FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	C.O.82	88

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 50% OR 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
		SANDS WITH FINES MORE THAN 12% FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE-GRAINED SOILS 50% OR 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)
SHELBY TUBE SAMPLE	TV TORVANE SHEAR (tsf)
GRAB SAMPLE	PEN POCKET PENETROMETER (tsf)
CORE SAMPLE	UC UNCONFINED COMPRESSION (psi)
WATER LEVEL OBSERVED IN BORING	UU UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION (ksf)

LOG LEGEND FOR SOIL 6164-00.GPJ GEOLABS.GDT 7/31/09

Plate
A-0.1

GEOLABS, INC.
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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

LOG LEGEND FOR ROCK 6164-00.GPJ GEOLABS.GDT 7/31/09

Plate
A-0.2

BORING LOCATION					
Boring Nos.	Station (approx.)	Offset from Baseline (feet)	Offset Direction (facing up-station)	Site Nos.	Note
1	75+00	5	right	1	
2	74+00	5	left	1	
3	73+00	5	right	1	
4	792+25	5	right	2	
5	789+00	5	left	2	between Site # 2 and # 3
6	788+50	5	right	2	
7	773+90	5	left	3	
8	773+00	5	right	3	
9	14+00	5	left	6	
10	9+60	5	right	6	
11	286+10	50	right	10	
12	285+00	60	right	10	

GEOTECHNICAL NOTES

1. 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.

2. 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.

3. 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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Exp. 04-30-10

Geolabs, Inc.

DATE	REVISION
7/28/10	Added Boring Location Table.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS LEGEND & NOTES

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 1 OF 7 SHEETS

C.O.82

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	83	88

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 1

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
							0		GW	6-inch ASPHALTIC CONCRETE
										12-inch BASE COURSE
			18				5			Brownish gray COBBLES AND GRAVEL with sand and silt, medium dense, dry to damp (rock fill)
	9				32					grades with dense sandy gravel seams
			50				10			
			22							
							15			
	11				37					
			50				20		GW	Brownish gray GRAVEL with cobbles (basaltic) and little sand, dense, damp (clinker)
			12							
							25			
	8		100	70	50/4" Ref.					Gray dense BASALT, moderately fractured, slightly weathered, hard
							30			Boring terminated at 31.5 feet
							35			
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			

Date Started:	May 26, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 26, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	31.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/31/09

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 2

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
							0		GW	6-inch ASPHALTIC CONCRETE
										12-inch BASE COURSE
			26				5			Brownish gray COBBLES AND GRAVEL with sand, medium dense to dense, damp (rock fill)
Sieve	7				22					
			17				10			
	5				32					
			50				15			grades with boulders
			40							
							20			
			25							
							25			Brownish gray GRAVEL AND COBBLES (BASALTIC), dense, damp (clinker)
			50	0	20/0" Ref.					Gray vugular BASALT with clinker, severely fractured, slightly weathered, hard
							30			Boring terminated at 31 feet
							35			
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			

Date Started:	May 27, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 27, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	31 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/31/09

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 1

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 2 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	84	88

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 3

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			GW	6-inch ASPHALTIC CONCRETE
			31								12-inch BASE COURSE
							5				Brownish gray GRAVEL AND COBBLES with sand and silt, medium dense to dense, damp (rock fill)
	4				36						
	12				36						
			100				10				grades with boulders, dense, dry
			78								
							15				
			30								grades with more gravel
							20				Brownish gray COBBLES AND GRAVEL (BASALTIC) with sand and traces of silt, medium dense, damp (clinker)
	13				19						
			67	11			25				
			81	38							Brownish gray BASALT with clinker, moderately fractured, slightly weathered, hard
							30				Boring terminated at 30 feet
							35				
							40				
							45				
							50				
							55				
							60				
							65				
							70				
							75				

Date Started:	May 27, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 27, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	30 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/21/09

GEOLABS, INC.
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EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 4

