

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

GEOTECHNICAL DATA FROM SURFACE AND SUBSURFACE SAMPLES
OUTSIDE OF AND WITHIN LIQUEFACTION-RELATED
GROUND FAILURES CAUSED BY THE
OCTOBER 17, 1989, LOMA PRIETA EARTHQUAKE,
SANTA CRUZ AND MONTEREY COUNTIES, CALIFORNIA

by

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INTRODUCTION

In this paper, we present a set of basic data obtained by the U.S. Geological Survey from field and laboratory studies of liquefaction-related ground failure in the Monterey Bay area (fig. 1). Following the October 17, 1989, Loma Prieta earthquake, investigators observed many ground failures caused by liquefaction, chiefly in Holocene floodplain deposits. Liquefaction failures were especially frequent in a narrow corridor along the region's principal rivers, and within coastal spits and eolian dunes. In the upper Pajaro river basin, occasional occurrences of liquefaction, including lateral spreading, were noted from the headwater areas east of Gilroy to Chittenden Gap and from below Chittenden Gap to the mouth of the Pajaro. Along the coast, liquefaction was commonly observed associated with post-1854 but pre-1906 channels and related deposits of the Pajaro and Salinas river and their tributaries, and near Elkhorn Slough and Moss Landing. In the Salinas Valley, liquefaction including lateral spreading was observed along the present channel from Davis Road Near Salinas to the mouth at Monterey Bay. Types of liquefaction-induced failures and ground effects observed included lateral spreading, differential ground settlement, loss of bearing capacity, and the formation of sand boils on the ground surface. Permanent ground displacements induced by liquefaction impacted many types of structures, including buildings, bridges, roads, pipelines, irrigation works, water wells, flood control levees and sea walls. Flow failure on hillslopes was the only type of liquefaction failure not observed in 1989, perhaps because of drainage and desiccation of hillslope colluvium during intense drought conditions in the years prior to the earthquake.

A modern geologic map showing Quaternary deposits and a derivative map showing relative liquefaction hazard were published by the U.S. Geological Survey prior to the 1989 earthquake (Dupre and Tinsley, 1980). Except for minor modifications, the techniques employed to derive the hazard map used the methods of Youd and Perkins (1978). The proximity of the 1989 Loma Prieta earthquake to the Monterey Bay area provided an excellent opportunity to evaluate the performance of published regional liquefaction hazard maps, it also provided a natural laboratory to study the process of liquefaction. Consequently, this report contains data representing index properties of soils that failed owing to liquefaction as well as for adjacent deposits that did not fail. A few sites were selected for study in order to obtain index properties on soils underlying deposits that were mapped by Dupre and Tinsley (1980) as being too well-consolidated to develop liquefaction, but which were known to contain perched ground water and about which there was some question about the properties of the materials. In general, where lateral spreading was observed, cone penetration tests (CPT) were conducted to include not only the deposits that liquefied but also the adjacent deposits that did not liquefy. This approach was designed to investigate how stratigraphy controls the occurrence of liquefaction, and to provide data for modeling the process of lateral spreading.

METHODS

Field Methods

Cone Penetration Test (CPT)

Cone penetration tests were made at each of the sites (Table 1, figs. 2-23) to determine stratification and penetration resistance for liquefaction analyses. We used a Hogentogler (any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS) 10-ton subtraction cone with a single element strain gauge. The strain gauge is located in a 3.57-cm diameter housing, the tip of which is a 60° 10 cm² cone. Penetration resistance (qc) is measured at the cone, side friction (Fs) is measured along

a 150 cm² sleeve located behind the cone. The cone is advanced into the soil at a rate of 2-cm per second. Penetration resistance at the cone is measured in mN/m², sleeve resistance is measured in kN/m². Cone resistance and the ratio (Rf) between sleeve resistance and cone resistance, in percent, is used to determine soil type. The procedures and equipment meet the requirements of ASTM D3441-79 (American Society for Testing and Materials (ASTM), 1983).

Standard Penetration Test (SPT)

After CPT soundings determined stratification, SPT's (Table 1, figs. 2-23) were made three to five feet (1-1.5 m) away from the CPT's to measure dynamic penetration resistance and obtain samples for liquefaction analyses. The SPT procedures follow the guidelines outlined in D1586-67 (ASTM, 1983). Modifications for use with hollow-stem augers (10-inch (25.4 cm) outside diameter, 4-inch (10.2 cm) inside diameter) are described in Youd and Bennett (1983). A Mobile "ADO standard penetration sampler", 2-inch (5.1 cm) outside diameter, with 1.38-inch (3.5 cm) inside diameter, with split liners was used to obtain samples. The sampler is advanced by repeatedly dropping a 140 lb (63.6 kg) Mobile "In-hole sampling hammer" 30 inches (76 cm). The penetration resistance (N) is equal to the number of hammer blow needed to advance the sampler 1 foot (30.5 cm) past an initial 6-inch (15.2 cm) seating interval. The hammer is raised and dropped using a Mobile "Safe-T-Driver" hoist. When the hammer reaches the proper height the hoist is reversed, as a result the cable is thrown off and the hammer falls with less friction or resistance than a rope-around-a-cathead type hoist. The overall efficiency of the hammer-hoist system is 68 percent (Douglas and Strutynsky, 1984). Undisturbed samples were also taken using thin-walled Shelby tubes. Tubes were slowly pushed into the soil 24 in (0.61 m) and then rotated to shear off the sample from the undisturbed soil.

Laboratory Methods

Index tests conducted in the laboratory include; grain size (D422-63, ASTM, 1983), liquid limit (D423-66, ASTM, 1983), plastic limit (D424-59, ASTM, 1983), and water content (D2216-80, ASTM, 1983). Samples were classified according to the Unified Soil Classification (USC) (D2488-69, ASTM, 1983) as modified by Howard (1984). Table 2 is a list of index properties from all of the sites. Shelby tubes with samples were cut into 4 in (102 mm) lengths for density and vane shear tests. Each subsample was measured and weighed. Unconfined strength was determined by averaging 3 or 4 measurements using a pocket penetrometer. Laboratory vane tests were conducted, with samples still in the tubes, using a Wykeham Farrance laboratory vane shear device, model LV1-452. The vanes are 0.5 by 0.5 in (12.7 by 12.7 mm) and were rotated at about 90 degrees per minute. The vane was inserted into the soil 1.6 in (40 mm). Peak strength and vane rotation were measured, then the vane was rotated twice and remolded strength measured. After the vane was removed water content samples were taken from the area of the vane test. The sample was then extruded, the tube cleaned and weighed, and density calculated. Table 3 is a list of the strength measurements and density calculations. Table 4 is a list of radiocarbon dates. Index properties, blow counts, CPT records, lithology, and descriptions for all the soundings and borings are shown in Logs 1-151.

Liquefaction Resistance

Liquefaction resistance is determined using the empirical methods developed by Seed and others (1983) and modified by Seed and others (1985). Liquefaction resistance was calculated using PETAL2 (Chen, 1986). Inputs to the program include; ground acceleration, and magnitude; soil density, 120 pounds per cubic foot above the water table and 130 pounds per cubic foot below the water table; fines content and median grain size (Table 2); and blow count (N) and cone resistance (qc). The accelerations that we used were based on peak ground accelerations at: Corralitos, Watsonville, Salinas, and Greenfield.

Output from PETAL2 includes modified blow count ($N_{1,60}$) and a modified blow count based on the qc value; induced cyclic stress ratio and stress ratio required to liquefy; and the factor of safety (FS) against liquefaction. The induced cyclic stress ratio (CSR-I) is equal to:

$$\text{CSR-I} = 0.65 \cdot (A/g) \cdot (\text{total stress/effective stress}) \cdot r_d \quad (1)$$

Where A is the peak ground acceleration; g is the acceleration due to gravity; and r_d is a stress reduction factor that varies from 1 at the ground surface to about 0.9 at a depth of 30 ft (9.1 m) beneath the surface. The factor of safety (FS) is defined as the stress ratio required to liquefy divided by the stress ratio induced by the earthquake. If the FS is greater than 1 the deposit is said to have a high resistance (H) to liquefaction, if the FS is less than 1 the liquefaction resistance is low (L). If the FS determined by the SPT and CPT methods agree an "H" or "L" is placed in the liquefaction resistance column in the log. If the SPT and CPT methods disagree, a liquefaction resistance is chosen that best fits the conditions and an asterisk marks the liquefaction resistance symbol (H^* , L^*) to show there was disagreement between methods. If the soil contains less than 15 percent clay but is above the water table a "D" (dry) is placed in the column, if the soil contains more than 15 percent clay a "C" is placed in the column indicating no liquefaction. Table 5 contains calculated liquefaction resistance values determined by CPT and SPT. All of the liquefaction resistances reported here are preliminary, liquefaction resistances are expected to change as accelerations at the sites are more accurately determined.

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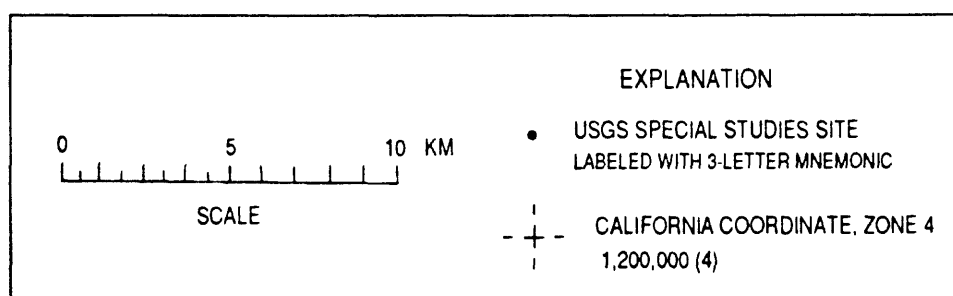
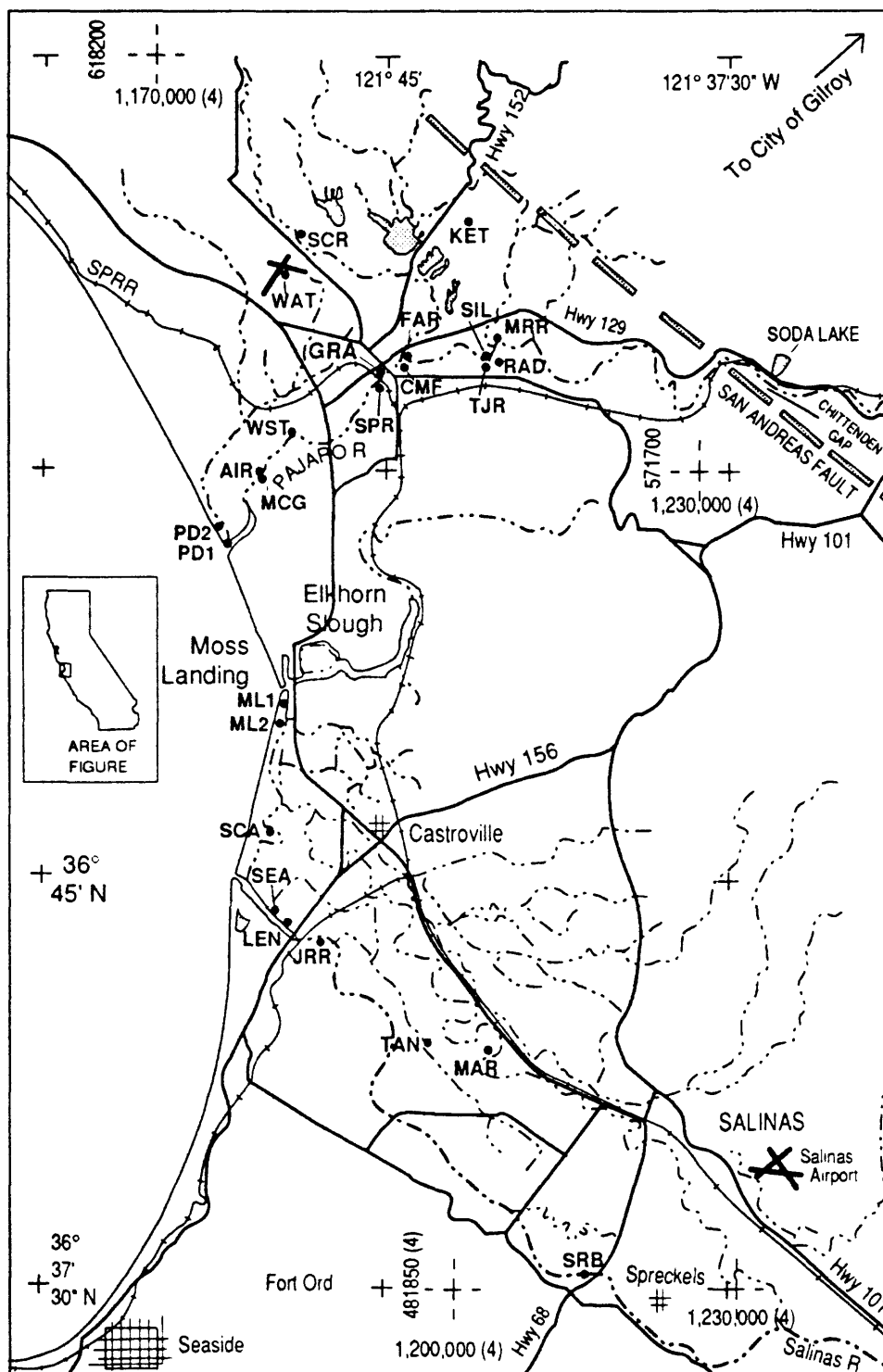
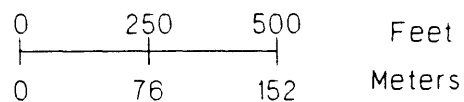
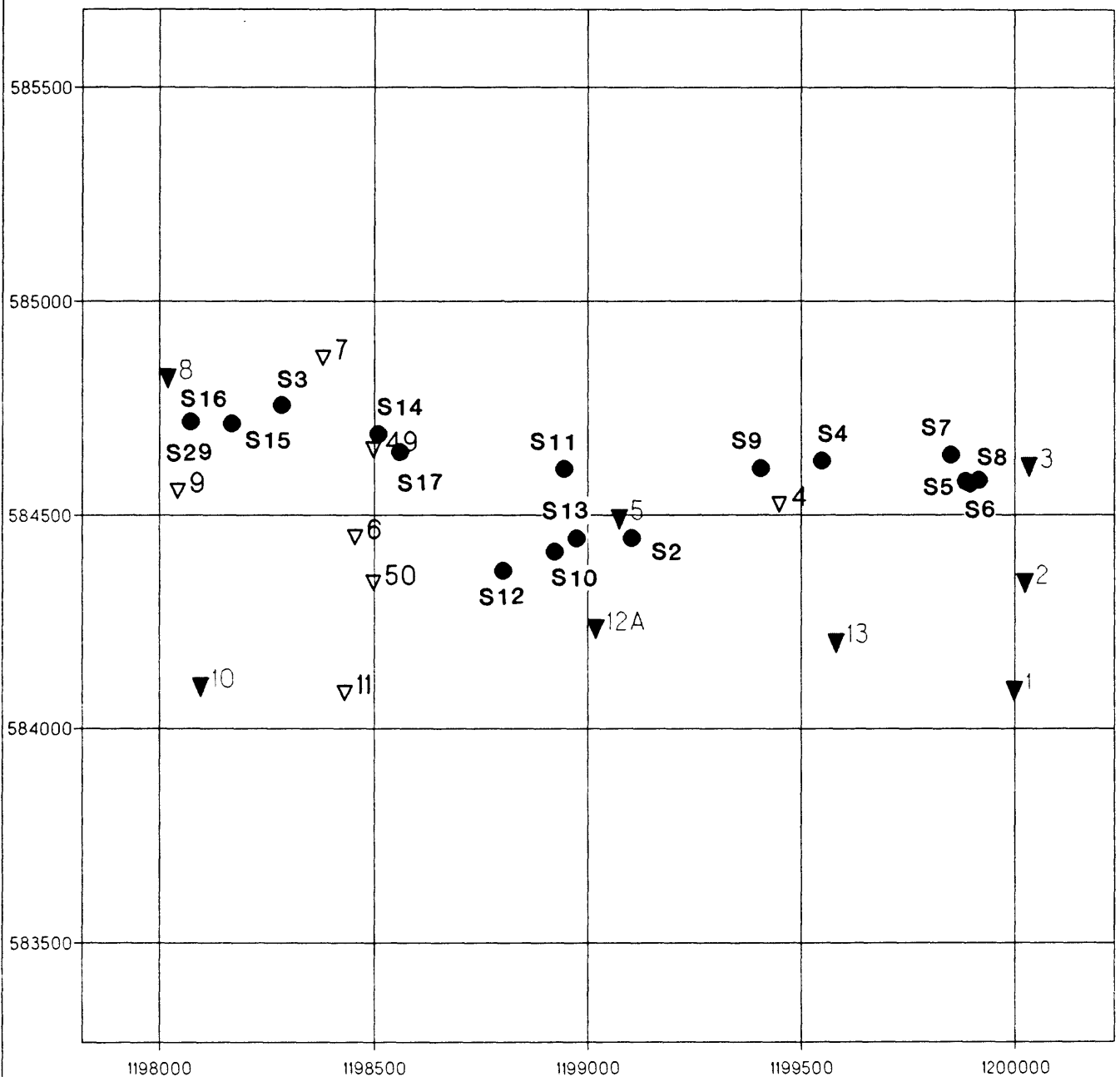


Figure 1

County: MONTEREY, 7.5 min Quad: WATSONVILLE EAST

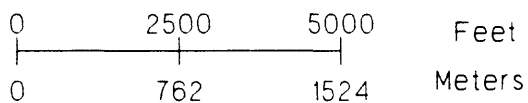
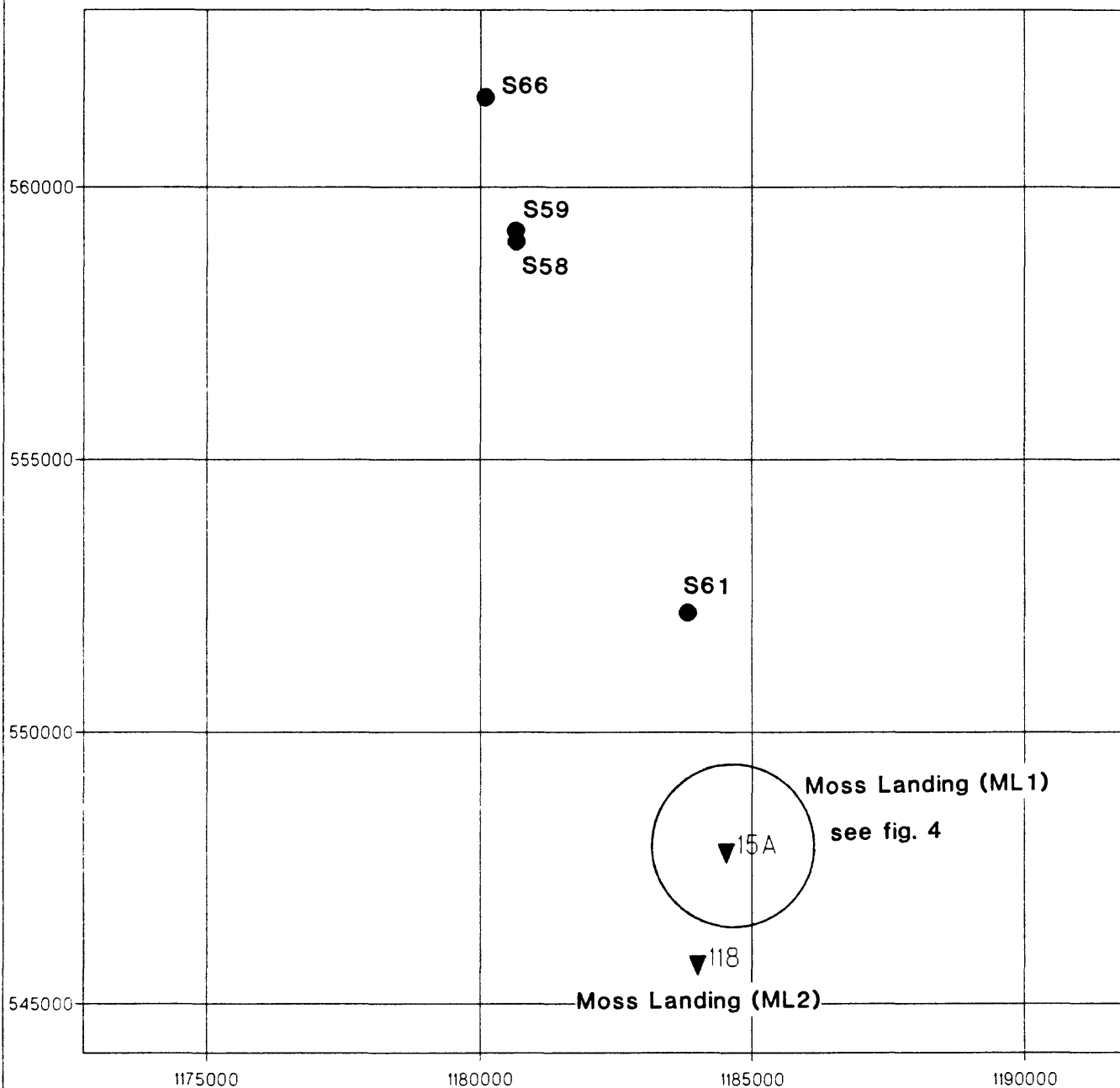


LOCATION: Miller Farm (CMF)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 2

County: MONTEREY, 7.5 min Quad: MOSS LANDING

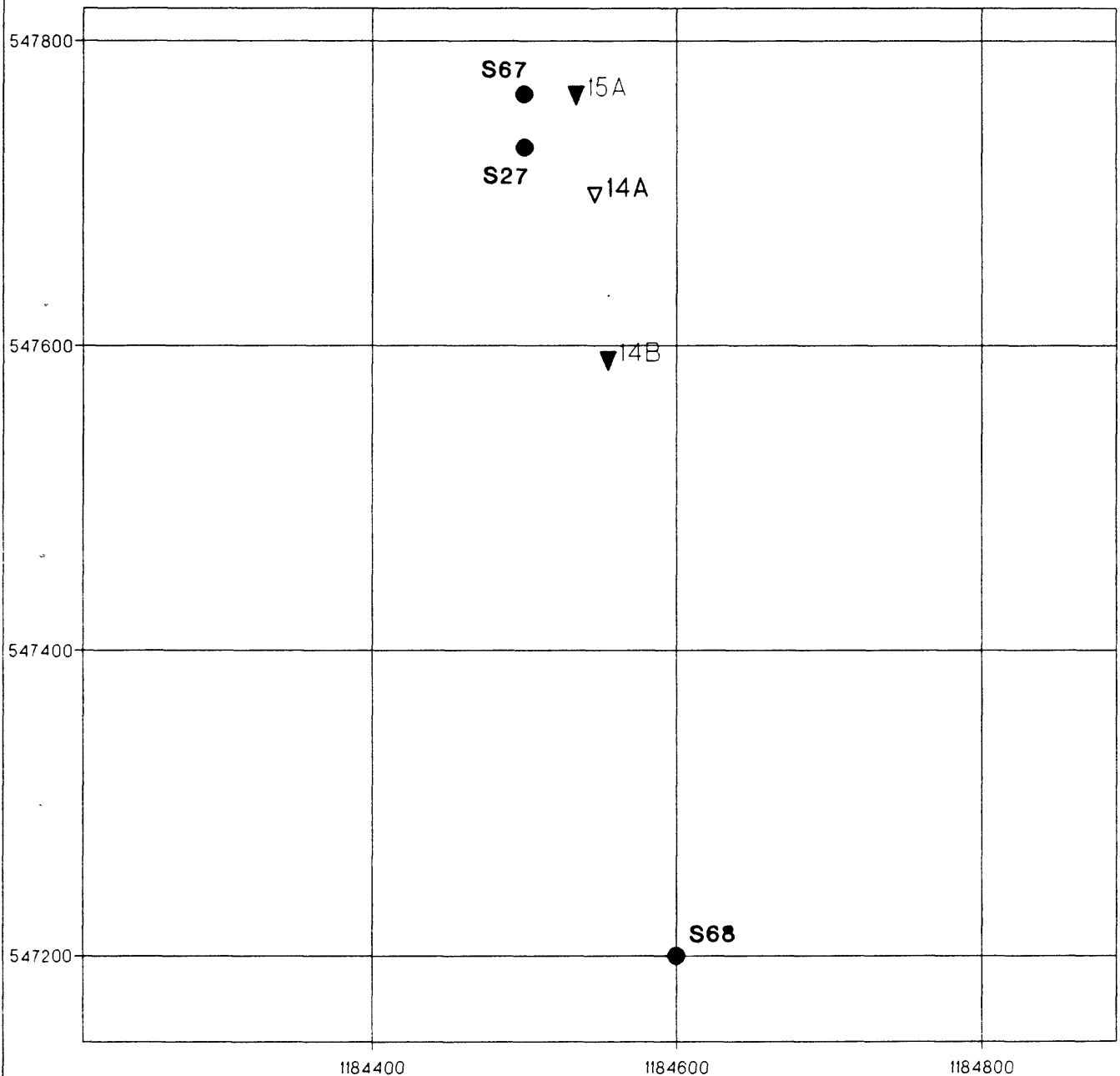


LOCATION: Moss Landing Area

▼=CPT and SPT ●=SURFACE SAMPLE

Figure 3

County: MONTEREY, 7.5 min Quad: MOSS LANDING

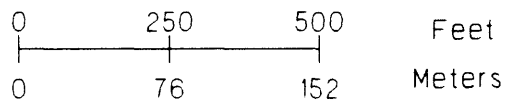
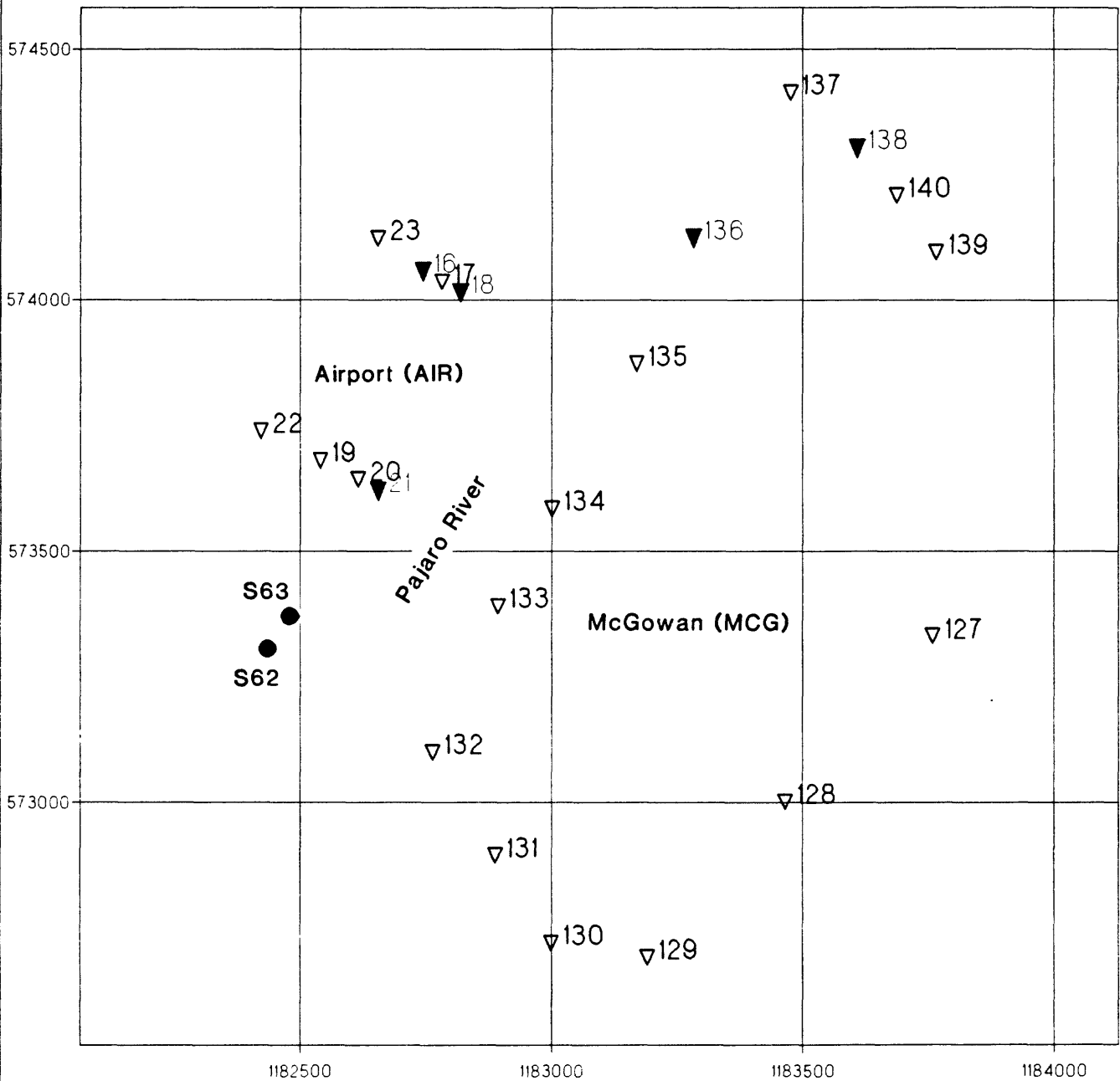


LOCATION: Moss Landing (ML1)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 4

