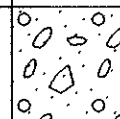
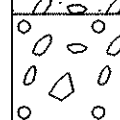
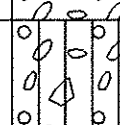

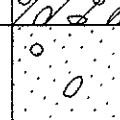
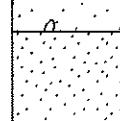
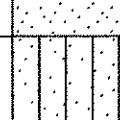


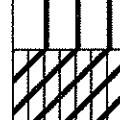
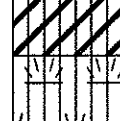

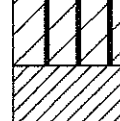
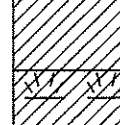
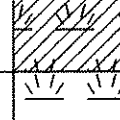


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83F-02-00M	2004	95	98

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
		LESS THAN 5% FINES		GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	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
		LESS THAN 5% FINES		SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	50% OR MORE OF COARSE FRACTION PASSING THROUGH NO. 4 SIEVE	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
50% OR MORE OF MATERIAL PASSING THROUGH NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT 50 OR MORE		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
				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
- 3-INCH O.D. MODIFIED CALIFORNIA SAMPLE
- SHELBY TUBE SAMPLE
- GRAB SAMPLE
- CORE SAMPLE

- LL LIQUID LIMIT
- PI PLASTICITY INDEX
- TV TORVANE SHEAR (tsf)
- PEN POCKET PENETROMETER (tsf)
- WATER LEVEL OBSERVED IN BORING

GEOTECHNICAL NOTES

- A geotechnical engineering report entitled "Geotechnical Engineering Exploration, Kahekili Highway Lighting Improvements, Haiku Road to Ahuimanu Place, Koolaupoko, Oahu, Hawaii" dated February 15, 2002 has been prepared by Geolabs Inc. A copy of the report is on file at the office of the Engineer for review by the Contractor.

- The following structural loads are used in the design of the drilled shaft foundations for the lighting system.

30-Foot Light Pole

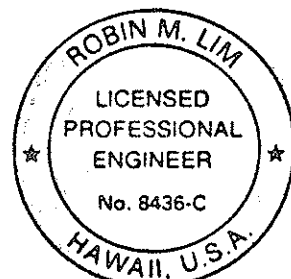
Axial Load at Base of Pole	700 lbs.
Lateral Load at Base of Pole	700 lbs.
Bending Moment at Base of Pole	16,000 ft-pounds

- The drilled shaft foundation design is based on the following design parameters.

30-Foot Light Pole

	Type I	Type II	Type III
Drilled Shaft Diameter	22 inches	22 inches	30 inches
Drilled Shaft Embedment Below Finish Grade	6 feet	8 feet	12 feet
Subsurface Soil Conditions	Stiff Clayey Silt	Medium Stiff Silty Clay	Very Soft Silty Clay
Cohesion	1,000 psf	700 psf	200 psf
Unit Weight	110 pcf	110 pcf	110 pcf
Modulus of Subgrade Reaction	500 pci	100 pci	50 pci
Ground Surface	Level	Sloping 1.5H:1V	Level

- For boring locations, see Sheet 9 & 10.
- 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.
- 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.
- Contractor shall be responsible for his own assumptions regarding the subsoil conditions at the drilled shaft locations. No additional compensation shall be made if actual subsoil conditions differ from those depicted in the logs of borings.
- Hard materials in the form of boulders and basalt formation shall be anticipated at the site and shall not be considered as rock. Drilling into such materials shall not give cause for a claim for additional compensation regardless of hardness or difficulty in drilling.



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OR UNDER MY SUPERVISION
Robin M. Lim

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BORING LOG LEGEND, GEOTECHNICAL NOTES


KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS
Haiku Rd. to Ahuimanu Place
Project No. 83F-02-00M


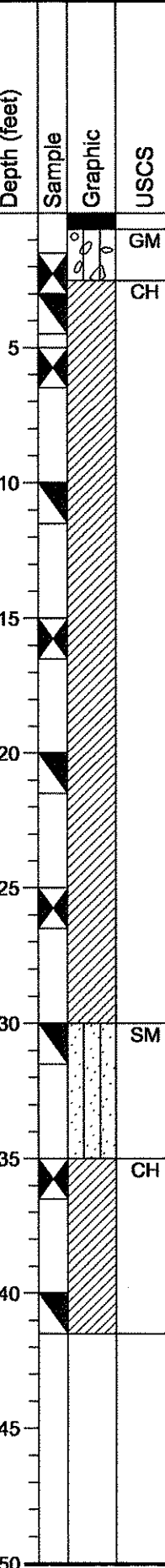
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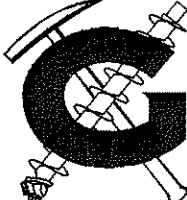
Date: SEPT 2002

