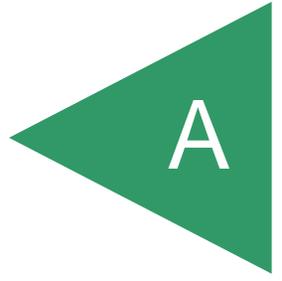


APPENDIX

A



APPENDIX A

EXPLORATORY EXCAVATIONS

Our subsurface exploration consisted of drilling 17 large diameter borings, 48 excavator trenches, and 71 trackhoe trenches. We performed the field investigation in two phases in 2008 and 2010. We have also included two large diameter borings, 47 backhoe trenches, 10 air-track borings, and 17 seismic surveys from a previous geotechnical report prepared in 2004 by Neblett & Associates in Appendix D. The locations of some of the exploratory borings and trenches were surveyed by the project civil engineer with the remainder located in the field using compass and tape. The large diameter borings were excavated to a maximum depth of 70 feet with a truck-mounted drill rig equipped with a 30-inch diameter bucket-auger. The excavator trenches were extended to a maximum depth of approximately 24 feet using a Komatsu PC 400 excavator equipped with a 36-inch wide bucket. The trackhoe trenches were performed using a John Deere 555 trackhoe equipped with a 24-inch wide bucket and extended to a maximum depth of 13 feet. The approximate boring and trench locations are shown on the Geologic Map (Figures 2 through 4). The logs of the small diameter borings are presented in the geotechnical investigation report for the realignment of Otay Lakes Road dated November 16, 2010 (Project No. G1012-52-01A).

We obtained samples during our subsurface exploration in the borings using a Modified California sampler. The sampler is composed of steel and is driven to obtain ring samples. The Modified California sampler has an inside diameter of 2.5 inches and an outside diameter of 3 inches. Up to 18 rings are placed inside the sampler that is 2.375 inches in diameter and 1 inch in height. We placed the ring samples in moisture-tight containers and transported them to the laboratory for testing. We also obtained bulk samples for laboratory testing.

The large-diameter boring sampler was driven 12 to 18 inches into the bottom of the excavation with the use of a telescoping Kelly bar. The weight of the Kelly bar (4,500 pounds maximum) drives the sampler and varies in weight with depth. The height of drop is usually 18 inches. Blow counts are recorded for every 12 inches the sampler is driven. The penetration resistance values shown on the boring logs are shown in terms of blows per foot. These values are not to be taken as N-values and adjustments have not been applied.

We estimated elevations shown on the boring and trench logs either from a topographic map or by using a benchmark. In addition, some elevations were obtained from surveying stakes provided in the field. We visually examined, classified, and logged the soil conditions encountered in the borings and trenches in general conformance with the American Society for Testing and Materials (ASTM) Practice for Description and Identification of Soils (Visual - Manual Procedure D2844). The logs of the exploratory borings and trenches are presented on Figures A-1 through A-136 and included

herein. The logs depict the various soil and rock types encountered and indicate the depths at which samples were obtained.

The County of San Diego Department of Environmental Health issued a Waiver for Geotechnical Borings for the exploratory excavations and is shown after the figures in this appendix.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 1		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>563'</u>	DATE COMPLETED <u>01-07-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL/CH	TOPSOIL/COLLUVIUM (Qc) Stiff, moist, dark brown to reddish brown, Silty CLAY with trace gravel				
2					-Becomes grayish brown below 2 feet				
4					-Weathered contact				
6	LB1-1			SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 5-15% gravel up to 3 inches; no discernible bedding; cemented 3-4 inch thick continuous black reduced bed present at 5 feet		5	128.7	7.1
8					-Random pale green 4-12 inch wide claystone rip-up clasts floating in matrix between 8 and 12½ feet				
10	LB1-2						5/10"	127.8	9.3
12									
14				GM/GC	Dense, damp, mottled light brown, green and orange, Gravelly/Clayey SANDSTONE with 20-30% subangular to angular gravel, cobble and boulder size rocks up to 14 inches				
16	LB1-3				-Scoured undulating contact (5-10°, S35W)				
18	LB1-4			CL/CH	OTAY FORMATION (To) Very stiff to hard, moist, pale green with orange mottling, Silty CLAYSTONE with trace gravel and cobble up to 6 inches; moderately weak, waxy, random polished high angle parting surfaces; manganese staining		6	122.9	12.0
20	LB1-5				-Gravel and cobble present, with 10-15% up to 10 inches between 16½ to 18 feet				
22					-Becomes pale gray with orange mottling below 18 feet				
24					-PROMINENT SHEAR at 20.1 feet; (35°, N10E); paper thin to 1/4-inch thick plastic clay gouge; poorly remolded and continuous		4	115.0	17.0
					-Gravel and cobble size content increase to 10-20% between 21-22 feet				

Figure A-1,
Log of Boring LB 1, Page 1 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 1		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>563'</u>	DATE COMPLETED <u>01-07-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
26	LB1-6				- PROMINENT SHEAR at 24.9 feet; (30-40°, N30W) ; 1/4 to 1/2-inch thick plastic clay gouge; well developed, continuous and moderately remolded		2	101.9	23.4
28	LB1-7				- PROMINENT SHEAR at 28.9 feet; (35°, N5W) ; 1/2 to 2-inch thick plastic clay gouge; well defined, moderately to well developed and moderately to highly remolded				
30	LB1-8				- PROMINENT SHEAR at 31.5 feet; (45°, N45E) ; 1/4 to 1/2-inch thick continuous, poorly remolded plastic clay gouge		3	101.5	23.6
32					- PROMINENT SHEAR at 33.8 feet; (40°, N60W) ; paper thin to 1/4-inch thick continuous plastic clay gouge with poorly remolded clay in random areas				
34					- SHEAR ZONE present from 35.1 to 39.8 feet				
36	LB1-9				- PROMINENT SHEAR at 35.1 feet; (35°, N20W) ; paper thin to 1/4-inch thick poorly developed, poorly remolded plastic clay gouge		2	102.2	25.0
38									
40	LB1-10								
42					- MINOR SHEAR at 42.0 feet; (high angle) ; paper thin to 1/4-inch thick; very poorly developed				
44									
46	LB1-11						3	100.7	25.0
48				-Becomes pale olive green below 48 feet					

Figure A-1,
Log of Boring LB 1, Page 2 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE
			... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 1		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>563'</u>	DATE COMPLETED <u>01-07-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
50									
52						-MULTIPLE SHEARS present between 51 and 52 feet; (avg. 10-15°, S50W); 1/2 to 3-inch thick, continuous with variable orientation and thickness highly remolded plastic clay gouge			
54				CL		-Distinct change in competency below 54 feet			
56	LB1-12					Hard, moist, pale gray to pale olive green, Silty CLAYSTONE; with little fine to coarse, sandy grit, conchoidal fracturing and manganese staining	10	104.3	23.0
58									
60									
62									
64						-Becomes mottled pale green and reddish brown and waxy with some shining high angle parting surfaces; competent			
66	LB1-13					-18-inch thick clayey sandstone bed present at 65½ feet	10/10"	122.1	13.9
68									
70						BORING TERMINATED AT 70 FEET No groundwater encountered			

Figure A-1,
Log of Boring LB 1, Page 3 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

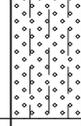
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 2		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>611'</u>	DATE COMPLETED <u>01-08-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM/SC	TOPSOIL Loose, damp, dark brown, Silty/Clayey, fine to medium SAND with 10-15% gravel and cobble up to 6 inches				
2				CL/CH	Stiff, moist, reddish brown, Silty CLAY with 10-15% gravel and cobble up to 6 inches				
4				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 10-20% gravel, cobble and boulders up to 24 inches; rippers used; very difficult drilling				
REFUSAL AT 5 FEET									

Figure A-2,
Log of Boring LB 2, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 3		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) 575'	DATE COMPLETED 01-08-2010			
					EQUIPMENT 30" DIAMETER BUCKET RIG		BY: T. REIST		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL				
				SM	Loose, damp, brown, Silty, fine to coarse SAND with 10% gravel; drilled on road				
2					OTAY FORMATION (To)				
					Dense, damp, mottled pale green, orange and brown, Silty, fine to coarse SANDSTONE with some clay				
4				CL	Very hard, damp, mottled maroon and dark olive green, Silty, CLAYSTONE				
	LB3-1				-Blocky weathering transitional contact	5	111.0	16.1	
6				SC/SM	Very dense, damp, mottled brown, dark olive green with some orange oxidation, Silty/Clayey, fine to coarse SANDSTONE				
8									
10	LB3-2					5/10"	119.1	14.3	
12									
14				SM	Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 5-15% gravel up to 3 inches				
16									
					-Sharp slightly undulating horizontal contact				
18				SC/SM	Very dense, damp, mottled brown, dark olive green with some orange oxidation, Silty/Clayey, fine to coarse SANDSTONE				
20	LB3-3				-Becomes fine to medium below 20 feet	5/10"	118.1	15.5	
22									
					-Gradational contact				
24				SM	Very dense, damp, Silty, fine to coarse SANDSTONE; with random 6-inch				

Figure A-3,
Log of Boring LB 3, Page 1 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE
			... WATER TABLE OR SEEPAGE
			... DRIVE SAMPLE (UNDISTURBED)

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 3		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>575'</u>	DATE COMPLETED <u>01-08-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
26					gravel beds				
28									
30	LB3-4						10/10"	122.2	9.6
32									
34									
36					-Becomes much coarser-grained with increase in gravel and cobble 10-15% up to 6 inches				
38									
40	LB3-5						8/8"	125.0	10.3
42									
44									
46				CL	-Slightly scoured contact with 1 to 2-inch black sandstone lense; (15°, S45E) Very hard, damp, mottled brown and dark olive green, Silty/fine, Sandy CLAYSTONE				
48				SM/SC	-Gradational contact Very dense, damp, mottled brown and dark pale green, Silty/Clayey SANDSTONE with trace gravel				

Figure A-3,
Log of Boring LB 3, Page 2 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS					
	... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 3		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>575'</u>	DATE COMPLETED <u>01-08-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
50	LB3-6					-Becomes pale green with orange oxidation below 50 feet	8/10"	120.9	13.9
52									
54				SM		Very dense, damp, light brown to orange, Silty, fine to coarse SANDSTONE with trace gravel			
56									
58									
60	LB3-7			CL		Very hard, damp, dark green, Silty CLAYSTONE	10/8"	108.8	18.2
					BORING TERMINATED AT 60 FEET No groundwater encountered				

Figure A-3,
Log of Boring LB 3, Page 3 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 4		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>555'</u>	DATE COMPLETED <u>01-08-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, Sandy CLAY with 10-20% gravel and cobble up to 24 inches				
2									
4	LB4-1			SM/SC	OTAY FORMATION (To) Dense to very dense, damp, brown and gray with orange mottling, Silty/Clayey, fine to medium SANDSTONE with random 10-20% gravel beds	4	113.5	14.4	
6									
8									
10									
12					-Gradational contact				
14				SM	Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 5-10% gravel up to 2 inches				
16	LB4-2					6/10"	124.4	9.3	
18					-Becomes much coarser-grained with increase in gravel 10-20% up to 3 inches; also mottled pale green and light brown				
20									
22									
24									

Figure A-4,
Log of Boring LB 4, Page 1 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 4		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>555'</u>	DATE COMPLETED <u>01-08-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
26	LB4-3						5/8"	129.1	8.7
28									
30									
32									
34									
36	LB4-4			CL	-Sharp contact with 1/2 to 2-inch thick black sandstone bed; slightly undulatory (5-10°, due west) Very hard, damp, pale green, Silty CLAYSTONE		10/10"	121.6	13.1
38				SM/SC	-Gradational contact Very dense, damp, pale green, Silty/Clayey, fine SANDSTONE -1-foot thick gravelly sandstone bed with 20-30% gravel and cobble up to 5 inches at 37.5 feet -Becomes brown at 38.5 feet				
40				SM	Very dense, damp, reddish brown and gray, Silty, fine to coarse SANDSTONE with abundant gravel				
42									
44				CL	Very hard, damp, pale green, Silty CLAYSTONE with random 1/2 to 1 1/2 inches wide sand filled fractures from 44 to 47 feet; waxy but very competent		5/8"	120.7	13.3
46	LB4-5								
48									

Figure A-4,
Log of Boring LB 4, Page 2 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL		... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE
			... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 4		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>555'</u>	DATE COMPLETED <u>01-08-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
50									
52									
54				SM	-Gradational contact Very dense, moist, mottled pale green, orange and light brown, Silty, fine to coarse SANDSTONE with abundant gravel				
56	LB4-6						25/7"	125.8	8.4
58					-Slight seepage observed at 57 feet				
60									
					BORING TERMINATED AT 60 FEET No groundwater encountered				

Figure A-4,
Log of Boring LB 4, Page 3 of 3

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 5		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>719'</u>	DATE COMPLETED <u>01-11-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Very stiff, moist, dark brown, Gravelly CLAY with sand and 20-30% subangular to angular gravel and cobble up to 8 inches				
2				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, light brown to brown, Gravelly, fine to coarse SANDSTONE with 20-40% subangular to angular gravel and cobble up to 12 inches				
8	LB5-1			SM/SC	-Gravel/cobble lag deposit with up to 16-inch boulders at contact; scoured undulating contact (10-30°, N30W)				
10	LB5-2			CL	OTAY FORMATION (To) Dense, damp, mottled brown and pale green, Silty/Clayey, fine to coarse SANDSTONE with 10% gravel up to 1/2 to 2 inches; webbed clay filled fractures Hard, damp, mottled brown and pale green, Silty/fine to coarse Sandy CLAYSTONE	3	109.6	17.5	
14				SM/SC	-Fracture (30°, N10W), 1/2-inch thick white caliche along transitional contact Very dense, damp, brown, Silty/Clayey, fine to medium SANDSTONE				
20	LB5-3			SM	Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 10-20% gravel up to 1/2 to 1 inch	10	123.5	11.1	
22									
24									

Figure A-5,
Log of Boring LB 5, Page 1 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 5		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>719'</u>	DATE COMPLETED <u>01-11-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
26									
28									
30	LB5-4			SM/SC and CL	-Scoured undulating contact Very dense/hard, damp, mottled brown and pale green, Silty/Clayey, fine SANDSTONE/with interbedded fine, Sandy CLAYSTONE		10	113.4	17.8
32									
34				SM	Very dense, damp, light brown, Silty, fine SANDSTONE				
36									
38									
40	LB5-5				-Becomes fine to coarse and tan below 39.5 feet -Sample disturbed		15/6"	118.9	6.7
42									
44					-Gravel and cobble increase to 10-30% up to 5 inches				
46					-Difficult drilling				
					BORING TERMINATED AT 46 FEET No groundwater encountered				

Figure A-5,
Log of Boring LB 5, Page 2 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS					
	... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

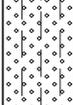
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 6		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>684'</u>	DATE COMPLETED <u>01-11-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, Silty CLAY with sand and gravel				
2									
4				SM	OTAY FORMATION (To) Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 5-10% gravel and cobble up to 4 inches				
6									
8				SM	Very dense, damp, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 20-35% gravel, cobble and boulders up to 14 inches that decrease with depth				
10									
12									
14									
16				SM/SC	Very dense, damp, mottled light brown and pale green, Silty/Clayey, fine SANDSTONE				
18									
20				SM	Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 10-20% gravel				
22									
24									

Figure A-6,
Log of Boring LB 6, Page 1 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 6 ELEV. (MSL.) <u>684'</u> DATE COMPLETED <u>01-11-2010</u> EQUIPMENT <u>30" DIAMETER BUCKET RIG</u> BY: <u>T. REIST</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
MATERIAL DESCRIPTION								
26				SM	-From 25 to 28 feet, gravel and cobble increase 10-25% up to 8 inches			
28								
30								
32						-Sampler destroyed		
34	LB6-1					-Very slow and difficult drilling below 34 feet; rippers used		
36								
38						-2-foot thick discontinuous, very hard, mottled maroon and pale green, silty claystone; bed truncated by gravel sandstone bed		
40								
42						-Becomes brown to light brown and more clayey with 10-15% gravel and cobble up to 4 inches below 38½ feet		
					PRACTICAL REFUSAL AT 43 FEET			

Figure A-6,
Log of Boring LB 6, Page 2 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 7		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>615'</u>	DATE COMPLETED <u>01-11-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, Silty/fine to coarse, Sandy CLAY with 10-15% gravel and cobble up to 8 inches				
2				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, mottled light brown, to brown, Clayey/Silty, fine to coarse SANDSTONE with 10-30% gravel, cobble and boulders up to 16 inches; very difficult drilling with auger and rippers used -Larger boulders present below 6 feet up to 24 inches; becomes mottled reddish brown, pale green and brown				
4				GM	Very dense, damp, light brown and brown, Gravelly, fine to coarse SANDSTONE with clay and silt within matrix, 20-40% gravel, cobble and boulders up to 3 feet; very slow difficult drilling				
6									
8									
10									
12					REFUSAL AT 12 FEET				

Figure A-7,
Log of Boring LB 7, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 8		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>537'</u>	DATE COMPLETED <u>01-12-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist, dark brown, Sandy CLAY with cobble and boulders up to 24 inches randomly present; slow difficult drilling; auger used				
2									
4						-Boulder			
					REFUSAL ON BOULDER AT 4 FEET				

Figure A-8,
Log of Boring LB 8, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 9		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>537'</u>	DATE COMPLETED <u>01-12-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist, dark brown, Sandy CLAY, with random cobble and boulders up to 24 inches; slow difficult drilling; rippers used				
2					-Cobble and boulder content increase; becomes light brown; possible fanglomerate contact?				
4					-Boulder				
6					REFUSAL ON BOULDER AT 6 FEET				

Figure A-9,
Log of Boring LB 9, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 10		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>527'</u>	DATE COMPLETED <u>01-12-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Soft to stiff, moist, dark brown, Sandy CLAY with trace gravel				
2				CL	-Gradational contact FANGLOMERATE DEPOSITS (Tof) Very stiff, moist, mottled orange, brown and gray, fine to coarse, Sandy CLAY with 10-25% angular gravel up to 3 inches; no discernible bedding				
4	LB10-1								
6	LB10-2				-Becomes pale green with orange oxidation below 5 feet with random gypsum veins	2	119.5	14.8	
8				CL	OTAY FORMATION (To) Very dense, damp, mottled orange brown and gray, Gravelly CLAYSTONE with sand, gravel, cobble and boulders up to 8 inches				
10					-1½ thick, stiff, moist, pale green claystone bed with gravel at 10 feet				
12	LB10-3					4/4"	121.6	8.6	
14					-Very difficult drilling				
PRACTICAL REFUSAL AT 15 FEET									

Figure A-10,
Log of Boring LB 10, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		
	... SAMPLING UNSUCCESSFUL	
	... DISTURBED OR BAG SAMPLE	
	... DRIVE SAMPLE (UNDISTURBED)	
	... CHUNK SAMPLE	

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 11		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>529'</u>	DATE COMPLETED <u>01-13-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, fine to coarse, Sandy CLAY with trace gravel				
2				CL/SC	OTAY FORMATION (To) Very hard to very dense, damp, mottled light brown, brown and pale green, Sandy, fine to medium CLAYSTONE/Clayey, fine to medium SANDSTONE; clay and sand content vary with depth				
6	LB11-1						5/10"	111.1	15.7
10	LB11-2						5/8"	116.5	16.2
18				SM	Very dense, damp, light gray, Silty, fine to medium SANDSTONE				
20	LB11-3			CL/SC	-Irregular scoured contact with 6 to 8-inch gravel and cobble bed at contact (10-20°, S35W) Very hard to very dense, damp, mottled light brown, brown and pale green, Sandy, fine to medium CLAYSTONE/Clayey, fine to medium SANDSTONE; clay and sand content vary with depth		6	123.1	13.7
24				SM	-Gradational contact Very dense, damp, gray to light brown, Silty, fine to coarse SANDSTONE with 5-10% gravel up to 3 inches				
26									
28									

Figure A-11,
Log of Boring LB 11, Page 1 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS			
	... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE
			... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 11		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>529'</u>	DATE COMPLETED <u>01-13-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
30									
32									
34									
36						-Sharp slightly scoured contact with coarse sandstone at base (2-3°, S35W) -1½ foot thick pale green and light brown, sandy claystone/clayey sandstone bed at 35½ feet			
38									
40									
42	LB11-4			CL		-Sharp scoured undulating contact Very hard to hard, pale green, Silty CLAYSTONE, waxy but very competent	8	121.0	14.3
44	LB11-5								
46	LB11-6			SC		-Gradational contact Very dense, damp, orange brown, Clayey, fine to coarse SANDSTONE with 10-30% gravel and cobble up to 10 inches	11/10"	125.7	11.0
48									
50						BORING TERMINATED AT 50 FEET No groundwater encountered			

Figure A-11,
Log of Boring LB 11, Page 2 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 12		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) 532'	DATE COMPLETED 01-13-2010			
					EQUIPMENT 30" DIAMETER BUCKET RIG		BY: T. REIST		
MATERIAL DESCRIPTION									
0	LB12-1			SC	COLLUVIUM (Qc) Loose, damp to moist, brown to reddish brown, Clayey, fine to medium SAND with trace gravel and cobble up to 6 inches				
2				CL	-Gradational contact Stiff, moist, reddish brown, Silty CLAY with some sand, gravel and cobble up to 4 inches				
4			CL	Stiff to very stiff, moist, mottled gray, light brown and green, Sandy CLAYSTONE with trace gravel	1	108.2	17.7		
6			SC	OTAY FORMATION (To) Dense, damp, mottled pale green, light brown, Clayey/Silty SANDSTONE					
8			SM	Very dense, damp, mottled gray, light brown and pale green, Gravelly, fine to coarse SANDSTONE with clay, gravel, cobble and boulders up to 30 inches; very slow difficult drilling					
10			SM	-Heavily scoured contact Very dense, damp, light brown, pale green and light orange, Silty, fine to coarse SANDSTONE					
12				SM	-Becomes silty/clayey sandstone below 14 feet				
14				SM	Very dense, damp, light brown and gray, Gravelly/Silty, fine to coarse SANDSTONE with 20-40% gravel, cobble and boulders up to 24 inches; difficult drilling, rippers and auger used				
16				SM					
18				SM					
20				SM					
					REFUSAL AT 21 FEET ON BOULDER				

Figure A-12,
Log of Boring LB 12, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 13 ELEV. (MSL.) <u>542'</u> DATE COMPLETED <u>01-13-2010</u> EQUIPMENT <u>30" DIAMETER BUCKET RIG</u> BY: <u>T. REIST</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
MATERIAL DESCRIPTION								
0	LB13-1			CL	COLLUVIUM (Qc) Stiff, moist, brown to reddish brown, Silty/fine to coarse Sandy CLAY with trace gravel	4	118.8	12.1
2								
4					-Gradational contact			
6			SC	FANGLOMERATE DEPOSITS (Tof) Medium dense to dense, damp to moist, light brown to gray, Clayey, fine to coarse SAND with 10-20% gravel and cobble up to 8 inches; random 12-inch boulder also present; no discernible bedding				
8				SM	-Sharp undulating scoured contact (10-20°, N80W) with increase in cobble and boulders OTAY FORMATION (To) Dense to very dense, damp, pale green, orange and light brown, Silty, fine to coarse SANDSTONE with 5-10% gravel -1½ foot thick silty/clayey, fine to medium sandstone bed with occasional cobble and boulder up to 14 inches -Gravel and cobble lenses present from 13 to 18 feet up to 20 inches; slow difficult drilling; rippers and auger used			
10								
12								
14								
16								
18					REFUSAL AT 18 FEET ON BOULDER			

Figure A-13,
Log of Boring LB 13, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 14		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>512'</u>	DATE COMPLETED <u>01-14-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, fine to coarse Sandy/Silty CLAY with 5% gravel and cobble up 8 inches				
2				SC	FANGLOMERATE DEPOSITS (Tof) Dense, damp, mottled light brown and orange, Clayey, fine to coarse SANDSTONE with 10-20% gravel, cobble and boulders up to 14 inches; no discernible bedding; difficult drilling				
4									
6									
8				SM	-Heavily scoured and undulating contact (10-30°, S10E) OTAY FORMATION (To) Dense, damp, light brown, orange and pale green, Silty, fine to medium SANDSTONE				
10				SC/SM	Dense, damp, pale green and orange, Clayey/Silty SANDSTONE				
12				SM/SC	Dense, damp, dark gray, Gravelly/Clayey, fine to coarse SANDSTONE with 20-30% gravel, cobble and boulders up to 14 inches; very slow difficult drilling; rippers used				
14					PRACTICAL REFUSAL 1T 14 FEET				

Figure A-14,
Log of Boring LB 14, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 15		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>507'</u>	DATE COMPLETED <u>01-14-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	COLLUVIUM/ALLUVIUM (Qc/Qal) Loose to medium dense, moist, dark brown, Clayey, fine to coarse SAND, 10-20% with gravel, cobble and boulders up to 14 inches; slow difficult drilling; rippers used				
2									
4									
REFUSAL AT 5 FEET									

Figure A-15,
Log of Boring LB 15, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	<input type="checkbox"/> ... SAMPLING UNSUCCESSFUL	<input type="checkbox"/> ... STANDARD PENETRATION TEST	<input type="checkbox"/> ... DRIVE SAMPLE (UNDISTURBED)
	<input checked="" type="checkbox"/> ... DISTURBED OR BAG SAMPLE	<input checked="" type="checkbox"/> ... CHUNK SAMPLE	<input type="checkbox"/> ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 16		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>546'</u>	DATE COMPLETED <u>01-14-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0	LB16-1			CL/CH	COLLUVIUM (Qc) Stiff, moist, brown to dark brown, Silty CLAY with some sand; trace gravel				
2									
4				CL	-Gradational contact Very stiff, moist, pale olive green to olive brown, Silty CLAY/CLAYSTONE with sand grit, trace gravel and gypsum	1	110.5	17.4	
6				SM/SC	OTAY FORMATION (To) Dense, damp, orange brown and pale green, Gravelly/Clayey, fine to coarse SAND with 20-40% gravel, cobble and boulders up to 14 inches				
8									
REFUSAL AT 9 FEET ON BOULDER									

Figure A-16,
Log of Boring LB 16, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 17		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>509'</u>	DATE COMPLETED <u>01-14-2010</u>			
					EQUIPMENT <u>30" DIAMETER BUCKET RIG</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist, dark brown, Sandy CLAY with 5-10% gravel and cobble up to 6 inches				
2					-Becomes very stiff, pale gray to pale green				
4				CL/SC	OTAY FORMATION (To) Dense, damp, light brown to pale green, fine to coarse, Sandy CLAYSTONE/Clayey, fine to coarse SANDSTONE				
6					-Scoured contact				
8				CL	Dense, damp, pale green and orange, Gravelly/fine to coarse, Sandy CLAYSTONE with 30% gravel, cobble and boulders up to 12 inches				
10				CL	-Heavily scoured contact Hard, moist, pale green, Silty CLAYSTONE with fine to coarse, sandy grit; waxy but very competent				
10	LB17-1				-Gravel in shoe; blow counts not accurate	5/8"	113.2	15.3	
12				SM/SC	Very dense, damp, pale green and orange brown, Gravelly/Clayey, fine to coarse SANDSTONE with 20-40% gravel, cobble and boulders up 14 inches with random pale green discontinuous claystone beds				
14									
16									
18				CL	-Gradational contact Very stiff to hard, pale gray-green, Silty CLAYSTONE with fine to coarse sandy grit and trace gravel; waxy but competent	2	112.6	18.0	
20					-Gravel content increases below 21 feet				
22					-Gradational contact				
24				SM/SC	Very dense, damp, pale green and orange brown, Gravelly/Clayey, fine to coarse SANDSTONE with 20-40% gravel, cobble and boulders up 14 inches with random pale green discontinuous claystone beds				

Figure A-17,
Log of Boring LB 17, Page 1 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING LB 17 ELEV. (MSL.) <u>509'</u> DATE COMPLETED <u>01-14-2010</u> EQUIPMENT <u>30" DIAMETER BUCKET RIG</u> BY: <u>T. REIST</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
26	LB17-3					5/8"	126.8	9.1
28								
30					-Gravel, cobble and boulder content increases below 30 feet			
					PRACTICAL REFUSAL AT 31 FEET			

Figure A-17,
Log of Boring LB 17, Page 2 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

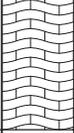
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 1		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>652'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, damp, brown, Clayey, fine to coarse SAND				
2					METAVOLCANIC ROCK (KJmv) Highly weathered, brown, moderately strong, METAVOLCANIC ROCK -Becomes moderately weathered and very strong; angular fragments up to 12" in maximum dimension				
					REFUSAL AT 3 FEET No groundwater encountered				

Figure A-18,
Log of Trench ET 1, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 2		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>700'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Loose, damp, brown, fine to medium Sandy CLAY				
2					METAVOLCANIC ROCK (KJmv) Slightly weathered, grayish brown, very strong to extremely strong, METAVOLCANIC ROCK; angular fragments up to 18" in max dimension				
					REFUSAL AT 2½ FEET No groundwater encountered				

Figure A-19,
Log of Trench ET 2, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 3		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>674'</u>	DATE COMPLETED <u>08-18-2008</u>				
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>			
MATERIAL DESCRIPTION										
0				CL	TOPSOIL Loose, damp, brown, fine to medium, Sandy CLAY					
2										
4					METAVOLCANIC ROCK (KJmv) Soil, brownish- to olive gray, weak METAVOLCANIC ROCK (saprolite)					
6					-Becomes highly weathered					
8					-Becomes moderately weathered and moderately weak					
10					-Becomes moderately strong to strong; some angular fragments to 8" in max dimension					
12					-Very strong					
					REFUSAL AT 13 FEET No groundwater encountered					

Figure A-20,
Log of Trench ET 3, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 4		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>540'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
0				SC	COLLUVIUM (Qc) Loose, damp, brown to dark brown, Clayey, fine to coarse SAND				
2						-Becomes medium dense			
4					METAVOLCANIC ROCK (KJmv) Highly weathered, grayish brown, moderately weak, METAVOLCANIC ROCK				
6						-Becomes moderately strong			
8						-Becomes strong to very strong and moderately weathered -Some angular fragments up to 12" in max dimension			
10									
12									
14					REFUSAL AT 14 FEET No groundwater encountered				

Figure A-21,
Log of Trench ET 4, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 5		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>505'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, damp, brown, Clayey, fine to coarse SAND				
2					METAVOLCANIC ROCK (KJmv) Highly weathered, grayish brown, weak, METAVOLCANIC ROCK with red oxidation -Becomes moderately weathered and moderately weak -Becomes strong to very strong; angular fragments up to 12" in max dimension				
4									
6									
8									
					REFUSAL AT 9 FEET No groundwater encountered				

Figure A-22,
Log of Trench ET 5, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 6			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)								
					ELEV. (MSL.) <u>506'</u>	DATE COMPLETED <u>08-18-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>J. PAGNILLO</u>											
MATERIAL DESCRIPTION																		
0	ET6-1			SC	ALLUVIUM (Qal) Medium dense, damp to moist, brown to dark brown, Clayey, fine to coarse SAND with trace sub-angular metavolcanic rock up to 6" in maximum dimension													
2																		
4	ET6-2			CL/CH	OTAY FORMATION (To) Stiff, moist, light olive gray, fine to coarse, Sandy CLAYSTONE; waxy lustre, local polished surfaces -Becomes stiff to very stiff													
6																		
8																		
10																		
12																		
14																		
16																		
18																		
TRENCH TERMINATED AT 19 FEET No groundwater encountered																		

Figure A-23,
Log of Trench ET 6, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 7		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>550'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
20									
22									
24									
					TRENCH TERMINATED AT 24 FEET No groundwater encountered				

Figure A-24,
Log of Trench ET 7, Page 2 of 2

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	<input type="checkbox"/> ... SAMPLING UNSUCCESSFUL	<input type="checkbox"/> ... STANDARD PENETRATION TEST	<input type="checkbox"/> ... DRIVE SAMPLE (UNDISTURBED)
	<input checked="" type="checkbox"/> ... DISTURBED OR BAG SAMPLE	<input checked="" type="checkbox"/> ... CHUNK SAMPLE	<input type="checkbox"/> ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

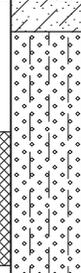
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 8		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>646'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>J. PAGNILLO</u>				
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, damp, reddish brown, Clayey, fine to coarse SAND				
2	ET8-1			SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, brown and gray, Silty/Gravelly, fine to coarse SANDSTONE with 30-40% gravel and cobble up to 6 inches				
4									
6									
8					-Boulders up to 18 inches present				
10									
12					REFUSAL AT 12 FEET No groundwater encountered				

Figure A-25,
Log of Trench ET 8, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

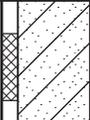
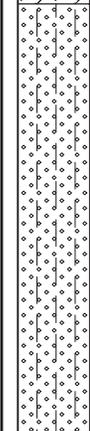
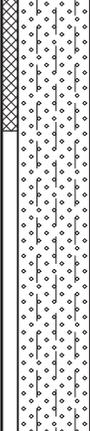
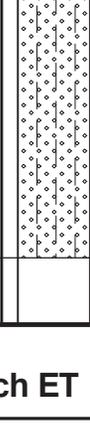
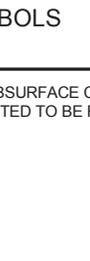
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 9			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>596'</u>	DATE COMPLETED <u>08-18-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>J. PAGNILLO</u>			
MATERIAL DESCRIPTION										
0	ET9-1			CL	TOPSOIL Medium dense, damp, brown to dark brown, fine to medium Sandy CLAY					
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, moist, light brown, Silty, fine- to coarse-grained SANDSTONE with cobbles and some boulders up to 24" in maximum dimension approx. 10% greater than 12-inch minus					
4										
6										
8										
10	ET9-2									
12										
14										
16										
18										
					TRENCH TERMINATED AT 19 FEET No groundwater encountered					

Figure A-26,
Log of Trench ET 9, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 10		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>504'</u>	DATE COMPLETED <u>08-21-2008</u>				
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				CL	ALLUVIUM (Qal) Medium dense, dry, brown, Sandy CLAY; some rootlets					
2						-Becomes dense with some nested gravels and boulders up to 2 feet in maximum dimension				
4				SC	OTAY FORMATION (To) Dense, moist, light grayish to yellowish brown, Clayey, medium- to coarse-grained SANDSTONE with 20% gravel and occasional cobble					
6										
8										
10										
12					-Massive; becomes very dense and cemented					
14					REFUSAL AT 14 FEET No groundwater encountered					

Figure A-27,
Log of Trench ET 10, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 11 ELEV. (MSL.) <u>545'</u> DATE COMPLETED <u>08-18-2008</u> EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>J. PAGNILLO</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
MATERIAL DESCRIPTION									
0				CL	UNDOCUMENTED FILL (Qudf) Medium dense, moist, dark brown, fine to medium, Sandy CLAY with trace cobble up to 6" in maximum dimension				
2									
4									
6				SM	OTAY FORMATION (To) Dense, moist, light brown, Silty, fine- to coarse-grained SANDSTONE with 10-20% gravel and cobble up to 12-inch minus -Amount of cobble decreases				
8									
10									
12									
14									
16									
					TRENCH TERMINATED AT 16 FEET No groundwater encountered				

Figure A-28,
Log of Trench ET 11, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

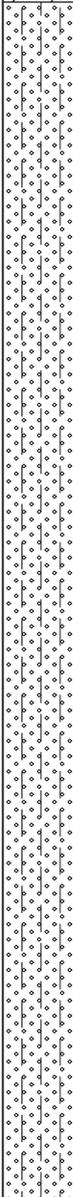
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 12		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>612'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Soft, damp, brown, fine to medium Sandy CLAY				
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, moist, light brown, Silty, fine- to coarse-grained SANDSTONE with 15% gravel, cobble and boulders up to 18 inches				
6					-Amount of cobble and boulder decreases				
18					TRENCH TERMINATED AT 19 FEET No groundwater encountered				

Figure A-29,
Log of Trench ET 12, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

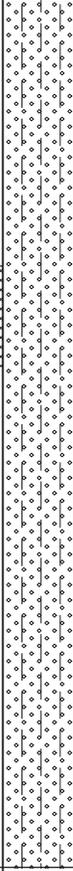
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 13		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) 516'	DATE COMPLETED 08-22-2008			
					EQUIPMENT PC 400LC-EXCAVATOR W/36" BUCKET		BY: M. ERTWINE		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, dry, grayish brown, Silty to Clayey SAND				
2				CL	Stiff to hard, brown, Sandy CLAY				
4				SM	OTAY FORMATION (To) Dense, moist, light yellowish to grayish brown, Silty, fine- to coarse-grained SANDSTONE; few gravels -Becomes very dense with approx. 10-20% gravels and cobbles				
8	ET13-1								
12					-Massive				
16					-Becomes strongly cemented and conglomeratic				
					REFUSAL AT 16 FEET No groundwater encountered				

Figure A-30,
Log of Trench ET 13, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 14		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>616'</u>	DATE COMPLETED <u>08-22-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Medium dense, moist, grayish brown, Silty SAND; some gravels and cobbles				
2				SC	FANGLOMERATE DEPOSITS (T of) Dense, slightly moist, reddish brown, Clayey/Gravelly, fine to medium SANDSTONE with 20-30% gravel and cobble up to 12-inch minus				
4	ET14-1								
6									
8									
10					-Becomes very dense with abundant boulders greater than 2-feet in maximum dimension				
					REFUSAL AT 10 FEET No groundwater encountered				

Figure A-31,
Log of Trench ET 14, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

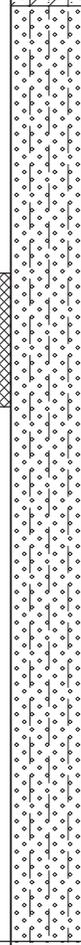
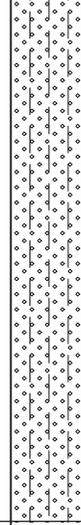
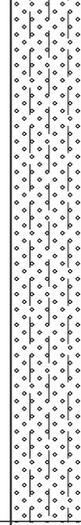
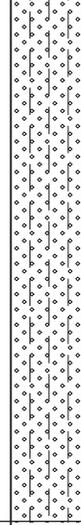
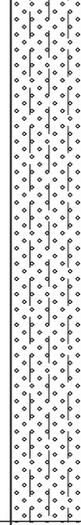
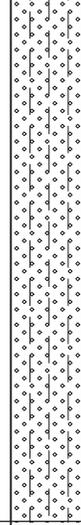
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 15			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>510'</u>	DATE COMPLETED <u>08-22-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				SC-SM	ALLUVIUM (Qal) Medium dense, dry, brown, Clayey to Silty SAND					
2				SM	OTAY FORMATION (To) Dense, moist, olive gray to light reddish brown, Silty to Clayey, fine- to medium-grained SANDSTONE					
6	ET15-1									
8					-Becomes fine- to coarse-grained with 20-30% cobbles and boulders up to 2-foot minus					
10										
12										
14					-Massive					
16					REFUSAL AT 16 FEET No groundwater encountered					

Figure A-32,
Log of Trench ET 15, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS					
	... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 16		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>644'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0	ET16-1			SC	TOPSOIL Loose, damp, brown, Clayey SAND				
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, dry, light brown, Silty/Gravelly, fine to medium SANDSTONE; angular gravels				
6	ET16-2				-Becomes dense, moist, light grayish brown and moderately cemented				
12	ET16-3			SM	OTAY FORMATION (To) Dense, damp, light brown, Silty, fine to medium SANDSTONE with some gravel				
18					TRENCH TERMINATED AT 18 FEET No groundwater encountered				

Figure A-33,
Log of Trench ET 16, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 17		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>614'</u>	DATE COMPLETED <u>08-18-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>J. PAGNILLO</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Loose, moist to wet, dark brown, fine to coarse, Sandy CLAY with trace cobble (~10%) up to 6" size				
2									
4				SM	OTAY FORMATION (To) Dense, moist to wet, light brown, Silty, fine to coarse SANDSTONE with cobble (~10-15%) sub-rounded, up to 12" in maximum dimension				
6									
8				CL	Hard, moist to wet, yellow, fine to medium, Sandy CLAYSTONE				
10	ET17-1								
12									
14									
16									
18									
20					TRENCH TERMINATED AT 20 FEET No groundwater encountered				

Figure A-34,
Log of Trench ET 17, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

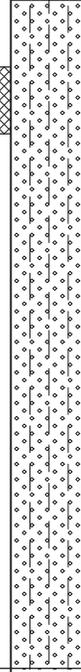
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 18		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>585'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Stiff, moist, brown, Sandy CLAY with some gravels				
2	ET18-1								
4									
6				SM	OTAY FORMATION (To) Dense, slightly moist, grayish brown, Silty, fine to medium, SANDSTONE; excavates blocky in texture				
8	ET18-2								
10									
12									
14					-Massive				
16					TRENCH TERMINATED AT 16 FEET No groundwater encountered				

Figure A-35,
Log of Trench ET 18, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

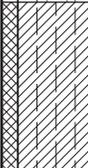
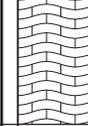
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 20		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>638'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0	B20-1			SM	ALLUVIUM (Qal) Loose, dry, grayish brown, Silty, fine to medium SAND with some clay and gravels				
2									
4									
6	B20-2			CL	OTAY FORMATION (To) Hard, light grayish brown, Silty CLAYSTONE				
8									
10									
12					-Massive				
14									
16					METAVOLCANIC ROCK (KJmv) Highly weathered, blue-gray, strong METAVOLCANIC ROCK				
					REFUSAL AT 16 FEET No groundwater encountered				

Figure A-37,
Log of Trench ET 20, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

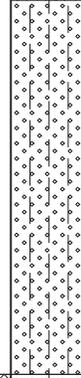
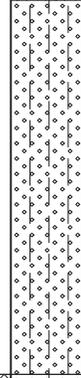
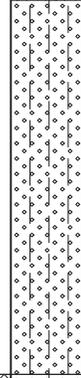
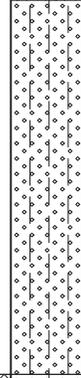
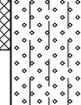
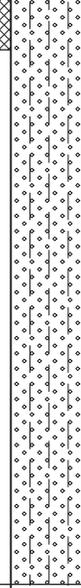
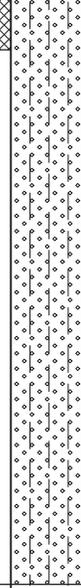
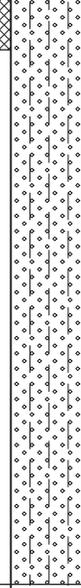
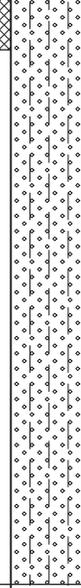
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 21			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>660'</u>	DATE COMPLETED <u>08-18-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0	ET21-1			CL	TOPSOIL Loose to medium dense, moist, dark brown, fine to medium Sandy CLAY with cobble (~10%) up to 6" size					
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, moist, light brown, Silty, fine to coarse SANDSTONE with 15% gravel, cobble and boulders up to 18 inches					
4										
6										
8										
10	ET21-2			SM	-Amount of cobble decreases (5-10%) OTAY FORMATION (To) Dense, damp, light brown, Silty, fine to coarse SANDSTONE with some gravel					
12										
14										
16										
18										
20										
					TRENCH TERMINATED AT 20 FEET No groundwater encountered					

Figure A-38,
Log of Trench ET 21, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 22			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>766'</u>	DATE COMPLETED <u>08-21-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0					METAVOLCANIC ROCK (KJmv) Moderately weathered, grayish brown, strong METAVOLCANIC ROCK; joint orientations range between N70°E, 3°S to horizontal					
2	ET22-1									
4					-Becomes moderately strong and highly weathered					
6										
8										
10										
12					REFUSAL AT 12 FEET No groundwater encountered					

Figure A-39,
Log of Trench ET 22, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

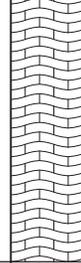
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 23		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>766'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Medium dense, dry, reddish brown, Clayey SAND; some gravels and occasional cobbles; approx 10% greater than 6" minus				
2									
4									
6					-30-40% greater than 6" minus				
8									
10					METAVOLCANIC ROCK (KJmv) Highly weathered, gray-brown, moderately strong METAVOLCANIC ROCK				
12									
14									
					REFUSAL AT 14 FEET No groundwater encountered				

Figure A-40,
Log of Trench ET 23, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

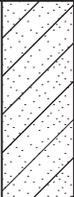
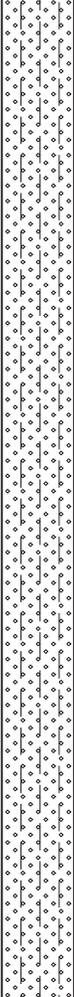
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 24		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>681'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, dark olive brown, Sandy CLAY				
2									
4				SM	OTAY FORMATION (To) Dense, moist, gray brown to reddish brown, medium-grained, Silty SANDSTONE				
6									
8					-20-30% gravel and cobble present				
10									
12									
14					-Massive				
16									
18									
					TRENCH TERMINATED AT 18 FEET No groundwater encountered				

Figure A-41,
Log of Trench ET 24, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 25		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>642'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Loose, dry, light brown, Silty, fine SAND				
2				SC	OTAY FORMATION (To) Dense, dry, light reddish brown, Clayey, fine- to coarse-grained SANDSTONE with coarse gravels				
6	ET25-1			SM/SC	Dense, moist, light olive brown, Silty to Clayey, fine-grained SANDSTONE				
12					-Some claystone lenses present				
18					TRENCH TERMINATED AT 18 FEET No groundwater encountered				

Figure A-42,
Log of Trench ET 25, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 26		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>619'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Loose, dry, dark brown, Silty SAND				
2				SM/SC	FANGLOMERATE DEPOSITS (Tof) Very dense, moist, grayish brown, Gravelly/Clayey, medium- to coarse-grained SANDSTONE with 30-40% gravel, cobble and boulders up to 3-feet in diameter				
4									
6	ET26-1								
8									
10									
12					-Becomes yellowish to reddish brown with increase in boulders -Very difficult excavation TRENCH TERMINATED AT 12 FEET No groundwater encountered				

Figure A-43,
Log of Trench ET 26, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

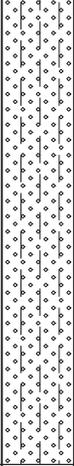
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 27		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>576'</u>	DATE COMPLETED <u>08-21-2008</u>				
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				SC	TOPSOIL Loose, dry, olive brown, Clayey SAND					
2										
4				SM	OTAY FORMATION (To) Dense, moist, tan to olive brown, Silty/Gravelly, fine to medium SANDSTONE with 20-30% gravel and cobble					
6										
8						-Gravel and cobble content decreases				
10						TRENCH TERMINATED AT 10 FEET No groundwater encountered				

Figure A-44,
Log of Trench ET 27, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 28			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>562'</u>	DATE COMPLETED <u>08-21-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				CL	TOPSOIL Stiff, moist, dark brown, Sandy CLAY					
2				SM/SC	OTAY FORMATION (To) Dense, moist, light grayish brown, Silty/Clayey, fine to coarse SANDSTONE; some angular gravels					
8	ET28-1				-2"-4" thick waxy claystone lense present; competent; not remolded					
12					TRENCH TERMINATED AT 12 FEET No groundwater encountered					

Figure A-45,
Log of Trench ET 28, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

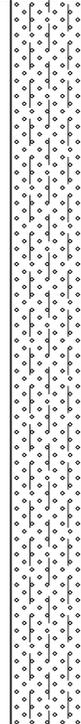
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 29		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>564'</u>	DATE COMPLETED <u>08-21-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Stiff, dry, dark olive brown, Sandy CLAY				
2	ET29-1								
4				SM/SC	OTAY FORMATION (To) Dense, moist, light grayish brown, Silty/Clayey, fine to coarse SANDSTONE; some gravels; weakly to moderately cemented				
6									
8									
10									
12					-Massive				
14					TRENCH TERMINATED AT 14 FEET No groundwater encountered				

Figure A-46,
Log of Trench ET 29, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

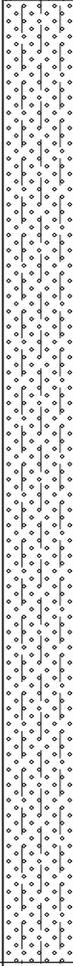
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 30		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>680'</u>	DATE COMPLETED <u>08-21-2008</u>				
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				CL	TOPSOIL Stiff, dry, dark brown, Sandy CLAY					
2				SM	OTAY FORMATION (To) Dense, moist, light brown, Silty, fine- to medium-grained SANDSTONE; some gravels and cobble					
4										
6										
8										
10										
12										
14										
16										
18										
20										
					TRENCH TERMINATED AT 20 FEET No groundwater encountered					

Figure A-47,
Log of Trench ET 30, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

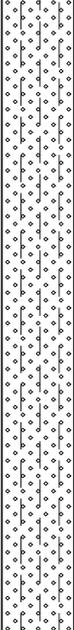
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 31		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>514'</u>	DATE COMPLETED <u>08-19-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Stiff, moist, brown, Clayey SAND; some boulders				
2									
4				SM/SC	OTAY FORMATION (To) Dense, moist, light grayish brown, Silty/Clayey, fine- to medium-grained SANDSTONE; occasional gravels				
6									
8									
10									
12									
					TRENCH TERMINATED AT 12½ FEET No groundwater encountered				

Figure A-48,
Log of Trench ET 31, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

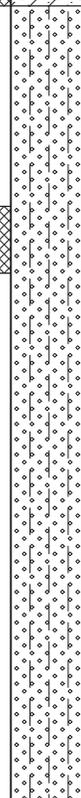
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 32			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>558'</u>	DATE COMPLETED <u>08-19-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
					MATERIAL DESCRIPTION					
0	ET32-1			SC	TOPSOIL Medium dense, dry, dark reddish brown, Clayey SAND; some gravels and cobbles					
2				SM	OTAY FORMATION (To) Dense, moist, light grayish brown, Silty, medium- to coarse-grained SANDSTONE; some gravels					
4										
6	ET32-2									
8										
10										
12										
14					TRENCH TERMINATED AT 14 FEET No groundwater encountered					

Figure A-49,
Log of Trench ET 32, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 33		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>633'</u>	DATE COMPLETED <u>08-19-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, dry, brown, Clayey SAND				
2	ET33-1			SM	FANGLOMERATE DEPOSITS (Tof) Dense, dry, reddish brown, Silty, medium- to coarse-grained SANDSTONE with 20-30% gravel, cobble and boulders up to 24 inches				
4									
					REFUSAL AT 5 FEET No groundwater encountered				

Figure A-50,
Log of Trench ET 33, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 34		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>535'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Loose, dry, light reddish brown, Silty SAND; trace gravels				
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, moist, reddish brown, Silty/Gravelly SANDSTONE with 30-40% gravel, cobble and boulders up to 24 inches				
4	ET34-1								
6									
8									
10				SC	OTAY FORMATION (To) Dense, damp, light reddish to yellowish brown, Clayey, fine to coarse SANDSTONE with some gravel and occasional boulder				
12									
14									
16					TRENCH TERMINATED AT 16 FEET No groundwater encountered				

Figure A-51,
Log of Trench ET 34, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

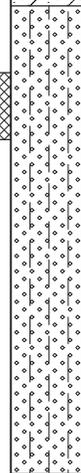
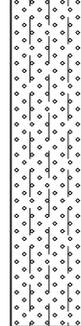
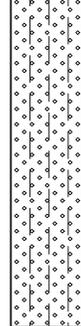
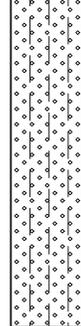
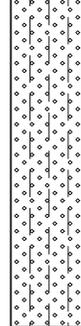
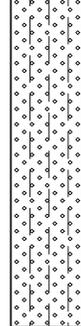
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 35		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>612'</u>	DATE COMPLETED <u>08-19-2008</u>				
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				CL	TOPSOIL Loose, dry, brown, Sandy CLAY					
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, moist, light reddish to light brown, Silty/Gravelly, medium- to coarse-grained SANDSTONE with 30-40% gravel					
4	ET35-1									
6										
8										
10				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty, fine to coarse SANDSTONE with some gravel					
12										
14										
					TRENCH TERMINATED AT 15 FEET No groundwater encountered					

Figure A-52,
Log of Trench ET 35, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 36			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>633'</u>	DATE COMPLETED <u>08-19-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				SM	FANGLOMERATE DEPOSITS (Tof) Dense, dry, reddish brown, Silty, medium- to coarse-grained SANDSTONE with 20-30% gravel, cobble and boulders up to 24 inches					
2										
4										
6	ET36-1			SM	OTAY FORMATION (To) Very dense, light olive brown, Gravelly, fine to coarse SANDSTONE with approx. 20% gravel and cobble less than 6" minus					
8					-Gravel increases with depth					
10										
12										
14										
16					-Occasional boulders within matrix approx 2' in maximum dimension					
18										
20					TRENCH TERMINATED AT 20 FEET No groundwater encountered					

Figure A-53,
Log of Trench ET 36, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 37			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>536'</u>	DATE COMPLETED <u>08-19-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0	ET37-1			SM	TOPSOIL Loose, dry, Silty, fine to medium SAND with abundant gravels and 2' boulders					
2				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, light grayish brown, Silty/Gravelly, medium- to coarse-grained SANDSTONE with 30-40% gravel and cobble					
4										
6										
8										
10					TRENCH TERMINATED AT 10 FEET No groundwater encountered					

Figure A-54,
Log of Trench ET 37, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 38		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>573'</u>	DATE COMPLETED <u>08-19-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>				
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Loose, dry, dark reddish brown, Silty SAND				
2				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, dry, light reddish brown, Silty/Gravelly medium- to coarse-grained SANDSTONE with 30-40% gravel and cobble less than 12 inches				
4									
6									
8					TRENCH TERMINATED AT 8 FEET No groundwater encountered				

Figure A-55,
Log of Trench ET 38, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 39		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>508'</u>	DATE COMPLETED <u>08-19-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0	ET39-1			SM/SC	ALLUVIUM (Qal) Medium dense, dry, reddish brown, Silty/Clayey SAND with 10-20% gravel, cobble and boulders up to 24 inches				
2				SM/SC	OTAY FORMATION (To) Very dense, moist, light grayish brown, Silty/Clayey, medium- to coarse-grained SANDSTONE				
4					METAVOLCANIC ROCK (KJmv) Slightly weathered, strong, grayish brown, METAVOLCANIC ROCK				
6					REFUSAL AT 6 FEET No groundwater encountered				

Figure A-56,
Log of Trench ET 39, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 40		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>520'</u>	DATE COMPLETED <u>08-19-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, dry, dark brown, Silty, fine to medium SAND with 10-20% gravel and cobble up to 6 inches				
2									
4									
6				SM	FANGLOMERATE DEPOSITS (Tof) Dense, moist, light grayish brown, Silty/Gravelly medium- to coarse-grained SANDSTONE with 30-40% gravel and cobble up to 6 inches				
8									
10									
12									
14									
					-Difficult excavation				
					REFUSAL AT 15 FEET No groundwater encountered				

Figure A-57,
Log of Trench ET 40, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 41		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>650'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SC	COLLUVIUM (Qc) Loose, dry, brown, Clayey SAND; occasional boulders in excess of 2 feet				
2									
4					METAVOLCANIC ROCK (KJmy) Highly weathered, light yellowish brown, medium strong METAVOLCANIC ROCK				
6	ET41-1								
8									
10									
12					-Becomes strong				
					REFUSAL AT 12 FEET No groundwater encountered				

Figure A-58,
Log of Trench ET 41, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 42		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>622'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	FANGLOMERATE DEPOSITS (Tof) Dense, damp, light reddish brown, Silty, fine- to medium-grained SANDSTONE with 15-25% gravel and cobble up to 12-inch minus				
2									
4									
6				SM	Dense, moist, light yellowish brown, Silty/Gravelly, medium- to coarse-grained SANDSTONE with 30-40% gravel and cobble up to 12-inch minus				
8									
10									
12									
14									
16									
18					REFUSAL AT 18 FEET No groundwater encountered				

