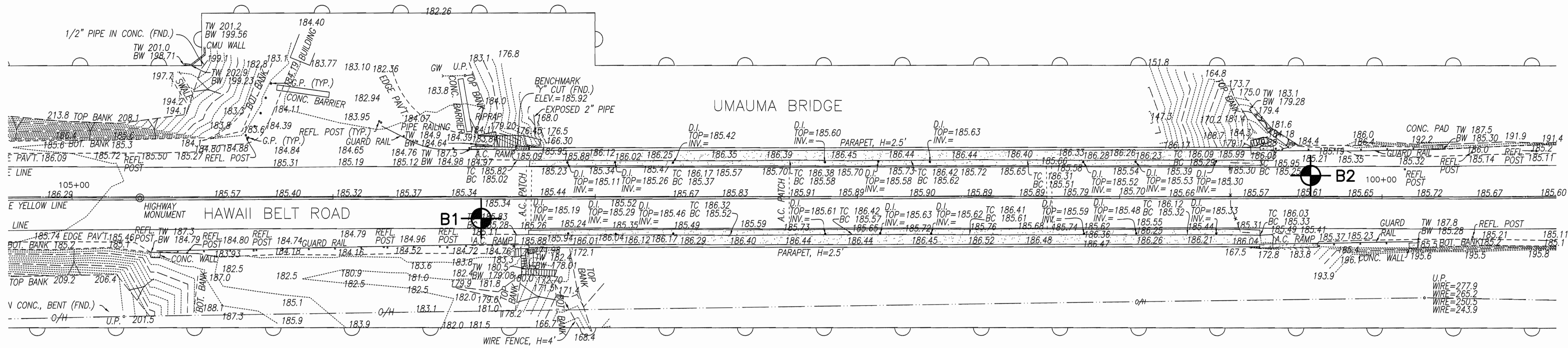
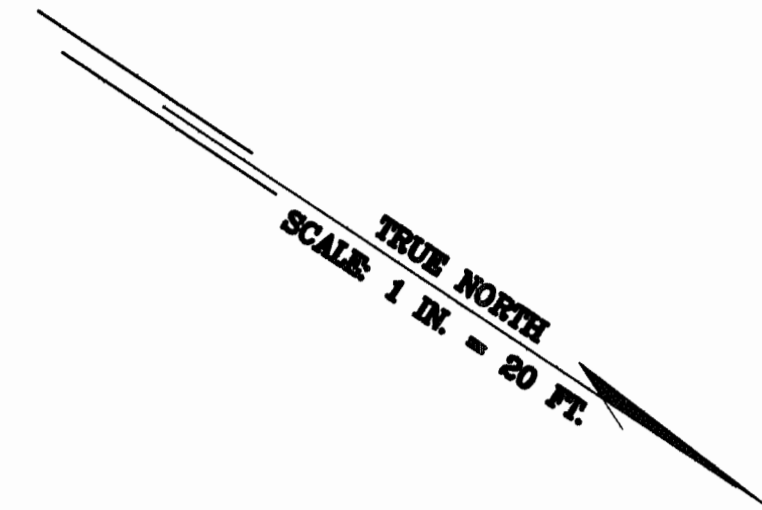


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	8	137



**Legend:**  
 Approximate location of borings.

TOPOGRAPHIC SURVEY MAP  
 UMAUMA BRIDGE  
 WAILUA, ISLAND OF HAWAII, HAWAII  
 JOB NO. : 10003-01 FIELD BOOK : M-173  
 FEBRUARY 23, 2010

**BENCHMARK**  
 REFERRED TO "4" CUT ON SOUTH END OF BRIDGE AS SHOWN ON HAWAII BELT ROAD AS-BUILTS PLANS, F.A.P. NO. SDR-3(13) SHEET 7  
 ELEV. = 185.92

