ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u> BORING NO. <u>B1 (STA 7+50)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING <u>6/4/96</u> SURFACE ELEV. 96±* DROP 30 in. WATER LEVEL None

D E P T H O	GR AP H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
		20000				Silty CLAY (CL-ML) — Reddish brown, moist, stiff, with cobbles and gravel.
			10/No	Penetrati	on	Cobble at 2 feet.
	9//	TO THE PERSON NAMED OF THE				Cobble at 3 feet.
<u> </u>			36	93	25	
						HIGHLY WEATHERED BASALT (WH) — Mottled grayish brown, moist, dense.
4.0			50/6"	100	24	
10-	+ + + + + + + + + + + + + + + + + + +					SLIGHTLY WEATHERED BASALT (WS) — Gray, hard.
	+ <u> </u> + + + + + + + + + +					
	+					
15	1 1 1 1					End boring at 14 feet.
						 Elevations based on Topographic Survey prepared by Engineers Surveyors Hawaii, Inc.
						Plate B1

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG W.O. <u>95-2687</u> BORING NO. B2 (STA 18+00) DRIVING WT. 140 lb. DATE OF DRILLING 6/4/96 SURFACE ELEV. 102± DROP 30 in. WATER LEVEL None

nonincentrations and an article and an article and an article and article article and article article and article arti	D E P T H O -	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
NAMES AND STREET OF THE STREET				20	101	27	Silty CLAY (CL-ML) — Reddish brown, moist, stiff, with weathered gravel.
Williamstandamscows	- 5			46/11"	99	19	HIGHLY WEATHERED BASALT (WH) — Mottled grayish brown, moist, dense.
	-10-						SLIGHTLY WEATHERED BASALT (WS) — Gray, hard.
A Victoria Section					-		End boring at 11 feet.
							Plate B2

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

-10-

BORING LOG

W.O. <u>95-2687</u>

BORING NO. <u>B3 (STA 31+50)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING 6/4/96 SURFACE ELEV. 104± DROP 30 in. WATER LEVEL None BLOWS DRY MOIST.
PER DENSITY CONT.
FOOT (PCF) (%) DESCRIPTION Silty CLAY (CL-ML) - Reddish brown, moist, medium stiff, with cobbles and gravel. Cobble at 1 foot. 41/9" 96 27 HIGHLY WEATHERED BASALT (WH) - Mottled yellowish brown, moist, dense. SLIGHTLY WEATHERED BASALT (WS) - Gray, hard, fractured. Begin NX coring at 4 feet. 100% recovery from 4 to 9 feet. RQD=28% Highly weathered basalt from 5.5 to 8.5 feet,

End boring at 9 feet.

FISCAL SHEET YEAR NO. S FED.ROAD FED. AID PROJ. NO. DIST.NO. SHEETS HAW. NH-037-1(22) 2003 72 HAWAII 6

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING NO. <u>B4 (STA 41+50)</u> DRIVING WT. <u>140 lb.</u>

BORING LOG

W.O. <u>95-2687</u> __ DATE OF DRILLING 6/4/96

WATER LEVEL None SURFACE ELEV. 110± DROP 30 in. BLOWS DRY MOIST.
PER DENSITY CONT.
FOOT (PCF) (%) DESCRIPTION H | H Silty CLAY (CL-ML) - Reddish brown, moist, medium štiff, with weathered gravel. 73 19 12 98 25 HIGHLY WEATHERED BASALT (WH) — Mottled grayish 12/10" 36 brown, moist, medium dense. 85 SLIGHTLY WEATHERED BASALT (WS) - Gray, hard.

End boring at 10 feet.

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

W.O. <u>95-2687</u> DATE OF DRILLING 6/4/96

							T. 140 lb. DATE OF DRILLING 6/4/96
Sl	SURFACE ELEV. 120.5± D			<u>±</u>	ROP	30 in. WATER LEVEL None	
	D E P T H O	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
				24	90	24	Silty CLAY (CL-ML) — Reddish brown, moist, stiff.
	5		(Bayerousse)	74	98	23	Cobbles from 5.5 to 7 feet.
	10		The state of the s	18	92	34	COMPLETELY TO HIGHLY WEATHERED BASALT (WC-WH) - Mottled reddish brown, moist, medium stiff.
	15			4/6" 20/2"	69	44	Hard at 14.5 feet. End boring at 14.5 feet.
					-		Plate B5

BORING LOG

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u> DATE OF DRILLING 5/28/96

					ORIVING WI	T. 140 lb. DATE OF DRILLING 5/28/96 30 in. WATER LEVEL None
			192:	<u> </u>	/NOF	JO III. WATER LEVEL NOME
D E P T H	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
- 5			13	96	19	Silty CLAY (CL—ML) — Reddish brown, moist, medium stiff, with gravel.
			27	86	29	HIGHLY WEATHERED BASALT (WH) — Mottled grayish brown, moist, dense.
<u> </u>			100/8"	91	28	Dense to medium hard from 10 feet.
-15-			73/10"	78	26	
20			50/3"	Tip Red	covery	MODERATELY WEATHERED BASALT (WM) — Mottled gray, medium hard.
25				-		End boring at 25 feet.
						Plate B6

