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
	SHELBY TUBE SAMPLE	TV	TORVANE SHEAR (tsf)
	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, HONOAPIILANI HIGHWAY WIDENING, LAHAINALUNA ROAD TO AHOLO ROAD, LAHAINA, MAUI, HAWAII" DATED JUNE 3, 2005, HAS BEEN PREPARED BY GEOLABS, INC. A COPY OF THE REPORT AND ITS AMMENDMENTS IS ON FILE AT THE OFFICE OF THE ENGINEER FOR REVIEW BY THE CONTRACTOR.

2. FOR BORING LOCATIONS, SEE SHEET 10 .

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

PLOT DATE: 57-29-2008 @ 10:57 am

PATH/FILENAME: F:\Projects\04-11wy\Honoapiilani Highway Widening\Lahaina\Working Drawings\Proj. Num Revised 11-22-06 (CIVIL FINAL)\Civil - Final\04-11wy-Honoapiilani Widen-EsCivil\Plan&Profile\Log sta 10-12.dgn LAST UPDATE: 34-06-2008 @ 10:34 am

GEOLABS, INC. — Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING LAHAINALUNA ROAD TO AHOLO ROAD LAHAINA, MAUI, HAWAII

Log of Boring 1

Approximate Ground Surface Elevation (feet MSL): 22.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	24	88			16	2.5			ML	Brown SANDY SILT with traces of gravel, stiff, moist (fill)
	22				5	0.8				
	29	84			6		5		MH	Brown CLAYEY SILT, medium stiff, moist (alluvium)
	28				4		10		SM	Brown to black SILTY SAND, loose, very moist (river deposit)
	49				5		15		MH	Brown CLAYEY SILT, medium stiff (alluvium)
	84	49			7		20		OL-PT	Gray ORGANIC SILT with abundant peat, soft (swamp)
	43				3		25		SM	Black SILTY FINE SAND, very loose (estuary)
	40				9		30			
			50				35			Gray BASALTIC COBBLES AND GRAVEL with sand, dense (river channel)
	14				15				SM	Black SILTY SAND with some gravel, medium dense (river deposit)
			16				40			
	48		31		25/.5' +25/.0' Ref.					Brownish gray BASALTIC COBBLES AND GRAVEL with sand, dense (river channel)
	7		60		50/.4' Ref.		45			
							50			grades to slightly cemented (conglomerate)
			62							grades with small boulders
			17				55		SW	Grayish brown GRAVELLY SAND with some cobbles, very dense (river channel)
							60			

Date Started:	February 17, 2004	Water Level: ▽	14 ft. 2/17/04 1150 HRS; 14.2 ft. 2/19/04 0820 HRS
Date Completed:	February 20, 2004		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	136 feet	Drilling Method:	4" Auger, 4" Casing & HQ Coring
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING LAHAINALUNA ROAD TO AHOLO ROAD LAHAINA, MAUI, HAWAII

Log of Boring 1

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	4		41		50/.3' Ref.		65		SW	
			53		20/.0' Ref.					Gray BASALTIC BOULDERS, COBBLES AND GRAVEL with sand, dense (river channel)
			30				70			
			53		20/.0' Ref.		75			
			50				80			
			52				85			
			30				90			grades with more sand
			50				95			
			20				100			Brownish gray BASALTIC BOULDERS, COBBLES AND GRAVEL in a reddish brown silt matrix, dense (alluvium/conglomerate)
			75				105			
			65				110			
			50	27			115			Gray vugular BASALT, closely fractured, slightly weathered, very hard (a'a)
							120			

Date Started:	February 17, 2004	Water Level: ▽	14 ft. 2/17/04 1150 HRS; 14.2 ft. 2/19/04 0820 HRS
Date Completed:	February 20, 2004		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	136 feet	Drilling Method:	4" Auger, 4" Casing & HQ Coring
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING LAHAINALUNA ROAD TO AHOLO ROAD LAHAINA, MAUI, HAWAII

Log of Boring 1

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
			97	52			125			Gray BASALT, severely fractured, moderately weathered, medium hard (a'a clinker)
			80	27						Gray dense BASALT, moderately fractured, slightly weathered, very hard (a'a)
			25				130			Gray BASALT, severely fractured, moderately weathered, medium hard (a'a clinker)
							135			Boring terminated at 136 feet
							140			* Elevations estimated from Preliminary Topographic Map transmitted by M & E Pacific, Inc. on May 24, 2005.
							145			
							150			
							155			
							160			
							165			
							170			
							175			
							180			