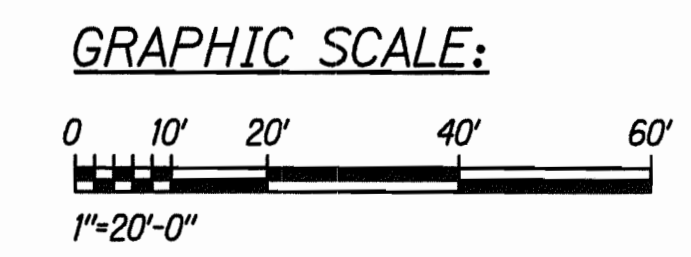
**LEGEND**

A.C.	ASPHALT CONCRETE	GW	GUY WIRE
BC	BOTTOM CURB	H	HEIGHT
BOT.	BOTTOM	HV	HAND VALVE
BW	BOTTOM WALL	O/H	OVERHEAD
C.L.	CHAIN LINK	PAV'T.	PAVEMENT
CRM	CONCRETE RUBBLE MASONRY	REFL.	REFLECTOR
CONC.	CONCRETE	S.L.	STREET LIGHT
D	DIAMETER OR DRAIN	STA.	STATION
D.I.	DRAIN INLET	TC	TOP CURB
DWY.	DRIVEWAY	TW	TOP WALL
ELEV.	ELEVATION	TYP.	TYPICAL
FND.	FOUND	U.P.	UTILITY POLE
G.P.	GUARD POST/GATE POST		

**BORING NOTES**

- The boring logs shown on the drawings indicate the approximate subsurface conditions encountered at that specified location and at the times of the field exploration only, and may not represent conditions at other locations or on other dates. Soil conditions and ground water levels may change with the weather, passage of time, and/or improvements or changes at the site.
- The penetration resistance shown on the boring logs indicate the number of blows required for a 3-inch O.D. split tube sampler.
- The data provided in the boring logs is for general information. Bidders shall examine the site and make their own interpretations and conclusions regarding the materials to be encountered. Neither the State of Hawaii nor Hirata & Associates, Inc. will assume responsibility for interpretations made by others.

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
DESIGNED BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTED	_____
NO.	_____



LICENSE EXPIRES: 4/30/14  
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*Con C. Truong*

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**BORING LOCATION PLAN**

HAWAII BELT ROAD  
 Rehabilitation of Umauma Stream Bridge  
 Federal Aid Project No. BR-019-2(61)

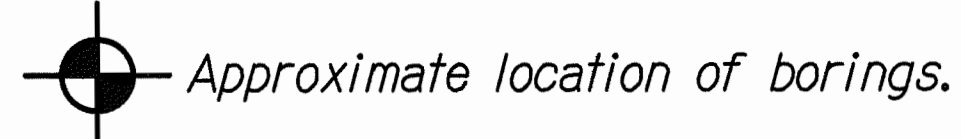
Scale: 1" = 20'-0" Date: July 25, 2012

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	9	137



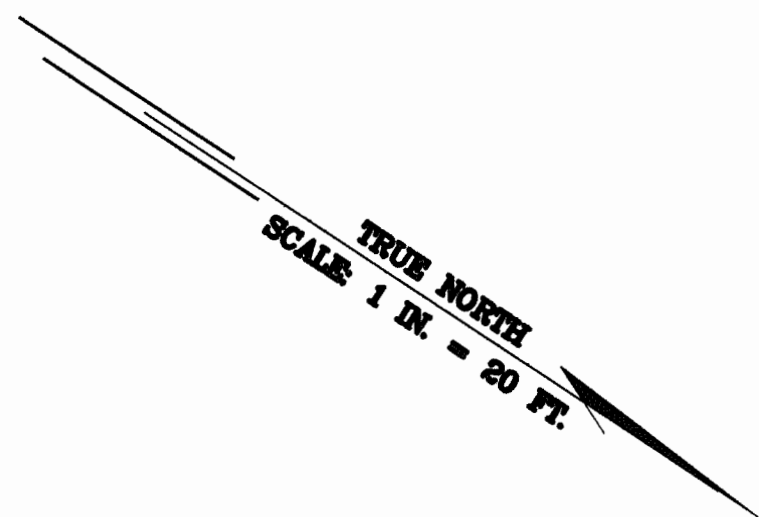
SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTEBOOK	
No.	