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

Plate B7

Plate B3

W.O. <u>95-2687</u> BORING NO. B7 (STA 88+30) DRIVING WT. 140 Ib. DATE OF DRILLING 5/24/96 SURFACE ELEV. 195± DROP 30 in. WATER LEVEL None

D E P T H - 0	G R A P H	S A M P L E	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
- 0 -						Silty CLAY (CL—ML) — Reddish brown, moist, medium stiff, with cobbles and gravel.
			16	85	39	COMPLETELY WEATHERED BASALT (WC) — Mottled reddish and grayish brown, moist, medium dense.
- 5			15	85	38	
-10			80/8"	107	15	HIGHLY WEATHERED BASALT (WH) — Mottled gray, slightly moist, dense to medium hard, highly fractured.
-15						MODERATELY TO SLIGHTLY WEATHERED BASALT (WM-WS) - Gray, hard, fractured. Begin NX coring at 11.5 feet. 100% Recovery from 11.5 to 16.5 feet. RQD = 40% 90% Recovery from 16.5 to 21.5 feet. RQD = 24%
	ADA) AN PROPERTY OF THE PROPER					End boring at 21.5 feet.

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

Plate B4

Plate B8

BORING NO. <u>B8 (STA 98+80)</u> DRIVING WT. <u>140 lb.</u> ___ DATE OF DRILLING <u>5/30/96</u> WATER LEVEL None SURFACE ELEV. 231± DROP 30 in. BLOWS DRY MOIST.
PER DENSITY CONT.
FOOT (PCF) (%) DESCRIPTION Silty CLAY (CL-ML) - Reddish brown, moist, stiff, with cobbles and gravel. 36/8" 94 Cobble at 3.5 feet. Cobble at 5 feet. Mottled reddish brown color from 5.5 feet. Cobble at 7.5 feet. Boulder at 9 to 10 feet. Cobble at 10 feet. Cobble at 11.5 feet. COMPLETELY WEATHERED BASALT (WC) — Mottled reddish brown, moist, medium dense. 92

LICENSED **PROFESSIONAL** ENGINEER

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

End boring at 14.5 feet.

BORING LOGS

HALEAKALA HIGHWAY WIDENING, PHASE HANA HIGHWAY TO PUKALANI BYPASS

SHEET No. 1 OF 5 SHEETS

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. Enc No S. Her Engineers surveyors Hawaii, INC. FED. AID PROJ. NO. NH-037-1(22) SCALE: AS NOTED DATE: NOV., 2002 LICENSE EXPIRATION DATE: 4/30/04

ERNEST K. HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. <u>95-2687</u>

BORING NO.B9 (STA 108+50)DRIVING WT.140 lb.DATE OF DRILLING 5/30/96SURFACE ELEV.266±DROP30 in.WATER LEVELNone

D E P T H	GR AP H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
						Silty CLAY (CL-ML) — Reddish brown, slightly moist, stiff.
	A CONTRACTOR OF THE PROPERTY O		33	86	14	COMPLETELY TO HIGHLY WEATHERED BASALT (WC—WH) — Mottled brown, slightly moist to maist, dense.
_ 5 _	Annual Property of the Control of th		67	84	22	
-10-						SLIGHTLY WEATHERED BASALT (WM) Gray, hard, highly vesicular. Begin NX coring at 6 feet. 90% Recovery from 6 to 11 feet. RQD = 68%
			- Programme and a service of the Service and Service a		And the second s	End boring at 11 feet.
Management of the second						Plate 89

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u> BORING NO. <u>B10 (STA 129+00)</u> DRIVING WT. <u>140 lb.</u> SURFACE ELEV. 339± DROP 30 in. __ DATE OF DRILLING <u>5/24/96</u> WATER LEVEL None

SURFACE ELE	SURFACE ELEV		<u> </u>	PROP	30 in. WATER LEVEL None
D G R A P H O	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
					Silty CLAY (CL-ML) — Reddish brown, moist, medium stiff.
		14	94	30	
- 5		13	69	34	COMPLETELY TO HIGHLY WEATHERED BASALT (WC-WH) - Mottled grayish brown, moist, medium dense.
		39	91	16	Dense from 7 feet.
-10		39	91	10	
					SLIGHTLY WEATHERED BASALT (WS) — Gray, hard, highly vesicular. Begin NX coring at 12 feet. 100% Recovery from 12 to 17 feet. RQD = 86%
15					RQU = 86%
					End boring at 17 feet.
-20-					Plate B10
Comment of the second s	CERTAIN TO SE	AND DESCRIPTION OF THE PROPERTY SHAPES			

