

Geotechnical Engineering

INTERSTATE ROUTE H-1 GUARDRAIL AND SHOULDER IMPROVEMENTS KAPIOLANI INTERCHANGE TO AINAKOA AVENUE HONOLULU, OAHU, HAWAII

Log of Boring

	Labo	oratory			F	ield							
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	(%)	Penetration Resistance	Pocket Pen. (tsf)	Depth (feet)	<u>e</u>	ic		Approximate Ground Surface Elevation (feet MSL): 58 *	
	Other	Moistu Conte	Dry D (pcf)	Core Recov	RQD (%)	Penet Resist	Pocke (tsf)	Depth	Sample	Graphic	nscs	Description	
										4 4 4 A		9-inch CONCRETE	
		11	109			35/3"		-	X	0000	GW	Light gray SANDY GRAVEL (BASALTIC) wi silt, dense, damp (base course) Brownish gray GRAVEL (BASALTIC) with s and clay and some cobbles (basaltic), me	and -
	0.							-		V J V J		dense, damp (fill)	ululli -
-	Sieve #200 = 20.9%	8				28		-		//			-
	Direct Shear	9	121			29/6" +30/3		5 -	X	9			-
								-				Gray with brown mottling COBBLES AND BOULDERS (BASALTIC) with clayey sand very dense, damp (fill)	i, -
								-					-
						20/3"		10 -	1	0		Boring terminated at 10.25 feet	_
								-				* Elevations estimated from Google Earth	© 2013.
								-					-
								-					_
								-					-
								15-					_
								-					-
								_					
9/16													
77. TO:								-					-
LABS.C								-	1				-
J GEO								20 -					
거	ate Star			uary 8,			Water I		1: Z	<u>Z</u> 1	Not E	ncountered	late
	ogged B		Y. Cl		2010		Drill Rig	 g:		(CME-		iato
g T	otal Dep	th:		5 feet			Drilling	Metl					- 1
က <u>်</u> V	Vork Ord	er:	6099			Driving	Ene	rgy	<i>r</i> : 1	140 lk	o. wt.,30 in. drop		



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Log of Boring

=									_				
	Labo	oratory			F	ield							
				(%)								Approximate Ground Surface Elevation (feet MSL): 87 *	
	sts	(%)	sity	/ ₀		5 e g	en.	et)				Lievation (leet MSL). 67	
	_ Te	ure	eus	ver	%)	trat stan) (fe	ele	hic	w		
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
\vdash	0	Σΰ	ㅁ용	OR	A.	2 5 5	3 4 5		ίÿ	ڻ م	\rightarrow	9-inch CONCRETE	
										9 4 A			
		17	111			80		-		000	GW	Gray SANDY GRAVEL (BASALTIC) with little	-
									M		SM	silt, dense, damp (base course) Reddish brown with dark gray mottling medium	/
								-	/\			to coarse SILTY SAND with some gravel	
								_				(basaltic) and traces of clay, dense, damp (fill)	
		33	90			36	3.0		M		01		
								-	Х		CL- ML	Reddish brown with gray mottling CLAYEY SILT with fine sand, very stiff, damp (residual soil)	-
												with fine sand, very sun, damp (residual son)	
		8				18/3"		5-					
										000	GP	Dark gray with orange mottling GRAVEL (BASALTIC) with silt, dense, dry to damp	
								-		000		(weathered rock)	1
								_		000		,	
										00			
								-		000			-
										00		Gray with orange mottling vesicular BASALT ,	
								-		\'_`		closely fractured, highly weathered, very hard	-
								40		\			
						15/1"	'	10 -		\		Boring terminated at 10.1 feet	一
								_				_	4
								-					-
								-					1
								_					J
								15-					4
								-					-
9								-	1				1
7/19/													
TOS								_					1
ABS.(-	-				-
EOL													
BORING_LOG 6099-00.GPJ GEOLABS.GDT 7/19/16								20-					
J 60.0	Date Star			uary 9,			Water L	eve	l: Z	Z N	Not E	ncountered	
609 	Date Com	•	l: Febr Y. C		2010							Plate	
S L	ogged B		Drill Rig: Mobile B-80 (Energy Transfer Ratio = 44.9%)										
g T	otal Dep	Drilling Method: 4" Auger & HQ Coring A - 2											
ğ V	Vork Ord	er:		Driving Energy: 140 lb. wt.,30 in. drop									