Legend:



Reference:

ControlPoint Surveying topographic map dated 02/23/2010



GRAPHIC SCALES:



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*Cow C. Truong*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOCATION PLAN**

**HAWAII BELT ROAD**  
Rehabilitation of Umauma Stream Bridge  
Federal Aid Project No. BR-019-2(61)

Scale: 1" = 10'-0"      Date: July 25, 2012

SHEET No. 79 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	10	137

**HIRATA & ASSOCIATES, INC.**

**BORING LOG** W.O. 10-4890

BORING NO. B1 DRIVING WT. 140 lb. START DATE 3/2/10  
 SURFACE ELEV. 185±\* DROP 30 in. END DATE 3/4/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			11	76	34	Clayey SILT (MH) - Mottled brown, moist, medium stiff, with sand and gravel. (Fill) Covered by 8 inches of asphaltic concrete over 8 inches of base material.
-5			7	77	32	
-10			8	76	40	BASALT (WS) - Gray, dense to hard, fractured.  Begin NX coring at 39 feet. 97% Recovery from 39 to 42 feet. RQD = 56%  80% Recovery from 42 to 47 feet. RQD = 48%  Highly weathered from 45.5 feet to 53 feet, dense to medium hard. 25% Recovery from 47 to 52 feet. RQD = 0%  60% Recovery from 53.5 to 58.5 feet. RQD = 45%  Moderate to highly fractured from 57 feet.  57% Recovery from 58.5 to 63.5 feet. RQD = 20%
-15			12	103	23	
-20			19	85	23	
-25			9	105	27	Clayey SILT (MH) - Mottled brown, moist, medium stiff. (Completely Weathered Rock)
-30			9	64	53	

Plate A4.1

**HIRATA & ASSOCIATES, INC.**

**BORING LOG** W.O. 10-4890

BORING NO. B1 (continued) DRIVING WT. 140 lb. START DATE 3/2/10  
 SURFACE ELEV. 185± DROP 30 in. END DATE 3/4/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
-30			14	62	59	BASALT (WS) - Gray, dense to hard, fractured.  Begin NX coring at 39 feet. 97% Recovery from 39 to 42 feet. RQD = 56%  80% Recovery from 42 to 47 feet. RQD = 48%  Highly weathered from 45.5 feet to 53 feet, dense to medium hard. 25% Recovery from 47 to 52 feet. RQD = 0%  60% Recovery from 53.5 to 58.5 feet. RQD = 45%  Moderate to highly fractured from 57 feet.  57% Recovery from 58.5 to 63.5 feet. RQD = 20%
-35						
-40						35/6" 50/2"
-45						
-50						
-55						
-60						