Figure A-59,
Log of Trench ET 42, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 43			PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>586'</u>	DATE COMPLETED <u>08-20-2008</u>	EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u> BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0	ET43-1			SM	FANGLOMERATE DEPOSITS (Tof) Dense, dry, light reddish brown, Silty/Gravelly SANDSTONE with 20% gravel and cobble less than 12-inch minus					
2				SM	Very dense, moist, light yellowish brown, Silty/Gravelly, medium- to coarse-grained SANDSTONE with 20-30% gravel, cobble and boulders up to 12 inches					
4										
6										
8										
10										
12					REFUSAL AT 12 FEET No groundwater encountered					

Figure A-60,
Log of Trench ET 43, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

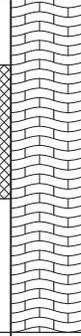
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 44		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>626'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0	ET44-1				METAVOLCANIC ROCK (KJmv) Highly weathered, reddish brown, moderately strong, METAVOLCANIC ROCK				
2									
4					-Becomes gray brown and slightly weathered				
					REFUSAL AT 5 FEET No groundwater encountered				

Figure A-61,
Log of Trench ET 44, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 45		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>679'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Loose, dry, reddish brown, Silty/Sandy CLAY with 10-20% gravel and cobble up to 6 inches				
2									
4					METAVOLCANIC ROCK (KJmv) Moderately weathered, gray-brown, strong, METAVOLCANIC ROCK				
					REFUSAL AT 5 FEET No groundwater encountered				

Figure A-62,
Log of Trench ET 45, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 46		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>621'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Highly weathered, loose, dry, reddish brown, Silty SAND with some gravel and cobble				
2									
4					METAVOLCANIC ROCK (KJmy) Soil, mottled reddish brown and gray, weak, METAVOLCANIC ROCK (saprolite); with gypsum crystals throughout				
6	ET46-1								
8									
10						-Becomes moderately weathered, gray-brown and moderately strong			
12					REFUSAL AT 12 FEET No groundwater encountered				

Figure A-63,
Log of Trench ET 46, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 47		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>593'</u>	DATE COMPLETED <u>08-20-2008</u>				
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>			
MATERIAL DESCRIPTION										
0				SM/SC	FANGLOMERATE DEPOSITS (Tof) Highly weathered, dense, slightly moist, reddish mottled yellowish brown, Gravelly/Clayey, medium- to coarse-grained SANDSTONE with 30-40% gravel, cobble and boulders up to 14 inches					
2										
4										
6										
8						-Gravel, cobble and boulders increases with depth				
10						-Occasional boulder greater than 1 to 2-foot minus				
12										
14										
16										
					REFUSAL AT 16 FEET No groundwater encountered					

Figure A-64,
Log of Trench ET 47, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH ET 48		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>520'</u>	DATE COMPLETED <u>08-20-2008</u>			
					EQUIPMENT <u>PC 400LC-EXCAVATOR W/36" BUCKET</u>		BY: <u>M. ERTWINE</u>		
MATERIAL DESCRIPTION									
0				SM	TOPSOIL Loose, dry, dark brown, Gravelly, fine to coarse SAND				
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, dry, reddish brown, Gravelly/Silty SANDSTONE with gravel, cobble and boulders up to 14 inches -Becomes grayish brown				
4									
6									
8									
10									
					REFUSAL AT 11 FEET No groundwater encountered				

Figure A-65,
Log of Trench ET 48, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

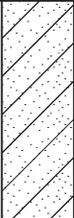
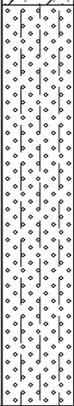
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 1		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>546'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Medium dense, moist, reddish brown to mottled gray, pale green and brown, fine to coarse, Sandy CLAY (weathered)				
2				SM/SC	OTAY FORMATION (To) Very dense, damp, pale green and light brown, Silty/Clayey, fine to coarse SANDSTONE with trace gravel				
4									
6									
TRENCH TERMINATED AT 7 FEET									

Figure A-66,
Log of Trench T 1, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

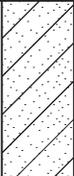
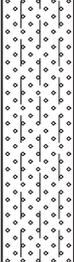
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 2 ELEV. (MSL.) <u>560'</u> DATE COMPLETED <u>01-29-2010</u> EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
MATERIAL DESCRIPTION								
0				CL	TOPSOIL Stiff, moist to wet, dark brown, fine to coarse, Sandy CLAY with trace gravel and cobble up to 8 inches			
2				SM/SC	FANGLOMERATE DEPOSITS (Tof) Dense, damp to moist, mottled light brown and pale green, Silty/Clayey, fine to coarse SANDSTONE with 20% gravel and cobble up to 9 inches; claystone and sandstone rip-up clasts up to 5 inches			
4								
TRENCH TERMINATED AT 5 FEET								

Figure A-67,
Log of Trench T 2, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

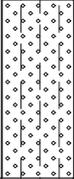
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 3		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>574'</u>	DATE COMPLETED <u>01-29-2010</u>				
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>					
					MATERIAL DESCRIPTION					
0				CL	TOPSOIL Soft to stiff, moist to wet, dark brown to reddish brown, Sandy CLAY with trace gravel and cobble					
2				SM	FANGLOMERATE DEPOSITS (Tof) Very dense to dense, mottled light brown and brown, Silty/Gravelly, fine to coarse SANDSTONE with 20-30% gravel and cobble up to 6 inches -Boulders observed at bottom of trench					
					PRACTICAL REFUSAL AT 3.5 FEET					

Figure A-68,
Log of Trench T 3, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

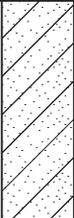
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 4		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>556'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Soft, moist to wet, dark brown to reddish brown, Sandy CLAY with trace gravel and cobble				
2				SC	FANGLOMERATE DEPOSITS (Tof) Medium dense, moist, reddish brown and brown, Clayey, fine to coarse SAND with gravel and cobble up to 6 inches; (weathered)				
4				SC/SM	OTAY FORMATION (To) Very dense, damp, pale green, Clayey/Silty, fine to coarse SANDSTONE with trace gravel				
6					TRENCH TERMINATED AT 6 FEET				

Figure A-69,
Log of Trench T 4, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

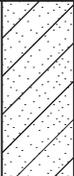
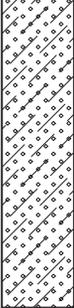
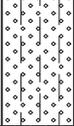
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 5		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>645'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Soft, moist to wet, dark brown, Sandy CLAY				
2				SC	FANGLOMERATE DEPOSITS (Tof) Dense, moist, mottled light brown, pale green and brown, Clayey SANDSTONE with 10-20% gravel and cobble up to 8 inches				
4					-Increase in gravel and cobble above contact				
6				SM	OTAY FORMATION (To) Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with trace gravel				
TRENCH TERMINATED AT 7 FEET									

Figure A-70,
Log of Trench T 5, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 6		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>712'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, moist to wet, dark brown, Clayey SAND with 15-20% boulders up to 24 inches				
2					-Minor seepage at 3 feet				
4					METAVOLCANIC ROCK (KJmv) Soil, blue green, weak, METAVOLCANIC ROCK (saprolite); excavates as stiff clay				
6									
8					Highly weathered, blue/green, weak, METAVOLCANIC ROCK (saprolite) with remnant rock fabric				
10		TRENCH TERMINATED AT 10 FEET							

Figure A-71,
Log of Trench T 6, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 7		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>688'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Stiff, moist to wet, dark brown to gray, Sandy CLAY with 15-20% gravel, cobble and boulders up to 20 inches				
2									
4									
6									
8					METAVOLCANIC ROCK (KJmv) Soil, light brown, weak, METAVOLCANIC ROCK (saprolite); rock fabric observed below 8 feet -Becomes highly weathered with rock fragments below 9 feet				
10						TRENCH TERMINATED AT 10 FEET			

Figure A-72,
Log of Trench T 7, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 8		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>773'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist, brown to reddish brown, Silty CLAY with sandy gravel and cobble up to 10 inches				
2									
4									
6					METAVOLCANIC ROCK (KJmv) Highly weathered to soil, green gray, weak, METAVOLCANIC ROCK (saprolite); remnant rock fabric observed				
8						TRENCH TERMINATED AT 8 FEET			

Figure A-73,
Log of Trench T 8, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

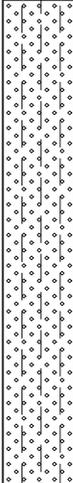
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 9		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)		
					ELEV. (MSL.) <u>696'</u>	DATE COMPLETED <u>01-29-2010</u>					
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION											
0				CL	COLLUVIUM (Qc) Stiff to soft, wet, dark brown, Sandy/Silty CLAY with trace gravel and cobble						
2						-Becomes brown below 3 feet					
4				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty, fine to coarse SANDSTONE with trace gravel						
6						-Becomes gray and fine to medium below 8 feet with no gravel					
8											
10					TRENCH TERMINATED AT 10 FEET						

Figure A-74,
Log of Trench T 9, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 10		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>636'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist, dark brown to reddish brown, Sandy CLAY with 10% gravel, cobble and boulders up to 14 inches				
2									
4				SC	OTAY FORMATION (To) Dense, moist, mottled gray, orange and light brown, Clayey, fine to coarse SANDSTONE with gravel, cobble and boulders up to 14 inches				
6						-Becomes very dense below 6 feet			
TRENCH TERMINATED AT 7 FEET									

Figure A-75,
Log of Trench T 10, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

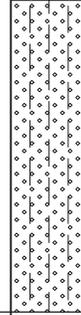
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 11		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>592'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff to soft, transitions from dark brown to reddish brown, Silty/Sandy CLAY with trace gravel and cobble				
2									
4				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty, fine to coarse SANDSTONE with 10% gravel				
6									
8					TRENCH TERMINATED AT 8 FEET				

Figure A-76,
Log of Trench T 11, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

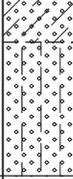
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 12		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>608'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist to wet, transitions from dark brown to reddish brown, Silty/Sandy CLAY with trace gravel and cobble				
2									
4				SC	OTAY FORMATION (To) Dense, damp, pale green, Clayey, fine to coarse SANDSTONE				
					SM	Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with trace gravel			
6					TRENCH TERMINATED AT 6 FEET				

Figure A-77,
Log of Trench T 12, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

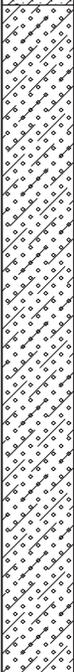
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 14		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>694'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff to soft, moist to wet, transitions from dark brown to reddish brown, Sandy CLAY with 10% gravel and cobble up to 6 inches				
2				SC	FANGLOMERATE DEPOSITS (Tof) Dense, damp to moist, mottled light brown and brown, Clayey, fine to coarse SANDSTONE with 10-20% gravel, cobble and boulders up to 14 inches				
4									
6									
8									
10					-Difficult trenching below 9 feet				
					PRACTICAL REFUSAL AT 10 FEET				

Figure A-79,
Log of Trench T 14, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 15		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>727'</u>	DATE COMPLETED <u>01-29-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist to wet, transitions from dark brown to reddish brown, Sandy CLAY with trace gravel and cobble				
2				SC	FANGLOMERATE DEPOSITS (Tof) Dense, damp, mottled light brown and brown, Clayey, fine to coarse SANDSTONE with 10-20% gravel, cobble and boulders up to 18 inches				
4					-Increase in boulders below 5.5 feet				
6					PRACTICAL REFUSAL AT 6 FEET				

Figure A-80,
Log of Trench T 15, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 16		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>496'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, dark brown, fine to coarse Sandy CLAY with 10% gravel, cobble and boulders up to 14 inches				
2							-Heavy seepage with minor caving		
4									
6									
8				SM/SC	OTAY FORMATION (To) Dense, moist, light brown and orange, Silty/Clayey, fine to coarse SANDSTONE				
TRENCH TERMINATED AT 8.5 FEET									

Figure A-81,
Log of Trench T 16, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

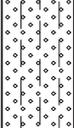
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 17		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>532'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose to medium dense, moist, dark brown, Clayey, fine to medium SAND with 10-15% gravel and cobble up to 10 inches				
2				SM	FANGLOMERATE DEPOSITS (Tof) Dense, damp to moist, mottled brown, light brown and pale green, Gravelly, fine to coarse SAND with clay, gravel and cobble up to 8 inches				
4					-Scoured contact				
				SM	OTAY FORMATION (To) Very dense, damp, light brown, Silty, fine to coarse SANDSTONE				
6					TRENCH TERMINATED AT 6 FEET				

Figure A-82,
Log of Trench T 17, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 18		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>540'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Stiff, very moist, dark brown to reddish brown, Sandy CLAY with gravel and cobble up to 8 inches				
2						-Gravel, cobble and boulders at contact			
4				SM	OTAY FORMATION (To) Very dense, damp, light brown, Silty, fine to coarse SANDSTONE with 10-20% gravel				
6						TRENCH TERMINATED AT 6 FEET			

Figure A-83,
Log of Trench T 18, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 19		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>577'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, very moist, dark brown to reddish brown, Sandy CLAY				
				SC	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, reddish brown, Clayey, fine to coarse SANDSTONE with 10-20% gravel and cobble up 6 inches				
2					REFUSAL AT 2.5 FEET				

Figure A-84,
Log of Trench T 19, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 20		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>488'</u>	DATE COMPLETED <u>02-01-2010</u>				
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>			
MATERIAL DESCRIPTION										
0				SC	<p>ALLUVIUM (Qal) Loose, wet, dark brown to brown, Clayey, fine to coarse SAND with 10-30% gravel, cobble and boulders up to 20 inches; minor to moderate caving</p>					
2										
4						-Heavy seepage at 4 feet				
6						-36-inch boulder present at 5 feet				
8										
10					SC	<p>OTAY FORMATION (To) Dense, moist, mottled pale green, orange and brown, Clayey, fine to coarse SANDSTONE with gravel and cobble; difficult to see below 10 feet due to caving and heavy seepage; sidewall collapsed soon after formation was exposed</p> <p>TRENCH TERMINATED AT 10 FEET DUE TO CAVING</p>				

Figure A-85,
Log of Trench T 20, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 21		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>525'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, moist, dark brown, Clayey, fine to coarse SAND with gravel, cobble and boulders up to 14 inches				
2									
4				SM	-Heavy seepage Loose, wet, dark brown, Gravelly, fine to coarse SAND with 20-40% gravel, cobble and boulders up to 14 inches; moderate caving				
6									
8									
10				SM/SC	FANGLOMERATE DEPOSITS (Tof) Dense, moist, mottled pale green and orange, Gravelly/Clayey, fine to coarse SANDSTONE with 30-40% gravel, cobble and boulders up to 14 inches				
TRENCH TERMINATED AT 10 FEET DUE TO CAVING									

Figure A-86,
Log of Trench T 21, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 22		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>534'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Medium dense, moist, reddish brown, Clayey, fine to medium SAND with 10% gravel and cobble up to 5 inches				
2				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, reddish brown, Gravelly, fine to coarse SANDSTONE with gravel and cobble up to 14 inches REFUSAL AT 2.5 FEET				

Figure A-87,
Log of Trench T 22, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 23		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>558'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	COLLUVIUM (Qc) Medium dense, moist, reddish brown, Clayey, fine to medium SAND with gravel and cobble up to 8 inches				
2									
4				SM/SC	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, transitions from reddish brown to mottled light brown and pale green, Gravelly/Clayey, fine to coarse SANDSTONE with 30-40% gravel, cobble and boulders up to 14 inches				
6									
PRACTICAL REFUSAL AT 6 FEET									

Figure A-88,
Log of Trench T 23, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 24		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>596'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	COLLUVIUM (Qc) Stiff, moist, transitions from dark brown to brown, Silty CLAY with trace gravel and cobble				
2									
4					METAVOLCANIC ROCK (KJmy) Soil, pale gray-green, weak METAVOLCANIC ROCK (saprolite); no distinguishable rock fabric; abundant gypsum present				
6	T24-1					-Remnant rock fragments present below 6 feet			
8									
					REFUSAL AT 9 FEET ON FRESH ROCK				

Figure A-89,
Log of Trench T 24, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 25		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>528'</u>	DATE COMPLETED <u>02-01-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, dark brown to brown, Silty CLAY with trace gravel and cobble				
2									
4				SM/SC	OTAY FORMATION (To) Dense, damp, reddish brown with pale green mottling, Silty/Clayey, fine to coarse SANDSTONE				
6									
8					TRENCH TERMINATED AT 8 FEET				

Figure A-90,
Log of Trench T 25, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 26		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>510'</u>	DATE COMPLETED <u>02-01-2010</u>				
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>			
MATERIAL DESCRIPTION										
0				CL	ALLUVIUM (Qal) Soft, wet, dark brown to brown, Sandy CLAY with 10% gravel and cobble up to 6 inches					
2						-Estimated 5-foot diameter boulder in sidewall at 3 feet; moderate seepage with minor/moderate caving below 3 feet				
4										
6				SC	Medium dense, moist, mottled light brown and pale green, Clayey, fine to medium SAND with minor pinholes					
8										
10				SM/SC	OTAY FORMATION (To) Very dense, damp, reddish brown with pale green mottling, Silty/Clayey, fine to coarse SANDSTONE TRENCH TERMINATED AT 10 FEET DUE TO CAVING OF SIDEWALL					

Figure A-91,
Log of Trench T 26, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 27		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) _____	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, transitions from dark brown to reddish brown, Sandy CLAY with 10-20% gravel, cobble and boulders up to 24 inches				
2									
4					METAVOLCANIC ROCK (KJmv) Soil, pale green-gray, weak, METAVOLCANIC ROCK (saprolite) with moderate amounts of gypsum				
6						-Remnant rock fragments present below 6 feet			
8									
TRENCH TERMINATED AT 9 FEET									

Figure A-92,
Log of Trench T 27, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 28		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>561'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Stiff, moist to wet, dark brown, Sandy CLAY with 10% gravel, cobble and boulders up to 14 inches				
2									
4				CL	FANGLOMERATE DEPOSITS (Tof) Very stiff, damp, white to pale green, fine to coarse, Sandy CLAY with 10-15% gravel and cobble size rock fragments up to 8 inches (appears to be reworked saprolite with abundant caliche)				
6									
8						-Gravel and cobble size fragment increase below 8 feet			
TRENCH TERMINATED AT 9 FEET									

Figure A-93,
Log of Trench T 28, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 29 ELEV. (MSL.) _____ DATE COMPLETED <u>02-02-2010</u> EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SC	MATERIAL DESCRIPTION TOPSOIL Loose, damp to moist, reddish brown, Clayey, fine to coarse SAND with 10% gravel, cobble and boulders up to 16 inches; possible metavolcanic rock contact REFUSAL ON ROCK AT 1 FOOT			

Figure A-94,
Log of Trench T 29, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS <input type="checkbox"/> ... SAMPLING UNSUCCESSFUL <input checked="" type="checkbox"/> ... DISTURBED OR BAG SAMPLE	<input type="checkbox"/> ... STANDARD PENETRATION TEST <input checked="" type="checkbox"/> ... CHUNK SAMPLE	<input checked="" type="checkbox"/> ... DRIVE SAMPLE (UNDISTURBED) <input checked="" type="checkbox"/> ... WATER TABLE OR SEEPAGE
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NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 30		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>522'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, moist to wet, dark brown, very Clayey, fine to coarse SAND with 20-30% gravel, cobble and boulders up to 16 inches				
2									
4									
6									
8				SM/SC	OTAY FORMATION (To) Dense, damp, light brown to brown, Clayey/Silty, fine to medium SANDSTONE; weathered in upper few feet				
10									
TRENCH TERMINATED AT 10 FEET									

Figure A-95,
Log of Trench T 30, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 31		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>508'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, moist to wet, reddish brown and dark brown, Clayey, fine to coarse SAND with 10-20% gravel, cobble and boulders up to 18 inches				
2									
4									
6									
8				SC/SM	OTAY FORMATION (To) Dense, damp, light brown and pale green, Clayey/Silty, fine to coarse SANDSTONE; weathered in upper foot				
TRENCH TERMINATED AT 9 FEET									

Figure A-96,
Log of Trench T 31, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 32		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>620'</u>	DATE COMPLETED <u>02-02-2010</u>				
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>			
MATERIAL DESCRIPTION										
0				CL	TOPSOIL Stiff, moist, dark brown, Sandy CLAY with 10% gravel and cobble up to 8 inches					
2										
4				SC	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, light brown and brown, Clayey, fine to coarse SAND with 20-30% gravel, cobble and boulders up to 18 inches					
6										
8										
10										
TRENCH TERMINATED AT 10 FEET										

Figure A-97,
Log of Trench T 32, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 33		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>730'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, dark reddish brown, Sandy CLAY with gravel and cobble size rock fragments up to 10 inches -Becomes gray brown below 2 feet				
2					METAVOLCANIC ROCK (KJmy) Moderately weathered, gray and brown, moderately strong, METAVOLCANIC ROCK PRACTICAL REFUSAL AT 3.5 FEET				

Figure A-98,
Log of Trench T 33, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

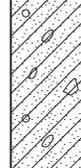
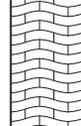
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 34		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>634'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, reddish brown, Sandy CLAY with 10% gravel and cobble size rock fragments up to 10 inches				
2					METAVOLCANIC ROCK (KJmv) Highly to moderately weathered, orange and gray, moderately weak, METAVOLCANIC ROCK				
					PRACTICAL REFUSAL AT 3.5 FEET				

Figure A-99,
Log of Trench T 34, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

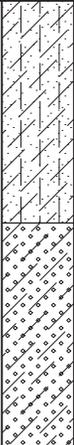
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 35		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>615'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC/SM	TOPSOIL Medium dense, moist, reddish brown, Clayey/Silty, fine to coarse SAND with 10% gravel, cobble and boulders up to 14 inches				
2				SC	FANGLOMERATE DEPOSITS Dense, damp, light brown and dark brown, Clayey, fine to coarse SANDSTONE with 20-30% gravel, cobble and boulders up to 12 inches				
4					TRENCH TERMINATED AT 5 FEET				

Figure A-100,
Log of Trench T 35, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 36		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>586'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Medium dense, moist to damp, Clayey, fine to coarse SAND with 10% gravel, cobble and boulders up to 12 inches				
2									
4				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, reddish brown, Silty, fine to coarse, SANDSTONE with 30% gravel, cobble and boulders up to 18 inches				
6									
8					-Difficult trenching below 8 feet				
10					PRACTICAL REFUSAL AT 10 FEET				

Figure A-101,
Log of Trench T 36, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 37		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>580'</u>	DATE COMPLETED <u>02-02-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, moist, dark brown, Clayey, fine to coarse SAND with several boulders up to 30 inches				
2				SM	OTAY FORMATION (To) Dense, damp, light brown, Clayey/Silty, fine to coarse SANDSTONE				
4					TRENCH TERMINATED AT 5 FEET				

Figure A-102,
Log of Trench T 37, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 38		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>480'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, dark brown, Sandy CLAY with trace cobble				
2						-Slight seepage at contact			
4				SC	OTAY FORMATION (To) (Weathered) Loose to medium dense, moist, light brown, very Clayey, fine to coarse SAND with trace gravel and cobble				
6									
8									
10									
12					SC/SM	OTAY FORMATION (To) Dense, damp to moist, white and orange brown, Clayey/Silty, fine to coarse SANDSTONE with trace gravel and cobble up to 8 inches			
TRENCH TERMINATED AT 13 FEET									

Figure A-103,
Log of Trench T 38, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 39		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>544'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, dark brown, Silty/Sandy CLAY with several boulders from 12-30 inches				
2									
4				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 20-30% gravel				
6									
TRENCH TERMINATED AT 6 FEET									

Figure A-104,
Log of Trench T 39, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

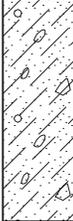
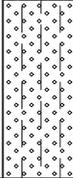
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 40		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>605'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, moist to wet, dark brown, Clayey SAND with 10% cobble and boulders up to 12 inches				
2					SM	FANGLOMERATE DEPOSITS (Tof) Dense, damp, light yellow brown, Silty, fine to coarse SANDSTONE with 20-30% gravel, cobble and boulders up to 16 inches			
4									
TRENCH TERMINATED AT 4.5 FEET									

Figure A-105,
Log of Trench T 40, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 41		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>537'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, wet, dark brown, very Clayey SAND with 20-30% cobble and boulders up to 24 inches				
2				SM	OTAY FORMATION (To) Very dense, damp, white to very light brown, Silty, fine to coarse SANDSTONE				
4					TRENCH TERMINATED AT 6 FEET				
6									

Figure A-106,
Log of Trench T 41, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

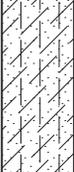
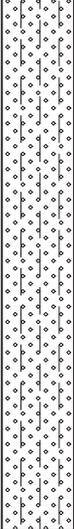
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 42		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>583'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC/SM	TOPSOIL Loose, moist, dark brown, Silty/Clayey, fine to coarse SAND with trace gravel				
2				SM	OTAY FORMATION (To) Dense to very dense, damp, light brown, Silty, fine to coarse SANDSTONE				
4									
6									
8					TRENCH TERMINATED AT 8 FEET				

Figure A-107,
Log of Trench T 42, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

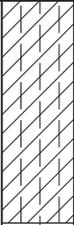
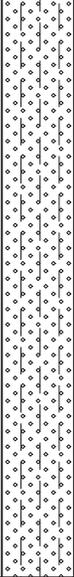
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 43		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>565'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, Silty CLAY with trace gravel				
2									
4				SM	OTAY FORMATION (To) Dense, damp, light brown with pale green mottling, Silty, fine to medium SANDSTONE with some clay				
6									
8									
TRENCH TERMINATED AT 9 FEET									

Figure A-108,
Log of Trench T 43, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

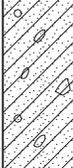
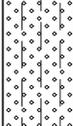
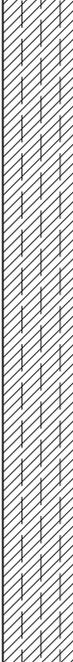
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 44		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>540'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, Sandy CLAY; several boulders 2 to 5 feet in diameter				
2				SM/SC	OTAY FORMATION (To) Dense, damp, mottled light brown to orange, Silty/Clayey, fine to coarse SANDSTONE with gravel and cobble up to 10 inches				
4				CL	Hard, moist, pale green, Silty CLAYSTONE; waxy and weathered -Becomes mottled brown and pale green with conchoidal fracturing and much more competent				
6									
8									
10									
TRENCH TERMINATED AT 11 FEET									

Figure A-109,
Log of Trench T 44, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

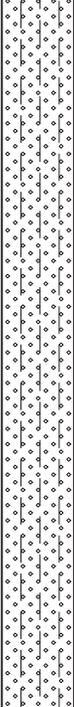
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 45		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>541'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, wet, dark brown, very Clayey SAND				
2				SM	OTAY FORMATION (To) Dense, damp, reddish brown, Silty/Gravelly, fine to coarse SANDSTONE with 15-25% gravel and occasional cobble up to 4 inches				
4									
6									
8					-Large 3-foot boulder present at 8 feet				
10					TRENCH TERMINATED AT 10 FEET				

Figure A-110,
Log of Trench T 45, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

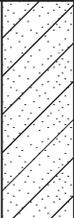
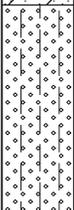
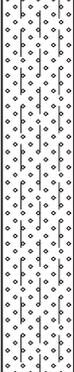
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 46		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>567'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	TOPSOIL Stiff, moist, dark brown, Sandy CLAY with some gravel				
2				SM	OTAY FORMATION (To) Dense to very dense, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 15-25% gravel				
4									
6									
8					-Cobble size fragments present below 8 feet				
TRENCH TERMINATED AT 9 FEET									

Figure A-111,
Log of Trench T 46, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 47		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>526'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM ((Qal) Soft, wet, dark brown, Sandy CLAY				
2						-Moderate seepage at contact			
4				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty, fine to coarse SANDSTONE with 10-20% gravel and cobble up to 10 inches				
6						-Random 16-inch boulders present below 6 feet			
8					TRENCH TERMINATED AT 8 FEET				

Figure A-112,
Log of Trench T 47, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

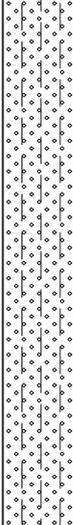
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 48		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>550'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Soft, wet, dark brown, Sandy CLAY with trace gravel and cobble				
2									
4				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 15-25% gravel and cobble up to 10 inches; occasional boulder up to 14 inches also present				
6									
8									
10					TRENCH TERMINATED AT 10 FEET				

Figure A-113,
Log of Trench T 48, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 49		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>496'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, wet, dark brown, Silty, fine to coarse SAND -Heavy seepage at 3 feet with moderate caving below				
2									
4									
6				SM	OTAY FORMATION (To) Very dense, damp, light brown, Silty/Gravelly, fine to medium SANDSTONE with 20-30% gravel, cobble and boulders up to 14 inches				
TRENCH TERMINATED AT 7 FEET DUE TO CAVING									

Figure A-114,
Log of Trench T 49, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

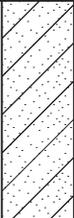
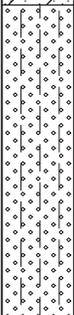
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 50		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>525'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Loose, wet, dark brown, Sandy CLAY				
2				SM	OTAY FORMATION (To) Dense, damp, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 10-25% gravel, cobble and boulders up to 14 inches				
4									
6					TRENCH TERMINATED AT 6 FEET				

Figure A-115,
Log of Trench T 50, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

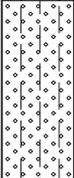
DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 51		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>559'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	TOPSOIL Loose, moist, dark brown, Clayey, fine to coarse SAND with trace gravel and cobble				
2									
4				SM	OTAY FORMATION (To) Very dense, damp, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 20-30% gravel				
TRENCH TERMINATED AT 5 FEET									

Figure A-116,
Log of Trench T 51, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 52		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>562'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, wet, dark brown, Clayey, fine to coarse SAND				
2				-Heavy seepage at 3 feet					
4									
6				SM/SC	OTAY FORMATION (To) Dense, damp, light brown with orange, Silty/Clayey, fine to coarse SANDSTONE				
8				TRENCH TERMINATED AT 8 FEET					

Figure A-117,
Log of Trench T 52, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 53		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>531'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				CL	ALLUVIUM (Qal) Stiff, moist to wet, dark brown, Sandy CLAY with trace gravel and cobble				
2									
4				SM	OTAY FORMATION (To) Very dense, damp, light brown with orange mottling, Silty/Gravelly, fine to coarse SANDSTONE with 20-30% gravel				
6						TRENCH TERMINATED AT 6 FEET			

Figure A-118,
Log of Trench T 53, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 54		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>515'</u>	DATE COMPLETED <u>02-03-2010</u>			
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SC	ALLUVIUM (Qal) Loose, wet, dark brown, very Clayey, fine to coarse SAND				
2									
4				SM	OTAY FORMATION (To) Dense to very dense, damp, light brown, Silty/Gravelly, fine to coarse SANDSTONE with 15-25% gravel and trace cobble				
TRENCH TERMINATED AT 5.5 FEET									

Figure A-119,
Log of Trench T 54, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 55 ELEV. (MSL.) <u>504'</u> DATE COMPLETED <u>02-03-2010</u> EQUIPMENT <u>JD 555 TRACKHOE</u> BY: <u>T. REIST</u>	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
MATERIAL DESCRIPTION								
0				SC/SM	ALLUVIUM (Qal) Loose, wet, dark brown, Clayey/Silty, fine to coarse SAND with 10-20% gravel and cobble up to 8 inches; moderate caving below 3 feet -Moderate seepage at 3 feet -Boulders up to 30 inches present at contact			
2								
4			▽					
6								
8				SC/SM	OTAY FORMATION (To) Dense, damp, light brown and orange, Silty/Clayey, fine to coarse SANDSTONE with 10-20% gravel, cobble and boulders up to 14 inches TRENCH TERMINATED AT 8 FEET DUE TO CAVING			

Figure A-120,
Log of Trench T 55, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 56		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)	
					ELEV. (MSL.) <u>520'</u>	DATE COMPLETED <u>02-03-2010</u>				
					EQUIPMENT <u>JD 555 TRACKHOE</u>		BY: <u>T. REIST</u>			
MATERIAL DESCRIPTION										
0				SC	OTAY FORMATION (To) Dense, moist, light brown, Clayey, fine to coarse SANDSTONE					
2										
4										
6										
8										
10										
					LOGGED ROAD HIGH CUT SLOPE *Picked through approx. 2 to 3 feet of colluvium to expose formational material					

Figure A-121,
Log of Trench T 56, Page 1 of 1

G1012-52-01A (OTAY RANCH RESORT VILLAGE).GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 57		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>555'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose to medium dense, dry to damp, brown, Silty, fine to medium SAND				
2									
4				SM	FANGLOMERATE DEPOSITS (Tof) Very dense, damp, light brown, Gravelly, fine to coarse SANDSTONE with 30-40% gravel and cobble up to 12-inches				
					PRACTICAL REFUSAL AT 4.5 FEET No groundwater encountered				

Figure A-122,
Log of Trench T 57, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 59		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>603'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				GM	ALLUVIUM (Qal) Loose, damp, brown, fine to coarse, Sandy GRAVEL, with gravel, cobble, and boulders up to 18-inch				
2						METAVOLCANIC ROCK (KJmy) Soil, pale green, weak METAVOLCANIC ROCK (saprolite); with remnant strong rock fragments floating in matrix			
4					PRACTICAL REFUSAL AT 5 FEET No groundwater encountered				

Figure A-124,
Log of Trench T 59, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS		... SAMPLING UNSUCCESSFUL		... STANDARD PENETRATION TEST		... DRIVE SAMPLE (UNDISTURBED)
		... DISTURBED OR BAG SAMPLE		... CHUNK SAMPLE		... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 60		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>653'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				GM	ALLUVIUM (Qal) Loose, damp, brown, fine to coarse, Sandy GRAVEL; with gravel, cobble, and boulders up to 20-inch				
2									
					METAVOLCANIC ROCK (KJmv) Soil, pale green with maroon oxidation, weak METAVOLCANIC ROCK (saprolite); with remnant rock fragments floating in matrix				
4									
					TRENCH TERMINATE AT 5 FEET No groundwater encountered				

Figure A-125,
Log of Trench T 60, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 61		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>680'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 18-inch				
2					METAVOLCANIC ROCK (KJmv) Moderately weathered, light brown, strong METAVOLCANIC ROCK				
4					REFUSAL AT 4 FEET No groundwater encountered				

Figure A-126,
Log of Trench T 61, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 62		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>738'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 14-inch				
2					METAVOLCANIC ROCK (KJmv) Moderately weathered, orange brown, strong METAVOLCANIC ROCK				
					REFUSAL AT 2.5 FEET No groundwater encountered				

Figure A-127,
Log of Trench T 62, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 63		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>738'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 24-inch				
2					METAVOLCANIC ROCK (KJmv) Moderately weathered, dark gray, strong METAVOLCANIC ROCK				
					REFUSAL AT 3 FEET No groundwater encountered				

Figure A-128,
Log of Trench T 63, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 64		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>572'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 18-inch				
2					METAVOLCANIC ROCK (KJmv) Slightly weathered, gray, very strong METAVOLCANIC ROCK				
					REFUSAL AT 2 FEET No groundwater encountered				

Figure A-129,
Log of Trench T 64, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 65		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>530'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 14-inch				
2									
4					METAVOLCANIC ROCK (KJmv) Soil, mottled pale green and brown, weak METAVOLCANIC ROCK (saprolite); with relic rock floating in matrix				
6									
					TRENCH TERMINATE AT 6 FEET No groundwater encountered				

Figure A-130,
Log of Trench T 65, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 66		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>490'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Silty, fine to coarse SAND				
2					-12-inch gravel lense present below 2 feet				
4					-Minor caving below 6 feet				
6									
8					METAVOLCANIC ROCK (KJmv) Moderately weathered, light brown and brown, strong METAVOLCANIC ROCK				
					REFUSAL AT 8 FEET No groundwater encountered				

Figure A-131,
Log of Trench T 66, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 67		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>580'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 16-inch				
2					METAVOLCANIC ROCK (KJmv) Moderately weathered, dark gray, strong METAVOLCANIC ROCK				
					REFUSAL AT 2.5 FEET No groundwater encountered				

Figure A-132,
Log of Trench T 67, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 68		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>650'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u> BY: <u>T. REIST</u>				
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 16-inch				
2					METAVOLCANIC ROCK (KJmv) Moderately weathered, dark gray, strong METAVOLCANIC ROCK				
					REFUSAL AT 2.5 FEET No groundwater encountered				

Figure A-133,
Log of Trench T 68, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	 ... SAMPLING UNSUCCESSFUL	 ... STANDARD PENETRATION TEST	 ... DRIVE SAMPLE (UNDISTURBED)
	 ... DISTURBED OR BAG SAMPLE	 ... CHUNK SAMPLE	 ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 70		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>496'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Gravelly, fine to coarse SAND, with gravel, cobble, and boulders up to 14-inch				
2						METAVOLCANIC ROCK (KJmy) Highly weathered, pale green and light brown, weak and strong METAVOLCANIC ROCK (saprolite); with relic rock fragments floating in matrix			
4					PRACTICAL REFUSAL AT 4 FEET No groundwater encountered				

Figure A-135,
Log of Trench T 70, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	TRENCH T 71		PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					ELEV. (MSL.) <u>495'</u>	DATE COMPLETED <u>10-15-2010</u>			
					EQUIPMENT <u>JD TRACKHOE</u>		BY: <u>T. REIST</u>		
MATERIAL DESCRIPTION									
0				SM	ALLUVIUM (Qal) Loose, damp, brown, Silty, fine to coarse SAND, with trace gravel				
2									
4									
6				GM	FANGLOMERATE DEPOSITS (Tof) Dense, damp, light brown, fine to coarse, Sandy, GRAVEL with 60-70% gravel, cobble, and boulders up to 16-inches				
						PRACTICAL REFUSAL AT 7 FEET No groundwater encountered			

Figure A-136,
Log of Trench T 71, Page 1 of 1

G1012-52-01D.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.



County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION

JACK MILLER
ASSISTANT DIRECTOR

P.O. BOX 129261, SAN DIEGO, CA 92112-9261
619-338-2222/FAX 619-338-2315/1-800-253-8933
www.sdcounty.ca.gov/deh/lwq

WAIVER FOR GEOTECHNICAL BORING(S)

August 4, 2008

NATHAN A. ASH
GEOCON ENVIRONMENTAL CON
6960 FLANDERS DRIVE
SAN DIEGO, CA 92121

RE: REQUEST FOR WAIVER # 1210
OTAY RANCH VILLAGE 13

5981300100	NORTH SIDE OF OTAY LAKES RD., CHULA VISTA, CA 91914
5981400100	NORTH SIDE OF OTAY LAKES RD., CHULA VISTA, CA 91914
5980900300	NORTH SIDE OF OTAY LAKES RD., CHULA VISTA, CA 91914

Monitoring Well Program (MWP) staff have reviewed County records currently available regarding County permitted hazardous materials establishments and Site Assessment and Mitigation Program (SAM) sites. **Based on this limited review, and your signed waiver statement, a waiver for a geotechnical-boring permit is granted.**

The following conditions apply:

1. **As specified in the Department of Water Resources Bulletin 74-81 and 74-90**
 - a. All borings must be properly destroyed. Borings must be sealed from the bottom of the boring to ground surface with an approved sealing material.
 - b. Drill cuttings are not acceptable fill material.
2. Drill cuttings must be properly handled and disposed to be in compliance with Stormwater Best Management Practices of the local jurisdiction.

Please note that there may be sites with contaminated soil and/or groundwater for which SAM has no information. All responsibilities, obligations and liabilities under state and local laws still apply to the proposed drilling. If new information becomes available indicating that substances have been found or *are planned to be used* at the site, you agree to notify MWP of this change for further evaluation.


 Ernesto Profeta, Environmental Health Technician
 Monitoring Well Program – Phone: (619) 338-2339, Fax: (619) 338-2315
 E Mail: DEH.monitoringwells@sdcounty.ca.gov

"Environmental and public health through leadership, partnership and science"

DEH-SAM-9070 <12"GTB (02-05)

Emailed copy 8/4



County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
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www.sdcounty.ca.gov/deh/lwq

JACK MILLER
ASSISTANT DIRECTOR

WAIVER FOR GEOTECHNICAL BORING(S)

September 25, 2009

Troy K. Reist
GEOCON ENVIRONMENTAL CON
6960 FLANDERS DRIVE
SAN DIEGO, CA 92121

RE: REQUEST FOR WAIVER # 1302
OTAY RANCH PRESERVE AND RESORT (VILLAGE 13)

5981300100 NORTH SIDE OF OTAY LAKES RD, CHULA VISTA CA 91914
5981400100 NORTH SIDE OF OTAY LAKES RD, CHULA VISTA CA 91914
5950900300 NORTH SIDE OF OTAY LAKES RD, CHULA VISTA CA 91914

Monitoring Well Program (MWP) staff have reviewed County records currently available regarding County permitted hazardous materials establishments and Site Assessment and Mitigation Program (SAM) sites. Based on this limited review, and your signed waiver statement, a waiver for a geotechnical-boring permit is granted.

The following conditions apply:

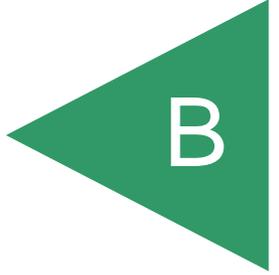
1. As specified in the Department of Water Resources Bulletin 74-81 and 74-90
 - a. All borings must be properly destroyed. Borings must be sealed from the bottom of the boring to ground surface with an approved sealing material.
 - b. Drill cuttings are not acceptable fill material except as indicated below.
2. Drill cuttings must be properly handled and disposed to be in compliance with Stormwater Best Management Practices of the local jurisdiction.
3. The 8-inch diameter borings must be completely backfilled with bentonite. The 30-inch diameter borings must be backfilled with a 24-inch bentonite layer at the base of each boring with alternating 12-inch layers of bentonite every 10 feet of depth.

Please note that there may be sites with contaminated soil and/or groundwater for which SAM has no information. All responsibilities, obligations and liabilities under state and local laws still apply to the proposed drilling. If new information becomes available indicating that substances have been found or are planned to be used at the site, you agree to notify MWP of this change for further evaluation.

Amelia Cesena, Environmental Health Technician

"Environmental and public health through leadership, partnership and science"

APPENDIX



APPENDIX B

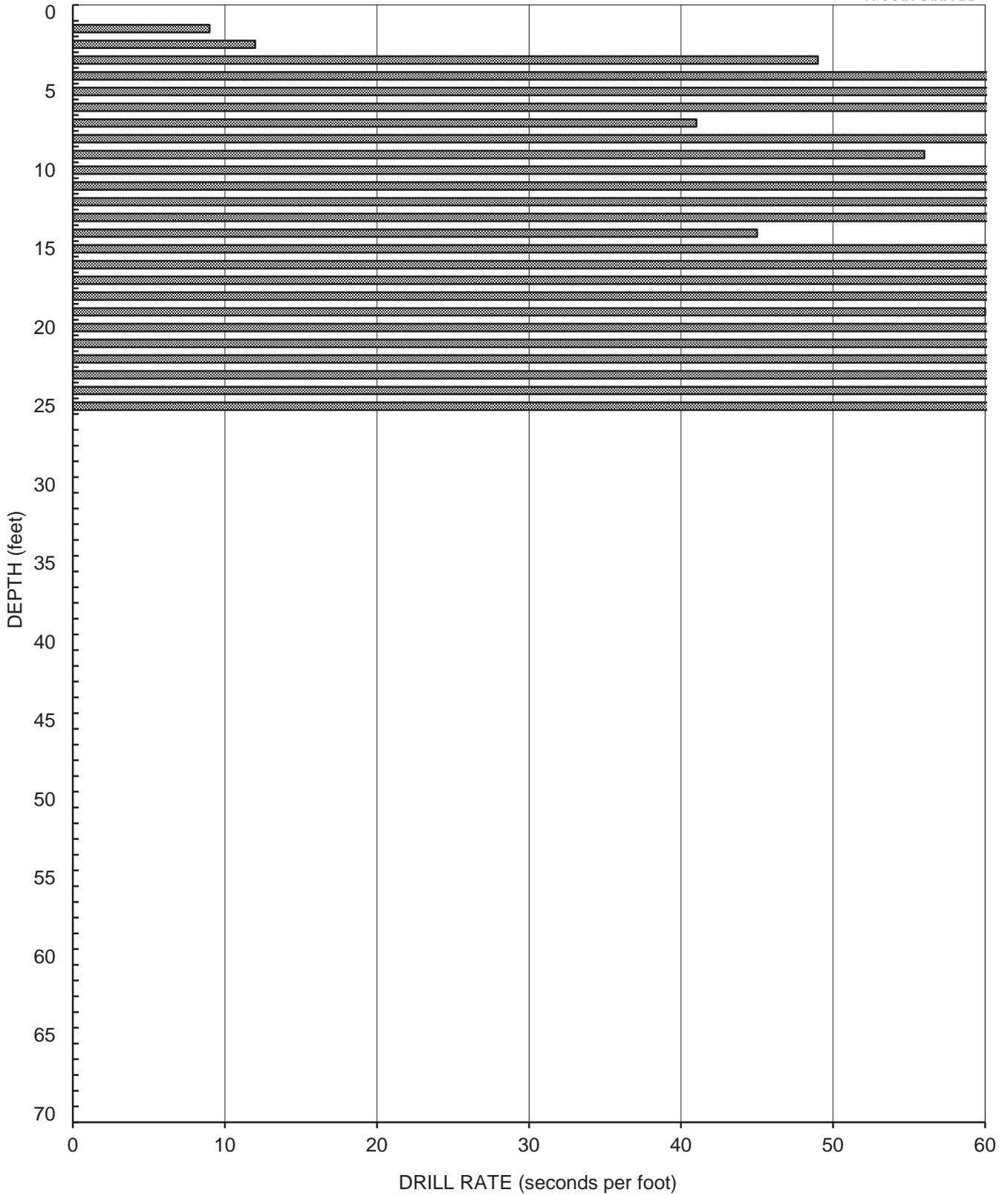
AIR TRACK BORINGS

Our subsurface investigation included excavating 22 air-track borings in the locations of proposed cuts to evaluate bedrock rippability. The air track borings were advanced to a maximum depth of approximately 67 feet using an ECM-370 drill rig equipped with a 4-inch diameter drill bit. The drill bit is advanced with an air percussion hammer and drill rods. As the drilling proceeded, Geocon Incorporated recorded the drill penetration rates in seconds per foot (seconds/foot) based on measured marks on the drill rig tower and a stopwatch. The approximate locations of the air track borings are shown on the Geologic Map, Figures 2 through 4. Logs of the air track borings are presented on Figures B-1 through B-22 in this appendix.

AIR TRACK BORING AT-1
Elevation - 807 Feet (MSL)



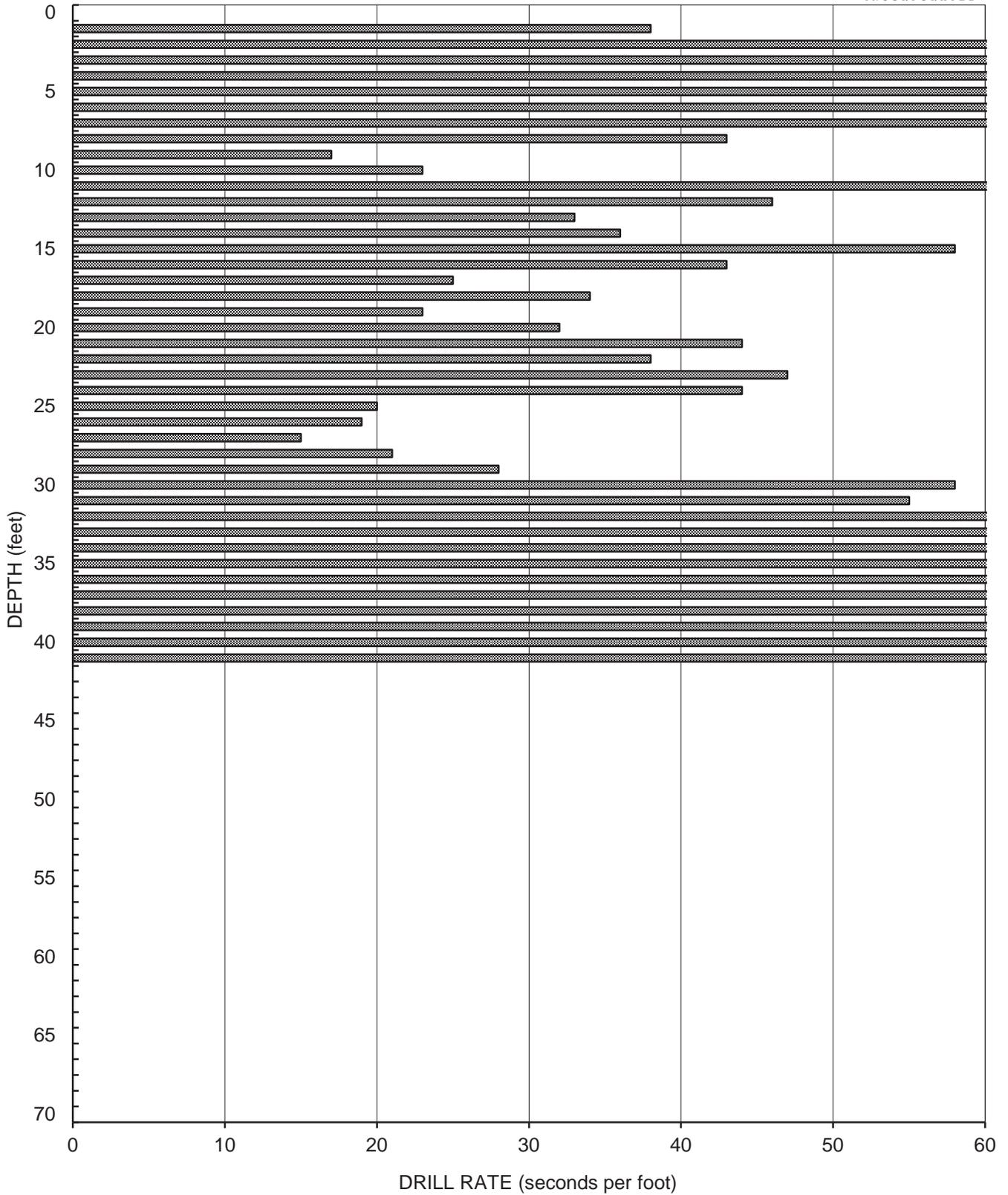
GEOCON
INCORPORATED



AIR TRACK BORING AT-2
Elevation - 820 Feet (MSL)



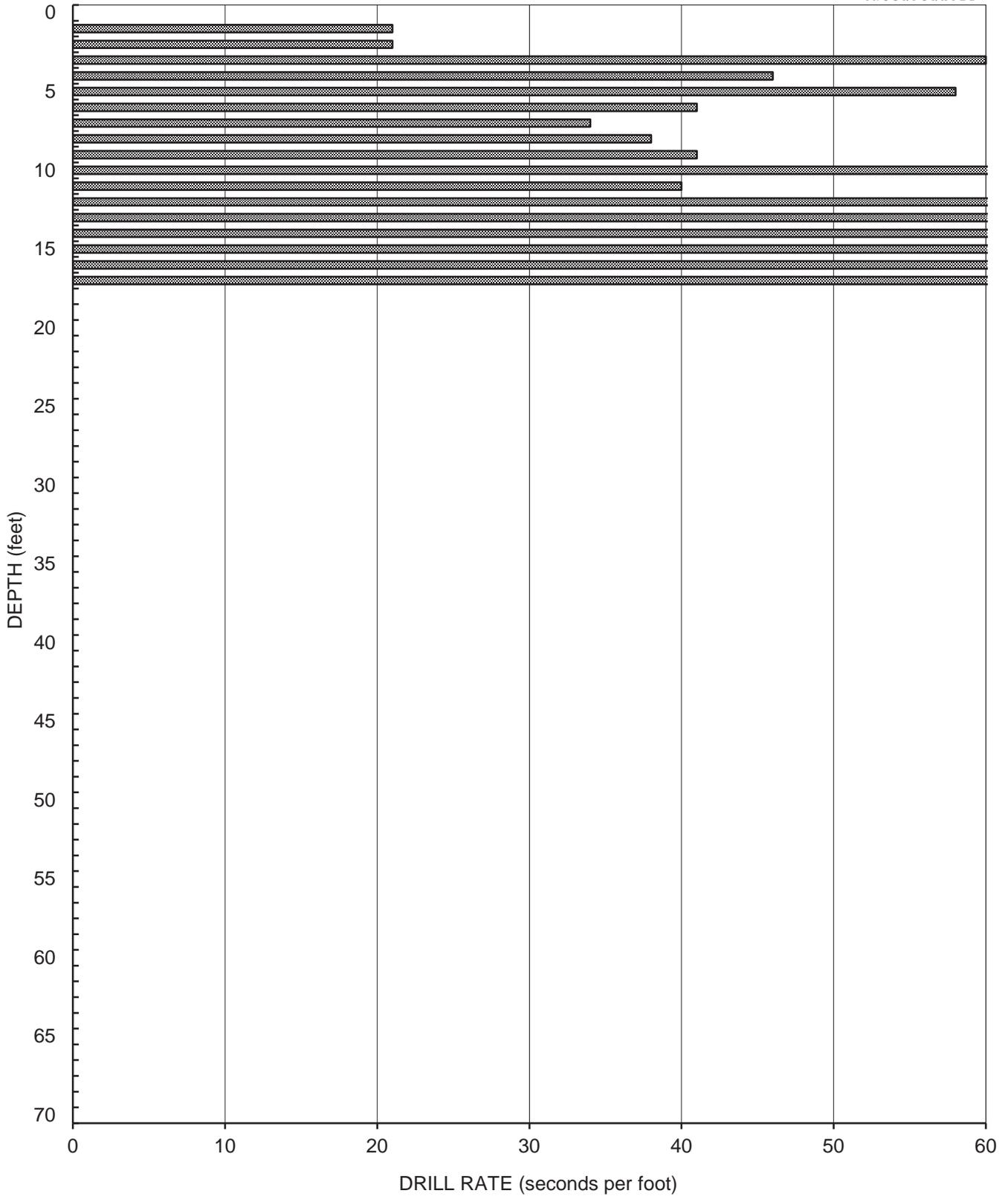
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INCORPORATED



AIR TRACK BORING AT-3
Elevation - 786 Feet (MSL)