Date Started:	February 17, 2004	Water Level: ▽	14 ft. 2/17/04 1150 HRS; 14.2 ft. 2/19/04 0820 HRS
Date Completed:	February 20, 2004		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	136 feet	Drilling Method:	4" Auger, 4" Casing & HQ Coring
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(39)	2008	11	194

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GEOTECHNICAL LEGEND, NOTES AND BORING LOGS - 1

Honoapiilani Highway Widening
Lahainaluna Road to Aholo Road
Project No. STP-030-1(39)

Scale: As Shown Date: October 2008

SHEET No. 1 OF 2 SHEETS

11

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(39)	2008	12	194

GEOLABS, INC. — Boring 2

Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING
LAHAINALUNA ROAD TO AHOLO ROAD
LAHAINA, MAUI, HAWAII

Log of Boring 2

Approximate Ground Surface Elevation (feet MSL): 13.0 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	25	70			42				ML	Brown SANDY SILT with gravel, very stiff, damp (fill)
	28				19	3.5			MH	Brown CLAYEY SILT with traces of organics, stiff, moist (alluvium)
	45	76			2	0.0	5		MH	Brown CLAYEY SILT, very soft, wet to saturated (alluvium)
									OL-PT	Black ORGANIC SILT with abundant peat, very soft (swamp)
	186				2	0.0	10			
					2					
	358	18					15		SP	Black and white poorly graded SAND, medium dense (river deposit and beach sand)
	25				18					
							20			grades with pebbles and rounded gravel
	23				20					
							25		SM	Gray SILTY FINE SAND with gravel, medium dense (river/estuary deposit)
	29				17					
							30			
							35			
					19					
							40			
							45			
			69		25/.0' Ref.					Gray BASALTIC BOULDERS, COBBLES AND GRAVEL with sand, dense (river channel)
			22				50			grades with more sand
							55			
			57							
							60			

Date Started:	February 25, 2004	Water Level: ⧖	6 ft. 2/25/04 1220 HRS
Date Completed:	February 26, 2004		9.3 ft. 2/26/04 0845 HRS
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	101.5 feet	Drilling Method:	4" Auger, 4" Casing & HQ Coring
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Boring 3

Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING
LAHAINALUNA ROAD TO AHOLO ROAD
LAHAINA, MAUI, HAWAII

Log of Boring 3

Approximate Ground Surface Elevation (feet MSL): 32.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	21	87			42				ML	Brown SANDY SILT with gravel, stiff, dry (fill)
	25				8	>4.5			CH	Brown SILTY CLAY, very stiff, damp (fill)
	15	87			22	3.0	5			grades with sand and gravel
									MH	Brown CLAYEY SILT, very stiff, moist (alluvium)
	34				3	0.3	10		MH	Dark brown CLAYEY SILT with sand, soft, moist to wet (alluvium)
	37	83			9					
							15			grades locally interbedded with coarse river sand lenses
	40				9				SM	Brown SILTY SAND, loose to medium dense (river deposit)
							20			
	45				11					
							25			grades locally interbedded with stiff brown silt lenses
	23				42				SM	grades with gravel Grayish brown SILTY SAND with gravel, dense (river deposit)
							30			
	61				4				MH	Gray CLAYEY SILT with sand, soft (alluvium)
							35			
	40				11				SM	Tannish gray SILTY SAND, loose
							40		MH	Gray CLAYEY SILT interbedded with brown silty sand, soft (alluvium)
							45			
	33				41				SP	Dark gray poorly graded SAND, dense (river deposit)
							50			
							55			
			83							Gray BASALTIC BOULDERS, COBBLES AND GRAVEL with sand, very dense (river channel)
							60			

Date Started:	February 27, 2004	Water Level: ⧖	17.5 ft. 2/27/04 0955 HRS
Date Completed:	March 1, 2004		34.5 ft. 3/1/04 1005 HRS
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	91 feet	Drilling Method:	4" Auger, 4" Casing & HQ Coring
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Boring 3 (Continued)

Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING
LAHAINALUNA ROAD TO AHOLO ROAD
LAHAINA, MAUI, HAWAII

Log of Boring 3

(Continued from previous plate)

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
			27		25/.0 Ref.					
							65			grades with more sand locally
			28							
			100	0			70			Gray BASALT, severely fractured, highly to completely weathered, soft to medium hard
			100	42			75			Gray vesicular BASALT, moderately to closely fractured, slightly to moderately weathered, hard to very hard
			50	7			80			Gray vesicular BASALT, severely fractured, slightly weathered, medium hard (pahoehoe basalt formation)
			67	30			85			
							90			Boring terminated at 91 feet
							95			
							100			
							105			
							110			
							115			
							120			