County: MONTEREY, 7.5 min Quad: WATSONVILLE WEST

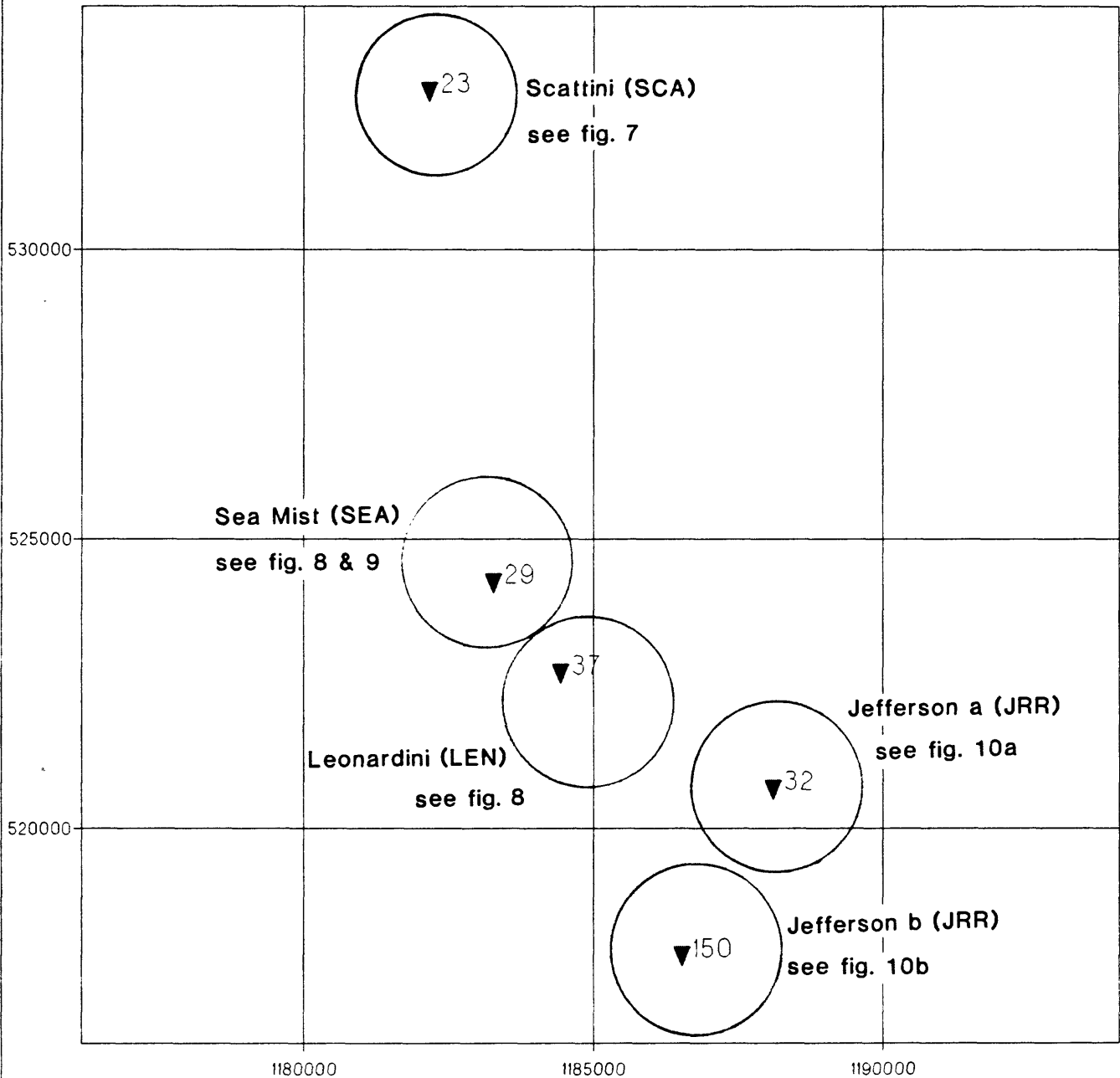


LOCATION: Airport (AIR) and McGowan (MCG)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 5

County: MONTEREY, 7.5 min Quad: MARINA

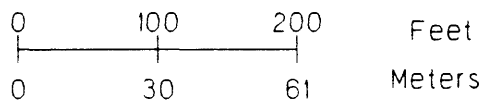
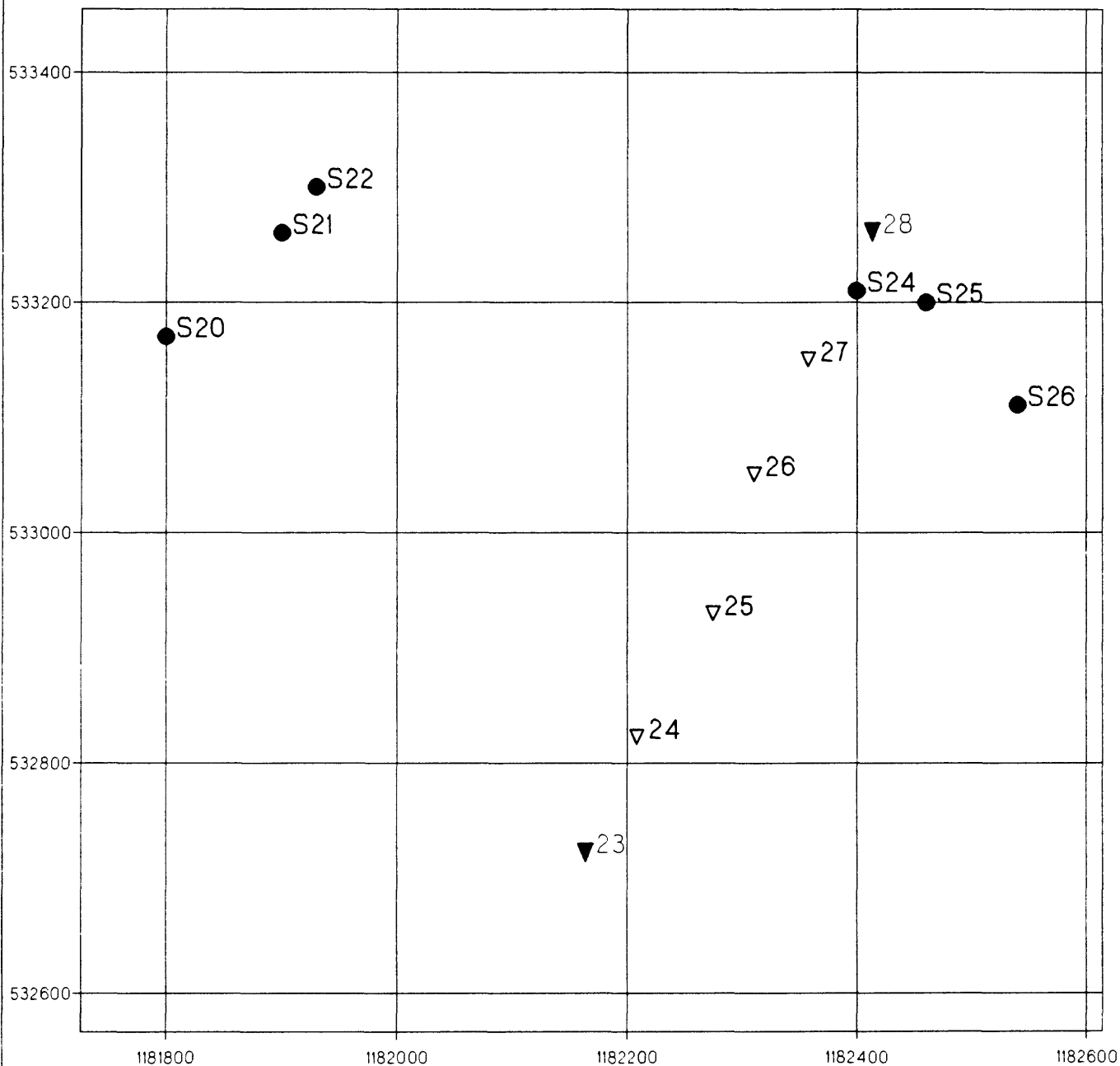


LOCATION: Castroville Area (SCA) (SEA) (LEN) (JRR)

▼=CPT and SPT

Figure 6

County: MONTEREY, 7.5 min Quad: MOSS LANDING

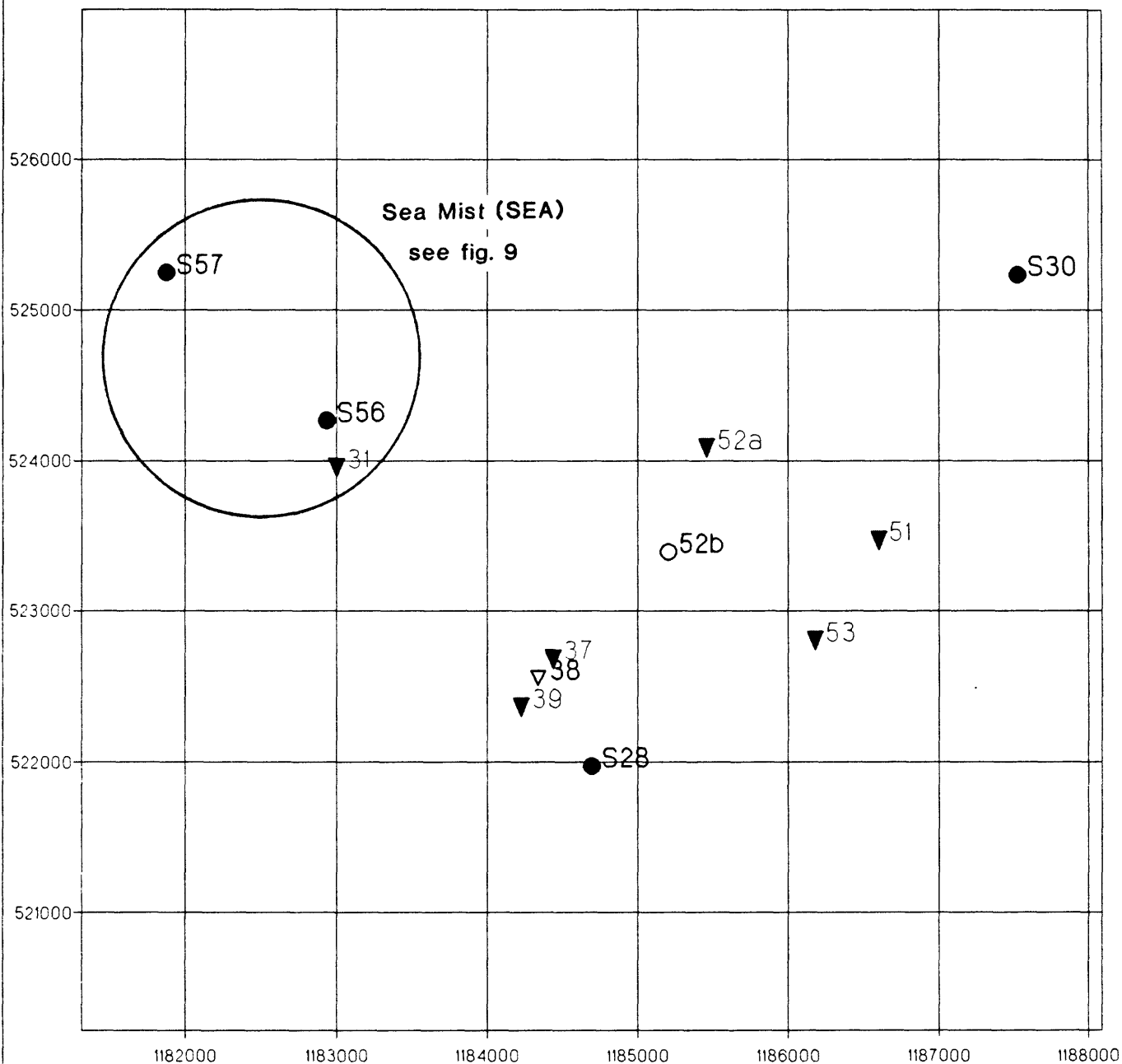


LOCATION: Scattini (SCA)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 7

County: MONTEREY, 7.5 min Quad: MARINA



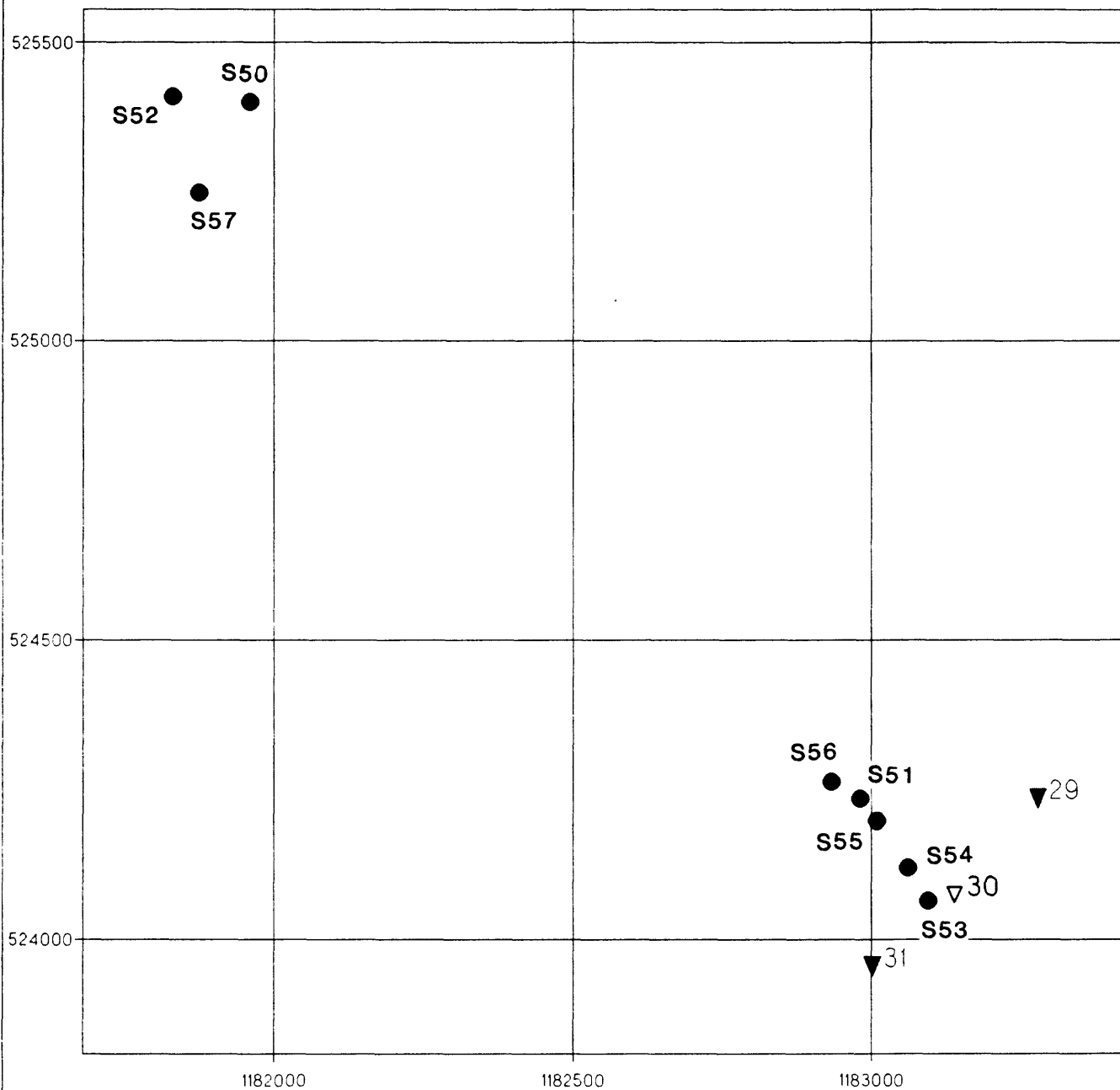
0 500 1000 Feet
0 152 305 Meters

LOCATION: Leonardini (LEN) and Sea Mist (SEA)

▽=CPT ○=SPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 8

County: MONTEREY, 7.5 min Quad: MARINA



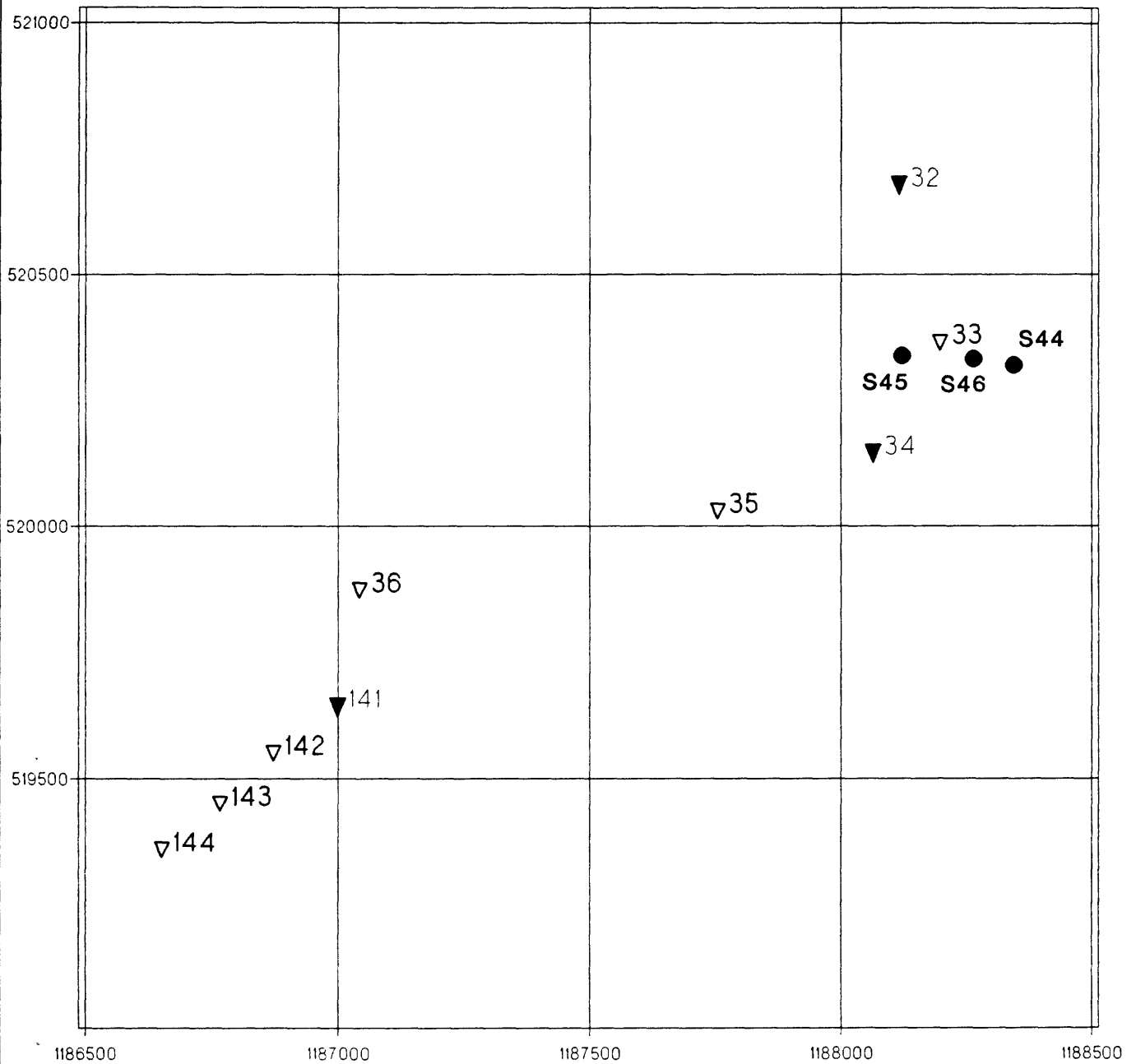
0 250 500 Feet
0 76 152 Meters

LOCATION: Sea Mist (SEA)

▼=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 9

County: MONTEREY, 7.5 min Quad: MARINA



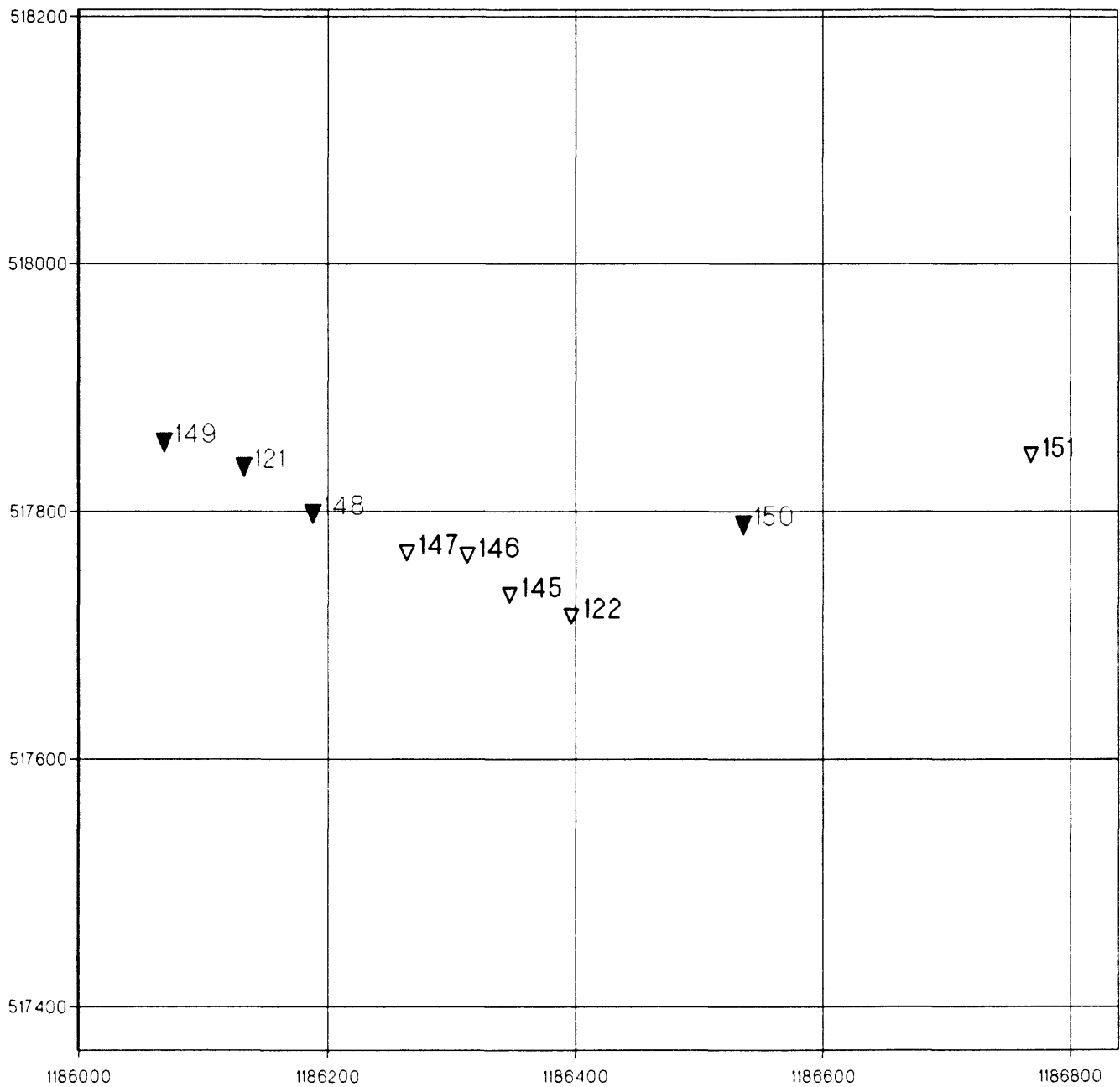
0 250 500 Feet
0 76 152 Meters

LOCATION: Jefferson Ranch a (JRR)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 10a

County: MONTEREY, 7.5 min Quad: MARINA



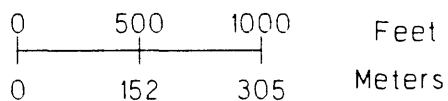
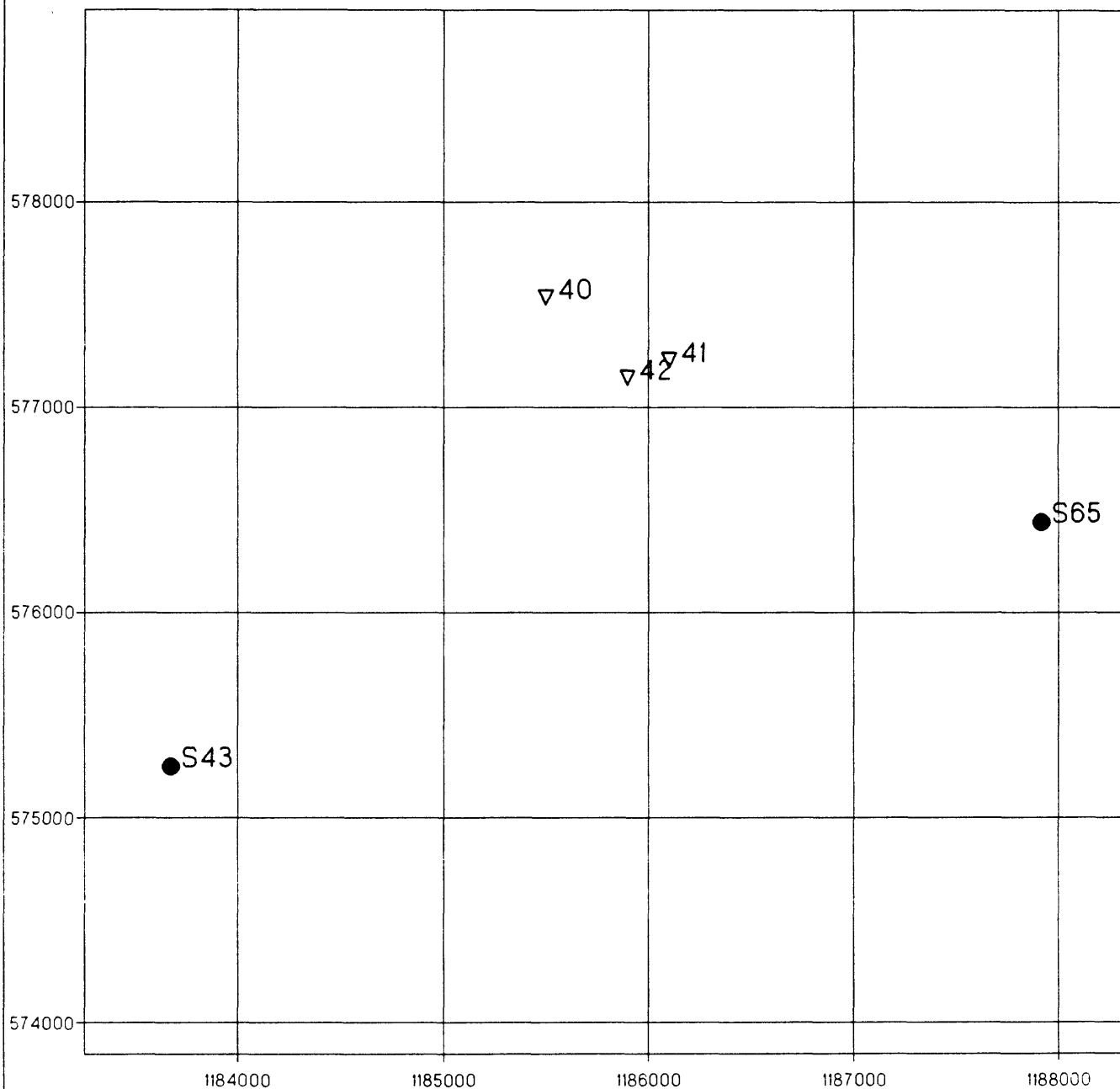
0 100 200 Feet
0 30 61 Meters

LOCATION: Jefferson Ranch b (JRR)

▽=CPT ▼=CPT and SPT

Figure 10b

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE WEST

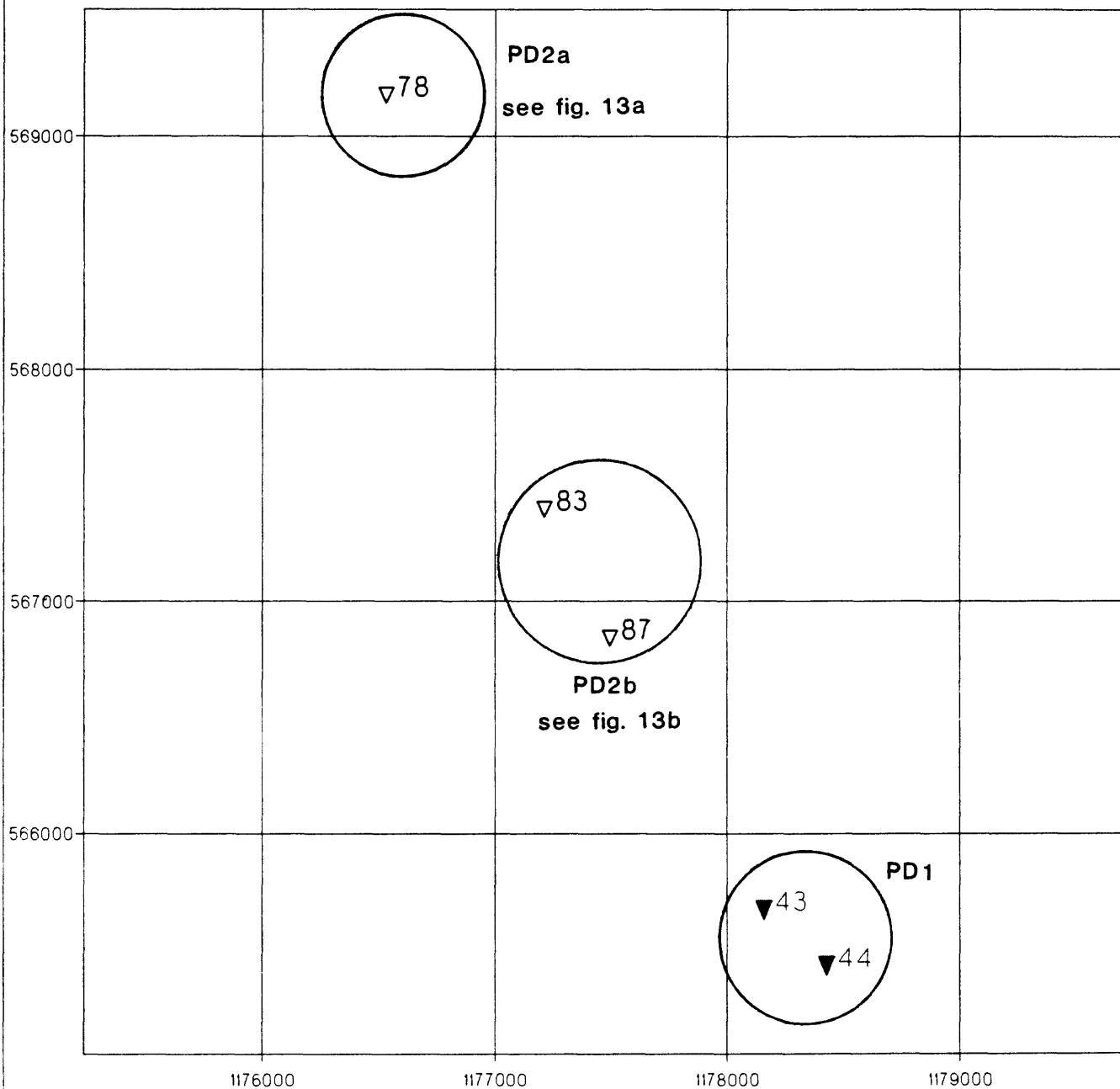


LOCATION: Water Treatment Plant (WST)