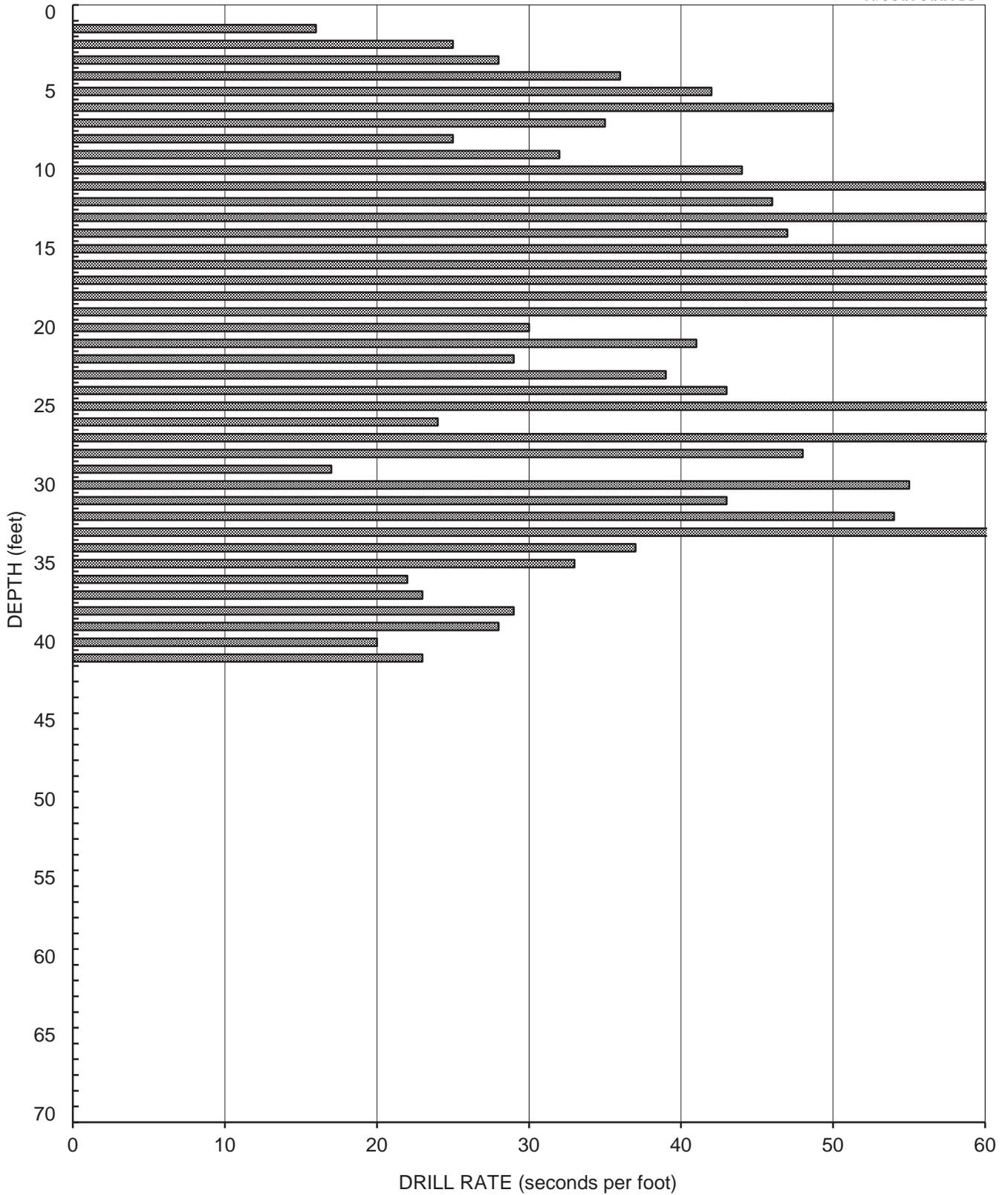
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INCORPORATED



AIR TRACK BORING AT-4
Elevation - 663 Feet (MSL)



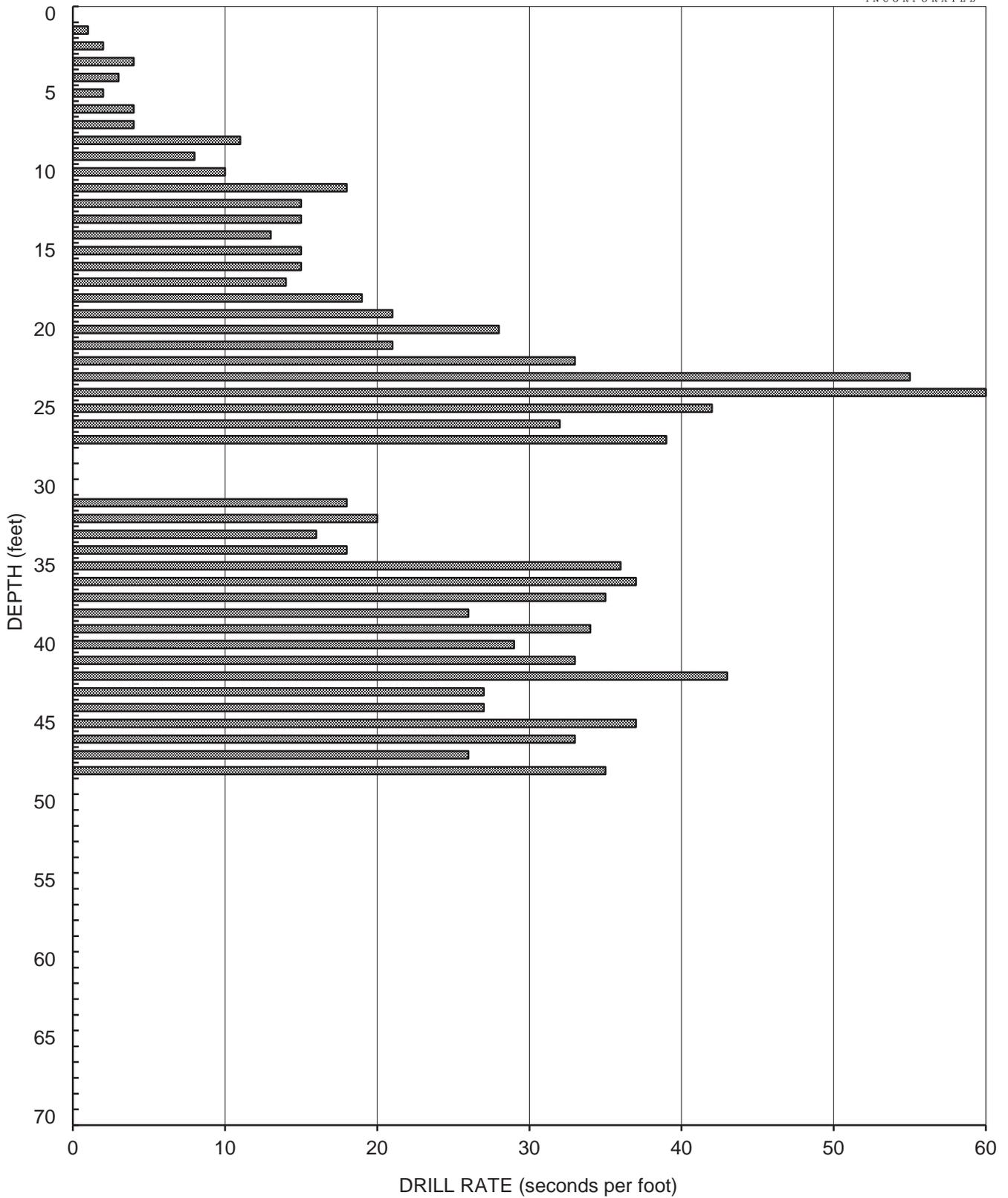
GEOCON
INCORPORATED



AIR TRACK BORING AT-5
Elevation - 684 Feet (MSL)



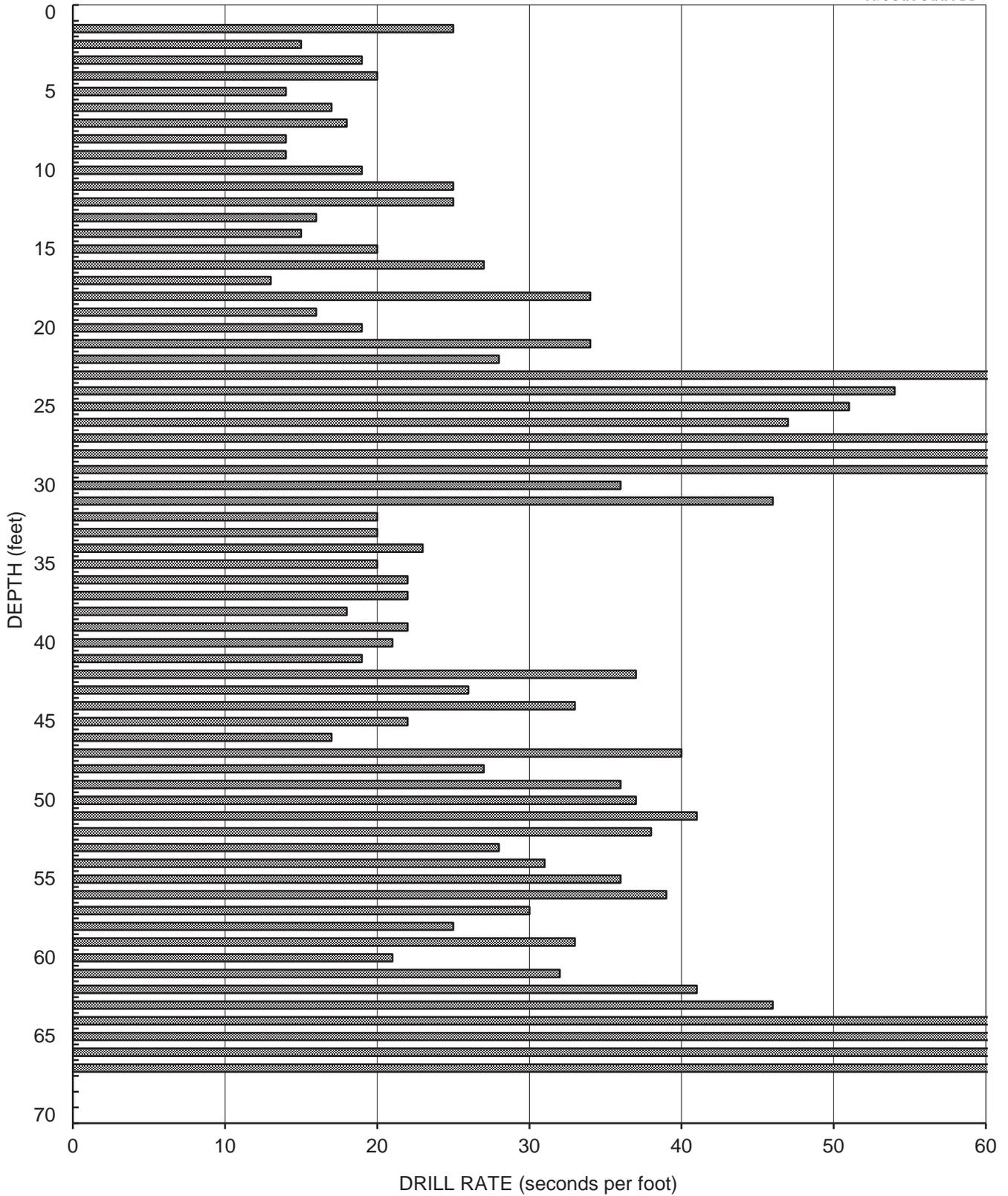
GEOCON
INCORPORATED



AIR TRACK BORING AT-6
Elevation - 645 Feet (MSL)



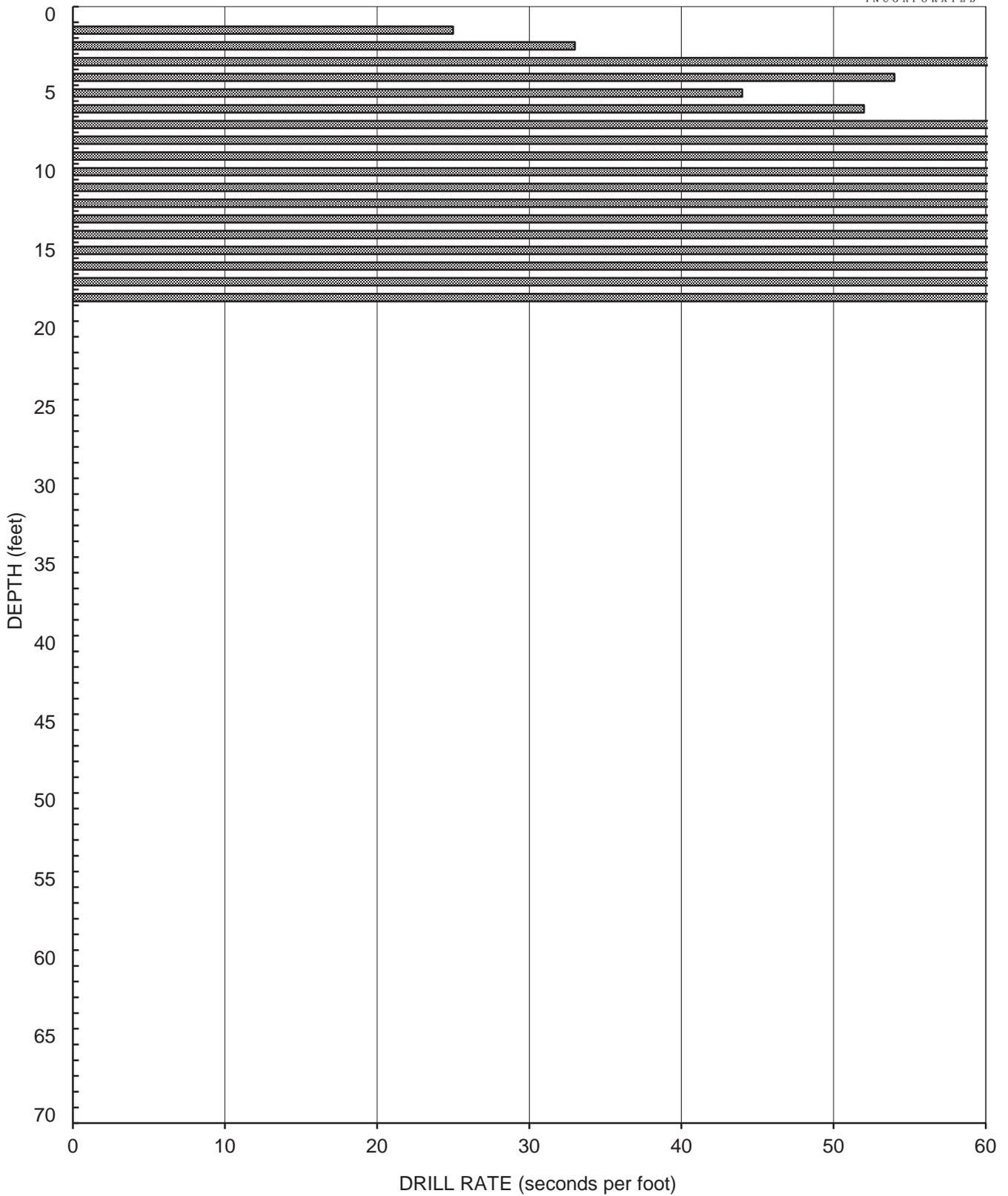
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INCORPORATED



AIR TRACK BORING AT-7
Elevation - 693 Feet (MSL)



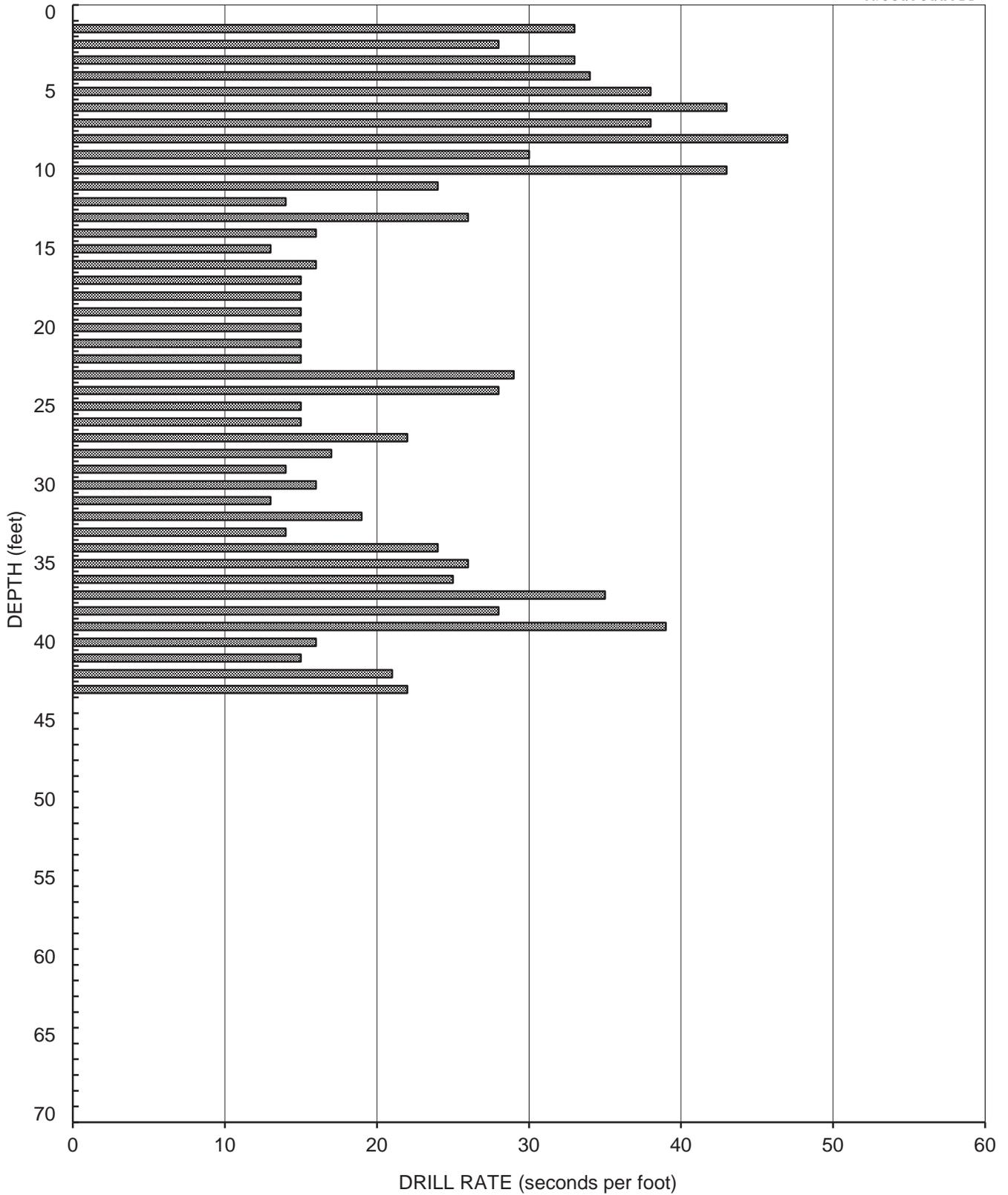
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INCORPORATED



AIR TRACK BORING AT-8
Elevation - 611 Feet (MSL)



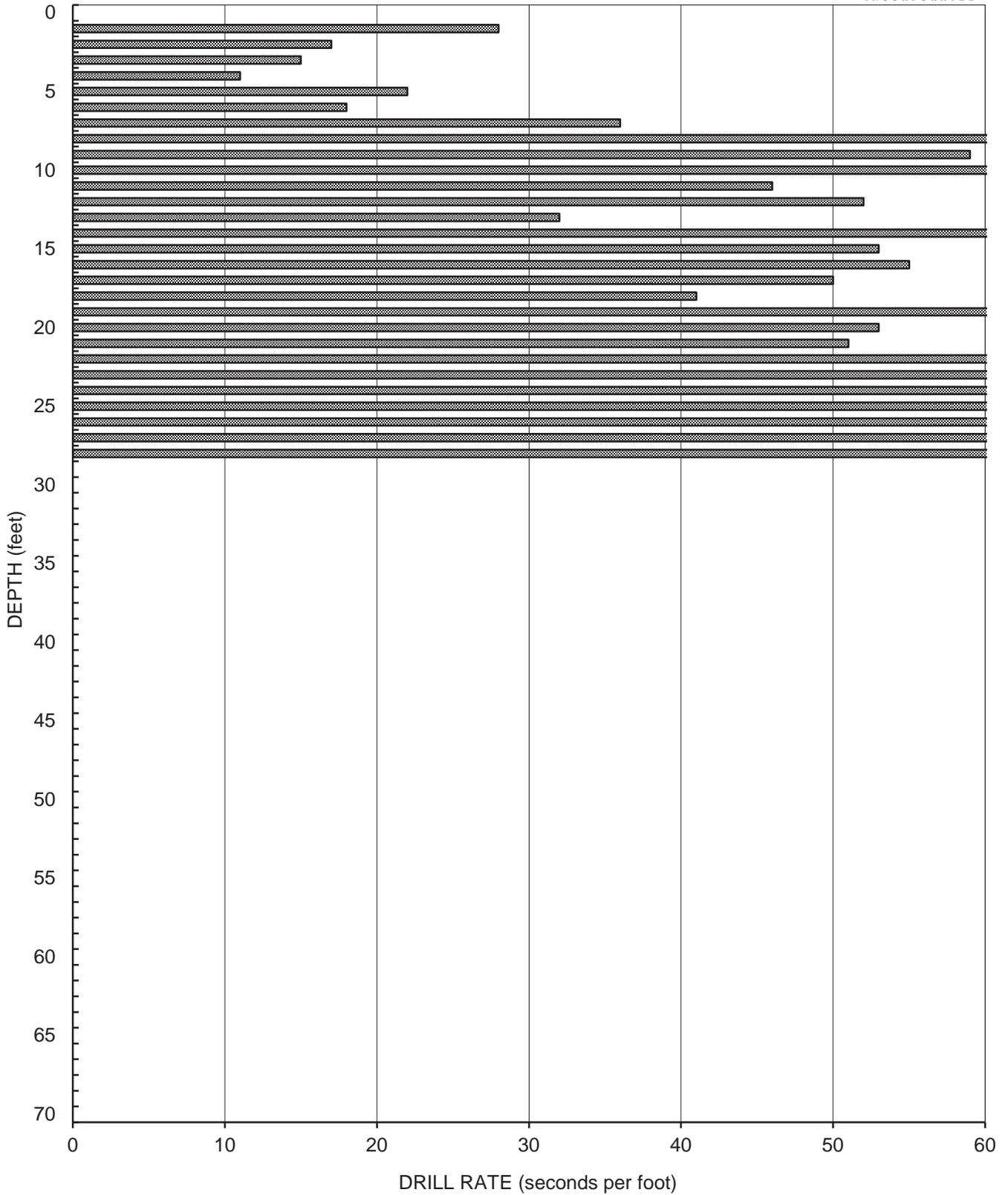
GEOCON
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AIR TRACK BORING AT-9
Elevation - 702 Feet (MSL)



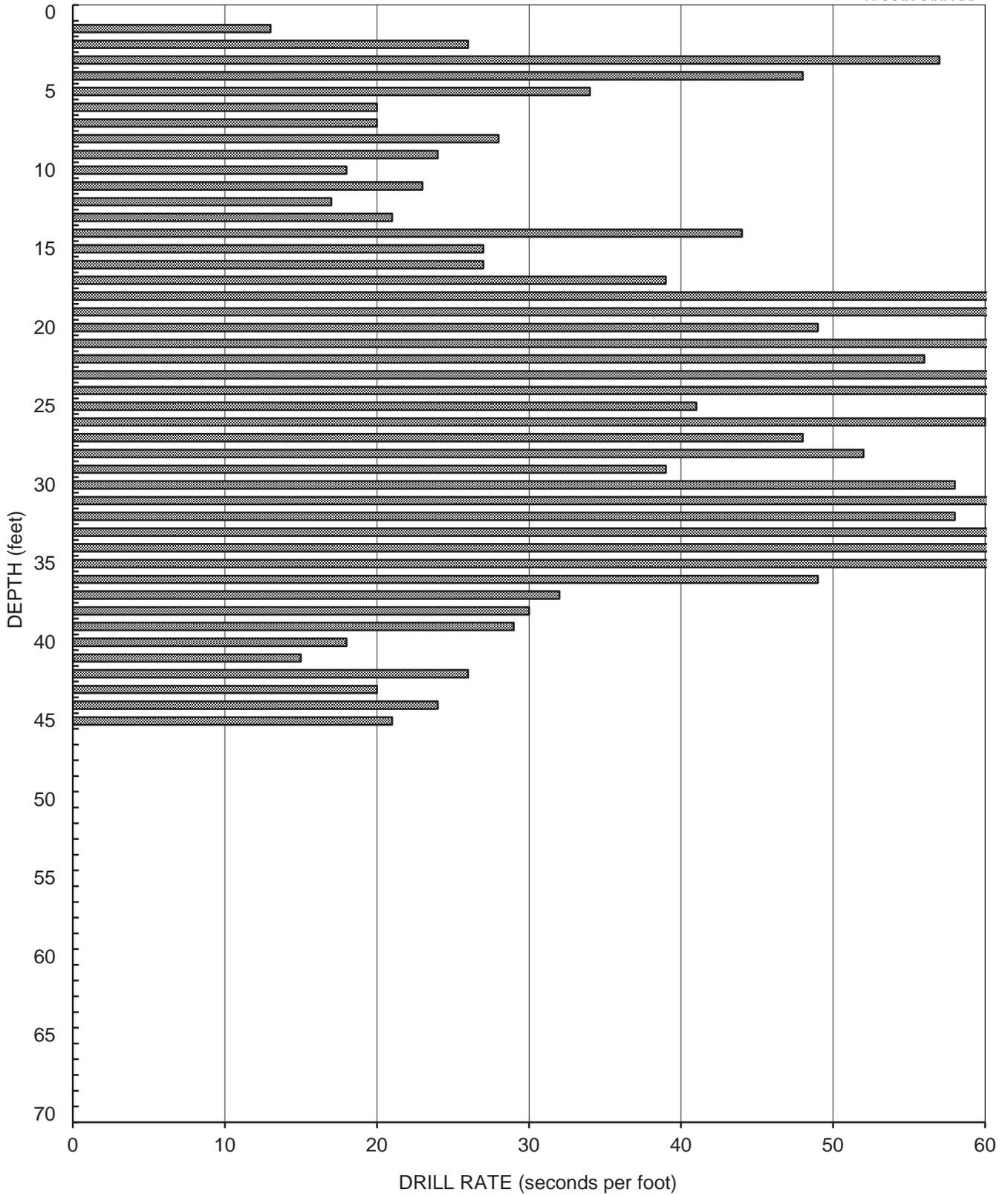
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AIR TRACK BORING AT-10
Elevation - 800 Feet (MSL)



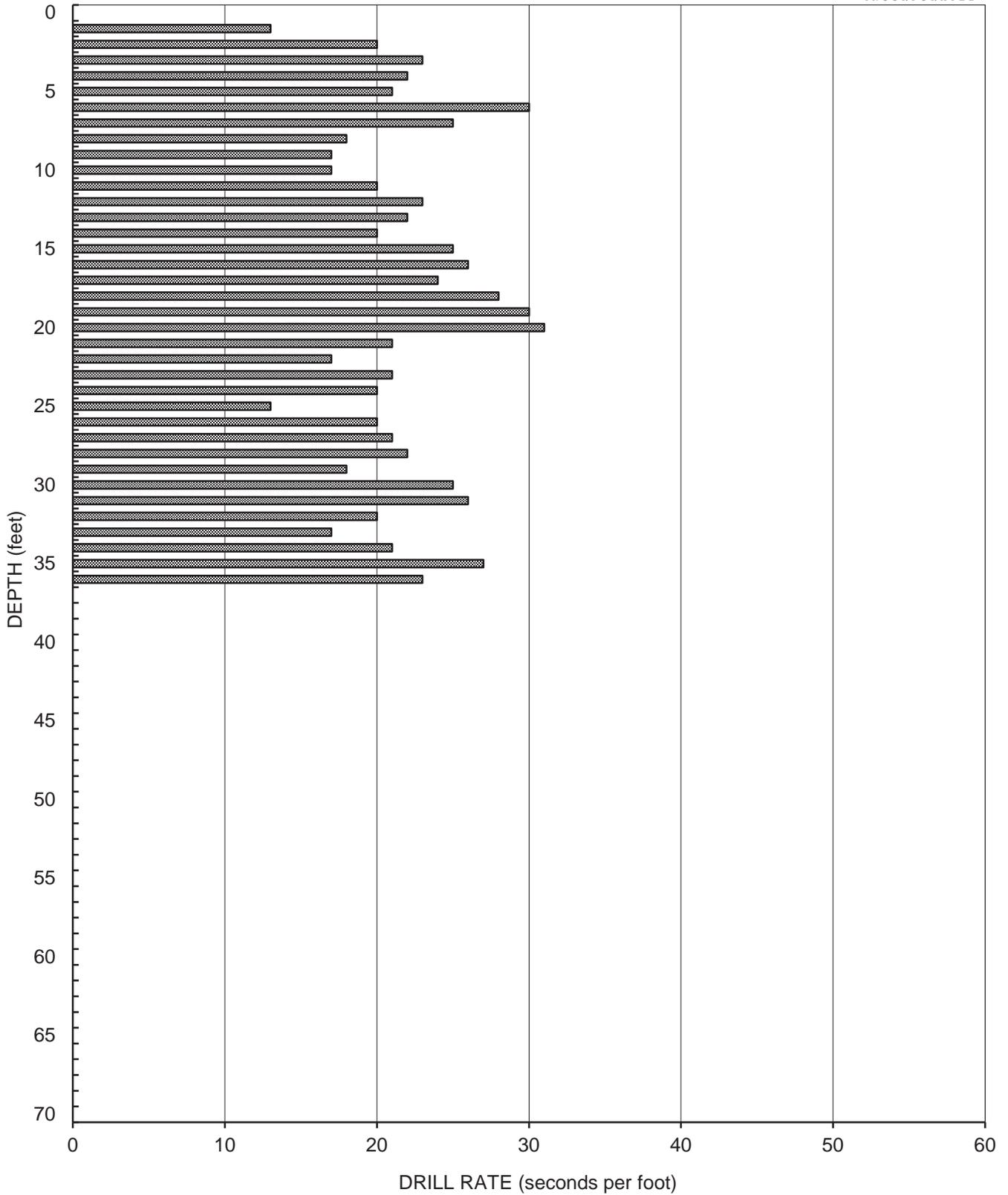
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AIR TRACK BORING AT-11
Elevation - 756 Feet (MSL)



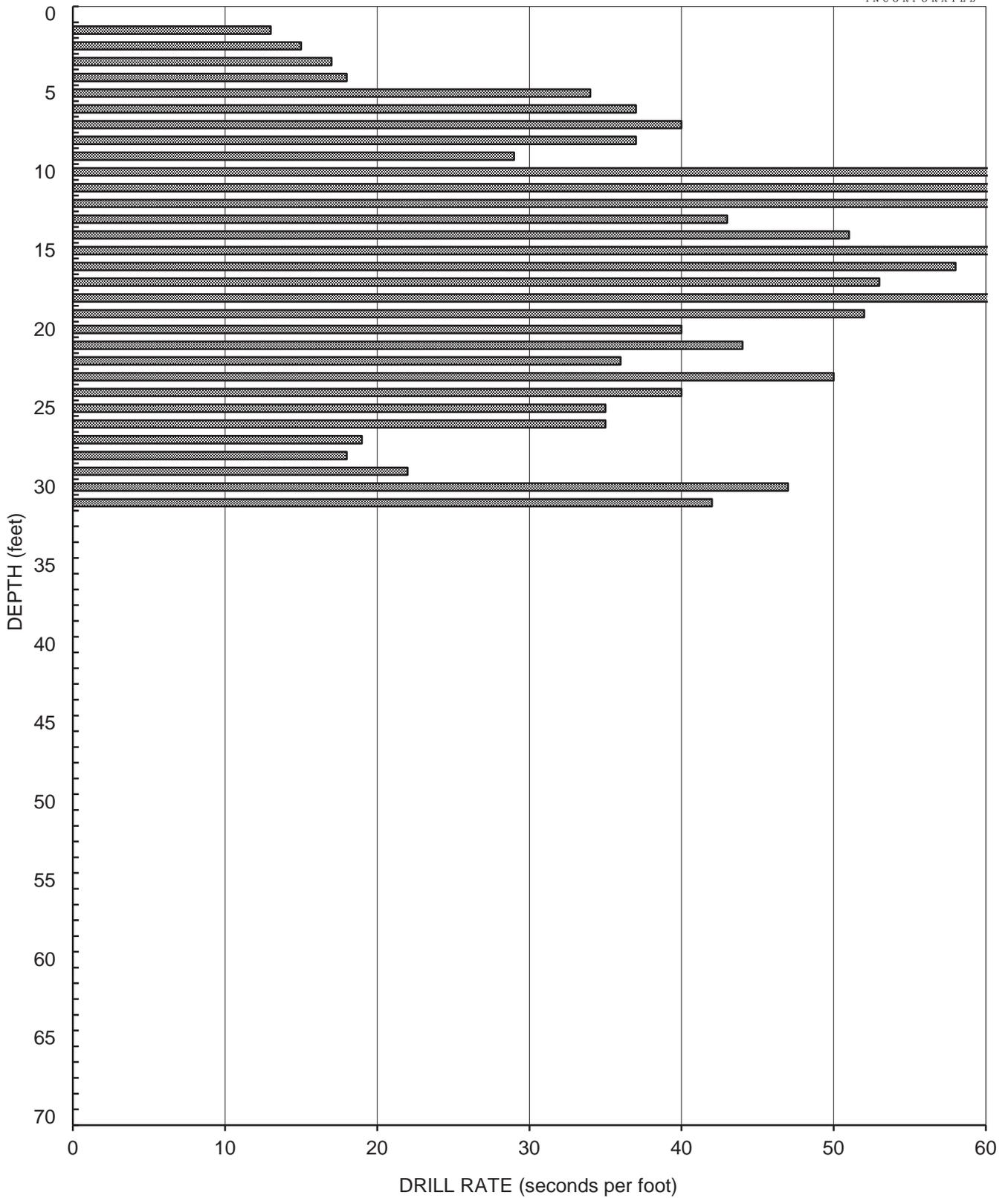
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AIR TRACK BORING AT-12
Elevation - 811 Feet (MSL)



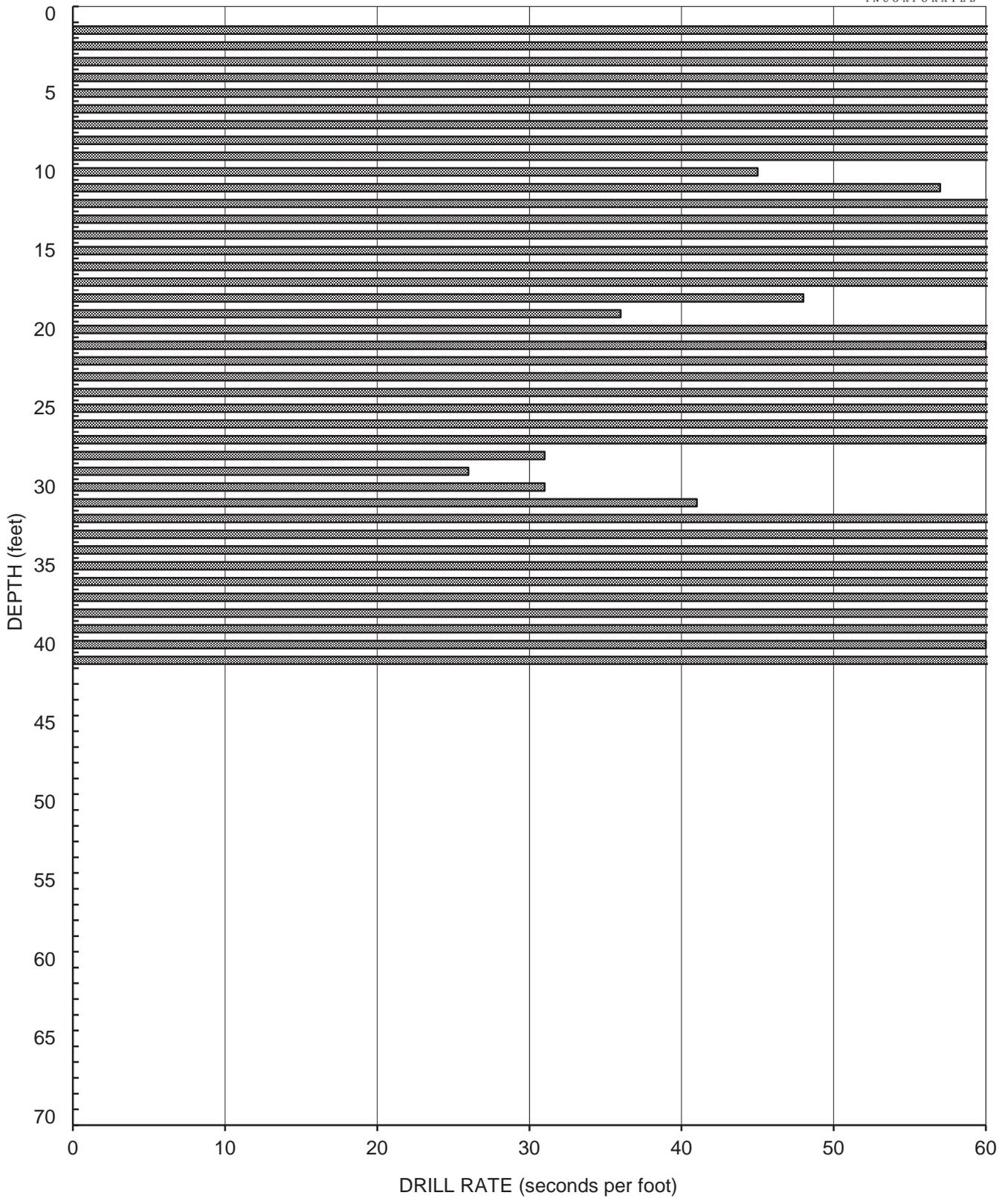
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AIR TRACK BORING AT-13
Elevation - 884 Feet (MSL)



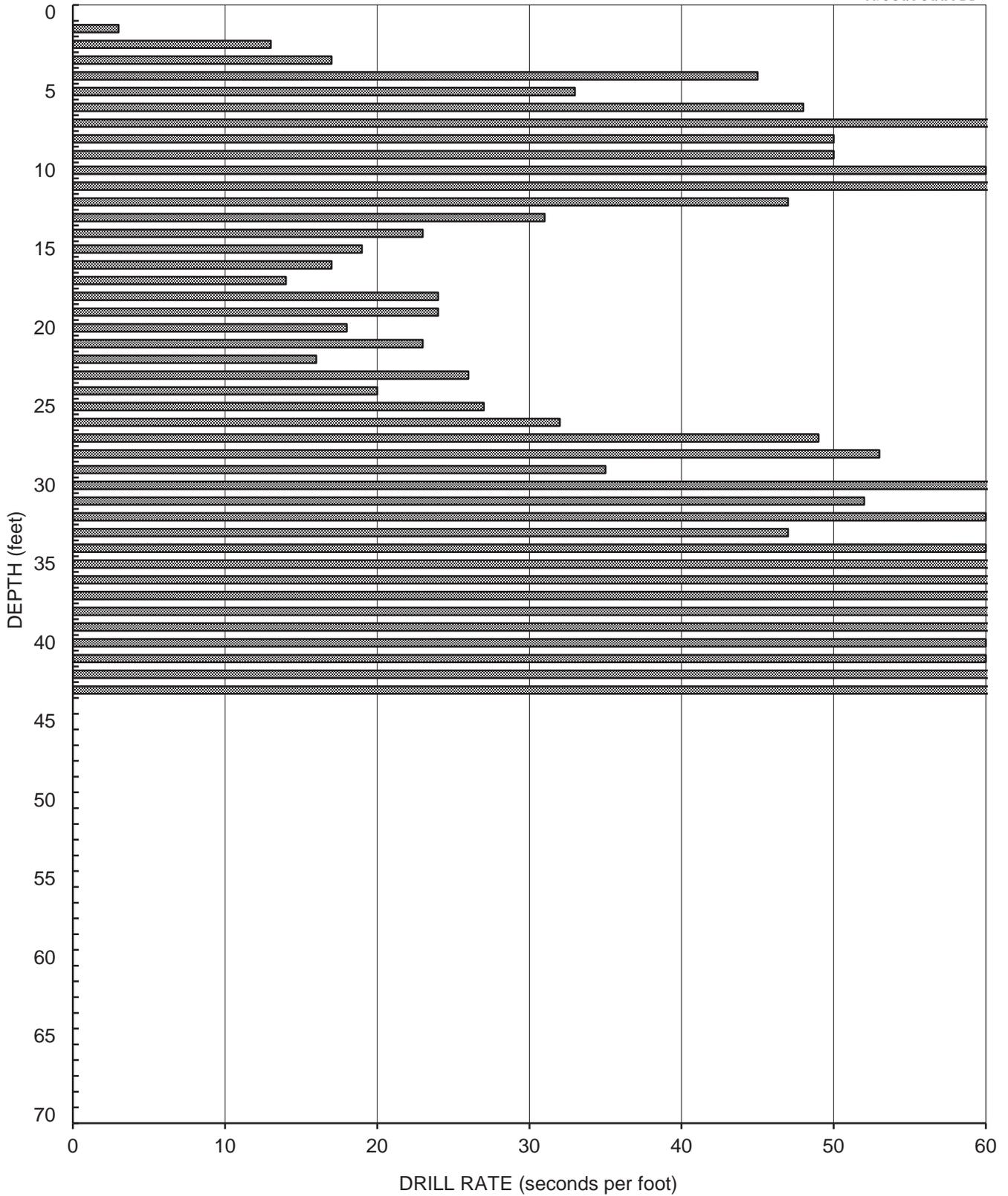
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AIR TRACK BORING AT-14
Elevation - 832 Feet (MSL)



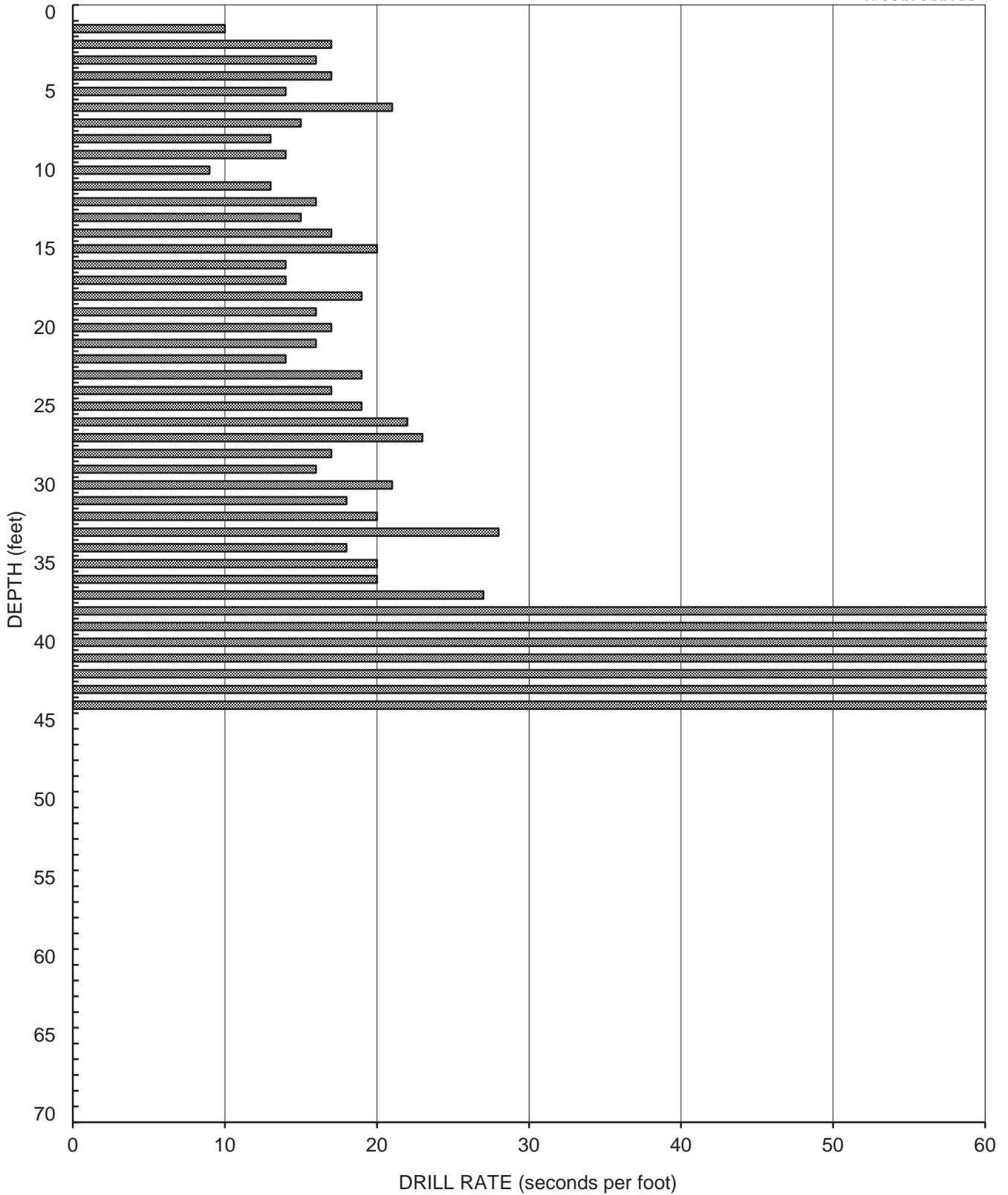
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AIR TRACK BORING AT-15
Elevation - 815 Feet (MSL)



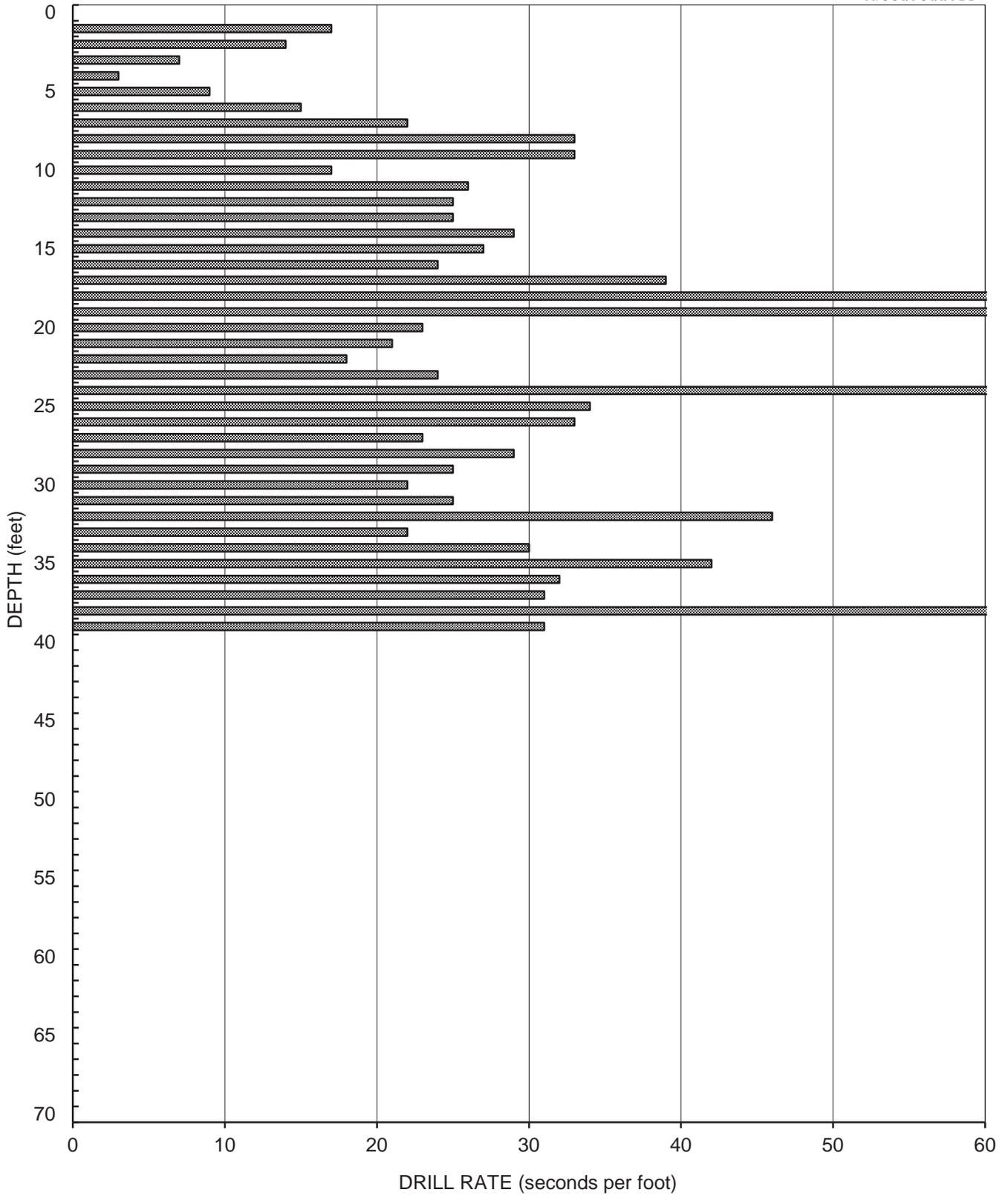
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AIR TRACK BORING AT-16
Elevation - 698 Feet (MSL)



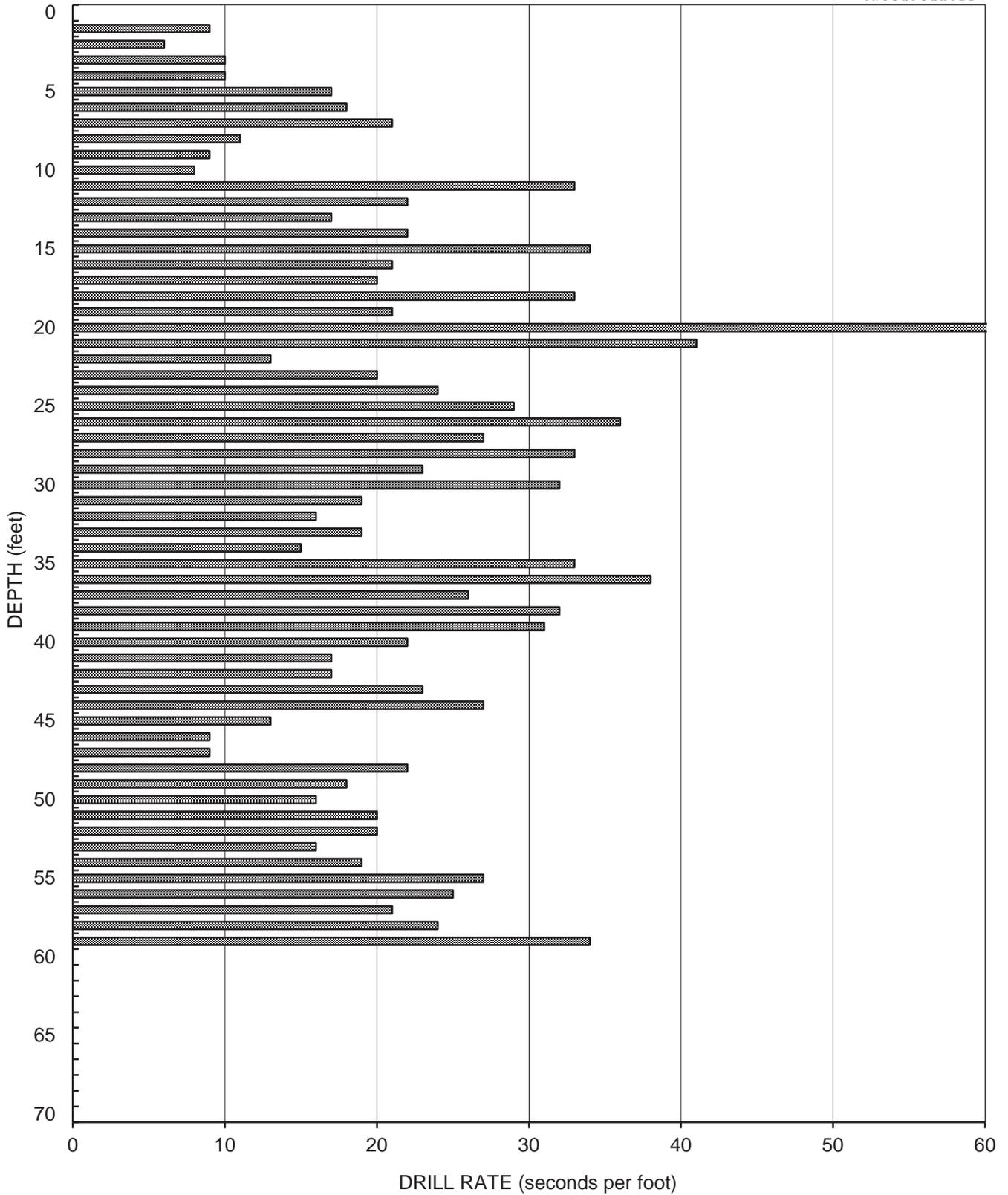
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INCORPORATED



AIR TRACK BORING AT-17
Elevation - 598 Feet (MSL)



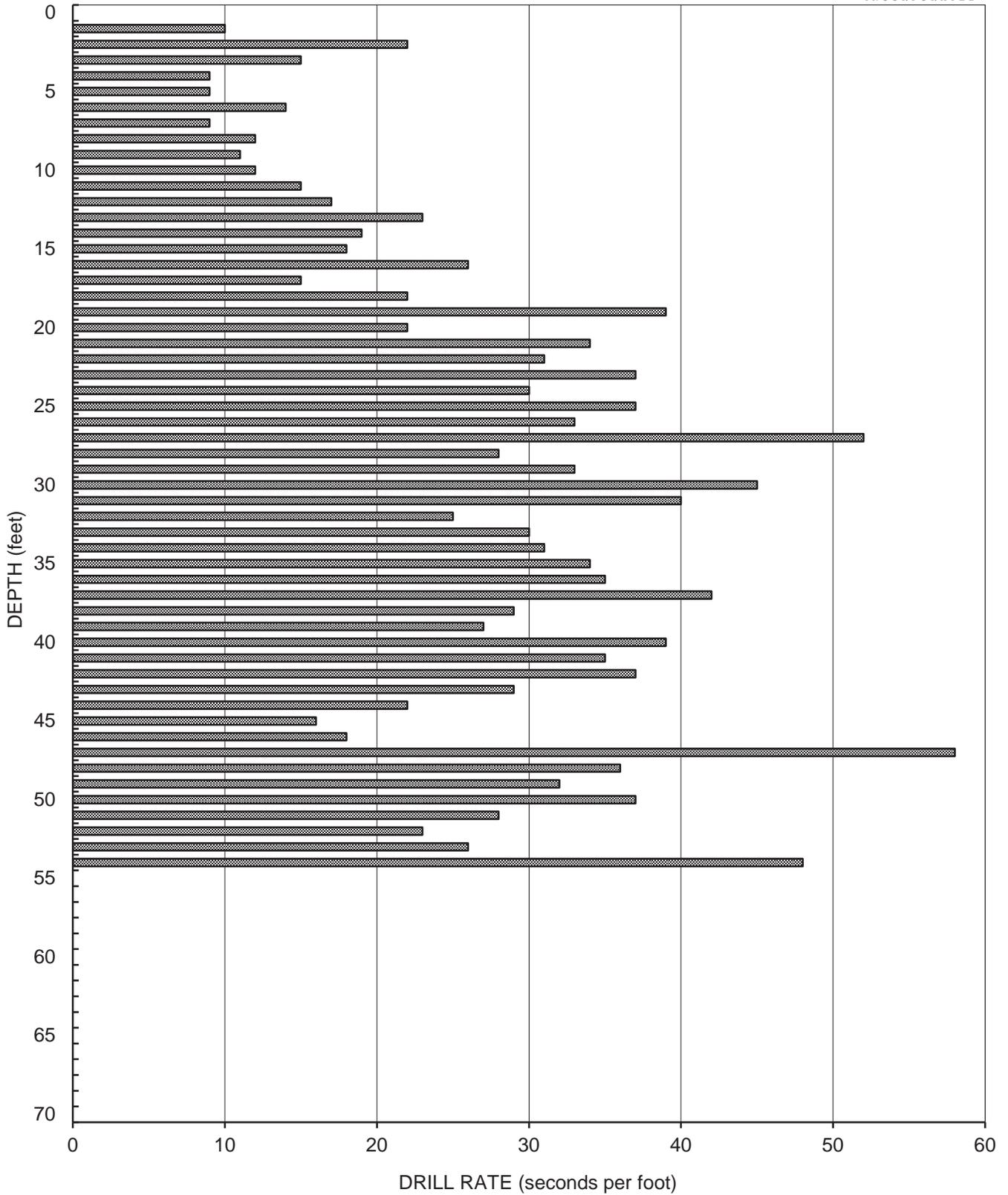
GEOCON
INCORPORATED



AIR TRACK BORING AT-18
Elevation - 596 Feet (MSL)