Geotechnical Engineering

ERNEST K. HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. <u>95-2687</u>

 BORING NO.
 B11 (STA 129+70)
 DRIVING WT.
 140 lb.
 DATE OF DRILLING 5/23/96

 SURFACE ELEV.
 340±
 DROP
 30 in.
 WATER LEVEL
 None

SURFAC	CE ELE	٧٠	340:	<u> </u>	DROP	30 in. WATER LEVEL None
D E P T H O	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			26/6" 10/No	79 Penetrati	14 on	Silty CLAY (CL-ML) — Reddish brown, moist, stiff, with cobbles and gravel. Cobbles at 1.5 feet.
5 –			40	99	25	
			13	87	37	COMPLETELY WEATHERED BASALT (WC) — Mottled reddish brown, moist, medium dense.
10			17	78	41	Mottled grayish brown color from 9.5 feet.
15	The second secon		15	73	40	
+ 1						MODERATELY WEATHERED BASALT (WM) — Gray, medium hard.
20			90/9"	Tip Re	covery	Dense to medium hard from 19 feet.
+-	- + - +		50/3"	No Re	covery	
25-	e de la companya de l			***************************************		End boring at 24.5 feet.
		som) kastanaka			an terminas en concentrado transfer accombante da est	Plate B11

ERNEST K. HIRATA & ASSOCIATES, INC.

FED.ROAD

DIST.NO.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

FISCAL SHEET TOTAL YEAR NO. SHEETS

72

BORING NO. B12 (STA 140+50) DRIVING WT. 140 Ib. DATE OF DRILLING 5/30/96

HAWAII HAW. NH-037-1(22) 2003

FED. AID PROJ. NO.

SURFACE ELEV	376:	<u>t </u>	PROP	30 in. WATER LEVEL None
D G R A M P L E	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
	40	98	21	Silty CLAY (CL-ML) — Brown, moist, stiff, with cobbles and gravel.
- 5 -	40	114	17	Cobble at 5 feet. Grayish brown color from 5.5 feet.
-10-	56/10"	97	21	Mottled reddish brown color from 9 feet. Boulder at 10.5 to 11.5 feet.
-15-	51/11"	97	23	Cobble at 12 feet.
				End boring at 15.5 feet. Plate B12

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

BORING NO. B13 (STA 150+50) DRIVING WT. 140 lb. DATE OF DRILLING 5/29/96 WATER LEVEL None

PT	MPLE	PER FOOT	DENSITY (PCF)	CONT.	DESCRIPTION
12 March					Silty GRAVEL (GM) — Grayish brown, slightly moist, dense, with cobbles.
412-(90/9"	109	12	Cobble at 3 feet.
5		50/5"	No Re	covery	Cobbles at 4.5 feet.
					Cobbles from 6.5 to 8 feet.
10-		10/No	Penetrati	on	Cobble at 9 feet.
					MODERATELY TO SLIGHTLY WEATHERED BASALT (WM-WS) - Gray, medium hard to hard.
15	100			Andrew Andrews	End boring at 14 feet.
H. S. L. S. Valler					Plate B13

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u> BORING NO. B14 (STA 171+10) DRIVING WT. 140 lb. DATE OF DRILLING 5/23/96

SUKFA	UE ELE	. v	4//:	<u> </u>	JRUP	30 in. WATER LEVEL None
D E P T H	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
- 0 -			64	104	21	Silty CLAY (CL-ML) — Reddish brown, moist, stiff. Cobble at 1.5 feet.
			14	96	30	Mediurn stiff at 3 feet.
- 5 -			44	87	30	Brown color from 6 feet.
-10-			6	84	35	Firm from 8 to 11.5 feet.
-15-			65/5"	118	18	HIGHLY WEATHERED BASALT (WH) — Dark brown, moist, dense.
-20-						SLIGHTLY WEATHERED BASALT (WS) — Gray, hard. Begin NX coring at 17 feet. 100% Recovery from 17 to 22 feet. RQD = 100%
	-1-1-1					End boring at 22 feet.
-25-	And the second s	Projekt sprivatelejski serii serrii serrii serrii serii		THE THE PROPERTY OF THE PROPER		Plate B14

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

BORING NO. B15 (STA 171+70) DRIVING WT. 140 lb. DATE OF DRILLING 5/23/96 SURFACE ELEV. 480± DROP 30 in. WATER LEVEL None

	102 220	- · · -	700	 _	/////	SO III. YEALL NOITE
D E P T H	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
- 0			The state of the s			Silty CLAY (CL-ML) — Reddish brown, moist, stiff, with sand.
			24	93	20	
- 5			11	95	27	Medium stiff from 4 to 7 feet.
				Andrew Walter State of Party State of S		Drawn color from 7 foot
			49	100	27	Brown color from 7 feet.
10-						
4.5			65/6"	70	22	COMPLETELY WEATHERED BASALT (WC) — Mottled dark brown, moist, dense.
15-	Section of the control of the contro				-	
	A CONTRACTOR OF THE PROPERTY O		86/10"	104	16	
20-	AND STATE OF THE PROPERTY OF T		00,10		10	
						SLIGHTLY WEATHERED BASALT (WM) — Gray, hard.
7-10-10-10-10-10-10-10-10-10-10-10-10-10-	+ + + +		10/No	Penetratio	on	
25	Party-regularity Party P	авия в поставления поставлени				End boring at 24 feet.
		***************************************				Plate B15

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u> BORING NO. B16 (STA 183+60) DRIVING WT. 140 lb. DATE OF DRILLING 5/29/96 SURFACE ELEV. 529± DROP 30 in. WATER LEVEL None

D E P T H	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			27	96	24	Silty CLAY (CL-ML) — Reddish brown, moist, stiff, with gravel.
_ 5 _			22	98	29	
-10-			7	75	47	COMPLETELY WEATHERED BASALT (WC) — Mottled reddish brown, moist, firm.
an harmon der Beller besteht b	And the state of t		W. I.			Hard at 12 feet. End boring at 12.5 feet.
15						Plate B16

LICENSED PROFESSIONAL ENGINEER THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

ENGINEERS SURVEYORS HAWAII, INC.