▽=CPT ●=SURFACE SAMPLE

Figure 11

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE WEST

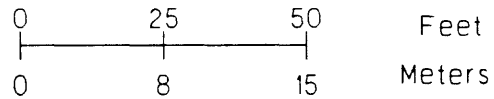
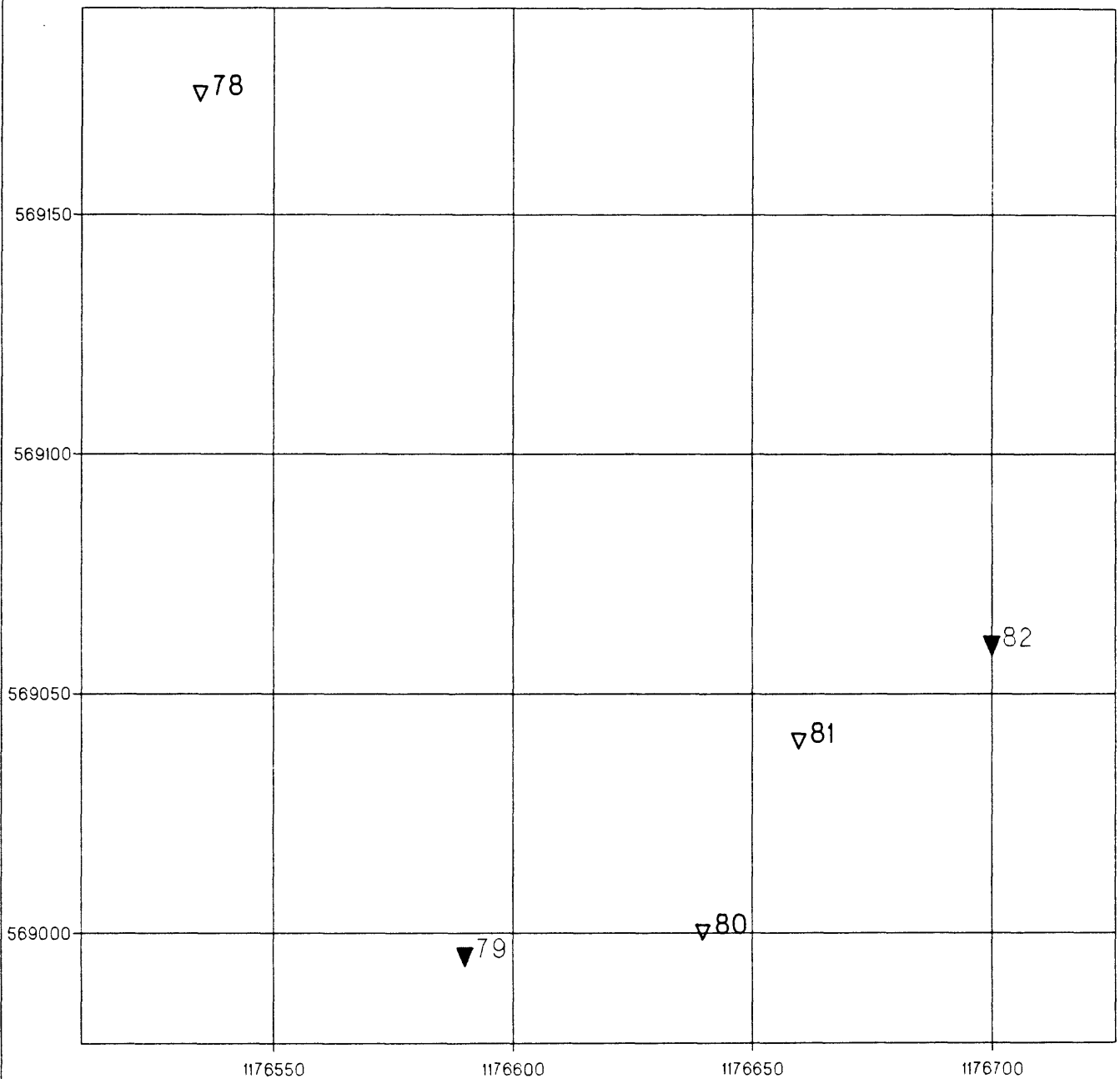


LOCATION: Pajaro Dunes (PD1 and PD2)

▽=CPT ▼=CPT and SPT

Figure 12

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE WEST

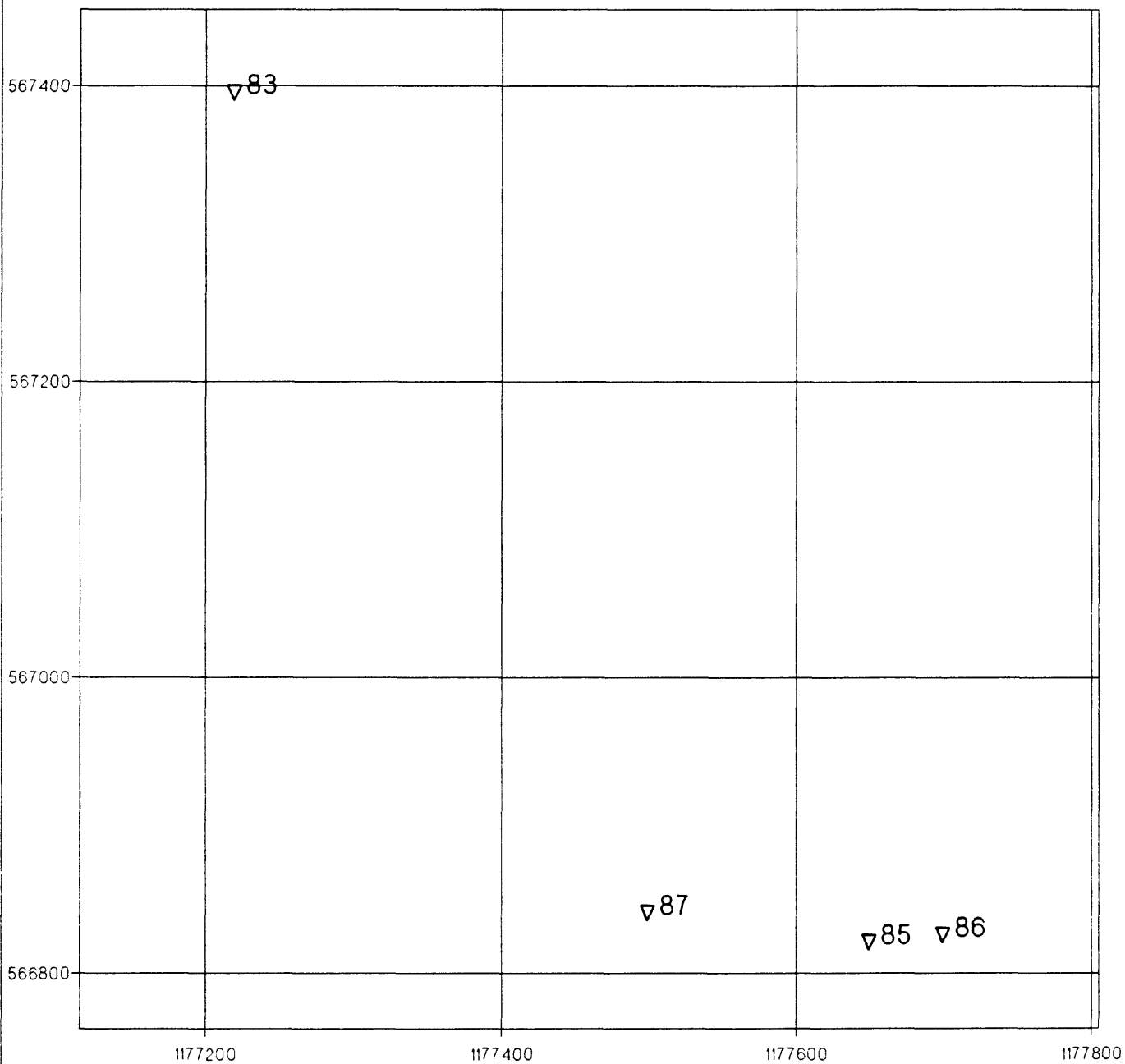


LOCATION: Pajaro Dunes a (PD2)

▽=CPT ▼=CPT and SPT

Figure 13a

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE WEST

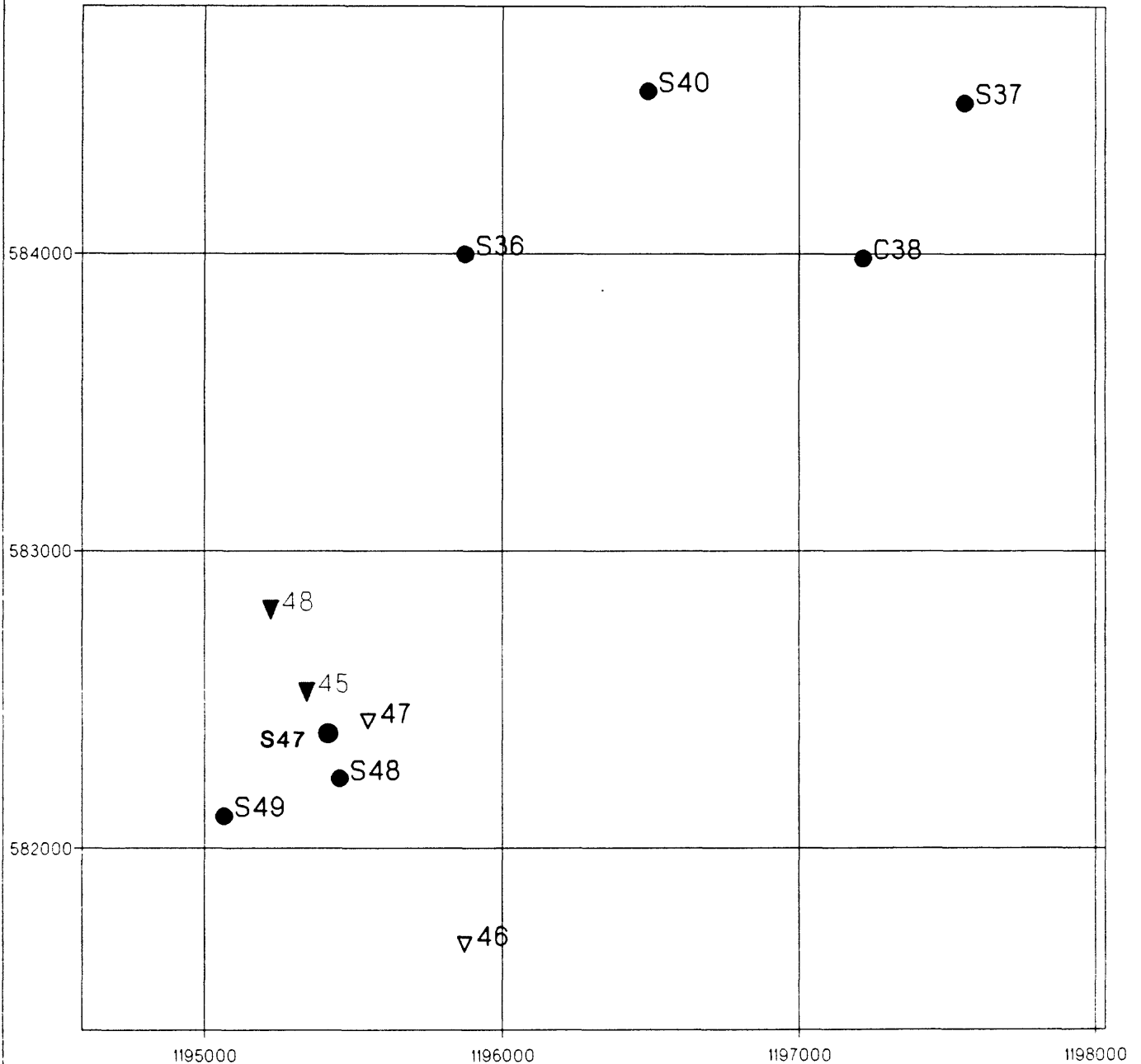


LOCATION: Pajaro Dunes b (PD2)

▽=CPT

Figure 13b

County: MONTEREY, 7.5 min Quad: WATSONVILLE WEST



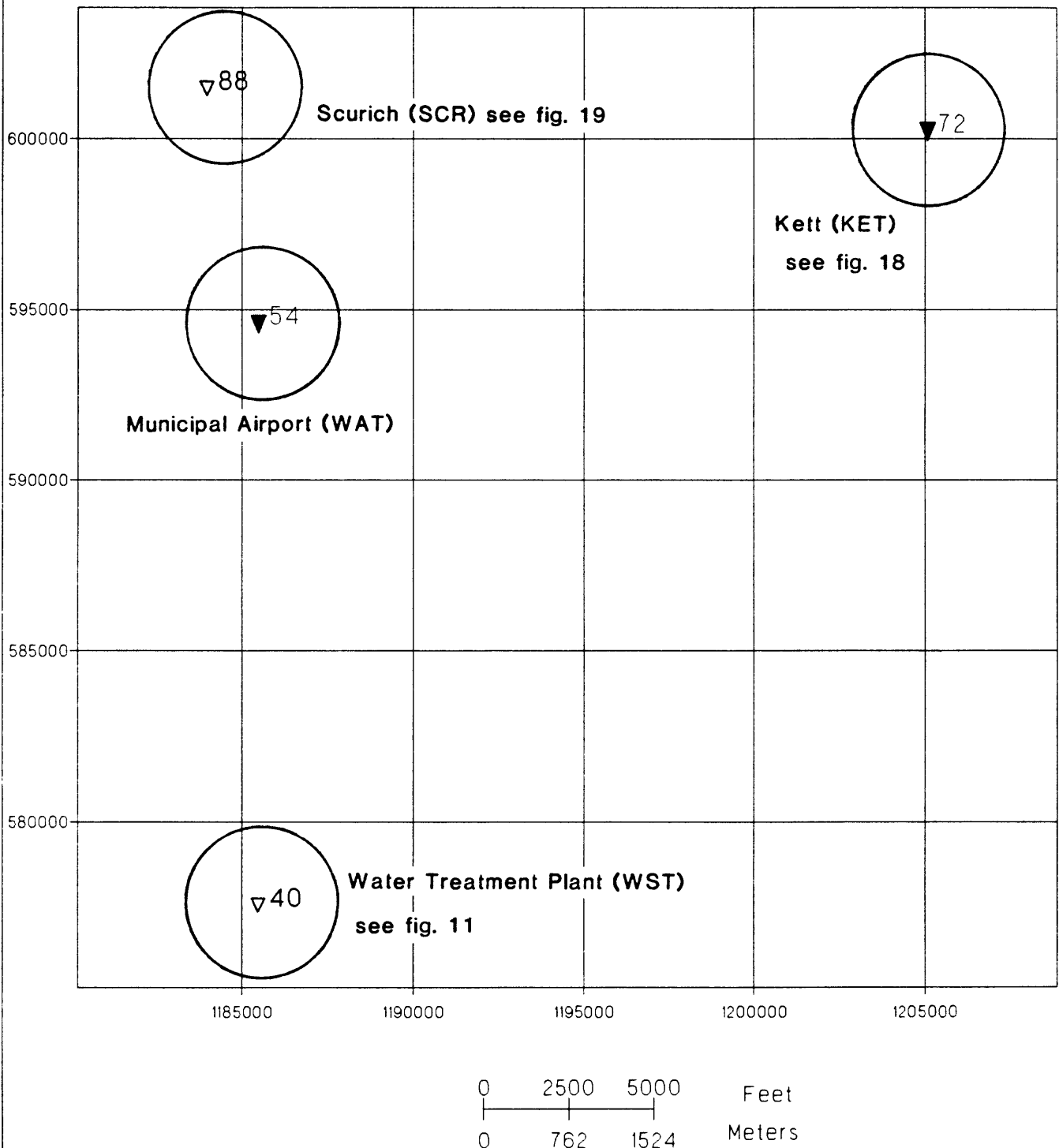
0 500 1000 Feet
0 152 305 Meters

LOCATION: SP Bridge Area (SPR)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 14

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE WEST

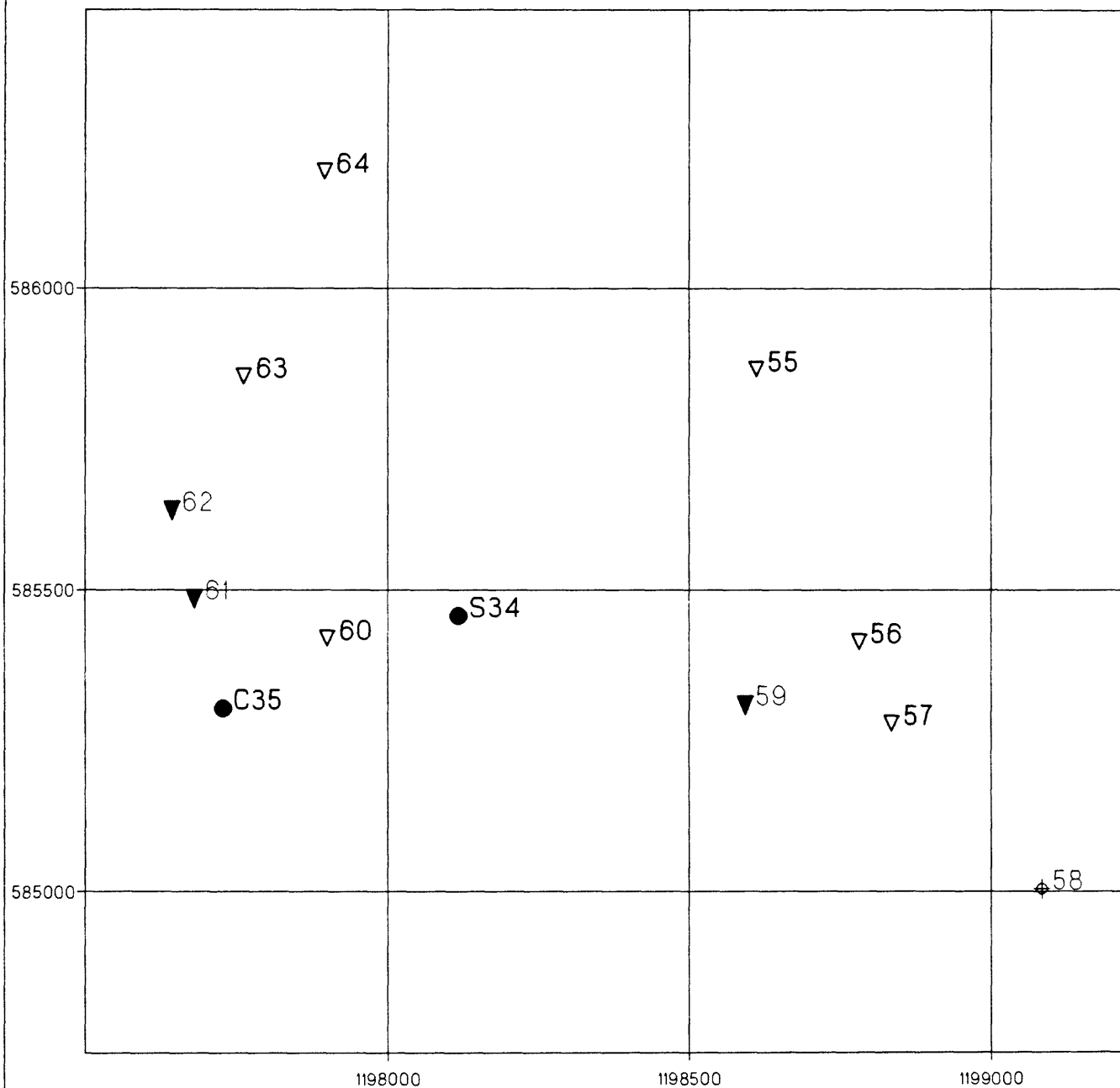


LOCATION: Watsonville Area (WST) (WAT) (KET) (SCR)

▽=CPT ▼=CPT and SPT

Figure 15

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE EAST



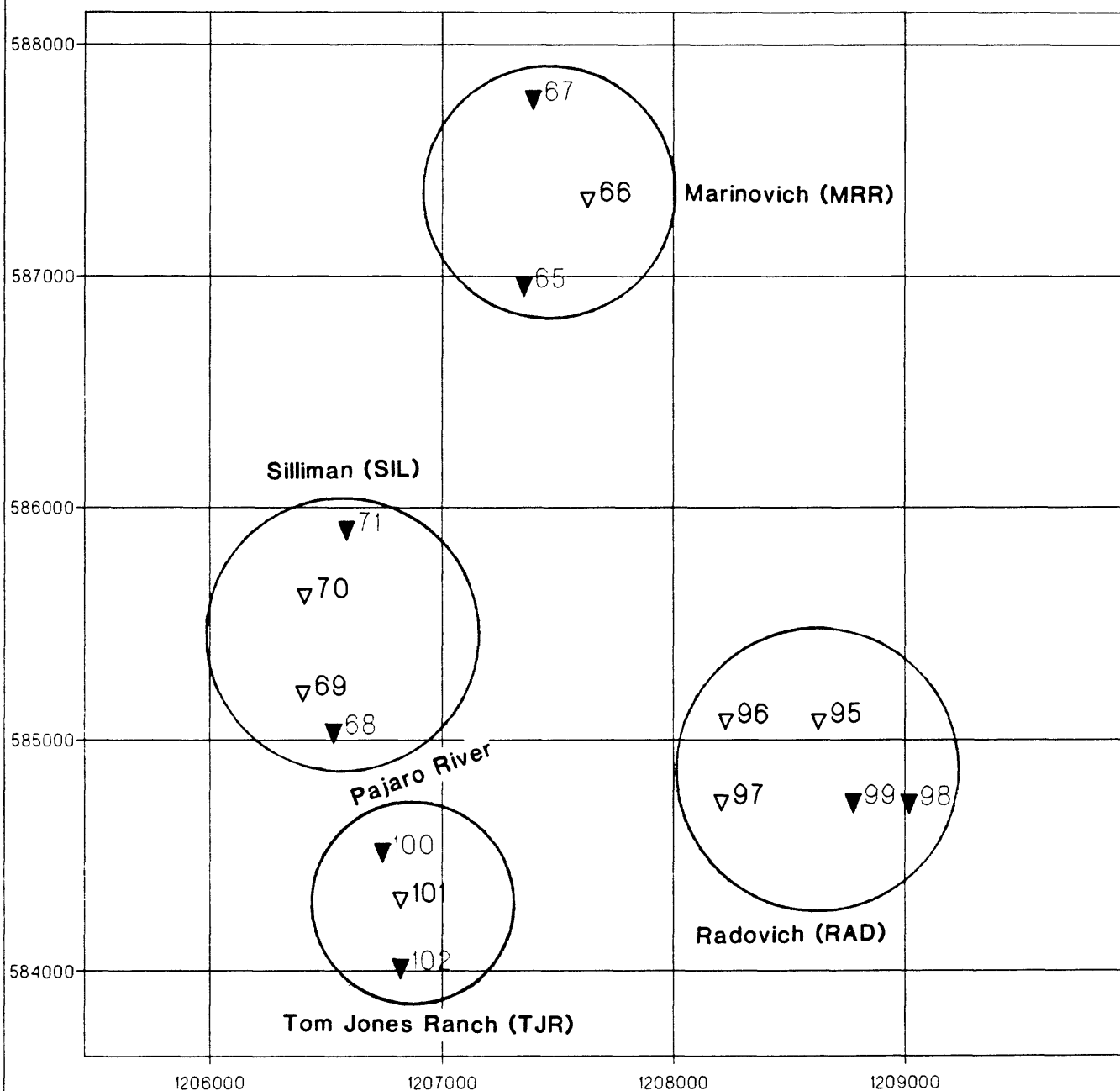
0 250 500 Feet
0 76 152 Meters

LOCATION: Faris Farms (FAR)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE ◆=WELL

Figure 16

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE EAST

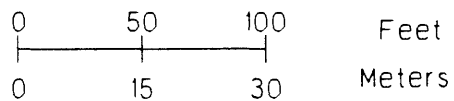
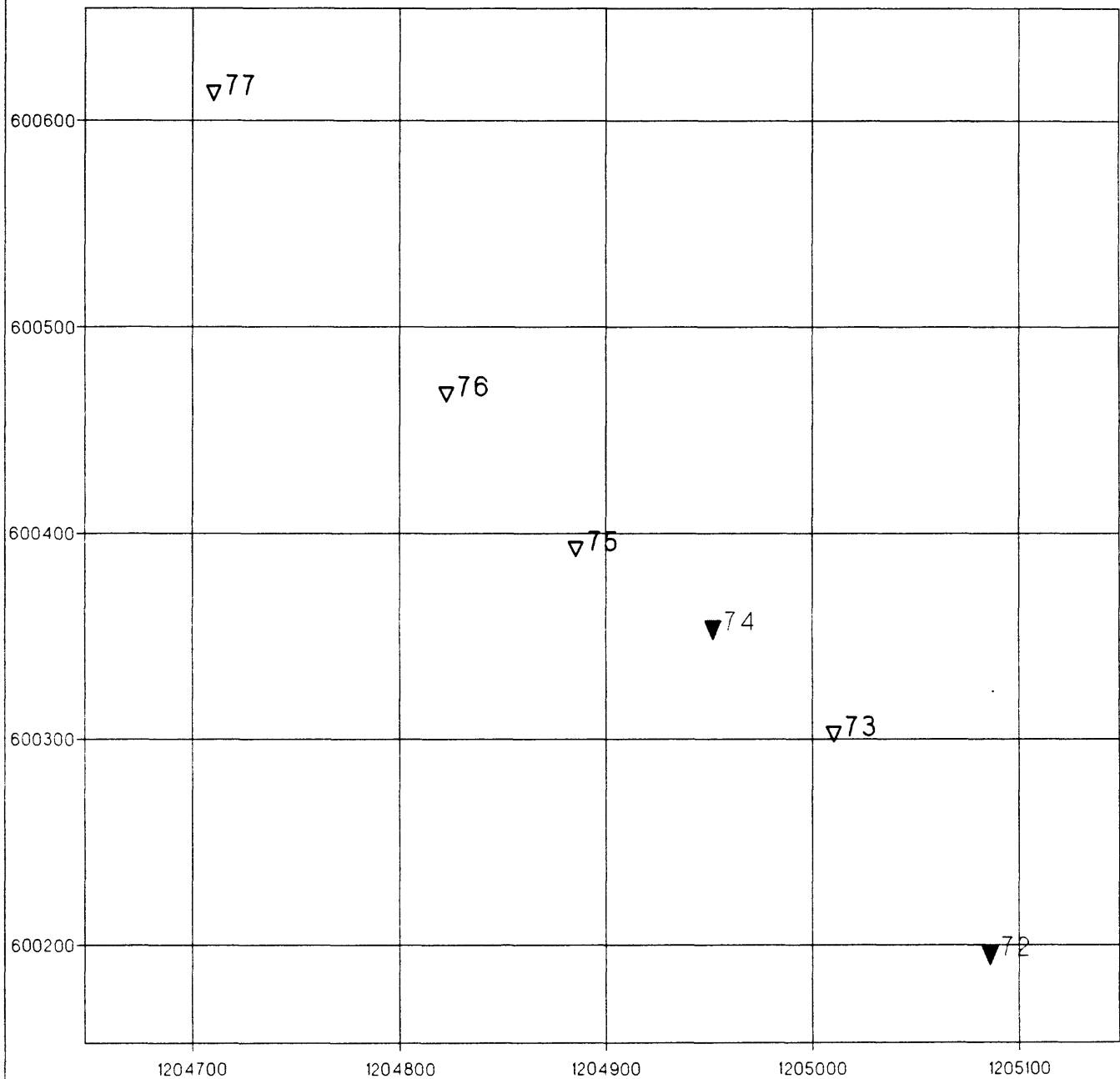


LOCATION: (RAD) (TJR) (SIL) (MRR)