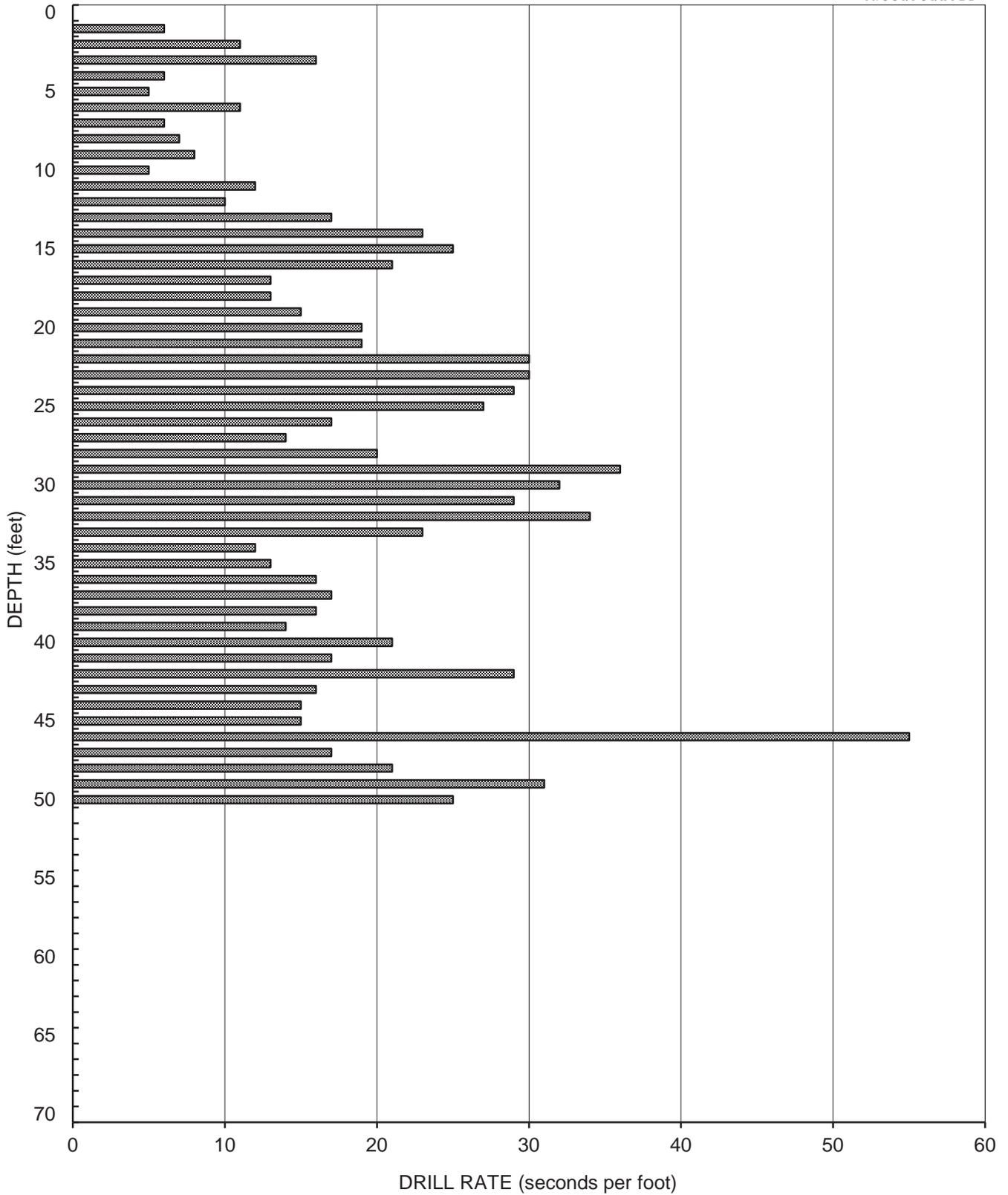
GEOCON
INCORPORATED



AIR TRACK BORING AT-19
Elevation - 563 Feet (MSL)



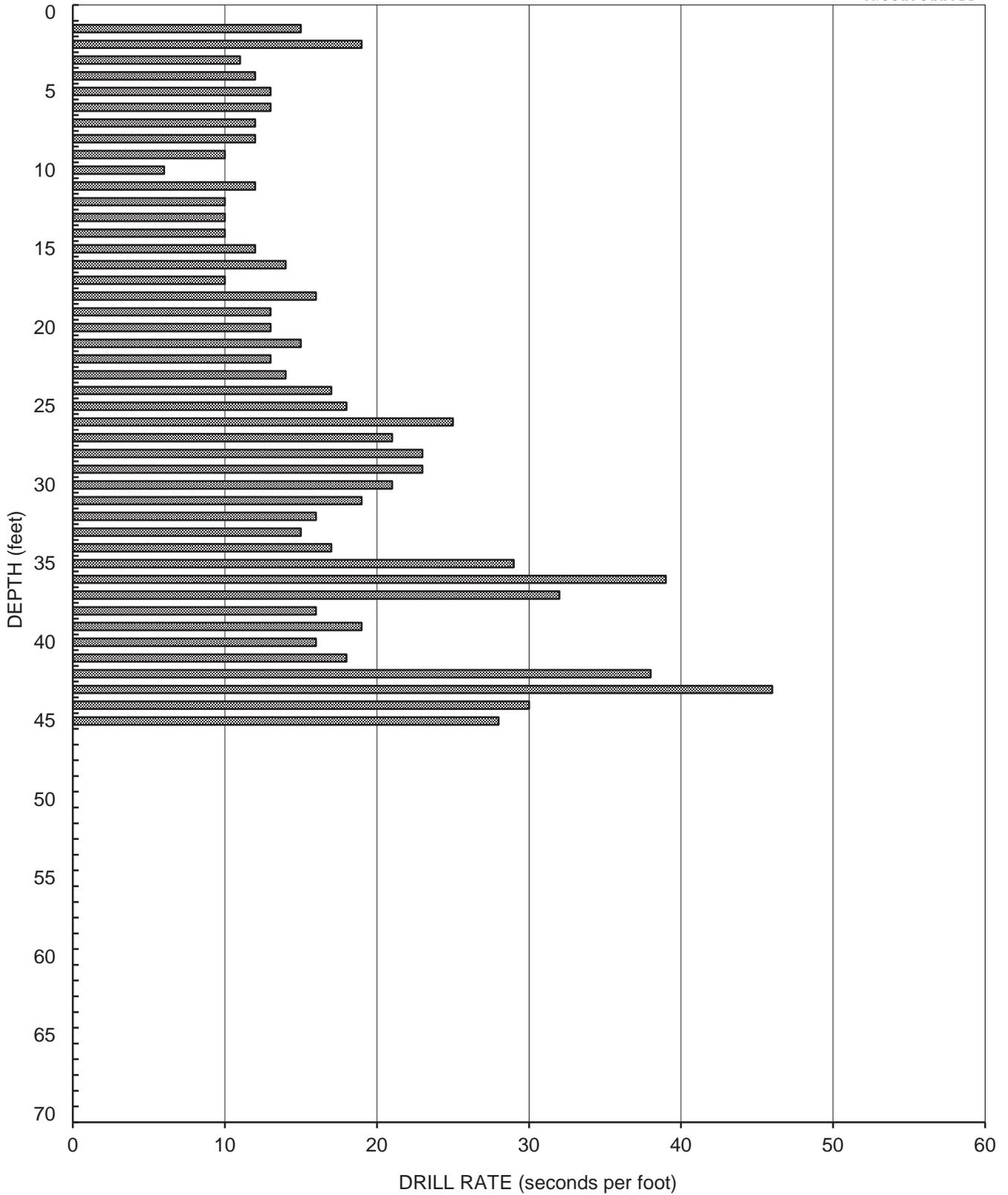
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AIR TRACK BORING AT-20
Elevation - 696 Feet (MSL)



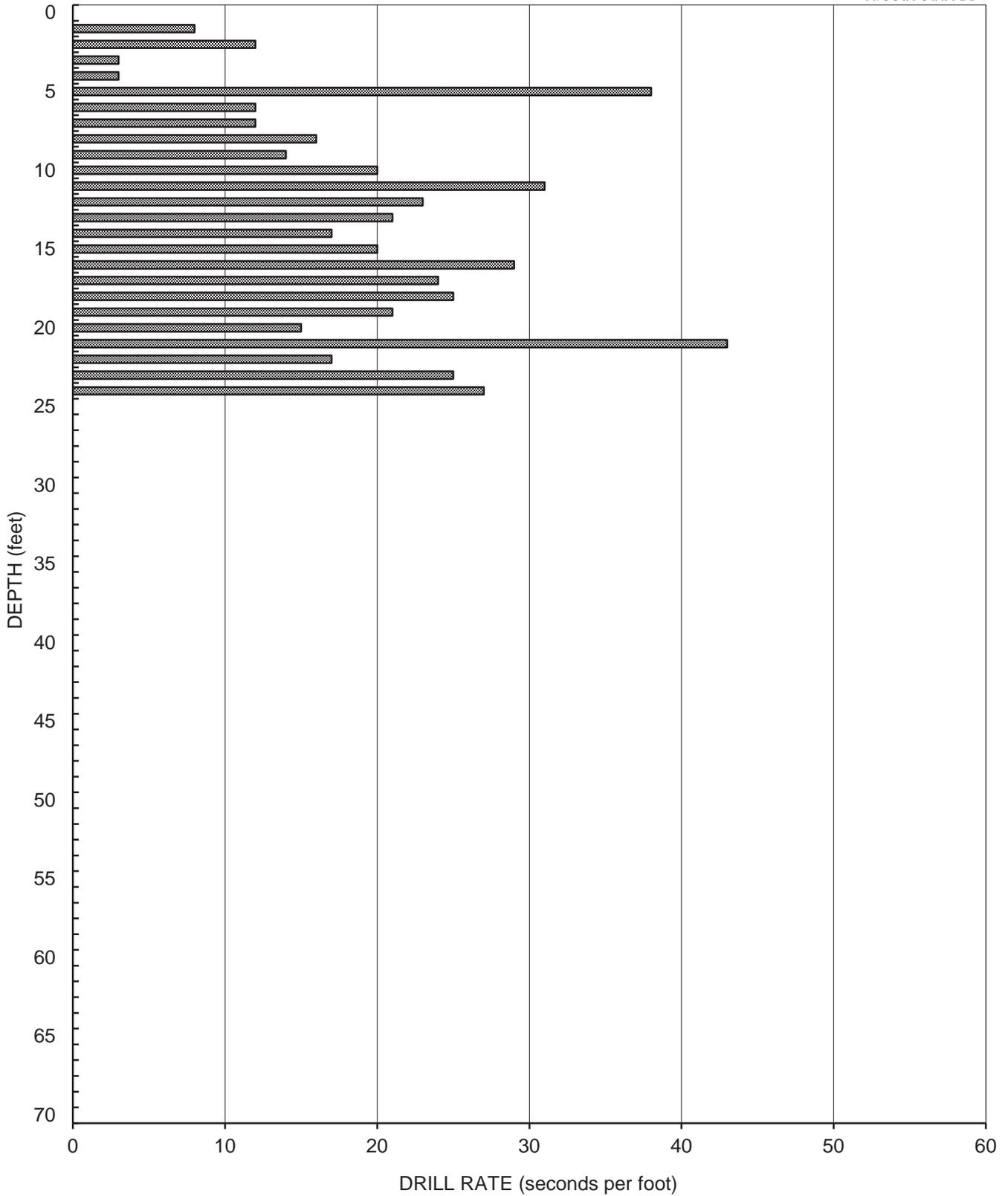
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AIR TRACK BORING AT-21
Elevation - 537 Feet (MSL)



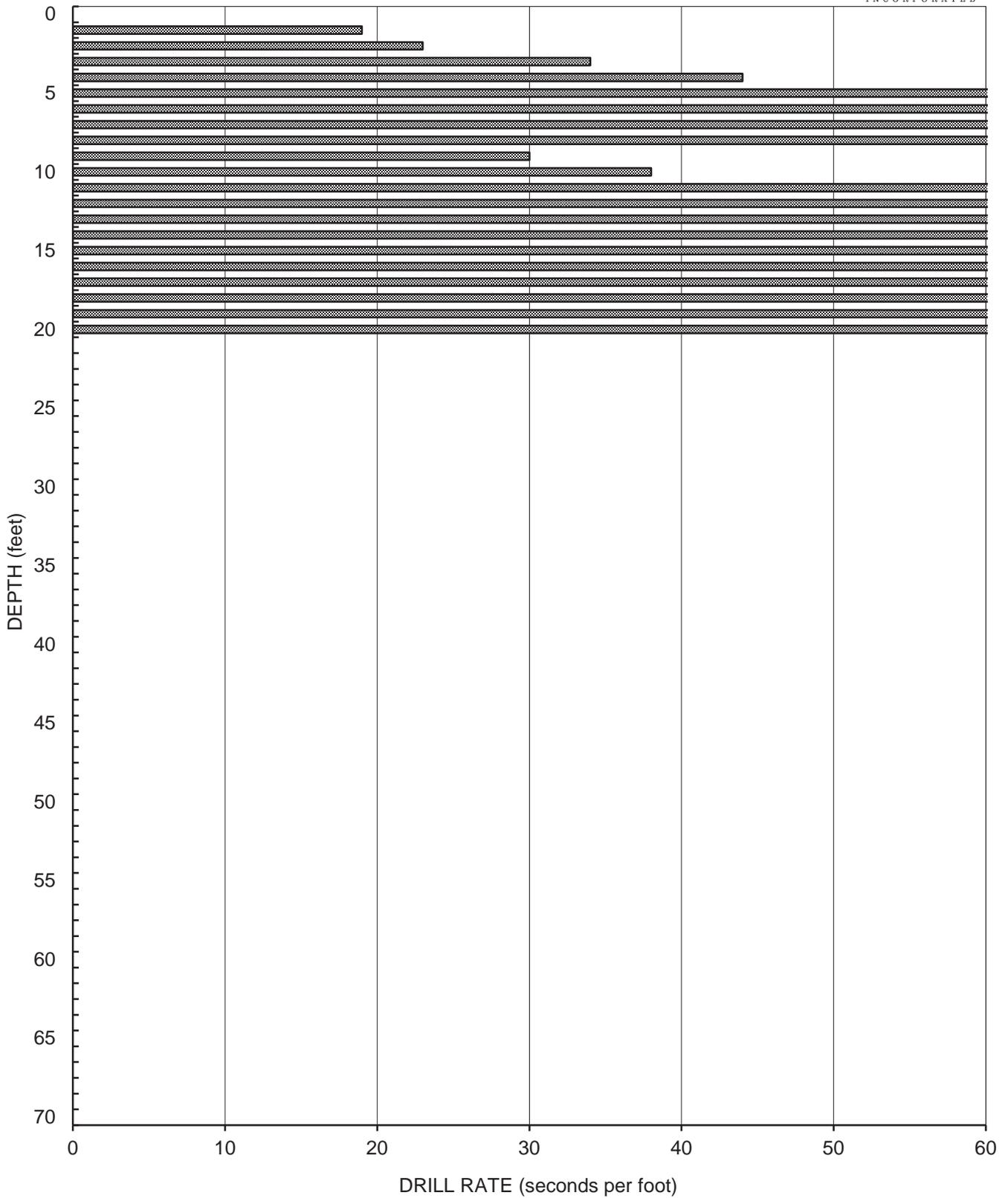
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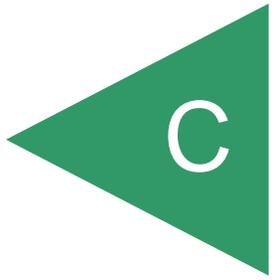
AIR TRACK BORING AT-22
Elevation - 728 Feet (MSL)



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APPENDIX



APPENDIX C

SEISMIC REFRACTION SURVEY REPORT

PREPARED BY

SOUTHWEST GEOPHYSICS, INC.

DATED OCTOBER 10, 2008 (PROJECT NO. 108226)

FOR

**OTAY RANCH RESORT VILLAGE
AREA A TENTATIVE MAP
SAN DIEGO COUNTY, CALIFORNIA**

PROJECT NO. G1012-52-01D

**SEISMIC REFRACTION SURVEY
OTAY RANCH RESIDENTIAL DEVELOPMENT
SAN DIEGO, CALIFORNIA**

PREPARED FOR:
Geocon Consultants, Inc.
6970 Flanders Drive
San Diego, CA 92121

PREPARED BY:
Southwest Geophysics, Inc.
7438 Trade Street
San Diego, CA 92121

October 10, 2008
Project No. 108226

October 10, 2008
Project No. 108226

Mr. Nathan Ash
Geocon Consultants, Inc.
6970 Flanders Drive
San Diego, CA 92121

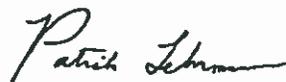
Subject: Seismic Refraction Survey
Otay Ranch Residential Development
San Diego, California

Dear Mr. Ash:

In accordance with your authorization, we have performed a seismic refraction survey for the proposed Otay Ranch Residential Development to be located in an area of generally undeveloped land along the north side of Otay Lakes Road in San Diego, California. Specifically, our survey consisted of performing 18 seismic refraction lines at the subject site. The purpose of our study was to develop a subsurface velocity profile of the areas surveyed, and to assess the apparent rippability of near surface materials. This data report presents our survey methodology, equipment used, analysis, and results.

We appreciate the opportunity to be of service on this project. Should you have any questions related to this report, please contact the undersigned at your convenience.

Sincerely,
SOUTHWEST GEOPHYSICS, INC.



Patrick Lehrmann, P.G., R.Gp.
Principal Geologist/Geophysicist

HV/PFL/hv

Distribution: (1) Electronic



Hans van de Vrugt, C.E.G., R.Gp.
Principal Geologist/Geophysicist



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1. INTRODUCTION

In accordance with your authorization, we have performed a seismic refraction survey for the proposed Otay Ranch Residential Development to be located in an area of generally undeveloped land along the north side of Otay Lakes Road in San Diego, California (Figure 1). Specifically, our survey consisted of performing 18 seismic refraction lines at the subject site. The purpose of our study was to develop a subsurface velocity profile of the areas surveyed, and to assess the apparent rippability of near surface materials. This data report presents our survey methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of 18 seismic refraction lines at the project site.
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results and conclusions.

3. SITE AND PROJECT DESCRIPTION

The project site generally includes south facing slopes and low-lying terrain along the north side of Otay Lakes Road (Figure 1). The project area is situated just to the north of Lower Otay Reservoir. Figures 2a and 2b illustrate the study area and general site conditions. Terrain at the site varies from gentle to very steep slopes, flat low-lying areas, and relatively small drainages. Numerous crystalline rock outcrops and remnant boulders were observed in the study areas. Vegetation generally consists of dry grass and brush. Figure 3 provides a general view of the site conditions in the project area and along some seismic lines.

Based on our discussions with you, we understand that the study area is under consideration for grading and construction of new single family homes and associated roadways. Cuts up to roughly 125 feet deep are proposed.

4. SURVEY METHODOLOGY

A seismic P-wave (compression wave) refraction survey was conducted at the site to evaluate the depth to bedrock and apparent rippability characteristics of the subsurface materials, and to develop a subsurface velocity profile of the areas surveyed. The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface, using a hammer and plate, are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of surface vertical component geophones and recorded with a 24-channel Geometrics StrataView seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thickness and velocity information on the subsurface materials.

Eighteen seismic lines/profiles (SL-1 through SL-18) were conducted as part of our study. The general locations of the lines were selected by your office, and are depicted on Figures 2a and 2b. Shot points were conducted at the ends and midpoint of each line and in areas where relatively deep cuts were proposed 50-foot offend shots were performed in order to increase the exploration depth.

The refraction method requires that subsurface velocities increase with depth. A layer having a velocity lower than that of the layer above will not be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. In addition, lateral variations in velocity, such as those caused by core stones or intrusions can also result in the misinterpretation of the subsurface conditions.

In general, seismic wave velocities can be correlated to material density and/or rock hardness. The relationship between rippability and seismic velocity is empirical and assumes a homogeneous mass. Localized areas of differing composition, texture, and/or structure may affect both the measured data and the actual rippability of the mass. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

The rippability values presented in Table 1 are based on our experience with similar materials and assumes that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that rock characteristics, such as fracture spacing and orientation, play a significant role in determining rock rippability. These characteristics may also vary with location and depth.

For trenching operations, the rippability values should be scaled downward. For example, velocities as low as 3,500 feet/second may indicate difficult ripping during trenching operations. In addition, the presence of boulders, which can be troublesome in a narrow trench, should be anticipated.

Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Local Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Local to General Blasting
Greater than 7,000 feet/second	Blasting Generally Required

It should be noted that the rippability cutoffs presented in Table 1 are slightly more conservative than those published in the Caterpillar Performance Handbook (Caterpillar, 2004). Accordingly, the above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids.

5. RESULTS

As previously indicated, 18 seismic traverses were conducted as part of our study. The collected data were processed using SIPwin (Rimrock Geophysics, 2003) a seismic interpretation program and analyzed using both SIPwin and SeisOpt Pro (Optim, 2008). Both programs use first arrival picks and elevation data to produce subsurface velocity models. SIPwin uses layered based modeling techniques to produce layered velocity models, where changes in velocities are depicted as

discrete contacts. SeisOpt Pro uses a nonlinear optimization technique called adaptive simulated annealing. The resulting velocity models provide a tomographic image of the estimated geologic conditions. Both vertical and lateral velocity information is contained in the models. Changes in layer velocity are revealed as gradients rather than discrete contacts, which typically are more representative of actual conditions.

Table 2 lists the approximate P-wave velocities and depths calculated from the seismic refraction traverses conducted during the evaluation. The approximate locations of the seismic refraction traverses are shown on the Seismic Line Location Maps (Figures 2a and 2b). The layer velocity profiles are included in Figures 4a through 4r. It should also be noted that, as a general rule, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth the length of the refraction line.

Table 2 – Seismic Traverse Results¹			
Traverse No. And Length	P-wave Velocity feet/second	Approximate Depth to Bottom of Layer in feet	Apparent Rippability³
SL-1 240 feet ²	V1 = 1,900 V2 > 10,000	2 – 7 ---	Easy Blasting Generally Required
SL-2 480 feet	V1 = 2,500 V2 = 8,450	1 – 8 ---	Moderate Blasting Generally Required
SL-3 240 feet ²	V1 = 1,675 V2 = 7,550	2 – 10 ---	Easy Blasting Generally Required
SL-4 240 feet	V1 = 1,650 V2 = 8,725 V3 > 10,000	3 – 8 20 – 36 ---	Easy Blasting Generally Required Blasting Generally Required
SL-5 240 feet	V1 = 1,475 V2 = 9,175	2 – 5 ---	Easy Blasting Generally Required
SL-6 480 feet	V1 = 2,450 V2 > 10,000	3 – 8 ---	Moderate Blasting Generally Required
SL-7 240 feet	V1 = 3,025 V2 > 10,000	4 – 8 ---	Moderate Blasting Generally Required
SL-8 240 feet	V1 = 1,625 V2 = 5,575	4 – 9 ---	Easy Very Difficult, Probable Blasting
SL-9 240 feet ²	V1 = 2,150 V2 > 10,000	4 – 11 ---	Moderate Blasting Generally Required
SL-10 240 feet	V1 = 1,600 V2 = 7,300	4 – 11 ---	Easy Blasting Generally Required
SL-11 240 feet	V1 = 1,575 V2 > 10,000	2 – 7 ---	Easy Blasting Generally Required

Traverse No. And Length	P-wave Velocity feet/second	Approximate Depth to Bottom of Layer in feet	Apparent Rippability³
SL-12 240 feet	V1 = 1,525 V2 = 9,050	3 – 6 ---	Easy Blasting Generally Required
SL-13 310 feet	V1 = 1,850 V2 = 9,425	2 – 6 ---	Easy Blasting Generally Required
SL-14 240 feet	V1 = 1,400 V2 > 10,000	1 – 6 ---	Easy Blasting Generally Required
SL-15 240 feet ²	V1 = 1,925 V2 = 5,600 V3 > 10,000	3 – 6 21 – 49 ---	Easy Very Difficult, Probable Blasting Blasting Generally Required
SL-16 240 feet	V1 = 1,775 V2 = 7,250 V3 > 10,000	6 – 8 58 – 77 ---	Easy Blasting Generally Required Blasting Generally Required
SL-17 240 feet	V1 = 1,450 V2 = 4,850 V3 = 8,475	3 – 6 26 – 44 ---	Easy Difficult, Possible Local Blasting Blasting Generally Required
SL-18 240 feet ²	V1 = 2,075 V2 = 3,975 V3 > 10,000	2 – 6 56 – 66 ---	Moderate Moderate Blasting Generally Required
¹ Results based on models generated using SIP, 2003 ² 50-foot off-end shots were also conducted at the ends of the line ³ Rippability criteria based on the use of a Caterpillar D-9 dozer ripping with a single shank			

6. CONCLUSIONS

The results from our seismic survey revealed two to three distinct layers at the locations surveyed. Based on our site observations and discussions with you, the layers detected have been interpreted to be surficial soil (colluvium or topsoil) overlying crystalline bedrock with varying degrees of weathering along profiles SL-1 through SL-17, and topsoil overlying fanglomerate deposits and crystalline bedrock along profile SL-18. Figures 4a through 4r provide the velocity models for the areas calculated from both SIPwin and SeisOpt Pro. In general the two results agree well, with distinct lateral velocity variations evident in the tomographic profiles for some areas. Based on the results of our survey, significant variations in the subsurface materials are present in the study area. Accordingly, variability in the excavatability (including excavation depth) of the subsurface materials should be expected across the project area.

Based on our results, very difficult conditions where blasting may be required to obtain proposed excavation depths may be encountered depending on the location, excavation depth, and desired

rate of production. A contractor with excavation experience in similar difficult conditions should be consulted for expert advice on excavation methodology, equipment, production rate, and possibly oversized materials.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Southwest Geophysics, Inc. should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

Caterpillar, Inc., 2004, Caterpillar Performance Handbook, Edition 35, Caterpillar, Inc., Peoria, Illinois.

Optim, Inc., 2008, SeisOpt Pro, V-5.0.

Mooney, H.M., 1976, Handbook of Engineering Geophysics, dated February.

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Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Press.



SITE LOCATION MAP



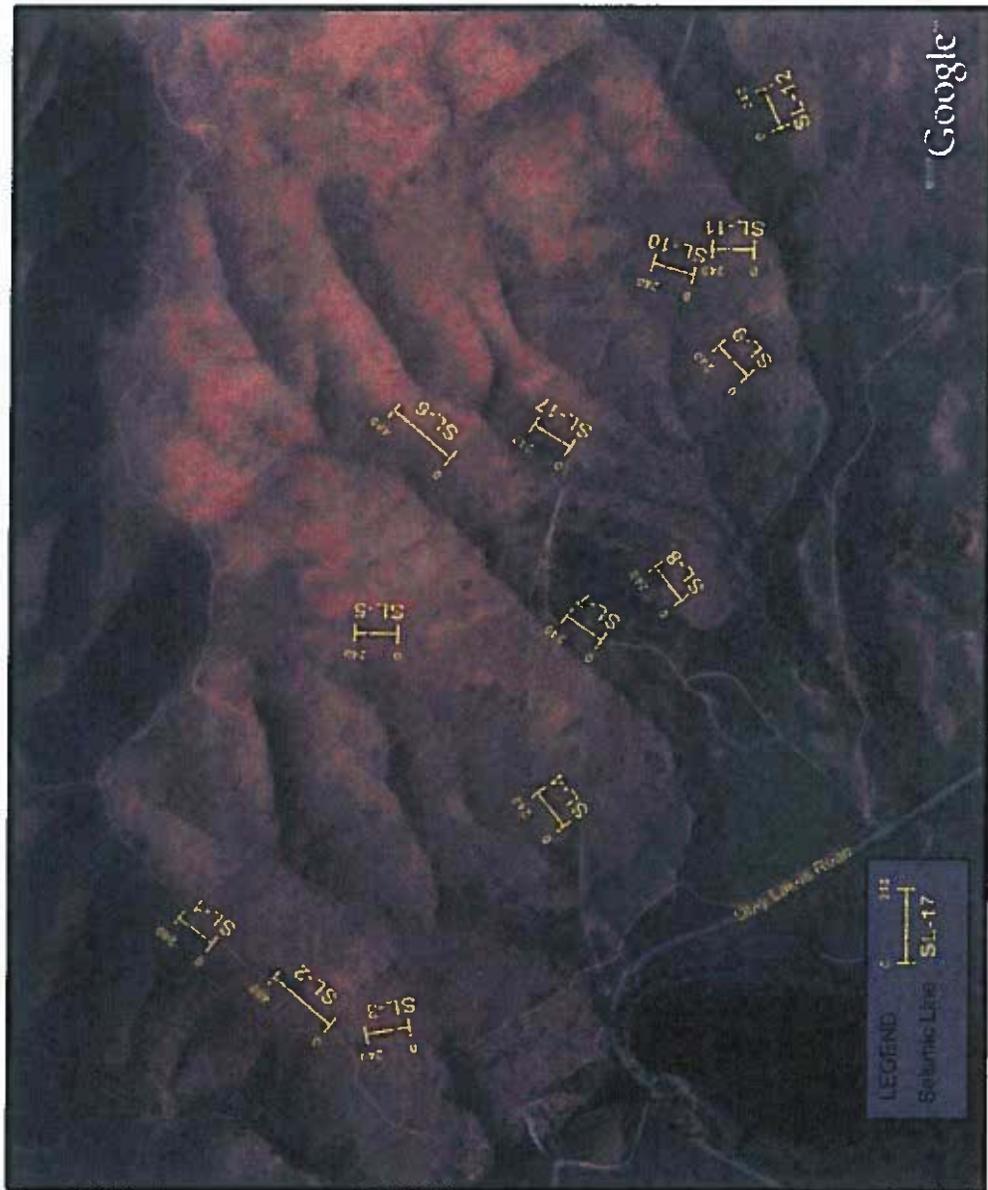
Otay Ranch Residential Development
Chula Vista, California

Project No.. 108226

Date: 10/08



Figure 1



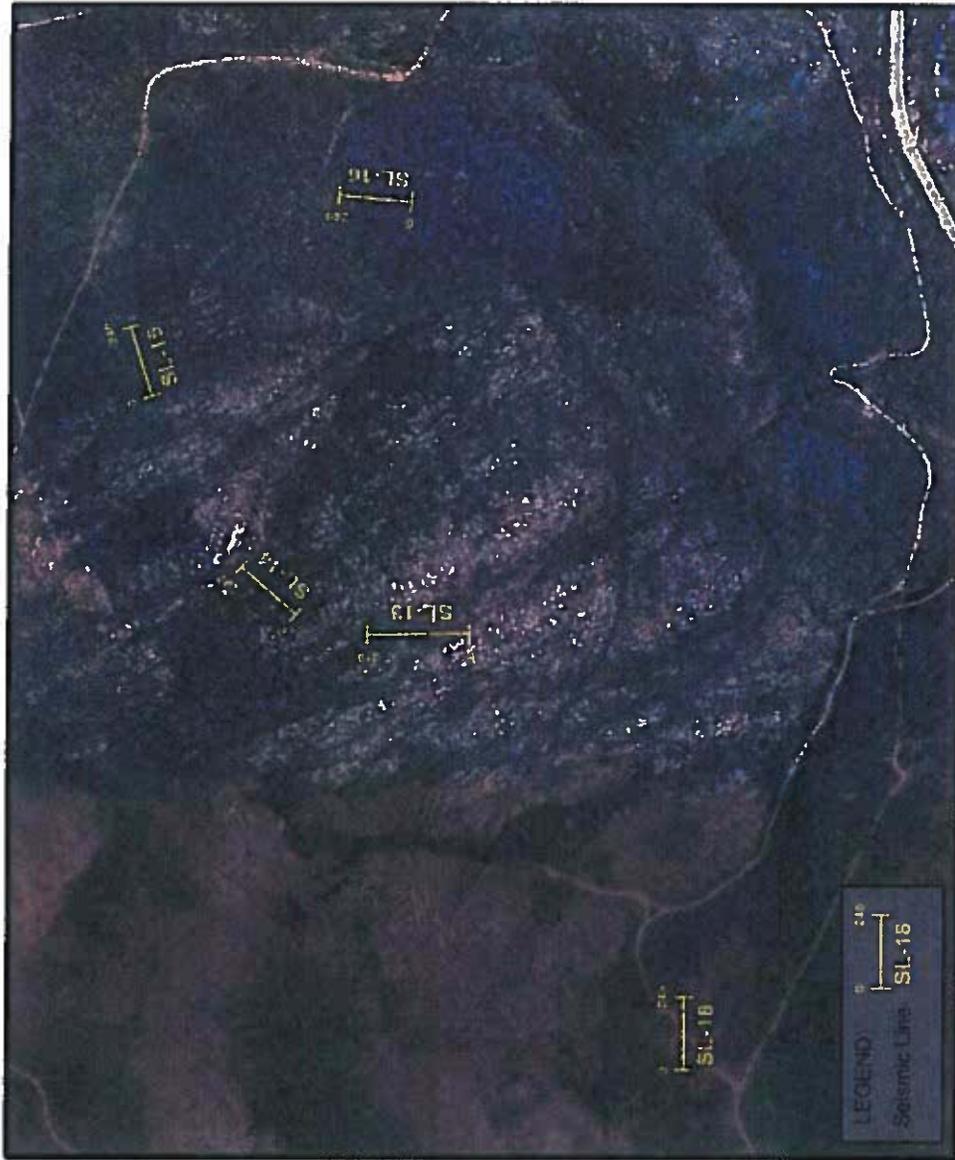
**SEISMIC LINE
LOCATION MAP**



Otay Ranch Residential Development
San Diego, California
Project No. 106228 | Date 1/10/08

**SOUTHWEST
OPPORTUNITIES INC.**
Figure 2a





**SEISMIC LINE
LOCATION MAP**

N
A

Olay Ranch Residential Development
San Diego, California

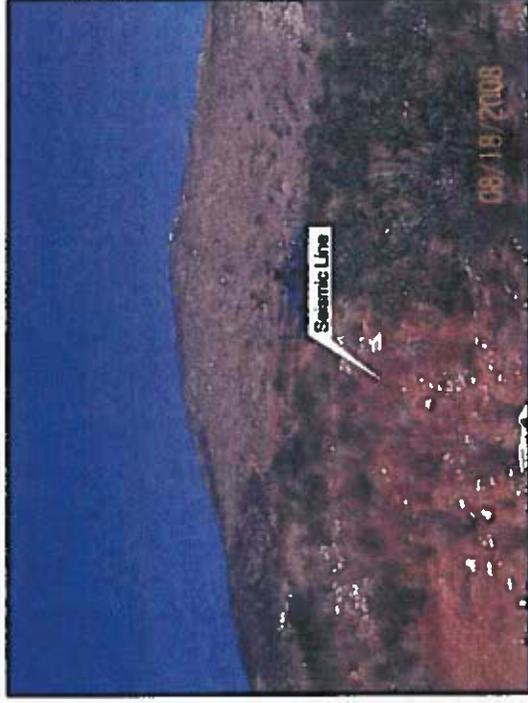
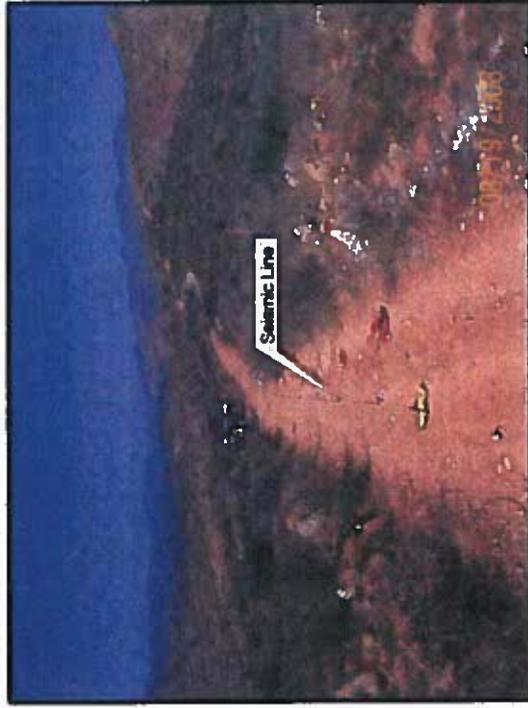
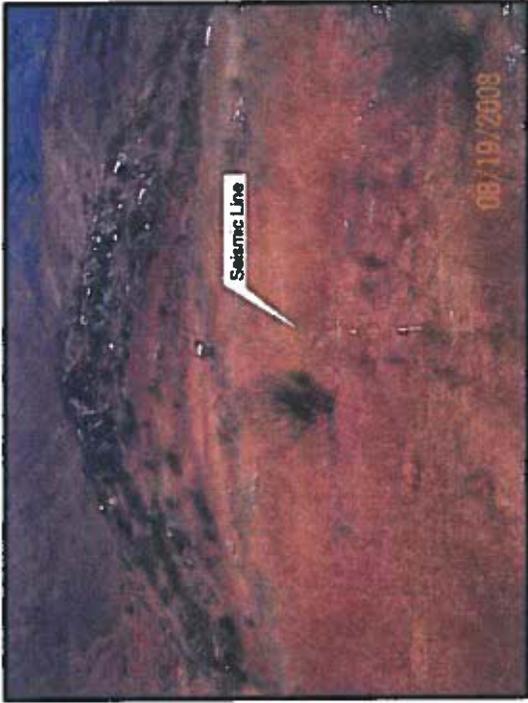
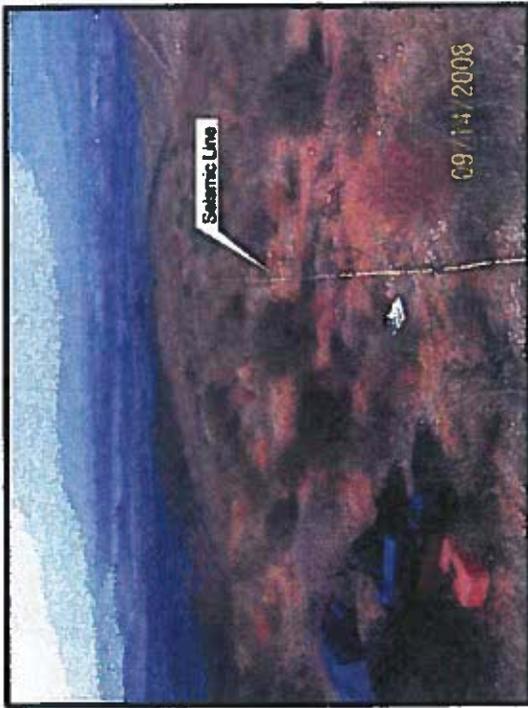
Project No. 108228

Date: 10/03



Figure 2b





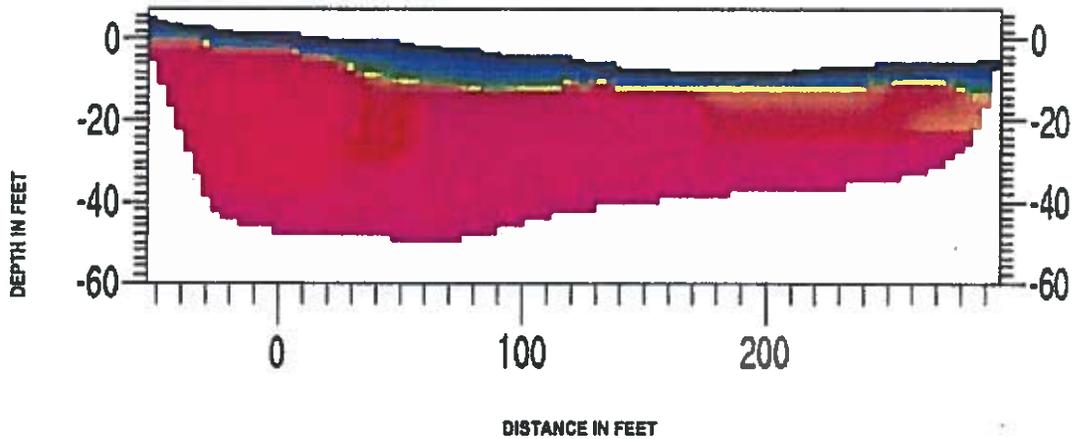
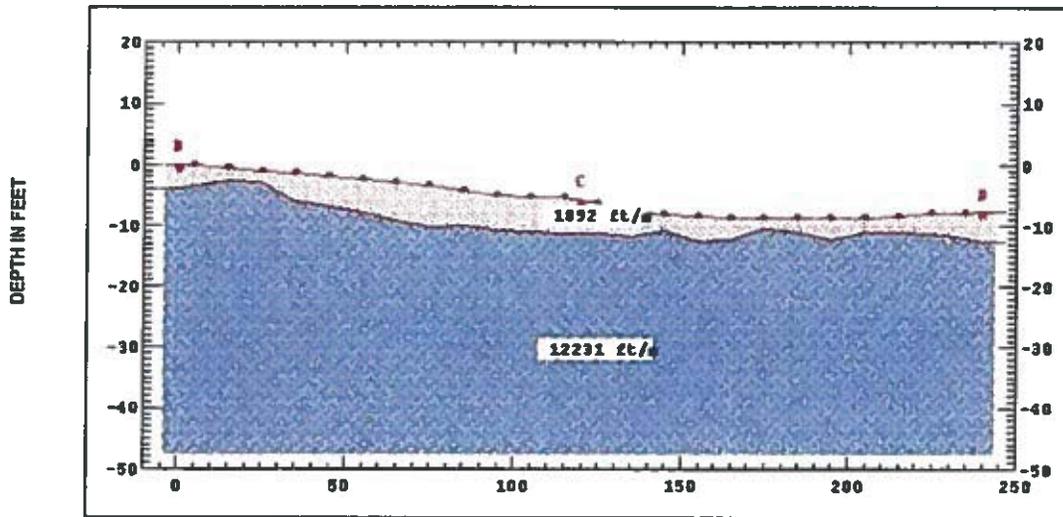
SITE PHOTOGRAPHS

Olay Ranch Residential Development
Chula Vista, California

Project No. 108226 Date: 10/06



Figure 3



**SEISMIC PROFILE
SL-1**

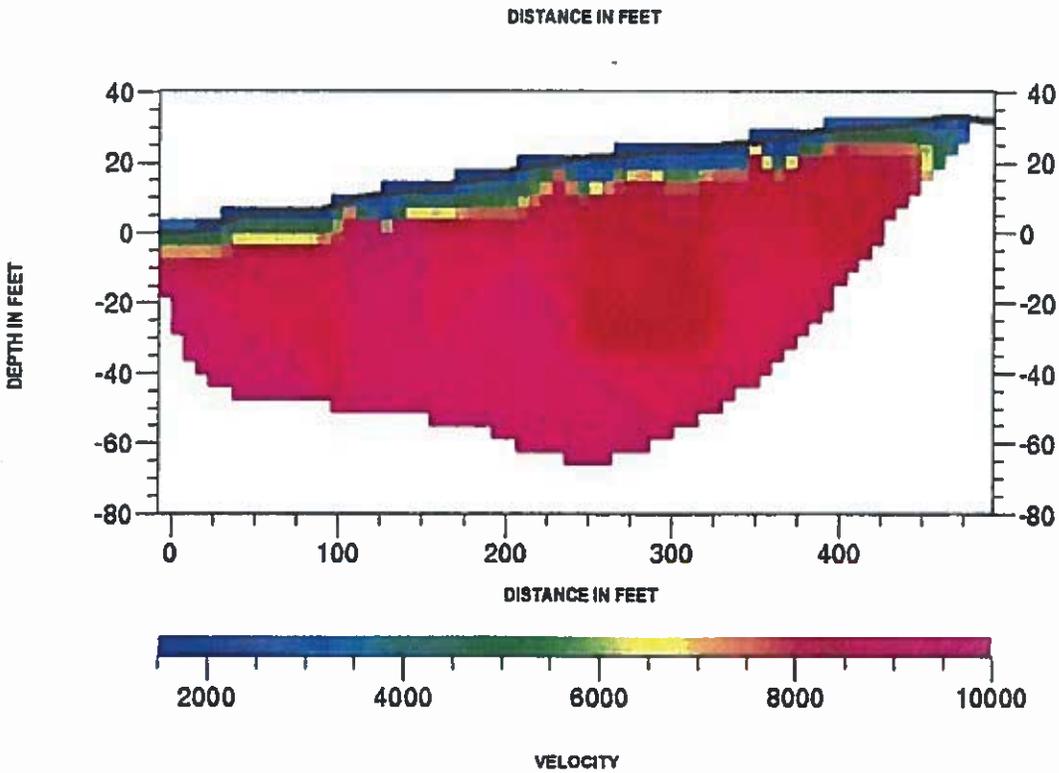
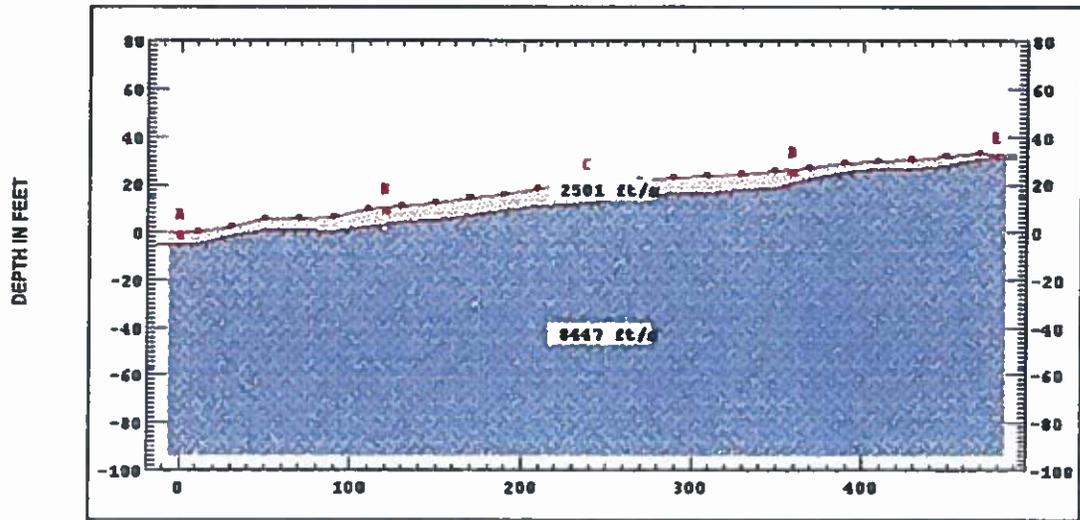
Otay Ranch Residential Development
San Diego, California

Project No.: 108226

Date: 10/08



Figure 4a



**SEISMIC PROFILE
SL-2**

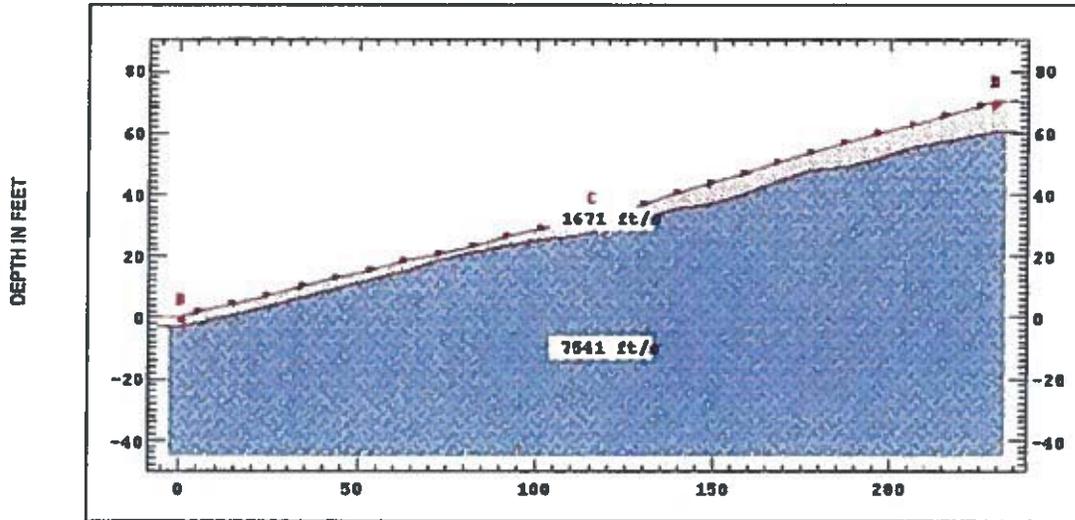
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Project No.: 108226

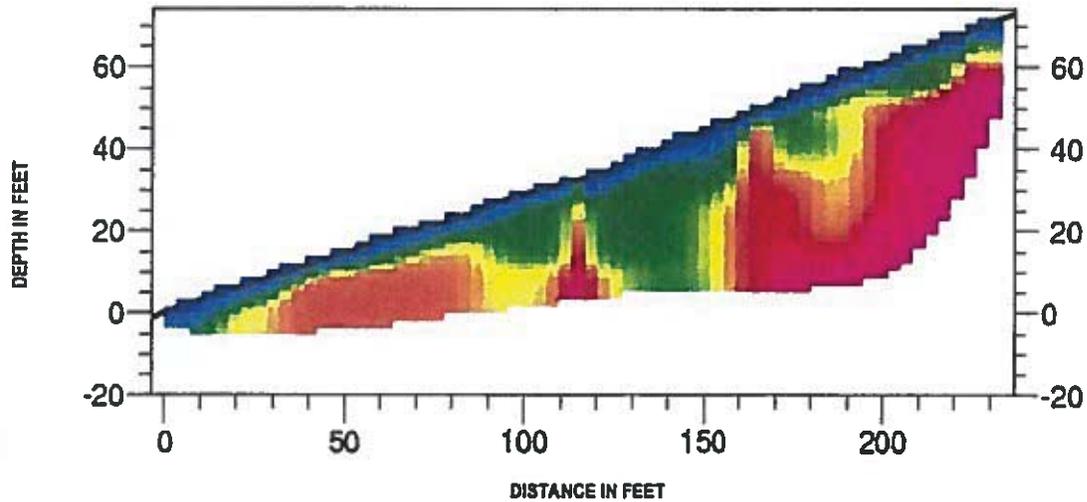
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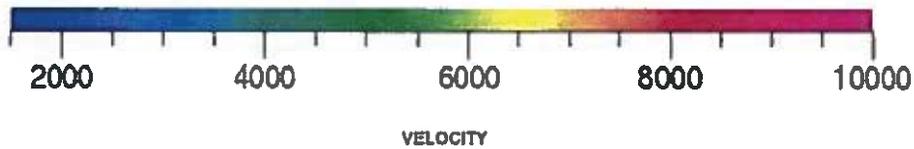
Figure 4b



DISTANCE IN FEET



DISTANCE IN FEET



**SEISMIC PROFILE
SL-3**

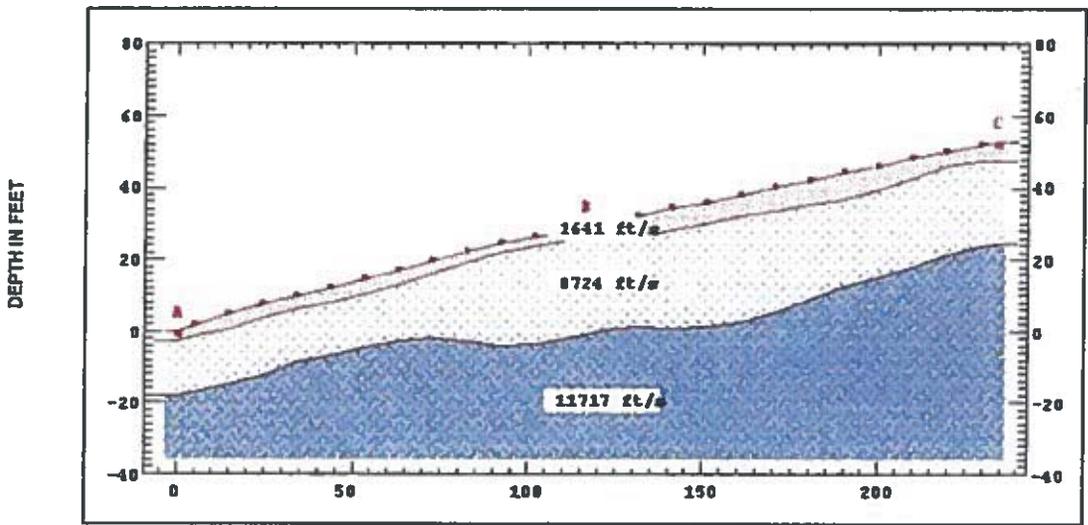
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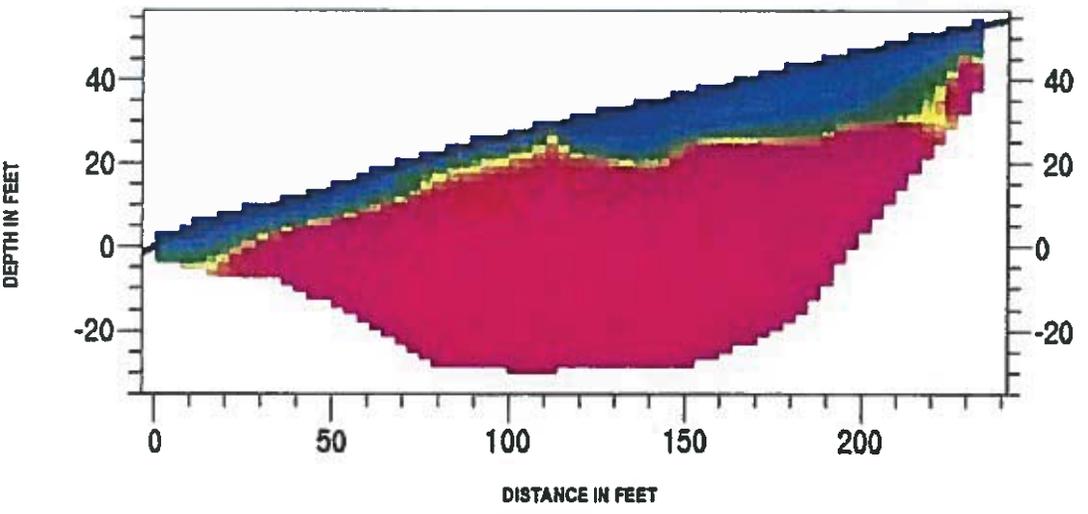
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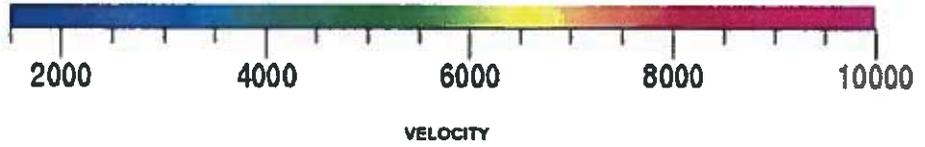
Figure 4c