SHEET No. 1 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83F-02-00M	2004	96	98

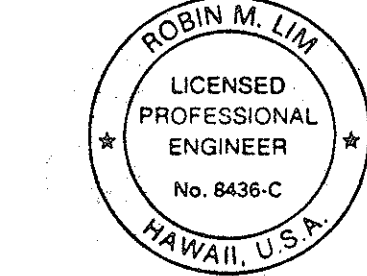
		GEOLABS, INC.		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII				Log of Boring 1		
Laboratory				Field				Approximate Ground Surface Elevation (feet MSL): 58 *		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blow/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	9	121			53		0	GP SM		6 inches ASPHALTIC CONCRETE
	20				37		1			Tan SANDY CORALLINE GRAVEL, very dense, damp (fill)
	38	78			19	2.0	5	CH		Grayish brown GRAVELLY SAND with silt medium dense, moist (fill)
										Reddish brown SILTY CLAY with some gravel, medium stiff to stiff, moist
	23				23		10			
	47	75			24	1.5	15			
	47				15	1.75	20			grades to very moist
	59	65			10	0.75	25	CL-OL		Reddish brown SILTY CLAY with some gravel, very moist, medium stiff to stiff
	63				4	0.75	30			Dark grayish brown SILTY CLAY with some gravel and organics, soft, very moist
	54	65			15		35	ML		Orange brown GRAVELLY SILT with sand, medium dense, very moist
	53				20		40			
							45			Boring terminated at 41.5 feet
							50			* Elevations estimated from Plans provided by Ron N. S. Ho and associates, Inc. on October 23, 2001.
Date Started: August 13, 2001				Water Level: 3.7 ft. 8/13/01 1145 HRS				Plate A - 1		
Date Completed: August 13, 2001										
Logged By: E. Shinsato				Drill Rig: CME-55						
Total Depth: 41.5 feet				Drilling Method: 4" Auger						
Work Order: 4730-00				Driving Energy: 140 lb. wt., 30 in. drop						

		GEOLABS, INC.		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII				Log of Boring 2		
Geotechnical Engineering										
Laboratory		Field						Approximate Ground Surface Elevation (feet MSL): 57 *		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
LL=82 PI=52	21	94			25		0		GM	6 inches ASPHALTIC CONCRETE
	39				10		6		CH	Tan SANDY CORALLINE GRAVEL with silt, dense, damp (fill)
	25				19		10			Reddish brown SILTY CLAY with some gravel, medium stiff, moist grades to grayish brown
							15			grades to reddish brown
	30				9		20			grades to very moist
					13	1.75	25			Reddish brown SILTY CLAY with some gravel, very moist, medium stiff
	45				12		30			Light brown SILTY SAND with gravel, medium dense
	49	72			16	1.0	35			Brown SILTY CLAY with gravel, medium stiff
	47				24		40			Boring terminated at 41.5 feet
	53	68			12	1.25				
47				14						
Date Started: August 14, 2001		Water Level: 29.0 ft. 8/14/01 1016 HRS		Plate A - 2						
Date Completed: August 14, 2001		28.8 ft. 8/14/01 1058 HRS								
Logged By: E. Shinsato		Drill Rig: CME-55								
Total Depth: 41.5 feet		Drilling Method: 4" Auger								
Work Order: 4730-00		Driving Energy: 140 lb. wt., 30 in. drop								

		GEOLABS, INC.		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII				Log of Boring 3		
Laboratory		Field						Approximate Ground Surface Elevation (feet MSL): 60 *		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample Graphic	USCS	Description
	22	104			42				GM	6 inches ASPHALTIC CONCRETE
	31				13	2.0			CH	Tan SANDY CORALLINE GRAVEL with silt, very dense, damp (fill)
	40	79			40		5			Reddish brown SILTY CLAY with gravel, stiff, moist grades to very stiff
	25				32		10			
	40	85			32	1.75	15			
	54				8		20			grades to orange brown, medium stiff, very moist
	52	69			20	2.0	25			Orange brown SILTY CLAY with gravel, medium stiff, very moist
	52				15	2.0	30			
	61	64			17	1.75	35			
	67				6		40			
										Boring terminated at 41.5 feet