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			GW	6-inch ASPHALTIC CONCRETE
			23								12-inch BASE COURSE
							5			GW-GM	Brownish gray COBBLES AND GRAVEL with sand and traces of silt, medium dense to dense, damp (rock fill)
Sieve	14				34						grades with more sand
			17				10				Grayish brown GRAVEL with sand and silt, dense, damp (fill)
	10										
			100	40	26/6" +20/0" Ref.		15				Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand and little silt, dense, damp (clinker)
			18							GM	Gray BASALT, moderately fractured, slightly weathered, hard to very hard
	24				49		20				Grayish brown SILTY GRAVEL with some cobbles, dense, moist (volcanic ash and clinker)
			50								
			33				25				Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand and silt, dense, damp (clinker)
					20/0" Ref.		30				Boring terminated at 30 feet
							35				
							40				
							45				
							50				
							55				
							60				
							65				
							70				
							75				

Date Started:	May 28, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 28, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	30 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/21/09

ORIGINAL PLAN
NOTE BOOK
SURVEY PLOTTED BY DATE
DRAWN BY
TRACED BY
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 2

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	85	88

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 5

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			GW	6-inch ASPHALTIC CONCRETE
	3		21		50/6" Ref.						12-inch BASE COURSE
							5			GP	Brownish gray GRAVEL AND COBBLES with sand and little silt, dense, damp (fill)
Sieve	16				11						Grayish brown GRAVEL with sand, loose to medium dense, moist (fill)
			33				10			ML	Brown SILT with gravel, medium stiff, moist (volcanic ash)
	9				19						
			44				15				Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand and silt, medium dense, damp (clinker)
	8				25						
							20				Boring terminated at 18.5 feet
							25				
							30				
							35				
							40				
							45				
							50				
							55				
							60				
							65				
							70				
							75				

Date Started:	May 28, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 28, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	18.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/31/09

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 6

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			GW	6-inch ASPHALTIC CONCRETE
	6		40		32					GW	12-inch BASE COURSE
							5				Brownish gray SANDY GRAVEL with some cobbles, dense, damp (fill)
Sieve	19				11					ML	Brown SILT with gravel, medium stiff, moist (volcanic ash)
			25				10				Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand and little silt, dense, damp (clinker)
	3		37	12	25/1" Ref.						
							15				Gray BASALT, closely fractured, slightly weathered, hard
							20				Boring terminated at 16.5 feet
							25				
							30				
							35				
							40				
							45				
							50				
							55				
							60				
							65				
							70				
							75				

Date Started:	May 28, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 28, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	16.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/31/09

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

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Geolabs, Inc.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 3

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 4 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	86	88

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 7

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			GW	6-inch ASPHALTIC CONCRETE
										GW	12-inch BASE COURSE
	5		43		33		5				Grayish brown SANDY GRAVEL with some cobbles, medium dense to dense, damp (fill)
	8		33		56		10				
	13		19		21		15				
	1		28		34		20				
	10		50		76		25				Grayish brown GRAVEL (BASALTIC) with sand and silt, dense, damp (clinker)
											Boring terminated at 25 feet
							30				
							35				
							40				
							45				
							50				
							55				
							60				
							65				
							70				
							75				

BORING LOG_DOT 6X4x30.GPJ GEOLABS.GDT 7/31/09

Date Started:	May 28, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 28, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	25 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 8

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	USCS	Description
							0			GW	6-inch ASPHALTIC CONCRETE
Sieve	8		33		51					SW-SM	12-inch BASE COURSE
							5				Grayish brown SAND with gravel and silt, dense, damp (fill)
Sieve	9				23						grades with cobbles
			31				10				Brownish gray GRAVEL AND COBBLES with sand, medium dense, damp (fill)
	11				13					GW	Brownish gray COBBLES AND GRAVEL (BASALTIC) with sand and traces of silt, medium dense, damp (clinker)
			39				15				
	15				50/6" Ref.						Boring terminated at 17.5 feet
							20				
							25				
							30				
							35				
							40				
							45				
							50				
							55				
							60				
							65				
							70				
							75				

BORING LOG_DOT 6X4x30.GPJ GEOLABS.GDT 7/31/09

Date Started:	May 29, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 29, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	17.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

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

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This work was prepared by me or under my supervision.
Exp. 04-30-10

Geolabs, Inc.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 4

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 5 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	87	88