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Log of Boring

Labo	oratory			F	ield						
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	(%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	е	ic		Approximate Ground Surface Elevation (feet MSL): 108 *
Other	Moistu	Ory De	Sore	RQD (%)	Peneti Resist	Pocke (tsf)	Jepth	Sample	Graphic	nscs	Description
LL=NP PI=NP Sieve -#200 = 41.4%	20 22 22	5d) 95 76	Cor. Rec	RQI	23 9 13/1"	Poc (tsf)	5- 10-	X	Grand	GW SC	11-inch CONCRETE Grayish brown SANDY GRAVEL (BASALTIC) with silt, dense, damp (base course) Reddish brown with black mottling medium CLAYEY SAND with gravel (basaltic), medium dense, damp (fill) Dark gray with red mottling COBBLES (BASALTIC) with sand and some silt, medium dense, damp (fill)
Date Start Date Com Logged B Total Dep Work Ord											Boring terminated at 10.1 feet
Date Start Date Com			uary 8, uary 8,			Water I	_eve	l: Z	<u> </u>	Not E	ncountered Plate
Logged B	y:	Y. CI	niba			Drill Rig				ME-	55
Total Dep Work Ord		10.1 6099				Drilling Driving					ger & HQ Coring A - 3 b. wt.,30 in. drop



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Log of Boring

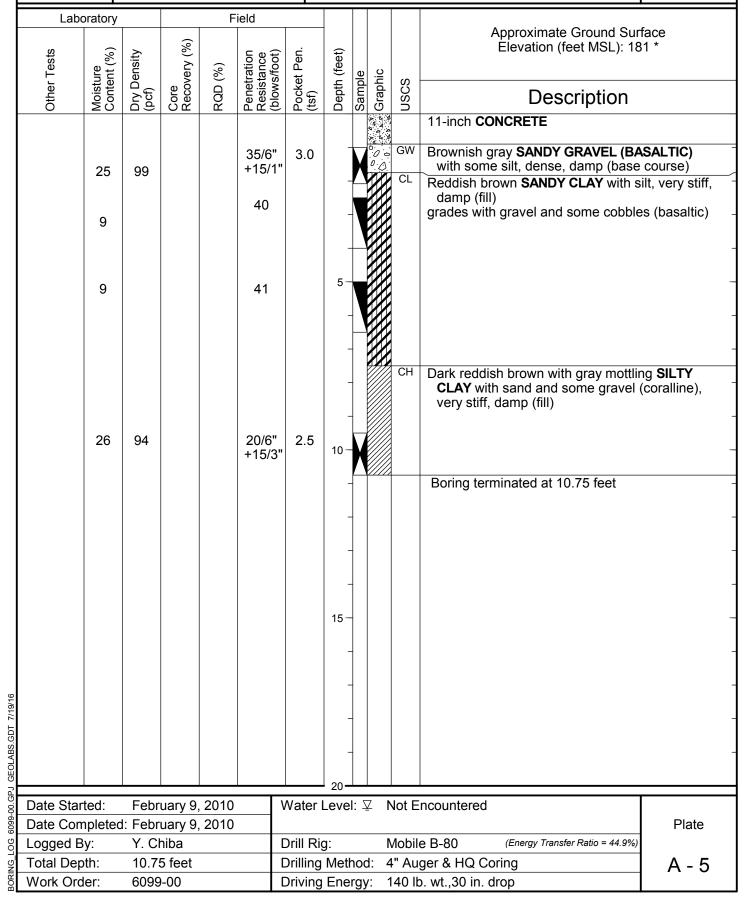
Г	Labo	oratory			F	ield							
	ø	(0	>	(%)		C 40 (C)	ز.	Œ				Approximate Ground Surface Elevation (feet MSL): 144 *	
	Test	ıre nt (%	ensity	ery ((%	ance //foot	t Per	(feet	е	ic		, ,	
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
	_									0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		9-inch CONCRETE	
		12	127			63	3.5	-	V	000	GW CH	Gray SANDY GRAVEL (BASALTIC) with so silt, dense, dry to damp (base course)	/
								-	Λ			Reddish brown CLAY with gravel (basaltic stiff, damp (fill)	;), very -
	LL=70 PI=44	38				60/3"	3.5	-	Z			Sun, damp (iii)	-
								-	_	///// - ` ` `		Gray vesicular BASALT , moderately fractu	ıred, -
								5-		<u>'</u> - '		slightly weathered, very hard	
1	UC= 1050 psi			90	90			5-					
	·							-	Ш	<u> </u>			1
								-	Ш	, , _ , , , _ ,			-
1:	UC= 3620 psi							-	H	· / / ·			-
	0020 po.							_		\ 			
										\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
								10 -				Boring terminated at 10 feet	
								-					-
								-					4
								_					
								-					-
								15 -	_				-
								_					
9/16								-					
T 7/18								-	_				-
ABS.GI								-	_				-
GEOL								20-					
00.GPJ	Date Star	ted:	Febr	uary 9,	2010		Nater L		l: Z	Z N	lot E	ncountered	
6609	Date Com		l: Febr	uary 9,			= :						Plate
_	₋ogged B Γotal Dep		Y. CI				Orill Rig Orillina		<u> </u>			e B-80 (Energy Transfer Ratio = 44.9%) ger & HQ Coring	
BORIN I	Nork Ord	Drilling Method: 4" Auger & HQ Coring Driving Energy: 140 lb. wt.,30 in. drop											