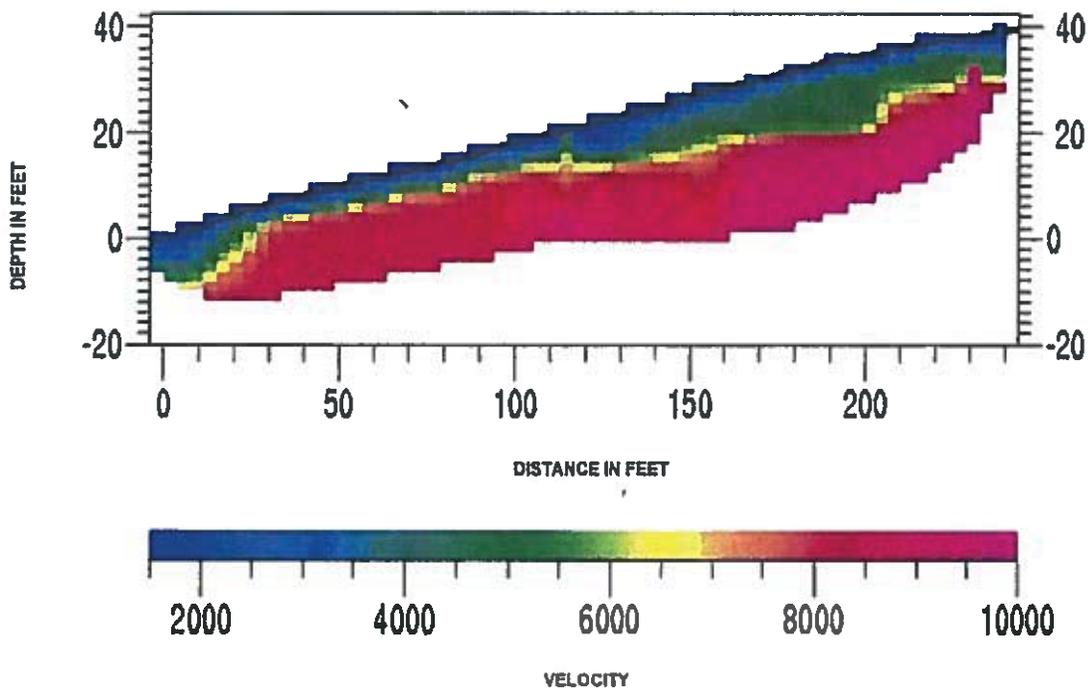
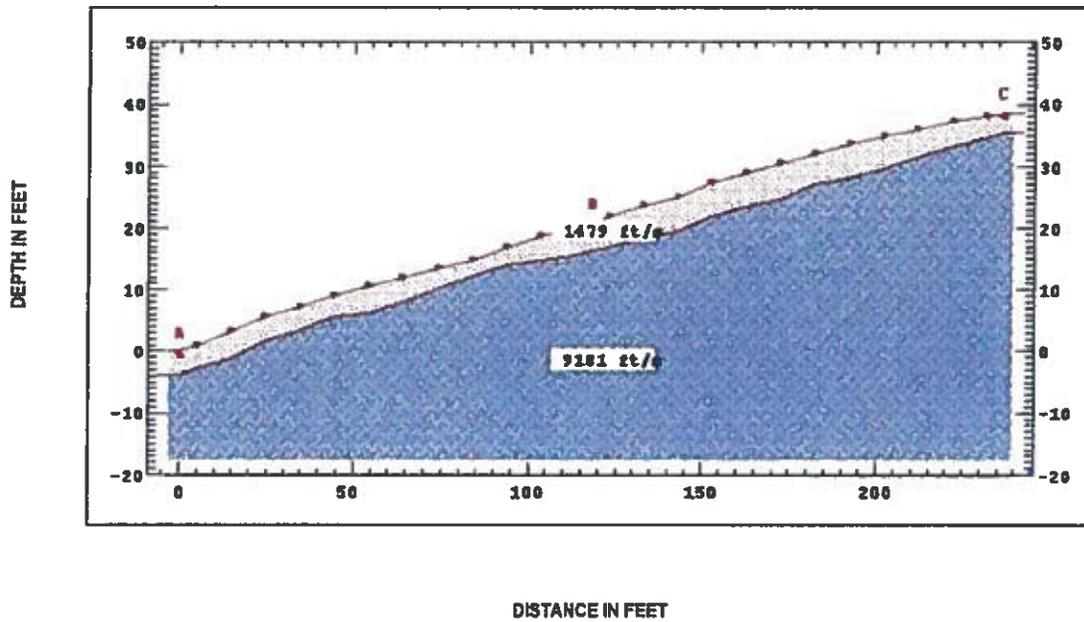
DISTANCE IN FEET



DISTANCE IN FEET



SEISMIC PROFILE SL-4	Otay Ranch Residential Development San Diego, California		 Figure 4d
	Project No: 108226	Date: 10/06	



**SEISMIC PROFILE
SL-5**

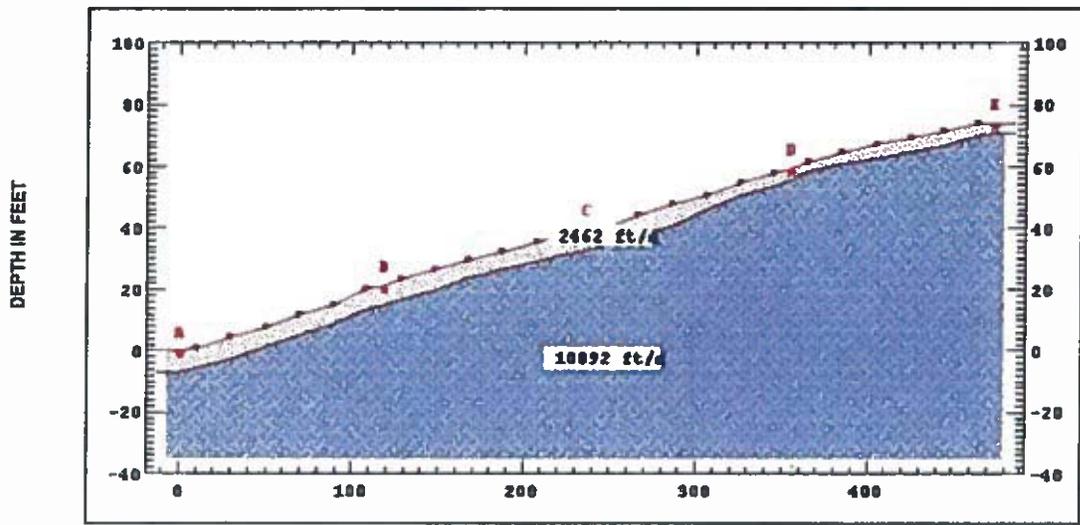
Otay Ranch Residential Development
San Diego, California

Project No.: 106226

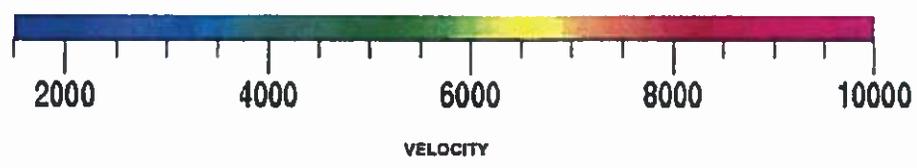
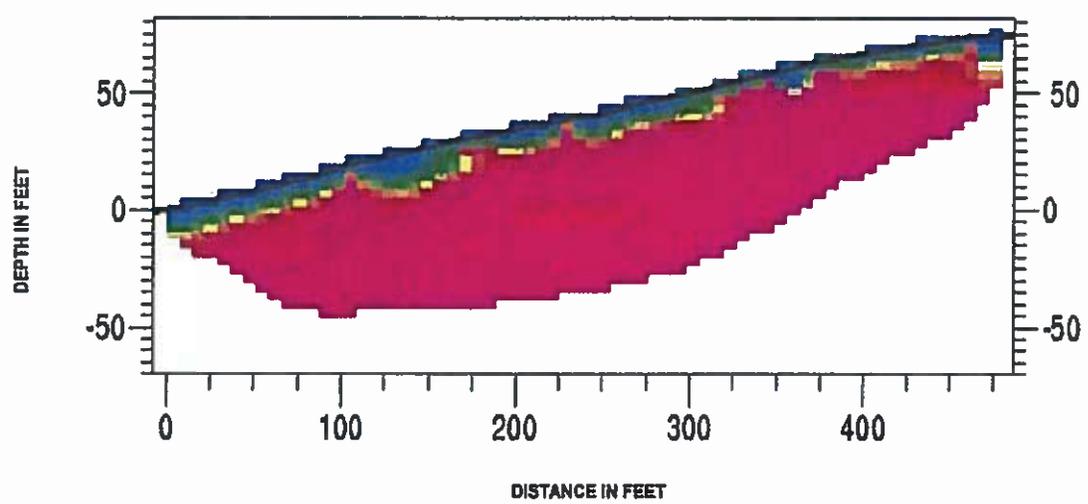
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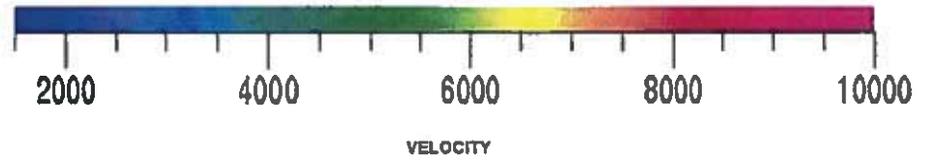
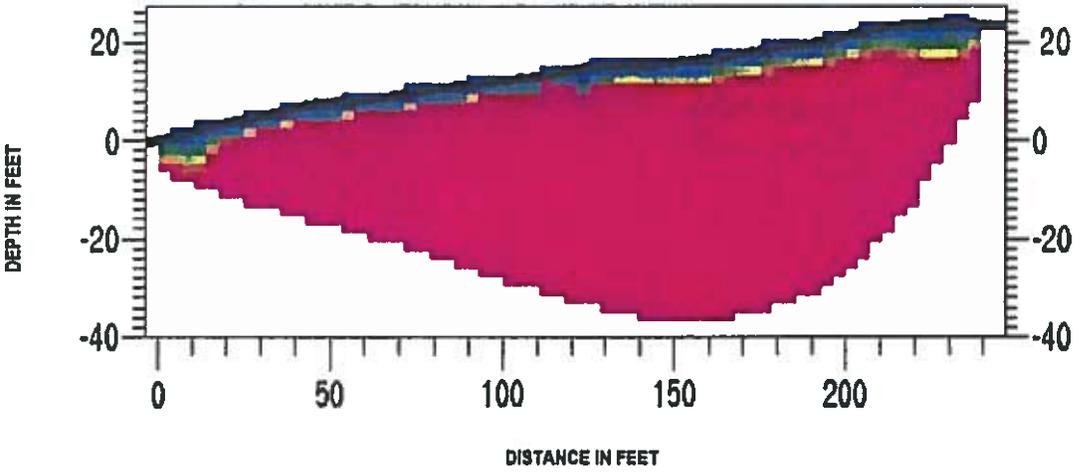
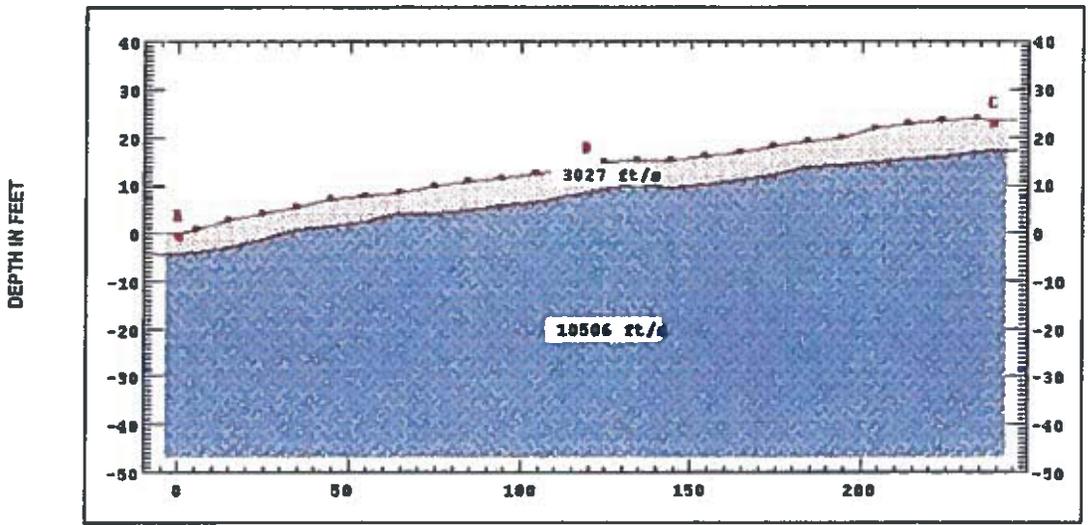
Figure 4e



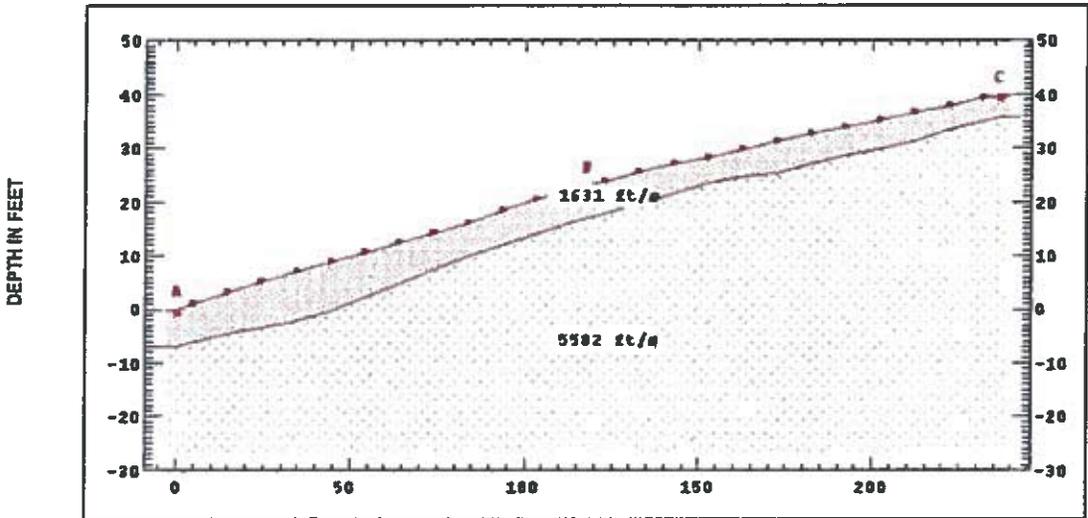
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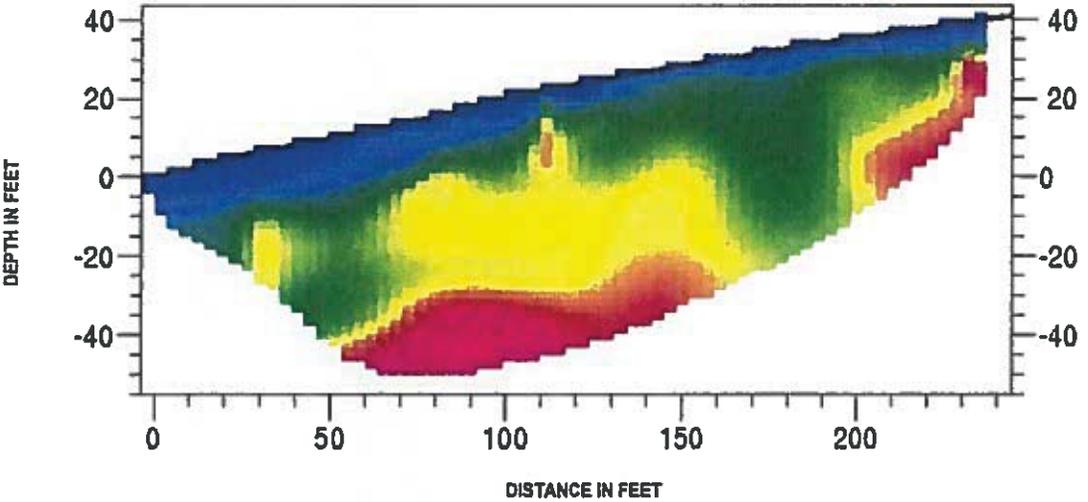
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	Project No.: 108226	Date: 10/08	



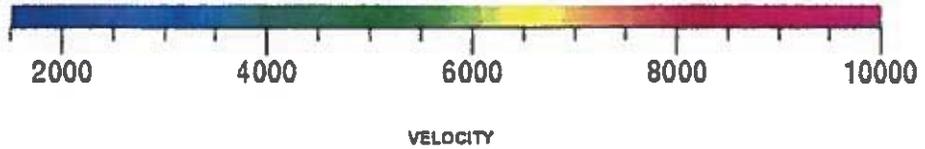
SEISMIC PROFILE SL-7	Otay Ranch Residential Development San Diego, California		 Figure 4g
	Project No.: 108226	Date: 10/08	



DISTANCE IN FEET



DISTANCE IN FEET



**SEISMIC PROFILE
SL-8**

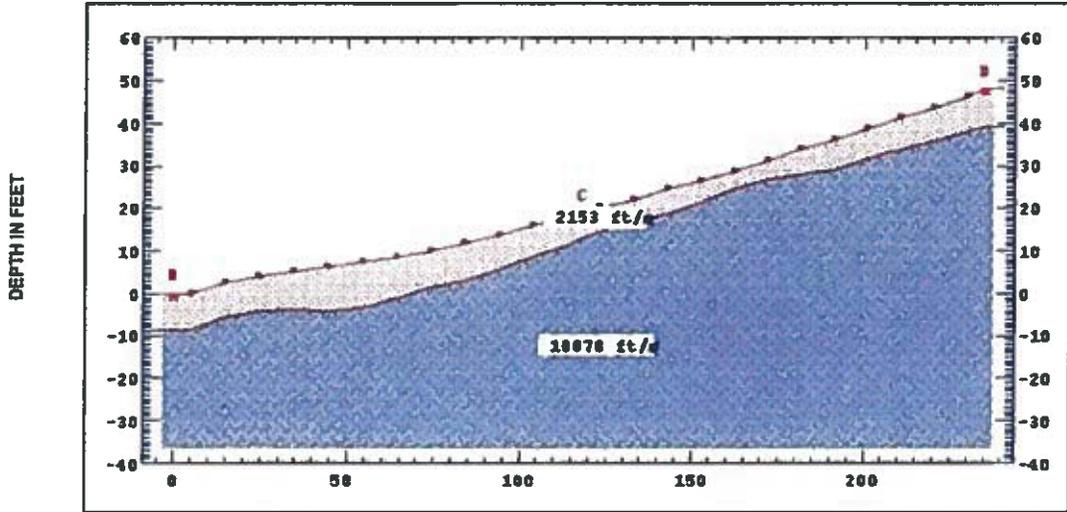
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Project No. 108226

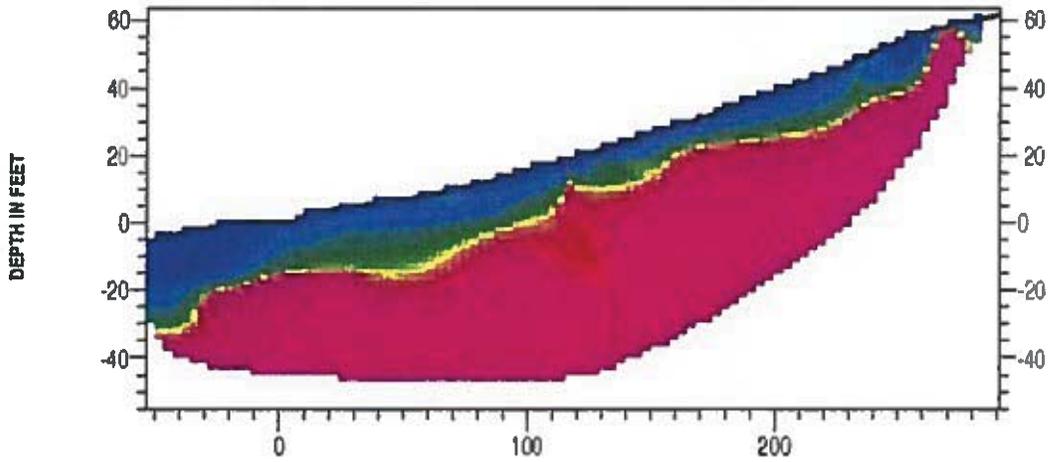
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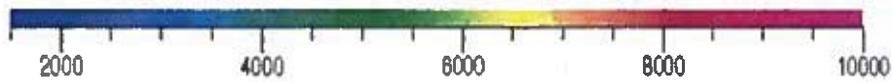
Figure 4h



DISTANCE IN FEET



DISTANCE IN FEET



VELOCITY

**SEISMIC PROFILE
SL-9**

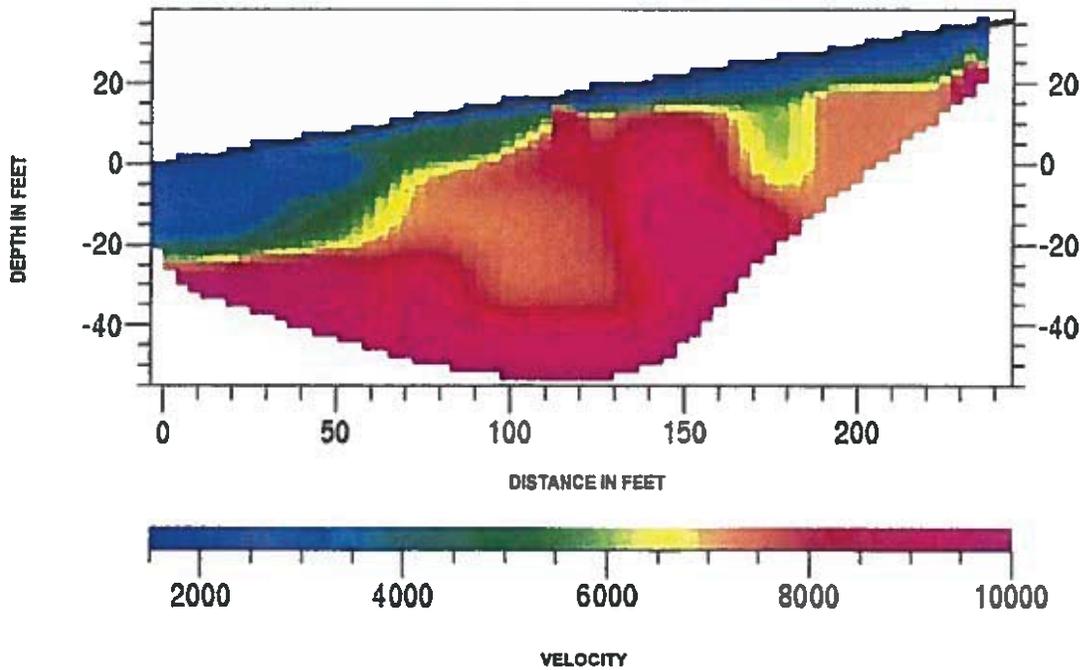
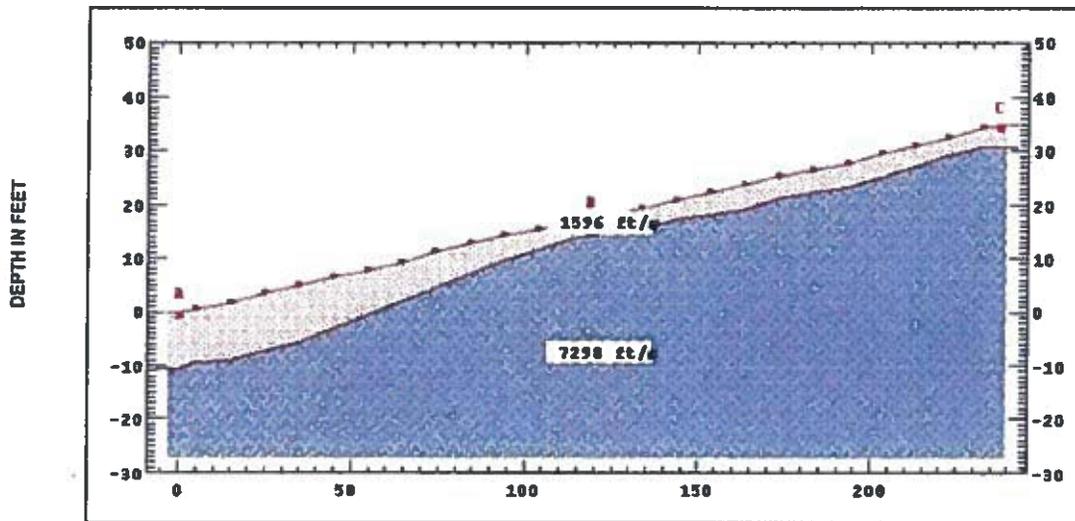
Otay Ranch Residential Development
San Diego, California

Project No.: 108226

Date: 10/08



Figure 4i



**SEISMIC PROFILE
SL-10**

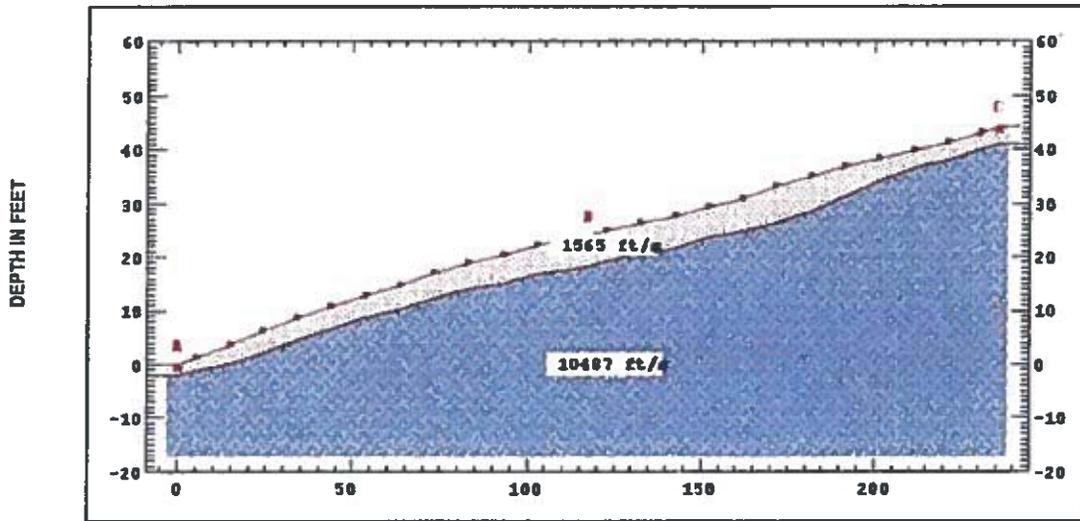
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Project No.: 108226

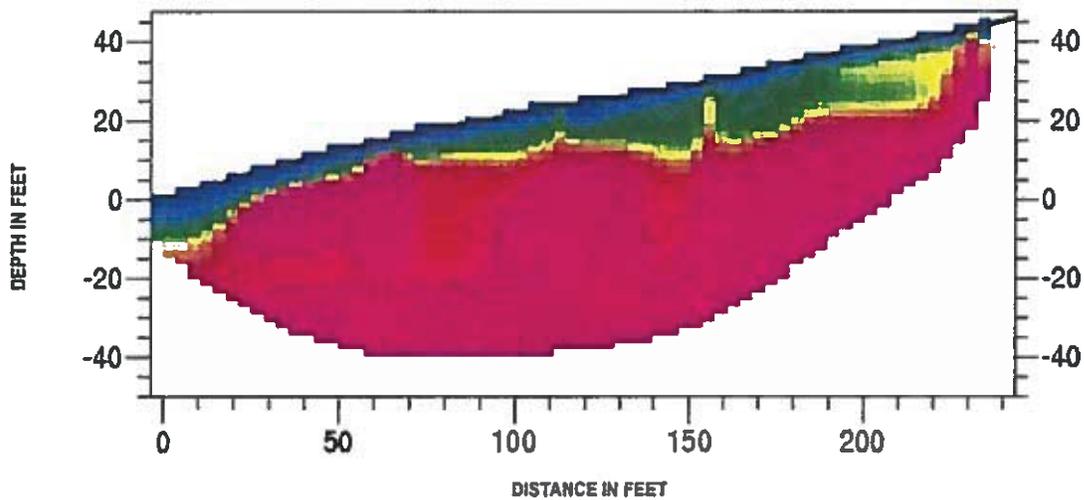
Date: 10/08



Figure 4j



DISTANCE IN FEET



VELOCITY

**SEISMIC PROFILE
SL-11**

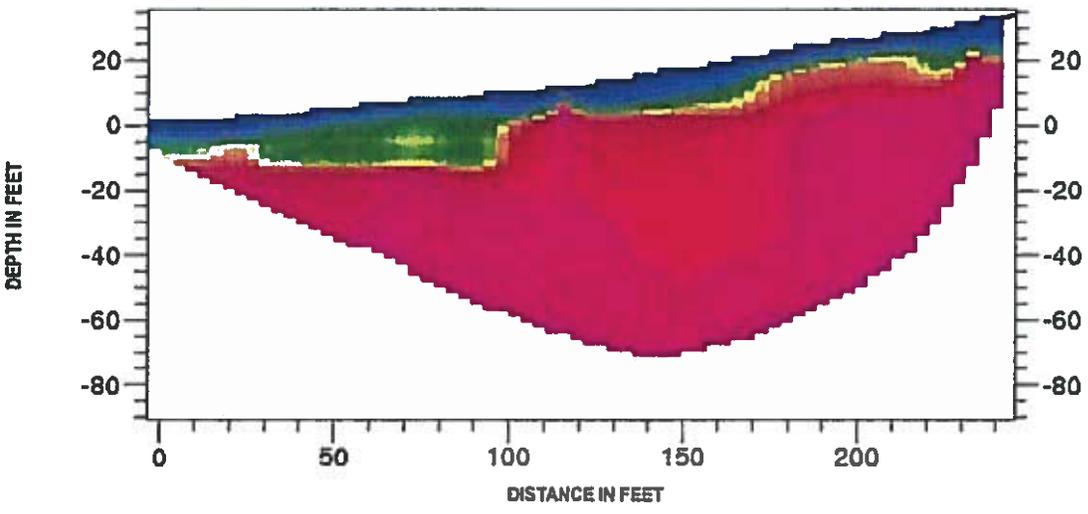
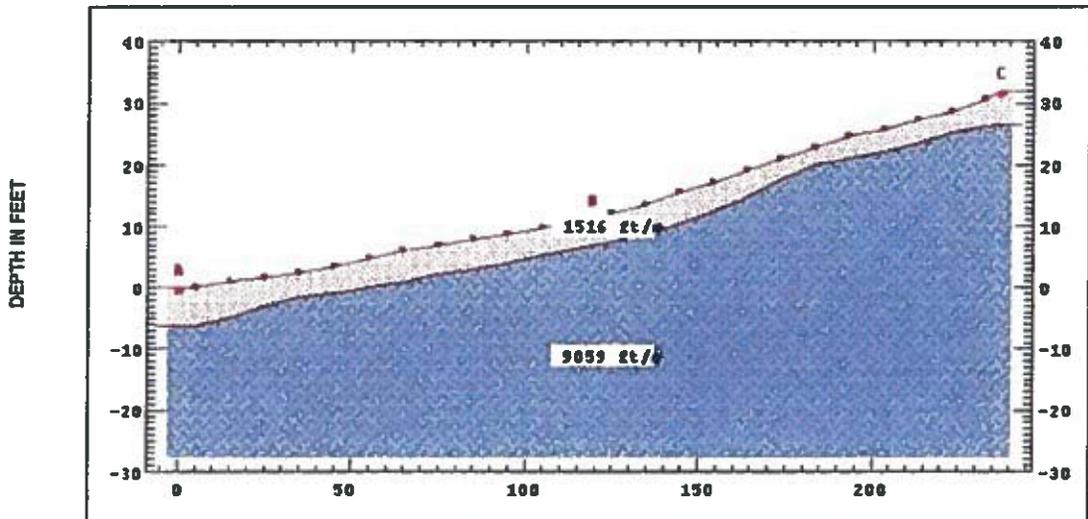
Olay Ranch Residential Development
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Project No.. 108226

Date: 10/08



Figure 4k



**SEISMIC PROFILE
SL-12**

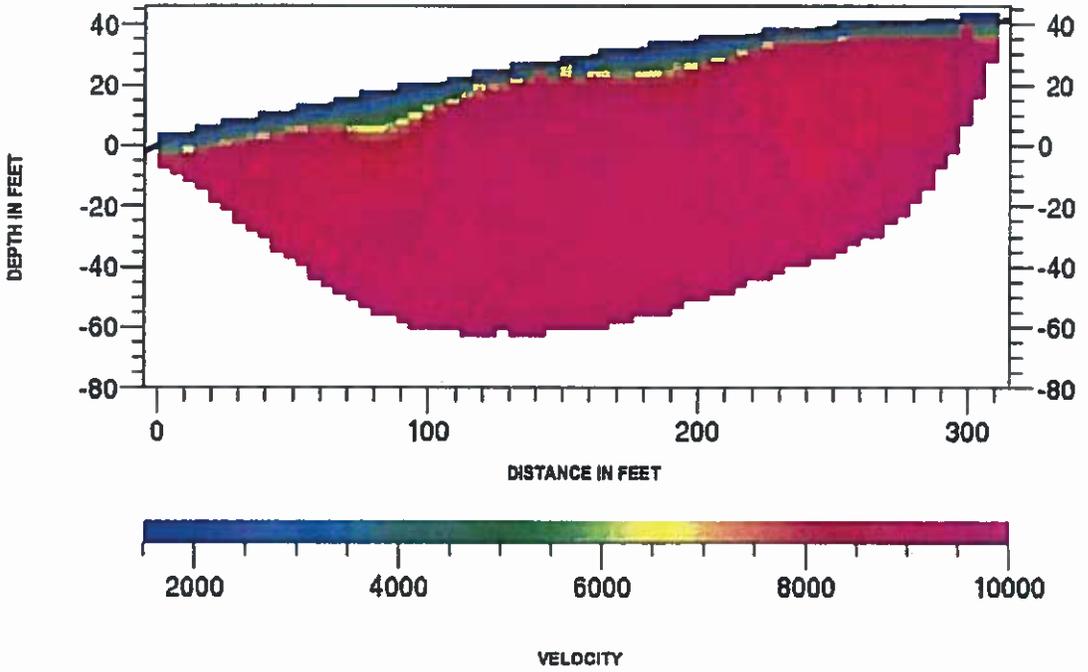
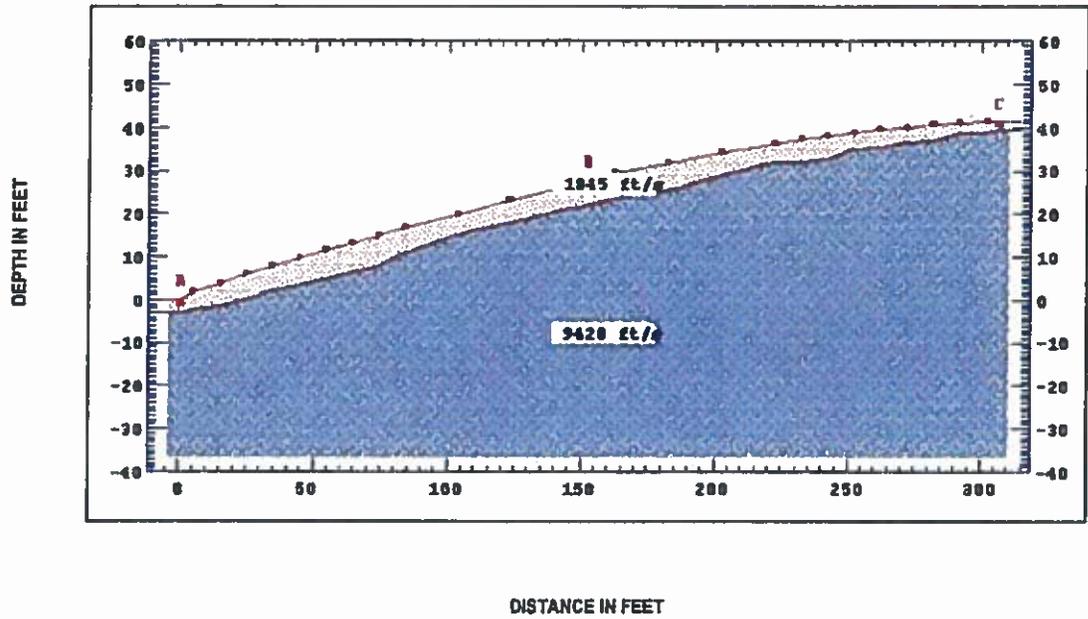
Otay Ranch Residential Development
San Diego, California

Project No.: 108226

Date: 10/08



Figure 4i



**SEISMIC PROFILE
SL-13**

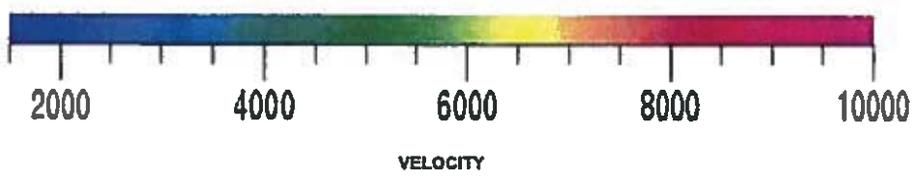
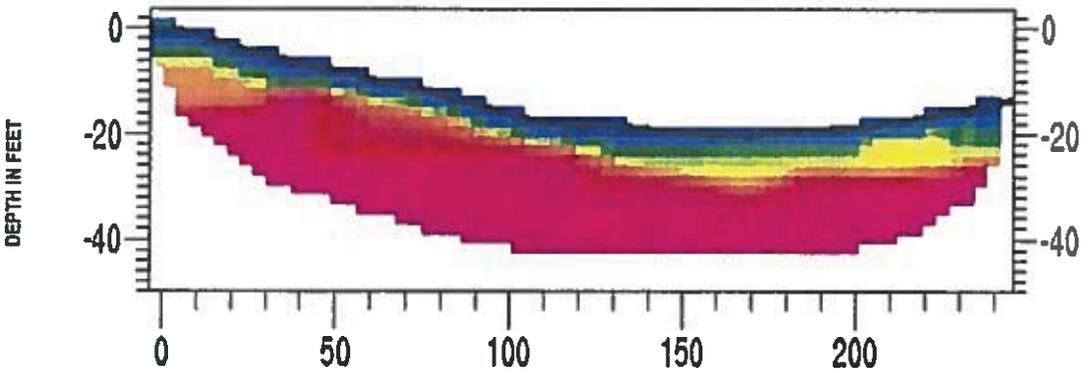
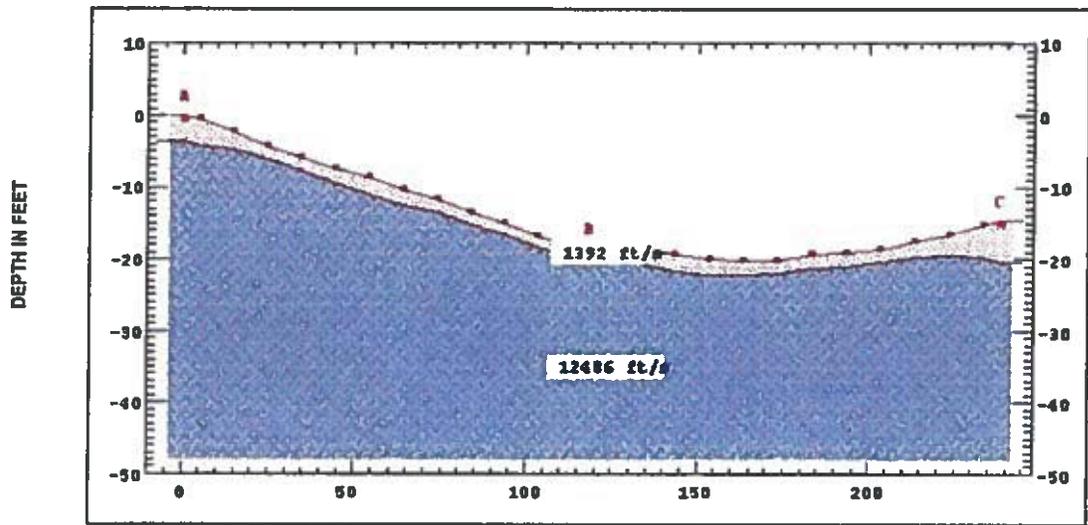
Otay Ranch Residential Development
San Diego, California

Project No. 108226

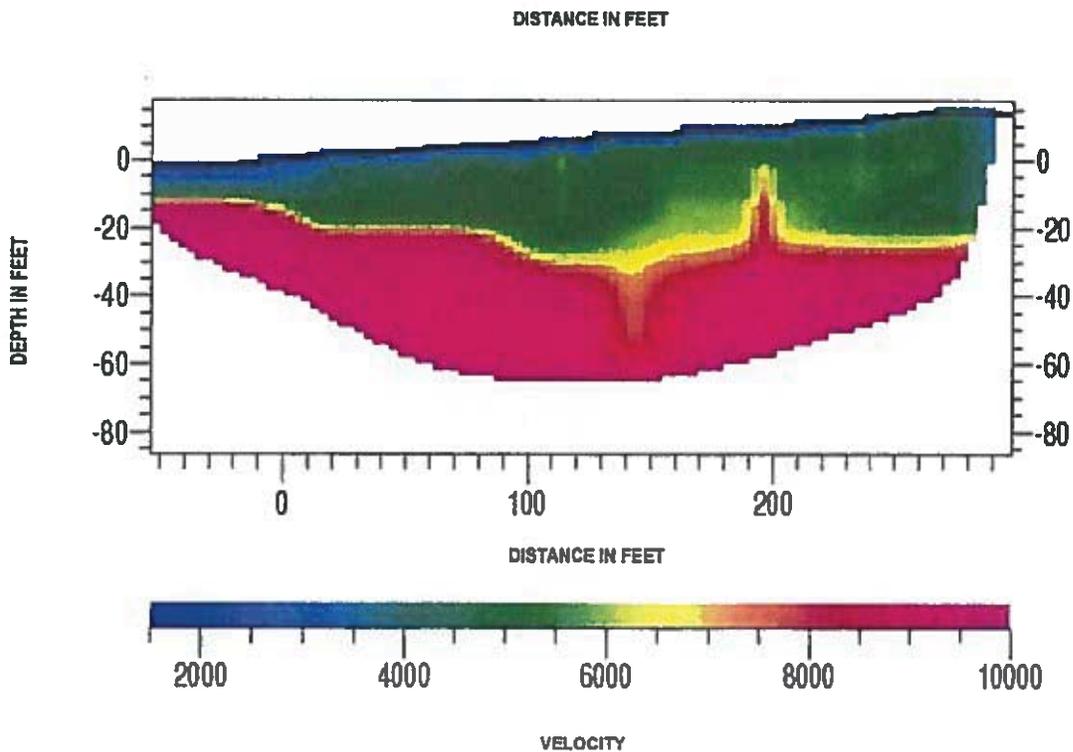
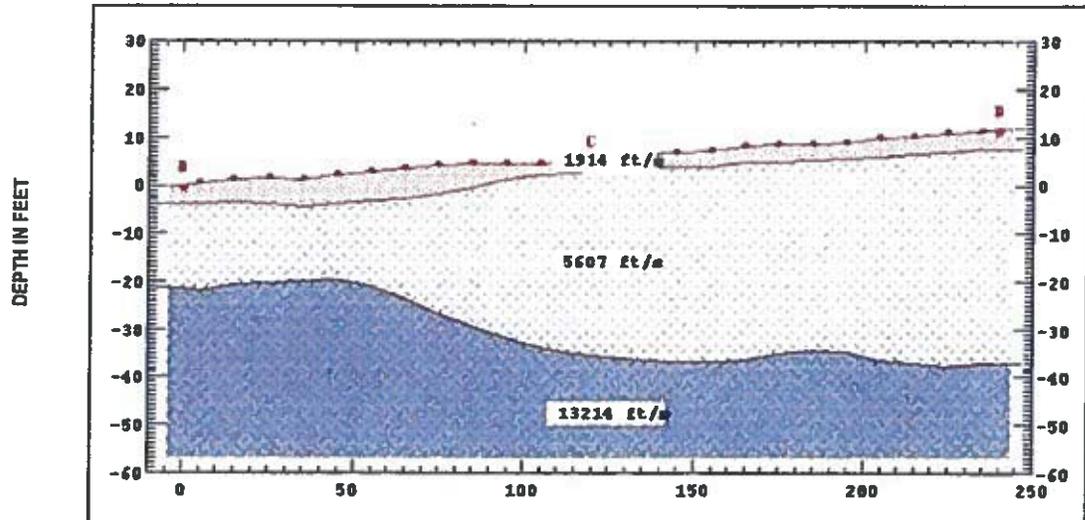
Date: 10/08



Figure 4m



SEISMIC PROFILE SL-14	Otay Ranch Residential Development San Diego, California		 Figure 4n
	Project No.: 108226	Date: 10/08	



**SEISMIC PROFILE
SL-15**

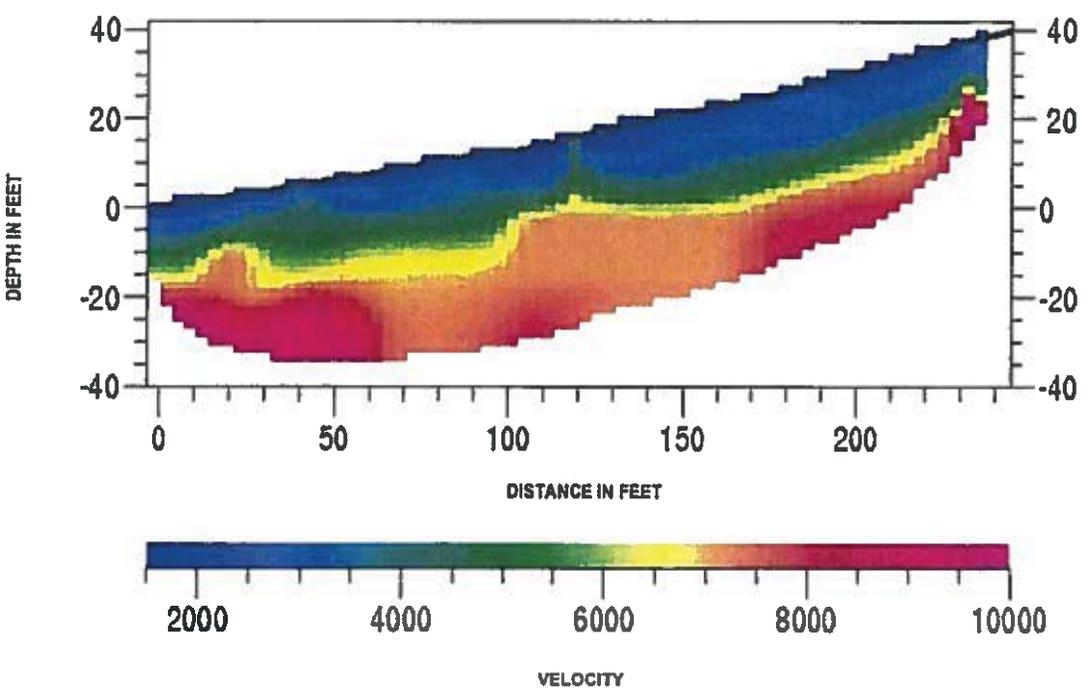
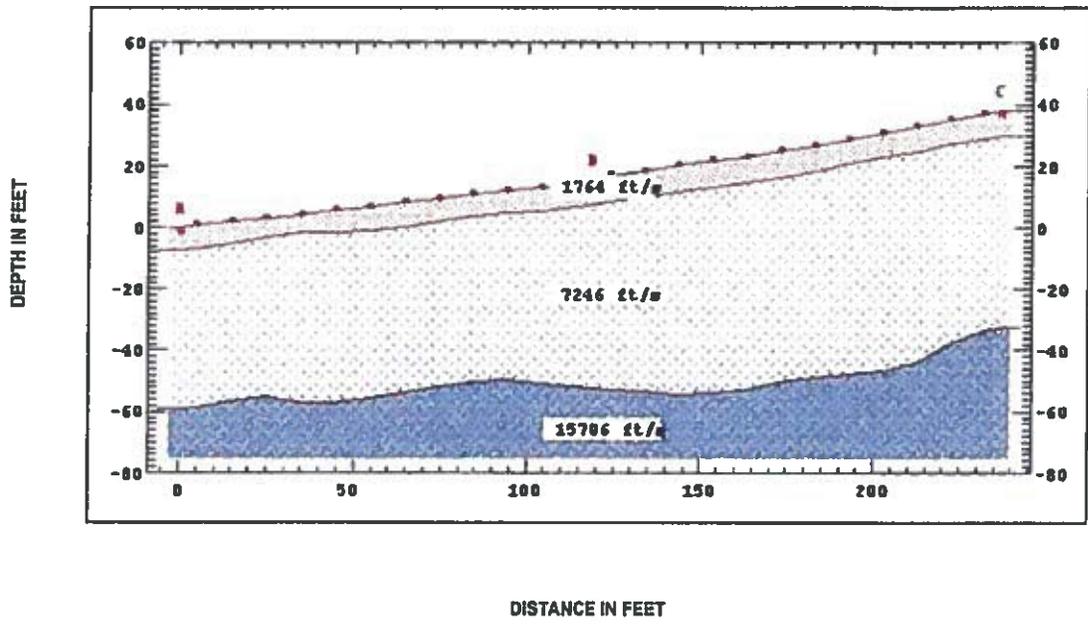
Otay Ranch Residential Development
San Diego, California

Project No.: 108226

Date: 10/08



Figure 4o



**SEISMIC PROFILE
SL-16**

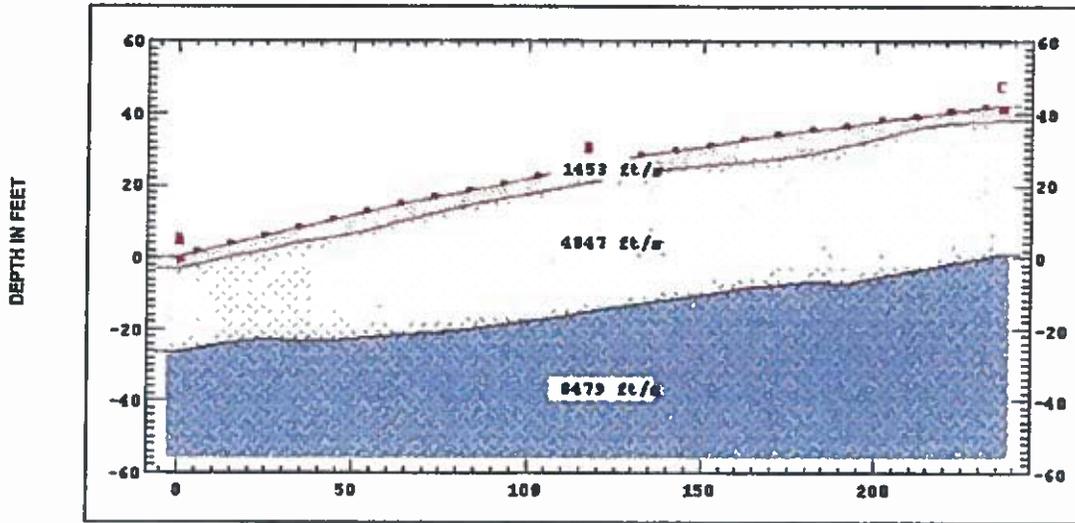
Otay Ranch Residential Development
San Diego, California

Project No.: 108226

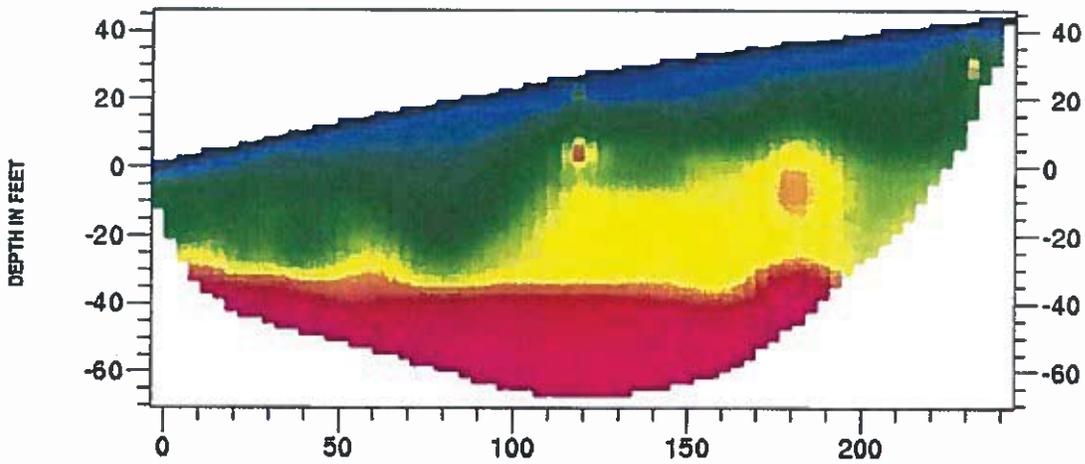
Date: 10/08



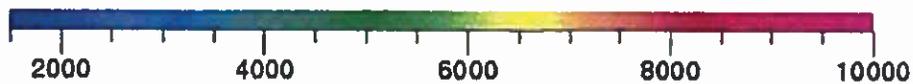
Figure 4p



DISTANCE IN FEET



DISTANCE IN FEET



VELOCITY

**SEISMIC PROFILE
SL-17**

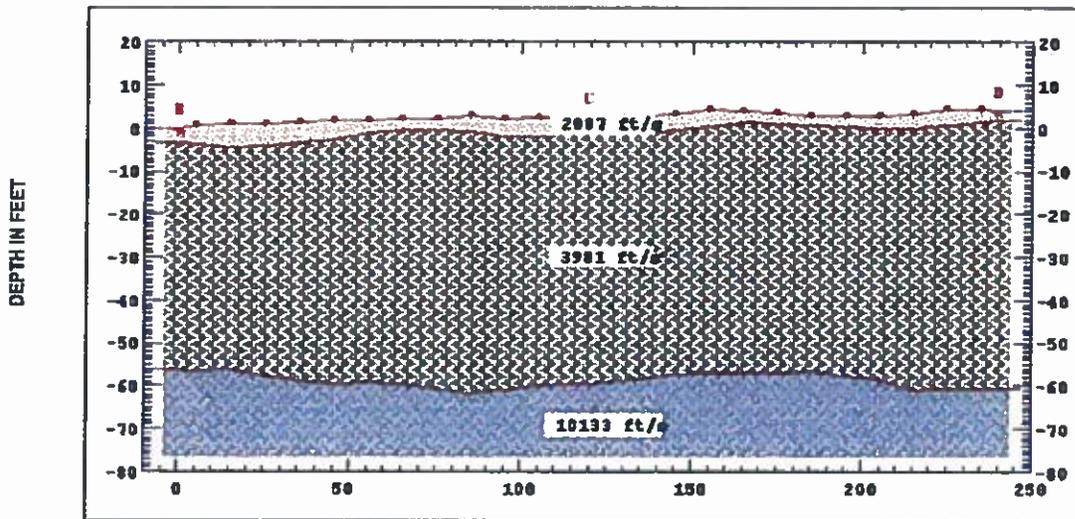
Otay Ranch Residential Development
San Diego, California

Project No.: 108226

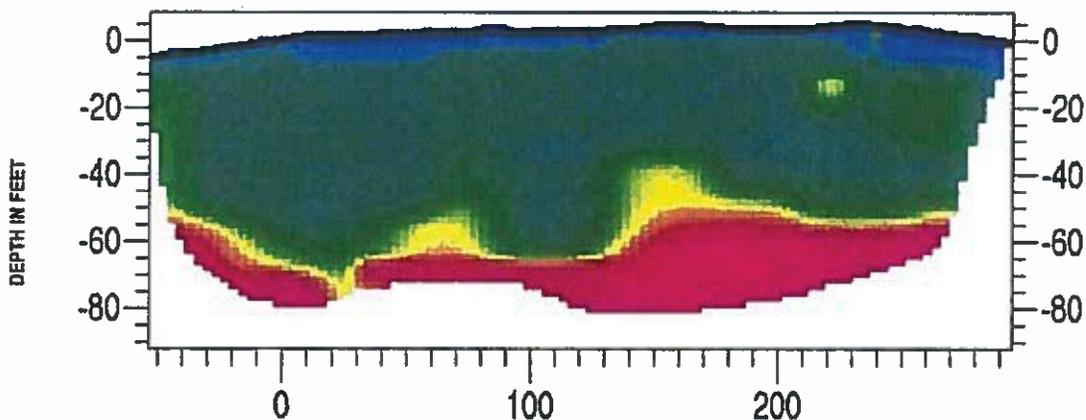
Date: 10/08



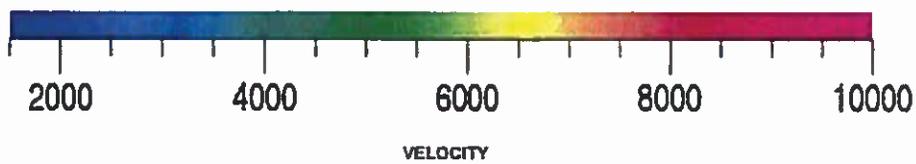
Figure 4q



DISTANCE IN FEET



DISTANCE IN FEET



VELOCITY

**SEISMIC PROFILE
SL-18**

Otay Ranch Residential Development
San Diego, California

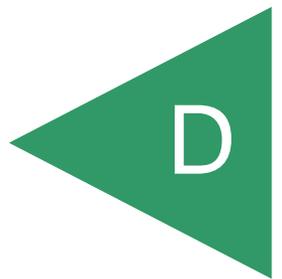
Project No.: 108228

Date: 10/08



Figure 4r

APPENDIX



APPENDIX D

BORING LOGS AND SEISMIC REFRACTION SURVEYS

FROM

***PRELIMINARY GEOLOGIC/GEOTECHNICAL FEASIBILITY
FOR ENVIRONMENTAL IMPACT REPORT,
OTAY RANCH VILLAGE 13,
CITY OF CHULA VISTA,
COUNTY OF SAN DIEGO, CALIFORNIA,***

PREPARED BY

**NEBLETT & ASSOCIATES,
DATED JANUARY 16, 2004 (PROJECT NO. 362-000-02)**

FOR

**OTAY RANCH RESORT VILLAGE
AREA ATENTATIVE MAP
SAN DIEGO COUNTY, CALIFORNIA**

PROJECT NO. G1012-52-01D

GEOTECHNICAL BORING LOG

SHEET 1 OF 1

PROJECT NO. 362 000
 DATE STARTED 6/18/01
 DATE FINISHED 6/18/01
 DRILLER _____
 TYPE OF DRILL RIG Bucket Auger

PROJECT NAME OTAY RANCH
 GROUND ELEV. _____
 GW DEPTH (FT) _____
 DRIVE WT. _____
 DROP _____

BORING DESIG. NB-2
 LOGGED BY JSC
 NOTE _____

DEPTH (feet)	ELEV.	SAMPLE TYPE	BLOWS/FT	LITHOLOGY	GROUP SYMBOL	GEOTECHNICAL DESCRIPTION	MOISTURE CONT. (%)	DRY (pcf) DENSITY	SAT. URATION (%)	Other Tests
5		B R	5			<p><u>Alluvium (Qal):</u> Sandy to gravelly clay, dark brown, slightly moist, stiff, coarse-grained, porous, rooted, sharp lower contact.</p>				
7						<p>@ 5' <u>Unnamed Facglomerate Deposits (Tfg):</u> Gravel/cobble conglomerate in clayey sand matrix, mottled, reddish brown and brown, moist, moderately hard, very clayey.</p>				
10						<p>@ 7' Sandstone with gravel, mottled, brown and reddish brown, moist, moderately hard, coarse-grained, some cobbles, gypsum crystals throughout.</p>				
15						<p>@ 10' No sample taken due to cobbles. @ 10' Sharp contact. Gravel/cobble conglomerate with clayey sand matrix, reddish brown, moist, moderately hard, coarse-grained sand.</p>				
20						<p>@ 15' No sample taken due to cobbles.</p>				
25						<p>@ 20' No sample taken due to cobbles.</p>				
28						<p>@ 25' No sample taken due to cobbles - difficult drilling @ 25' Cobble/boulder conglomerate with clayey sand matrix, reddish brown, moist, dense, coarse-grained sand.</p>				
28.0						<p>@ 28' Difficult drilling - ripper utilized. @ 28' Refusal on boulder. Total depth 28.0 feet. No groundwater, no caving.</p>				

SAMPLE TYPES:
 RING (DRIVE) SAMPLE
 SPT (SPLIT SPOON) SAMPLE
 BULK SAMPLE TUBE SAMPLE

Water Seepage
 MAX - Max. Density/Opt. Moist.
 DS - Direct Shear
 GS - Grain Size Analysis
 EI - Expansion Index
 CONS - Consolidation

NEBLETT & ASSOCIATES, INC.
 4911 WARNER AVENUE, SUITE 218
 HUNTINGTON BEACH, CA 92649 714 840 8286
 PLATE A-2

NT - 1

Date Excavated: 6-19-01

Logged by: JSC

Depth

Description

0.0' - 3.0'

Alluvium (Qal): silty sand with gravel, cobbles, and boulders, brown, slightly moist, moderately dense, rooted, clayey, porous, difficult to excavate, sharp lower contact.