Plate A4.2

**HIRATA & ASSOCIATES, INC.**

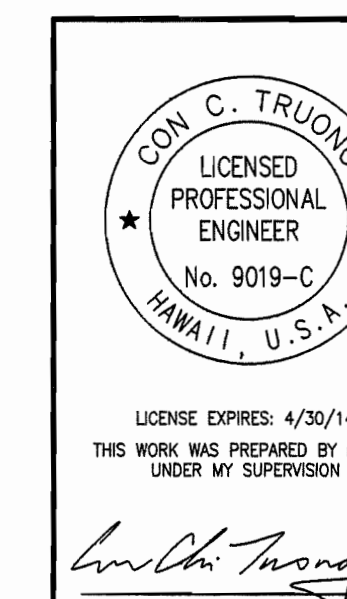
**BORING LOG** W.O. 10-4890

BORING NO. B1 (continued) DRIVING WT. 140 lb. START DATE 3/2/10  
 SURFACE ELEV. 185± DROP 30 in. END DATE 3/4/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
-60						Highly fractured, with clinkers from 62 to 72 feet.  47% Recovery from 64.5 to 69.5 feet. RQD = 0%
-65						
-70			35			70% Recovery from 71.5 to 76.5 feet. RQD = 28% moderately weathered, hard from 72 feet.
-75						
-80						End boring at 76.5 feet.  Neither groundwater nor seepage water encountered.  * Elevations based on topographic survey maps prepared by ControlPoint Surveying, Inc., dated February 23, 2010.
-85						
-90						

Plate A4.3

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTEBOOK	
No.	



STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**BORING LOG #1**

**HAWAII BELT ROAD**  
 Rehabilitation of Umauma Stream Bridge  
 Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 25, 2012

SHEET No. 710 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	11	137

**HIRATA & ASSOCIATES, INC.**

**BORING LOG** W.O. 10-4890

BORING NO. B2 DRIVING WT. 140 lb. START DATE 3/15/10  
 SURFACE ELEV. 185± DROP 30 in. END DATE 3/17/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			42	96	30	Clayey SILT (MH) - Mottled brown, moist, stiff, with sand and gravel. (Fill) Covered by 7 inches of asphaltic concrete over 10 inches of base material.
5			22	96	18	
			17/6" 50/6"	84	37	
10						Very moist at 6 feet.
15			14	57	62	COMPLETELY WEATHERED ROCK - Mottled brown, moist, medium dense.
20			50/2"		Tip Recovery	Moderately weathered, dense to medium hard from 18 to 25 feet.
25			32/6" 58/6"	105	16	
30			17	76	46	

Plate A4.4

**HIRATA & ASSOCIATES, INC.**

**BORING LOG** W.O. 10-4890

BORING NO. B2 (continued) DRIVING WT. 140 lb. START DATE 3/15/10  
 SURFACE ELEV. 185± DROP 30 in. END DATE 3/17/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						
			25	74	33	
35						
			22	58	82	
40						
			50/3"	60	60	Dense to medium hard at 43 feet.
45						
50						BASALT (WS) - Gray, hard, slightly weathered. Begin NX coring at 48 feet. 97% Recovery from 48 to 53 feet. RQD = 82%
55						60% Recovery from 53 to 58 feet. RQD = 40%
						Clinker at 55 to 57 feet.
60						95% Recovery from 58 to 63 feet. RQD = 72%

Plate A4.5

**HIRATA & ASSOCIATES, INC.**


**BORING LOG** W.O. 10-4890

BORING NO. B2 (continued) DRIVING WT. 140 lb. START DATE 3/15/10  
 SURFACE ELEV. 185± DROP 30 in. END DATE 3/17/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						
						88% Recovery from 63 to 68 feet. RQD = 50%
65						
						100% Recovery from 68 to 70 feet. RQD = 88%
70						End boring at 70 feet.
						Neither groundwater nor seepage water encountered in the boring.
75						
80						
85						
90						

Plate A4.6

SURVEY PLOTTED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 DRAWN BY \_\_\_\_\_  
 TRACED BY \_\_\_\_\_  
 DESIGNED BY \_\_\_\_\_  
 QUANTITIES BY \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_  
 ORIGINAL PLAN \_\_\_\_\_  
 NOTEBOOK \_\_\_\_\_  
 No. \_\_\_\_\_



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*Coy C. Truong*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOG #2**