Date Started:	February 27, 2004	Water Level: ⧖	17.5 ft. 2/27/04 0955 HRS
Date Completed:	March 1, 2004		34.5 ft. 3/1/04 1005 HRS
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	91 feet	Drilling Method:	4" Auger, 4" Casing & HQ Coring
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Boring 4

Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING
LAHAINALUNA ROAD TO AHOLO ROAD
LAHAINA, MAUI, HAWAII

Log of Boring 4

Approximate Ground Surface Elevation (feet MSL): 23.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	24	94			17/.3'				GW	4-inch ASPHALTIC CONCRETE Tannish gray BASALTIC SANDY GRAVEL, dense, moist
	24				16				MH	Reddish brown CLAYEY SILT, stiff, moist (alluvium)
					5		5			
									ML	Brown CLAYEY SILT with traces of fine sand, soft, moist (alluvium)
	46				3		10			
										grades with a little gravel
	50	69			4		15			
	85				4		20		CH	Dark brown to black SILTY CLAY with some roots, soft
										Boring terminated at 21.5 feet
							25			
							30			
							35			
							40			
							45			
							50			
							55			
							60			

Date Started:	February 23, 2004	Water Level: ⧖	13.6 ft. 2/23/04 1215 HRS
Date Completed:	February 23, 2004		13.5 ft. 2/23/04 1215 HRS
Logged By:	V. Bounlangsy	Drill Rig:	MOBILE B-53
Total Depth:	21.5 feet	Drilling Method:	4" Auger
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Boring 5

Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING
LAHAINALUNA ROAD TO AHOLO ROAD
LAHAINA, MAUI, HAWAII

Log of Boring 5

Approximate Ground Surface Elevation (feet MSL): 14.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
LL=49 PI=20	24				7				ML	Reddish brown SANDY SILT, medium stiff, moist (fill)
	45	72			3		5		MH	Reddish brown CLAYEY SILT, soft, moist (alluvium)
	86				2		10		CH	Gray SILTY CLAY with some roots, soft (alluvium)
									SP-SM	Whitish gray poorly graded SAND with silt, medium dense (river deposit)
	46	74			17		15			
	36				10		20			Boring terminated at 20 feet
							25			
							30			
							35			
							40			
							45			
							50			
							55			
							60			

Date Started:	February 23, 2004	Water Level: ⧖	5.9 ft. 2/23/04 1300 HRS
Date Completed:	February 23, 2004		5.9 ft. 2/23/04 1500 HRS
Logged By:	V. Bounlangsy	Drill Rig:	MOBILE B-53
Total Depth:	20 feet	Drilling Method:	4" Auger
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC. — Boring 6

Geotechnical Engineering

HONOAPIILANI HIGHWAY WIDENING
LAHAINALUNA ROAD TO AHOLO ROAD
LAHAINA, MAUI, HAWAII

Log of Boring 6

Approximate Ground Surface Elevation (feet MSL): 13.5 *

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	ROD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	29				12				ML	Reddish brown SANDY SILT, medium stiff, moist (fill)
	125	38			2		5		ML	Brown CLAYEY SILT, soft (alluvium)
									CH	Gray SILTY CLAY, soft (alluvium)
	50				2		10		SM	Dark gray SILTY SAND, loose (river deposit)
	21	101			30		15		SP	Grayish tan poorly graded SAND, dense (river deposit)
	35				16					grades with some coralline gravel, medium dense
							20			Boring terminated at 20 feet
							25			
							30			
							35			
							40			
							45			
							50			
							55			
							60			

Date Started:	February 24, 2004	Water Level: ⧖	4 ft. 2/24/04 0900 HRS
Date Completed:	February 24, 2004		3 ft. 2/24/04 1300 HRS
Logged By:	V. Bounlangsy	Drill Rig:	MOBILE B-53
Total Depth:	20 feet	Drilling Method:	4" Auger
Work Order:	5107-00	Driving Energy:	140 lb. wt., 30 in. drop

ORIGINAL PLAN

NOTE BOOK

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

No. ____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GEOTECHNICAL
BORING LOGS - 2
Honoapiilani Highway Widening
Lahainaluna Road to Aholo Road
Project No. STP-030-1(39)

Scale: As Shown Date: October 2008

SHEET No. 2 OF 2 SHEETS

12

PLOT DATE: 57-29-2008 @ 10:57 am

PATH/FILENAME: P:\Projects\Oahu-Hwy\Honoapiilani Highway Widening\Geo\Working Drawings\Proj. Num. Revised 1-22-08 (DWL FINAL)\Dwl - Final\04s-HonoapiilaniWiden-ExCavPhotoAddSoilCmp sht1 10-12.dwg

LAST UPDATE: 34-06-2008 @ 10:34 am