GRAVEL with clay seams and traces of organic matter, very loose (alluvium)
	46	72			15		25			grades to orange-grayish brown, medium dense
	38				25		30			
							35			

BORING LOG DOT 4515-00.PJ GEOLABS.GDT 4/30/11

Date Started:	July 12, 2001	Water Level: ▽	Not Available
Date Completed:	July 16, 2001		
Logged By:	E. Shinsato	Drill Rig:	CONCORE
Total Depth:	70.3 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4515-00	Driving Energy:	140 lb. wt., 30 in. drop

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

CLAYTON S. MIMURA
LICENSED PROFESSIONAL ENGINEER
No. 4176-C
HAWAII, U.S.A.

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GEOLABS, INC. — APRIL 30, 2012 LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 2

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
FEDERAL-AID PROJECT NO. STP-0300(125)

Scale: As Shown — Date: December 2011

SHEET No. G.3 OF G.4 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-0300(125)	2011	31	55

GEOLABS, INC.
Geotechnical Engineering

CASTLE HILLS ACCESS ROAD
DRAINAGE IMPROVEMENTS
PROJECT NO. HWY-0-04-98
KANEOHE, 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
	19	97			81				SM	grades to dense
	41				35		40			
LL=69 PI=37	69	57			10		45		CH	Grayish brown with multi-color mottling CLAY with sand and gravel, soft to medium stiff (saprolite)
	103				7		50		SM	Orange-grayish brown SILTY SAND with some sub-rounded gravel and traces of clay seams, loose
	76	54			34		55			grades to medium dense
	59				67		60			grades to dense to very dense
										grades with some cobbles and boulders, very dense
	38				60/5" Ref.		65			
							70			

Date Started:	July 12, 2001	Water Level: ▽	Not Available
Date Completed:	July 16, 2001		
Logged By:	E. Shinsato	Drill Rig:	CONCORE
Total Depth:	70.3 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4515-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4515-00.PJ GEOLABS.GDT 5/31/11

GEOLABS, INC.
Geotechnical Engineering

CASTLE HILLS ACCESS ROAD
DRAINAGE IMPROVEMENTS
PROJECT NO. HWY-0-04-98
KANEOHE, 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
					50/3" Ref.					Boring terminated at 70.3 feet
							75			
							80			
							85			
							90			
							95			
							100			
							105			

Date Started:	July 12, 2001	Water Level: ▽	Not Available
Date Completed:	July 16, 2001		
Logged By:	E. Shinsato	Drill Rig:	CONCORE
Total Depth:	70.3 feet	Drilling Method:	4" Auger & 4" Casing
Work Order:	4515-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 4515-00.PJ GEOLABS.GDT 5/31/11

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

ORIGINAL PLAN
NOTE BOOK
No.

CLAYTON S. MIMURA
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GEOLABS, INC. — APRIL 30, 2012 LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 3

CASTLE HILLS ACCESS ROAD
Drainage Improvements, Phase 2
FEDERAL-AID PROJECT NO. STP-0300(125)

Scale: As Shown — Date: December 2011

SHEET No. G.4 OF G.4 SHEETS