▽=CPT ▼=CPT and SPT

Figure 17

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE EAST

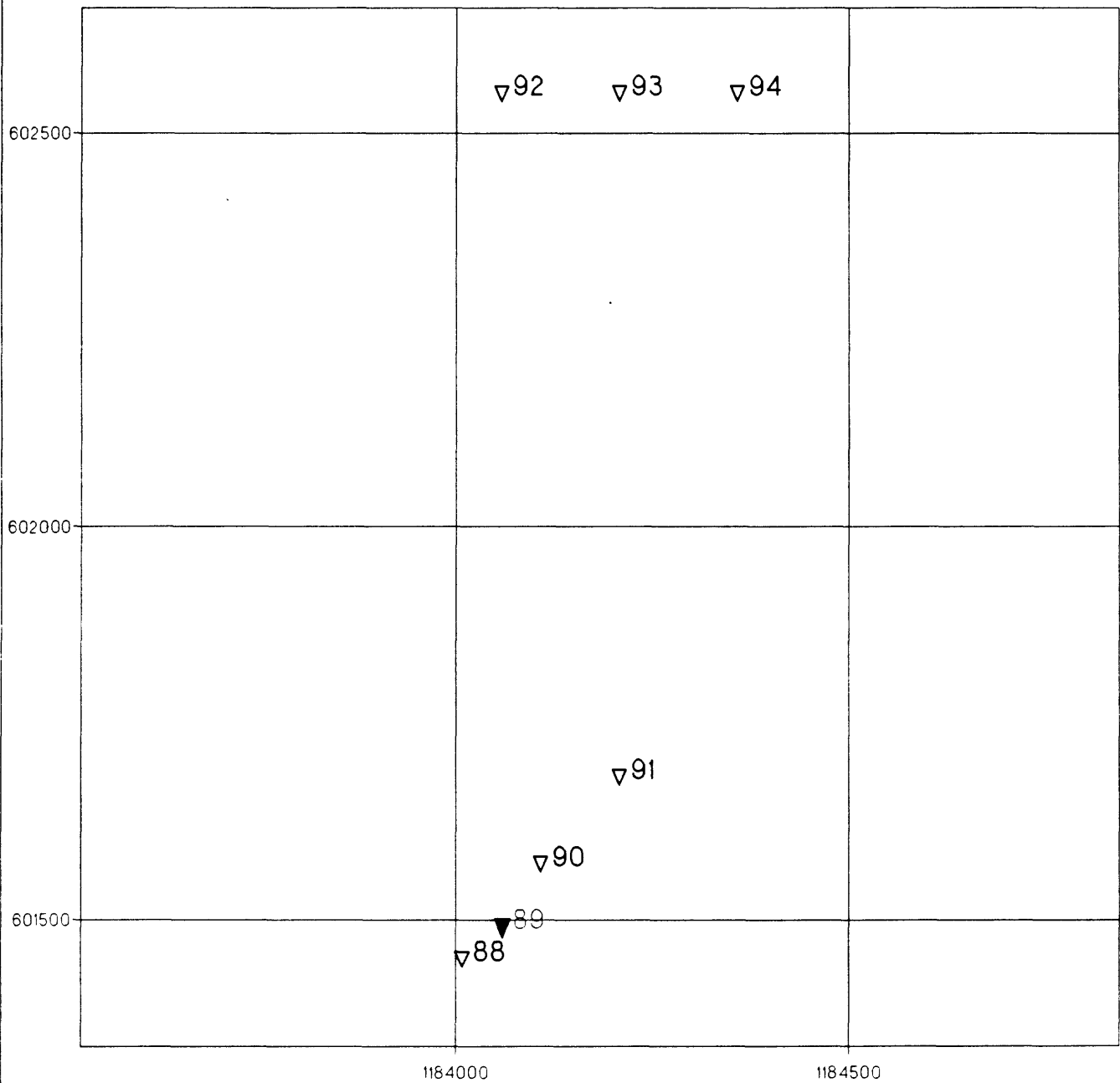


LOCATION: Kett (KET)

▽=CPT ▼=CPT and SPT

Figure 18

County: SANTA CRUZ, 7.5 min Quad: WATSONVILLE EAST

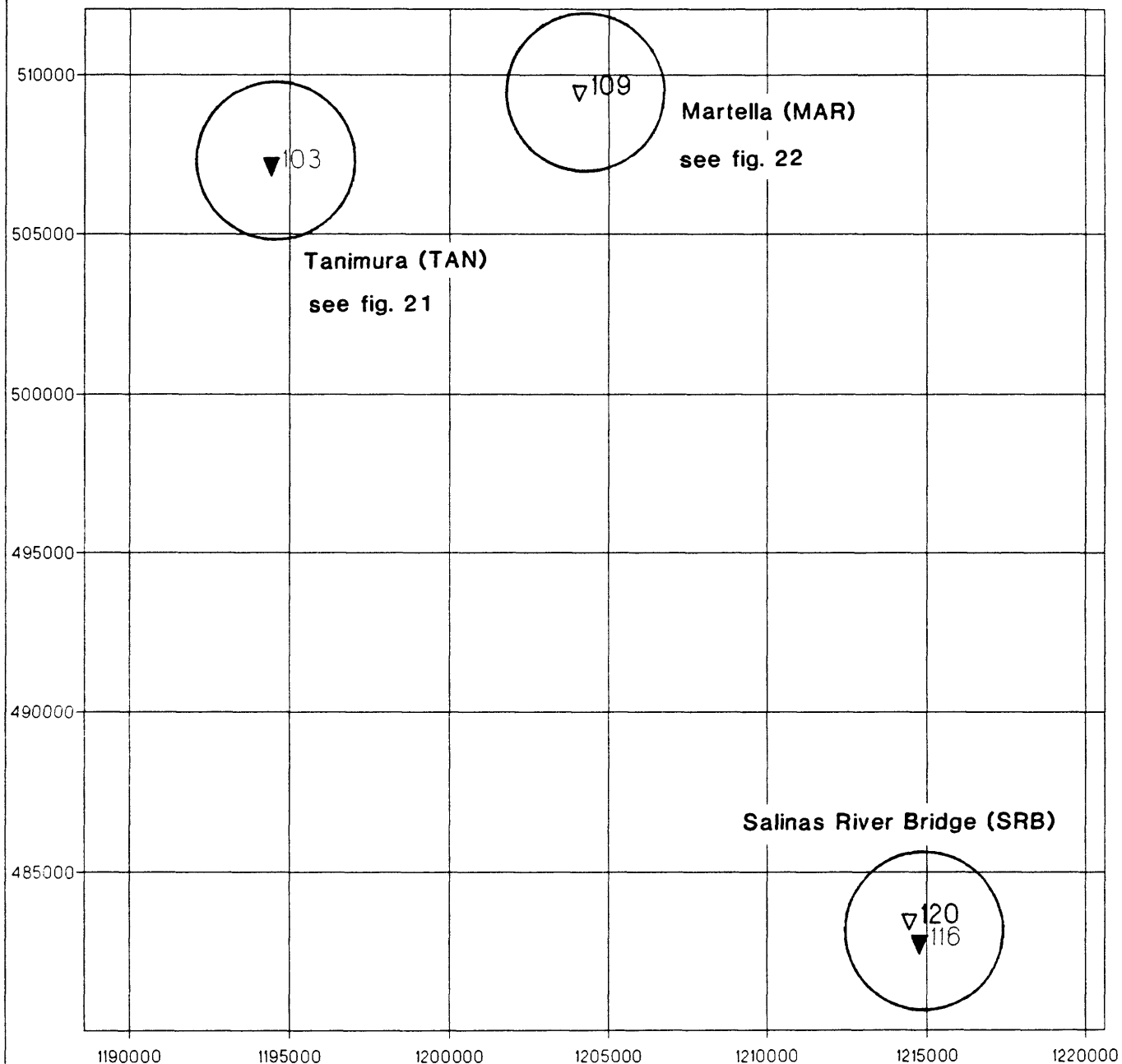


LOCATION: Scurich (SCR)

▽=CPT ▼=CPT and SPT

Figure 19

County: MONTEREY, 7.5 min Quad: SALINAS



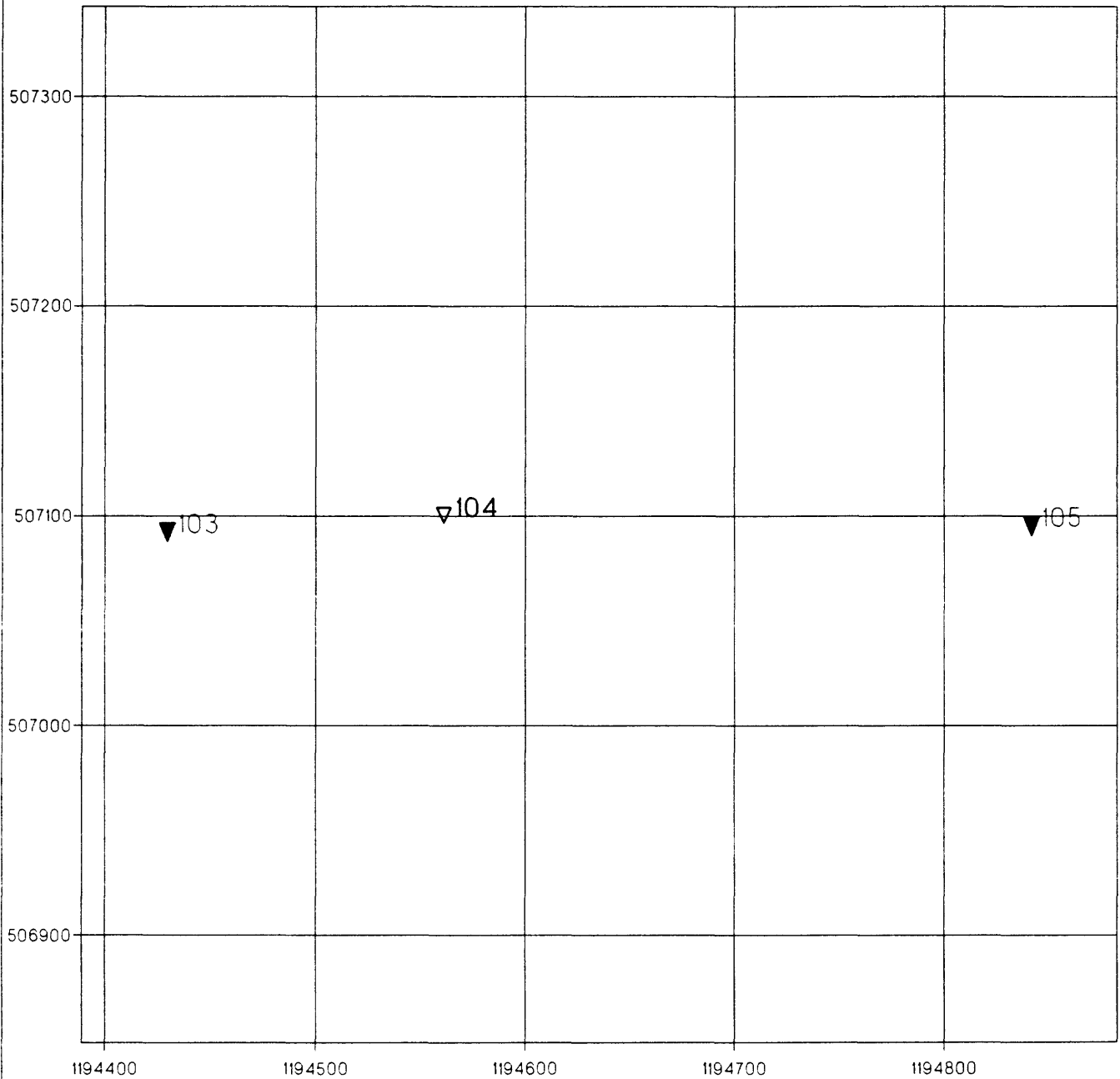
0 2500 5000 Feet
0 762 1524 Meters

LOCATION: Salinas River Area (MAR) (TAN) (SRB)

▽=CPT ▼=CPT and SPT

Figure 20

County: MONTEREY, 7.5 min Quad: SALINAS



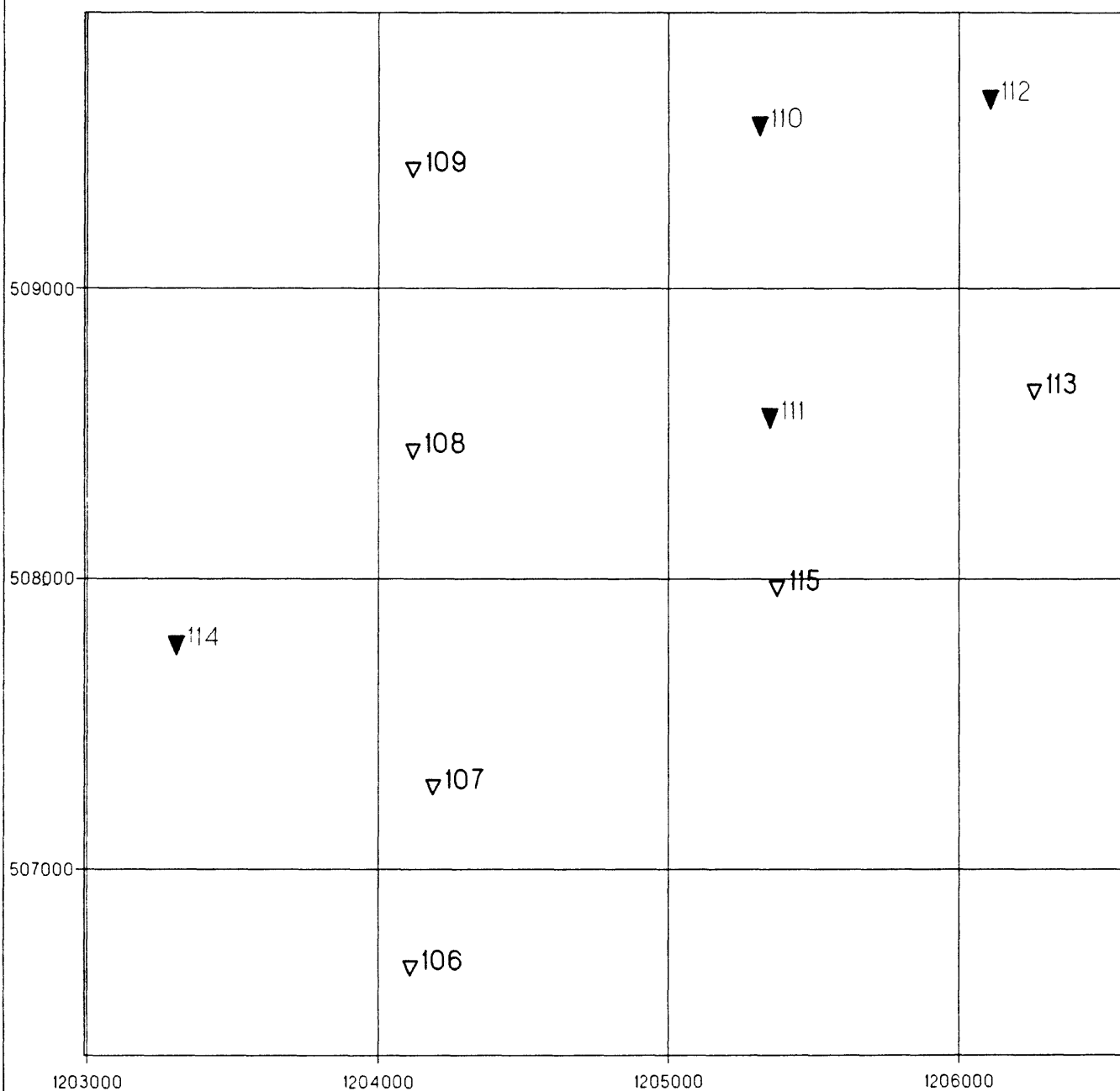
0 50 100 Feet
0 15 30 Meters

LOCATION: Tanimura (TAN)

▽=CPT ▼=CPT and SPT

Figure 21

County: MONTEREY, 7.5 min Quad: SALINAS

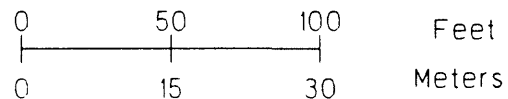
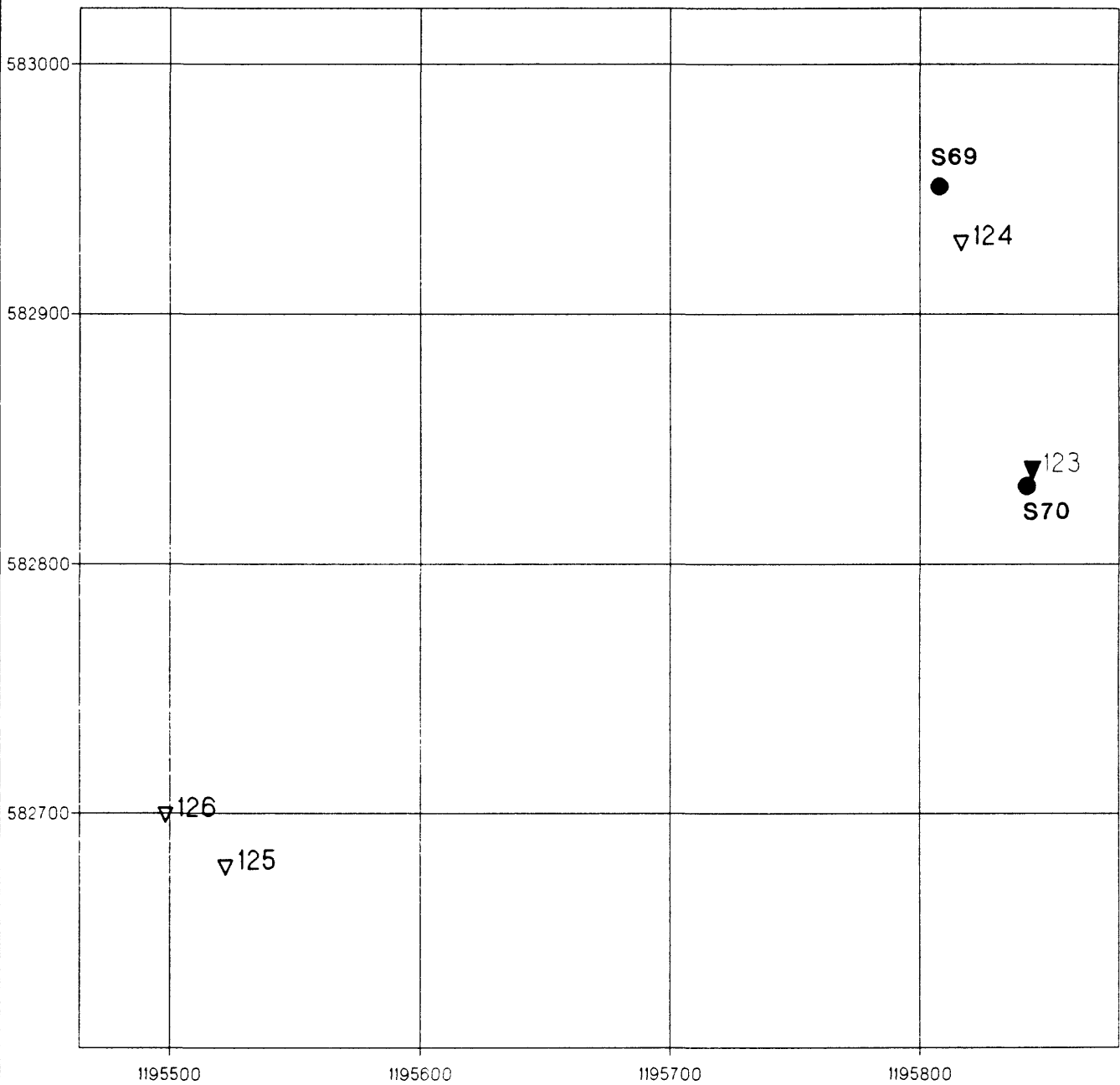


LOCATION: Martella (MAR)

▽=CPT ▼=CPT and SPT

Figure 22

County: MONTEREY, 7.5 min Quad: WATSONVILLE WEST

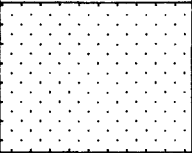
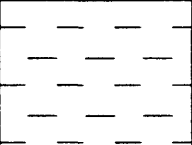
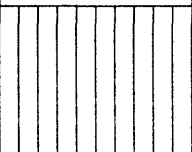
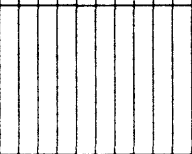
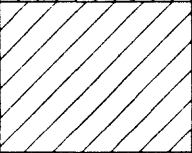
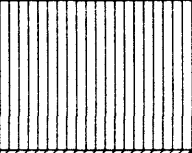
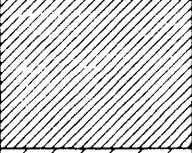
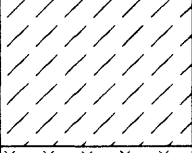
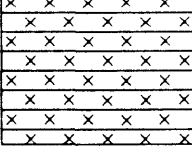


LOCATION: Granite Construction Co. (GRA)

▽=CPT ▼=CPT and SPT ●=SURFACE SAMPLE

Figure 23

Explanation for Logs

GRAPHIC LOG	LIQUEFACTION RESISTANCE	DESCRIPTION OF SYMBOLS
	L-H*	Sand, SP to SP-SM
	L-H	Silty sand, SM
	L-H	Sandy silt, ML
	C-L-H	Silt, ML
	c	Lean clay, CL
	c	Elastic silt, MH
	c	Fat clay, CH
	c-H	Interbedded sand and silt or clay, SP to SM and ML to CH
	Soil	Soil

C – No liquefaction, clay content greater than 15%

▽ – Water table

D – Clay content < 15%, but above water table

H, L – High or low resistance, both methods agree

H*, L* – Liquefaction resistance determined by

SPT and CPT methods disagree, most likely selected

ucs – Unconfined compressive strength

ksc – kilograms per square centimeter

Figure 24

TABLE 1. Sites, soundings and tests

SITE	SOUNDING NUMBER	TESTS
MILLER (CMF)	1	CPT, SPT
	2	CPT, SPT
	3	CPT, SPT
	4	CPT
	5	CPT, SPT
	6	CPT
	7	CPT
	8	CPT, SPT
	9	CPT
	10	CPT, SPT
	11	CPT
	12A	CPT, SPT
	12B	TUBES
	13	CPT, TUBES
	49	CPT
	50	CPT
MOSS LANDING (ML1)	14A	CPT
	14B	CPT, SPT
	15A	CPT, SPT
	15B	SPT, SPT
(ML2)	118	CPT, AUGER
	119	CPT
AIRPORT (AIR)	16	CPT, SPT
	17	CPT
	18	CPT, SPT
	19	CPT
	20	CPT
	21	CPT, SPT
	22	CPT
	23	CPT
SCATTINI (SCA)	23	CPT, SPT
	24	CPT
	25	CPT
	26	CPT
	27	CPT
	28	CPT, SPT
SEA MIST (SEA)	29	CPT, SPT
	30	CPT
	31	CPT, SPT

SITE	SOUNDING NUMBER	TESTS
JEFFERSON (JRR)	32	CPT, SPT
	33	CPT
	34	CPT, SPT
	35	CPT
	36	CPT
	121	CPT, SPT, TUBES
	122	CPT
	141	CPT, SPT, TUBES
	142	CPT
	143	CPT
	144	CPT
	145	CPT
	146	CPT
	147	CPT
	148	CPT, SPT
	149	CPT, SPT
	150	CPT, SPT, TUBES
	151	CPT
LEONARDINI (LEN)	37	CPT, SPT
	38	CPT
	39	CPT, SPT
	51	CPT
	52a	CPT, SPT, TUBES
	52b	SPT
	53	CPT
WATER PLANT (WST)	40	CPT
	41	CPT
	42	CPT
PAJARO DUNES (PD1)	43	CPT, SPT
	44	CPT, SPT
	(PD2)	78
	79	CPT, SPT
	80	CPT
	81	CPT
	82	CPT, TUBES
	83	CPT
	84	NONE
	85	CPT
	86	CPT
	87	CPT
	45	PCPT, SPT
	46	PCPT
	47	PCPT
	48	PCPT, SPT
SP BRIDGE (SPR)	45	PCPT, SPT
	46	PCPT
	47	PCPT
	48	PCPT, SPT
MUNIAIR (WAT)	54	CPT, SPT, TUBES
FARRIS (FAR)	55	CPT
	56	CPT
	57	CPT
	58	CPT, SPT

SITE	SOUNDING NUMBER	TESTS
FARRIS (FAR)	59	CPT, SPT
	60	CPT
	61	CPT, SPT
	62	CPT, SPT
	63	CPT
	64	CPT
MARINOVICH (MRR)	65	CPT, SPT
	66	CPT
	67	CPT
	68	CPT, SPT, TUBES
SILLIMAN (SIL)	69	CPT, SPT, TUBE
	70	CPT
	71	CPT, SPT
KETT (KET)	72	CPT, SPT, TUBE
	73	CPT
	74	CPT, SPT
	75	CPT
	76	CPT
	77	CPT
SCURICH (SCR)	88	CPT
	89	CPT, SPT
	90	CPT
	91	CPT
	92	CPT
	93	CPT
	94	CPT
RADOVICH (RAD)	95	CPT
	96	CPT
	97	CPT
	98	CPT, SPT
	99	CPT, SPT
TOM JONES (TJR)	100	CPT, SPT, TUBE
	101	CPT
	102	CPT, SPT, TUBE
TANIMURA (TAN)	103	CPT, CPT, TUBE
	104	CPT
	105	CPT, SPT, TUBE

SITES	SOUNDING NUMBER	TESTS
MARTELLA (MAR)	106	CPT
	107	CPT
	108	CPT
	109	CPT
	110	CPT, SPT, TUBE
	111	CPT, SPT, TUBE
	112	CPT, SPT, TUBE
	113	CPT
	114	CPT, SPT, TUBES
	115	CPT
SALINAS RIVER BRIDGE (SRB)	116	CPT, SPT
	117	CPT, SPT
	120	CPT, AUGER
GRANITE CONSTRUCTION COMPANY (GRA)	123	CPT, SPT
	124	CPT
	125	CPT
	126	CPT
MCGOWAN (MCG)	127	CPT
	128	CPT
	129	CPT
	130	CPT
	131	CPT
	132	CPT
	133	CPT
	134	CPT
	135	CPT
	136	CPT, SPT, TUBES
	137	CPT
	138	CPT, SPT, TUBES
	139	CPT
	140	CPT

Explanation:

CPT= Cone penetration test, no samples

PCPT= Piezo-cone penetration test, no samples

SPT= Standard penetration test, samples

TUBES= Undisturbed samples from thin-wall Shelby tubes

AUGER= Disturbed samples, brought to the surface by the auger

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
CLINT MILLER FARMS (CMF)																
CMF1-1	1.5	auger		0	13	52	35	0.011		ML	SILT		44	16		0.7
CMF1-2	3.0	2-3.5	6	0	34	53	13	0.048	17	ML	Sandy SILT	20	28	1	-7.5	0.1
CMF1-3	6.5	6-7.5		0	9	79	12	0.038	12	ML	SILT	29				
CMF1-4	7.3	6-7.5	6	0	3	53	44	0.007		mh	elastic silt					
CMF1-5	11.0	10-11.5	17	0	2	30	68	0.002		MH	Elastic SILT	35	68	32	0	0.7
CMF1-6	16.0	15-16.5	3	0	30	60	10	0.051	12	ML	Sandy silt	31	27	2	3.2	0.4
CMF1-7	26.0	25-26.5	3	0	2	85	13	0.027	8	ML	SILT	31	32	5	0.9	0.8
CMF1-8	36.0	35-36.5	16	0	66	26	8	0.120	16	SM	Silty SAND	27				
CMF1-9	49.5	48.5-50	23	0	84	13	3	0.277	13	SM	Silty SAND	25				
CMF2-1	3.0	2-3.5	5	0	42	44	14	0.060	27	ML	Sandy SILT					
CMF2-2	6.0	5-6.5	6	0	22	69	9	0.047	9	ML	SILT with sand	26	26	0		
CMF2-3	13.5	12.5-14	2	0	25	53	22	0.024		ML	SILT with sand	23	28	4	-0.2	0.3
CMF2-4	23.0	22-23.5	3	0	5	84	11	0.036	10	ML	SILT	35	31	1	4.9	0.2
CMF2-5	35.0	34-35.5	23	0	62	26	12	0.103	31	SM	Silty SAND	28				
CMF3-1	1.0	auger		0	39	45	16	0.054	42	ML	Sandy SILT		24	0		
CMF3-2	5.5	4.5-6	6	0	72	19	9	0.139	26	SM	Silty SAND	7				
CMF3-3	9.0	8-9.5	3	0	47	45	8	0.071	10	ML	Sandy SILT	26	23	0		
CMF3-4	15.0	14-15.5	11	0	81	12	7	0.154	16	SM	Silty SAND	28				
CMF3-5	18.5	17.5-19	6	0	59	36	5	0.086	6.5	SM	Silty SAND	29				
CMF3-7	22.0	21-22.5	13	0	78	17	5	0.120	3.9	SM	Silty SAND	28				
CMF3-8	26.0	25-26.5	26	0	77	20	3	0.115	3.6	SM	Silty SAND	24				
CMF3-9	33.0	32-33.5	2	0	34	52	14	0.033	19	ML	Sandy SILT	33	29	6	1.7	1.0
CMF3-10	46.0	45-46.5	23	0	70	22	8	0.133	20	SM	Silty SAND	29				
CMF3-12	50.0	49-50.5	30	7	81	12		0.360		SM	Silty SAND	25				
CMF3-13	55.0	54-55.5	50	4	85	11		0.430	9	SW-SM	SAND with silt	23				
CMF5-1	6.0	5-6.5	7	0	50	43	7	0.076	14	SM	silty SAND	24				
CMF5-2	11.0	10-11.5	27	0	90	10		0.223	3.3	SP-SM	SAND with silt	12				
CMF5-3	14.0	13-14.5	15	0	90	10		0.244	3.8	SP-SM	SAND with silt	25				
CMF5-4	16.8	16-17.5		0	9	79	12	0.042	15	ML	SILT					
CMF5-5	17.5	16-17.5	5	0	84	14	2	0.146	3.3	SM	silty SAND	23				
CMF5-6	23.0	22-23.5	20	0	87	13		0.185	4.3	SM	silty SAND	22				
CMF5-7	34.5	33.5-35	24	0	91	9		0.230	3.4	SP-SM	SAND with silt	24				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
CMF8-1	9.3	8.25-9.75	4	0	26	66	8	0.054	7.8	ML	SILT with sand		28	0		
CMF8-2	11.5	auger		0	51	39	10	0.077	17	SM	silty SAND					
CMF8-3	13.5	auger		0	42	43	15	0.060	39	ML	sandy SILT		28	2		0.2
CMF8-4	15.0	14-15.5	11	0	55	40	5	0.082	7	SM	silty SAND	22				
CMF8-6	19.5	18.5-20	9	0	83	13	4	0.143	55	SM	silty SAND	25				
CMF8-7	24.5	23.5-25	9	0	86	14		0.263		SM	silty SAND					
CMF8-9	33.8	33-34.5		0	88	12		0.310	6.3	SW-SM	SAND with silt	19				
CMF8-10	34.2	33-34.5	44	0	93	7		0.260	2.9	SP-SM	SAND with silt					
CMF8-11	37.0	36-37.5	31	0	93	7		0.255	2.8	SP-SM	SAND with silt					
CMF10-1	11.0	10-11.5	11	0	2	42	56	0.004		MH	Elastic SILT	35	50	24	0.4	0.6
CMF10-2	21.0	20-21.5	5	0	46	36	18	0.062	48	ML	Sandy SILT	26				
CMF10-3	25.0	24-25.5	12	0	80	15	5	0.152	9	SM	silty SAND	31				
CMF10-4	30.5	29.5-31	25	0	80	17	3	0.115	3	SM	silty SAND	27				
CMF10-5	34.0	33-34.5	45	0	86	11	3	0.180	4	SM	silty SAND	22				
CMF12a-2	5.8	5.25-6.75		0	2	57	41	0.008		mh	Elastic silt					
CMF12a-1	6.5	5.25-6.75	12	0	2	52	46	0.006		mh	Elastic silt	32				
CMF12a-4	9.8	9.5-11		0	1	24	75	0.002		ch	Fat clay					
CMF12a-3	10.5	9.5-11	19	0	25	51	24	0.032		ML	SILT with sand	24				
CMF12a-6	12.8	12.5-14		0	46	46	8	0.068	12	ml	Sandy SILT	28				
CMF12a-5	13.5	12.5-14	2	0	10	69	21	0.028		ml	Silt	25				
CMF12a-9	16.2	16-17.5		0	23											
CMF12a-8	16.8	16-17.5		0	13	76	11	0.038	11	ml	Silt					
CMF12a-7	17.3	16-17.5	6	0	14	52	34	0.013		cl	Lean clay	32				
CMF12a-11	19.8	19.5-21		0	65	23	12	0.114	72	SM	silty SAND					
CMF12a-10	20.5	19.5-21	7	0	37	45	18	0.054	35	ML	sandy SILT	27				
CMF12a-13	27.2	27-28.5		0	48	40	12	0.071	24	ML	sandy SILT					
CMF12a-12	28.0	27-28.5	11	4	55	30	11	0.099	31	SM	silty SAND	23				
CMF12a-16	34.2	34-35.5		0	10	58	32	0.014	23	ml	silt					
CMF12a-15	34.8	34-35.5		0	70	18	12	0.180	70	SM	silty SAND					
CMF12a-14	35.3	34-35.5	6	0	10	26	64	0.003		mh	Elastic silt	26				
CMF12b	4.3 a	4-6		0	2	42	56	0.004		MH	Elastic SILT	30	58	25	-0.1	0.6
CMF12b	4.5	4-6														
CMF12b	4.5	4-6		0	2	23	75	0.002		CH	Fat CLAY	31	80	41		0.9
CMF12b	4.7 b	4-6		0	1	24	75	0.002		CH	Fat CLAY	29	74	51	0.1	1.0
CMF12b	4.9 c	4-6														