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DESIGNED BY: _____	
QUANTITIES BY: _____	
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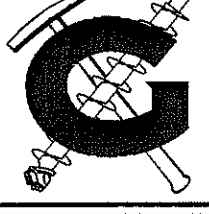
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BORING LOGS
KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS
Haiku Rd. to Ahuimanu Place
Project No. 83F-02-00M
Scale: AS NOTED
Date: SEPT 2002
SHEET No. 2 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83F-02-00M	2004	97	98

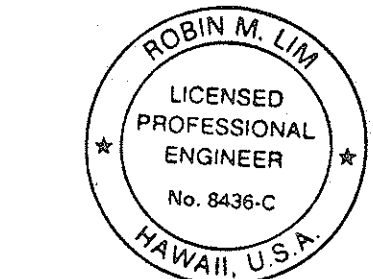
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Laboratory		Field		Approximate Ground Surface Elevation: N/A			
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)
	32 4	77			61 40/.5' Ref. 15/.0' Ref.	>4.5	
				Description			
				4 inches ASPHALTIC CONCRETE Reddish brown SILTY CLAY with gravel, very stiff			
				Gray BASALT, severely fractured, slightly weathered, medium hard (basalt formation)			
				Boring terminated at 12 feet			
				Plate A - 4			

		GEOLABS, INC. Geotechnical Engineering		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII		Log of Boring 5	
Laboratory		Field		Approximate Ground Surface Elevation: N/A			
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)
	11				30/.3' Ref. 40/.2' Ref. 15/.0' Ref. 15/.0' Ref.		
				Description			
				Brown SILTY GRAVEL with cobbles, medium dense to dense, moist (fill)			
				Gray BASALT, severely fractured, moderately weathered, medium hard (basalt formation)			
				Boring terminated at 13 feet			
				Plate A - 5			

		GEOLABS, INC. Geotechnical Engineering		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII		Log of Boring 6	
Laboratory		Field		Approximate Ground Surface Elevation (feet MSL): 99 *			
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)
	10 41	116			32 6 5	0.25	
	58				6		
	59	63			13	2.25	
	74				7		
	63	60			10	0.75	
	68				8		
	62	60			23	1.75	
	54				21		
				Description			
				6 inches ASPHALTIC CONCRETE Tan SANDY CORALLINE GRAVEL with silt, medium dense, damp (fill)			
				Reddish brown CLAYEY SILT with gravel, soft, very moist			
				grades to soft to medium stiff			
				Brown with black and white mottling CLAYEY SILT with gravel, soft to medium stiff			
				Brown with black and white mottling CLAYEY SILT with sand and gravel, stiff			
				Boring terminated at 41.5 feet			
				Plate A - 6			

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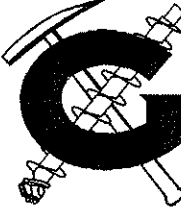
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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

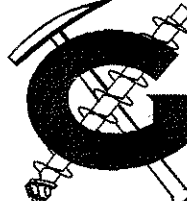
BORING LOGS

KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS
Haiku Rd. to Ahuimanu Place
Project No. 83F-02-00M

Scale: AS NOTED Date: SEPT 2002
SHEET No. 3 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83F-02-00M	2004	98	98

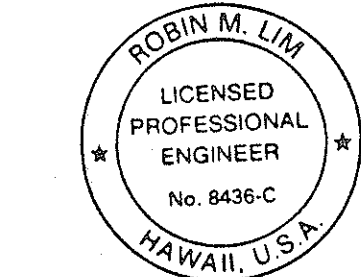
		GEOLABS, INC.		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII				Log of Boring 7		
Geotechnical Engineering										
Laboratory		Field						Approximate Ground Surface Elevation: N/A		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blow/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	USCS	
								Graphic		
LL=95 PI=57	6	114			85				GP	5 inches ASPHALTIC CONCRETE Tan SANDY CORALLINE GRAVEL with silt, dense, damp (fill) Brown SILTY CLAY with gravel, soft, very moist
	52				5				CH	
	59	63			9	0.50	5			
	68				2		10			grades to dark brown, very soft
					3		15			grades with organics
	79				4		20			
	75	56			11	1.75	25			Orange brown SILTY CLAY with gravel, medium stiff
	67				11		30			
	71	57			16		35		CH	Orange brown SILTY CLAY with gravel, stiff
	68				16		40			Boring terminated at 41.5 feet
							45			
							50			
Date Started: August 17, 2001				Water Level: 14.5 ft. 8/17/01 0946 HRS		Plate A - 7				
Date Completed: August 17, 2001				9.4 ft. 8/17/01 1113 HRS						
Logged By: E. Shinsato				Drill Rig: CME-55						
Total Depth: 41.5 feet				Drilling Method: 4" Auger						
Work Order: 4730-00				Driving Energy: 140 lb. wt., 30 in. drop						