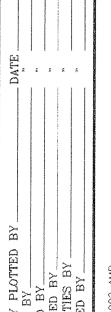
LICENSE EXPIRATION DATE: 4/30/04

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

HALEAKALA HIGHWAY WIDENING, PHASE I HANA HIGHWAY TO PUKALANI BYPASS FED. AID PROJ. NO. NH-037-1(22)

SCALE: AS NOTED DATE: NOV., 2002 SHEET No. 2 OF 5 SHEETS



ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

BORING NO. B17 (STA 196+00) DRIVING WT. 140 lb. DATE OF DRILLING 5/29/96 SURFACE ELEV. 592.5± DROP 30 in. __ WATER LEVEL____None___ BLOWS DRY MOIST.
PER DENSITY CONT.
FOOT (PCF) (%) DESCRIPTION

Silty GRAVEL (GM) - Grayish brown, moist, medium dense. 93 27 Silty CLAY (CL-ML) - Reddish brown, moist, medium stiff, with cobbles, gravel, and sand. Boulder at 4 to 5 feet. - 5 - 7 - 7 m Begin NX coring at 5 feet. 58% recovery from 5 to 9 feet. Cobbles from 5 to 6 feet. Cobbles from 7.5 to 8.5 feet. End NX coring at 9 feet. Cobbles from 9 to 11 feet. --10---Silty CLAY (CL-ML) - Brown, moist, medium stiff. 19 80 31

End boring at 14.5 feet.

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

BORING NO. B18 (STA 205+50) DRIVING WT. 140 Ib. DATE OF DRILLING 5/29/96 SURFACE ELEV. 641± DROP 30 in. WATER LEVEL None DESCRIPTION

BLOWS DRY MOIST.
PER DENSITY CONT.
FOOT (PCF) (%) Silty CLAY (CL-ML) - Reddish brown, slightly moist, stiff, with cobbles, gravel, and sand. Boulder at 0.5 to 2 feet. 70/10" 105 Cobbles from 3 to 4.5 feet. SLIGHTLY WEATHERED BASALT (WS) - Gray, hard. Begin NX coring at 5 feet. 94% Recovery from 5 to 10 feet. RQD = 80%End boring at 10 feet. Plate B18 ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

W.O. <u>95-2687</u>

DATE OF DRILLING 5/23/96 BORING NO. <u>B19 (STA 239+75)</u> **DRIVING WT.** <u>140 lb.</u> SURFACE ELEV. 815± DROP WATER LEVEL None

BORING LOG

SURFACE ELEV	0133	<u> </u>	JRUP	JU In. WATER LEVEL None
S A M P L E D E P T H O	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
	4/6" 15/No	Tip Re Penetrati	covery on	Silty CLAY (CL-ML) — Brown, moist, medium stiff, with cobbles. Cobbles from 2 to 3 feet.
	16	95	30	Cobbles from 2 to 3 feet.
-5-	15	86	37	
	17	82	22	COMPLETELY WEATHERED BASALT (WC) — Mottled brown, moist, medium dense.
-10				
-15 - 15 - 15 - 15 - 15 - 15 - 15 - 15	15/No	Penetrati	on	SLIGHTLY WEATHERED BASALT (WS) — Gray, hard, vesicular. Begin NX coring at 13 feet. 100% Recovery from 13 to 18 feet. RQD = 80%
+ 1 + 1 + 1 - 1 + 1 + 1 + 1 + 1 + 1 + 1		aller till a tille som men av til å Aller A tille som en sym å		End boring at 18 feet.
-20-				Plate B19

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

FED.ROAD

DIST.NO.

HAWAII

BORING LOG

HAW.

FED. AID

PROJ. NO.

NH-037-1(22)

W.O. <u>95-2687</u>

FISCAL SHEET

NO.

8

SHEETS

72

YEAR

2003

BORING NO. B20 (STA 240+25) DRIVING WT. 140 Ib. DATE OF DRILLING 5/22/99 SURFACE ELEV. 811± DROP 30 in. ___ WATER LEVEL None BLOWS DRY MOIST.
PER DENSITY CONT.
FOOT (PCF) (%) DESCRIPTION Н Silty CLAY (CL-ML) — Dark brown, moist, medium 99 27 19 Cobble at 2 feet. 90 Firm at 3 feet. 95 SLIGHTLY WEATHERED BASALT (WS) - Gray, hard, 10/No Penetration fractured. Begin NX coring at 10 feet. 100% Recovery from 10 to 15 feet. RQD = 50%Vesicular from 11.5 feet. -15-100% Recovery from 15 to 20 feet. RQD = 84%-20-End boring at 20 feet.