**HAWAII BELT ROAD**  
**Rehabilitation of Umauma Stream Bridge**  
**Federal Aid Project No. BR-019-2(61)**

Scale: None Date: July 25, 2012

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	12	137

**HIRATA & ASSOCIATES, INC.**

BORING LOG W.O. 10-4890

BORING NO. B3 DRIVING WT. 140 lb. START DATE 4/5/10  
 SURFACE ELEV. 76± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						BASALT (WS) - Gray, hard, slight to moderately fractured, slightly weathered. Begin NX coring from surface. 97% Percent recovery from 0 to 5 feet. RQD = 68%
5						100% Recovery from 5 to 10 feet. RQD = 72%
10						100% Recovery from 10 to 15 feet. RQD = 72% Moderate to highly fractured from 12 to 20 feet.
15						100% Recovery from 15 to 20 feet. RQD = 17%
20						100% Recovery from 20 to 25 feet. RQD = 97%
25						100% Recovery from 25 to 30 feet. RQD = 77%
30						Brown, highly fractured, moderately weathered at 29 feet. Plate A4.7

**HIRATA & ASSOCIATES, INC.**

BORING LOG W.O. 10-4890

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 4/5/10  
 SURFACE ELEV. 76± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						100% Recovery from 30 to 35 feet. RQD = 75%
35						100% Recovery from 35 to 40 feet. RQD = 82%
40						100% Recovery from 40 to 45 feet. RQD = 43% Moderately fractured, with clinkers from 41 to 50 feet.
45						100% Recovery from 45 to 50 feet. RQD = 42%
50						97% Recovery from 50 to 55 feet. RQD = 52%
55						Reddish brown, highly weathered from 52 to 54 feet. 88% Recovery from 55 to 60 feet. RQD = 80%
60						Plate A4.8

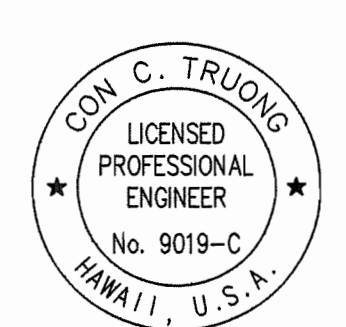
**HIRATA & ASSOCIATES, INC.**

BORING LOG W.O. 10-4890

BORING NO. B3 (continued) DRIVING WT. 140 lb. START DATE 4/5/10  
 SURFACE ELEV. 76± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						100% Recovery from 60 to 65 feet. RQD = 32% Moderately fractured, with weathered seams from 62 to 64 feet.
65						97% Recovery from 65 to 70 feet. RQD = 72%
70						End boring at 70 feet. Groundwater encountered at 29 feet at 10:15 am on 4/8/10. Plate A4.9
75						
80						
85						
90						

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTEBOOK	_____
No.	_____



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*Con C. Truong*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOG #3**

**HAWAII BELT ROAD**  
Rehabilitation of Umauma Stream Bridge  
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 25, 2012

SHEET No. 712 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	13	137

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B4 DRIVING WT. 140 lb. START DATE 3/29/10  
 SURFACE ELEV. 100± DROP 30 in. END DATE 3/31/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
			10	53	47	Clayey SILT (MH) - Brown, moist, medium stiff, with gravel. (Volcanic Ash)
5			10	66	41	
10			12	85	21	
						Boulder at 11 feet.
15						BASALT (WS) - Gray, hard, slightly weathered. Begin NX coring at 12.5 feet. 76% Recovery from 12.5 to 17.5 feet. RQD = 47% Moderately fractured from 12.5 to 17.5 feet.
20						93% Recovery from 17.5 to 22.5 feet. RQD = 52%
25						98% Recovery from 22.5 to 27.5 feet. RQD = 83%
30						100% Recovery from 27.5 to 32.5 feet. RQD = 95%

Plate A4.10

HIRATA & ASSOCIATES, INC.

BORING LOG W.O. 10-4890

BORING NO. B4 (continued) DRIVING WT. 140 lb. START DATE 3/29/10  
 SURFACE ELEV. 100± DROP 30 in. END DATE 3/31/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						100% Recovery from 32.5 to 36.5 feet. RQD = 100%
35						100% Recovery from 37.5 to 42.5 feet. RQD = 100%
40						100% Recovery from 42.5 to 47.5 feet. RQD = 95%
45						100% Recovery from 47.5 to 52.5 feet. RQD = 95%
50						100% Recovery from 52.5 to 57.5 feet. RQD = 92%
55						Reddish brown, moderate to highly weathered from 56 to 63 feet. 100% Recovery from 57.5 to 62.5 feet. RQD = 28%
60						

Plate A4.11

HIRATA & ASSOCIATES, INC.