3.0' - 6.5'

Unnamed Faglomerate Deposits (Tfg): gravel and cobble conglomerate with clayey sand matrix, mottled orangish brown and grayish brown, slightly moist, moderately dense, locally decomposed clay (bentonite) within matrix, difficult to excavate.

Total Depth 6.5'; no groundwater, no caving.

NT - 2

Date Excavated: 6-19-01

Logged by: JSC

Depth

Description

0.0' - 4.5'

Colluvium (Qcol): silty sand, brown, slightly moist, moderately dense, fine to coarse grained, porous, rooted, some gravel and cobbles, some boulders at 3 feet, sharp lower contact.

4.5' - 7.5'

Unnamed Faglomerate Deposits (Tfg): gravel-cobble conglomerate with coarse sand and clay matrix (bentonitic), mottled orangish brown, pale greenish brown and yellowish brown, slightly moist, massive, cobble amount increases with depth, few boulders.

Total Depth 7.5'; no groundwater, no caving.

NT - 3

Date Excavated: 6-19-2001

Logged by: JSC

Depth Description

0.0' - 3.5' Alluvium (Qal): silty sand, brown, slightly moist, moderately dense, fine to coarse grained, boulders and cobbles, porous, sharp lower contact.

BULK SAMPLE at 1.0' to 2.0'.

3.5' - 7.5' Unnamed Fanglomerate Deposits (Tfg): sandy claystone (bentonitic), pale yellowish to greenish gray, moist, soft to moderately hard, massive, weathered.

BULK SAMPLE at 6'.

Total Depth 7.5'; no groundwater, no caving.

NT - 4

Date Excavated: 6-19-2001

Logged by: JSC

Depth Description

0.0' - 2.0' Colluvium (Qcol): gravelly sand, brown, fine- to coarse-grained, moist, moderately dense, weakly bedded, heavily rooted in upper 1-2 feet.

2.0' - 6.0' Unnamed Fanglomerate Deposits (Tfg): gravel and cobble conglomerate with clayey coarse sand matrix, mottled brown and pale brown, moist, moderately hard, massive.

Total Depth 6.0'; no groundwater, no caving.

NT - 5

Date Excavated: 6-19-2001

Logged by: JSC

Depth Description

0.0' - 5.0' Alluvium (Qcol): clayey sand and silty sand; dark brown; fine to medium grained; slightly moist; moderately dense; some gravel; weak angular blocky structure; sharp lower contact.

5.0' - 7.5' Unnamed Fanglomerate Deposits (Tfg): gravel and cobble conglomerate with clayey coarse sand matrix, mottled brown and pale brown, moist, moderately hard, massive.

Total Depth 7.5'; no groundwater, no caving.

NT - 6

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 6.0'	<u>Alluvium (Qal)</u> : silty sand and clayey sand, dark brown to very dark brown, moist, moderately dense, rooted, decomposed organics, sharp lower contact.
6.0' - 8.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : sandy claystone, mottled brown and pale greenish gray, slightly moist, soft to moderately hard, fine to coarse grained.
<u>Total Depth 8.0'; no groundwater, no caving.</u>	

NT - 7

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.5'	<u>Alluvium (Qal)</u> : silty to clayey sand, brown, slightly moist, moderately dense, fine to coarse grained with gravel and cobbles, porous, rooted, sharp lower contact.
3.5' - 5.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate with clayey coarse sand matrix, medium brown to light brown and orangish brown, slightly moist, moderately hard, massive.
<u>Total Depth 5.5'; no groundwater, no caving.</u>	

NT - 8

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.5'	<u>Alluvium (Qal)</u> : silty to clayey sand, brown, slightly moist, moderately dense, fine to coarse grained with gravel and cobble, some boulders, porous, sharp lower contact.
3.5' - 5.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate with clayey coarse sand matrix, medium brown to light brown and orangish brown, slightly moist, moderately hard, massive.
<u>Total Depth 5.5'; no groundwater, no caving.</u>	

NT - 9

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : clayey sand and silty sand with gravel and cobble, brown, moist, moderately dense, porous, rooted.
2.0' - 3.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone with clay, brown, slightly moist, soft to moderately hard coarse-grained sand.
<u>Total Depth 3.0'</u> ; no groundwater, no caving.	

NT - 10

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : silty sand with gravel, cobble, and boulder, dark brown, slightly moist, moderately dense; porous, rooted, sharp lower contact.
4.0' - 7.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate with clayey sand matrix, slightly moist, moderately hard, massive.
<u>Total Depth 7.0'</u> , no groundwater, no caving.	

NT - 11

Date excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : silty sand with gravel, cobble and boulders, brown, slightly moist, moderately dense, rooted, very difficult to excavate, sharp lower contact.
4.0' - 6.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : sandstone with gravel and cobbles, pale brown and grayish brown, slightly moist, moderately hard, fine to coarse grained.
<u>Total Depth 6.0'</u> ; no groundwater, no caving.	

NT - 12

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.5'	<u>Alluvium (Qal)</u> : clayey sand with gravel and cobble, dark brown, slightly moist, dense, porous, sharp lower contact.
3.5' - 5.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone, pale brown and orangish brown, slightly moist, moderately hard, fine to coarse grained, massive.
<u>Total Depth 5.5'; no groundwater, no caving</u>	

NT - 13

Date Excavated: 6-19-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 1.5'	<u>Alluvium (Qal)</u> : silty sand with gravel and cobble, grayish brown, slightly moist, moderately dense, porous.
1.5' - 3.0'	Cobbly to sandy clay, dark brown to reddish brown, moist, stiff, sharp lower contact.
3.0' - 5.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : sandy to gravelly claystone, moist, soft to moderately hard.
<u>Total Depth 5.5'; no groundwater, no caving.</u>	

NT - 14

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Alluvium (Qal)</u> : sandy clay, light grayish brown, slightly moist, stiff, some coarse sand, fine gravel (40%), trace cobble, small boulder (<5%).
3.0' - 9.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : clayey sandstone, pale greenish yellow, moist, moderately hard, fine to coarse grained, moderately graded, subangular to angular, occasional small subrounded cobbles, cobble/boulder bed from 7' to 8'.
<u>Total Depth 9.0'; no groundwater, no caving.</u>	

NT - 15

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Alluvium (Qal)</u> : sandy clay, medium brown, moist, stiff, porous, fine to coarse sand (15%), subangular to subrounded cobble/boulder (30%).
2.0' - 8.0'	<u>Unnamed Fnglomerate Deposits (Tfg)</u> : gravelly sandstone, pale greenish yellow, moist, dense, moderately well to well graded, angular, fine to coarse sand, gravel (15%), some oxidation mottling.
<u>Total Depth 8.0'; no groundwater, no caving.</u>	

NT - 16

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : sandy clay, dark brown, moist, stiff, porous.
2.0' - 5.0'	<u>Unnamed Fnglomerate Deposits (Tfg)</u> : gravelly sandstone, pale greenish yellow, moist, moderately dense, angular, fine to coarse sand, gravel (15%), some oxidation mottling.
<u>Total Depth 5.0'; no groundwater, no caving</u>	

NT - 17

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : sandy silt, gray brown, moist, stiff, fine to coarse grained, porous, roots, cobble/boulder layer from 2' to 3', orangish brown.
5.0' - 8.0'	<u>Unnamed Fnglomerate Deposits (Tfg)</u> : sandy claystone, pale yellowish green, moist, moderately hard, plastic, bentonitic, coarse grained sand
BULK SAMPLE at 7'.	
<u>Total Depth 8.0'; no groundwater, no caving.</u>	

NT - 18

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Alluvium (Qal)</u> : sandy clay, pale reddish brown, moist, stiff, porous, fine to coarse grained, trace gravel, roots.
2.0' - 5.0'	<u>Unnamed Faglomerate Deposits (Tfg)</u> : clayey sandstone with gravel and cobbles, pale yellowish brown, moist, moderately hard, fine to coarse sand, gravel/cobbles (30-40%).
<u>Total Depth 5.0'; no groundwater, no caving.</u>	

NT - 19

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : clayey sand, gray brown, moist, soft, fine to coarse sand, abundant cobbles at surface, angular.
2.0' - 6.0'	<u>Unnamed Faglomerate Deposits (Tfg)</u> : sandy claystone, pale olive gray, moist, soft, some medium to coarse sand.
<u>Total Depth 6.0'; no groundwater, no caving.</u>	

NT - 20

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : silty clay, gray brown, moist, hard, abundant boulders in clayey silt matrix, angular. Refusal on cobble/boulder bed.
<u>Total Depth 4.0'; no groundwater, no caving.</u>	

NT - 21

Date Excavated: 6-20-2001
Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.5'	<u>Colluvium (Qcol)</u> : sandy clay, pale reddish brown, slightly moist, stiff, fine to coarse sand (<15%), gravel (5%), subangular, cobble/boulder layer from 2' to 2.5'.
2.5' - 8.0'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : clayey sandstone with gravel and cobbles, pale yellowish brown, moist, moderately hard, fine to coarse sand, gravel/cobbles (30-40%), angular boulder to 12" from 7' to 8'.
<u>Total Depth 8.0'; no groundwater, no caving.</u>	

NT - 22

Date Excavated: 6-20-2001
Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 5.0'	<u>Alluvium (Qal)</u> : gravelly clay, gray brown, moist, stiff.
5.0' - 8.0'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : clayey sandstone with gravel and cobbles, pale yellowish brown, moist, moderately hard, fine to coarse sand, gravel/cobbles (30-40%), angular to subangular boulders from 5' to 7'.
<u>Total Depth 8.0'; no groundwater, no caving.</u>	

NT - 23

Date Excavated: 6-20-2001
Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : sandy clay with cobbles and boulders, gray brown, moist, stiff, porous.
2.0' - 5.0'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : silty claystone, pale yellowish green, moist, soft, scarce coarse sand.
<u>Total Depth 5.0'; no groundwater, no caving</u>	

NT - 24

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Alluvium (Qal)</u> : clayey sand, reddish brown, moist, stiff, poorly sorted, fine to coarse grained, some fine angular gravel, small cobbles.
3.0' - 6.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : silty claystone, pale yellowish green, moist, soft, some coarse sand, cobble/boulder bed at contact.
<u>Total Depth 6.0'</u> ; no groundwater, no caving.	

NT - 25

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : sandy clay, reddish brown, moist, stiff, some fine to coarse sand, gravel/small cobbles (10-15%).
2.0' - 4.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone, yellowish gray, slightly moist, dense, fine to coarse grained.
<u>Total Depth 4.5'</u> ; no groundwater, no caving.	

NT - 26

Date Excavated: 3-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Alluvium (Qal)</u> : sandy clay, reddish brown, moist, stiff, some fine to coarse sand, gravel/small cobbles (10-15%).
2.0' - 6.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : silty claystone, light gray brown, moist, soft, trace coarse sand.
BULK SAMPLE: at 6 feet.	
<u>Total Depth 6.0'</u> ; no groundwater, no caving.	

NT - 27

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Alluvium (Qal)</u> : sandy clay, reddish brown, moist, stiff, some fine to coarse sand, gravel/small cobbles (10-15%).
3.0' - 5.0'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : gravelly sandstone, yellowish gray, slightly moist, moderately hard, fine to coarse grained, abundant cobbles.

Total Depth 5.0'; no groundwater, no caving.

NT - 28

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 1.5'	<u>Colluvium (Qcol)</u> : sandy clay, reddish brown, moist, stiff, some fine to coarse sand, very few cobbles.
1.5' - 4.0'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : clayey sandstone, pale yellowish green, moist, moderately hard, fine to coarse sand, abundant cobbles (30-40%), few small boulders (<5%).

Total Depth 4.0'; no groundwater, no caving.

NT - 29

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Alluvium (Qal)</u> : sandy clay, reddish brown, moist, hard, roots,
3.0' - 7.0'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : clayey sandstone, pale yellowish green, moist, moderately hard, fine to coarse sand, few cobbles.

Total Depth 7.0'; no groundwater, no caving

NT - 30

Date Excavated: 6-20-2001

Logged by: SMR

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Alluvium (Qal)</u> : clayey sand with cobbles, reddish brown, moist, dense, boulder/cobble at base, difficult to excavate, sharp lower contact.
3.0' - 7.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : clayey sandstone, pale yellowish green, moist, moderately hard, fine to coarse sand, weathered.
5.0' - 7.0'	Gravelly sandstone, pale yellowish green, slightly moist, moderately hard, fine to coarse grained, abundant cobbles.
<u>Total Depth 7.0'; no groundwater, no caving.</u>	

NT - 31

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.5'	<u>Alluvium (Qal)</u> : clayey sand with cobbles, reddish brown, moist, dense, fine to coarse sand, gravel/cobble (30-40%), few small boulders, porous, roots
3.5' - 7.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : clayey sandstone, pale yellowish green, moist, moderately hard, fine to coarse sand, moderately graded, few cobbles.
<u>Total Depth 7.0'; no groundwater, no caving.</u>	

NT - 32

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 5.0'	<u>Alluvium (Qal)</u> : gravel, cobble, and boulder in silty sand matrix, brown, slightly moist, moderately dense, fine to coarse grained, porous, difficult to excavate at 3', dense, sharp lower contact.
5.0' - 7.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : coarse sandstone with gravel, clayey matrix, mottled greenish brown and orangish brown, moist, soft to moderately hard.

Total Depth 7.0'; no groundwater, no caving.

NT - 33

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : coarse-grained sand with gravel and cobbles, brown, moist, loose, interbedded with dark brown clayey sand. BULK SAMPLE at 2'.
4.0' - 4.5'	Cobble and boulders, pale yellowish green, very moist, dense. Groundwater at 4.0', Refusal due to caving. <u>Total Depth 4.5'; groundwater at 4', caving to 4'.</u>

NT - 34

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : gravel, cobble, and boulders in silty sand matrix, brown, slightly moist to moist, dense, porous, roots, difficult to excavate, sharp lower contact.
4.0' - 8.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone with cobbles, mottled orangish brown, greenish brown, and gray, moist, soft to moderately hard, weathered to 7'.

Total Depth 8.0'; no groundwater, no caving.

NT - 35

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 2.5'	<u>Colluvium (Qcol)</u> : gravelly to cobbly sand with clay, brown, slightly moist, moderately dense, fine to coarse grained, porous, rooted, sharp lower contact.
2.5' - 4.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone with cobbles, pale brown, greenish brown, and orangish brown, slightly moist, moderately hard, massive.
	BULK SAMPLE at 3 feet.
	<u>Total Depth 4.0'</u> ; no groundwater, no caving

NT - 36

Date Excavated: 3-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Alluvium (Qal)</u> : silty sand with gravel, cobble, and boulder, brown, slightly moist, moderately dense, porous, rooted, sharp lower contact.
0.0' - 4.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate with clayey sand matrix, mottled medium brown and orangish brown, slightly moist, moderately hard, some boulder.
	<u>Total Depth 4.0'</u> ; no groundwater, no caving

NT - 37

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 2.0'	<u>Colluvium (Qcol)</u> : silty sand with gravel, cobble, and boulder, brown, slightly moist, moderately dense, porous, rooted, sharp lower contact.
2.0' - 3.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone with clay, mottled brown, orange and greenish brown, slightly moist, moderately hard, difficult to excavate.
	<u>Total Depth 3.5'</u> ; no groundwater, no caving.

NT - 38

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : silty sand with gravel and cobble, medium to dark brown, slightly moist, loose to moderately dense, rooted.
2.0' - 4.0'	Silty sand with gravel, dark brown, moist, moderately dense.
4.0' - 5.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate with clayey sand matrix, mottled greenish gray, orangish brown, and brown, moist, moderately hard to soft.

Total Depth 5.0'; no groundwater, no caving.

NT - 39

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 2.5'	<u>Alluvium (Qal)</u> : silty to clayey sand with gravel, cobble, and boulder, brown, slightly moist, loose to moderately dense, sharp lower contact.
2.5' - 4.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravelly sandstone, clayey (bentonitic), coarse-grained sand matrix, mottled pale brown and brown, greenish brown, moist, moderately hard, increase in cobble with depth.

Total Depth 4.5'; no groundwater, no caving.

NT - 40

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 2.5'	<u>Colluvium (Qcol)</u> : clayey sand and gravel with cobble, brown to reddish brown, slightly moist, moderately dense to dense, porous, rooted, sharp lower contact.
2.5' - 4.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : clayey sandstone, mottled greenish brown and brown, moist, moderately hard, fine to coarse grained.

Total Depth 4.0'; no groundwater, no caving.

NT - 41

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : clayey sand and gravel with cobble. brown to reddish brown, slightly moist, moderately dense to dense, porous, rooted, sharp lower contact.
4.0' - 5.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : sandy claystone, mottled greenish brown and brown, moist, moderately hard, massive.
<u>Total Depth 5.0'; no groundwater, no caving.</u>	

NT - 42

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : gravel, cobble, and boulder in silty sand matrix, brown, slightly moist, moderately dense, rooted, difficult to excavate, sharp lower contact.
4.0' - 5.0'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : coarse-grained sandstone, clayey, pale greenish brown, moist, moderately hard, massive, cobbly at 5'.
<u>Total Depth 5.0'; no groundwater, no caving.</u>	

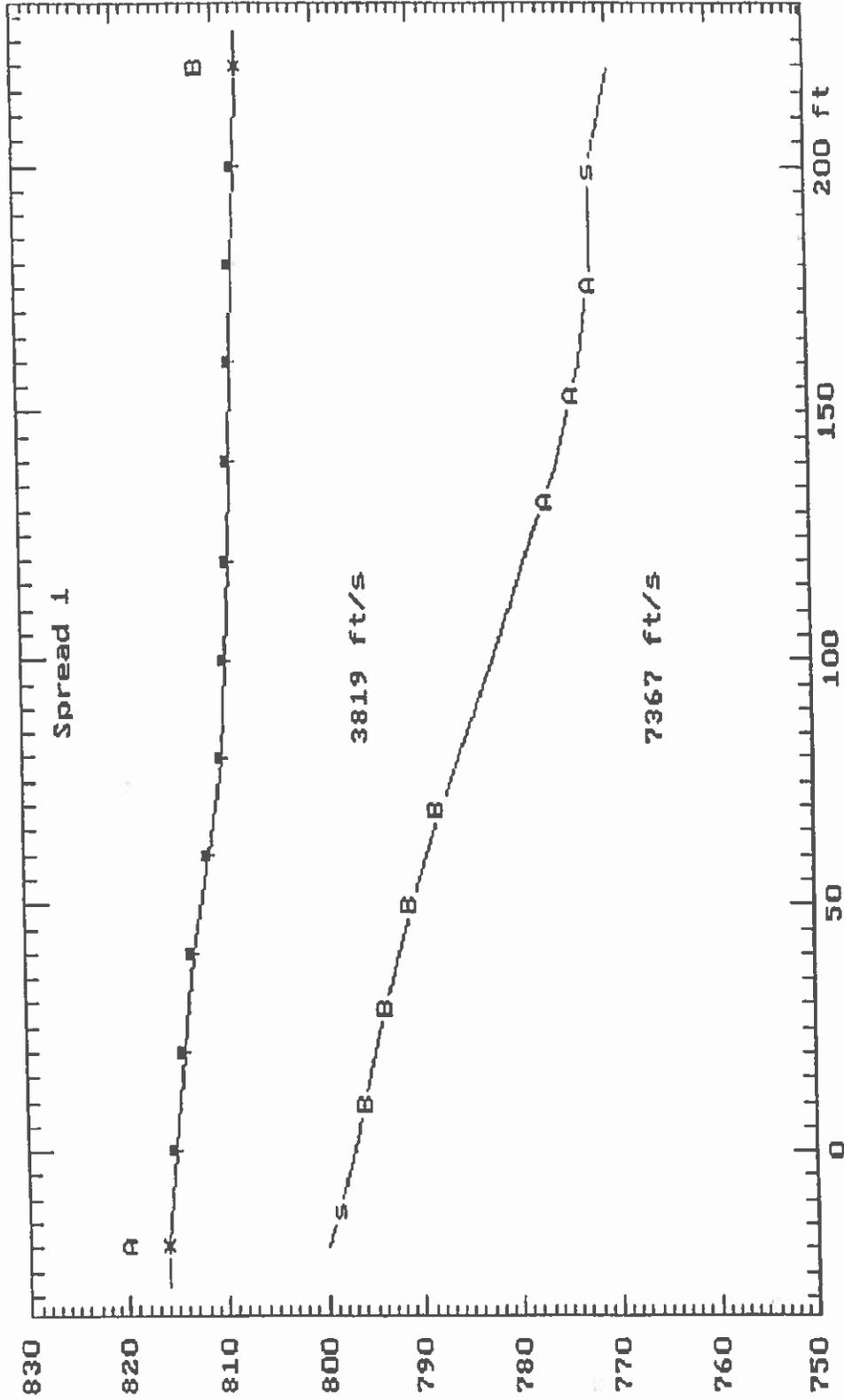
NT - 43

Date Excavated: 3-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Colluvium (Qcol)</u> : clayey sand, dark reddish brown, moist, dense, fine to coarse grained, porous, rooted, sharp lower contact.
0.0' - 4.5'	<u>Unnamed Fanglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate, brown, slightly moist, moderately hard, difficult to excavate, deep reddish brown with depth.
<u>Total Depth 4.5'; no groundwater, no caving</u>	

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Seismic Line S-17

Otay Ranch-Village 13, Chula Vista, CA

NT - 44

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Alluvium (Qol)</u> : clayey sand, dark reddish brown, moist, dense, fine to coarse grained, porous, rooted, sharp lower contact.
3.0' - 3.5'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : gravel and cobble conglomerate, brown, slightly moist, moderately hard, difficult to excavate.
	<u>Total Depth 3.5'</u> ; no groundwater, no caving.

NT - 45

Date Excavated: 6-20-2001

Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Alluvium (Qal)</u> : cobble and boulder in silty sand matrix, brown, slightly moist, fine to coarse grained, porous, rooted.
4.0	REFUSAL at 4' at contact with <u>Bedrock - Santiago Peak Volcanics (KJsp)</u>
	<u>Total Depth 4.0'</u> ; no groundwater, no caving.

NT - 46

Date Excavated: 6-20-2001

<u>Depth</u>	<u>Description</u>
0.0' - 4.0'	<u>Colluvium (Qcol)</u> : clayey sand with gravel and cobble, slightly moist, moderately dense, porous, cobble and boulder near lower contact.
4.0' - 5.5'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : sandy claystone, greenish brown, moist, moderately hard, some gravel.
	REFUSAL on large boulder at 5.5 feet.
	<u>Total Depth 5.5'</u> ; no groundwater, no caving.

NT - 47

Date Excavated: 6-20-2001

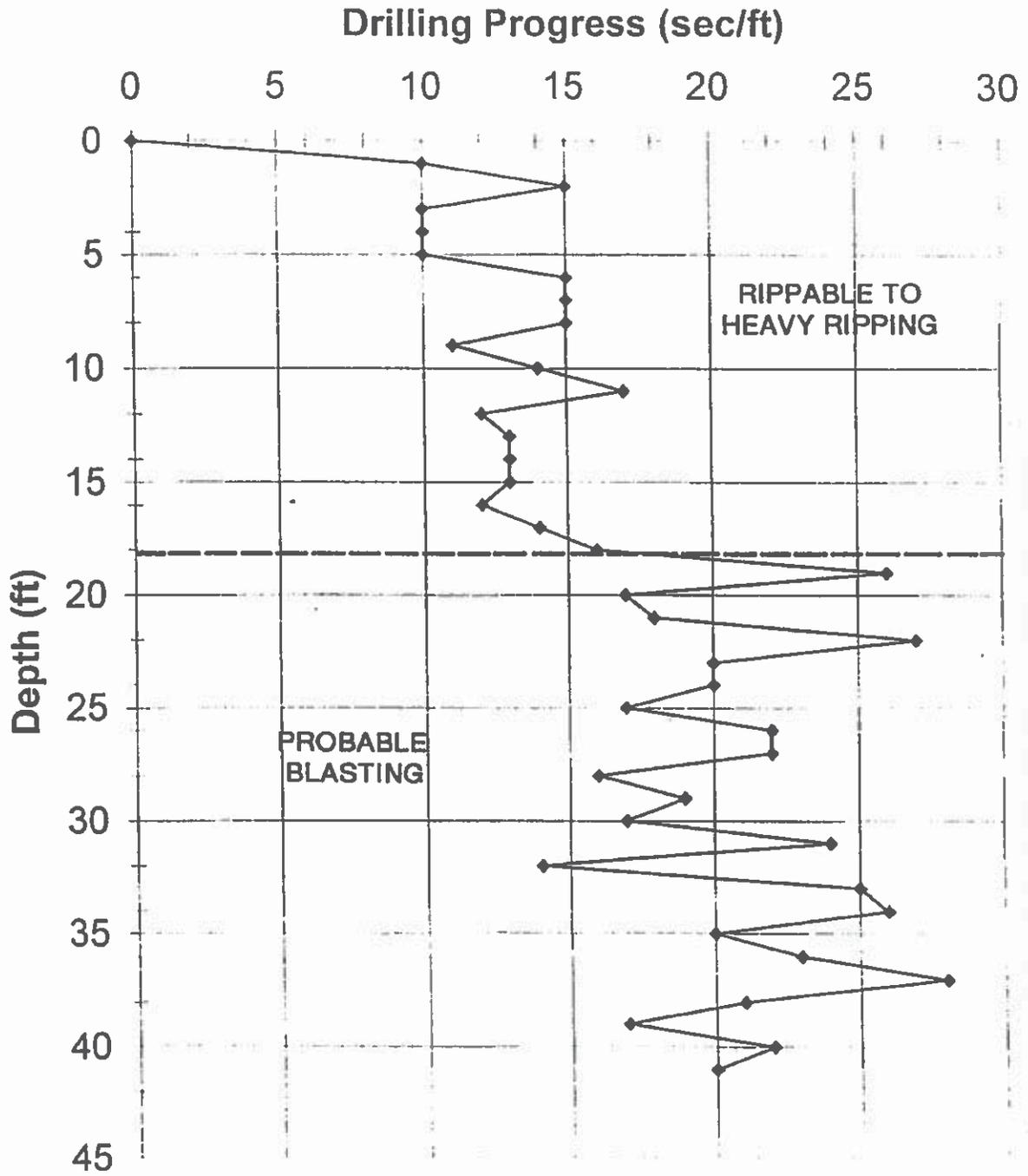
Logged by: JSC

<u>Depth</u>	<u>Description</u>
0.0' - 3.0'	<u>Colluvium (Qcol)</u> : gravelly to sandy clay, dark brown, moist, dense, some silty sand, moist, dense, sharp lower contact.
3.0' - 5.5'	<u>Unnamed Fonglomerate Deposits (Tfg)</u> : sandy claystone, brown, slightly moist, moderately hard, greenish brown at 4.5'.
<u>Total Depth 5.5'; no groundwater, no caving.</u>	

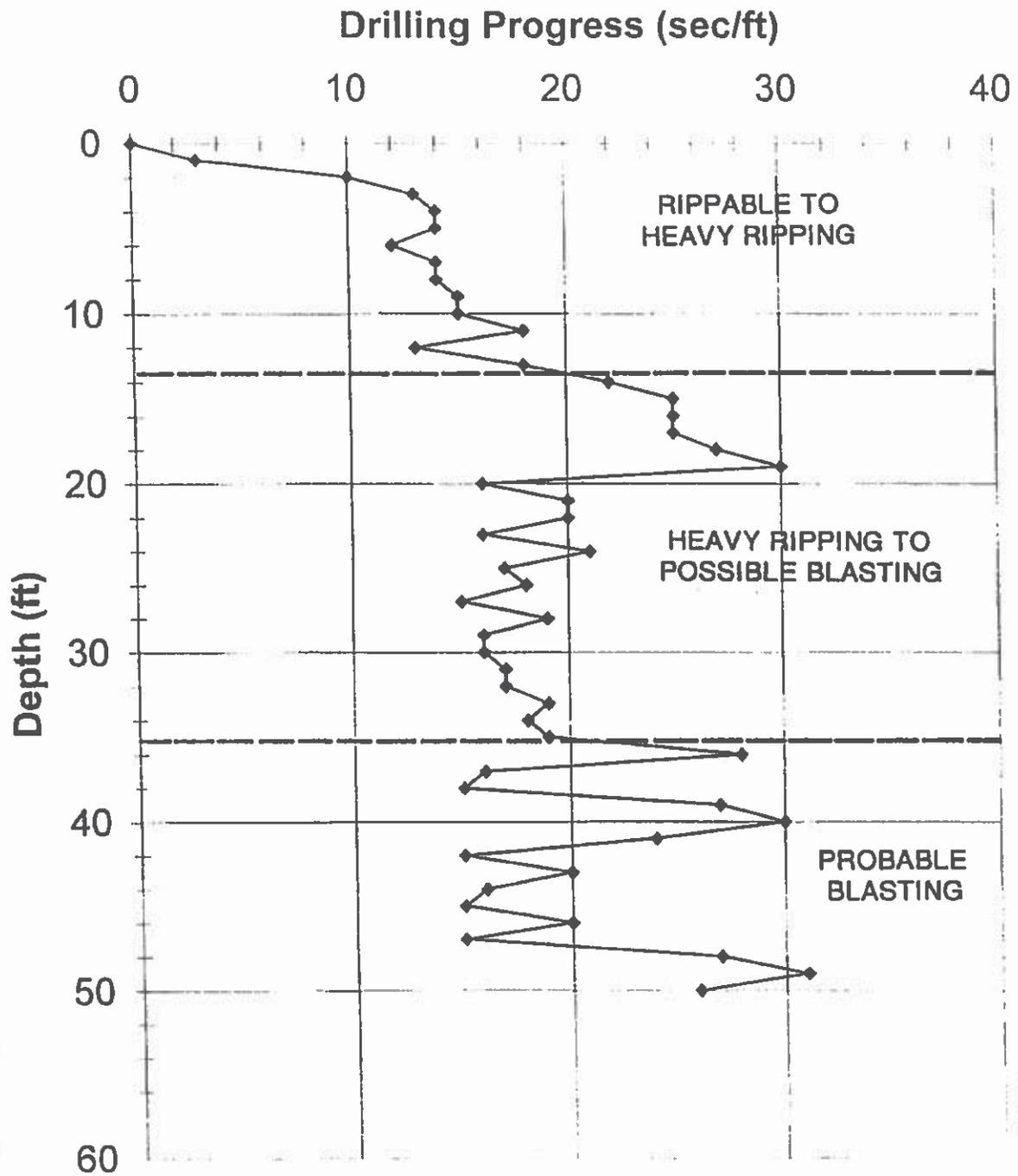
APPENDIX B

AIR HAMMER AND SEISMIC REFRACTION DATA

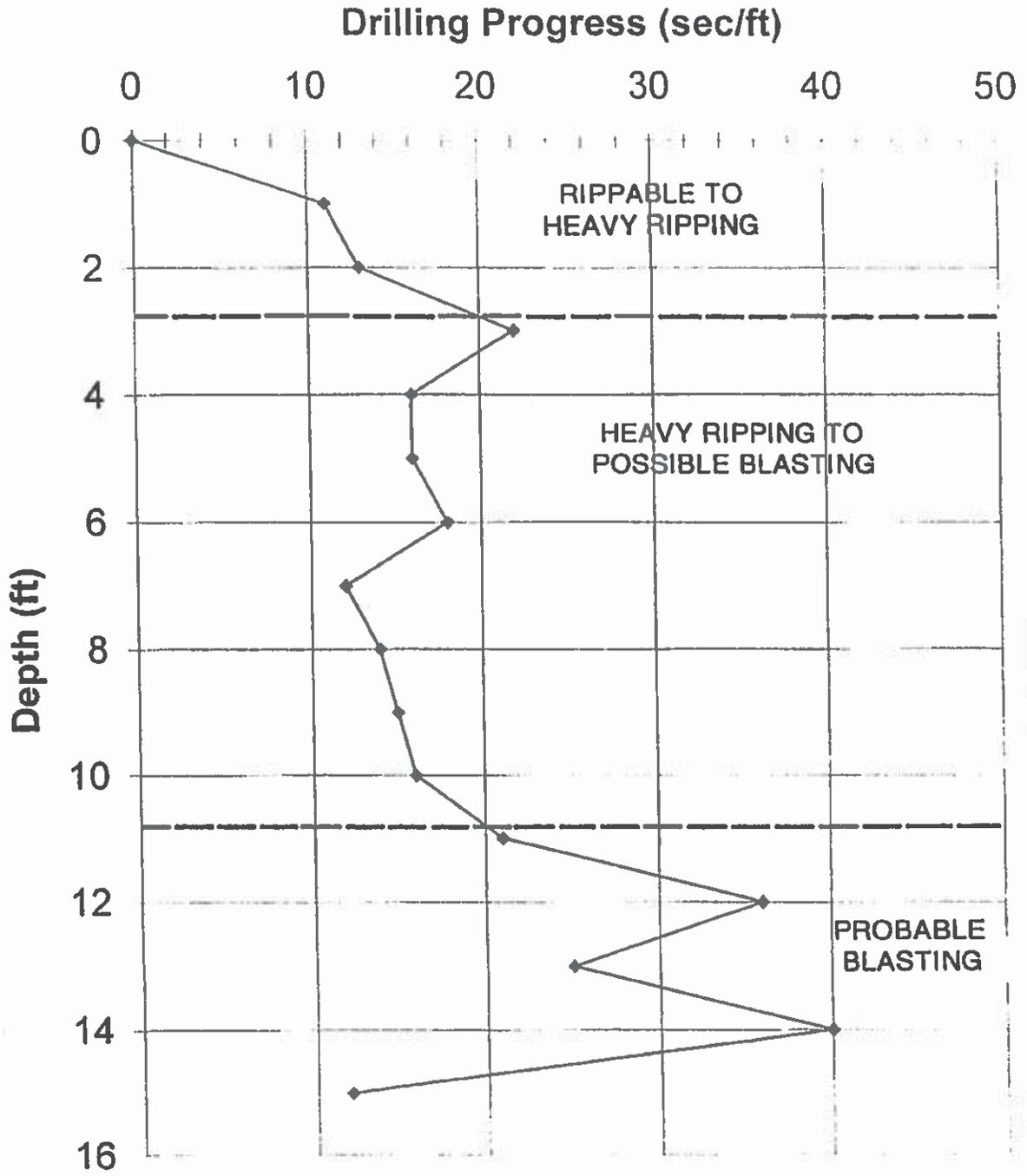
AH-1



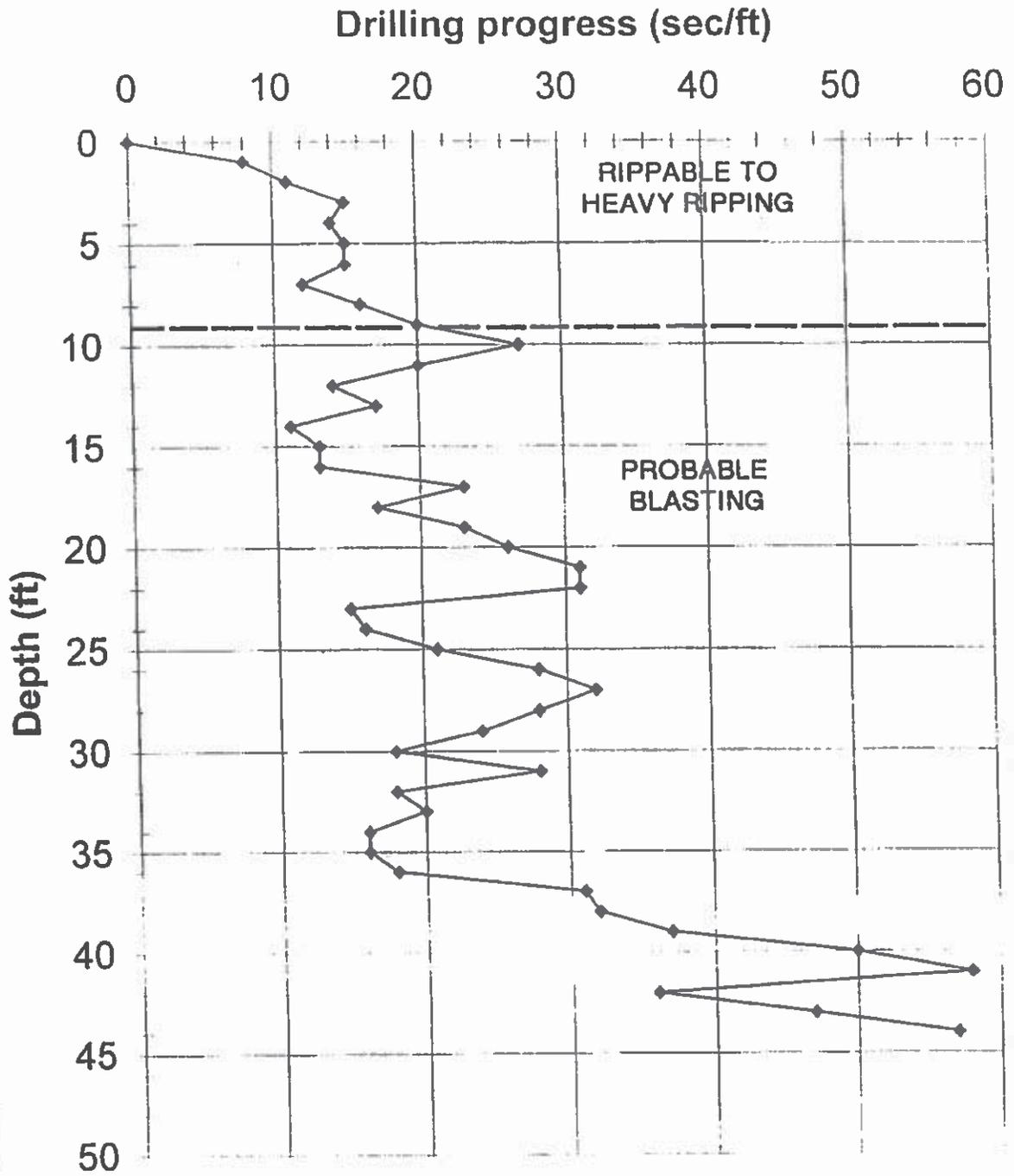
AH-2



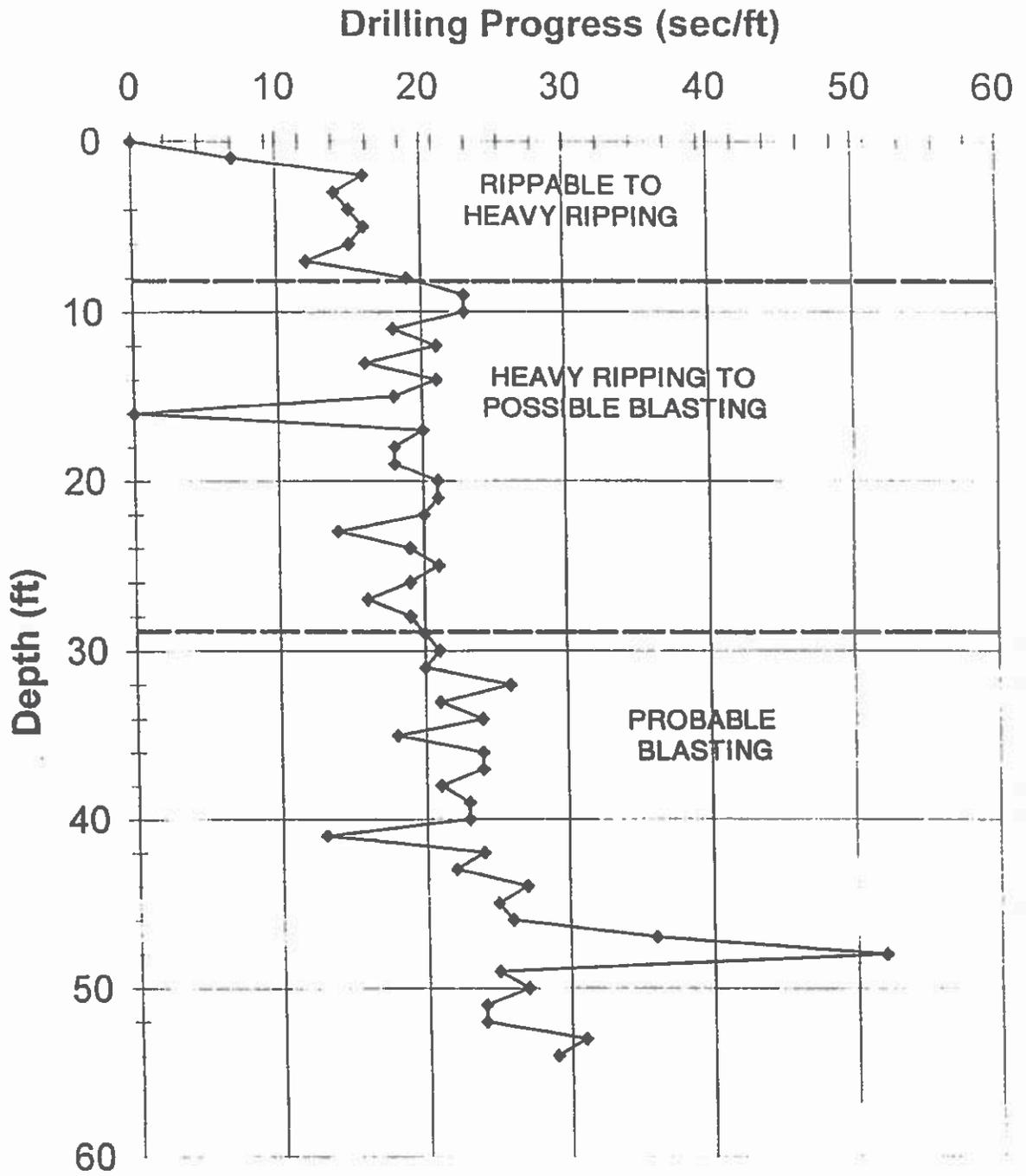
AH-3



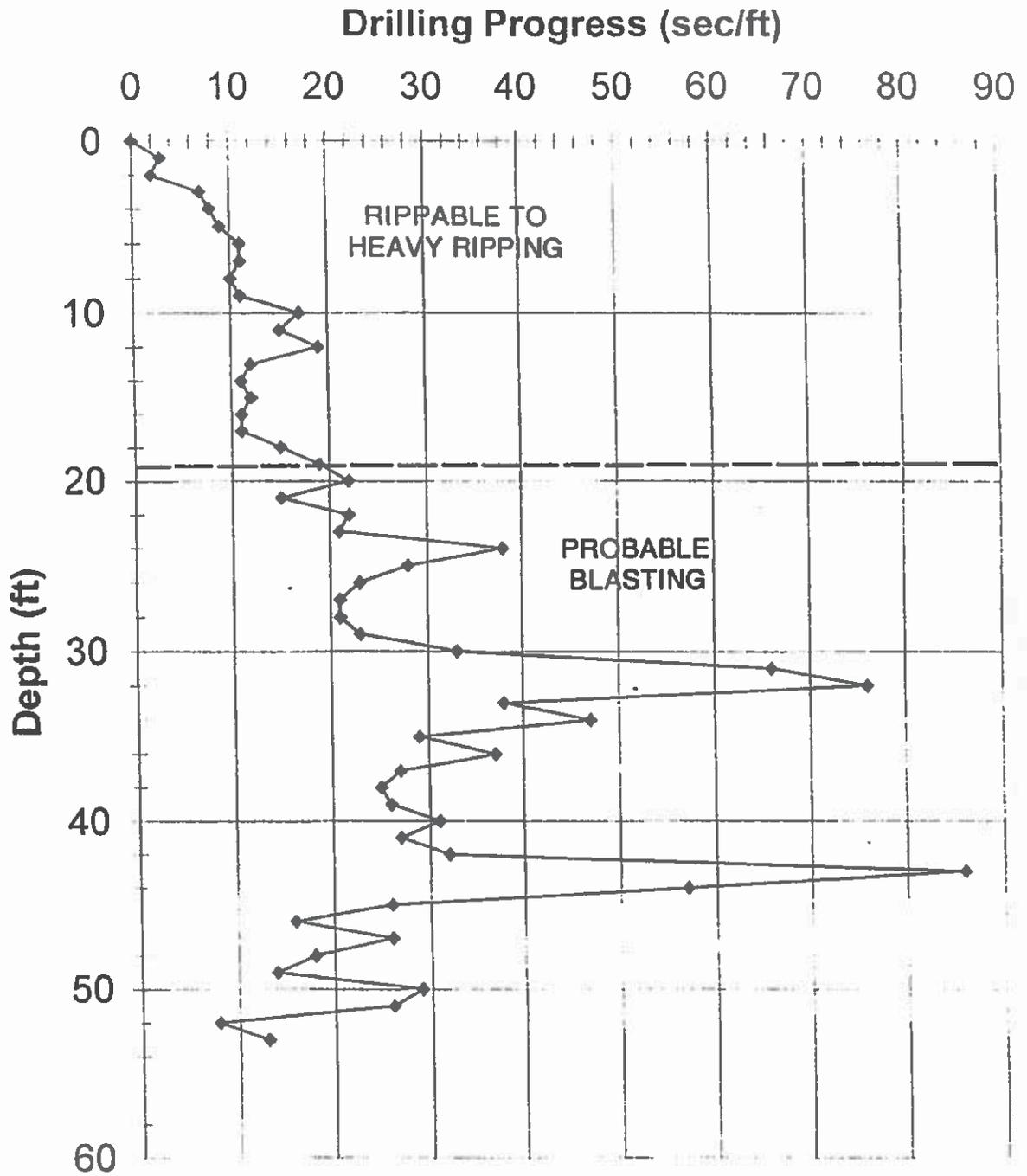
AH-4



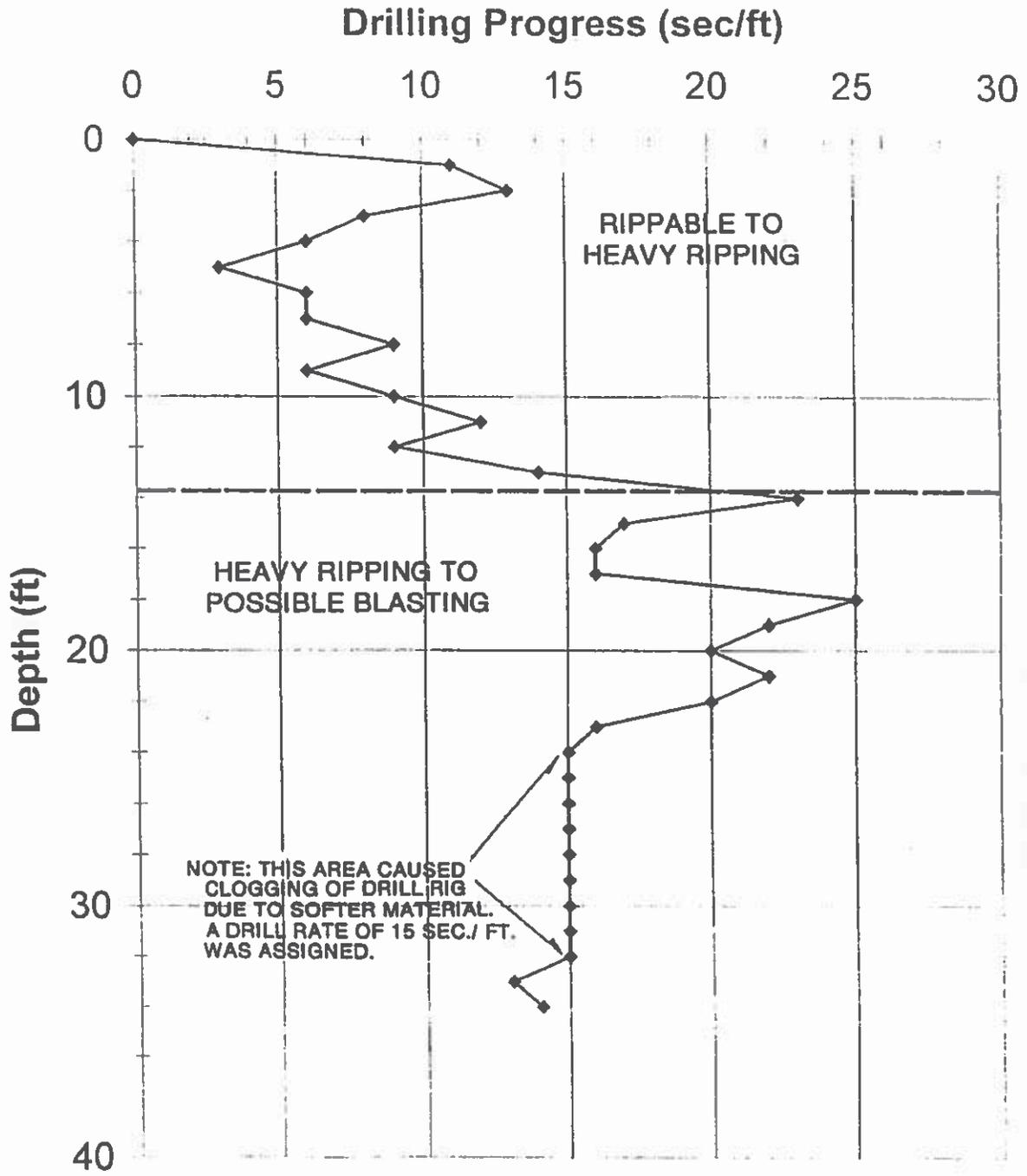
AH-5



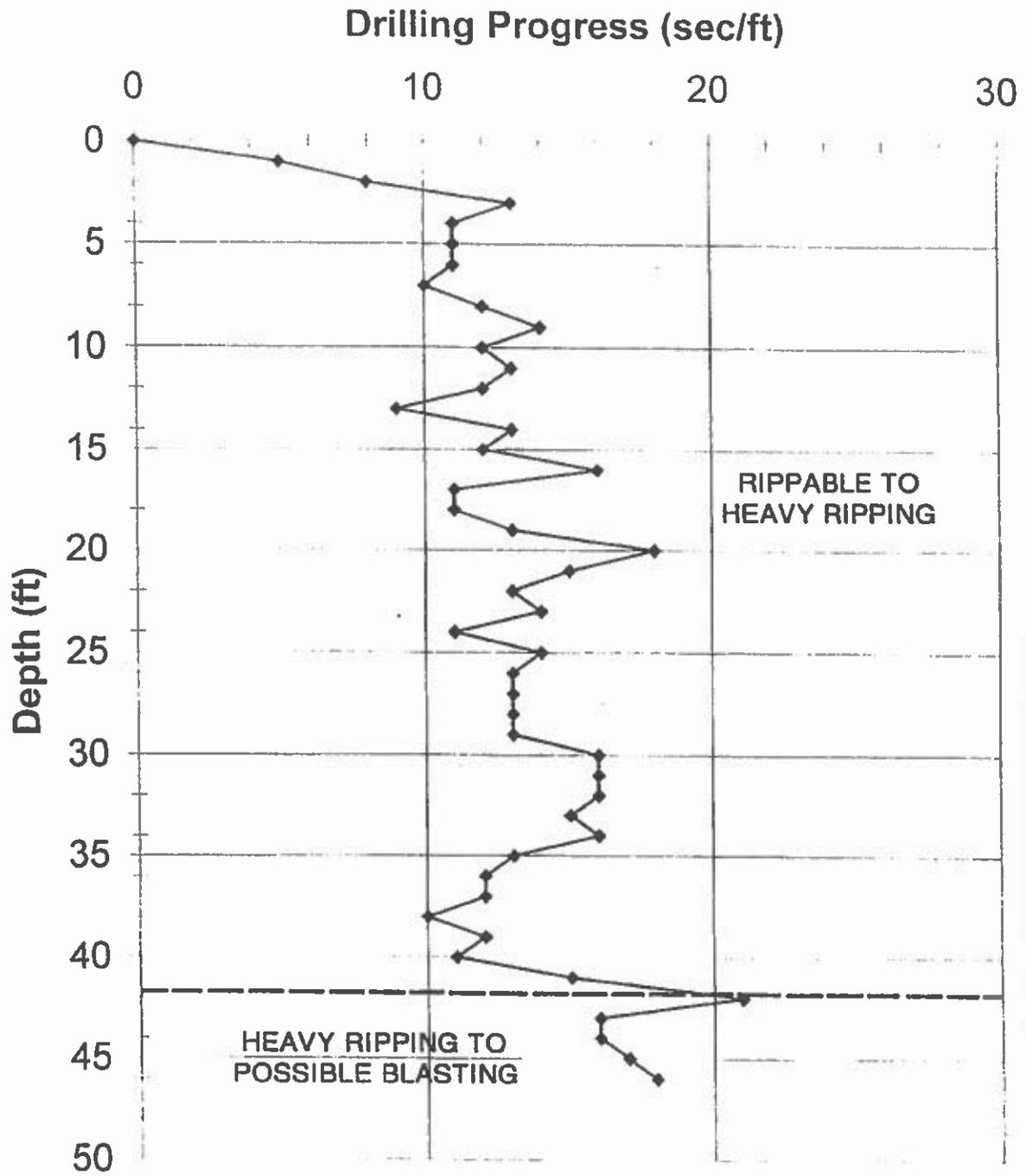
AH-6



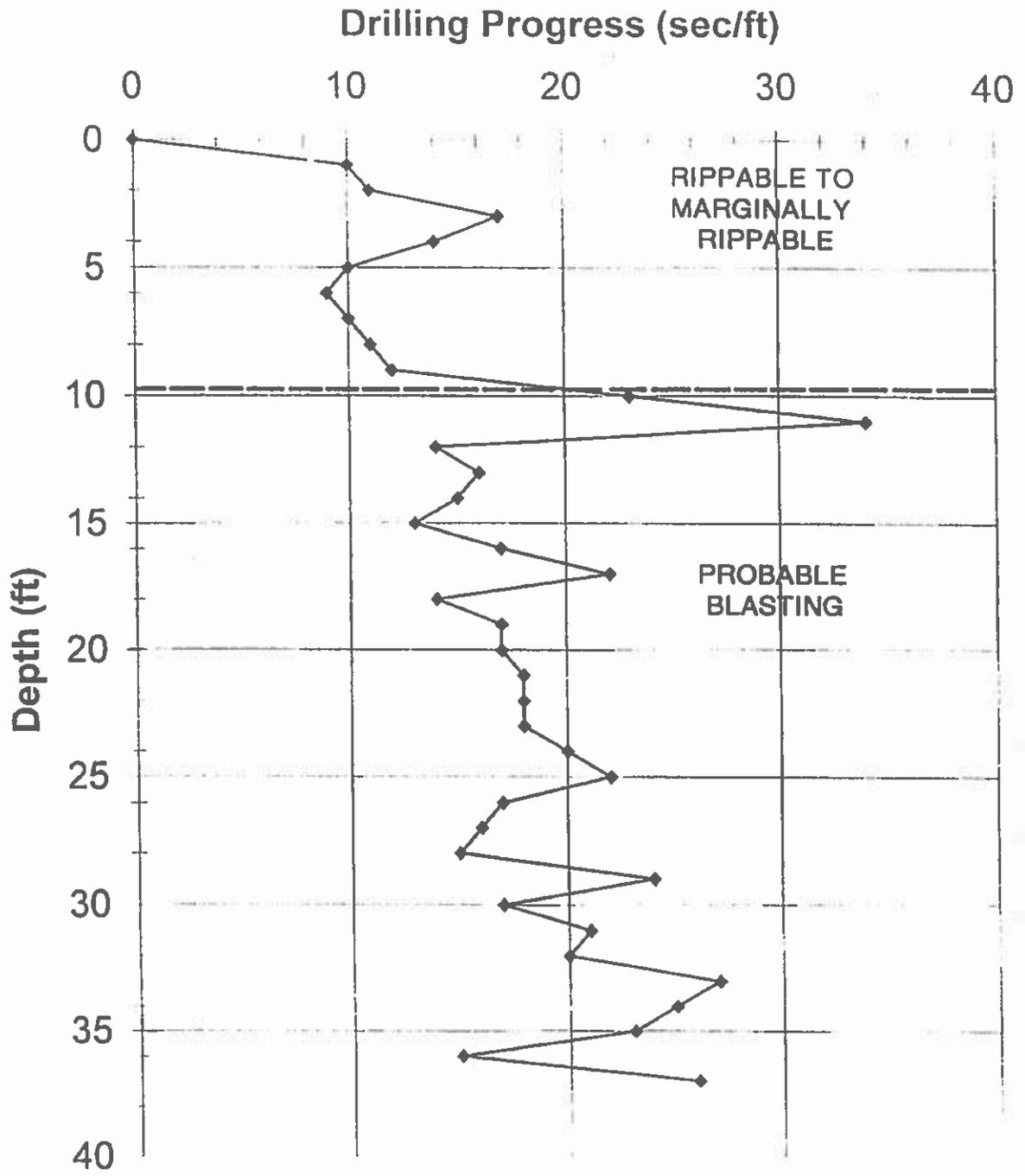
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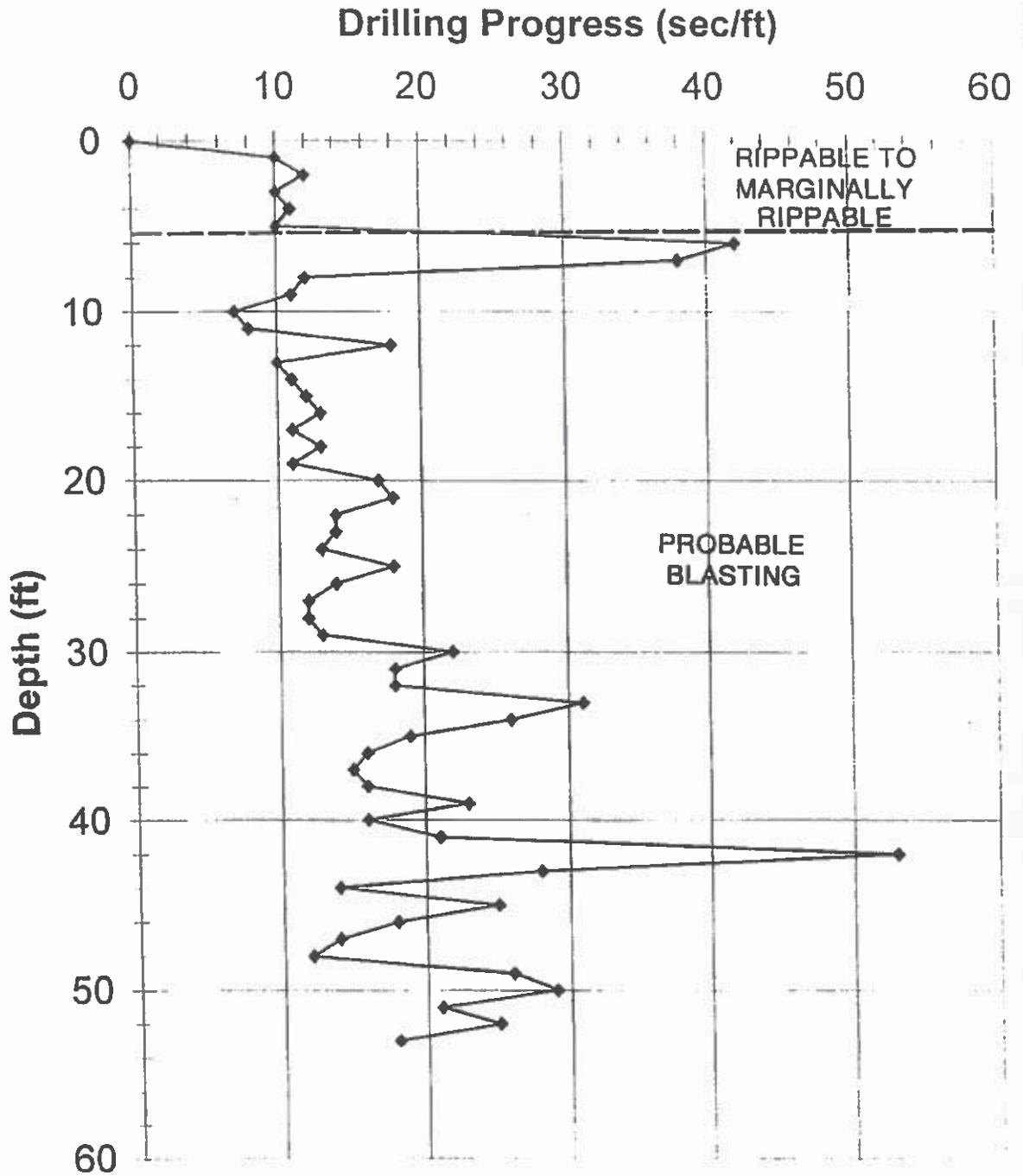
AH-8