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

Plate B17

BORING NO. <u>B21 (STA 255+20)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING <u>5/29/99</u>

SUBFACE FLEY 870+ DROP 30 in WATER LEVEL None

SUF	RFACE ELE	.V	870:	<u>t </u>	ROP	30 in. WATER LEVEL None
D E P T H O	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			13	84	28	Silty CLAY (CL—ML) — Brown, moist, medium stiff, with gravel. Covered by 3 inches of asphaltic concrete.
- 5			21	97	24	COMPLETELY TO HIGHLY WEATHERED BASALT (WC-WH) - Mottled grayish brown, moist, dense.
10		T. LEWIS CO. CO.	28	88	38	
and a second			63	93	25	
15						End boring at 14 feet.
	MAR (MAR) (MAR)					Plate B21

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

			2 (STA 27 951:			T. 140 lb. DATE OF DRILLING 5/28/96 30 in. WATER LEVEL None
D E P T H O	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			13	75	39	COMPLETELY WEATHERED BASALT (WC) — Mottled brown, moist, medium dense. Covered by 2.5 inches of asphaltic concrete.
5 —	A CONTRACTOR OF THE CONTRACTOR		20	76	42	
10			50/6"	86	20	HIGHLY WEATHERED BASALT (WH) — Grayish brown, moist, dense.
15-			82/7"	Tip Re	covery	MODERATELY WEATHERED BASALT (WM) — Mottled gray, dense to medium hard.
	**************************************					End boring at 15 feet. Plate B22

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

SURFACE ELEV. 1022± DROP____

12

20

BORING NO. <u>B23 (STA 284+10)</u> DRIVING WT. <u>140 lb.</u>

BLOWS DRY MOIST.

PER DENSITY CONT. FOOT (PCF) (%)

89

80

73

30

BORING LOG

30 in.

stiff, with gravel. Brown color from 1 foot.

medium dense.

medium hard.

End boring at 14 feet.

W.O. <u>95-2687</u>

DATE OF DRILLING 5/28/96 WATER LEVEL None

DESCRIPTION

Silty CLAY (CL-ML) — Grayish brown, moist, medium COMPLETELY TO HIGHLY WEATHERED BASALT (WC-WH) -- Mottled yellowish brown, moist, MODERATELY WEATHERED BASALT (WM) - Gray,

Plate B23

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

Plate B20

Plate B24

BORING NO. <u>B24 (STA 65+40)</u> DRIVING WT. <u>140 lb.</u> ___ DATE OF DRILLING <u>5/30/96</u> WATER LEVEL None SURFACE ELEV. 146± DROP 30 in. DRY BLOWS PER DENSITY CONT. FOOT (PCF) (%) DESCRIPTION Silty CLAY (CL-ML) — Reddish brown, slightly moist, COMPLETELY WEATHERED BASALT (WC) - Grayish 70 brown, moist, dense. MODERATELY TO SLIGHTLY WEATHERED BASALT (WM-WS) - Gray, hard, vesicular.
Begin NX coring at 5 feet.
98% Recovery from 5 to 10 feet.
RQD = 82% -10-----End boring at 10 feet.

LICENSED PROFESSIONAL ENGINEER

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

BORING LOGS

HALEAKALA HIGHWAY WIDENING, PHASE HANA HIGHWAY TO PUKALANI BYPASS FED. AID PROJ. NO. NH-037-1(22) DATE: NOV., 2002

SHEET No. 3 OF 5 SHEETS

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. ENGINEERS SURVEYORS HAWAII, INC. SCALE: AS NOTED LICENSE EXPIRATION DATE: 4/30/04

)ATE "

8

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

BORING NO. B25 (STA 78+00) DRIVING WT. 140 lb. DATE OF DRILLING 5/30/96 SURFACE ELEV. 170± DROP 30 in. WATER LEVEL None DRY MOIST.
DENSITY CONT.
(PCF) (%) BLOWS PER FOOT DESCRIPTION Sitty CLAY (CL-ML) - Reddish brown, moist, stiff. 87 18 10/No Penetration HIGHLY WEATHERED BASALT (WH) - Mottled grayish brown, moist, dense to medium hard. 15/4" 80 15 10/No Penetration MODERATELY WEATHERED BASALT (WM) - Gray, medium hard. Dense to medium hard from 12 feet. End boring at 15 feet.

Geotechnical Engineering BORING LOG BORING NO. <u>B26 (STA 118+60)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING <u>5/30/99</u>

ERNEST K. HIRATA & ASSOCIATES, INC.