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Log of Boring





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Log of Boring

Ì	Labo	oratory			F	ield							
				(%								Approximate Ground Surfa Elevation (feet MSL): 203	ace *
١	Fests	it (%	nsity	ery (9	(%	ation ance foot)	Pen	(feet)	4	O		o.ao (.ooo_). _	
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
l				0 =			ш О		0,) A A A	١	12-inch CONCRETE	
								-		0	GW	Grayish brown SANDY GRAVEL (BAS	SALTIC)
		23	83			25/1"			X	0	CL	with some silt, dense, damp (base o	course) _
										000		Reddish brown SANDY CLAY with grant (basaltic), medium stiff, damp (fill)	avel
		6				15/6"		-		000		Dark brownish gray GRAVEL (BASAL	
١						+10/0" Ref.		-		00		some sand, dense, damp to dry (we rock)	7
١								_		, , ,		Dark gray with orange mottling scoria BASALT, closely fractured, highly w	ceous reathered
		8				20/3"		5-				medium hard to hard	odinorod, _
								-					-
١								_		, ,			_
١										, ,			
١								-					-
١								-					-
١								40		,,,			
		3				15/1"		10 -				Boring terminated at 10.1 feet	
								-					-
١								_					-
١													
								-					1
								-					-
								15					
١								15-					
								-					-
								_					
19/16													
DT 7/								-					-
ABS.G								-					-
GEOL								00					
BORING_LOG 6099-00.GPJ GEOLABS.GDT 7/19/16	Date Star	ted:	Febr	uary 1	1. 2010) I v	Vater L	20- eve	l: Z	Z N	Not F	ncountered	
0-6609	Date Com												Plate
F0G	Logged B		Y. CI				Drill Rig					e B-80 (Energy Transfer Ratio = 44.9%)	
RING	Total Dep		10.1				Drilling					ger & HQ Coring	A - 6
BÖ	Work Ord	er:	6099	1-00			Driving	∟ne	rgy	<u>': 1</u>	40 lk	o. wt.,30 in. drop	



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Lat	oratory			F	ield						
			(%								Approximate Ground Surface Elevation (feet MSL): 181 *
Fests	re (%	nsity	ery (⁶	(%	ation ance foot)	Pen	(feet)	a)	S		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description
									4 4 4		9-inch CONCRETE
							-		00 \	GW	Light grayish brown SANDY GRAVEL (BASALTIC) with some silt, dense, damp (base course)
UC= 3180 psi			89	83			-				Reddish gray vesicular BASALT , closely to severely fractured, slightly weathered, very hard grades to moderately fractured at 3 feet
			95	50			5 -				grades to closely fractured
							-				
							10 -				Boring terminated at 10 feet
							-				
							15 -				-
							-				
Date Sta Date Co Logged I Total De Work Or							-				
j 2							20-				
Date Sta			uary 10			Nater I	eve	l: Z	Z 1	Not E	ncountered
Date Co		l: Febr Y. Cl), 2010		Drill Rig	۸.		N	Mobil	Plate e B-80 (Energy Transfer Ratio = 44.9%)
Total De		10 fe				Orilling		าดต			ger & HQ Coring A - 7
Work Or		6099				Driving					o. wt.,30 in. drop



