

Work Order:

6891-20(A)

#### GEOLABS, INC.

Geotechnical Engineering

#### FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

Other Tests  Moisture Content (%) Dry Density (pcf) Core Recovery (%) Sample Graphic USCS  Abproximate Ground Surging (fsf) Depth (feet) Core (blows/foot) Depth (feet) Core (blows/foot) Description  Description	face
weny veny (%) S S S S S S S S S S S S S S S S S S S	
Other Tests  Moisture Content (%) Dry Density (pcf) Core Racovery (%) Sample Graphic USCS  Description  Description  Description  Description  Outher Tests  Core Racovery (%) Sample Graphic USCS	
° <sub>O →</sub> GP \3-Inch <b>ASPHALTIC CONCRETE</b>	/
50/3" CH Brownish gray SANDY GRAVEL, del	nse, moist
LL=78   13   9   Brown <b>SILTY CLAY</b> with a little grave very stiff, moist (alluvium)	el (basaltic), - -
Brownish gray <b>BOULDER</b> (alluvium)	
TXUU 22 75 19 Reddish brown with multi-color mott S <sub>u</sub> =2.0 ksf SILT, very stiff, moist (alluvium)	ling <b>SANDY</b>
23 7 Reddish brown <b>SANDY CLAY</b> , very state of the control of the	stiff, moist - - - -
Brownish gray <b>BOULDERS</b> in brown matrix, very dense, damp (alluviun	
36	- - - -
10 109 40 50/1"	- - - -
Date Started: October 27, 2017 Date Completed: November 28, 2017 Logged By: B. Aiu / N. Vaiana  Date Started: CME-75DR (Energy Transfer Ratio = 74.1%)	DY SILT with noist -
	1
35	
Date Started: October 27, 2017 Water Level: ▼ Not Encountered	
Date Completed: November 28, 2017	Plate
Logged By: B. Aiu / N. Vaiana Drill Rig: CME-75DR (Energy Transfer Ratio = 74.1%)	<u> </u>
Total Depth: 32.5 feet Drilling Method: 4" Solid Stem Auger & PQ Coring  Work Order: 6891 20(A) Driving Energy: 140 lb, wt. 30 in, drep	A - 1.1

Driving Energy:

140 lb. wt., 30 in. drop



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#### FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

F	Labo	ratory			F	ield							
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	(Continued from previous pla	te)
BORING_LOG 6891-20A,GPJ GEOLABS.GDT 3/8/18					ц		) (1)	40			ח	Boring terminated at 32.5 feet  * Elevations estimated from Site Plate by Austin, Tsutsumi & Associates, December 18, 2017.	ans provided - Inc. on
191-20A.	Date Start			ber 27			Vater I	eve	l: <b>\</b>	N	lot E	ncountered	Plate
96 68	Date Completed: November 28, 2017 Logged By: B. Aiu / N. Vaiana			Drill Rig	<b>]</b> :		(	ME-	75DR (Energy Transfer Ratio = 74.1%)	าำผเ⊄			
NG_LC	Total Depth: 32.5 feet			Orilling		100			lid Stem Auger & PQ Coring	A - 1.2			
BORI	Work Order: 6891-20(A)					Driving Energy: 140 lb. wt., 30 in. drop							