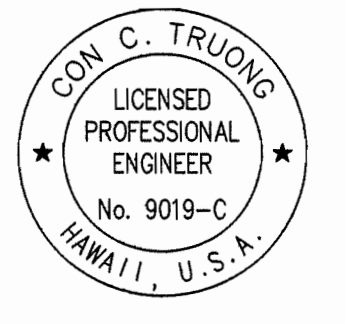
BORING LOG W.O. 10-4890

BORING NO. B4 (continued) DRIVING WT. 140 lb. START DATE 4/5/10  
 SURFACE ELEV. 100± DROP 30 in. END DATE 4/7/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
60						100% Recovery from 62.5 to 67.5 feet, RQD = 82%
65						End boring at 67.5 feet.
70						Neither groundwater nor seepage water encountered.
75						
80						
85						
90						

Plate A4.12

DATE \_\_\_\_\_  
 SURVEY PLOTTED BY \_\_\_\_\_  
 DRAWN BY \_\_\_\_\_  
 TRACED BY \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_  
 ORIGINAL PLAN \_\_\_\_\_  
 NO. \_\_\_\_\_



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STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**BORING LOG #4**

HAWAII BELT ROAD  
 Rehabilitation of Umauma Stream Bridge  
 Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 25, 2012

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	14	137

HIRATA & ASSOCIATES, INC.

BORING LOG

W.O. 10-4890

BORING NO. B5 DRIVING WT. 140 lb. START DATE 3/23/10  
 SURFACE ELEV. 147± DROP 30 in. END DATE 3/25/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
0						Clayey SILT (MH) - Mottled brown, moist, medium stiff, with gravel. (Volcanic Ash)
5			9	64	55	
			5	53	72	
			17/6"	49	88	
10			35/6"			WEATHERED ROCK (WC) - Mottled brown, moist, medium dense to dense, completely weathered.
						BASALT (WS) - Gray, hard, slightly weathered. Highly to moderately weathered from 10.5 to 12 feet.
15						Begin NX coring at 13 feet. 88% Recovery from 13 to 18 feet. RQD = 83%
20						100% Recovery from 18 to 23 feet. RQD = 33% Brown, highly weathered at 19 feet.
25						100% Recovery from 23 to 28 feet. RQD = 90%
30						92% Recovery from 28 to 33 feet. RQD = 47% Moderately fractured at 29 feet. Plate A4.13

HIRATA & ASSOCIATES, INC.


BORING LOG

W.O. 10-4890

BORING NO. B5 (continued) DRIVING WT. 140 lb. START DATE 3/23/10  
 SURFACE ELEV. 147± DROP 30 in. END DATE 3/25/10

DEPTH	GRAPH	SAMPLE	BLOWS PER FOOT	DRY DENSITY (PCF)	MOIST. CONT. (%)	DESCRIPTION
30						98% Recovery from 33 to 38 feet. RQD = 75%
35						100% Recovery from 38 to 43 feet. RQD = 37% Moderate to highly fractured, moderately weathered from 38 to 45 feet.
40						100% Recovery from 43 to 48 feet. RQD = 78%
45						
50						End boring at 48 feet.
55						Neither groundwater nor seepage water encountered.
60						

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTEBOOK	
No.	