SURF	ACE ELE	V	302:	<u>t</u> [ROP	30 in. WATER LEVEL None
D E P T H O	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
	# # #					Silty GRAVEL (GM) — Grayish brown, slightly moist, dense.
			40/4"	Tip Re	covery	Silty CLAY (CL-ML) — Grayish brown, slightly moist, stiff, with cobbles and gravel. Cobble at 1 foot. Cobble at 3 feet.
- 5 -	+-111 +111 +111 +111 +111 +111 +111		50/5"	No Re	covery	MODERATELY WEATHERED BASALT (WM) — Gray, medium hard, highly vesicular.
-10-			50/2"	Tip Re	covery	
-15-			10/No	Penetrati	on	
						End boring at 15 feet. Plate B26

ERNEST K. HIRATA & ASSOCIATES. INC.

Geotechnical Engineering

W.O. <u>95-2687</u>

BORING LOG W.O. <u>95-2687</u> BORING NO. <u>B27 (STA 160+70)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING <u>5/29/96</u>

SURFA	CE ELE	V	444:	<u>t</u> D	ROP	30 in. WATER LEVEL None
DEPTIO	GR A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
_ 0 _	# # # # # # # # # # # # # # # # # # #		47	119	6	Silty GRAVEL (GM) — Grayish brown, slightly moist, dense. Brown color from 2 feet.
<u> </u>			24	97	26	Silty CLAY (CL-ML) — Reddish brown, moist, stiff.
	Grand Control of the		4/6" 12/6"	93	30	COMPLETELY TO HIGHLY WEATHERED BASALT (WC-WH) — Mottled grayish brown, moist, medium dense to dense.
10						End boring at 9.5 feet.
		and the same of th				Plate B27

FED. AID PROJ. NO. FISCAL SHEET YEAR NO. S FED.ROAD DIST.NO. SHEETS HAW. NH-037-1(22) 2003 72 HAWAII

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u> ___ DATE OF DRILLING <u>5/29/96</u>

Plate B28

			3 (STA 21 697:			. 140 lb. DATE OF DRILLING 5/29/96 30 in. WATER LEVEL None
DEPTHO	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			W-1010			Silty CLAY (CL-ML) — Brown, moist, stiff, with gravel.
	Manufacture Manufa		35	88	29	HIGHLY WEATHERED BASALT (WH) — Mottled grayish brown, moist, dense.
5 —			65	105	18	Mottled yellowish brown color at 4 feet.
	Section 1997 (1997) (19		50/5"	Tip Re	covery	
_10						SLIGHTLY WEATHERED BASALT (WS) — Gray, hard.

End boring at 12.5 feet.

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

Plate B25

BORING LOG W.O. <u>95-2687</u> BORING NO. <u>B29 (STA 227+90)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING <u>5/29/96</u> SURFACE ELEV. 754± DROP 30 in. WATER LEVEL None

SUKFA	CE ELE	. v	/34:	<u> </u>	JROP	JO In. WATER LEVEL None
DEPTHO	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
	radius accion					Silty GRAVEL (GM) — Reddish brown, slightly moist, dense.
	A STATE OF THE PARTY OF THE PAR		29/6" 35/1"	97	23	HIGHLY WEATHERED BASALT (WH) — Mottled grayish brown, moist, dense.
5			50/5"	Tip Re	covery	MODERATELY WEATHERED BASALT (WM) — Mottled gray, dense to medium hard.
+			50/3"	No Re	covery	
10-						End boring at 9 feet.
						Plate B29

ERNEST K. HIRATA & ASSOCIATES, INC. Geotechnical Engineering

BORING LOG W.O. <u>95-2687</u>

Plate B30

) (STA 12 333:			7. 140 lb. DATE OF DRILLING 8/25/99 30 in. WATER LEVEL None
DEPTHO	G R A P H	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			42	91	26	Silty CLAY (CL-ML) — Reddish brown, moist, stiff, with sand and gravel.
			45	90	28	
- 5 -			43	86	34	
						HIGHLY WEATHERED BASALT (WH) — Mottled grayish brown, moist, dense.
	-			No Re		
—10 —				enetration enetration		MODERATELY WEATHERED BASALT (WM) — Gray, medium hard.
			•			
						End boring at 13 feet.

ERNEST K. HIRATA & ASSOCIATES, INC.

Geotechnical Engineering

BORING LOG

W.O. <u>95-2687</u>

Plate B31

BORING NO. <u>B31 (STA 128+00)</u> DRIVING WT. <u>140 lb.</u> DATE OF DRILLING <u>8/25/99</u> SURFACE ELEV. 337± DROP 30 in. WATER LEVEL None BLOWS DRY MOIST. PER DENSITY CONT. FOOT (PCF) (%) DESCRIPTION -0-Silty CLAY (CL-ML) - Brown, moist, stiff, with sand and gravel. 99 50 38 90 29 16 81 34 53/6"
10/No Penex

10/No Penex

10/No Penetration HIGHLY WEATHERED BASALT (WH) - Grayish brown, moist, dense. MODERATELY WEATHERED BASALT (WM) — Gray, medium hard. End boring at 15 feet.

> LICENSED PROFESSIONAL ENGINEER

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

BORING LOGS

HALEAKALA HIGHWAY WIDENING, PHASE HANA HIGHWAY TO PUKALANI BYPASS FED. AID PROJ. NO. NH-037-1(22)

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

SHEET No. 4 OF 5 SHEETS

SCALE: AS NOTED DATE: NOV., 2002

LICENSE EXPIRATION DATE: 4/30/04

ENGINEERS SURVEYORS HAWAII, INC.