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
CMF12b	5.2	4-6		0	15	63	22	0.025		CL	Lean CLAY w/S		35	11		1.0
CMF12b	5.3 d	4-6		0	1	32	67	0.003		CH	Fat CLAY	28	68	38		1.0
CMF12b	5.6	4-6														
CMF12b	5.7 e	4-6		0	1	36	63	0.003		CH	Fat CLAY		69	41		1.2
CMF12b	5.8	4-6		0	5	52	43	0.007		CL	Lean CLAY	35	48	21	0.4	1.1
CMF12b	6.5	6-8		0	2	59	39	0.009		ML	SILT	28	45	14	-0.2	0.6
CMF12b	7.8	6-8		0	2	54	44	0.007		MH	Elastic SILT	33	57	25	0.0	0.9
CMF12b	8.4	8-10		0	2	20	78	0.002		CH	Fat CLAY	35	81	60	0.2	1.2
CMF12b	9.3	8-10.5		0	2	44	54	0.004		MH	Elastic SILT	31	61	27	-0.1	0.8
CMF12b	11.4	10.5-12.5		0	19	63	18	0.042	24	CL	lean CLAY w/S	28	34	12	0.5	1.2
CMF12b	12.2	10.5-12.5		0	3	43	54	0.004		CH	Fat CLAY	38	62	32	0.2	0.9
CMF12b	13.1	12.5-14.5		0	28	54	18	0.046		ML	SILT w/S	30	31	7	0.8	0.4
CMF12b	13.2											35				
CMF12b	14.4	12.5-14.5		0	20	59	21	0.041		ML	SILT w/S	26	33	8	0.2	0.5
CMF13	4.3	4-6		0	51	39	10	0.077	31	SM	silty SAND	17				
CMF13	5.8	4-6		0	78	15	7	0.113	8	SM	silty SAND					
CMF13	7.9	6-8		0	15	70	15	0.027	35	CL	Lean CLAY w/S		32	9		0.9
CMF13	8.3	8-10		0	21	70	9	0.050	9.3	ML	SILT w/S	30	30			
CMF13	9.6	8-10		0	4	65	31	0.020		CL	Lean CLAY		44	22		1.0
CMF13	9.8	8-10		0	5	60	35	0.013		ML	SILT	30	43	11	-0.2	0.6
CMF13	10.3	8-10		0	7	53	40	0.008		ML	SILT	32	44	12	0.0	0.5
CMF13	11.3	10-12		0	3	65	32	0.012		ML	SILT	31	41	15	0.3	0.8
CMF13	13.5	12-13.8		0	7	49	44	0.007		CL	Lean CLAY	32	45	23	0.4	0.7
MOSS LANDING (ML1)																
ML PIT	2.0	pit		0	100	0	0	0.300	1.6	SP	SAND					
ML PIT	4.5	pit		0	100	0	0	0.305	1.6	SP	SAND					
ML14-2	6.0	5-6.5		0	97	3		0.650	3.7	SP	SAND					
ML14-1	6.4	5-6.5	24	0	99	1		1.200	5.2	SP	SAND					
ML14--lost	9	8-9.5	40													
ML14-5	11.8	11-12.5		0	98	2		0.840	2.5	SP	SAND					
ML14-4	12.1	11-12.5		0	98	2		0.435	2.4	SP	SAND					
ML14-3	12.4	11-12.5	22	4	93	4		0.522	3.5	SP	SAND					
ML14-7	14.8	14.5-16		0	99	1		0.710	2.7	SP	SAND					
ML14-6	15.5	14.5-16	31	0	95	5		0.270	2.5	SP-SM	SAND with silt					
ML14-10	20.0	19-20.5	24	0	98	2		0.445	2.3	SP	SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
ML15-1	3.0	auger		0	38	46	16	0.052		ML	sandy SILT					
ML15-3	4.8	4-5.5		0	49	39	12	0.069	33	ML	sandy SILT					
ML15-2	5.3	4-5.5	5	0	60	30	10	0.097	21	SM	silty SAND					
ML15-6	7.9	7-8.5		0	83	17		0.580		SM	silty SAND					
ML15-5	8.1	7-8.5		0	67	22	11	0.144		SM	silty SAND					
ML15-4	8.3	7-8.5	9	0	7	48	45	0.006		mh	elastic silt	51				
ML15-8	12.8	12-13.5		0	97	3		0.620	3.5	SP	SAND					
ML15-7	13.3	12-13.5	32	0	100	0	0	0.480	2.6	SP	SAND					
ML15-11	19.2	19-20.5		1	98	1	0	0.990	3.1	SP	SAND					
ML15-10	19.5	19-20.5		0	17											
ML15-9	20.0	19-20.5	60	0	94	6		0.520	3.6	SP-SM	SAND with silt					
ML15-13	23.8	23-24.5		1	79	11	9	0.270	57	SM	silty SAND					
ML15-12	24.3	23-24.5	11	0	32					cl	Sandy lean clay					
ML15B-1	5.5	auger		0	56	36	8	0.100	28	SM	silty SAND					
ML15B-5	6.2	6-7.5		0	92	8		0.730	5.7	SM	silty SAND					
ML15B-4	6.6	6-7.5		0	74	21	5	0.362	40	SM	silty SAND					
ML15B-3	6.9	6-7.5		0	14	46	40	0.008		cl	Lean clay					
ML15B-2	7.4	6-7.5	1	0	98	2	0	0.308	1.8	SP	SAND					
MOSS LANDING (ML2)																
ML118	2.0	auger		0	94	3	3	0.248	2.3	SP-SM	SAND w/M					
ML118	2.5	auger		0	93	4	3	0.330	2.7	SP-SM	SAND w/M					
ML118	4.0	auger		0	12	63	25	0.010		CH	Fat CLAY		60	33		2.2
ML118	7.0	auger		0	5	62	33	0.008		ML	SILT		44	16		0.8
ML118	9.0	auger		0	4	71	25	0.010		CL	Lean CLAY		39	15		0.9
ML118	12.0	auger		0	93	4	3	0.520	3.2	SP-SM	SAND w/M					
ML118	15.0	auger	7	90	2	1	1.150	4.3		SP	SAND					
ML118	18.0	auger	9	66	18	7	0.430	60		SM	Silty SAND					
ML118	22.0	auger	1	20	51	28	0.016			cl	Lean clay					
ML118	27.0	auger	1	93	6		0.550	4.3		SP-SM	SAND w/M					
ML118	30.0	auger	0	60	24	16	0.096	54		SC	Clayey SAND		37	13		1.2
ML118	32.0	auger	0	75	16	9	0.305	60		SM	Silty SAND					
ML118	33.0	auger	0	85	7	8	0.300	28		SM	Silty SAND					
ML118	37.5	auger	0	44	33	23	0.058	68		ML	Sandy SILT					
ML118	47.0	auger	4	78	12	6	0.320	31		SM	Silty SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
ML118	52.0	auger		0	53	31	16	0.095	76	SM	Silty SAND					
AIRPORT (AIR)																
AIR16-2	7.3	6.5-8		0	3	70	27	0.014		ml	Silt					
AIR16-1	7.6	6.5-8	6	0	29	59	12	0.043	19	ML	SILT with sand	26				
AIR16-3	10.5	9.5-11	5	7	4	61	28	0.019		ml	Silt	28				
AIR16-4	15.0	14-15.5	9	0	60	27	13	0.097		SM	Silty SAND	24				
AIR16-5	20.8	20.5-21		0	45	43	12	0.067	40	ML	Sandy SILT	26				
AIR16-6	21.7	20.5-22	11	0	22	58	20	0.043	50	ML	SILT with sand					
AIR16-7	24.5	23.5-25	7	0	7	42	51	0.004		CH	Fat CLAY	45	55	23	0.6	0.6
AIR18-2	7.3	6.5-8		0	73	20	7	0.117	4.3	SM	Silty SAND					
AIR18-1	7.8	6.5-8		0	87		13	0.153	2.9	SM	Silty SAND	29				
AIR18-3	8.0	6.5-8	3													
AIR18-6	10.6	10-11.5		0	90		10	0.148	2.1	SP-SM	SAND with silt					
AIR18-5	10.9	10-11.5		0	61	36	3	0.087	4.4	SM	Silty SAND	33				
AIR18-4	11.2	10-11.5	8	0	90		10	0.193	3.1	SP-SM	SAND with silt	26				
AIR18-8	14.5	14-15.5		0	66	31	3	0.107	5.6	SM	Silty SAND					
AIR18-7	15.3	14-15.5	5	0	93	7		0.310	2.2	SP-SM	SAND with silt					
AIR18-10	20.6	20-21.5		0	31	51	18	0.036	29	ML	Sandy SILT					
AIR18-9	21.3	20-21.5	3	0	46	36	18	0.064		ML	Sandy SILT					
AIR18-12	24.2	23.5-25		0	76	12	12	0.150		SM	Silty SAND	24				
AIR18-11	24.5	23.5-25	26	0	90		10	0.140	2.2	SP-SM	SAND with sand					
AIR18-13	28.5	27.5-29	5	0	89	11		0.112	1.7	SP-SM	SAND with silt	27				
AIR18-15	37.3	37-38.5		0	66	19	15	0.131	85	SM	silty SAND					
AIR18-14	38.0	37-38.5	5	0	4	46	50	0.005		MH	Elastic SILT	31	51	16	-0.2	0.6
AIR18-16	50.0	49-50.5	33	0	24	65	11	0.050	12	ML	SILT with sand	21				
AIR21-1	7.0	6-7.5	5	0	95		5	0.200	1.9	SP-SM	SAND with silt					
AIR21-2	10.3	9-10.5		0	98	2		0.380	1.9	SP	SAND					
AIR21-3	10.6	9-10.5	5	0	92	8		0.236	2.7	SP-SM	SAND with silt					
AIR21-5	12.5	12-13.5		0	93	7		0.370	2.6	SP-SM	SAND with silt					
AIR21-4	13.0	12-13.5	6	7	88	5		0.910	5.6	SP-SM	SAND with silt					
AIR21-7	15.5	15-16.5		1	93	6		0.391	3	SP-SM	SAND with silt					
AIR21-6	16.0	15-16.5	3	9	84	7		0.540	5	SP-SM	SAND with silt					
AIR21-8	18.7	18-19.5		0	69	26	5	0.098	6.8	SM	silty SAND					
AIR21-9	19.3	18-19.5	8	0	98	2		0.285	2	SP	SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
AIR21-12	21.3	21-22.5		0	95	5		0.278	2.9	SP-SM	SAND with silt					
AIR21-11	21.5	21-22.5		0	56			0.120		SM	silty SAND	29				
AIR21-10	22.0	21-22.5	12	0	95	5		0.259	2.3	SP-SM	SAND with sand					
AIR21-14	26.2	26-27.5		0	92	8		0.280	3.4							
AIR21-15	26.7	26-27.5		0	74			0.402		SM	silty SAND					
AIR21-13	27.3	26-27.5	2	0	2					ch	clay(?)	52				
AIR21-16	35.0	34-35.5	17	0	88	12		0.198		SM	silty SAND					
SCATTINI (SCA)																
SCA23-1	6.0	5-6.5	9	0	61	33	6	0.096	8.4	SM	Silty SAND	28				
SCA23-2	12.0	12-13.5		0	86	14		0.121	2.2	SM	Silty SAND					
SCA23-3	12.5	12-13.5	11	0	68	22	9	0.097	18	SM	Silty SAND	33				
SCA23-4	16.0	15-16.5	3	0	38	49	13	0.060	27	ML	Sandy SILT	47	32	2	8.4	0.3
SCA23-6	20.5	20-21.5		0	36	45	19	0.057	35	ML	Sandy SILT					
SCA23-5	21.0	20-21.5	1	0	14	72	14	0.040	15	ML	SILT	37	41	9	0.6	1.5
SCA23-7	28.0	27-28.5	21	0	93	7		0.245	2.5	SP-SM	SAND with silt	35				
SCA28-1	5.0	4-5.5	1	0	1	50	49	0.005		MH	Elastic SILT	60	68	34	0.8	1.1
SCA28-2	8.5	7.5-9	21	0	98	2		0.680	2.2	SP	SAND	20				
SCA28-3	15.0	14-15.5	33	0	96	4		0.780	9.8	SP	SAND	14				
SCA28-LOST	21	20-21.5	15													
SCA28-4	26.5	26.5-28		0	94	6		0.640	3	SP-SM	SAND with silt	17				
SCA28-5	27.5	26.5-28	27													
SCA28-6	40.5	40-41.5		0	94	6		0.410	3.1	SP-SM	SAND with silt	17				
SCA28-7	41.3	40-41.5	5									83				
SEA MIST (SEA)																
SEA29-1	3.0	2-3.5	15	0	5	46	49	0.005		CH	Fat CLAY	21	63	32	-0.3	0.9
SEA29-2	8.5	7.5-9	4	0	2	37	61	0.003		MH	Elastic SILT	35	58	20	-0.2	0.5
SEA29-3	12.0	11-12.5	2	0	52	26	22	0.080		SM	silty SAND	30				
SEA29-4	21.0	20-21.5	2	0	2	76	22	0.024	32	ML	SILT	29	37	9	0.1	0.6
SEA29-5	25.5	24.5-26	32	0	92	8		0.262	3.2	SP-SM	SAND with silt	19				
SEA31-1	4.0	3-4.5	5	0	32	63	5	0.054	3.9	ML	Sandy SILT	32	29	0		
SEA31-2	11.0	10-11.5	5	0	72	26	2	0.098	2.5	SM	silty SAND	31				
SEA31-3	14.0	13-14.5	7	0	84	16		0.123	3	SM	silty SAND	24				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
SEA31-4	17.0	16-17.5	9	0	78	22		0.240		SM	silty SAND	25				
SEA31-5	24.0	23-24.5	13	0	86	14		0.244		SP-SM	SAND with silt	23				
SEA31-6	28.0	27-28.5	10	0	89	11		0.258	5.2	SP-SM	SAND with silt	21				
SEA31-7	30.4	30-31.5		0	89	11		0.223	4.4	SP-SM	SAND with silt	25				
SEA31-8	31.1	30-31.5	9	0	5	28	63	0.003		CL	Lean CLAY		43	19		0.4
SEA31-10	37.8	37-38.5		0	27	50	23	0.040		ML	SILT with sand					
SEA31-9	38.0	37-38.5	137	0	91	7	2	0.300	3.8	SP-SM	SAND with silt	12				
JEFFERSON RANCH (JRR)																
JRR32-1	8.0	7-8.5	9	0	96	4		0.280	2.5	SP	SAND					
JRR32-2	10.5	10-11.5		0	96	4		0.289	2.6	SP	SAND					
JRR32-3	11.2	10-11.5	12	0	95	5		0.282	2.4	SP-SM	SAND with silt					
JRR32-4	19.5	18.5-20	16	0	92	8		0.340	3.8	SP-SM	SAND with silt	24				
JRR32-6	24.0	23-24.5	15	0	92	8		0.245	2.8	SP-SM	SAND with silt					
JRR32-7	37.0	36-37.5	30	0	86	9	5	0.140	3	SM	silty SAND	29				
JRR32-10	43.9	43-44.5														
JRR32-8	44.0	43-44.5		0	94	6		0.285	2.9	SP-SM	SAND with silt					
JRR32-9	44.2	43-44.5	5	0	13	25	62	0.002				62				
JRR34-1	5.0	4-5.5	19	0	93	7		0.330	3.7	SP-SM	SAND with silt	25				
JRR34-2	8.0	7-8.5	18	0	99	1		0.380	1.9	SP	SAND					
JRR34-3	12.0	11-12.5	20	0	94	6		0.285	2.7	SP-SM	SAND with silt					
JRR34-5	13.3	13-14.5		0	83	17		0.279		SM	Silty SAND					
JRR34-4	14.0	13-14.5	17	0	5	27	68	0.002		MH	Elastic SILT	42				
JRR34-6	20.7	20-21.5		0	6	26	68	0.002		MH	Elastic SILT	38				
JRR34-7	21.4	20-21.5	4													
JRR34-8	27.0	26-27.5	9	0	2	36	62	0.002		MH	Elastic SILT	44	66	24	0.1	0.5
JRR34-10	33.0	33-34.5														
JRR34-9	34.0	33-34.5	6	0	1	22	77	0.002		MH	Elastic SILT	58	84	40	0.4	0.7
JRR121-1	1.5	a 0-3		0	1	28	71	0.002		CH	Fat CLAY		69	34	NA	0.7
JRR121-2	4	a 3-5		0	2	47	51	0.005		CH	Fat CLAY	53.3	65	35	0.7	0.9
JRR121-3f	10.2	T 10-12		0	11	43	46	0.006		cl	Lean clay	45.1			NA	
JRR121-3e	10.5	T 10-12		0	1	49	50	0.005		MH	Elastic SILT	55.6	68	33	0.6	1.0
JRR121-3d	10.8	T 10-12		0	0	53	47	0.006		CH	Fat CLAY	53.4	64	33	0.7	1.0
JRR121-3c	11.2	T 10-12		0	0	61	39	0.008		MH	Elastic SILT	49	55	22	0.7	1.4
JRR121-3b	11.5	T 10-12		0	0	58	42	0.008		MH	Elastic SILT	48.5	55	24	0.7	0.8

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
JRR121-3a	11.8	T 10-12		0	1	57	42	0.008		CH	Fat CLAY	49.9	58	28	0.7	1.0
JRR121-4f	15.2	T 15-17		0	1	43	56	0.004		MH	Elastic SILT	69	75	37	0.8	1.2
JRR121-4e	15.5	T 15-17		0	7	54	39	0.010		CH	Fat CLAY	51.5	69	37	0.5	1.3
JRR121-4d	15.8	T 15-17		0	3	38	59	0.004		CH	Fat CLAY	67.1	75	41	0.8	1.1
JRR121-4c	16.2	T 15-17		0	2	35	63	0.003		CH	Fat CLAY	65.4	76	43	0.8	1.1
JRR121-4b	16.5	T 15-17		0	4	45	51	0.005		MH	Elastic SILT	60.5	72	37	0.7	1.0
JRR121-4a	16.8	T 15-17		0	3	60	37	0.011		MH	Elastic SILT	51.7	57	25	0.8	1.0
JRR121-5	19	18-19.5	3	0	93	7		0.347	2.6	SP-SM	SAND w/M	23				
JRR121-6	23	22-23.5	11	0	94	6		0.420	2.9	SP-SM	SAND w/M	19.5				
JRR121-7	26	25-26.5	14	0	92	8		0.370	4.2	SP-SM	SAND w/M					
JRR121-8	31.4	31-31.7		0	85	9	6	0.190	15	SM	Silty SAND					
JRR121-9	32	31.7-32.5	28	0	17	36	47	0.006		CH	Fat CLAY	33.9	54	31	0.4	0.9
JRR141-1	5	4-5.5	16	0	94	6		0.288	2.6	SP-SM	SAND w/M					
JRR141-2	8.3	8-9.5		0	62	31	7	0.086	5.4	SM	Silty SAND					
JRR141-4	9	8-9.5	3	0	17	62	21	0.034		ml	Silt w/S					
JRR141-8	11.4	11-12.5		0	66	29	5	0.107	8	SM	Silty SAND					
JRR141-7	12	11-12.5	5	0	82	15	3	0.159	3.9	SM	Silty SAND					
JRR141-9	16	15-16.5	10	0	86	10	4	0.195	4.2	SM	Silty SAND					
JRR141-11	19.4	19-20.5		0	87			0.194	4	SM	Silty SAND					
JRR141-10	20	19-20.5	15	0	92	8		0.251	3.3	SP-SM	SAND w/M					
JRR141-12	26	25-26.5	14	0	96	4		0.356	2.4	SP	SAND					
JRR141-13e	30.9	T 31-33		0	94	6		0.400	2.4	SP-SM	SAND with silt					
JRR141-13d2	31.2	T 31-33		0	92	8		0.420	2.8	SP-SM	SAND with silt					
JRR141-13d1	31.5	T 31-33		0	92	8		0.445	2.4	SP-SM	SAND with silt					
JRR141-13c2	31.8	T 31-33		0	92	8		0.490	2.6	SP-SM	SAND with silt					
JRR141-13c1	32.2	T 31-33		0	91	9		0.495	3.5	SP-SM	SAND with silt					
JRR141-13b	32.5	T 31-33		0	90	10		0.550	7.9	SW-SM	SAND with silt					
JRR141-13a2	32.8	T 31-33		3	83	6	8	0.510	93	SW-SM	SAND with silt					
JRR141-13a1	32.9	T 31-33		3	44					ml	Sandy silt	25.1				
JRR141-14	33.5	A 33-34		1	25	22	52	0.004		CL	Lean CLAY /S		45	22		0.8
JRR148-1	21	20-21.5	NA	0	95	5		0.350	2.9	SP-SM	SAND with silt					
JRR148-2	24	23-24.5	8	0	95	5		0.405	2.2	SP	SAND					
JRR148-3	27	26-27.5	11	0	92	8		0.440	4.3	SP-SM	SAND with silt					
JRR149-3	18.6	18-19.5	5	0	98	2		0.370	1.9	SP	SAND					
JRR149-4	22	21-22.5	12	0	93	7		0.401	3.9	SP-SM	SAND w/M					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
JRR149-5	25	24-25.5	14	0	91	9		0.398	4.7	SP-SM	SAND w/M					
JRR149-6	27.5	27-28.5		0	91	9		0.378	4.1	SP-SM	SAND w/M					
JRR149-7	28	27-28.5	12	0	83	9	8	0.328	51	SM	Silty SAND					
JRR149-9	30.5	30-31.5		0	92	8		0.370	4.2	SP-SM	SAND w/M					
JRR149-10	31	30-31.5	26	0	11	47	42	0.008		CH	Fat CLAY		53	27		1.2
JRR149-11	32	a 31.5-32.5		0	24	31	45	0.007		CH	Fat CLAY w/S		51	28		1.1
JRR150-1e2	11.4	11-13		0	8	44	48	0.006		CH	Fat CLAY	46.8	65	36	0.5	1.4
JRR150-1e1	11.6	11-13		0	1	73	26	0.018	19			37.6			NA	NA
JRR150-1d	11.8	11-13		0	0	55	45	0.006		MH	Elastic SILT	63.4	67	31	0.9	1.1
JRR150-1c	12.2	11-13		0	1	55	44	0.007		MH	Elastic SILT	49.4	57	30	0.7	1.1
JRR150-1b	12.5	11-13		0	1	61	38	0.008		MH	Elastic SILT	49.5	57	24	0.7	0.9
JRR150-1a	12.8	11-13		0	0	60	40	0.007		ml	Silt	54.4				
JRR150-3	19	18-19.5	21	0	92	8		0.249	2.7	SP-SM	SAND w/M					
JRR150-4	22	21-22.5	20	0	93	7		0.247	2.3	SP-SM	SAND w/M	24				
JRR150-5	24.5	24-25.5		0	92	7		0.281	2.8	SP-SM	SAND w/M					
JRR150-6	25	24-25.5	21	0	5	68	27	0.020		ml	Silt	32.5				
LEONARDINI (LEN)																
LEN37-1	5.5	4-5.5	6	0	61	34	5	0.090	3.2	SM	silty SAND	30				
LEN37-2	11.0	10-11.5	9	0	87	9	4	0.105	3	SP-SM	SAND with sand	27				
LEN37-3	15.0	14-15.5	3*	0	88	12		0.170	3.3	SP-SM	SAND with sand	25				
LEN37-4	21.0	20-21.5	11	0	92	8		0.195	2.4	SP-SM	SAND with sand	29				
LEN37-5	26.0	25-26.5	17	0	94	6		0.197	2.2	SP-SM	SAND with sand	26				
LEN37-6	33.0	32-33.5	23	0	90	10		0.220	3.5	SP-SM	SAND with sand					
LEN37-7	38.4	38-39.5		0	96	4		0.215	1.9	SP	SAND					
LEN37-8	39.2	38-39.5		0	1	30	69	0.003		ch	Fat clay	51				
LEN37-9	39.2	38-39.5	4													
LEN39-1	6.0	5-6.5	2	0	47	28	25	0.060		ML	Sandy SILT	27				
LEN39-2	11.0	10-11.5	10	0	89	11		0.185	3	SP-SM	SAND with silt	24				
LEN39-3	13.5	13-14.5		0	86	10	4	0.188	4	SM	Silty SAND					
LEN39-4	14.3	13-14.5	7	0	92	8		0.232	3	SP-SM	SAND with silt	26				
LEN39-5	21.0	20-21.5	8	0	95	5		0.305	2.5	SP-SM	SAND with silt	25				
LEN51-1	4.5	3.5-5	9	0	85	14	1	0.144	3.0	SM	Silty SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
LEN51-2	7.5	6.5-8	7	0	57	42	1	0.080	3.3	SM	Silty SAND	31.4				
LEN51-4	11	10-11.5	2	0	64	33	3	0.088	5.0	SM	Silty SAND	28.3				
LEN51-5	14	13-14.5	9	0	88	12		0.340	6.3	SW-SM	SAND w/m	23				
LEN51-6	17	16-17.5	11	0	92	8		0.345	3.5	SP-SM	SAND w/m	23.1				
LEN51-7	21	20-21.5	15	0	91	9		0.251	3.1	SP-SM	SAND w/m	25.6				
LEN51-8	24	23-24.5	16	0	92	8		0.271	3.1	SP-SM	SAND w/m	27.9				
LEN51-9e	29.5	29-31		0	2	38	60	0.003		CH	Fat CLAY	46.6	61	32	0.6	NA
LEN51-9d	29.8	29-31		0	1	16	83	0.002		CH	Fat CLAY	59.5	84	52	0.5	NA
LEN51-9c	30.2	29-31		0	0	14	86	0.001		CH	Fat CLAY	51.7	81	48	0.4	NA
LEN51-9b	30.5	29-31		0	1	11	88	0.002		CH	Fat CLAY	53.3	80	49	0.5	NA
LEN51-9a	30.8	29-31		0	1	15	84	0.002		CH	Fat CLAY	48.7	73	35	0.3	NA
LEN51-10f	31.2	31-33		0	0	30	70	0.003		CH	Fat CLAY	49.2	73	43	0.4	NA
LEN51-10e	31.5	31-33		0	2	34	66	0.003		CH	Fat CLAY	46.8	66	32	0.4	NA
LEN51-10d	31.8	31-33		0	0	47	53	0.003		ch	Fat clay	47.8	66	32	0.4	NA
LEN51-10c	32.2	31-33		0	3	11	86	0.002		CH	Fat CLAY	51.7	76	43	0.4	NA
LEN51-10b	32.5	31-33		0	5	38	57	0.003		CH	Fat CLAY	46.7	60	30	0.6	NA
LEN51-10a	32.8	31-33		0	4	58	38	0.009		CH	Fat CLAY	40.9	60	30	0.4	NA
LEN51-11	35.0	34-36		0	6	31	63	0.003		ch	Fat clay					
LEN52A-1	1.5	0-3		0	44	39	17	0.060		ml	Sandy SILT					
LEN52A-2	5.5	5-6.5		0	44	39	17	0.063	57	ML	Sandy SILT	30				
LEN52A-3	6	5-6.5	1	0	62	23	15	0.101	72	SM	Silty SAND					
LEN52A-4	11	10-11.5	10	0	88	12		0.159	2.9	SP-SM	SAND w/M					
LEN52A-5	16	15-16.5	NA	0	87	11	2	0.270	5.5	SM	Silty SAND	27.1				
LEN52A-6	18.5	18-19.5														
LEN52A-7	19	18-19.5	23	0	93	7		0.200	2.1	SP-SM	SAND w/M					
LEN52A-9	23.5	23-24.5		0	91	9		0.220	2.8	SP-SM	SAND w/M					
LEN52A-8	24.3	23-24.5	6	0	6	24	70	0.002		ch	Fat clay	38.3				
LEN52A-10g	29.8	29.5-32		0	3	63	34	0.010		CL	Lean CLAY					
LEN52A-10f	30.2	29.5-32		0	26	60	14	0.040	13	ML	SILT w/S	39.7	49	25	0.6	1.0
LEN52A-10e	30.5	29.5-32		0	18	69	13	0.036	18	ML	SILT w/S	30.3	32	4	0.6	0.5
LEN52A-10d	30.8	29.5-32		0	1	82	17	0.025	28	ml	so:t	33.9				
LEN52A-10c	31.2	29.5-32		0	0	70	30	0.012	11	ML	SILT	38.3				
LEN52A-10b	31.5	29.5-32		0	1	77	22	0.016		ml	silt	40.2	46	15	0.6	1.1
LEN52A-10a2	31.7	29.5-32		0	4	70	26	0.015		ml	silt	44.4				
LEN52A-10a1	31.9	29.5-32		0	77	12	11	0.117	37	SM	Silty SAND	34.9				
LEN52B-1	1	0-2		0	29	41	30	0.024		ML	SILT w/S					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
LEN52B-2	3.5	3-4		0	47	32	21	0.062		ML	Sandy SILT					
LEN52B-3	6	5-6.5	2	0	76	13	11	0.152	46	SM	Silty SAND					
LEN53-1	4	3-4.5	12	0	89		11	0.155	2.6	SM	Silty SAND					
LEN53-2	7.5	7-8.5		0	92	8		0.175	2.4	SP-SM	SAND w/M					
LEN53-3	8.25	7-8.5	7	0	87	13		0.155		SM	Silty SAND					
LEN53-4	11	10-11.5		0	87	13		0.162	3.2	SM	Silty SAND					
LEN53-5	11.4	10-11.5	6	0	94	6		0.201	2.4	SP-SM	SAND w/M					
LEN53-6	16	15-16.5	10	0	93	7		0.253	2.9	SP-SM	SAND w/M					
LEN53-7	19	18-19.5	17	0	93	7		0.251	2.8	SP-SM	SAND w/M					
LEN53-8	27	26-28		0	15	51	34	0.013		ml	Silt w/S	31.4				
PAJARO DUNES (PD1)																
PAJ43-1	2.0	1.5-2.5		0	91	9		0.200	2.1	SP-SM	SAND with silt					
PAJ43-5	2.8	2.5-4		0	82	9	9	0.195	36	SM	Silty SAND					
PAJ43-4	3.3	2.5-4														
PAJ43-3	3.5	2.5-4		0	96	4		0.210	1.7	SP	SAND					
PAJ43-2	3.8	2.5-4	27									29				
PAJ43-8	5.2	5-6.5		0	80	10	10	0.188	51	SM	silty SAND					
PAJ43-7	5.8	5-6.5		0	2	32	66	0.003		MH	Elastic SILT		71	35		0.8
PAJ43-6	6.3	5-6.5	NA	0	94	6		0.260	2.1	SP-SM	SAND with silt	23				
PAJ43-9	10.5	auger										49				
PAJ43-11	11.2	11-12.5		0	81	11	8	0.150	17	SM	silty SAND	30				
PAJ43-10	12.0	11-12.5	19													
PAJ43-13	15.0	14-15.5		8	87	5	0	0.345	3.3	SP-SM	SAND with silt					
PAJ43-12	15.3	14-15.5	76	0	90	10		0.275	4.1	SP-SM	SAND with silt	17				
PAJ43-14	20.0	19-20.5	65	0	89	11		0.248	4.7	SP-SM	SAND with silt					
PAJ43-16	25.0	24-25.5	136	15	84	1	0	0.455	2.2	SP	SAND with gravel					
PAJ44-1	10.5	9.5-11	23	0	97	3		0.210	1.7	SP	SAND	27				
PAJ44-4	13.8	13-14.5		0	97	3		0.212	1.7	SP	SAND					
PAJ44-3	14.0	13-14.5		0	93	7		0.207	2	SP-SM	SAND with silt					
PAJ44-2	14.3	13-14.5	17	0	97	3		0.219	1.7	SP	SAND	25				
PAJ44-lost	19	18-19.5	11													
PAJ44-5	23.5	22.5-24	38	0	97	3		0.251	1.8	SP	SAND	19				
PAJ44-7	27.5	27-28.5		0	95	5		0.240	2							
PAJ44-6	28.0	27-28.5		0	2	12	86	0.002		ch	Fat clay	44				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
PAJ44-8	28.5	27-28.5	5	0	2	32	66	0.002		ch	fat clay					
PAJ44-9	31.0	30-31.5	25	0	89	11		0.215	4.2	SP-SM	SAND with silt	26				
PAJARO DUNES (PD2)																
PAJ79-1	4.8	4-5.5		0	9	37	54	0.004		mh	Elastic silt					
PAJ79-2	4.2	4-5.5	1	0	8	38	54	0.004		mh	Elastic silt					
PAJ79-3	7.8	7-8.5		0	99	1	0	0.258	1.8	SP	SAND					
PAJ79-4	8.0	7-8.5	47													
PAJ79-A	9.2	9-11		0	88	12		0.209	6.7	SW-SM	SAND w/M					
PAJ79-B	9.5	9-11		0	89	11		0.213	4	SP-SM	SAND w/M					
PAJ79-C	9.8	9-11		0	93	7		0.218	2.5	SP-SM	SAND w/M					
PAJ79-D	10.2	9-11		0	92	8		0.204	2.3	SP-SM	SAND w/M					
PAJ79-E	10.5	9-11		0	92	8		0.318	3.5	SP-SM	SAND w/M					
PAJ79-2E	10.6	9-11		0	87	13		0.230	9.3	SM	Silty SAND					
PAJ79-F	10.8	9-11		0	84	16		0.259		SM	Silty SAND					
PAJ79-5	13.0	12-13.5		1	97	2	0	0.418	1.9	SP	SAND					
PAJ79-6	12.5	12-13.5														
PAJ79-7	12.3	12-13.5	26	0	96	4	0	0.228	1.9	SP	SAND					
PAJ79-8	15.5	15-16.5		1	96	3	0	0.390	2.4	SP	SAND					
PAJ79-9	16.0	15-16.5		0	46											
PAJ79-8	16.3	15-16.5	22	1	96	3	0	0.390	2.4	SP	SAND					
PAJ79-11	16.5	16-17		1	35	25	39	0.011		ML	Sandy SILT	49		17		0.6
PAJ82	3.0	auger		0	76	13	11	0.190	54	SM	Silty SAND					
PAJ82-1	5.1	5-7										56				
PAJ82-1	5.2	5-7										37				
PAJ82-1	5.4	5-7		0	3	61	36	0.008		CH	Fat CLAY	65	81	50	0.7	1.9
PAJ82-1	5.7	5-7		0	2	57	41	0.008		CH	Fat CLAY	50	67	40	0.6	1.4
PAJ82-1	6.0	5-7		0	2	35	63	0.003		CH	Fat CLAY	54	71	40	0.6	1.1
PAJ82-1	6.1	5-7										51				
PAJ82-1	6.3	5-7		0	1	62	37	0.009		MH	Elastic SILT	42	55	25	0.5	1.3
PAJ82-1	6.5	5-7								CH	Fat CLAY	47	58	31	0.6	
PAJ82-1	6.6	5-7		0	4	43	53	0.004		CH	Fat CLAY	44	59	34	0.6	1.0
PAJ82-2	8.0	8-10		0	23	50	27	0.022		ML	SILT w/S		37	12		0.9
PAJ82-2	8.2	8-10		0	0	68	32	0.016		CH	Fat CLAY		69	43		1.6
PAJ82-2	8.3	8-10		0	1	37	62	0.003		MH	Elastic SILT	66	55	21	1.5	0.6
PAJ82-2	9.0	8-10										41				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
PAJ82-2	9.2	8-10		0	23	60	17	0.035		CL	Lean CLAY w/S		27	14		1.2
PAJ82-2	9.5	8-10		0	67	24	9	0.151	37	SM	Silty SAND	23				
PAJ82-2	10.0	8-10		0	73	16	11	0.178	59	SM	Silty SAND					
PAJ82-3	21.7	21-23		0	91	9		0.350	4.4	SP-SM	SAND w/M					
PAJ82-3	22.0	21-23		0	5	41	54	0.004		CH	Fat CLAY	84	85	61	1.0	1.6
PAJ82-3	22.4	21-23		0	93	7			4	SP-SM	SAND w/M					
PAJ82	23.5	23-24		0	55	16	29	0.112		SM	Silty SAND					
SOUTHERN PACIFIC (SPR)																
SPR45-1	6.0	5-6.5	15	0	4	39	57	0.004		CH	Fat CLAY	30	64	29	-0.2	0.7
SPR45-2	11.0	10-11.5	7	0	76	18	6	0.107	6	SM	Silty SAND					
SPR45-3	16.0	15-16.5	11	0	94	6		0.167	2	SP-SM	SAND with silt	36				
SPR45-4	19.0	18-19.5	11	0	90	10		0.171	2.6	SP-SM	SAND with silt					
SPR45-5	23.0	22-23.5	19	0	89	11		0.240	4.3	SP-SM	SAND with silt					
SPR45-6	25.8	25-26.5		0	94	5	1	0.300	3.3	SP-SM	SAND with silt	49				
SPR45-7	26.0	25-26.5	12													
SPR45-12	29.0	28-30		0	25	32	43	0.007		MH	Eastic SILT		51	20		0.7
SPR45-8	29.5	29-30.5		0	5	45	50	0.005		ch	Fat clay					
SPR45-9	30.0	29-30.5	8	5	86	9		0.475	5.5	SP-SM	SAND with silt					
SPR45-10	33.0	32-33.5	41	0	93	7		0.355	3.3	SP-SM	SAND with silt					
SPR45-11	36.0	35-36.5	22	0	91	9		0.355	4	SP-SM	SAND with silt					
SPR45-13	36.5	auger		0	40	29	31	0.020		ml	Sandy silt					
SPR48-1	6.0	5-6.5	6	0	70	26	4	0.108	3.4	SM	Silty SAND					
SPR48-2	11.0	10-11.5		0	41	49	10	0.062	15	ML	Sandy SILT					
SPR48-3	11.5	10-11.5	7													
SPR48-4	16.0	15-16.5	13	0	88	12		0.158	3	SP-SM	SAND with silt	26				
SPR48-5	20.7	20-21.5														
SPR48-6	21.0	20-21.5	7	0	87	13		0.168	3.2	SP-SM	SAND with silt					
SPR48-lost	24	23-24.5	10													
SPR48-7	28.0	27-28.5	11	0	86	10	4	0.164	3.6	SP-SM	SAND with silt	30				
SPR48-8	31.0	30-31.5	13	12	81	7		0.625	6	SP-SM	SAND with silt					
SPR48-9	36.0	35-36.5	11	0	91	9		0.225	3.3	SP-SM	SAND with silt	30				
MUNICIPAL AIPORT 54 (WAT)																
MA54	3.0	2.5-4.5		0	48	29	23	0.060		CL	Sandy lean CLAY		23	10		0.6