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*COIN C. TRUONG*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**BORING LOG #5**

HAWAII BELT ROAD  
Rehabilitation of Umauma Stream Bridge  
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 25, 2012

SHEET No. T14 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-019-2(61)	2012	15	137

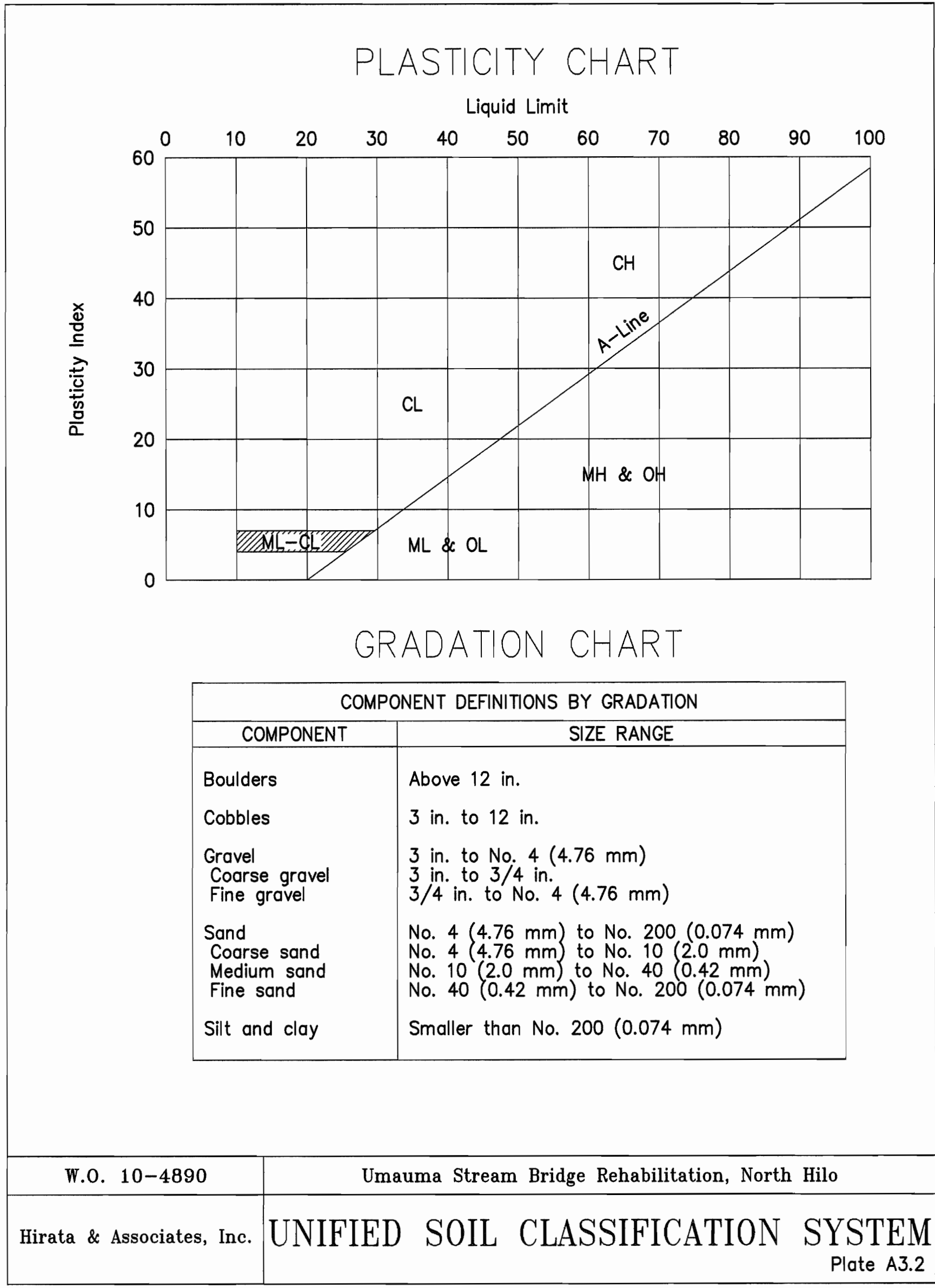
MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS (More than 50% of the material is LARGER than No. 200 sieve size.)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines.)	GW Well graded gravels, gravel-sand mixtures, little or no fines.	
		GRAVELS WITH FINES (Appreciable amt. of fines.)	GP Poorly graded gravels or gravel-sand mixtures, little or no fines.	
		SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size.)	CLEAN SANDS (Little or no fines.)	GM Silty gravels, gravel-sand-silt mixtures.
			SANDS WITH FINES (Appreciable amt. of fines.)	GC Clayey gravels, gravel-sand-clay mixtures.
	FINE GRAINED SOILS (More than 50% of the material is SMALLER than No. 200 sieve size.)	SILTS AND CLAYS (Liquid limit LESS than 50.)	SW Well graded sands, gravelly sands, little or no fines.	
			SP Poorly graded sands or gravelly sands, little or no fines.	
			SM Silty sands, sand-silt mixtures.	
			SC Clayey sands, sand-clay mixtures.	
SILTS AND CLAYS (Liquid limit GREATER 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.			
	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.			
	CH Inorganic clays of high plasticity, fat clays.			
	OH Organic clays of medium to high plasticity, organic silts.			
HIGHLY ORGANIC SOILS		PT Peat and other highly organic soils.		
		FRESH TO MODERATELY WEATHERED BASALT		
		VOLCANIC TUFF / HIGHLY TO COMPLETELY WEATHERED BASALT		
		CORAL		