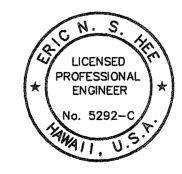
ED.ROAD DIST.NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(22)	2003	10	72

Date/Time:	May 3, 2001		
Test performed by:	Ernest K. Hirata & Associates	, Inc.	
Owner:	State of Hawaii - Department	of Transportation - High	ways Division
Station No. along Haleakala Highway:	Near Sta. 1+10 (Existing Sta.	38+80)	·
Test Hole Number:	P1		
Elevation: 88.0± ft. Depth to Groundwater Depth to Bedrock (if ob Diameter of Hole: 4 Depth to Hole Bottom:			
Depth		Soil Profile	
(inches) 0 - 42	Clavey SILT (ML) P.	(Color, texture, other	
No. 19 Carlos Company of the Company	sand.	eddish to gravish brown,	Sudinin Willst' Still Mith
42 - 84	MODERATELY WEA	THERED BASALT (WM) - Mottled grayish
84 - 240	brown, medium hard.	DED BACALT (MC)	and the second
0-4 - 2-40	SLIGHTLT WEATHE	RED BASALT (WS) - Gr	ay, nard.
Time 12 inches of wate For percolation te 1 hour. For percolation te	PERCOLATION r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time inte	ervals and water drops e	ours. Record time interv
Time 12 inches of wate For percolation te 1 hour. For percolation te and water drops a is greater than 30	r to seep away: <u>NA</u> minutes r to seep away: <u>NA</u> minutes sts in sandy soils, record time inte	ervals and water drops e e test hole for at least 4 h our; or if the time for the ad water drops at least ev	ours. Record time interviews to seep awa
Time 12 inches of wate For percolation te 1 hour. For percolation te and water drops a is greater than 30	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time into sts in non-sandy soils, presoak that least every 10 minutes for 1 ho minutes, record time intervals ar	ervals and water drops e e test hole for at least 4 h our; or if the time for the ad water drops at least ev	ours. Record time interviews to seep awa
For percolation te 1 hour. For percolation te and water drops a is greater than 30 or until 2 success	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time intests in non-sandy soils, presoak that least every 10 minutes for 1 hominutes, record time intervals ar ive drops do not vary by more that	ervals and water drops e e test hole for at least 4 h our; or if the time for the od water drops at least ev an 1/16 inch.	nours. Record time interviews to seep awayery 30 minutes for 4 hou
Time 12 inches of wate For percolation te 1 hour. For percolation te and water drops a is greater than 30 or until 2 success Time interval*	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time intests in non-sandy soils, presoak that least every 10 minutes for 1 hominutes, record time intervals ar ive drops do not vary by more that	ervals and water drops e e test hole for at least 4 h our; or if the time for the id water drops at least ev an 1/16 inch.	ours. Record time interviews to seep awayery 30 minutes for 4 hou
Time 12 inches of wate For percolation te 1 hour. For percolation te and water drops a is greater than 30 or until 2 success Time interval* * Water pumped interval	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time into sts in non-sandy soils, presoak that least every 10 minutes for 1 ho minutes, record time intervals ar ive drops do not vary by more the Drop in inches	ervals and water drops entertal and water drops at least 4 hour; or if the time for the find water drops at least even 1/16 inch. Time interval	ours. Record time interviews to seep awayery 30 minutes for 4 hou

)ATE "