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

Laboratory				"ald								
Labo	oratory			Г	ield						Approximate Ground Surf	face
J v		_	(%)		ر ا د م ت	ا ج	<u>ت</u>				Elevation : N/A	
est	t (%	nsit	Jan (	(%	ation foot	Per	fee	4	0			
Other Tests	stur	De	e e	RQD (%)	netra sista ws/	ket	Depth (feet)	nple	phic	SS	Б	
	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQ	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Dec	Sample	Graphic	nscs	Description	
										CL	Brown SILTY CLAY with a little sand	and gravel
Direct	19	80			27			M			(basaltic), very stiff, dry (fill)	_
Shear LL=49	16				24		-					_
PI=29	10											_
							_ '					_
TXUU	17	103			98		5-	M				_
S <sub>u</sub> =14.2 ksf										МН	Brown with some black mottling CLA	YEY SILT.
KSI							-		$\mathcal{M}$		hard, dry (alluvium)	- , -
								1	W			-
								1	W			-
	17				120		10 -	1	144	N // I	Taradiah harawa QANDV QU T haradad	
									!	ML	Tannish brown <b>SANDY SILT</b> , hard, d	iry (alluvium) =
							-					-
								1	***************************************	МН	Brown with some light tan mottling C	LAYEY
								1	W		SILT, hard, dry (alluvium)	=
	23	95			55/3"		15-	H	W			-
									W			-
							-	1	$\mathcal{M}$			-
								+	$\mathcal{M}$			-
									W			-
	22				96		20 -		W			-
												=
								-			Boring terminated at 21.5 feet	=
								-				-
								-				-
							25 -	-				_
								-				-
								4				=
								-				-
								-				-
							30 -	-				_
10/6												-
<u> </u>								-				-
7.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1								-				=
								1				=
Date Star Date Con Logged B Total Dep							35 <b>-</b>					
Date Star	ted:		Water I		: <u>\</u>	<u> </u>	Not E	ncountered				
Date Con		, 2017 , 2017			Plate							
Logged B	•	, ,		Drill Rig	a:		(	CME-	45C TRUCK (Energy Transfer Ratio = 78%)	.55		
Total Dep		Drilling Method: 4" Solid Stem Auger A -										
Work Ord			Driving Energy: 140 lb. wt., 30 in. drop									
3 <u> </u>		, , , ,	-20(A)					رن	<u> </u>		, <del></del> - <del></del> -	



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

Lab	Laboratory Field					d						
Ŋ	(9)	y	(%)		C 10 T		t)				Approximate Ground Surface Elevation (feet MSL): 234 *	
Test	ure int (%	ensit	/ery (	(%)	ration tance s/foof	at Per	(fee	<u>e</u>	ic			
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
	11	82	0 11	ш.	55/3"			0 <i>)</i>		GM	Brown <b>SILTY GRAVEL (BASALTIC)</b> with some boulders (basaltic), very dense, dry (fill)	
	5	02			26		-			МН	Brown <b>CLAYEY SILT</b> with some boulders (basaltic), stiff, damp (fill)	
			33				_				(5555115), 5111, 5211.p (111)	-
	13		33		12		5 -	U				-
			43		12		-					
							-	$\  \ $				-
							10 -	Ц				-
	22		74		19		-					-
			71				-			CL	Reddish brown <b>SILTY CLAY</b> with some sand ar	
							15-	$\ $		OL	a little gravel (basaltic), stiff, damp (residual se	
LL=45 PI=21	26				39		-					-
			100				-	11				_
	24				74		20 -	H		ML	Gray with multi-color mottling <b>SANDY SILT</b> with some gravel (basaltic), hard, damp (saprolite)	
							-				Boring terminated at 21.5 feet	
							-					1
							25 -					-
							-					-
							-					-
<u>o</u>							30 -					-
88							-					-
Date Star Date Con Logged E Total Dep							-					-
							35 <b>-</b>					
Date Star	ate Started: October 17, 2017 ate Completed: October 17, 2017							l: 4	<u> </u>	Not E	ncountered Plate	
Logged E	ogged By: N. Vaiana						Drill Rig: CME-45C TRUCK (Energy Transfer Ratio = 78%)					
Total Dep	Total Depth: 21.5 feet						Drilling Method: 4" Solid Stem Auger & HQ Coring					
Work Ord	der:	6891	-20(A)			Driving Energy: 140 lb. wt., 30 in. drop						