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Log of Boring

Г	Labo	ratory			F	ield							\neg
		Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	(%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	(feet)	e	ic		Approximate Ground Surface Elevation (feet MSL): 115 *	
	Other Tests	Moistu Contei	Dry De (pcf)	Core	RQD (%)	Peneti Resist (blows	Pocke (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
										4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4		8-inch CONCRETE	
19/16		21 8	101			26 24 10/1" 12/1"		5			GW SC SP	4-inch CONCRETE Grayish brown SANDY GRAVEL (BASALTIC) with silt, dense, damp (base course) Orangish brown CLAYEY SAND with gravel (basaltic), medium dense, damp (fill) Dark gray SAND with some gravel (basaltic), medium dense, damp (weathered rock) Reddish gray scoriaceous BASALT, closely to severely fractured, highly weathered, medium hard grades to very hard Boring terminated at 10.1 feet	
BORING_LOG 6099-00.GPJ GEOLABS.GDT 7/19/16								20 -	_				-
00.GPJ	Date Star	ted:	Febr	uary 10	0, 2010		Water I		l: Z	<u> </u>	Not E	ncountered	\exists
0-6609	Date Com								_		_	Plate	
[00]	Logged B		Y. CI				Drill Rig					e B-80 (Energy Transfer Ratio = 44.9%)	
SING.	Total Dep		10.1				Drilling					ger & HQ Coring A - 8	
<u> </u>	Work Ord	er:	6099	-00			Driving	Ene	rgy	<i>r</i> : 1	40 lk	o. wt.,30 in. drop	



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L	aboratory	′		F	ield									
			<u></u>								Approximate Ground Surface			
l sts	(%	` <u>.</u> ≧_	%		5 g (. E	et)				Elevation (feet MSL): 84 *			
ĕ	nt (Sus	ery	(%)	anc anc	F P	(fe	ø	ic					
Other Tests	istu	ا ۾ ڪ	_ 5 S	RQD (%)	neti sist	, ke	Depth (feet)	Sample	hde	nscs	Description			
₹	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RG	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	De	Sa	Graphic	SN	Description			
									A 4 4		9-inch CONCRETE			
							_		A 4		3-inch CONCRETE			
									0.00	GW	Grayish brown SANDY GRAVEL (BASALT	IC)		
	21	105			40/3"	3.0	_	М		CL	with silt, dense, damp (base course)			
											Dark reddish brown SANDY CLAY with gra			
	47				00		-				(basaltic) and little gravel (coralline), very	y stiff,		
	17				29	3.0		\setminus			damp (fill)			
							-	1				-		
								-						
					15/1"		5-	_	700		Brownish gray SILTY COBBLES (BASALT	IC) -		
					15/1						with gravel and some boulders, dense, d	lamp		
							-	1	107		(weathered rock)	-		
									76					
							-	1	005			-		
									00					
							-	ĺ	\supset \circ			1		
									7, 1		Reddish gray vesicular BASALT, closely			
							-				fractured, highly weathered, very hard	1		
							40		- / /					
					8/1"		10 -		1		Boring terminated at 10.1 feet			
							_							
							_					-		
							-	-				4		
							-					-		
							15 -	1				-		
							-	1				-		
9							-	1				-		
/19/1														
<u></u>							-	1				1		
SS.GI														
OLAE							-	1				1		
Date C Logge Total [Work of the control of the con							20-							
Data	Started:	Ech	uary 1	0 2011		Water I		· \	7 N	Jot C	ncountered			
Date S						vvaleri	Leve	ı	∠ ľ	NUL E		Diete		
bate C	Complete		Drill Rig				1-1-11		Plate					
ĕ Logge	Logged By: Y. Chiba Total Depth: 10.1 feet										e B-80 (Energy Transfer Ratio = 44.9%)			
Total [•	Drilling Method: 4" Auger & HQ Coring A - 9							\ - 9					
∯ Work (Order:	6099	9-00			Driving Energy: 140 lb. wt.,30 in. drop								