		GEOLABS, INC.		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII				Log of Boring 8	
Laboratory		Field						Approximate Ground Surface Elevation: N/A	
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Description
	7	123			85			AC	6 inches ASPHALTIC CONCRETE
	20				21			GP	Tan SANDY CORALLINE GRAVEL, dense, damp (fill)
	51	63			42		5	GC	Grayish brown CLAYEY BASALTIC GRAVEL, medium dense, moist (fill)
								SM	Orange brown SILTY BASALTIC SAND with gravel, dense, moist
					15/0' Ref.		10		grades with boulders and cobbles
					5	0.0	15	CH	Dark brown SILTY CLAY with sand, very soft
					4		20		
LL=78 PI=44	67						25	SP- SM	Dark grayish brown GRAVELLY SAND with silt, medium dense
	49	70			23		30	MH	Dark grayish brown CLAYEY SILT with sand, stiff
	60				16	2.25	35		
	68	58			24		40		
	67				10		45		
							50		Boring terminated at 41.5 feet
Date Started: August 21, 2001		Water Level: 14.2 ft. 8/21/01 0957 HRS		Plate A - 8					
Date Completed: August 21, 2001		13.7 ft. 8/21/01 1130 HRS							
Logged By: E. Shinsato		Drill Rig: CME-55							
Total Depth: 41.5 feet		Drilling Method: 4" Auger							
Work Order: 4730-00		Driving Energy: 140 lb. wt., 30 in. drop							

G GEOLABS, INC. Geotechnical Engineering		KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS HAIKU ROAD TO AHUIMANU PLACE KOOLAUPOKO, OAHU, HAWAII				Log of Boring 9				
Laboratory		Field						Approximate Ground Surface Elevation: N/A		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	USCS	Description
	10	113			43				GP	6 inches ASPHALTIC CONCRETE
					12					Tan SANDY CORALLINE GRAVEL, medium dense, damp (fill)
	52	67			12	0.50	5		CH	grades with cobbles
										Brown SILTY CLAY with gravel, medium stiff, very moist
	60				3		10			grades to dark grayish brown, very soft
	33				11		15		SW-SM	Dark grayish brown GRAVELLY SAND with silt loose
	66				3		20			
	70	58			22	2.75	25		CL	Grayish brown SILTY CLAY with sand, stiff
	49				50/4' Ref.		30		SM	Orange brown SILTY BASALTIC SAND with gravel, medium dense
	71	57			17		35		MH	Orange brown CLAYEY SILT with sand and gravel, medium stiff
	79				9	0.50	40		CH	grades to SILTY CLAY
										Boring terminated at 41.5 feet
							45			
							50			
Date Started: August 20, 2001		Water Level: 10.2 ft. 8/20/01 1011 HRS		Plate A - 9						
Date Completed: August 20, 2001		9.3 ft. 8/20/01 1152 HRS								
Logged By: E. Shinsato		Drill Rig: CME-55								
Total Depth: 41.5 feet		Drilling Method: 4" Auger								
Work Order: 4730-00		Driving Energy: 140 lb. wt., 30 in. drop								

SURVEY PLOTTED BY: _____	DATE: _____
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DESIGNED BY: _____	
QUANTITIES BY: _____	
CHECKED BY: _____	

LAST SAVE: 08/05/03 @ 07:45:58 BY: LA PLOT SC: 1'-0"=1'
2. AVOID PROJECTS \1085\1085_Sample_Sheet_83F-02-00M.DWG



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION
Robin M. Lim

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BORING LOGS
KAHEKILI HIGHWAY LIGHTING IMPROVEMENTS
Haiku Rd. to Ahuimanu Place
Project No. 83F-02-00M
Scale: AS NOTED
Date: SEPT 2002
SHEET No. 4 OF 4 SHEETS