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

						_	_			•		
Labo	oratory			Fi	ield							
			5)								Approximate Ground Surface	
sts	(%)	iţ	%) /		oo (f	en (S	e (j				Elevation (feet MSL): 344 *	
je je	ure int (	ens	/er)	(%)	rati tan	2   C	(fe	<u>e</u>	jc	"		
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
	15	87					-	M		МН	Brown with multi-color mottling <b>CLAYEY SILT</b> with some sand (basaltic), hard, moist (saproli	te) <sup>-</sup>
	7				72/3"		-				Gray <b>BOULDERS (BASALTIC)</b> with some sand, very dense, dry (saprolite)	_
	19	90			16		5-		$\prod$	ML	Brown with gray <b>SANDY SILT</b> with a little gravel (basaltic), very stiff, moist	_
							-			МН	Brown <b>CLAYEY SILT</b> with some sand and grave (basaltic), very stiff, moist (saprolite)	
							-				Brownish gray <b>BOULDERS (BASALTIC)</b> with some sand, very dense, dry (saprolite)	
LL=71 PI=44	24				19		10 -	1		СН	Purplish red <b>SILTY CLAY</b> with some sand	
							-	-			(basaltic), stiff, moist (saprolite)	_
												-
	43	75			35		15-	M		GM	Brownish gray <b>SILTY GRAVEL (BASALTIC)</b> with	
							-		000		some sand (basaltic), medium dense, moist (saprolite)	-
							-					_
	43				28		20 -	1			grades with more sand	-
							-		000			_
							-			МН	Dark gray with dark brown mottling <b>CLAYEY SILT</b> with some sand and gravel (basaltic),	
	35	82			84		25 -				hard, moist (saprolite)	-
		"-			•			Å				-
							-		#	N 41	Occupith deal and markling OANDY OH T	
							-		Ш	ML	Gray with dark red mottling SANDY SILT (BASALTIC) with traces of gravel (basaltic),	_
	33				65/3"	,	30 -				hard, moist (saprolite)	_
Date Star Date Con					00/0			$\Box$			Boring terminated at 30.75 feet	
							-					-
Ś							-	$\  \cdot \ $				-
d l						-					-	
	ata Chartadi — Oatabar 40, 2047					<u> </u>	35-				1	
Date Star	Oate Started: October 18, 2017					Water I	Leve	l: <b>1</b>	<u> </u>	lot E	ncountered	
	Date Completed: October 18, 2017							Plate				
	Logged By: N. Vaiana Total Dooth: 30.75 foot						Drill Rig: CME-45C TRUCK (Energy Transfer Ratio =					
Total Depth: 30.75 feet  Work Order: 6891-20(A)						Drilling Method: 4" Solid Stem Auger  A						
Work Ord			Driving Energy: 140 lb. wt., 30 in. drop									



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

ı	Labo	oratory											
	Ø			(%)		<b>5</b> •		<u></u>				Approximate Ground Surface Elevation (feet MSL): 481 *	
	Test	ıre nt (%	ensity	ery (	(%	ance //foot	t Per	(feet	в	ic		,	
	Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description	
		27	76			49		_			МН	Reddish brown <b>CLAYEY SILT</b> , hard, dan (residual soil)	np
	LL=58 PI=27	30	-			23		-					-
	TXUU S <sub>u</sub> =6.1 ksf	32	79			47	4.3	5 - - -	X				- - -
		33				21		10 -				grades with a little silty clay	- - -
		34	83			38	4.3	- 15 - -	X				- - - -
		37				36/1"		20 <del>-</del>			CH	Reddish brown SILTY CLAY, very stiff to moist (residual soil)  Gray SILTY GRAVEL (BASALTIC), very of dry (saprolite)  Boring terminated at 20.58 feet	-
								25 - -					- - -
BORING_LOG 6891-20A.GPJ GEOLABS.GDT 3/8/18								30 -					- - -
J GEOLAB								- - - 25					- - -
20A.GP.	Date Star	Date Started: May 2, 2017						35 <b>-</b> _eve	1: Z	<u> </u>	Not E	ncountered	
6891-2	Date Com				Plate								
507 -	Logged B		Drill Rig: CME-45C TRUCK (Energy Transfer Ratio = 78%						_				
ORING	Total Depth: 20.58 feet  Work Order: 6891-20(A)						Drilling Method: 4" Solid Stem Auger  Driving Energy: 140 lb, wt 30 in, drop						A - 5
ĭ	VV SIN SIU	<b>υ</b> ι.	JUJ 1	<u> </u>			Driving Energy: 140 lb. wt., 30 in. drop						



#### FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

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Log of Boring

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU Geotechnical Engineering

Laboratory				F	ield							
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Approximate Ground Surface Elevation (feet MSL): 395 *  Description	
ō	ĭŏ	٥٥	ΩÃ	Ř	<u>ଜୁ ଜୁ ବ</u>	P. St.	ے	Š	<u>ن</u>	Ğ CH	Reddish brown <b>SILTY CLAY</b> , very stiff, m	noiet
Direct Shear LL=64 PI=37	22 24	71			50 43		- - -	X		OIT	(residual soil) grades to hard	ioist
TXUU S <sub>u</sub> =1.3 ksf	24	72			94		5 - - -	X		CH	Brown with multi-color mottling <b>SILTY CL</b> hard, moist (residual soil)	<b>.AY</b> ,
LL=60 PI=30	26				18		10 -					
Direct Shear	28	80			66		- 15 - -	X		МН	Brown with multi-color mottling <b>CLAYEY</b> hard, moist (saprolite)	SILT,
	14				38/3"		20 -				Gray <b>BASALT</b> , moderately weathered, so medium hard Boring terminated at 20.25 feet	oft to
							- 25 - - -	-				
							30 -	-				
							25-					
Date Start Date Com	pleted	l: Octo				Water I		l: 👤			ncountered	Plate
Logged By			aiana 5 foot			Orill Rig		202			45C TRUCK (Energy Transfer Ratio = 78%)	۸ ۵
Total Dep			5 feet -20(A)			Drilling Driving					lid Stem Auger o. wt., 30 in. drop	A - 6



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

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)	<u>e</u>	iic		Approximate Ground Sur Elevation (feet MSL): 22					
Other	Aoistu Sonte	ory De pcf)	Sore	RQD (%)	Peneti Resist blows	Pocke tsf)	Septh	Sample	Graphic	nscs	Description					
Direct	17	82	OH	ш	84	4.5		U)		MH	Brown with tan SILTY GRAVEL (COI with some sand, dry (fill)	H				
Shear	17				46/3"		-				Reddish brown <b>CLAYEY SILT</b> with s boulders, hard, dry (alluvium)	ome -				
TXUU S <sub>u</sub> =5.5 ksf	19	88			75		5 <del>-</del> -	X				- - -				
LL=53 PI=27	21				48		10 — 			СН	Dark reddish brown <b>SILTY CLAY</b> , ve moist (saprolite)	ery stiff, - - - -				
	15	82			37/3"		- 15 - -			SM	Brownish gray <b>SILTY SAND (BASAL</b> little gravel (basaltic), very dense, (weathered basalt)					
	7				80/5"		20 — 				Gray <b>BASALT</b> , moderately to closely slightly weathered, medium hard (pasalt)					
UC= 5630 psi UC= 1980 psi			100	44 38			25 — - - - -				grades to moderately weathered	- - - - - -				
T 3/8/18							30 -		-		Boring terminated at 30.5 feet					
Date Com							- - - 35	-								
Date Star	Date Started: October 16, 2017						_eve	l: 🛂	<u> </u>	lot E	ncountered					
Date Con	Date Completed: October 17, 2017							Drill Rig: CME-45C TRUCK (Energy Transfer Ratio = 78%)								
	Logged By: N. Vaiana  Total Depth: 30.5 feet							200			45C TRUCK (Energy Transfer Ratio = 78%) lid Stem Auger & HQ Coring	^ 7				
Work Ord	Total Depth: 30.5 feet  Work Order: 6891-20(A)							Drilling Method: 4" Solid Stem Auger & HQ Coring  Driving Energy: 140 lb. wt., 30 in. drop								