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
MA54	3.8	2.5-4.5		0	45	28	27	0.048		CL	Sandy lean CLAY		35	16		0.8
MA54	4.3	2.5-4.5		3	44	23	30	0.045		CL	Sandy lean CLAY	18	36	17	-0.1	0.8
MA54	4.5	auger		1	48	22	29	0.060		CL	sandy lean CLAY		32	9		0.4
MA54	9.0	8-9.5	41	3	62	19	16	0.242	128	SM	silty SAND	16				
MA54	12.8	12.5-14.3		1	63	20	16	0.182		SM	silty SAND					
MA54	13.2	12.5-14.3		1	72	12	15	0.285	120	SM	silty SAND					
MA54	13.5	12.5-14.3		1	69	18	12	0.238	102	SM	silty SAND					
MA54	13.8	12.5-14.3		1	66	23	10	0.220	62	SM	silty SAND					
MA54	14.2	12.5-14.3		10	63	17	10	0.305	61	SM	silty SAND					
MA54	20.0	20-21.5	7	0	17	45	38	0.015		CL	Lean CLAY w/S	41	40	15	1.0	0.7
MA54	31.7	31.5-32.3		0	25	41	34	0.016		CL	Lean CLAY w/S	37	46	20	0.5	1.0
MA54	31.9	31.5-32.3		0	14	29	57	0.003		CH	Fat CLAY	46	72	39	0.3	0.9
MA54	32.3	31.5-32.3		0	80	11	9	0.258	31	SM	Silty SAND	17				
MA54	32.4	31.5-32.3		7	80		13	0.268		SM	Silty SAND					
MA54	32.8	31.5-32.3		1	84	11	4	0.240	13	SM	Silty sand					
MA54	34.1	33.5-35		1	86	12	2	0.225	4.5	SM	Silty SAND					
MA54	34.8	33.5-35	25	0	73	22	5	0.128	10	SM	Silty SAND					
FARRIS FARMS (FAR)																
FAR58-1	1.3	1-2.6		0	87		13	0.185		SM	Silty SAND					
FAR58-2	2.1	1-2.6	3	0	34	53	13	0.048		ML	Sandy SILT	10				
FAR58-3	6.5	6-7.5		0	18	75	7	0.044	6.8	ML	SILT	12				
FAR58-4	7.1	6-7.5		0	8	79	13	0.029	11.7	ML	SILT					
FAR58-5	7.5	6-7.5	4	0	57	35	8	0.085	11.5	SM	Silty SAND	10				
FAR58-6	11.3	10.5-12		0	10	66	24	0.020	15.8	ML	SILT	34				
FAR58-7	11.8	10.5-12	10	0	85	12	3	0.127	9.9	SM	Silty SAND	21				
FAR58-8	14.5	13.5-15	26	0	84	13	3	0.115	3.3	SM	silty SAND	27				
FAR58-9	20.0	19-20.5	21	0	98		2	0.290	1.9	SP	SAND	24				
FAR58-10	24.7	24-25.5		0	96	4		0.262	2.1	SP	SAND	23				
FAR58-11	25.3	24-25.5	17	0	93	7		0.238	2.5	SP-SM	SAND with /m					
FAR59	1.5	auger		0	42	42	16	0.056		ml	Sandy silt					
FAR59	4.0	3.5-5		0	49	45	6	0.074	3.8	ml	Sandy silt	13				
FAR59	4.8	3.5-5	2	0	39	51	10	0.051	14	ml	Sandy silt					
FAR59	6.8	6.5-8		0	24	64	12	0.045	11.3	ML	SILT W/S					
FAR59	7.5	6.5-8	2	0	42	54	4	0.063	3.9	ml	Sandy silt	21				
FAR59	10.0	auger		0	14	59	27	0.022		ML	SILT	28	35	7	0.0	0.3

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
FAR59	10.3	10-11.5		0	1	53	46	0.006		CL	Lean CLAY	37	47	23	0.6	0.9
FAR59	11.0	10-11.5	4	0	11	69	20	0.031	19.0	CL	Lean CLAY	35	33	10	1.2	1.0
FAR59	13.4	13-14.5		0	83	14	3	0.113	2.8	SM	Silty SAND	27				
FAR59	14.2	13-14.5	5	0	70	25	5	0.097	5.4	SM	Silty SAND	34				
FAR59	16.6	16-17.5		0	75	18	7	0.113	9	SM	Silty SAND					
FAR59	17.3	16-17.5	9	0	94	6		0.159	1.9	SP-SM	SAND w/M	32				
FAR59	21.0	20-21.5	16	0	95	5		0.205	2.1	SP-SM	SAND w/M	26				
FAR59	26.0	25-26.5	21	0	93	7		0.205	2.4	SP-SM	SAND w/M	25				
FAR59	30.3	30-31.5		0	93	7		0.200	2.3	SP-SM	SAND w/M	24				
FAR59	31.1	30-31.5	16	0	90	10		0.190	3.5	SP-SM	SAND w/M	24				
FAR61-1	3.0	2-3.5		0	23	73	4	0.049	3.8	ML	SILT w/S		26	9	-0.2	
FAR61-2	3.1	2-3.5	4									15				
FAR61-4	7.5	6.5-8		0	57	37	6	0.085	7	SM	silty SAND					
FAR61-3	7.6	6.5-8	4									34				
FAR61-5	8.6	8-9.5										26				
FAR61-6	8.8	8-9.5	12	0	28	61	11	0.047	10	ML	SILT w/S					
FAR61-7	11.3	11-12.5										28				
FAR61-8	12.0	11-12.5	9	0	62	31	7	0.090	5	SM	silty SAND					
FAR61-9	14.7	14.5-16										38				
FAR61-10	15.7	14.5-16	13	2	92	6		0.300	3	SP-SM	SAND with/m					
FAR61-14	21.1	20.5-22										25				
FAR61-15	21.5	20.5-22	9	0	79	18	3	0.113	2.2	SM	silty SAND					
FAR61-16	28.6	28-29.5										23				
FAR61-17	29.0	28-29.5	28	0	91	9		0.200	2.7	SP-SM	SAND with/m					
FAR62-1	3.0	2-3.5		0	2	48	50	0.005		CH	Fat CLAY	28	57	30		0.9
FAR62-2	3.1	2-3.5	10									28				
FAR62-4	6.0	5-6.5		0	4	66	30	0.019		ML	SILT		36	9	0.4	0.5
FAR62-3	6.0	5-6.5	3									31				
FAR62-7	12.9	12.5-14		0	5	60	35	0.014		ml	Silt					
FAR62-6	13.0	12.5-14										41				
FAR62-5	13.4	12.5-14										42				
FAR62-10	13.4	12.5-14		0	2	72	26	0.014	9.5	ML	SILT					
FAR62-9	13.9	12.5-14										40				
FAR62-11	13.9	12.5-14	1	0	5	55	40	0.007		ml	Silt					
FAR62-13	16.5	15.5-17	6	0	1	49	50	0.005		MH	Elastic SILT		53	21	0.1	0.7
FAR62-22	30.1	30-31.5										30				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
FAR62-16	30.2	30-31.5														
FAR62-17	30.4	30-31.5		0	2	35	63	0.002		MH	Elastic SILT	43	66	38	0.4	0.8
FAR62-18	31.4	30-31.5	7									36				
FAR62-21	35.3	35-36.5														
FAR62-19	35.5	35-36.5		0	5	30	65	0.003		MH	Elastic silt	32				
FAR62-19	35.5	35-36.5										32				
FAR62-20	36.0	35-36.5	9	0	4	80	16	0.029	9.1	ML	SILT		35	4		1.0
MARINOVICH FARMS (MRR)																
MRR65-1	2.0	auger		0	9	57	34	0.011		CH	Fat CLAY					
MRR65-2B2	5.5	5-6.5		0	11	77	12	0.035	11	ML	SILT					
MRR65-2B1	6.3	5-6.5	6	0	16	72	12	0.048	16	ML	SILT w/S					
MRR65-4	14.0	13-14.5	7	0	58	37	5	0.087	6.4	SM	silty SAND					
MRR65-5	17.0	16-17.5	5	0	70	27	3	0.104	4.5	SM	silty SAND					
MRR65-6	20.3	20-21.5		0	37	59	4	0.056	5.7	ML	Sandy SILT					
MRR65-7	21.1	20-21.5	6	0	41	51	8	0.066	8.3	ML	Sandy SILT					
MRR65-8	25.0	24-25.5	13	0	88	12		0.159	2.7	SM	silty SAND					
MRR65-9	30.0	29-30.5	20	0	89	11		0.156	2.4	SP-SM	pg SAND w/M					
MRR67-2	2.1	1.5-3		0	36	60	4	0.060	5.5	ML	Sandy SILT					
MRR67-1	2.7	1.5-3	2	0	3	88	9	0.028	5.7	ML	SILT					
MRR67-3	8.0	7-8.5	3	0	0	44	56	0.004		CH	Fat CLAY	39	66	35	0.2	1.1
MRR67-4	9.3	8-10.5		0	1	51	48	0.006		CH	Fat CLAY	47	58	27	0.6	0.9
MRR67-5	9.8	9.5-10		0	2	65	33	0.017		CL	Lean CLAY	38				
MRR67-6	12.0	10-14		0	1	64	35	0.016		CL	Lean CLAY		46	21		1.0
MRR67-T	14.5	14-16		0	1	50	49	0.005		ML	SILT	35	48	17	0.3	0.6
MRR67-T	14.7	14-16		0	1	54	45	0.006		MH	Elastic SILT	35	56	17	0.5	0.5
MRR67-T	15.0	14-16		0	3	35	62	0.003		MH	Elastic SILT	48	65	24	0.3	0.7
MRR67-T	15.5	14-16		0	1	58	41	0.007		ML	SILT	39	47	14	0.4	0.9
MRR67-T	15.8	14-16		0	1	57	42	0.008		CL	Lean CLAY	40	47	20	0.6	0.7
MRR67-7	17.0	16-17.5	4	0	1	65	34	0.011		MH	Elastic SILT	41	50	15	0.4	0.7
MRR67-9	20.6	20-21.5		0	85	14	1	0.220	4.8	SM	Silty SAND					
MRR67-8	21.2	20-21.5	25	0	85	13	2	0.203	4.9	SM	Silty SAND					
MRR67-12	24.0	24-25.5		0	75	19	6	0.229	27	SM	Silty SAND					
MRR67-11	24.6	24-25.5		0	23	50	27	0.016		ML	SILT w/S	33				
MRR67-10	25.3	24-25.5	4	0	31	49	20	0.036	18	ML	Sandy SILT	31				
MRR67-16	27.5	27-28.5		0	43	43	14	0.062	28	ML	Sandy SILT					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
MRR67-15	27.9	27-28.5										37				
MRR67-14	28.0	27-28.5										30				
MRR67-13	28.3	27-28.5	3	0	60	31	9	0.112	27	SM	Silty SAND					
SILLIMAN (SIL)																
SIL68-15	1.7	outcrop		0	27	55	18	0.029	22	ML	SILT w/S					
SIL68-14	2.5	outcrop		1	91	8		0.395	6.4	SW-SM	SAND w/M					
SIL68-13	4.0	outcrop		0	88	12		0.308	8.7	SW-SM	SAND w/M					
SIL68-3	5.9	5.5-7														
SIL68-4	6.2	5.5-7		0	61	32	7	0.093	11	SM	Silty SAND					
SIL68-2	6.5	5.5-7														
SIL68-1	6.8	5.5-7														
SILT68-T	7.1	7-9	2	0	46	46	8	0.066	12	ML	Sandy SILT					
SILT68-T	7.2	7-9		0	14	67	19	0.027		CL	Lean CLAY		37	15		1.4
SILT68-T	7.4	7-9		0	48	42	10	0.069	21	ML	Sandy SILT					
SILT68-T	7.4	7-9		0	65	24	11	0.121	43	SM	Silty SAND					
SILT68-T	7.6	7-9		0	40	47	13	0.054	25	ML	Sandy SILT					
SILT68-T	7.8	7-9		0	37	48	15	0.052	38	ml	sandy silt					
SILT68-T	8.1	7-9		0	21	67	12	0.032	12	ML	SILT w/S		33	0		
SILT68-T	8.3	7-9		0	76	22	2	0.150	6.8	SM	Silty SAND					
SILT68-T	8.5	7-9		0	49	33	18	0.069	46	ML	Sandy SILT					
SILT68-T	8.8	7-9		0	74	20	6	0.147	12	SM	Silty SAND					
SILT68-T	8.8	7-9		0	73	24	3	0.188	12	SM	Silty SAND					
SIL68-7	13.8	14-15.5		0	91	9		0.184	2.5	SP-SM	pg SAND w/M					
SIL68-6	14.6	14-15.5		0	81	16	3	0.156	6.2	SM	Silty SAND					
SIL68-5	15.3	14-15.5	13	0	80	18	2	0.149	15	SM	Silty SAND					
SIL68-9	19.8	19.5-21		0	85	15		0.175		SM	Silty SAND					
SIL68-8	20.5	19.5-21	7													
SIL68-10	24.9	24-25.5	15	0	89	11		0.298	5.6	SP-SM	Sand w/M					
SIL68-12	30.5	30-31.5		0	85	12	3	0.199	4.1	SM	Silty SAND					
SIL68-11	31.2	30-31.5	16	0	85	11	4	0.247	11	SM	Silty SAND					
SIL71-1	6.0	6-7.5	9	0	86	13	1	0.187	4.7	SM	Silty SAND					
SIL71-5	9.5	10-11.5		0	23	70	7	0.047	6.3	ML	SILT with/S					
SIL71-4	10.3	10-11.5		0	71	22	7	0.107	8.1	SM	Silty SAND					
SIL71-3	10.6	10-11.5														
SIL71-2	10.9	10-11.5	5													
SIL71-6	13.0	13-14.5	8	0	80	14	6	0.145	8.1	SM	Silty SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
SIL71-7	19.5	19-20.5	13	0	91	9		0.203	2.3	SP-SM	pg SAND w/M					
SIL71-8	25.0	24-25.5	14	0	82	14	4	0.123	4.5	SM	Silty SAND					
SIL71-9	27.5	27-28.5	6	0	31	63	6	0.054	4.6	ML	Sandy SILT					
SIL71-11	29.4	29-30.5		0	44	49	7	0.064	9.2	ML	Sandy SILT					
SIL71-10	30.0	29-30.5	13	0	79	16	5	0.200	14	SM	Silty SAND					
KETT (KET)																
KET72-1	0.5	auger		1	44	28	27	0.044		ml	sandy silt					
KET72-2	1.5	auger		0	47			0.060								
KET72-3	2.5	auger		2	34	21	43	0.009		ML	Sandy SILT		45	16		0.4
KET72-4	5.0	4-5.5	26	1	37	28	34	0.018		ml	sandy silt					
KET72-5a	5.8	5.5-7.5		0	21	41	38	0.010		CH	Fat CLAY w/S	24	50	27	0.0	1.3
KET72-5b	6.2	5.5-7.5		0	21	50	29	0.019		CL	Lean Clay w/S	22	44	25	0.1	1.7
KET72-5c	6.8	5.5-7.5		1	34	36	29	0.026		CL	Sandy lean CLAY	21	37	19	0.1	0.8
KET72-5d	7.1	5.5-7.5		0	22	43	35	0.012		CH	Fat CLAY w/S	21	54	35	0.1	2.1
KET72-5e	7.4	5.5-7.5		0	15	41	44	0.008		CH	Fat CLAY w/S	24	53	30	0.0	0.9
KET74-1	1.0	auger		25	36	27	12	0.151	69	SM	Silty SAND w/G					
KET74-2	2.0	auger		0	38	34	28	0.034		CL	Sandy lean CLAY		28	11		0.6
KET74-4	4.1	3.5-5		0	13	49	38	0.010		cl	Lean clay					
KET74-3	4.9	3.5-5	1	2	51			0.095		SM	silty SAND					
KET74-5	9.0	8-9.5	14	10	75	15		0.670		SM	silty SAND					
KET74-8	12.6	12-13.5														
KET74-7	12.8	12-13.5														
KET74-6	13.3	12-13.5	6	0	18	34	48	0.006		cl	lean clay w/s					
KET74-10	16.1	15.5-17		0	68	19	13	0.165	74	SM	silty SAND					
KET74-9	16.6	15.5-17	7	0	62	12	26	0.132		SM	silty SAND					
KET74-14	19.3	19-20.5		0	4	29	67	0.002		ch	fat clay					
KET74-13	19.8	19-20.5		3	70	8	19	0.190		SM	silty SAND					
KET74-11	20.3	19-20.5	10													
KET74-12	20.3	19-20.5														
KET74-15	21.5	auger		0	24	33	43	0.009		CL	Lean CLAY w/S	45	21			0.7
SCURICH (SCR)																
SCR89-a		RIVER BED		13	72	15	0	0.560	50	SW-SM	SAND w/M					
SCR89-b		RIVER BANK		0	91	9		0.280	3.1	SP-SM	SAND w/M					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
SCR89-c	1.0	auger		0	70			0.137		sm	Silty SAND					
SCR89-1	3.5	2.5-4	6	1	82	17		0.179		SM	Silty SAND					
SCR89-4	6.0	5.5-7		0	98	2	0	0.259	2.3	SP	SAND					
SCR89-3	6.5	5.5-7	11	no sieve			4									
SCR89-5	8.5	8-9		11	49	18	22	0.150		SM	silty SAND					
SCR89-9	14.6	14.5-16		0	96	4		0.370	3.3	SP	SAND					
SCR89-8	15.0	14.5-16		0	90	10		0.169	2.6	SP-SM	SAND w/m					
SCR89-7	15.7	14.5-16	7	0	94	6		0.280	3.9	SP-SM	SAND w/m					
SCR89-15	21.1	20-21.5		0	33	41	26	0.026		ml	sandy silt					
SCR89-10	21.4	20-21.5	11	0	30	51	19	0.040	26	ml	Sandy SILT					
SCR89-18	23.3	23-24.5		0	5	52	43	0.007		cl	Lean clay					
SCR89-17	24.2	23-24.5	6	0	10	54	36	0.010		CL	Lean CLAY	49	24			0.9
RADOVICH (RAD)																
RAD98-1	2.7	2-3.5		0	2	60	38	0.010		ml	Silt	26				
RAD98-2	3.2	2-3.5	13	0	6	73	21	0.029		ML	SILT	24	30	4	-0.4	0.3
RAD98-3	6.2	5.5-7		0	7	39	54	0.004		MH	Elastic silt	34	57	25	0.1	0.7
RAD98-4	6.8	5.5-7	11	0	88	12		0.259		SP-SM	pg SAND w/m					
RAD98-5	10.0	9-10.5	8	0	89	11		0.189	4	SP-SM	pg SAND w/m					
RAD98-6A	12.5	12-13.5		0	87	13		0.208		SM	Silty SAND					
RAD98-6B	12.8	12-13.5	16	0	89	11		0.174	4	SM	Silty SAND					
RAD98-7	17.9	17-18.5		0	95	5		0.196	2	SP	SAND					
RAD98-8	18.5	17-18.5	14	0	91	9		0.350	4.5	SP-SM	SAND w/m					
RAD98-9	25.0	24-25.5	19	0	94	6		0.297	3.1	SP-SM	SAND w/m					
RAD98-10A	30.2	30-31.5		0	97	3		0.250	2.2	SP	SAND					
RAD98-10B	30.9	30-31.5	29	0	96	4		0.360	3	SP	SAND					
RAD98-11	34.3	34-35.5		1	88	11		0.403	9	SP-SM	SAND w/m					
RAD98-12	35.0	34-35.5	31	0	63	29	8	0.095	16	SM	silty SAND	20				
RAD99-1	4.6	4-5.5		0	1	82	17	0.019		ML	SILT	32	37	8	0.4	0.6
RAD99-2	4.8	4-5.5	3	0	5	43	52	0.005		cl	lean clay	33				
RAD99-3	9.2	9-10.5		0	3	22	75	0.002		mh	Elastic silt	43				
RAD99-4A	9.8	9-10.5		0	4	30	66	0.003		MH	Elastic SILT	37	68	34	0.1	0.8
RAD99-4B	10.2	9-10.5	5	0	1	27	72	0.002		MH	Elastic SILT	64	36			0.8
RAD99-5	14.3	14-15.5		0	8	78	14	0.035	20	ML	SILT	40				
RAD99-6	15.0	14-15.5	11	0	87	13		0.147		SM	silty SAND					
RAD99-7	17.2	17-18.5		0	95	5		0.198	2.1	SP-SM	pg SAND w/m					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
RAD99-8	17.6	17-18.5		0	17	68	15	0.037	17	ML	SILT with/S	34				
RAD99-9	18.2	17-18.5	13	0	84	10	6	0.153	12	SM	silty SAND					
RAD99-10	20.6	20-21.5		0	86	12	2	0.178	9	SM	silty SAND					
RAD99-11	21.2	20-21.5	8	0	78	17	5	0.135	10	SM	silty SAND					
RAD99-12	25.0	24-25.5	26	0	81	11	8	0.195	34	SM	silty SAND					
RAD99-13	33.0	32-33.5	14	0	83	16	1	0.200	4.9	SM	silty SAND					
RAD99-17	40.0	auger		0	18	64	18	0.037		ML	SILT with/S		30	5		0.4
RAD99-14	41.4	41-42.5		0	89	11		0.240	4.6	SP-SM	pg SAND /M					
RAD99-15	42.0	41-42.5		0	10	80	10	0.033	7.8	ML	SILT	28				
RAD99-16	42.3	41-42.5	24	0	74	20	6	0.197	21	SM	Silty SAND					
TOM JONES RANCH (TJR)																
TJR100-1	2.0	auger		0	5	59	36	0.010		ML	SILT		46	14		0.6
TJR100-2	5.0	auger		0	31	52	16	0.044	20	CL	Sandy lean CLAY		28	6		1.0
TJR100	5.7	5.5-7.75		0	47	45	8	0.069	10	ML	Sandy SILT					
TJR100	6.0	5.5-7.75		0	41	46	13	0.062	22	ML	Sandy SILT	32	29	3	1.8	0.5
TJR100	6.3	5.5-7.75		0	33	55	12	0.054	19	ML	Sandy SILT	30	30	4	1.1	0.4
TJR100	6.6	5.5-7.75		0	5	83	12	0.032	12	ML	SILT	28	33	8	0.3	1.1
TJR100	7.0	5.5-7.75		0	17	68	15	0.028	20	ML	SILT w/ S	33	38	8	0.3	0.8
TJR100	7.3	5.5-7.75		0	31	57	12	0.048	16	ML	Sandy SILT	20	27	5	-0.4	1.3
TJR100-5	13.3	13-14.5		0	49	34	17	0.072		ml	sandy silt					
TJR100-4	13.7	13-14.5		0	64	25	11	0.107	32	SM	Silty SAND					
TJR100-3	14.4	13-14.5	6	0												
TJR100-6	20.1	20-21.5		0	7	51	42	0.007		CH	Fat CLAY	27				
TJR100-8	20.5	20-21.5		0	2	50	48	0.005		ch	fat clay	37	56	32	0.4	1.5
TJR100-7	21.2	20-21.5	5	0	8	84	8	0.038	7.2	ml	silt					
TJR100-11	23.5	23-24.5		0	10	80	10	0.036	6.1	ML	SILT	31				
TJR100-9	24.5	23-24.5	4	0	75	20	5	0.171	10	SM	Silty SAND					
TJR100-14	26.2	26-27.5		0	86	14		0.276	8.7	SM	Silty SAND					
TJR100-13	26.8	26-27.5	12	0	34	46	20	0.040	48	ml	sandy silt					
TJR100-16	29.8	29.5-31		0	45	48	7	0.064	13	ml	sandy silt					
TJR100-15	30.5	29.5-31	8	0	73	22	5	0.116	4.4	SM	Silty SAND					
TJR100-17b	33.5	33-34.5		0	79	18	3	0.133	3.3	SM	Silty SAND	26				
TJR100-18	33.8	33-34.5		0												
TJR100-17a	34.2	33-34.5	25	0												
TJR102-3	4.7	4-5.5		0	1	37	62	0.003		ch	Fat clay	32				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
TJR102-2	5.0	4-5.5														
TJR102-1	5.3	4-5.5	9	0	1	65	34	0.009		ml	silt	26				
TJR102-4	10.0	9-10.5	8	0	46	45	9	0.068	12	ML	Sandy SILT					
TJR102-5	12.3	12-13.5		0	36	51	12	0.055	17	ML	Sandy SILT					
TJR102-6	13.3	12-13.5	6	0	21	72	7	0.051	6	ML	SILT w/S					
TRJ102	15.3	15-17		0	40	49	11	0.060	18	ml	sandy silt					
TRJ102	15.6	15-17		0	28	63	9	0.050	8.6	ML	SILT w/S	24				
TRJ102	15.9	15-17		0	28	62	10	0.047	12	ML	SILT w/S	29	30	5	0.8	0.6
TRJ102	16.3	15-17		0	22	64	14	0.042	17	ml	silt w/S	24				
TRJ102	16.6	15-17		0	21	68	11	0.037	13	ml	silt w/S	23				
TRJ102	17.1	15-17		0	27	59	14	0.046	28	CL	Lean CLAY w/S	18	28	8	-0.3	0.8
TJR102-9	20.8	20-21.5		0	28	55	17	0.048	24	ML	SILT w/S					
TJR102-7	21.3	20-21.5	5	0	28	62	4	0.051	4	ML	SILT w/S					
TJR102-13	22.3	22-23.5		0	9	86	5	0.043	4	ML	SILT	31				
TJR102-12	22.9	22-23.5		0	27	66	7	0.056	5.6	ML	SILT w/S					
TJR102-11	23.4	22-23.5	9	0	2	89	9	0.033	5.5	ML	SILT					
TANIMURA (TAN)																
TAN103-1	6.0	5-6.5	5	0	0	70	30	0.013		MH	Elastic SILT	39	51	21	0.4	1.1
TAN103	10.2	10-12		0	35	61	4	0.062	3.2	ml	Sandy silt					
TAN103	10.5	10-12		0	35	63	2	0.062	3.0	ml	Sandy SILT	36				
TAN103	10.8	10-12		0	2	65	33	0.011		CL	Lean CLAY	44	49	27	0.8	1.8
TAN103	11.1	10-12		0	10	70	20	0.019	235	MH	Elastic SILT		51	18		1.5
TAN103	11.3	10-12		0	3	85	12	0.024	6	ML	SILT	44	38	8	1.8	2.0
TAN103	11.5	10-12		0	3	88	9	0.005		MH	Elastic SILT	48	62	28	0.5	1.1
TAN103	11.8	10-12		0	3	88		0.028	4.3	ML	SILT	36	35	3	1.4	0.5
TAN103-4	12.2	12-14		0	4	88	8	0.029	4.7	ML	SILT	34	33	3	1.3	1.0
TAN103-4	12.5	12-14		0	2	78	20	0.022	11	ML	SILT	37	37	5	0.9	0.5
TAN103-4	12.8	12-14		0	2	88	10	0.022	4.6	CL	Lean CLAY	37	39	19	0.9	3.8
TAN103-4	12.9	12-14		0	3	92	5	0.037	3.3	ML	SILT	37				
TAN103-4	13.1	12-14		0	4	92	4	0.041	2.6	ML	SILT	36				
TAN103-4	13.3	12-14		0	16	78	6	0.041	3	ML	Silt w/S					
TAN103-4	13.5	12-14		0	5	88	7	0.029	3.7	ML	SILT	40	36	5	1.7	1.7
TAN103-4	13.8	12-14		0	11	86	3	0.042	2.4	ML	SILT	35				
TAN103-5	16.5	15.5-17	7	0	88	10	2	0.172	3.3	SM	Silty SAND					
TAN103-6	22.0	21-22.5	10	0	87	12	1	0.261	9	SM	Silty SAND					
TAN103-7	27.0	26-27.5	10	0	87	13	0	0.239	3.3	SM	Silty SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
TAN103-10	32.0	auger		0	26	40	34	0.014	25	ML	SILT w/S		48	17		0.9
TAN103-lost	34	33-34.5	10													
TAN103-9	36.9	36-37.5	8	0	88	12	0	0.260	8	SM	Silty SAND					
TAN103-8	37.4	36-37.5	8	0	86	14		0.288		SM	Silty SAND					
TAN105-1	2.0	auger		0	9	53	38	0.009		CL	lean CLAY	29	48	22	0.1	0.8
TAN105-2	6.0	5-6.5	5	0	39	54	7	0.060	6.6	ML	Sandy SILT					
TAN105-3	11.0	10-11.5	10	0	73	22	5	0.111	4.8	SM	Silty SAND					
TAN105-5	16.0	15-16.5	6	0	59	34	7	0.078	9	SM	Silty SAND					
TAN105-10	18.7	18.5-20		0	82	17	1	0.128	2.9	SM	Silty SAND					
TAN105-9	19.2	18.5-20		0	76	19	5	0.129	7.6	SM	Silty SAND					
TAN105-8	19.8	18.5-20		0	84	14	2	0.195	4.4	SM	Silty SAND					
TAN105-15	20.1	18.5-20	9									39				
TAN105-16	27.8	28-30		0	8	83	9	0.031	7.0	ML	SILT	31	33	6	0.7	3.0
TAN105-16	28.2	28-30		0	30	59	11	0.048	13	ML	Sandy SILT	32	30	6	1.4	2.0
TAN105-16	28.5	28-30		0	22	64	14	0.039	20	ML	SILT w/S	32	32	6	1.0	0.7
TAN105-16	28.8	28-30		0	22	62	16	0.037	19	ML	SILT w/S	34	34	6	1.0	0.7
TAN105-16	29.2	28-30		0	30	62	8	0.048	8.6	ML	Sandy SILT	31	29	0		
TAN105-16	29.5	28-30		0	41	51	8	0.058	8.4	ML	Sandy SILT	31				
TAN105-16	29.8	28-30		0	41	51	8	0.059	6.3	ML	Sandy SILT	33				
TAN105-12	34.0	33-34.5	10	0	82	15	3	0.154	4.5	SM	Silty SAND					
TAN105-13	39.5	38.5-40	12	0	89	11		0.213	4	SP-SM	SAND w/M					
MARTELLA (MAR)																
MAR110-1	4.0	3-4.5		0	1	68	31	0.010		ML	SILT	37	49	20	0.4	1.2
MAR110-2	4.0	3-4.5	3									37				
MAR110-3	12.0	11-12.5		0	87	13		0.160	5	SM	Silty SAND					
MAR110-4	12.0	11-12.5	4									31				
MAR110-5	16.0	15-16.5	7	0	86	12	2	0.165	11	SM	Silty SAND					
MAR110-6	21.0	20-21.5	16	0	90	8	2	0.303	4.6	SP-SM	SAND w/M					
MAR110-7	22.2	22-24		0	85	13	2	0.240	6.3	SM	Silty SAND					
MAR110-7	22.5	22-24		0	14	36	50	0.005		ch	fat clay	34				
MAR110-7	22.8	22-24		0	9	42	49	0.005		CH	Fat CLAY	35	67	36	0.1	1.4
MAR110-7	23.2	22-24		0	5	39	56	0.004		CH	Fat CLAY	44	75	40	0.2	1.2
MAR110-7	23.5	22-24		0	8	41	51	0.005		CH	Fat CLAY	39	75	41	0.1	1.5
MAR110-7	23.7	22-24		0	17	27	56	0.004		ch	Fat clay	36				
MAR110-7	23.9	22-24		0	87	12	1	0.211	4.3	SM	Silty SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
MAR110-8	27.5	26.5-28	19	0	90	10		0.195	2.7	SP-SM	SAND w/M					
MAR110-9	28.5	auger		0	6	30	64	0.002		CH	Fat CLAY		76	42		0.9
MAR111-1	3.0	auger		0	79	14	7	0.175	15	SM	Silty SAND	37				
MAR111-3	4.2	3-4.5	4	0	10	54	36	0.010		ml	SILT					
MAR111-4	7.0	6-7.5	10	0	81	17	2	0.150	4.3	SM	Silty SAND					
MAR111-5	11.0	10-11.5	6	0	90	10		0.181	2.8	SP-SM	SAND w/M					
MAR111-6	16.0	15-16.5		0	85	14	1	0.207	3.3	SM	Silty sand	28				
MAR111-7	16.0	15-16.5	4									28				
MAR111-8	21.0	20-21.5	7	0	95	5	0	0.240	2	SP-SM	SAND w/M					
MAR111-9	23.3	23-25		1	95	4		0.285	1.9	SP	SAND					
MAR111-9	23.7	23-25		4	91	6		0.380	3.2	SP-SM	SAND w/M					
MAR111-9	23.8	23-25		0	24	57	19	0.040		CL	Lean CLAY w/S	31	31	12	1.0	1.0
MAR111-9	24.3	23-25		0	21	57	22	0.033		ML	SILT w/S	32	32	7	1.0	0.6
MAR111-9	24.5	23-25		0	22	60	18	0.035		ML	SILT w/S	28	32	7	0.4	0.6
MAR111-9	24.8	23-25		0	20	59	21	0.032		ML	SILT w/S	25				
MAR111-10	25.0	25-26.5		0	57	38	5	0.116	19	SM	Silty SAND					
MAR111-12	25.5	25-26.5										33				
MAR111-13	26.1	25-26.5	3	0	3	79	18	0.030	17	ML	SILT	39	36	3	2.1	0.3
MAR112-1	6.0	5-6.5	1	0	21					ml	Silt w/S					
MAR112-8	6.1	6.5-8.5		0	67	32	1	0.096	3.2	SM	Silty SAND					
MAR112-8	6.4	6.5-8.5		0	35	60	5	0.060	5.8	ml	Sandy SILT					
MAR112-8	6.7	6.5-8.5		0	37	55	8	0.058	9.2	ml	Sandy SILT					
MAR112-3	11.1	10-11.5	1	0	29	62	9	0.046	9.3	ML	SILT w/S	34	29	3	2.7	1.5
MAR112-4	19.5	18.5-20	11	0	83	16	1	0.155	3.7	SM	Silty SAND					
MAR112-10	21.0	auger										44				
MAR112-9	21.0	auger		0	7	41	52	0.004		CH	Fat CLAY	44	61	37	0.5	1.2
MAR112-5	26.0	auger										38				
MAR112-7	27.0	26-27.5										28				
MAR112-6	27.0	26-27.5	6	0	43	39	18	0.060	53	ML	Sandy SILT	28	29	4	0.8	0.3
MAR114-1	3.0	Auger														
MAR114-7	8.1	8-9.5		0	18	47	35	0.012		ML	SILT w/S	45	42	16		0.6
MAR114-8	8.1	8-9.5		0	1	49	50	0.005		mh	Elastic silt					
MAR114-6	8.6	8-9.5		0	60	36	4	0.084	3.8	SM	Silty SAND					
MAR114-5	8.9	8-9.5										35				
MAR114-3	9.3	8-9.5										44				