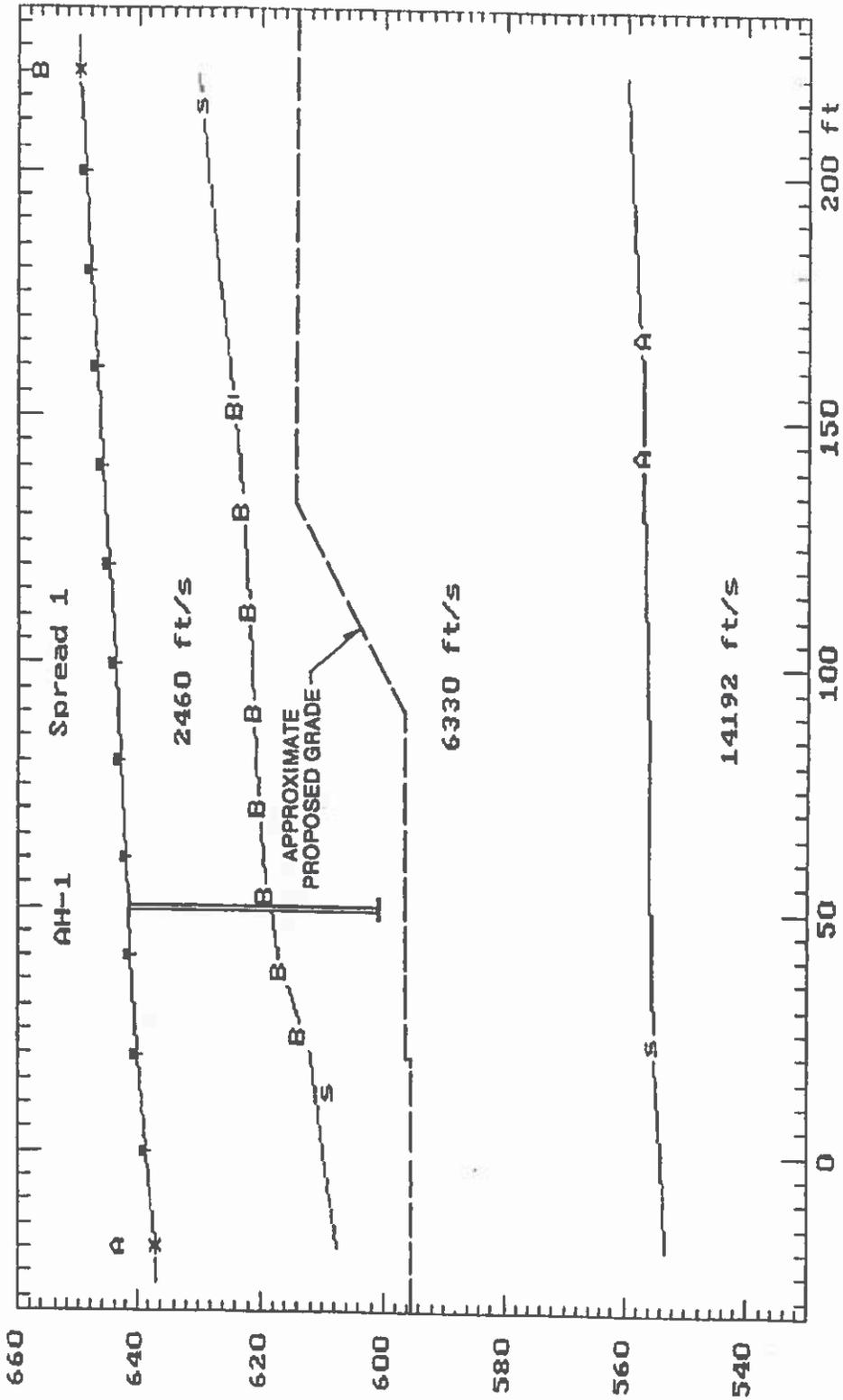
AH-9



AH-10



Otay Ranch - Village 13



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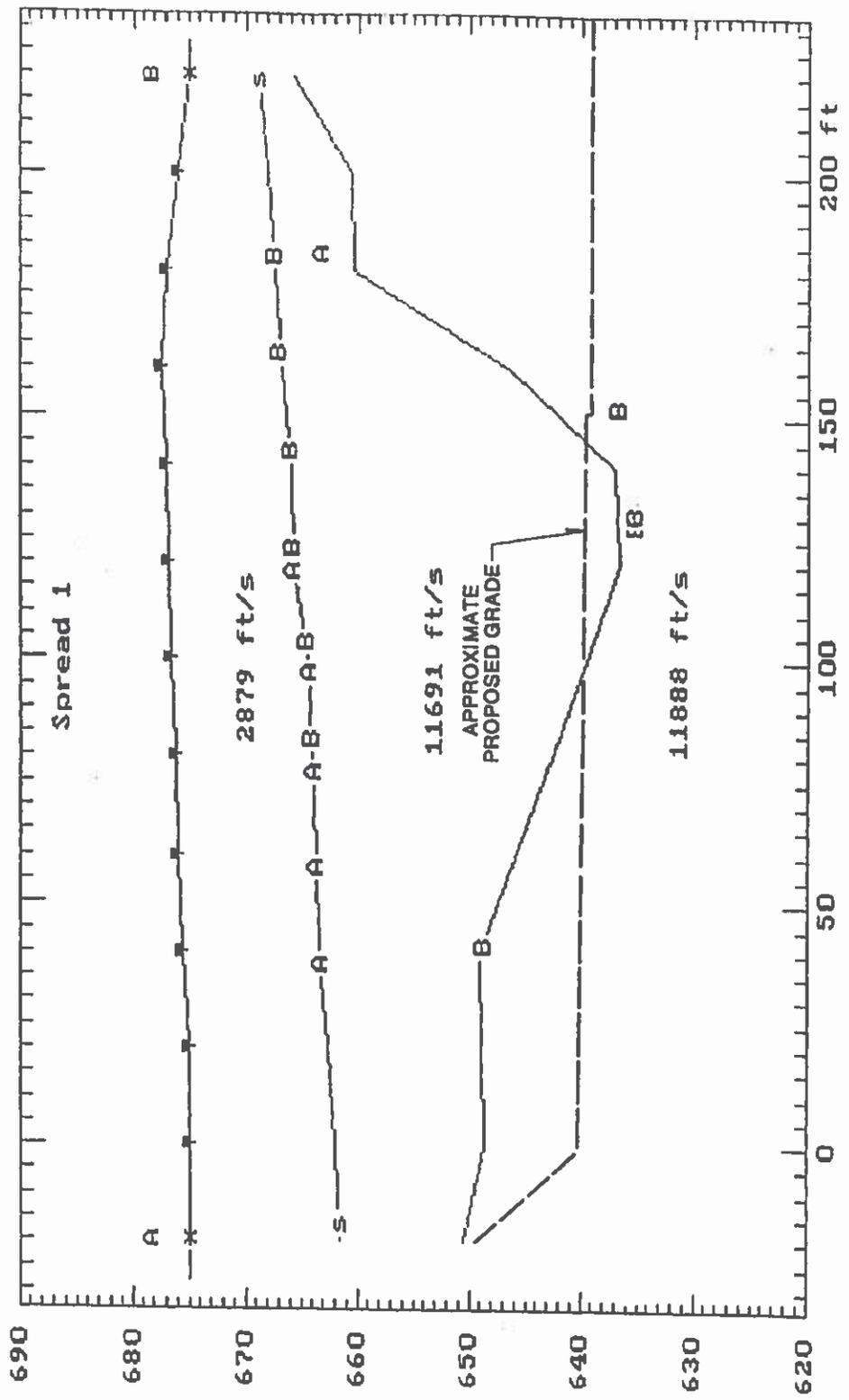
Seismic Line S-1

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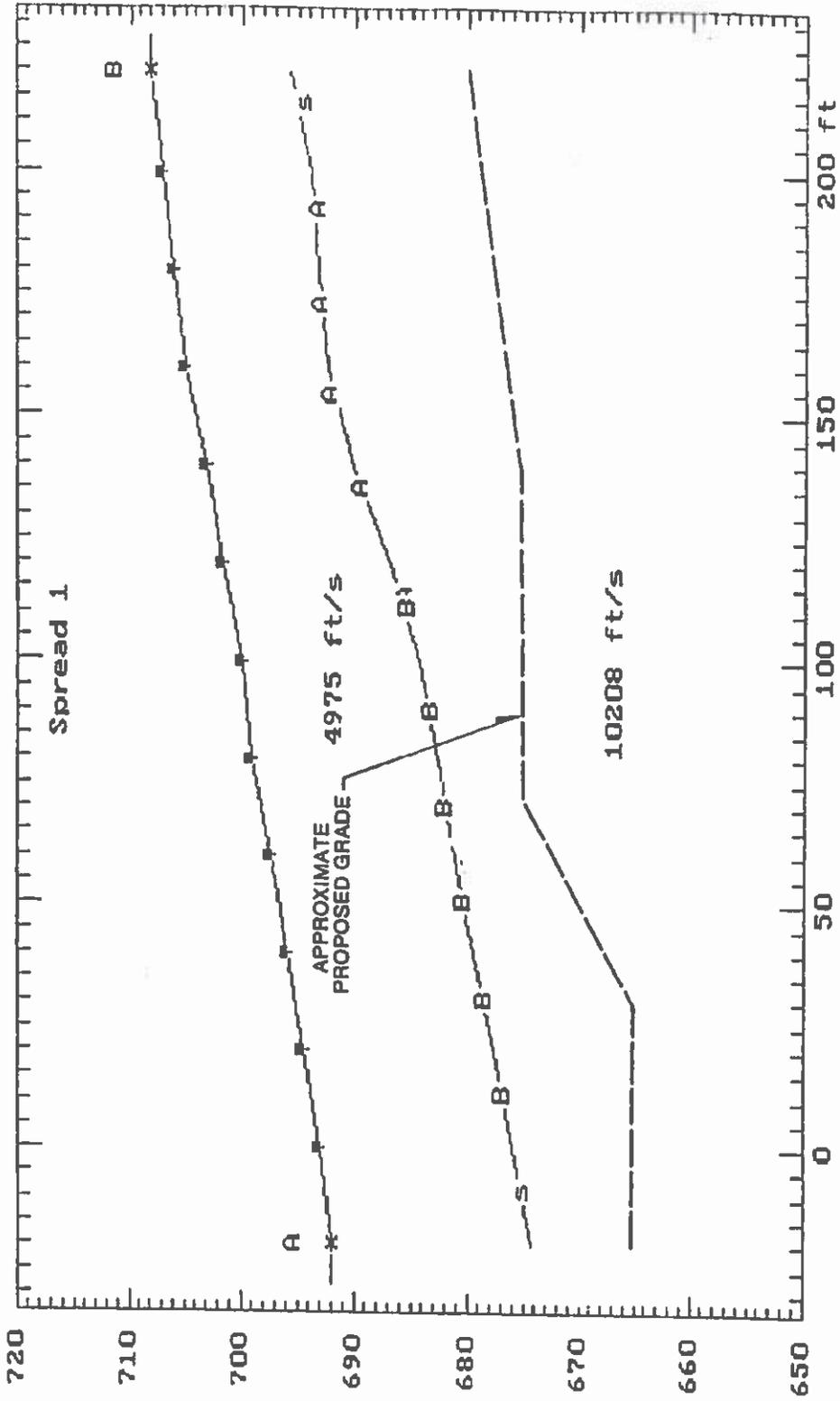
Prepared by

Neblett and Associates, Inc.

Seismic Line S-2
 Otay Ranch-Village 13, Chula Vista, CA

Huntington Beach, CA PN: 362-000.02

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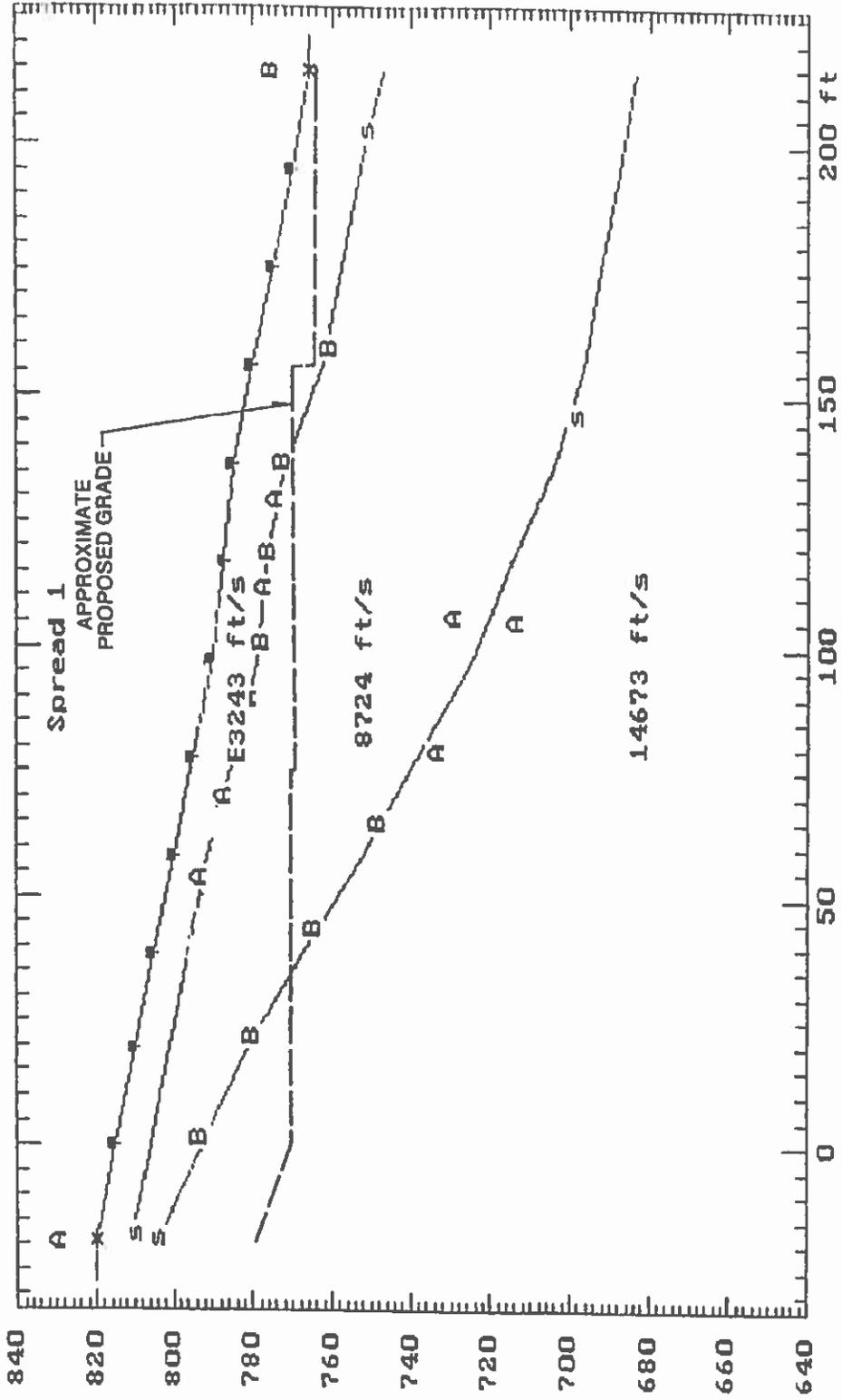
Seismic Line S-3

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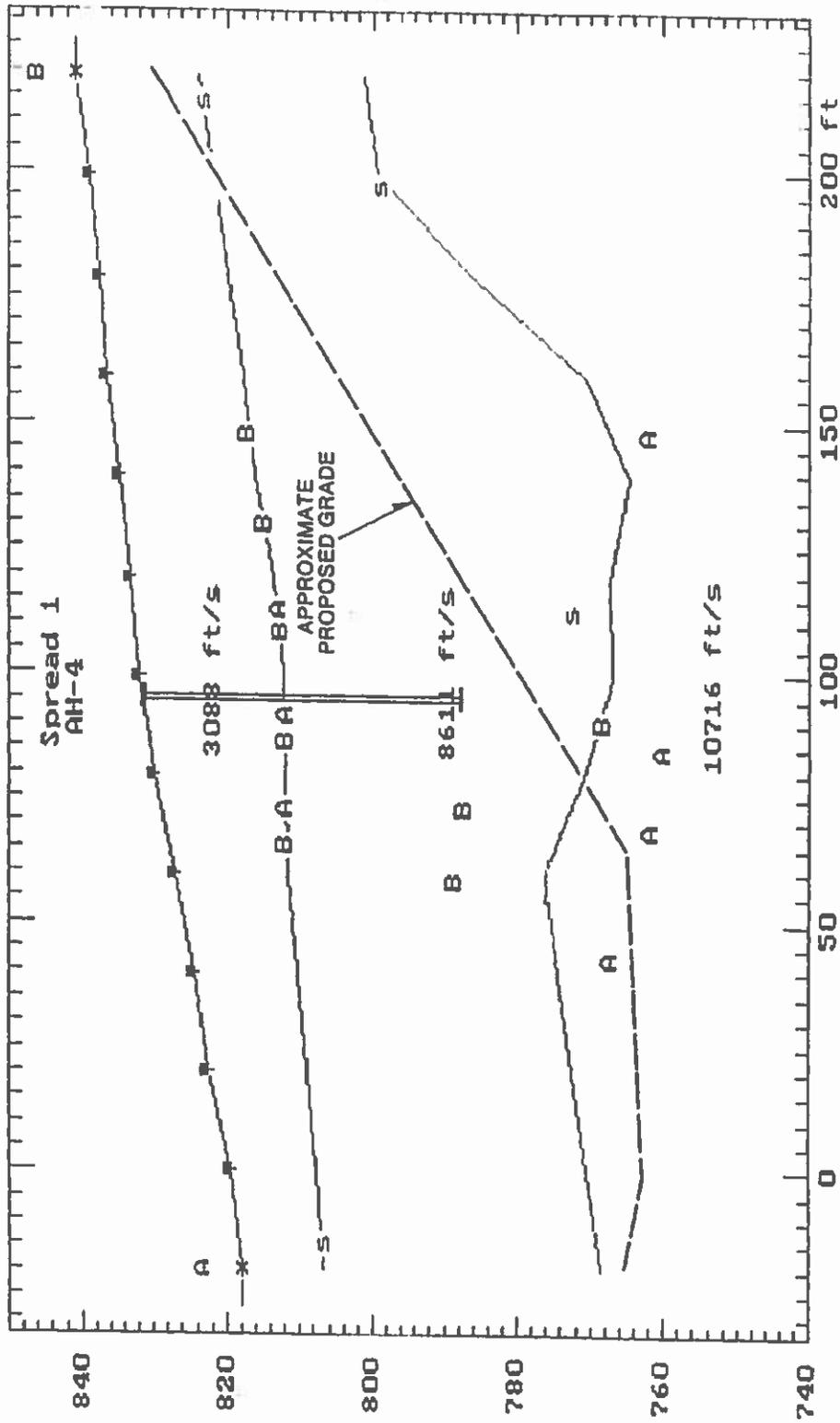
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Prepared by

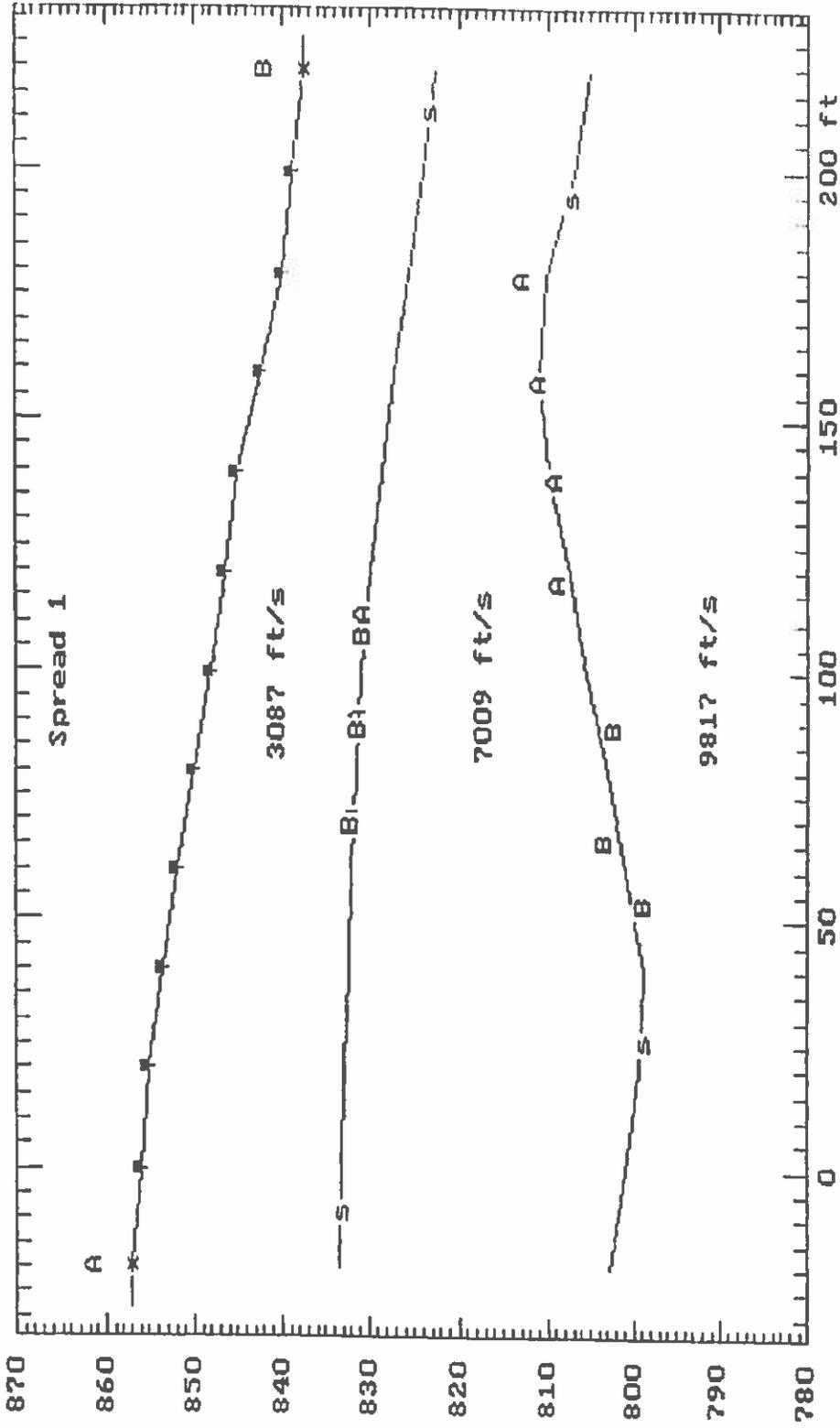
Seismic Line S-6

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Prepared by

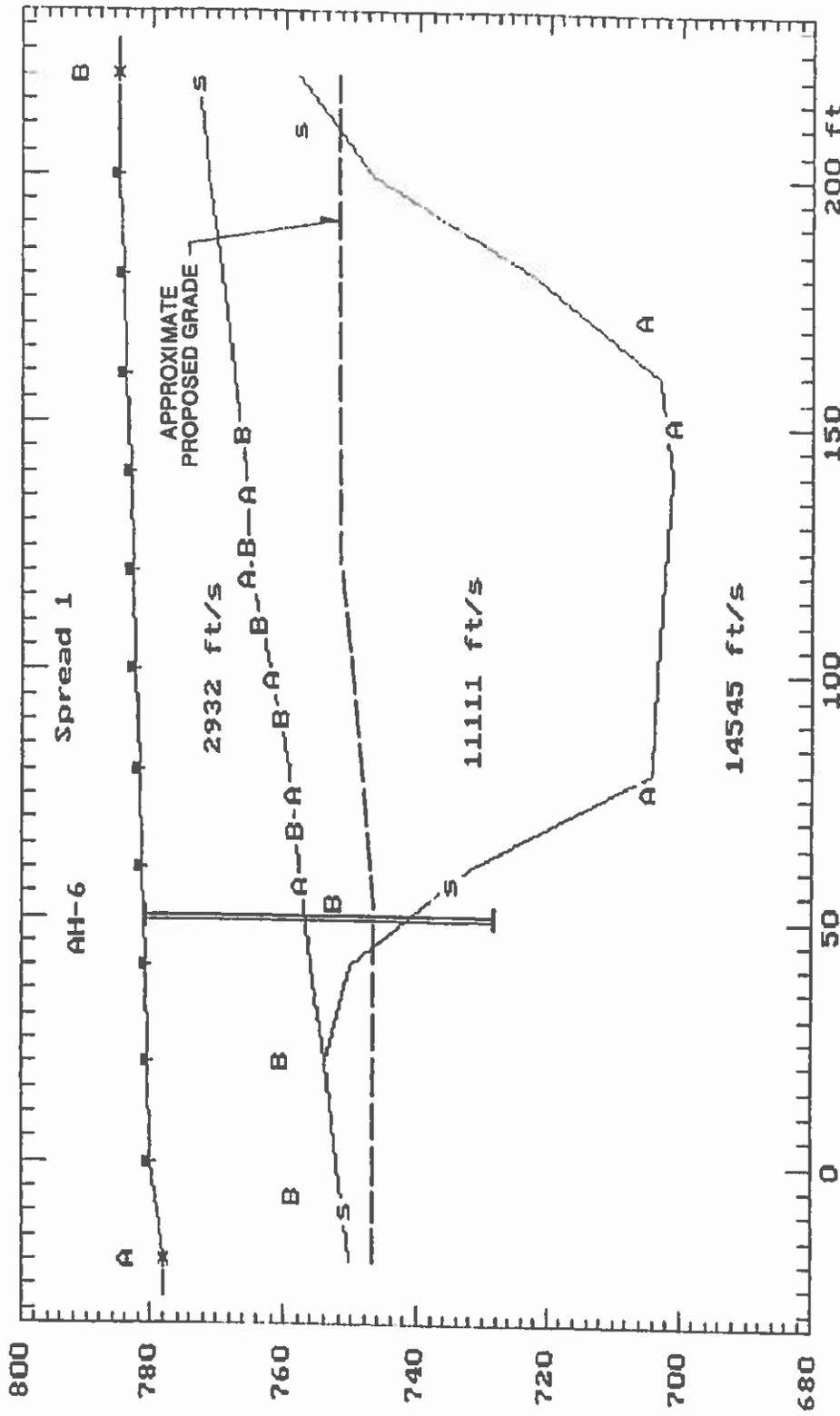
Seismic Line S-8

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Prepared by

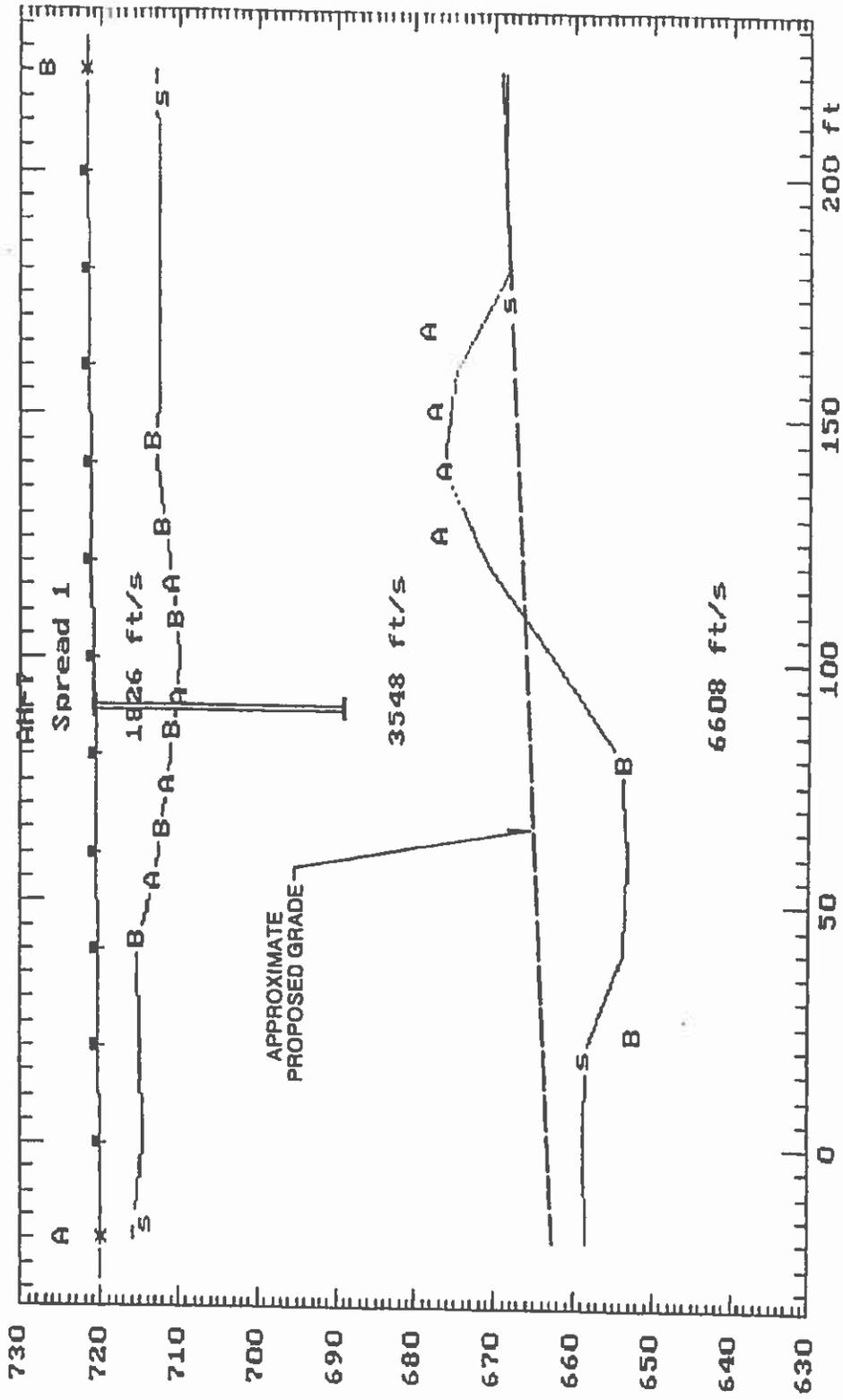
Seismic Line S-9

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Prepared by

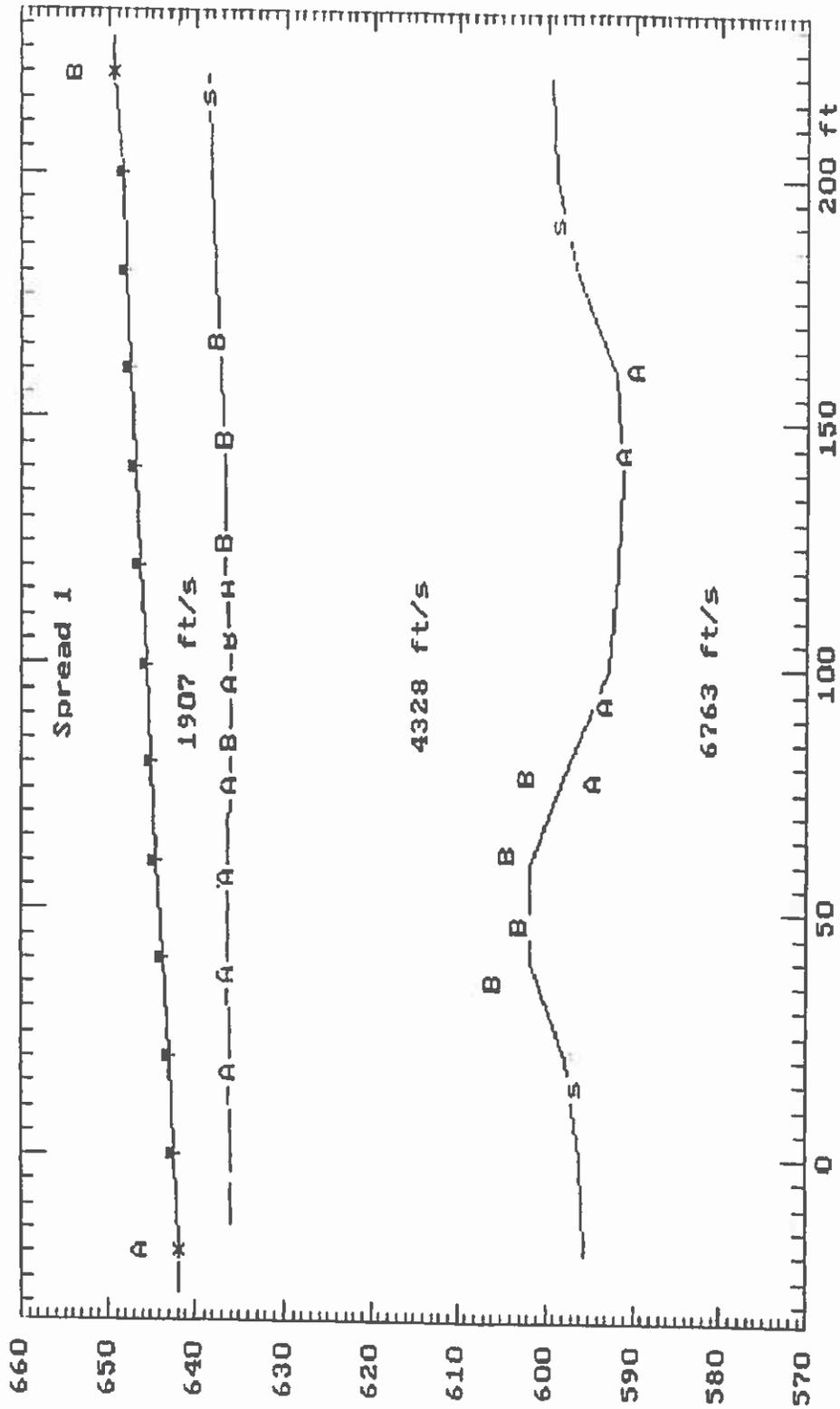
Seismic Line S-10

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NOTE: BASED ON ORIGINAL GRADING CONCEPT, S-11 WAS IN A BEDROCK CUT AREA. BASED ON CURRENT PROPOSED GRADE S-11 IS IN FILL AREA.

Prepared by

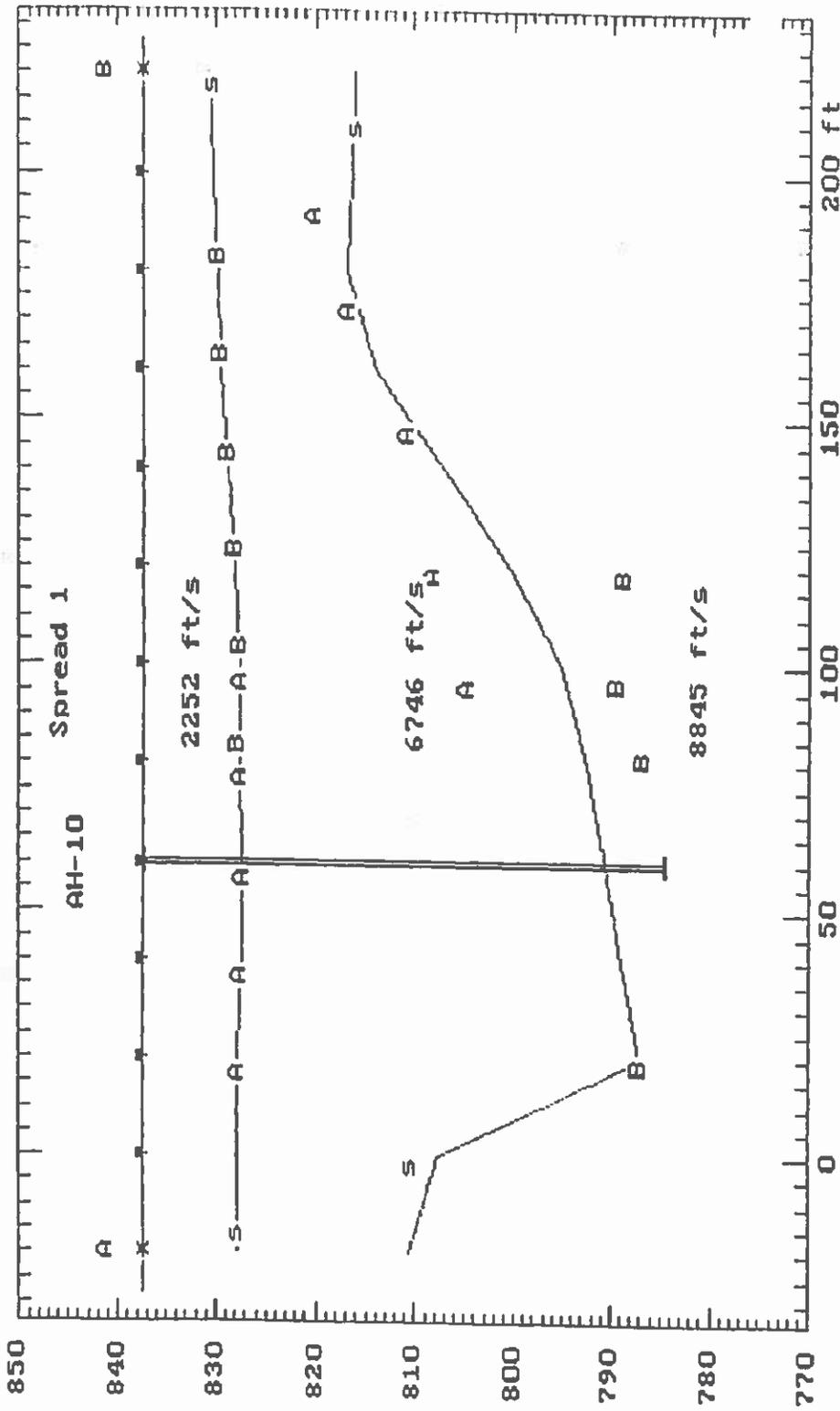
Seismic Line S-11

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Prepared by

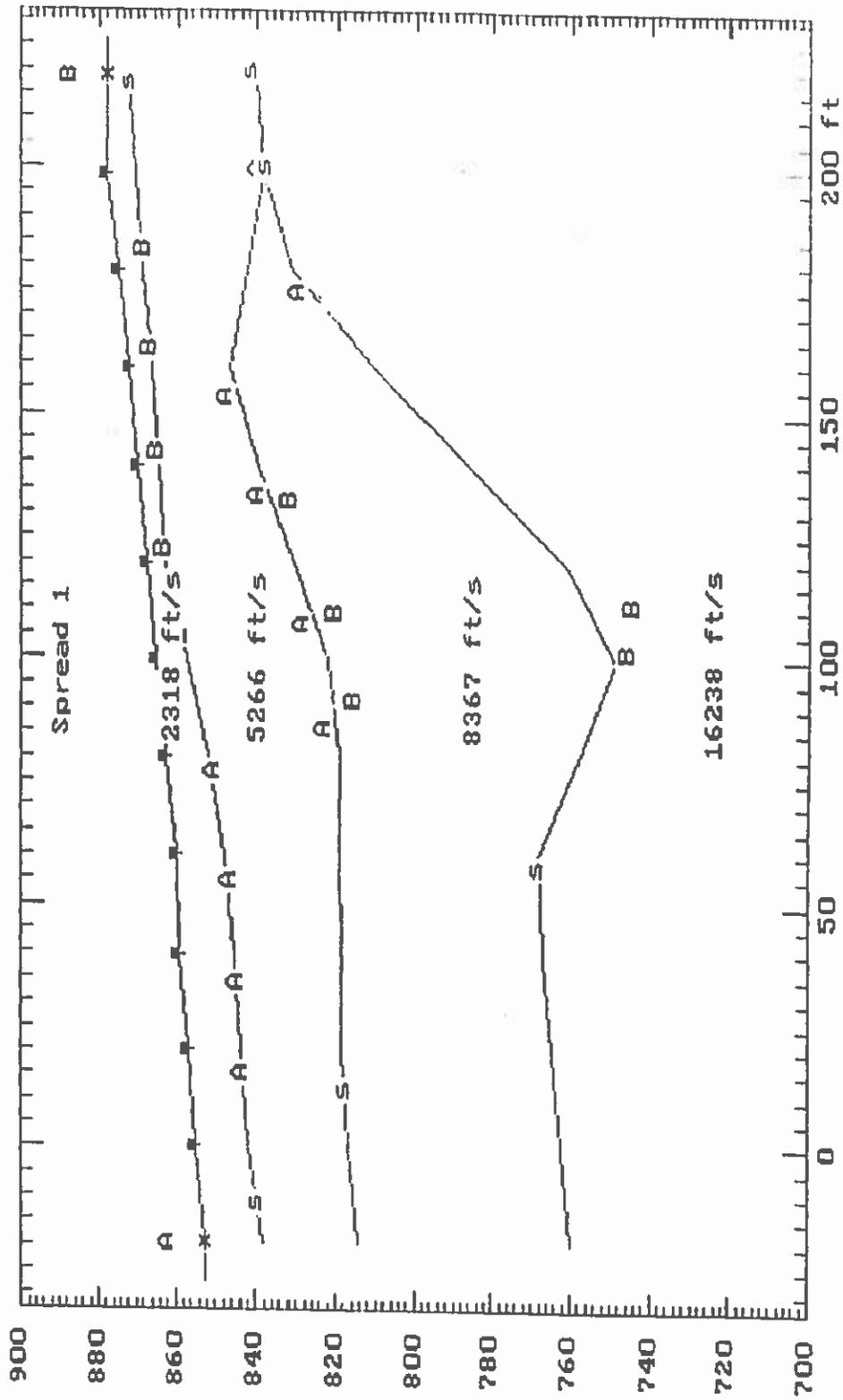
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Seismic Line S-13

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Prepared by

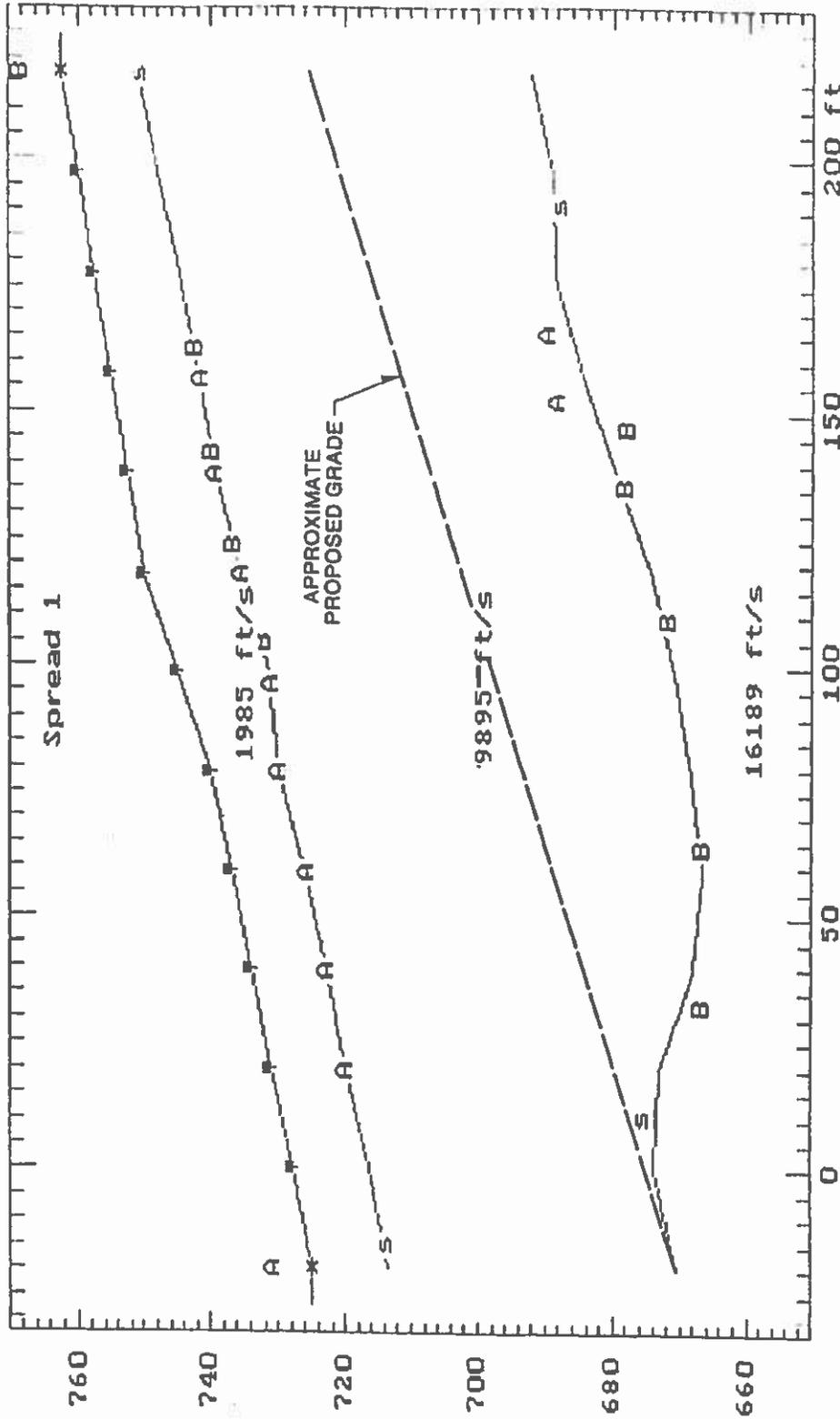
Seismic Line S-14

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Prepared by

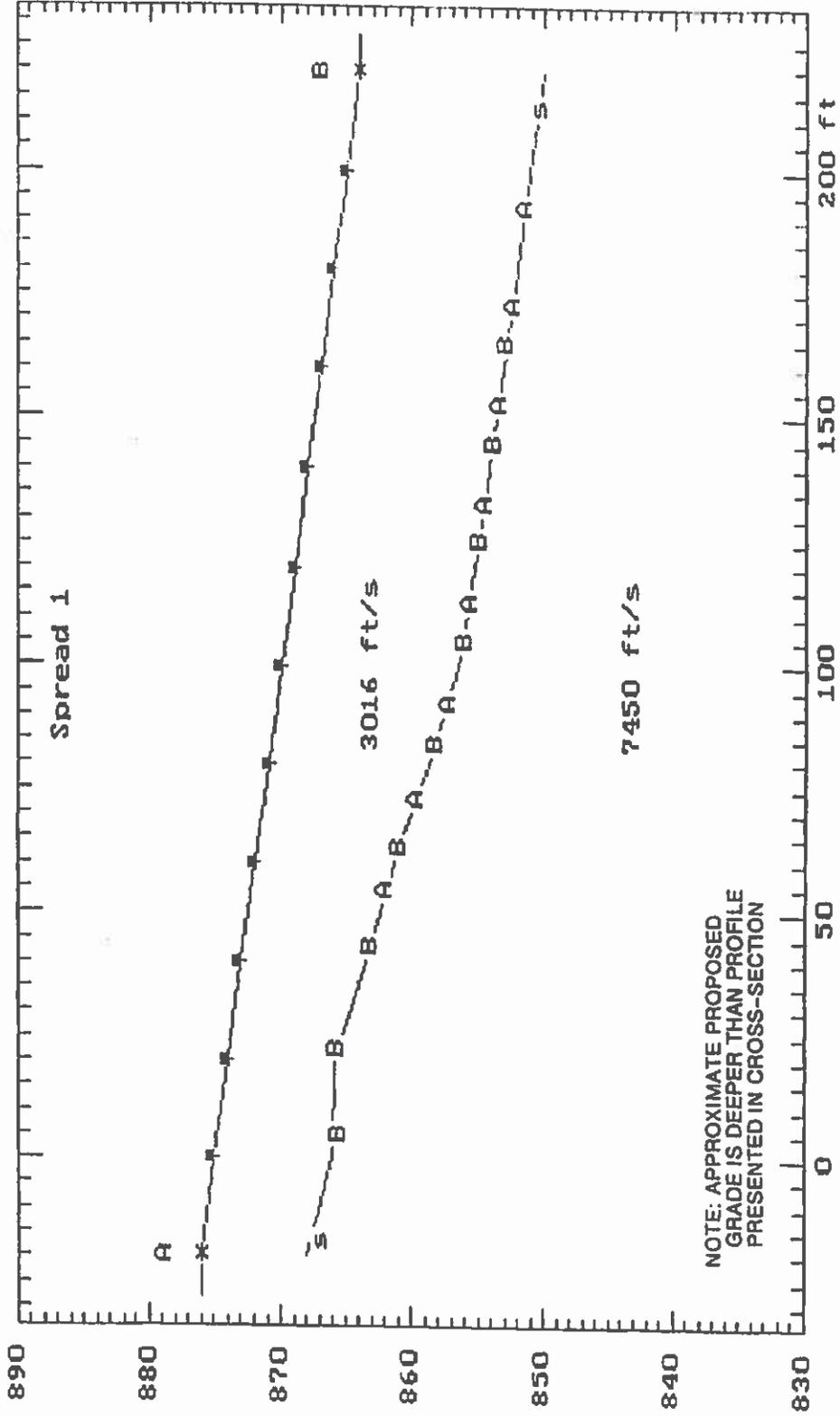
Seismic Line S-15

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Prepared by

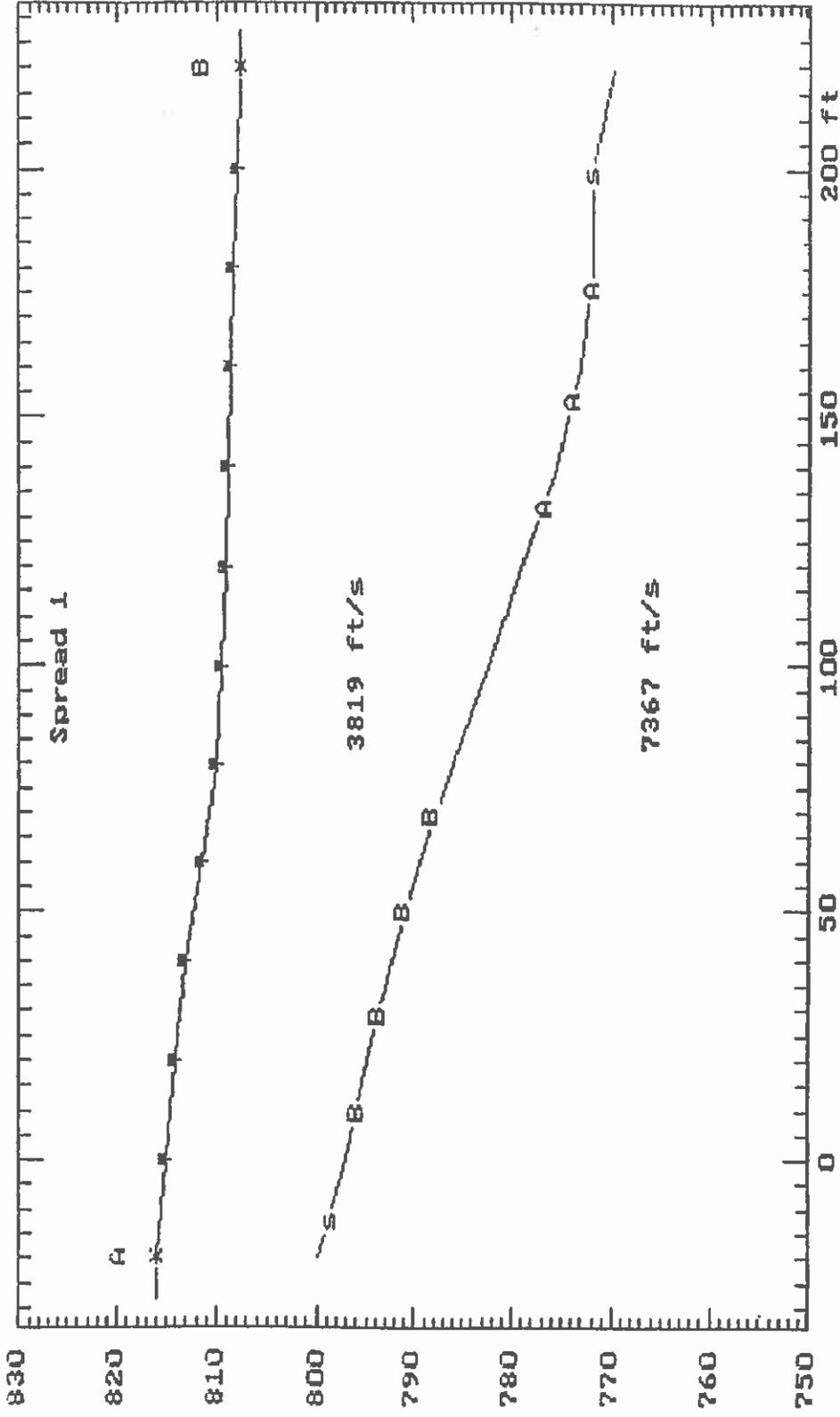
Seismic Line S-16

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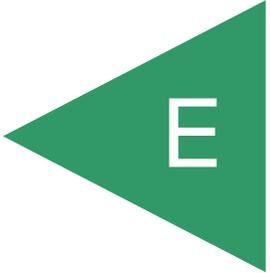
Seismic Line S-17

Neblett and Associates, Inc.