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 9

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
							0		GW	6-inch ASPHALTIC CONCRETE
			67							11-inch BASE COURSE
							5			Brownish gray BOULDERS AND COBBLES with gravel and traces of sand and silt, medium dense, dry (rock fill)
			5							Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand, medium dense, damp (clinker)
	6		58	38	9/6" +20/0" Ref.		10			Gray vugular BASALT, moderately fractured, unweathered, hard
			40	10			15			Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand, medium dense, damp (clinker)
							20			Gray vugular BASALT, closely fractured, unweathered, hard
	7		100	63	7/6" +20/0" Ref.		25			Brownish gray GRAVEL AND COBBLES (BASALTIC), loose to medium dense, damp (clinker)
										Gray vesicular BASALT, moderately fractured, unweathered, hard
							30			Boring terminated at 26 feet
							35			
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			

Date Started:	May 29, 2009	Water Level: ▽	Not Encountered
Date Completed:	May 29, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	26 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 6164-00.GPJ GEOLABS.GDT 7/21/09

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 10

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	8				31		0		GW	9-inch ASPHALTIC CONCRETE
			42						GW	9-inch BASE COURSE
							5			Brownish gray to gray GRAVEL with sand and cobbles, medium dense, dry to damp (fill)
Sieve	10				26					
			61				10			Gray vesicular to scoriaceous BASALT, moderately fractured, unweathered, hard
	5		88	40	7/6" +20/0" Ref.		15			
			90	15						grades to closely fractured
			53	0			20			grades to severely fractured
							25			Boring terminated at 26.5 feet
							30			
							35			
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			

Date Started:	June 2, 2009	Water Level: ▽	Not Encountered
Date Completed:	June 2, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	26.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING LOG DOT 6164-00.GPJ GEOLABS.GDT 7/21/09

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

This work was prepared by me or under my supervision.
Exp. 04-30-10

Geolabs, Inc.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 5

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 6 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ER15-(22)	2009	88	88

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 11

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	9				16		0		ML	Brown SILT with gravel, stiff, damp (topsoil)
			33							Brownish gray COBBLES AND GRAVEL (BASALTIC), loose to medium dense, damp (clinker)
	9				29		5			
			44							grades with scoriaceous cobbles
							10			
	25				15					grades with sand
			100	78			15			Gray dense BASALT, massive, unweathered, very hard
			100	65						
							20			
			20	0						Brownish gray GRAVEL AND COBBLES (BASALTIC) with sand, loose to medium dense, damp (clinker)
							25			Boring terminated at 26.5 feet
							30			
							35			
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			

Date Started:	June 3, 2009	Water Level: ▽	Not Encountered
Date Completed:	June 3, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	26.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/31/09

GEOLABS, INC.
Geotechnical Engineering

EMERGENCY EARTHQK. ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
ROUTE 190, MP 12.1 TO 31.2
FEDERAL AID PROJECT NO. ER-15(22)

Log of Boring 12

Approximate Ground Surface Elevation : N/A

Other Tests	Moisture Content (%)	Dry Unit Weight (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
			17				0		ML	Brown SILT with gravel, stiff, moist (topsoil)
										Brownish gray COBBLES AND GRAVEL (BASALTIC) with sand and traces of silt, loose to medium dense, dry to damp (clinker)
Sieve	16				9		5			
			47							
							10			
			70	33						
							15			Gray vugular BASALT, moderately fractured, unweathered, hard
			17							Brownish gray COBBLES AND GRAVEL (BASALTIC) with sand, loose to medium dense, damp (clinker)
							20			
	11				12					
			56	0			25			Gray BASALT, moderately fractured, unweathered, hard
										Boring terminated at 26.5 feet
							30			
							35			
							40			
							45			
							50			
							55			
							60			
							65			
							70			
							75			

Date Started:	June 2, 2009	Water Level: ▽	Not Encountered
Date Completed:	June 2, 2009		
Logged By:	S. Latronic	Drill Rig:	MOBILE B-53
Total Depth:	26.5 feet	Drilling Method:	4" Auger & HQ Coring
Work Order:	6164-00	Driving Energy:	140 lb. wt., 30 in. drop

BORING_LOG_DOT 6164-00.GPJ GEOLABS.GDT 7/31/09

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

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

This work was prepared by me or under my supervision.
Exp. 04-30-10

Geolabs, Inc.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOGS - 6

EMERGENCY EARTHQUAKE ROCKFALL REPAIRS
VARIOUS LOCATIONS ON HAWAII, UNIT 4
Federal Aid Project No. ER-15(22)

Scale: As Shown Date: December 2009

SHEET No. 7 OF 7 SHEETS