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wh	LL	PI	LI	ACT
MAR114-4	9.4	8-9.5		0	40	53	7	0.064	8.2	ML	Sandy SILT					
MAR114-2	9.5	8-9.5	1	0	37	56	7	0.061	7.2	ML	Sandy SILT					
MAR114-9	13.2	13-15		0	2	58	40	0.009		MH	Elastic SILT	41	54	23	0.4	1.2
MAR114-9	13.5	13-15		0	4	62	34	0.009		ML	SILT	32	49	18	0.1	0.9
MAR114-9	13.8	13-15		0	3	75	22	0.015		ML	SILT	34	46	16	0.3	1.2
MAR114-9	14.2	13-15		0	3	78	19	0.019	13	CL	Lean CLAY	34	41	19	0.6	1.7
MAR114-9	14.5	13-15		0	1	75	24	0.013	11	ML	SILT	33	42	12	0.2	0.9
MAR114-9	14.9	13-15		0	0	66	34	0.008		CH	Fat CLAY	38	53	25	0.4	1.3
MAR114-12	17.4	17-18.5		0	20	43	37	0.009		ML	SILT w/S					
MAR114-10	17.6	17-18.5										41				
MAR114-13	18.1	17-18.5		0	72	24	4	0.121	4.2	SM	Silty SAND					
MAR114-11	18.4	17-18.5	3									38				
MAR114-16	21.7	21.5-23.5		2	20	57	21	0.032	25	ML	SILT w/S		34	8	0.3	0.7
MAR114-16	22.0	21.5-23.5		0	19	61	20	0.036	23	ML	SILT w/S	27	34	7	0.0	0.7
MAR114-16	22.3	21.5-23.5		0	13	65	22	0.027	19	ML	SILT	28	33	8	0.4	0.8
MAR114-16	22.7	21.5-23.5		0	4	73	23	0.019	11	ML	SILT	31	40	11	0.2	1.2
MAR114-16	23.0	21.5-23.5		0	3	77	20	0.017	6.9	ML	SILT	38	38	9	1.0	1.5
MAR114-16	23.3	21.5-23.5		0	11	76	13	0.025	9.2	ML	SILT	31	37	9	0.3	1.1
MAR114-20	24.7	24.5-26										41				
MAR114-18	25.4	24.5-26		0	15	73	12	0.040	14	ML	SILT w/S		32	8		1.2
MAR114-21	25.5	24.5-26	2									38				
MAR114-22	30.0	29.5-31.5		0	12	38	50	0.005		MH	Elastic SILT		60	17	-0.2	0.4
MAR114-22	30.3	29.5-31.5		0	6	28	66	0.003		CH	Fat CLAY	39	66	24	-0.1	0.5
MAR114-22	30.7	29.5-31.5		0	1	42	57	0.004		MH	Elastic SILT	38	74	36	0.0	1.2
MAR114-22	31.0	29.5-31.5		0	3	40	57	0.004		MH	Elastic SILT	37	60	20	-0.2	0.6
MAR114-22	31.3	29.5-31.5		0	2	39	59	0.003		CH	Fat CLAY	36	65	33	0.1	0.8
MAR114-22	30.5	29.5-31.5														
MAR114-23	32.0	auger		0	2	34	64	0.003		MH	Elastic SILT	48	65	32	0.5	0.9
SALINAS RIVER BRIDGE (SRB)																
SRS116	1.0	0-1.5	5	0	38	54	8	0.062	12	ML	Sandy SILT					
SRS116	2.5	1.5-3	3	0	50	44	6	0.075	7.2	SM	Silty SAND					
SRS116	6.5	5.5-7	2	0	46	50	4	0.070	2.7	ML	Sandy SILT					
SRS116	9.5	8.5-10	5	0	79	17	4	0.120	2.6	SM	Silty SAND					
SRS116	13.0	12-13.5	5	0	50	46	4	0.075	3.5	SM	Silty SAND					
SRS116	17.0	16-17.5	5	0	94	6		0.202	2	SP-SM	SAND w/M					
SRS116	21.0	20-21.5	7	0	93	7		0.243	2.4	SP-SM	SAND w/M					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
SRS116	26.0	25-26.5	7	0	86	14		0.217	4.1	SM	Silty SAND					
SRS116	29.5	28.5-30	10	0	94	6		0.295	2.6	SP-SM	SAND w/M					
SRS116	33.0	32-33.5	9	Lost sample												
SRS116	37.0	36-37.5	9	Lost sample												
SRS117	1.0	0-1.5	5	0	40	55	5	0.060	3.6	ML	Sandy SILT					
SRS117	3.0	1.5-3	4	0	33	63	4	0.057	2.5	ML	Sandy SILT					
SRS117	6.0	5-6.5	3	0	50	46	4	0.074	2.9	SM	Silty SAND					
SRS117	9.0	8-9.5	5	0	77	20	3	0.118	3.3	SM	Silty SAND					
SRS117	13.0	12-13.5	5	0	65	35		0.096	2.5	SM	Silty SAND					
SRS117	16.4	16-17.5		0	16	78	6	0.050	5.9	ML	SILT w/S					
SRS117	17.1	16-17.5	6	0	90	7	3	0.150	2.2	SP-SM	SAND w/M					
SRS117	21.0	20-21.5	7	0	88	12		0.225	4.3	SP-SM	SAND w/M					
SRS117	24.4	24-25.5		0	95	5		0.360	2.4	SP-SM	SAND w/M					
SRS117	25.1	24-25.5	10	0	90	7	3	0.255	4	SP-SM	SAND w/M					
SRS117	29.0	28-29.5	10	0	48	50	2	0.072	2.9	ML	Sandy SILT					
SRS117	32.4	32-33.5		0	77	21	2	0.143	3.4	SM	Silty SAND					
SRS117	33.1	32-33.5	17	0	98	2		0.750	4	SP	SAND					
SRS117	37.0	36-37.5	14	0	96	4		0.790	3.9	SP	SAND					
SRS117	41.0	40-41.5	20	0	50	40	10	0.076	18	SM	Silty SAND					
SRS117	45.0	44-45.5	10	0	11	77	12	0.019	8.3	ML	Sandy SILT					
SRS-CS	4	Auger		0	36	53	11	0.060	35	ml	Sandy silt					
SRS-CS	9	Auger		0	65	30	5	0.092	5.3	SM	Silty SAND					
SRS-CS	13	Auger		0	48	46	6	0.072	7.1	ML	Sandy SILT					
SRS-CS	18	Auger		0	82	15	3	0.166	5.5	SM	Silty SAND					
SRS-CS	21.5	Auger		0	83	16	1	0.257	6.4	SM	Silty SAND					
SRS-CS	23.5	Auger		0	83	12	5	0.210	12	SM	Silty SAND					
SRS-CS	25.5	Auger		0	85	11	4	0.230	7.3	SM	Silty SAND					
SRS-CS	26.5	Auger		0	83	12	5	0.220	11	SM	Silty SAND					
SRS-CS	29.5	Auger		0	83	13	4	0.238	7.7	SM	Silty SAND					
SRN120	12.5	12-14		0	24	48	28	0.021		ml	Silt w/S					
SRN120	13.5	12-14		0	90			2.600	4.1	SP-SM	SAND w/M					
SRN120	15.0	14-16		0	3	21	76	0.001		ch	Fat clay					
SRN120	18.5	17.5-19.5		0	7	53	40	0.009		cl	Lean clay					
SRN120	21.0	20-22		0	20	23	57	0.003		ch	Fat clay w/S					
SRN120	23.5	22.5-24.5		0	2	23	75	0.002		ch	Fat clay					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
SRN120	26.0	25-27		0	13	41	56	0.004		cl	Lean clay					
SRN120	28.5	27.5-29.5		0	9	33	58	0.003		cl	Lean clay					
SRN120	31.0	30-32		0	35	33	32	0.030	45	ml	Sandy SILT					
SRN120	34.0	33-35		0	49	37	14	0.073	56	ML	Sandy SILT					
SRN120	36.0	35-37		0	83	14	3	0.178		SM	Silty SAND					
GRANITE																
GRA123	0	sb-123		0	86		14	0.200	4.1	SM	Silty SAND					
	0	sb-124		0	74	19	7	0.137	12	SM	Silty SAND					
	0	sb-126		1	63	28	8	0.106	15	SM	Silty SAND					
GRA123-2	4.5	3.5-5	6	0	30	60	10	0.046	14	ML	Sandy silt					
GRA123-4	9.5	8.5-10	2	0	24	64	12	0.043	14	ML	SILT with sand					
GRA123-7	14.5	13.5-15	2	0	25	61	14	0.044	19	ML	SILT with sand					
GRA123-8	19.5	18.5-20	14	0	89	11		0.195	3.1	SP-SM	SAND w/M				NA	0.8
GRA123-9	24.3	24-25.5	8	0	92	8		0.225	2.8	SP-SM	SAND w/M					
GRA123-10	25	24-25.5	8	0	73	18	9	0.150	30	SM	Silty SAND					
GRA123-13	29	28-29.5	12	0	94	6		0.316	2.7	SP-SM	SAND w/M					
GRA123-14	36	35-36.5	16	0	89	11		0.261	5.4	SP-SM	SAND w/M					
McGOWAN																
MCG136-1	2	1.5-2.5		0	15	46	39	0.010		cl	Lean clay w/S				NA	NA
MCG136-2	3	2.5-3.5		0	5	58	37	0.012		CL	Lean CLAY				NA	0.7
MCG136-3e	6.5	T 6-8		0	16	48	36	0.013		ML	SILT w/S	24.5	38	8	-0.7	0.3
MCG136-3d	6.8	T 6-8		0	4	50	46	0.006		CH	Fat CLAY	35.1	59	29	0.2	1.0
MCG136-3c	7.3	T 6-8		0	9	55	36	0.010		CL	Lean CLAY	35.1	46	23	0.5	1.3
MCG136-3b	7.5	T 6-8		0	77	11	12	0.152		SM	Silty SAND	18.8				
MCG136-3a	7.8	T 6-8		0	82	11	7	0.164	13	SM	Silty SAND	19				
MCG136-4	9	8-9.5	6	0	89	11		0.148	2.5	SP-SM	SAND w/M					
MCG136-5f	12.7	T 12.5-14.5		0	54	31	15	0.083	33	SM	Silty SAND	22.7				
MCG136-5e	13.0	T 12.5-14.5		0	81	12	7	0.142	18	SM	Silty SAND	24.4				
MCG136-5d2	13.2	no12.5-14.5										35.1				
MCG136-5d1	13.4	T 12.5-14.5		0	2	53	45	0.007		CL	Lean CLAY	26.5	49	23	0.0	0.9
MCG136-5c	13.7	T 12.5-14.5		0	1	48	51	0.005		MH	Elastic SILT	42.3	51	22	0.6	0.6
MCG136-5b	14.0	T 12.5-14.5		0	4	51	45	0.007		ML	SILT	40.1	44	18	0.8	0.5
MCG136-5a2	14.3	T 12.5-14.5		0	10	56	34	0.012		ML	SILT		36	13	NA	0.5

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
MCG136-5a1	14.4	T 12.5-14.5		0	70	20	10	0.108	24	SM	Silty SAND	33.9				
MCG136-6	18	17.5-19	9									56.5				
MCG136-7	18.5	17.5-19	9	0	93	7		0.252	2.4	SP-SM	SAND w/M					
MCG136-8	21	20.5-22	19									34.2				
MCG136-9	21.5	20.5-22	19	0	89	11		0.203	3.3	SP-SM	SAND w/M					
MCG136-10	24.5	23.5-25	20	0	92	8		0.320	3.5	SP-SM	SAND w/M					
MCG136-11	27	26.5-28		0	91	9		0.195	2.6	SP-SM	SAND w/M					
MCG136-12	27.5	26.5-28	26													
MCG136-13e	34.6	T 34-36		0	0	78	22	0.030	36.0	ML	SILT	28.3	31	5	0.5	NA
MCG136-13d	34.8	T 34-36		0	6	75	19	0.028		ml	Silt	27			NA	NA
MCG136-13c	35.2	T 34-36		0	3	26	71	0.002		CH	Fat CLAY	41.7	58	30	0.5	NA
MCG136-13b	35.5	T 34-36		0	0	26	74	0.002		CH	Fat CLAY	38.4	65	37	0.3	NA
MCG136-13a	35.8	T 34-36		0	0	17	83	0.001		CH	Fat CLAY	39.1	62	31	0.3	NA
MCG138-1	2.5	2-3		0	18	43	39	0.010		CL	Lean CLAY w/S		44	21	NA	0.7
MCG138-2	5.5	5-6.5		0	69	22	9	0.110	19	SM	Silty SAND					
MCG138-3	6	5-6.5	1									24.1				
MCG138-4g	6.5	6.8-8.8		0	27	58	15	0.043		ML	Silt with sand	24.6	26	4	0.7	0.4
MCG138-4f	6.7	6.8-8.8		0	13	72	15	0.033	27	ML	SILT	32.3	29	4	1.8	0.4
MCG138-4e	7.0	6.8-8.8		0	9	72	19	0.028		ML	SILT	30.9	32	8	0.9	0.5
MCG138-4d	7.3	6.8-8.8		0	28	51	21	0.032		ml	silt with sand	31.8			NA	NA
MCG138-4c	7.7	6.8-8.8		0	39	39	22	0.041		ML	Sandy SILT	31.4	29	4	1.6	0.2
MCG138-4b	8.0	6.8-8.8		0	23	52	25	0.023		ml	silt with sand	33.4				
MCG138-4a	8.3	6.8-8.8		0	44	36	20	0.060		ML	Sandy SILT	30.2				
MCG138-5	11.3	11-12.5		0	62	26	12	0.087	33	SM	Silty SAND					
MCG138-6	11.7	11-12.5		0	80	11	9	0.160	26	SM	Silty SAND					
MCG138-7	12	11-12.5	3									28.1				
MCG138-8g	16.0	16-18		0	42	40	18	0.052		ml	Sandy SILT		27	3		0.3
MCG138-8f	16.2	16-18		0	49	31	20	0.071	31	ML	Sandy SILT	27.7				
MCG138-8e2	16.4	16-18		0	42	42	16	0.059		ML	Sandy SILT					
MCG138-8e1	16.6	16-18		0	33	47	20	0.037		ml	Sandy silt	27.8				
MCG138-8d2	16.8	16-18		0	18	64	18	0.037		CL	Lean CLAY with sand	28.2	32	9	0.6	0.6
MCG138-8d1	16.9	16-18		0	19	66	15	0.031		ml	Silt with sand	29.4			NA	NA
MCG138-8c	17.2	16-18		0	9	78	13	0.030		ML	SILT	33.2	31	6	1.4	0.5
MCG138-8b2	17.4	16-18		0	5	79	16	0.028		ML	SILT	37.4			NA	NA
MCG138-8b1	17.6	16-18		0	2	69	29	0.012		CL	Lean CLAY	35.6	39	16	0.8	0.6
MCG138-8a	17.8	16-18		0	35	43	22	0.027		CL	Sandy lean CLAY	31.8	30	9	1.2	0.5
MCG138-9	20.3	20-21.5		0	54	28	18	0.080		SM	Silty SAND					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
MCG138-10	20.8	20-21.5	2									38.8				
MCG138-12f	21.8	21.5-23.5		0	47	38	15	0.067		ML	Sandy SILT	28.1				
MCG138-12e2	21.9	21.5-23.5		0	48	32	20	0.070		ML	Sandy SILT					
MCG138-12e1	22.1	21.5-23.5		0	49	32	19	0.074		ML	Sandy SILT	28.1				
MCG138-12d	22.3	21.5-23.5		0	56	29	15	0.082		SM	Silty SAND	29				
MCG138-12c	22.7	21.5-23.5		0	51	35	14	0.076	35	SM	Silty SAND	30.2				
MCG138-12b	23.0	21.5-23.5		0	46	36	18	0.068		ML	Sandy SILT	30.4				
MCG138-12a2	23.2	21.5-23.5		0	89	11		0.149	2.3	SP-SM	SAND with silt					
MCG138-12a1	23.4	21.5-23.5		0	68	19	13	0.100	59	SM	Silty SAND	31				
MCG138-13	25.5	25-26.5	19	0	82	8	10	0.144	29	SM	Silty SAND					
MCG138-14	26	25-26.5										25.7				
MCG138-15	29	28-29.5	29	0	88	7	5	0.162	3.9	SM	Silty SAND	33.3				