Otay Ranch-Village 13, Chula Vista, CA

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APPENDIX

A solid green triangle pointing to the left, containing the letter 'E' in white.

E

APPENDIX E

MATAVOLCANIC ROCK RIPPABILITY SUMMARY

Our subsurface investigation included excavating 22 air-track borings, 18 seismic-refraction surveys, and 14 excavator trenches within the Metavolcanic Rock. We have also included subsurface exploration information consisting 7 air-track borings, 2 backhoe trenches, and 14 seismic-refraction surveys within the Metavolcanic Rock from a previous geotechnical report by Neblett & Associates (2004) in our analysis. We used information from our subsurface exploration and the previous exploration to estimate the approximate thickness of capping material and the depth to non-rippable rock summarized in Table E-I for each excavation location (if located within Metavolcanic Rock). The rippability information is also presented on the Geologic Map, Figures 2 through 4, at each excavation location within the rock unit. We provided an average value for the data on the geologic map when 2 or more methods were used in the same proximity.

**TABLE E-I
METAVOLCANIC ROCK RIPPABILITY SUMMARY**

Excavation No.	Geologic Formation	Estimated Thickness of Capping Material after Screening (feet)	Estimated Rippable Depth (feet)
AT-1	Metavolcanic Rock (KJmv)	2	3
AT-2	Metavolcanic Rock (KJmv)	1	1
AT-3	Metavolcanic Rock (KJmv)	0	1
AT-4	Metavolcanic Rock (KJmv)	1	2
AT-6	Fanglomerate Deposits (Tof)/Metavolcanic Rock (KJmv)	23	23
AT-7	Metavolcanic Rock (KJmv)	0	1
AT-8	Fanglomerate Deposits (Tof)/Metavocanic Rock (KJmv)	34	34
AT-9	Metavolcanic Rock (KJmv)	1	5
AT-10	Metavolcanic Rock (KJmv)	0	2
AT-11	Metavolcanic Rock (KJmv)	0	2
AT-12	Metavolcanic Rock (KJmv))	0	5
AT-13	Metavolcanic Rock (KJmv)	0	0
AT-14	Metavolcanic Rock (KJmv))	1	3
AT-15	Metavolcanic Rock (KJmv)	1	26
AT-16	Metavolcanic Rock (KJmv)	4	7
AT-21	Metavolcanic Rock (KJmv)	5	16
AT-22	Metavolcanic Rock (KJmv)	0	2
AH-2	Metavolcanic Rock (KJmv)	1	13½
AH-3	Metavolcanic Rock (KJmv)	1	10½

**TABLE E-1 (Continued)
METAVOLCANIC ROCK RIPPABILITY SUMMARY**

Excavation No.	Geologic Formation	Estimated Thickness of Capping Material after Screening (feet)	Estimated Rippable Depth (feet)
AH-4	Metavolcanic Rock (KJmv)	2	9
AH-5	Metavolcanic Rock (KJmv)	1	8
AH-6	Metavolcanic Rock (KJmv)	6	19
AH-9	Metavolcanic Rock (KJmv)	1	10
AH-10	Metavolcanic Rock (KJmv)	1	5½
SL-1	Metavolcanic Rock (KJmv)	2	4½
SL-2	Metavolcanic Rock (KJmv)	1	4½
SL-3	Metavolcanic Rock (KJmv)	2	6
SL-4	Metavolcanic Rock (KJmv)	3	5½
SL-5	Metavolcanic Rock (KJmv)	2	3½
SL-6	Metavolcanic Rock (KJmv)	3	5½
SL-7	Metavolcanic Rock (KJmv)	4	12
SL-8	Metavolcanic Rock (KJmv)	4	6½
SL-9	Metavolcanic Rock (KJmv)	4	7½
SL-10	Metavolcanic Rock (KJmv)	4	7½
SL-11	Metavolcanic Rock (KJmv)	2	3½
SL-12	Metavolcanic Rock (KJmv)	3	4½
SL-13	Metavolcanic Rock (KJmv)	2	4
SL-14	Metavolcanic Rock (KJmv)	1	3½
SL-15	Metavolcanic Rock (KJmv)	3	21
SL-16	Metavolcanic Rock (KJmv)	5	7
SL-17	Metavolcanic Rock (KJmv)	3	26
SL-18	Metavolcanic Rock (KJmv)	61	61
S-2	Metavolcanic Rock (KJmv)	1	22
S-3	Metavolcanic Rock (KJmv)	0	12
S-4	Metavolcanic Rock (KJmv)	1	17
S-5	Metavolcanic Rock (KJmv)	1	5
S-6	Metavolcanic Rock (KJmv)	0	18
S-7	Metavolcanic Rock (KJmv)	1	10
S-8	Metavolcanic Rock (KJmv)	1	17
S-9	Metavolcanic Rock (KJmv)	0	16
S-12	Metavolcanic Rock (KJmv)	1	10
S-13	Metavolcanic Rock (KJmv)	0	9
S-14	Metavolcanic Rock (KJmv)	0	7
S-15	Metavolcanic Rock (KJmv)	0	8

**TABLE E-1 (Continued)
METAVOLCANIC ROCK RIPPABILITY SUMMARY**

Excavation No.	Geologic Formation	Estimated Thickness of Capping Material after Screening (feet)	Estimated Rippable Depth (feet)
S-16	Metavolcanic Rock (KJmv)	1	10
S-17	Fanglomerate Deposits (Tof)/Metavolcanic Rock (KJmv)	20	20
ET-1	Metavolcanic Rock (KJmv)	1	>3
ET-2	Metavolcanic Rock (KJmv)	½	2½
ET-3	Metavolcanic Rock (KJmv)	3	>13
ET-4	Metavolcanic Rock (KJmv)	5	>14
ET-5	Metavolcanic Rock (KJmv)	2	>9
ET-8	Metavolcanic Rock (KJmv)	½	>12
ET-19	Metavolcanic Rock (KJmv)	0	>3
ET-22	Metavolcanic Rock (KJmv)	0	>12
ET-23	Alluvium (Qal)/ Metavolcanic Rock (KJmv)	10	>14
ET-39	Alluvium (Qal)/Otay Formation (To) Metavolcanic Rock (KJmv)	5½	>6
ET-41	Metavolcanic Rock (KJmv)	4	>12
ET-44	Metavolcanic Rock (KJmv)	0	>5
ET-45	Metavolcanic Rock (KJmv)	3	>5
ET-46	Metavolcanic Rock (KJmv)	4	>12
NT-45	Alluvium (Qal)/Metavolcanic Rock (KJmv)	>4	--
NT-46	Metavolcanic Rock (KJmv)	>5½	--

APPENDIX



APPENDIX F

LABORATORY TESTING

We performed laboratory tests in accordance with generally accepted test methods of the American Society for Testing and Materials (ASTM) or other suggested procedures. Selected soil samples were analyzed for in-situ dry density and moisture content, maximum dry density and optimum moisture content, direct shear strength, expansion potential, Atterberg limits, water-soluble sulfate, water-soluble chloride ion, pH and resistivity, R-Value, aggregate quality, and gradation,. The results of the laboratory tests are presented on Tables F-I through F-IX and Figures F-1 through F-4. The in-place dry density and moisture content of the samples tested are presented on the boring logs in Appendix A.

**TABLE F-I
SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND
OPTIMUM MOISTURE CONTENT TEST RESULTS
ASTM D 1557**

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% dry wt.)
ET6-1	Dark brown, Clayey SAND	128.9	8.6
ET6-2	Light olive brown, Silty CLAY	117.7	14.2
ET8-1	Reddish brown, Clayey SAND	126.3	10.3
ET14-1	Reddish brown, Clayey SAND	131.9	7.7
ET16-2	Yellowish brown, Clayey SAND	117.8	14.3
ET21-2	Yellowish brown, Silty SAND	124.2	10.9
ET35-1	Light yellowish brown, Clayey SAND	125.5	11.0
ET41-1	Brown, Clayey SAND (Weathered KJmv)	117.6	13.9

**TABLE F-II
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080**

Sample No.	Dry Density (pcf)	Moisture Content (%)		Peak [Ultimate] Cohesion (psf)	Peak [Ultimate] Angle of Shear Resistance (degrees)
		Initial	After Test		
LB1-5	115.0	17.0	22.9	525[475]	29[25]
LB1-6	101.9	23.4	29.1	525[375]	21[19]
LB1-7**	n/a	n/a	n/a	430	22
LB1-9	102.2	25.0	31.9	350[600]	20[20]
LB1-12	104.1	23.0	29.8	450[425]	32[16]
LB3-3	118.1	15.5	21.7	750[125]	32[29]

TABLE F-II (Continued)
SUMMARY OF LABORATORY DIRECT SHEAR TEST RESULTS
ASTM D 3080

Sample No.	Dry Density (pcf)	Moisture Content (%)		Peak [Ultimate] Cohesion (psf)	Peak [Ultimate] Angle of Shear Resistance (degrees)
		Initial	After Test		
LB3-4	122.2	9.6	14.0	700[225]	40[40]
LB3-7	108.8	18.2	26.8	525[300]	31[30]
LB4-4	121.6	13.1	18.9	700[500]	33[29]
LB4-5	120.7	13.3	18.5	775[850]	34[30]
LB10-3	121.6	8.6	14.5	625[725]	45[43]
LB11-1	111.1	15.7	21.6	875[1000]	32[27]
LB12-1	108.2	17.7	21.8	300[500]	26[26]
LB17-1	113.2	15.3	20.5	500[725]	31[19]
LB17-2	112.6	18.0	23.4	300[375]	30[20]
ET6-1*	115.5	8.9	20.5	190 [140]	32 [32]
ET6-2*	107.1	12.8	22.9	380 [295]	16 [15]
ET8-1*	112.9	10.9	20.4	235	35
ET16-2*	104.7	15.5	24.7	390	24
ET35-1*	112.0	11.3	21.6	255 [215]	33 [33]
ET41-1*	105.5	14.1	21.0	240 [120]	32 [35]

*Sample remolded to a dry density of approximately 90 percent of the laboratory maximum dry density near optimum moisture content.

**Fully softened remolded sample.

TABLE F-III
SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS
ASTM D 4829

Sample No.	Moisture Content (%)		Dry Density (pcf)	Expansion Index	Expansion Classification
	Before Test	After Test			
ET6-2	12.5	29.5	98.5	63	Medium
ET9-1	9.3	19.1	112.4	40	Low
ET16-2	11.7	27.2	104.6	95	High
ET18-1	11.6	28.4	103.0	103	High
ET18-2	8.6	18.9	113.1	33	Low
ET37-1	10.9	25.3	105.2	66	Medium
ET41-1	11.3	26.6	102.2	57	Medium
ET46-1	13.9	34.8	93.0	90	Medium

**TABLE F-IV
SUMMARY OF LABORATORY ATTERBERG LIMITS TEST RESULTS
ASTM D 4318**

Sample No.	Liquid Limit	Plastic Limit	Plasticity Index
LB1-9	72	29	43
LB1-10	74	28	46
ET6-2	61	18	43

**TABLE F-V
SUMMARY OF LABORATORY WATER-SOLUBLE SULFATE TEST RESULTS
CALIFORNIA TEST NO. 417**

Sample No.	Water-Soluble Sulfate (%)	Water-Soluble Sulfate (ppm)	Sulfate Exposure
ET6-2	0.050	500	Not Applicable (S0)
ET9-1	0.002	20	Not Applicable (S0)
ET16-2	0.201	2,010	Severe (S2)
ET18-1	0.118	1,180	Moderate (S1)
ET18-2	0.008	80	Not Applicable (S0)
ET37-1	0.172	1,720	Moderate (S1)
ET46-1	0.975	9,750	Severe (S2)

**TABLE F-VI
SUMMARY OF LABORATORY WATER-SOLUBLE CHLORIDE ION CONTENT TEST
RESULTS AASHTO TEST NO. T 291**

Sample No.	Chloride Ion Content (%)	Chloride Ion Content (ppm)
ET17-1	0.188	1,882

**TABLE F-VII
SUMMARY OF LABORATORY POTENTIAL OF HYDROGEN (PH) AND RESISTIVITY TEST
RESULTS CALIFORNIA TEST METHOD 643**

Sample No.	pH	Minimum Resistivity (ohm-centimeters)
ET17-1	7.8	180

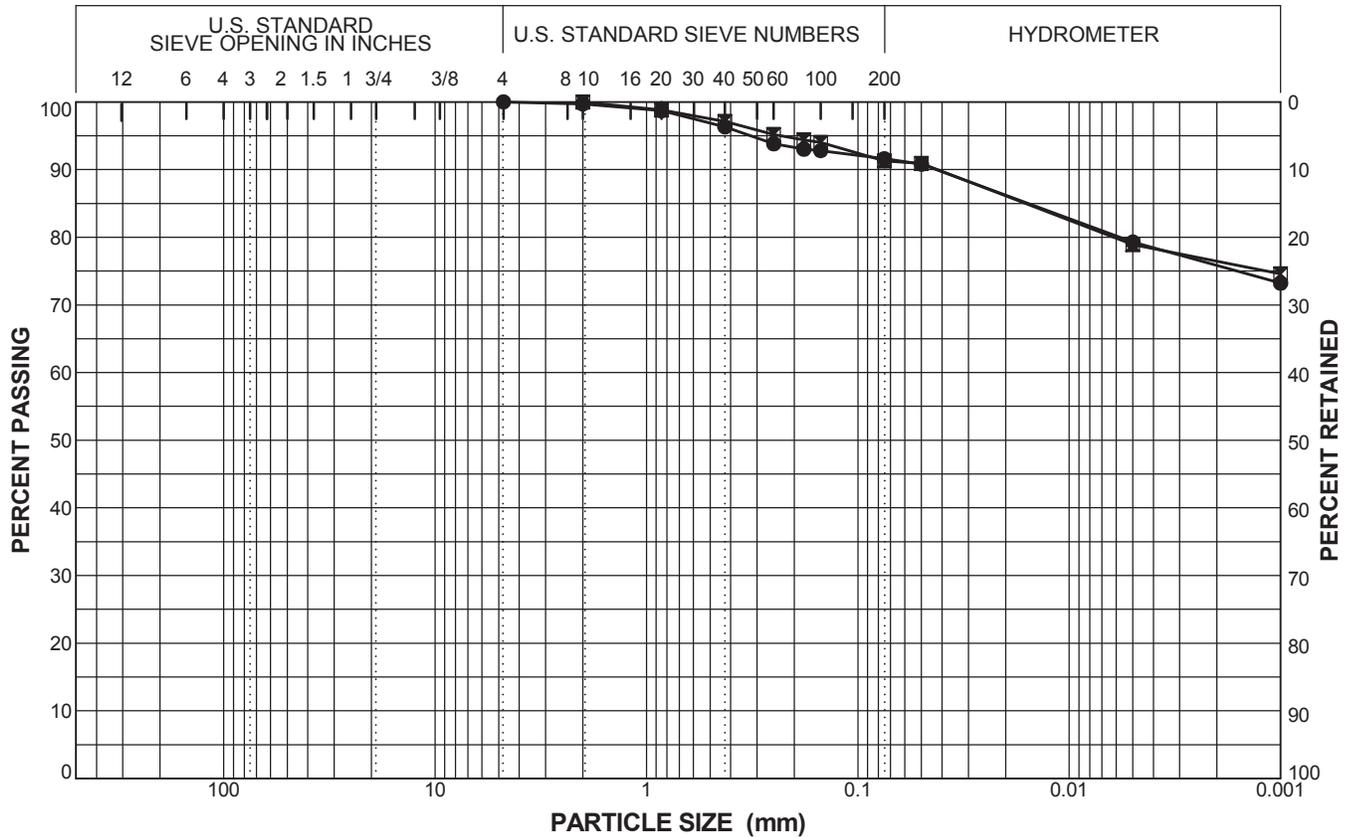
**TABLE F-VIII
SUMMARY OF LABORATORY RESISTANCE VALUE (R-VALUE) TEST RESULTS
ASTM D 2844**

Sample No.	R-Value
ET28-1	23

**TABLE F-IX
SUMMARY OF LABORATORY AGGREGATE QUALITY TEST RESULTS**

Test Type	Sample Number				Specified Value
	ET19-1	ET22-1	ET26-1	ET44-1	
Apparent Specific Gravity ASTM C128	2.6	2.6	2.7	2.7	2.5 Minimum (Greenbook)
Absorption ASTM C128 (%)	0.5	0.1	1.0	1.5	4.2 Maximum (Greenbook)
Density ASTM C128 (pcf)	162.3	164.4	164.6	159.2	--
Durability Index California Test 229	87	93	82	73	35 Minimum (Caltrans)
L.A. Abrasion ASTM C131 (% Wear, 200 Revolutions)	6	6	10	10	15 Maximum (Greenbook)
L.A. Abrasion ASTM C131 (% Wear, 500 Revolutions)	14	13	18	20	52 Maximum (Greenbook)
Geologic Unit	Metavolcanic Rock (KJmv)	Metavolcanic Rock (KJmv)	Fanglomerate Deposits Cobble (Tof)	Metavolcanic Rock (KJmv)	--

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	

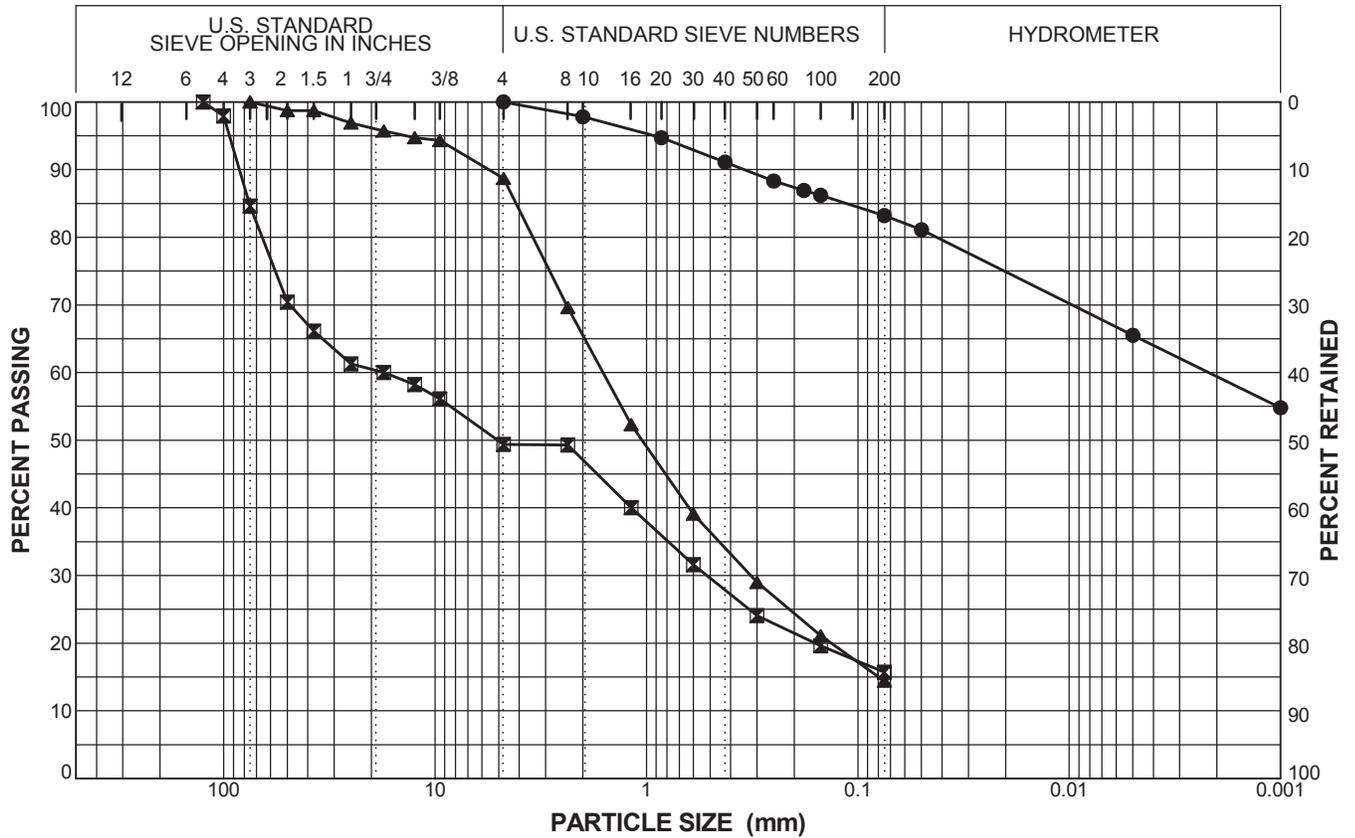


	SAMPLE	DEPTH (ft)	CLASSIFICATION	% Gravel	% Sand	% Fines
●	LB1-9	35.0	(CH) Silty CLAY	0	8	92
■	LB1-10	39.5	(CH) Silty CLAY	0	9	91
▲						

GRADATION CURVE

OTAY RANCH RESORT VILLAGE
 SAN DIEGO COUNTY, CALIFORNIA

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	

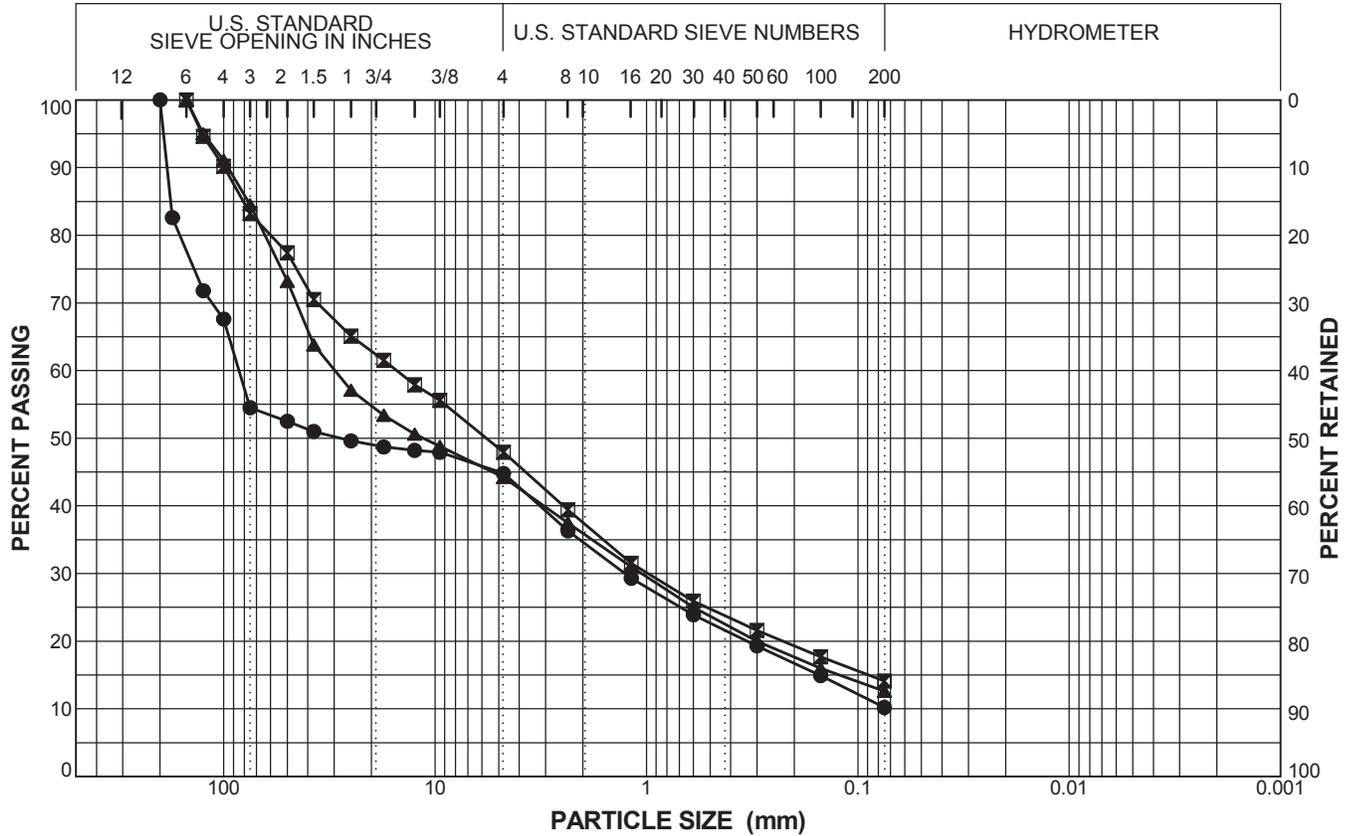


	SAMPLE	DEPTH (ft)	CLASSIFICATION	% Gravel	% Sand	% Fines
●	ET6-2	10.5	(CH) CLAY with sand	0	17	83
■	ET9-2	8.5	(GC) Clayey GRAVEL with sand	35	34	16
▲	ET13-1	7.0	(SC) Clayey SAND	11	74	14

GRADATION CURVE

OTAY RANCH RESORT VILLAGE
 SAN DIEGO COUNTY, CALIFORNIA

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	

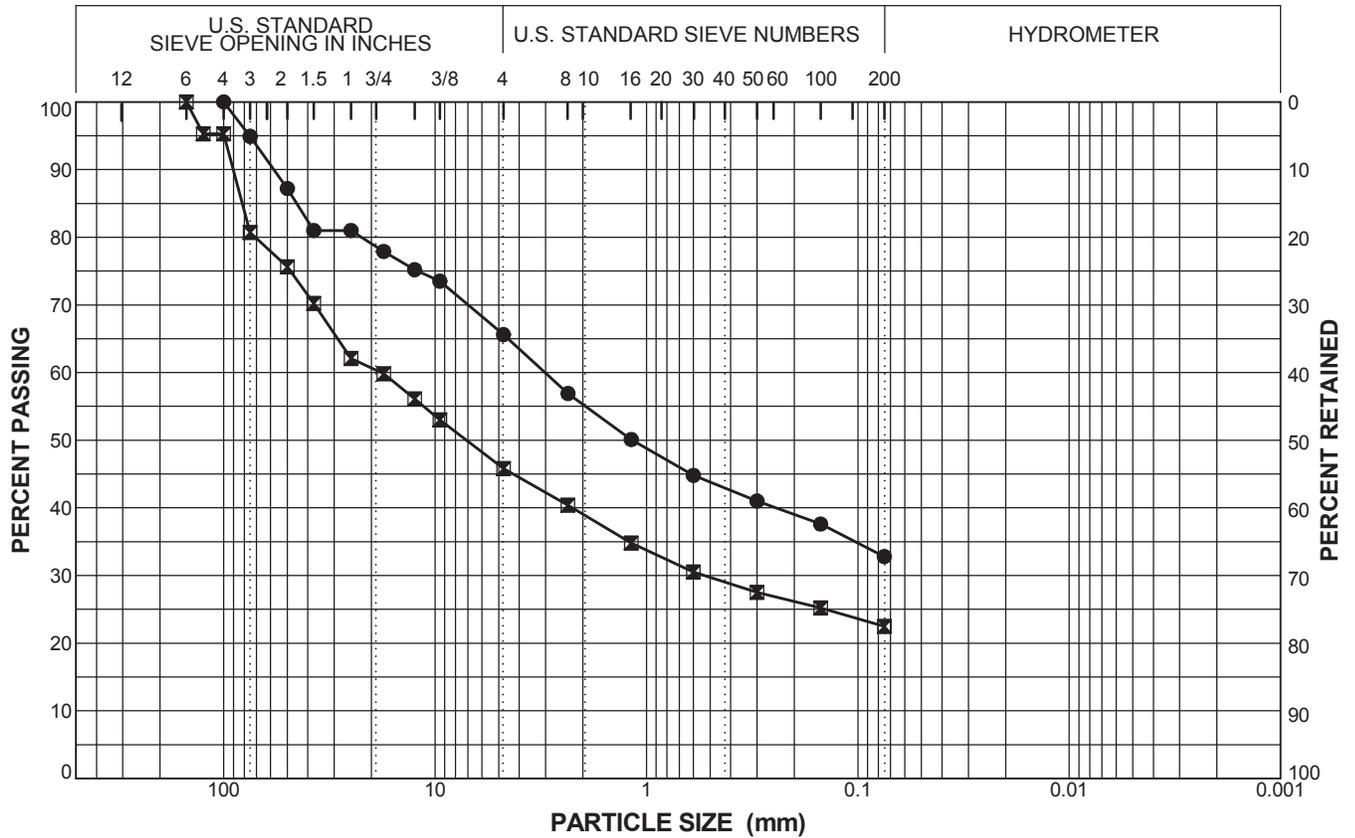


	SAMPLE	DEPTH (ft)	CLASSIFICATION	% Gravel	% Sand	% Fines
●	ET15-1	6.0	(GP-GM) GRAVEL with silt or clay and sand	10	35	10
☒	ET33-1	1.0	(GM) Silty GRAVEL with sand	35	34	14
▲	ET36-1	5.0	(GM) Silty GRAVEL with sand	40	32	13

GRADATION CURVE

OTAY RANCH RESORT VILLAGE
 SAN DIEGO COUNTY, CALIFORNIA

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		coarse	fine	coarse	medium	fine	



	SAMPLE	DEPTH (ft)	CLASSIFICATION	% Gravel	% Sand	% Fines
●	ET41-1	6.0	(GC) Clayey GRAVEL with sand	29	33	33
■	ET43-1	1.0	(GC) Clayey GRAVEL with sand	35	23	23
▲						

GRADATION CURVE

OTAY RANCH RESORT VILLAGE
 SAN DIEGO COUNTY, CALIFORNIA

APPENDIX



APPENDIX G

SLOPE STABILITY ANALYSIS

We performed slope stability analyses using a two-dimensional computer software *GeoStudio2004* developed by Geo-Slope International Ltd. We analyzed the critical modes of potential slip surfaces including rotational-mode and block-mode based on Spencer's method. The soil parameters used, case conditions, and the calculated factors of safety were presented herein. Plots of analyses' results, including the soil stratigraphy, potential failure surfaces, and calculated Factors of Safety, are included in this appendix.

Shear strength characters of the existing geologic units were estimated based on laboratory direct shear tests on samples obtained during our field investigation in accordance with ASTM D 3080 (see Appendix F), and based on empirical data obtained from the referenced geotechnical literature. The soil parameters used for the stability analyses are presented on Table G-I.

TABLE G-I
SUMMARY OF SOIL PROPERTIES USED FOR SLOPE STABILITY ANALYSES

Geologic Unit/Material	Density (pcf)	Cohesion (psf)	Friction Angle (degrees)
Compacted Fill (Qcf)	125	250	30
Surficial Deposits	120	300	16
Fanglomerate Deposits (Tof)	130	200	31
Otay Formation (To) - Sandstone	130	700	34
Otay Formation (To) – Sandstone (Clayey)	130	700	30
Otay Formation (To) – Claystone	130	300	22
Otay Formation (To) – Claystone (WEAK)	130	300	20
Metavolcanic Rock (KJmv)	130	1,000	35

We selected Cross Sections B1-B1', C1-C1', D-D', and P-P' to perform the slope stability analyses. Table G-II provides a summary of cases analyzed and calculated Factors of Safety. A minimum Factor of Safety of 1.5 under static conditions is currently required by the County of San Diego for slope stability. Results of slope stability analyses are plotted on Figures G-1 through G-4. As discussed herein, we encountered discontinuous claystone layers in several of the exploratory borings and trenches within the Otay Formation (To) and Fanglomerate Deposits (Tof). The claystone possesses relatively low shear strengths and may be prone to slope instability if exposed in cut slopes. This geologic claystone layer was mainly found in cross sections B1-B1' and C1-C1'. Surficial slope stability calculations are presented on Figure G-5.

**TABLE G-II
SUMMARY OF SLOPE STABILITY ANALYSES**

Cross Section	Condition of Slope Stability Analyses	Calculated Factor of Safety	Figure Number
B1-B1'	Minimum Rotational-Mode Factor of Safety – Cut and Fill Slope at inclination of 2:1 in Fanglomerate Deposits and Otay Formation	1.52	G-1
C1-C1'	Minimum Rotational-Mode Factor of Safety – Cut Slope at inclination of 2:1 in Fanglomerate Deposits and Otay Formation	1.65	G-2
D-D'	Minimum Rotational-Mode Factor of Safety – Cut Slope at inclination of 1.5:1 in Metavolcanic Rock	2.21	G-3
P-P'	Minimum Rotational-Mode Factor of Safety – Fill Slope at inclination of 2:1	1.71	G-4
N/A	Surficial Slope Stability Analysis	2.2	G-5

Otay Ranch Resort Village - Area A Tentative Map

Project No. G1012-52-01D

Cross Section B1-B1'

Name: B1_basin_cir.gsz

Date: 9/3/2014 Time: 10:17:43 AM

Description: Qcf C: 250 psf Phi: 30deg. Wt: 125pcf

Description: ToF C: 200 psf Phi: 31deg. Wt: 130pcf

Description: To-Claystone C: 300 psf Phi: 22deg. Wt: 130pcf

Description: KJmv C: 1000 psf Phi: 35deg. Wt: 130pcf

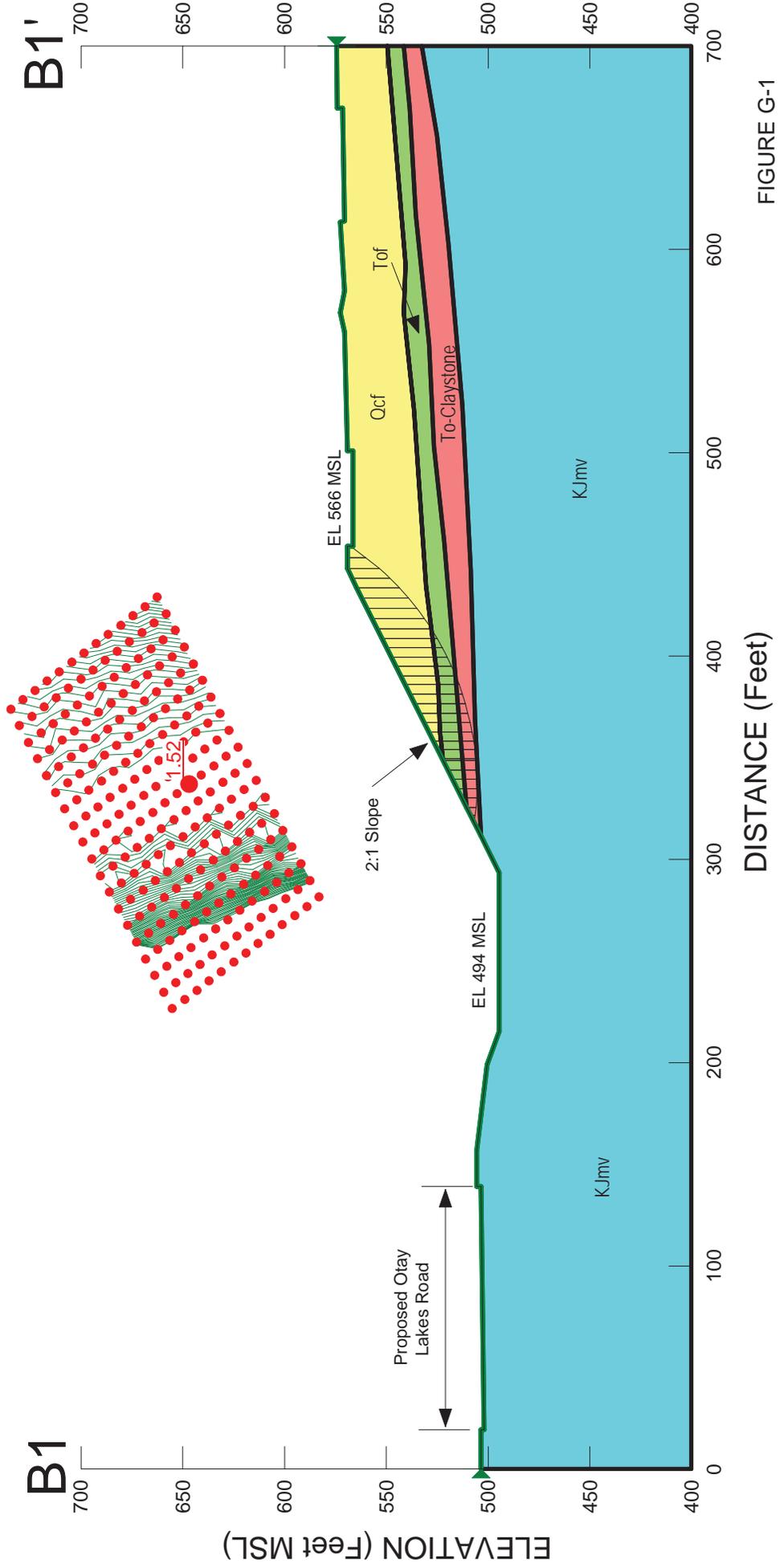


FIGURE G-1

Otay Ranch Resort Village - Area A Tentative Map

Project No. G1012-52-01D

Cross Section C1-C1'

Name: C1_basin1_cir.gsz

Date: 9/3/2014 Time: 10:22:11 AM

Description: Qcf C: 250 psf Phi: 30deg. Wt: 125pcf

Description: ToF C: 200 psf Phi: 31deg. Wt: 130pcf

Description: To-Claystone C: 300 psf Phi: 22deg. Wt: 130pcf

Description: To-Sandstone C: 700 psf Phi: 34deg. Wt: 130pcf

Description: To-Sandstone (SC) C: 700 psf Phi: 30deg. Wt: 130pcf

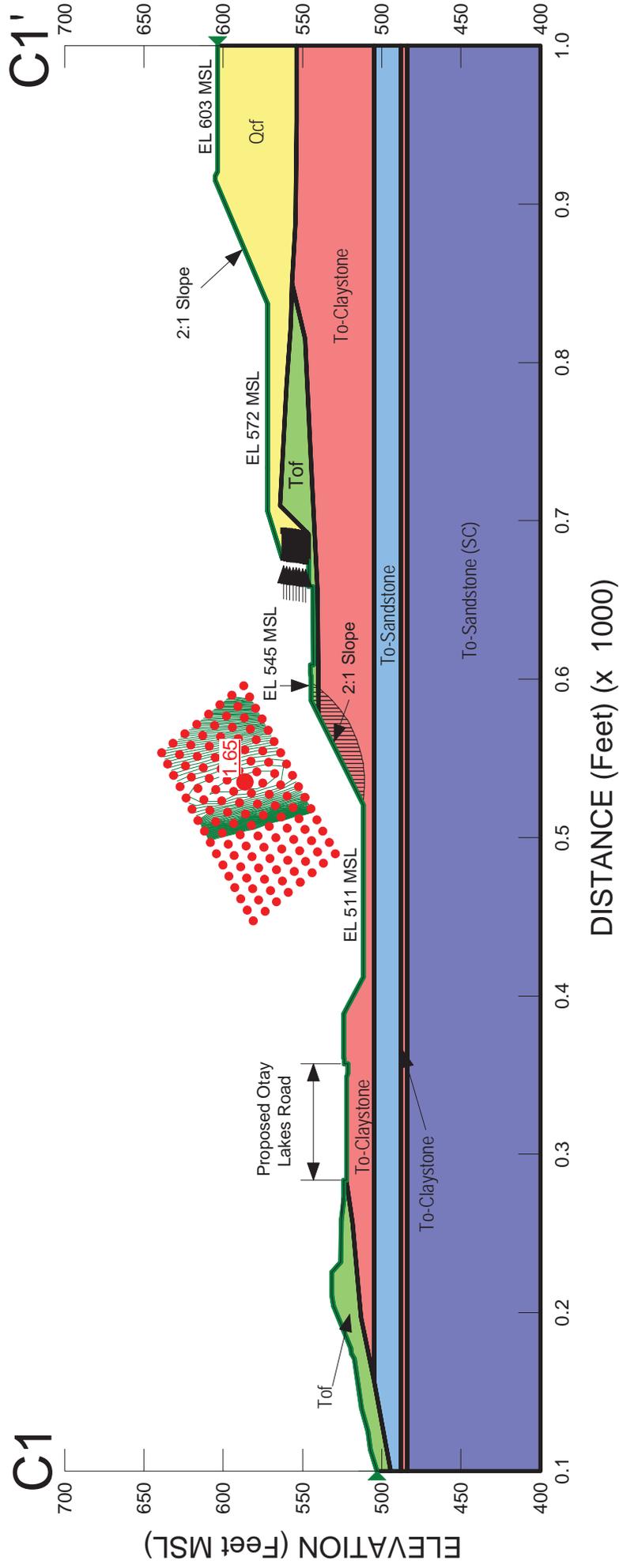


FIGURE G-2

Otay Ranch Resort Village - Area A Tentative Map

Project No. G1012-52-01D

Cross Section D-D'

Name: D-1_cir.gsz

Date: 9/3/2014 Time: 10:31:40 AM

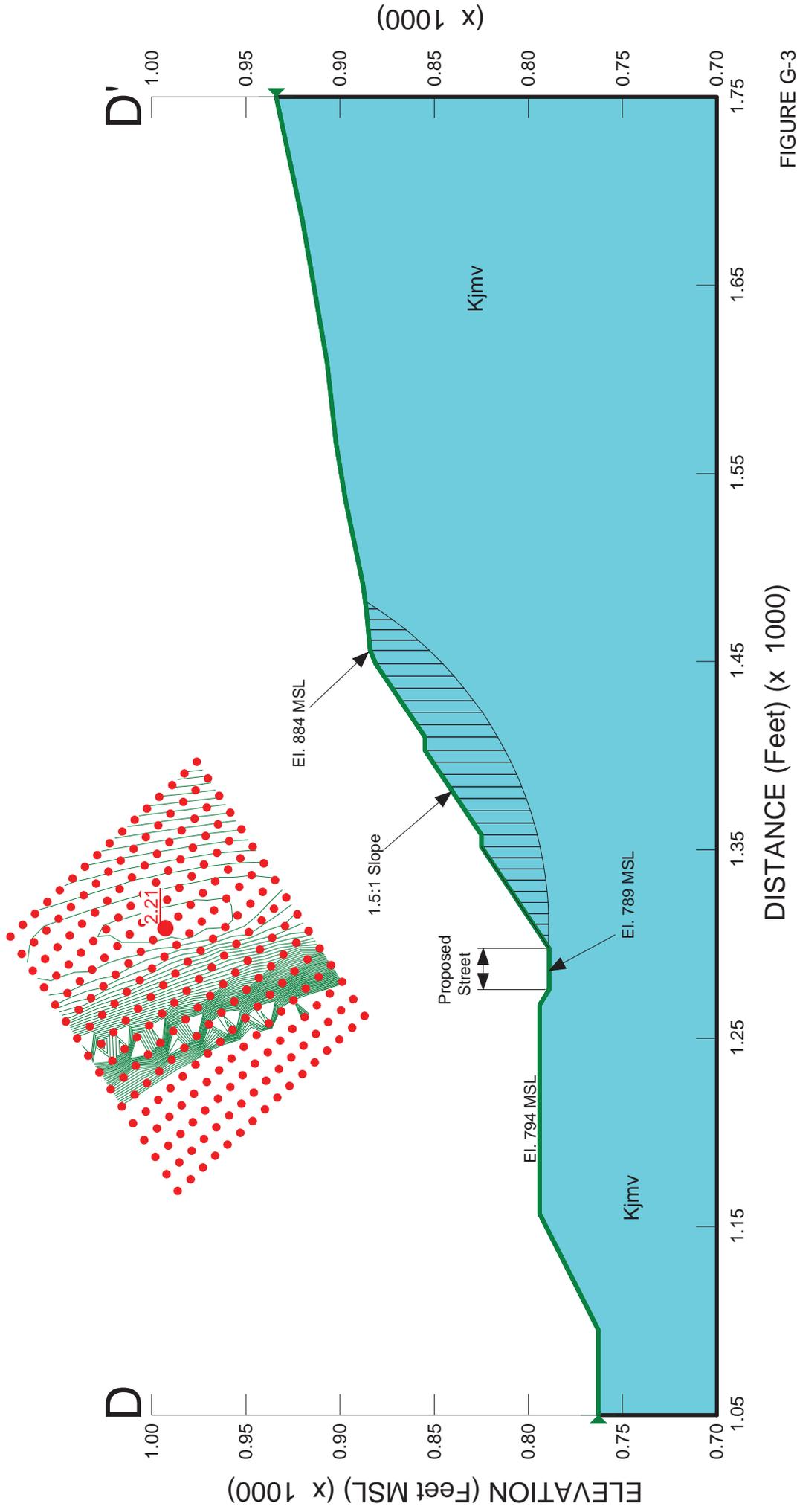
Description: Qcf C: 250psf Phi: 30deg. Wt: 125pcf

Description: To-Claystone C: 300psf Phi: 22deg. Wt: 130pcf

Description: To-Sandstone C: 700psf Phi: 34deg. Wt: 130pcf

Description: Tof C: 200psf Phi: 31deg. Wt: 130pcf

Description: Kjmv C: 1000psf Phi: 35deg. Wt: 130pcf



ASSUMED CONDITIONS :

SLOPE HEIGHT	H = Infinite
DEPTH OF SATURATION	Z = 3 feet
SLOPE INCLINATION	2 : 1 (Horizontal : Vertical)
SLOPE ANGLE	i = 26.6 degrees
UNIT WEIGHT OF WATER	γ_w = 62.4 pounds per cubic foot
TOTAL UNIT WEIGHT OF SOIL	γ_t = 130 pounds per cubic foot
ANGLE OF INTERNAL FRICTION	ϕ = 30 degrees
APPARENT COHESION	C = 250 pounds per square foot

SLOPE SATURATED TO VERTICAL DEPTH Z BELOW SLOPE FACE

SEEPAGE FORCES PARALLEL TO SLOPE FACE

ANALYSIS :

$$FS = \frac{C + (\gamma_t - \gamma_w) Z \cos^2 i \tan \phi}{\gamma_t Z \sin i \cos i} = 2.2$$

REFERENCES :

- 1.....Haefeli, R. *The Stability of Slopes Acted Upon by Parallel Seepage*, Proc. Second International Conference, SMFE, Rotterdam, 1948, 1, 57-62
- 2.....Skempton, A. W., and F.A. Delory, *Stability of Natural Slopes in London Clay*, Proc. Fourth International Conference, SMFE, London, 1957, 2, 378-81

SURFICIAL SOPE STABILITY ANALYSIS

GEOCON
INCORPORATED



GEOTECHNICAL CONSULTANTS
6960 FLANDERS DRIVE - SAN DIEGO, CALIFORNIA 92121 - 2974
PHONE 858 558-6900 - FAX 858 558-6159

OTAY RANCH RESORT VILLAGE
AREA A TENTATIVE MAP
SAN DIEGO COUNTY, CALIFORNIA

JH / RA

DSK/GTYPD

DATE 09 - 05 - 2014

PROJECT NO. G1012 - 52 - 01D FIG. G-5

APPENDIX



APPENDIX H

RECOMMENDED GRADING SPECIFICATIONS

FOR

OTAY RANCH RESORT VILLAGE
AREA A TENTATIVE MAP
SAN DIEGO COUNTY, CALIFORNIA

PROJECT NO. G1012-52-01D

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

- 1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon Incorporated. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.
- 1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.
- 1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, adverse weather, result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

- 2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.
- 2.2 **Contractor** shall refer to the Contractor performing the site grading work.
- 2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

- 2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.
- 2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.
- 2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.
- 2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

- 3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.
- 3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than $\frac{3}{4}$ inch in size.
- 3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.
- 3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than $\frac{3}{4}$ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

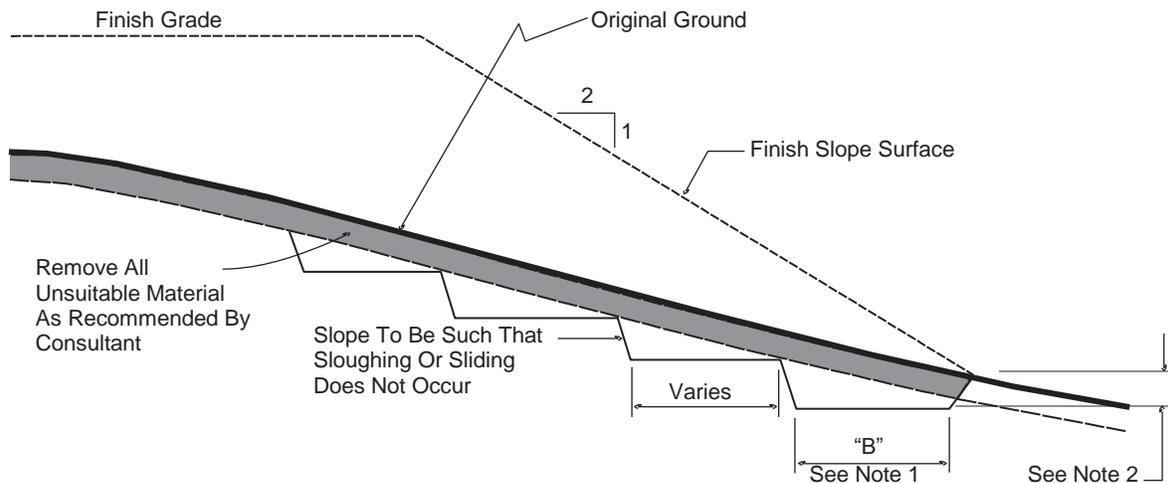
- 3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.
- 3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9 and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.
- 3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.
- 3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.
- 3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

- 4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

- 4.2 Any asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.
- 4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.
- 4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

- DETAIL NOTES:
- (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.
 - (2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

- 4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

- 5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.
- 5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

- 6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:
- 6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.
- 6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557-09.
- 6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.
- 6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

- 6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557-09. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.
- 6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.
- 6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.
- 6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.
- 6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:
- 6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.
- 6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

- 6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.
- 6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.
- 6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.
- 6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.
- 6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:
- 6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.
- 6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the

required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

- 6.3.3 Plate bearing tests, in accordance with ASTM D 1196-09, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.
- 6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of “passes” have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.
- 6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.
- 6.3.6 To reduce the potential for “piping” of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.
- 6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. OBSERVATION AND TESTING

- 7.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.
- 7.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.
- 7.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.
- 7.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.
- 7.5 The Consultant should observe the placement of subdrains, to verify that the drainage devices have been placed and constructed in substantial conformance with project specifications.
- 7.6 Testing procedures shall conform to the following Standards as appropriate:

7.6.1 Soil and Soil-Rock Fills:

- 7.6.1.1 Field Density Test, ASTM D 1556-07, *Density of Soil In-Place By the Sand-Cone Method.*
- 7.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938-08A, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*
- 7.6.1.3 Laboratory Compaction Test, ASTM D 1557-09, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*
- 7.6.1.4. Expansion Index Test, ASTM D 4829-08A, *Expansion Index Test.*

7.6.2 Rock Fills

- 7.6.2.1 Field Plate Bearing Test, ASTM D 1196-09 (Reapproved 1997) *Standard Method for Nonreparative Static Plate Load Tests of Soils and Flexible Pavement Components, For Use in Evaluation and Design of Airport and Highway Pavements.*

8. PROTECTION OF WORK

- 8.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.
- 8.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

9. CERTIFICATIONS AND FINAL REPORTS

- 9.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.
- 9.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.