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

Lak	oratory				ield								
Lai					leiu						Approximate Ground Surfa	ace	
ιχ		>	(%)		   = n <del>=</del>	ا نے ا	£				Elevation : N/A		
l est	€ %	nsit	ery (	(%	atio ance foo	Pe	(fee	a	ပ				
Other Tests	Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	December		
Q#	Ğ Co	Dry (pc	Col	RQ	Per Res (blc	Po(	Del	Sar	Gre	SN	Description		
										CL	Reddish brown <b>SILTY CLAY</b> , hard, dr	y (alluvium)	
Direct	17	88			70	4.5		M					
Shear LL=46	18				42			¥				1	
PI=21	'				72			V				1	
							_					1	
TXUU	19	94			76		5 -	M				1	
S <sub>u</sub> =2.7 ks	†									МН	Dark reddish brown CLAYEY SILT, ve	ery stiff,	
							_		M		moist (residual soil)	1	
							_	1 /	M			1	
							-	1	M			1	
	22				36		10 –	V	11				
							_	1	<del>\</del>	GM		th some	
							_	1	`\`-		sand (basaltic), dense, dry (weather Brownish gray <b>BASALT</b> , closely fracti	red basait)	
							_	1 [			moderately weathered, soft to medi		
								1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		(pahoehoe basalt)	1	
					10/0"		15 –	$\sqcap$	`\'-			1	
					Ref.		-	1 [	' \			-	
							-	1	\``			1	
							-	1	·/-)			-	
							-					=	
	13				74/3"		20 –		', -		\grades to dark purplish red	7	
							-	1			Boring terminated at 20.25 feet		
							-	1				1	
							-	1				1	
							-	1				1	
							25 –	1				-	
							-	1				1	
							-	1				1	
							-	1				- 1	
							-					- 1	
8							30 –	1				-	
/8/8							-	1				-	
[GD]							-					-{	
LAB							-					-{	
GEC							-						
BORING_LOG 6891-204.GPJ GEOLABS.GDT 3/80/18  Date Co Logged Total De Work Or	1	l	ber 16				35 <b>-</b>						
Date Sta			Water L	eve	l: 🛂	_ ^	lot E	ncountered					
g Date Co	•	, 2017				Plate							
<u> </u> Logged		Drill Rig	45C TRUCK (Energy Transfer Ratio = 78%)										
Total De		Drilling Method: 4" Solid Stem Auger A - 8											
ର୍ଚ୍ଚ Work Or	der:	-20(A)			Driving Energy: 140 lb. wt., 30 in. drop								



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# FREEWAY MANAGEMENT SYSTEM INTERSTATE H-1, H-2 AND FARRINGTON HIGHWAY PHASE 2A

DISTRICTS OF HONOLULU & EWA, ISLAND OF OAHU

Log of Boring

	Laho	ratory			F	ield									
					'							Approximate Ground Surfa	ace		
<u> 4</u>	3	(%	-₹	(%)		5 o <del>S</del>		et)				Elevation (feet MSL): 87			
Tes	3	nt (9	ensi	/ery	(%)	ratic tanc s/foc	t Pe	(fee	<u>e</u>	ic					
Other Tests		Moisture Content (%)	Dry Density (pcf)	Core Recovery (%)	RQD (%)	Penetration Resistance (blows/foot)	Pocket Pen. (tsf)	Depth (feet)	Sample	Graphic	nscs	Description			
		17	94			31		-			GM	Tan SILTY GRAVEL (CORALLINE) w sand, medium dense, dry (fill)	rith some		
		10				36		-			ML	Brown with gray <b>SANDY SILT</b> with so (basaltic), stiff, moist (older alluviun	ome gravel n)		
TXI S <sub>u</sub> =2.		14	99			16		5 <del>-</del> -	X				-		
LL=		21				24		- - 10 -			СН	Brown with multi-color mottling <b>SILTY</b> a little sand (basaltic), stiff, moist (a			
PI=	33							-				grades to light tan locally	-		
		19	95			52	4.3	- - 15 -			МН	Brown with light multi-color mottling (SILT with some sand (basaltic), ver (alluvium)			
								-					- - -		
		22				38		20 -			МН	Brown with light tan mottling <b>CLAYEY</b> some sand, very stiff, moist (alluviu			
								-				Boring terminated at 21.5 feet	-		
								25 - -					-		
								-					-		
3/8/18								30 -							
BORING LOG 6891-20A.GPJ GEOLABS.GDT 3/8/18  Date Logg Tota World								-	-				-		
on GEOL						35 <b>-</b>									
ნ Date	Start	17	Water I		1: 4	<u> </u>	Not E	ncountered							
) Date	Com	28, 20				Plate									
ဗ္ဗ <b>Log</b> g	ged By			Drill Rig	45C TRUCK (Energy Transfer Ratio = 78%)										
ଦ୍ର Tota	I Dept			Drilling Method: 4" Solid Stem Auger  A - 9											
წ Worl	k Ord	er:	6891	-20(A)			Driving Energy: 140 lb. wt., 30 in. drop								