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Γ	Labo	ratory			F	ield									
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	(%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	ole	nic		Approximate Ground Surface Elevation (feet MSL): 35 *			
	Other	Moist	Dry D (pcf)	Core	RQD (%)	Penet Resis (blow)	Pocke (tsf)	Depth	Sample	Graphic	nscs	Description			
ľ	-										SW	4-inch ASPHALTIC CONCRETE			
1		6	118			56/6" +40/3		-	H	0	GW	Tan with white mottling GRAVELLY SAND (CORALLINE) with silt and little clay, ver			
ı		19				77	3.0	-		0.0		\ dense, damp (fill) Light gray SANDY GRAVEL (BASALTIC)	with /		
1		13				''	3.0	_		!////	СН	some silt, very dense, damp (fill) Brown SANDY CLAY with some sand (co			
ı												and gravel (basaltic), very stiff, damp (fi			
ı								-					-		
		31				20	2.5	5-					-		
								-	1				-		
1								_							
											СН	Dark brown SANDY CLAY with some silt a gravel (basaltic), soft, moist (alluvium)	and		
								-							
								-	1				_		
	LL=54	33	79			9	1.0	10 -					_		
	PI=26	00	7.0				1.0	_	N						
ı								-				Brownish gray vesicular BASALT , closely	,		
								-		·		fractured, highly weathered, hard	-		
1								-		`.'			-		
1						40/4"		15-		`					
ı						12/1"						Boring terminated at 15.1 feet			
								-							
16								-					-		
T 7/19/								-					-		
ABS.GD								-					_		
GEOL								20-							
BORING_LOG 6099-00.GPJ GEOLABS.GDT 7/19/16	Date Start			uary 1			Water I		l: Z	<u></u>	Not E	ncountered			
-6609	Date Com				1, 2010		D*::: D.				Ack!		Plate		
ZG LOC	Logged B		Y. CI				Drill Rig Drilling		noc			e B-80 (Energy Transfer Ratio = 44.9%) ger & HQ Coring	\ - 10		
BORI		otal Depth: 15.1 feet ork Order: 6099-00						Driving Energy: 140 lb. wt.,30 in. drop							



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	Labo	oratory			F	ield							
	Fests	re ıt (%)	insity	Core Recovery (%)	(%	ation ance foot)	. Pen.	(feet)	a)	ပ		Approximate Ground Surface Elevation (feet MSL): 30 *	
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Sore	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
İ)	0 II			н)		0))	11-inch ASPHALTIC CONCRETE	
		9 20 13	92			95 53		- - - 5-			SC	Light tan SANDY GRAVEL (CORALLINE) some clay, dense, damp (fill) grades to light gray sandy gravel (basaltic feet Reddish brown with multi-color mottling C SAND with gravel and some sand (cora dense, damp (fill) Brown SANDY COBBLES (BASALTIC) with dense, moist (alluvium)	c) at 1.5 CLAYEY - Iline),
	LL=51 PI=27	36				5	1.0	- 10 - -			CH	Blackish brown SANDY CLAY , soft, moist (alluvium) Brown with dark gray mottling CLAYEY G (BASALTIC) with some sand, medium of	- - - -
/19/16	Sieve - #200 = 12.7%	17				44	7	<u>7</u> - 15 - -				wet (alluvium) Boring terminated at 16.5 feet	- - - -
BORING_LOG 6099-00.GPJ GEOLABS.GDT 7/19/16	Date Stari	ted:	Fahr	uary 1	1 2010	<u> </u>	Water I	20-		7 1	3 O f	t. 02/11/2010 1140 HRS	-
0-6609	Date Star						ıvalcı l	-cvc	ı. <u>-</u>	<u> </u>	J.U I		Plate
100 (Logged B	y:	Y. CI	niba			Drill Rig					e B-80 (Energy Transfer Ratio = 44.9%)	
RING	Total Dep		16.5				Orilling						\ - 11
BQ B	Work Ord	er:	6099	-00] [Driving	∟ne	rgy	: 1	40 lk	o. wt.,30 in. drop	