SAMPLE DEFINITION		
<input checked="" type="checkbox"/> 2" O.D. Standard Split Spoon Sampler	<input checked="" type="checkbox"/> Shelby Tube	RQD Rock Quality Designation
<input type="checkbox"/> 3" O.D. Split Tube Sampler	<input type="checkbox"/> NX / PQ / 4" Coring	<input type="checkbox"/> Water Level

W.O. 10-4890	Umauma Stream Bridge Rehabilitation, North Hilo
Hirata & Associates, Inc.	<b>BORING LOG LEGEND</b> Plate A3.1



Grade	Symbol	Description
Fresh	F	No visible signs of decomposition or discoloration. Rings under hammer impact.
Slightly Weathered	WS	Slight discoloration inwards from open fractures, otherwise similar to F.
Moderately Weathered	WM	Discoloration throughout. Weaker minerals such as feldspar decomposed. Strength somewhat less than fresh rock but cores cannot be broken by hand or scraped by knife. Texture preserved.
Highly Weathered	WH	Most minerals somewhat decomposed. Specimens can be broken by hand with effort or shaved with knife. Core stones present in rock mass. Texture becoming indistinct but fabric preserved.
Completely Weathered	WC	Minerals decomposed to soil but fabric and structure preserved (Saprolite). Specimens easily crumbled or penetrated.
Residual Soil	RS	Advanced state of decomposition resulting in plastic soils. Rock fabric and structure completely destroyed. Large volume change.

Reference: Soils Mechanics, NAVFAC DM-7.1, Department of the Navy, Naval Facilities Engineering Command, September, 1986.

W.O. 10-4890	Umauma Stream Bridge Rehabilitation, North Hilo
Hirata & Associates, Inc.	<b>ROCK WEATHERING CLASSIFICATION SYSTEM</b> Plate A3.3

SURVEY PLOTTED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 DRAWN BY \_\_\_\_\_  
 TRACED BY \_\_\_\_\_  
 DESIGNED BY \_\_\_\_\_  
 QUANTITIES BY \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_  
 ORIGINAL PLAN \_\_\_\_\_  
 NOTEBOOK \_\_\_\_\_  
 No. \_\_\_\_\_

LICENSE EXPIRES: 4/30/14  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

*Con C. Truong*

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**SOIL CLASSIFICATIONS**

**HAWAII BELT ROAD**  
Rehabilitation of Umauma Stream Bridge  
Federal Aid Project No. BR-019-2(61)

Scale: None Date: July 25, 2012

SHEET No. 715 OF 15 SHEETS