Date/Time:	May 1, 2001
Test performed by:	Ernest K. Hirata & Associates, Inc.
Owner:	State of Hawaii - Department of Transportation - Highways Division
Station No. along Haleakala Highway:	Sta. 8+60 (Existing Sta. 46+30)
Test Hole Number:	P2
Elevation: 96.6± ft. Depth to Groundwater Depth to Bedrock (if obtainmenter of Hole: 4 Depth to Hole Bottom:	
Depth	Soil Profile
(inches) 0 - 132	(Color, texture, other) Clayey SILT (ML) - Grayish brown, slightly moist, medium stiff, with
	sand and gravel.
132 - 180	MODERATELY WEATHERED BASALT (WM) - Mottled grayish
190 224	brown, medium hard.
180 - 234	SLIGHTLY WEATHERED BASALT (WS) - Gray, hard.
Time 12 inches of water For percolation tes 1 hour. For percolation tes	PERCOLATION READINGS To seep away: NA minutes To seep away: NA minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at sts in non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals are every 10 minutes for 1 hours or if the time for the first 6 inches to a second time intervals.
Time 12 inches of water For percolation tes 1 hour. For percolation tes and water drops a is greater than 30	r to seep away: <u>NA</u> minutes r to seep away: <u>NA</u> minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at
Time 12 inches of water For percolation tes 1 hour. For percolation tes and water drops a is greater than 30	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at sts in non-sandy soils, presoak the test hole for at least 4 hours. Record time int at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep a minutes, record time intervals and water drops at least every 30 minutes for 4 h
For percolation tes 1 hour. For percolation tes and water drops a is greater than 30 or until 2 successi	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at sts in non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals every 10 minutes for 1 hour; or if the time for the first 6 inches to seep a minutes, record time intervals and water drops at least every 30 minutes for 4 hours drops do not vary by more than 1/16 inch.
Time 12 inches of water For percolation test 1 hour. For percolation test and water drops a is greater than 30 or until 2 successitation. Time interval* * Water pumped into	r to seep away: NA minutes r to seep away: NA minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at sts in non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals every 10 minutes for 1 hour; or if the time for the first 6 inches to seep a minutes, record time intervals and water drops at least every 30 minutes for 4 hours drops do not vary by more than 1/16 inch.
For percolation tes 1 hour. For percolation tes and water drops a is greater than 30 or until 2 successi Time interval* * Water pumped into in at a rate of 0.6	r to seep away: NA minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at sts in non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals every 10 minutes for 1 hour; or if the time for the first 6 inches to seep a minutes, record time intervals and water drops at least every 30 minutes for 4 hole drops do not vary by more than 1/16 inch. Drop in inches Time interval Drop in inches Time interval Drop in inches
For percolation tes 1 hour. For percolation tes and water drops a is greater than 30 or until 2 successi Time interval* * Water pumped into in at a rate of 0.8 Approximate Percolation As the engineer respons to the fact that above site	r to seep away: NA minutes sts in sandy soils, record time intervals and water drops every 10 minutes for at least in non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals every 10 minutes for 1 hour; or if the time for the first 6 inches to seep a minutes, record time intervals and water drops at least every 30 minutes for 4 hours drops do not vary by more than 1/16 inch. Drop in inches Time interval Drop in inches Time interval Drop in inches Drop in

Date/Time:	May 2, 2001
Test performed by:	Ernest K. Hirata & Associates, Inc.
Owner:	State of Hawaii - Department of Transportation - Highways Division
Station No. along Haleakala Highway:	Sta. 24+30 (Existing Sta. 62+00)
Test Hole Number:	P3
Depth (inches)	Soil Profile (Color, texture, other)
0 - 126	Clayey SILT (ML) - Reddish brown, slightly moist, medium stiff to stiff.
126 - 138	MODERATELY WEATHERED BASALT (WM) - Mottled grayish
420 240	brown, medium hard.
138 - 240	SLIGHTLY WEATHERED BASALT (WS) - Gray, hard.
Time 12 inches of water	er to seep away: NA minutes
For percolation to 1 hour. For percolation to and water drops is greater than 30	ests in sandy soils, record time intervals and water drops every 10 minutes for at least sin non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep away minutes, record time intervals and water drops at least every 30 minutes for 4 hours ive drops do not vary by more than 1/16 inch.
For percolation to 1 hour. For percolation to and water drops is greater than 30	ests in sandy soils, record time intervals and water drops every 10 minutes for at least sin non-sandy soils, presoak the test hole for at least 4 hours. Record time intervals at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep away minutes, record time intervals and water drops at least every 30 minutes for 4 hour
For percolation to 1 hour. For percolation to and water drops is greater than 30 or until 2 success.	ests in sandy soils, record time intervals and water drops every 10 minutes for at least sin non-sandy soils, presoak the test hole for at least 4 hours. Record time interval at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep away minutes, record time intervals and water drops at least every 30 minutes for 4 hours ive drops do not vary by more than 1/16 inch.
For percolation to 1 hour. For percolation to and water drops is greater than 30 or until 2 success.	ests in sandy soils, record time intervals and water drops every 10 minutes for at least sin non-sandy soils, presoak the test hole for at least 4 hours. Record time interval at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep away minutes, record time intervals and water drops at least every 30 minutes for 4 hours ive drops do not vary by more than 1/16 inch.
For percolation to 1 hour. For percolation to and water drops is greater than 30 or until 2 success Time interval* * Water pumped in	ests in sandy soils, record time intervals and water drops every 10 minutes for at least sin non-sandy soils, presoak the test hole for at least 4 hours. Record time interval at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep away minutes, record time intervals and water drops at least every 30 minutes for 4 hours ive drops do not vary by more than 1/16 inch.
For percolation to 1 hour. For percolation to and water drops is greater than 30 or until 2 success Time interval* * Water pumped in at a rate of 1.0	ests in sandy soils, record time intervals and water drops every 10 minutes for at least sin non-sandy soils, presoak the test hole for at least 4 hours. Record time interval at least every 10 minutes for 1 hour; or if the time for the first 6 inches to seep award minutes, record time intervals and water drops at least every 30 minutes for 4 hours sive drops do not vary by more than 1/16 inch. Drop in inches Time interval Drop in inches Drop in inches



BORING LOGS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HALEAKALA HIGHWAY WIDENING, PHASE I
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(22)
SCALE: AS NOTED DATE: NOV., 2002 LICENSE EXPIRATION DATE: 4/30/04 SCALE: AS NOTED

SHEET No. 5 OF 5 SHEETS

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION. EUN No So Her ENGINEERS SURVEYORS HAWAII, INC. Plate A3