Surface samples S = Sand boil sample
C = Channel sample

SAMPLE #	Site	G	S	M	C	d50	Cu
S1	CMF	0	90	10		0.191	2.6
S2	CMF	0	88	12		0.187	3.3
S3	CMF	0	88	12		0.155	2.5
S4	CMF	0	92	8		0.190	2.5
S5	CMF	0	69	27	4	0.094	2.7
S6	CMF	0	58	39	3	0.082	2.3
S7	CMF	0	67	31	2	0.092	2.3
S8	CMF	0	57	40	3	0.080	2.4
S9	CMF	0	91	9		0.219	3
S10	CMF	0	59	37	4	0.090	5.3
S11	CMF	0	81	17	2	0.124	3.2
S12	CMF	0	65	32	3	0.101	4
S13	CMF	0	86	10	4	0.152	3.2
S14	CMF	0	74	21	5	0.107	4.5
S15	CMF	0	88	12		0.122	1.9
S16	CMF	0	80	17	3	0.118	2.9
S17	CMF	0	88	12		0.140	2.3
S18	South of study area	0	97	3		0.210	2.1

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	W _n	LL	PI	LI	ACT
S19	South of study area			0	95	5		0.171	1.9	SP-SM	SAND with silt					
S20	SCA			0	78	17	5	0.154	9.3	SM	silty SAND					
S21	SCA			0	75	24	1	0.109	3	SM	silty SAND					
S22	SCA			0	77	29	4	0.115	5.6	SM	silty SAND					
S23	SCA			0	68	28	4	0.103	3.1	SM	silty SAND					
S24	SCA			0	74	17	9	0.171	47	SM	silty SAND					
S25	SCA			0	89	11		0.340	5.4	SP-SM	SAND with silt					
S26	SCA			0	95	5		0.590	2.2	SP-SM	SAND with silt					
S27	ML1			0	97	3		0.285	2.1	SP	SAND					
S28	LEN			0	79	27	4	0.145	5.4	SM	silty SAND					
S29	North east CMF			0	38	53	9	0.059	12	ML	sandy SILT					
S30	LEN			0	70	28	2	0.094	2.3	SM	silty SAND					
S31	South of study area			0	80	19	1	0.142	3.1	SM	silty SAND					
S32	North east CMF			0	90	10		0.205	3.1	SP-SM	SAND with silt					
C33	East of RAD		16	83	1	23	2	0.109	3	SP	SAND with gravel					
S34	FAR		0	75	43	47	10	0.060	17	SM	silty SAND					
C35	FAR		0	43	70	37	3	0.083	2.8	ML	sandy silt					
S36	SPR		0	60	37	3		0.137	5.3	SM	silty SAND					
S37	SPR		0	79	16	5		0.166	3.5	SM	silty SAND					
C38	SPR		0	84	16	0		0.228	4.5	SP-SM	SAND with silt					
S39	North east RAD		0	89	12	27	4	0.094	4.5	SM	silty SAND					
S40	SPR		0	69	27	1		0.460	1.8	SP	SAND					
C41	East of study area		0	99	2	2		0.362	2.1	SP	SAND					
C42	North east RAD		2	96	20	20	2	0.117	3.8	SM	silty SAND					
S43	WST		0	78	20	0		0.138	3.5	SM	silty SAND					
S44	JRR		0	80	20	4		0.190	1.9	SP	SAND					
S45	JRR		0	96	4	9		0.151	2.1	SP-SM	SAND with silt					
S46	JRR		0	91	13	13	2	0.197	6.6	SM	silty SAND					
S47	SPR		0	85	88	12		0.200	3.7	SP-SM	SAND with silt					
S48	SPR		0	88	89	11		0.158	2.4	SP-SM	SAND with silt					
S49	SPR		0	89	74	23	3	0.112	3.2	SM	silty SAND					
S50	SEA		0	74	23	75	2	0.055	3	ML	silt with sand					
S51	SEA		0	23	35	60	5	0.061	6.8	ML	Sandy SILT					
S52	SEA		0	35	15	83	2	0.054	1.7	ML	silt with sand					
S53	SEA		0	15	83	2		0.056	2.2	ML	silt with sand					
S54	SEA		0	22	76	2		0.055	2.5	ML	silt with sand					
S55	SEA		0	21	76	2		0.044	3	ML	SILT					
S56	SEA		0	11	83	6		0.044	3	ML	SILT					

Table 2. Index properties of subsurface and surface samples

SITE	DEPTH (FT)	DEPTH RANGE	SPT N	G	S	M	C	D50 mm	Cu	USC	Name	Wn	LL	PI	LI	ACT
S57	SEA			0	36	61	3	0.063	2.8	ML	Sandy SILT					
S58	Zmudowski Beach			0	65	32	3	0.093	2.8	SM	Silty SAND					
S59	Zmudowski Beach			0	64	34	2	0.091	2.7	SM	Silty SAND					
S60	East of study area			0	98	2		0.425	2.3	SP	SAND					
S61	ML			0	98	2		0.225	1.9	SP	SAND					
S62	AIR			0	97	3		0.423	2.5	SP	SAND					
S63	AIR			0	79	19	2	0.245	12	SM	Silty SAND					
S64	North east AIR			0	74	26	0	0.099	2.3	SM	Silty SAND					
S65	WST			0	42	51	7	0.068	5.9	ML	SILT with sand					
S66	Zmudowski Beach			0	94	6		0.187	2.4	SP-SM	SAND with silt					
S67	ML1			0	94	6		0.375	2.5	SP-SM	SAND WITH SILT					
S68	ML1			0	98	2		0.37	1.9	SP	SAND					
S69	GRA			0	71	23	6	0.127	14	SM	Silty SAND					
S70	GRA			0	87	10	3	0.205	4.4	SM	Silty SAND					

G=GRAVEL (>4.75 mm)

S=SAND (4.75-0.075 mm)

M=SILT (0.075-0.005 mm)

C=CLAY (<0.005 mm)

Cu=Coefficient of uniformity, size at 60th percentile divided by size at 10th percentile D60/D10

D50=Median grain size, size at the 50th percentile

Wn=Natural water content expressed on percent dry weight

LL=Liquid limit expressed as percent water

PI=Plasticity index (liquid limit - plastic limit) expressed as percent water

LI=Liquidity index (Wn-plastic limit)/PI

ACT= Activity, PI/2 - micron clay fraction

USC=Unified Soil Classification

Table 3. Strength properties

SITE	DEPTH FROM TO	ASSIGN DEPTH	Wn %	LL %	PL %	PI %	LI	DENSITY g/cm ^ 3	SHEAR STRENGTH				RATIO %		
									PEAK REMOVED KN/M ^ 2	PP TSF	TIP MN/M ^ 2	SLEEVE KN/M ^ 2			
CLINT MILLER FARMS (CMF)															
CMF13	9.5	10.0	9.5	30	43	32	11	-0.2	1.79	67.5	27.6	2.4	0.80	34.8	4.4
CMF13	9.5	10.0	10.0	30						57.6	32.1	1.8	0.80	34.8	4.4
CMF13	10.0	10.5	10.3	32	44	32	12	0.0	1.88	42.1	20.5	2.1	1.25	83.5	6.5
CMF13	10.0	10.5	10.5	32						45.9	18.8	2.4	1.25	83.5	6.5
JEFFERSON RANCH (JRR)															
JRR121-3f	10	12	10.2	45.1									0.202	3.691	1.83
JRR121-3e	10	12	10.5	55.6	68	35	33	0.6	1.69	24.6	9.8	2.5	0.25	4.027	1.71
JRR121-3d	10	12	10.8	53.4	64	31	33	0.7	1.75	24.2	9.3	2.6	0.25	5.031	2.14
JRR121-3c	10	12	11.2	49	55	33	22	0.7	1.77	26.3	10.2	2.6	0.3	3.688	1.37
JRR121-3b	10	12	11.5	48.5	55	31	24	0.7	1.77	23.3	7.7	3.0	0.25	3.688	1.37
JRR121-3a	10	12	11.8	49.9	58	30	28	0.7	1.73	17.8	6.8	2.6	0.25	3.688	1.37
JRR121-4f	15	17	15.2	69	75	38	37	0.8					0.25	6.71	2.21
JRR121-4e	15	17	15.5	51.5	69	32	37	0.5	1.70	39.0	15.7	2.5	0.4	7.38	2.2
JRR121-4d	15	17	15.8	67.1	75	34	41	0.8	1.63	26.3	9.3	2.8	0.3	6.71	2
JRR121-4c	15	17	16.2	65.4	76	33	43	0.8	1.65	27.6	11.9	2.3	0.4	6.374	1.9
JRR121-4b	15	17	16.5	60.5	72	35	37	0.7	1.67	27.6	10.2	2.7	0.25	6.71	2.21
JRR121-4a	15	17	16.8	51.7	57	32	25	0.8	1.75	24.2	10.6	2.3	0.25	8.05	2.4
JRR141-13c	31	33	32.2						1.91				1.74	48.57	2.79
JRR141-13b	31	33	32.5						1.89				2.61	19.43	0.74
JRR141-13a	31	33	32.8	25.1									2.21	34.84	1.58
JRR150-1e2	11	13	11.4	46.8	65	29	36	0.5					0.34	5.69	1.7
JRR150-1e1	11	13	11.6	37.6					1.73	30.1	11.0	2.7	0.34	5.69	1.7
JRR150-1d	11	13	11.8	63.4	67	36	31	0.9	1.68	28.9	12.7	2.3	0.34	5.69	1.7
JRR150-1c	11	13	12.2	49.4	57	27	30	0.7	1.75	24.6	8.5	2.9	0.35	5.35	1.6
JRR150-1b	11	13	12.5	49.5	57	33	24	0.7	1.75	21.2	6.8	3.1	0.35	5.01	1.66
JRR150-1a	11	13	12.83	54.4					1.71	16.9	6.4	2.7	0.25	4.68	1.55
LEONARDINI (LEN)															
LEN51-9f	29	31	29.2						1.92				0.605	7.72	1.28
LEN51-9e	29	31	29.5	46.6	61	29	32	0.6	1.79	38.7	15.5	2.5	0.7	24.18	3.6
LEN51-9d	29	31	29.8	59.5	84	32	52	0.5	1.75	45.4	17.7	2.6	0.75	28.89	3.58
LEN51-9c	29	31	30.2	51.7	81	33	48	0.4	1.77	58.7	19.9	2.9	0.9	31.57	4.27

Table 3. Strength properties

SITE	DEPTH FROM TO	ASSIGN DEPTH	W _n %	LL %	PL %	PI %	LI	DENSITY g/cm ^{^3}	SHEAR STRENGTH		PP TSF	TIP MN/M ^{^2}	SLEEVE KN/M ^{^2}	RATIO %	
									PEAK	REMOVED					
									KN/M ^{^2}	KN/M ^{^2}					
LEN51-9b	29	31	30.5	53.3	80	31	49	0.5	1.75	48.7	15.5	3.1	0.739	34.93	4.73
LEN51-9a	29	31	30.8	48.7	73	35	38	0.4	1.86	54.2	13.3	4.1	0.806	38.96	4.83
LEN51-10f	31	33	31.2	49.2	73	30	43	0.4	1.85	50.9	14.4	3.5	0.806	34.93	4.33
LEN51-10e	31	33	31.5	46.8	66	34	32	0.4	1.78	66.4	16.6	4.0	0.907	42.99	4.74
LEN51-10d	31	33	31.8	47.8	66	34	32	0.4	1.78	57.6	17.7	3.2	0.941	46.35	4.93
LEN51-10c	31	33	32.2	51.7	76	33	43	0.4	1.73	47.6	15.5	3.1	0.806	40.98	5.08
LEN51-10b	31	33	32.5	46.7	60	30	30	0.6	1.77	112.9	10.0	11.3	0.739	34.26	4.64
LEN51-10a	31	33	32.8	40.9	60	30	30	0.4	1.83	34.3	13.3	2.6	0.739	26.87	3.64
LEN52A-10g	29.5	32	29.8	39.7	49	24	25	0.6					NA	NA	NA
LEN52A-10f	29.5	32	30.2	30.3	32	28	4	0.6	1.92	25.9	7.2	3.6	NA	NA	NA
LEN52A-10e	29.5	32	30.5	33.9					1.92	15.3	5.1	3.0	NA	NA	NA
LEN52A-10d	29.5	32	30.8	38.3					1.9	23.8	8.5	2.8	NA	NA	NA
LEN52A-10c	29.5	32	31.2	40.2	46	31	15	0.6	1.88	33.5	10.6	3.2	NA	NA	NA
LEN52A-10b	29.5	32	31.5	44.4					1.89				NA	NA	NA
LEN52A-10a	29.5	32	31.8	34.9					2.12				NA	NA	NA

MUNICIPAL AIRPORT (WAT)

WAT54	2.5	4.5	4.3	18	36	19	17	-0.1	1.96			4.5	4.47	211.7	4.7
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MARINOVICH (MRR)

MRR67	14.0	16.0	14.5	35	48	31	17	0.3	1.92	50.4	12.6	4.0	0.54	5.0	0.9
MRR67	14.0	16.0	14.7	35	56	39	17	0.5	1.87	48.1	15.0	3.2	0.54	8.4	1.6
MRR67	14.0	16.0	15.0	48	65	41	24	0.3	1.81	37.0	14.2	2.6	0.61	19.5	3.2
MRR67	14.0	16.0	15.5	39	47	33	14	0.4	1.92	61.9	23.6	2.6	1.1	18.5	3.1
MRR67	14.0	16.0	15.8	40	47	27	20	0.6	1.94	49.6	17.3	2.9	0.8	27.2	4.1
MRR67-7	16.0	17.5	17.0	41	50	35	15	0.4							

KETT

KET72-5a	5.8	5.5	7.5	24	50	23	27	0.0	1.90	232.4	77.5	3.0	3.62	184.1	5.1
KET72-5b	6.2	5.5	7.5	22	44	19	25	0.1	1.86	168.2	33.2	5.1	3.29	147.6	4.5
KET72-5c	6.8	5.5	7.5	21	37	16	19	0.2	1.89	249.0	27.7	9.0	3.09	137.2	4.5
KET72-5d	7.1	5.5	7.5	21	54	19	35	0.1	2.06	309.9	0.0		3.05	149.2	4.9
KET72-5e	7.4	5.5	7.5	24	53	23	30	0.0					2.82	128.3	4.5

Table 3. Strength properties

SITE	DEPTH FROM TO	ASSIGN DEPTH	Wn %	LL %	PL %	PI %	LI	DENSITY g/cm ^ 3	SHEAR STRENGTH			PP TSF	TIP MN/M ^ 2	SLEEVE KN/M ^ 2	RATIO %	
									PEAK	REMOVED	St					
PAJARO DUNES (PD2)																
PAJ82-1	5.0	7.0	5.4	65	81	31	50	0.7	1.67	42.6	12.6	3.4	0.7	0.30	20.8	6.9
PAJ82-1	5.0	7.0	5.7	50	67	27	40	0.6	1.67	51.2	15.0	3.4	0.9	0.20	12.7	6.4
PAJ82-1	5.0	7.0	6.0	54	71	31	40	0.6	1.75	51.2	16.1	3.2	0.8	0.15	8.9	5.9
PAJ82-1	5.0	7.0	6.1	51				NA	1.75	35.5	10.2	3.5	0.6	0.13	8.7	6.5
PAJ82-1	5.0	7.0	6.3	42	55	30	25	0.5	1.73	47.3	13.4	3.5	0.9	0.13	8.7	6.5
PAJ82-1	5.0	7.0	6.5	47	58	27	31	0.6	1.73	45.7	15.8	2.9	0.7	0.13	8.4	6.2
PAJ82-1	5.0	7.0	6.6	44	59	25	34	0.6	1.84	52.8	15.8	3.4	0.7	0.13	8.4	6.2
PAJ82-2	8.0	8.7	8.2	66	55	34	21	1.5	1.78	10.2	6.3	1.8	0.2	0.03	0.7	2.0
PAJ82-2	8.8	9.1	9.0	41				NA	1.97	20.5	6.3	3.2	0.3	0.03	0.7	2.0
TOM JONES RANCH (TJR)																
TJR100	5.5	7.8	6.6	28	33	25	8	0.3	2.02				1.3	1.04	15.4	1.5
TJR100	5.5	7.8	7.0	33	38	30	8	0.3	1.85	20.1	5.3	3.8	1.2	0.84	21.4	2.6
TRJ100	5.5	7.8	7.3	20	27	22	5	-0.4	1.96					0.57	14.1	2.5
TJR102	15.0	17.0	15.6	24				NA	1.81	30.5	6.8	4.5	0.8	2.95	44.1	1.5
TJR102	15.0	17.0	15.9	29	30	25	5	0.8	1.94	34.8	11.9	2.9	1.2	2.50	61.7	2.5
TJR102	15.0	17.0	16.3	24				NA	2.00	63.6	14.8	4.3	2.2	2.45	57.0	2.4
TJR102	15.0	17.0	16.6	23				NA	2.03	239.1	94.1	2.5	2.5	2.62	47.6	1.8
TANIMURA (TAN)																
TAN103-b	10.0	12.0	10.5	36					1.84	8.5	4.3	2.0	0.3	1.88	17.8	1.0
TAN103-c	10.0	12.0	10.8	44	49	22	27	0.8	1.81	33.9	11.9	2.9	0.8	1.81	40.6	2.2
TAN103-d	10.0	12.0	11.2	44	38	30	8	1.8	1.83	42.0	16.1	2.6	1.1	1.14	42.0	3.7
TAN103-e	10.0	12.0	11.5	48	62	34	28	0.5	1.85	40.6	15.3	2.7	1.0	0.94	41.6	4.4
TAN103-f	10.0	12.0	11.8	36	35	32	3	1.4	1.94	18.7	4.3	4.4	0.8	0.81	34.6	4.3
TAN103-4a	12.0	14.0	12.2	34	33	30	3	1.3	1.87	24.2	8.0	3.0	1.3	0.94	18.1	1.9
TAN103-4b	12.0	14.0	12.5	37	37	32	5	0.9	1.87	24.2	7.2	3.3	1.3	0.87	6.7	0.8
TAN103-4c	12.0	14.0	12.8	37	39	20	19	0.9	1.86	38.0	11.9	3.2	1.3	0.57	20.5	3.6
TAN103-4d	12.0	14.0	13.2	36					1.71	31.4	5.9	5.3	0.9	1.81	34.3	1.9
TAN103-4e	12.0	14.0	13.5	40	36	31	5	1.7	1.87	19.1	5.7	3.3	1.0	2.08	37.9	1.8
TAN103-4f	12.0	14.0	13.8	35					1.83	45.4	15.7	2.9	1.4	1.41	26.5	1.9
TAN105-16a	28.0	30.0	27.8	31	33	27	6	0.7	1.89	15.7	4.3	3.7	0.5	0.60	14.8	2.5
TAN105-16b	28.0	30.0	28.2	32	30	24	6	1.4	1.94	16.9	5.9	2.9	1.0	0.60	2.0	0.3

Table 3. Strength properties

SITE	DEPTH FROM TO		ASSIGN DEPTH	W _n %	LL %	PL %	PI %	LI	DENSITY g/cm ³	SHEAR STRENGTH PEAK REMOLDED		St	PP TSF	TIP MN/M ²	SLEEVE KN/M ²	RATIO %
TAN105-16c	28.0	30.0	28.5	32	32	26	6	1.0	1.97	20.6	5.5	3.7	1.2	0.67		
TAN105-16d	28.0	30.0	28.8	34	34	28	6	1.0	1.94	23.7	7.9	3.0	1.0	0.67	0.2	0.3
TAN105-16e	28.0	30.0	29.2	31	29	29	0	NA	1.91	9.3	3.0	3.1	0.9	0.77		
TAN105-16f	28.0	30.0	29.5	31					1.92	11.0	4.3	2.6	0.7			
TAN105-16g	28.0	30.0	29.8	33					1.99	20.8	6.4	3.3	1.0			
MARTELLA (MAR)																
MAR110-7b	22.0	24.0	22.5	34					1.75	89.8	29.9	3.0	1.5	3.05	80.1	2.6
MAR110-7c	22.0	24.0	22.8	35					1.81	139.5	24.4	5.7	2.3	1.78	39.2	2.2
MAR110-7d	22.0	24.0	23.2	44					1.78	66.2	23.7	2.8	1.8	1.64	56.6	3.5
MAR110-7e	22.0	24.0	23.5	39	75	34	41	0.1	1.81	60.7	20.5	3.0	1.4	1.39	50.6	3.7
MAR110-7f1	22.0	24.0	23.7	36					1.91	89.8	21.3	4.2	1.5	1.14	44.6	3.9
MAR110-7f2	22.0	24.0	23.9						1.91					7.81	55.3	0.7
MAR111-9	23.0	25.0	24.3	32	32	25	7	1.0	1.52	5.9	2.0	3	0.1	0.57		
MAR114-9	13.0	15.0	13.2	41	54	31	23	0.4	1.76	34.7	15.0	2.3	0.9	0.64	33.5	5.3
MAR114-9	13.0	15.0	13.5	32	49	31	18	0.1	1.84	64.6	22.1	2.9	1.3	0.50	32.9	6.5
MAR114-9	13.0	15.0	13.8	34	46	30	16	0.3	1.86	51.2	19.7	2.6	1.3	0.27	20.8	7.8
MAR114-9	13.0	15.0	14.2	34	41	22	19	0.6	1.89	53.6	18.9	2.8	1.1	0.20	7.7	3.8
MAR114-9	13.0	15.0	14.5	33	42	30	12	0.2	1.87	45.7	19.7	2.3	1.0	0.20	3.7	1.8
MAR114-9	13.0	15.0	14.9	38	53	28	25	0.4	1.81	70.1	22.1	3.2	1.1	0.20	3.7	1.8
MAR114-16a	21.5	23.5	21.7	28	34	26	8	0.3	1.86	36.9	13.6	2.7	0.5	0.60		
MAR114-16b	21.5	23.5	22.0	27	34	27	7	0.0	1.86	41.6	13.6	3.1	0.8	0.67 negative sleeves		
MAR114-16c	21.5	23.5	22.3	28	33	25	8	0.4	1.87	41.2	12.7	3.2	1.4	0.50		
MAR114-16d	21.5	23.5	22.7	31	40	29	11	0.2	1.89	39.0	14.4	2.7	0.8	0.57		
MAR114-16e	21.5	23.5	23.0	38	38	29	9	1.0	1.87	32.7	12.3	2.7	0.9	0.60		
MAR114-16f	21.5	23.5	23.3	31	37	28	9	0.3	1.89	36.1	11.0	3.3	0.9	0.77	22.5	
MAR114-22a	29.5	31.5	30.0	40	60	43	17	-0.2	1.59	52.0	12.2	4.3	1.5	0.70	34.0	4.6
MAR114-22b	29.5	31.5	30.3	39	66	42	24	-0.1	1.78	99.6	14.4	6.9	1.5	0.83	46.0	5.5
MAR114-22c	29.5	31.5	30.7	38				NA	1.78	131.7	16.6	7.9	2.1	0.82	44.0	5.4
MAR114-22d	29.5	31.5	31.0	37	60	40	20	-0.2	1.83	110.7	18.8	5.9	2.0	0.92	49.0	5.3
MAR114-22e	29.5	31.5	31.3	36	65	32	33	0.1	1.81	141.7	16.6	8.5	2.2	1.07	55.0	5.1
McGOWAN (MCG)																
MCG136-3e	6	8	6.5	24.5	38	20	8	0.6						0.77	45.16	5.87

Table 3. Strength properties

SITE	DEPTH FROM TO	ASSIGN DEPTH	Wn %	LL %	PL %	PI %	LI	DENSITY g/cm^3	SHEAR STRENGTH			PP TSF	TIP MN/M^2	SLEEVE KN/M^2	RATIO %	
									PEAK	REMOVED	St					
MCG136-3d	6	8	6.83	35.1	59	30	29	0.2	1.67	22.9	9.3	2.5	1.25	0.87	25.09	2.88
MCG136-3c	6	8	7.17	35.1	46	23	23	0.5	1.78	36.1	12.7	2.8	0.75	1.41	14.72	1.05
MCG136-3b	6	8	7.5	18.8					1.91	29.3	5.1	5.8	0.7	1.84	10.04	0.55
MCG136-3a	6	8	7.83	19					1.89	31.8	5.9	5.4	0.75	2.14	15.39	0.72
MCG136-5f	12.5	14.5	12.7	22.7					1.99	23.7	5.5	4.3	1.2	3.85	30.12	0.78
MCG136-5e	12.5	14.5	13	24.4					1.99	36.2	4.7	7.6	1.25	4.38	43.84	1
MCG136-5d2	12.5	14.5	13.2	35.1										3.25	20.41	0.63
MCG136-5d1	12.5	14.5	13.4	26.5	49	26	23	0.0	1.91	37.0	13.4	2.8	1	3.25	20.41	0.63
MCG136-5c	12.5	14.5	13.7	42.3	51	29	22	0.6	1.86	50.4	16.6	3.0	0.9	1.04	12.05	1.16
MCG136-5b	12.5	14.5	14	40.1	44	26	18	0.8	1.92	59.1	15.8	3.8	0.8	0.57	16.06	2.83
MCG136-5a	12.5	14.5	14.3	33.9					1.92	40.2	13.4	3.0	1.25	0.64	18.41	2.9
MCG136-13e	34	36	34.6	28.3	31	26	5	0.5					2.4	0.84	31.8	3.81
MCG136-13d	34	36	34.8	27					2.02	92.2	15.0	6.2	2.25	0.9	37.49	4.16
MCG136-13c	34	36	35.2	41.7	58	28	30	0.5	1.86	52.0	15.8	3.3	0.7	1.04	34.48	3.33
MCG136-13b	34	36	35.5	38.4	65	28	37	0.3	1.88	70.1	15.0	4.7	1.2	0.9	25.44	2.82
MCG136-13a	34	36	35.8	39.1	62	31	31	0.3	1.91	69.3	18.9	3.7	1.1	1.04	31.13	3
MCG138-4g	6.8	8.5	6.8	24.6	26	22	4	0.7						0.74	12.06	1.64
MCG138-4f	6.8	8.5	6.9	32.3	29	25	4	1.8	1.91	16.6	3.8	4.3	0.5	0.74	12.06	1.64
MCG138-4e	6.8	8.5	7	30.9	32	24	8	0.9	1.89	33.9	11.0	3.1	0.3	0.61	11.73	2.04
MCG138-4d	6.8	8.5	7.33	31.8					1.89	13.2	3.0	4.4	0.3	0.43	15	3.5
MCG138-4c	6.8	8.5	7.67	31.4	29	25	4	1.6	1.99	6.4	1.3	4.9	0.2	0.34	3.35	1
MCG138-4b	6.8	8.5	8	33.4					1.94	19.5	2.5	7.7	0.25	0.35	3.18	0.9
MCG138-4a	6.8	8.5	8.33	30.2					2.04	8.5	2.5	3.3	0.25	0.37	1.01	0.27
MCG138-8f	16	18.5	16.2	27.7					1.99	6.8	2.5	2.7	0.1	0.47	7.71	1.64
MCG138-8e	16	18.5	16.5	27.8					1.97	13.6	3.0	4.6	0.1	0.6	14.07	2.33
MCG138-8d2	16	18.5	16.8	28.2					1.97	15.3	3.8	4.0	1.2	0.67	21.1	3.14
MCG138-8d1	16	18.5	16.9	29.4	32	23	9	0.7	1.97	0.0	0.0			0.67	21.1	3.14
MCG138-8c	16	18.5	17.2	33.2	31	25	6	1.4	1.94	12.7	2.5	5.0	0.9	0.67	21.44	3.2
MCG138-8b2	16	18.5	17.4	37.4	39	23	16	0.9	1.91					0.47	14.07	2.99
MCG138-8b1	16	18.5	17.6	35.6					1.91	15.7	6.4	2.5	0.7	0.47	9.38	2
MCG138-8a	16	18.5	17.8	31.8	30	21	9	1.2	1.96	18.7	3.4	5.5	0.6	0.47	9.05	1.93

Table 3. Strength properties

SITE	DEPTH FROM TO	ASSIGN DEPTH	W _n %	LL %	PL %	PI %	LI	DENSITY g/cm ^{^3}	SHEAR STRENGTH			PP TSF	TIP MN/M ^{^2}	SLEEVE KN/M ^{^2}	RATIO %
									PEAK	REMOVED					
									KN/M ^{^2}	KN/M ^{^2}	KN/M ^{^2}				
MCG138-12f	21.5	23.5	21.7	28.1				2.02	11.0	2.5	4.3	0.1	1.04	19.09	1.84
MCG138-12e	21.5	23.5	22	28.1				2.00	16.6	2.5	6.5	0.1	1.64	37.51	2.28
MCG138-12d	21.5	23.5	22.3	29				1.97	21.2	4.3	5.0	1.2	1.78	36.84	2.07
MCG138-12c	21.5	23.5	22.7	30.2				1.99	28.4	6.4	4.5	1.1	1.61	33.82	2.1
MCG138-12b	21.5	23.5	23	30.4				1.99	22.5	5.1	4.4	1	1.01	14.41	1.43
MCG138-12a	21.5	23.5	23.3	31				1.97	4.6	0.9	5.4	0.3	2.55	30.48	1.2

W_n=Water content expressed as percent of dry weight

LL=Liquid limit expressed as percent water content

PL=Plastic limit expressed as percent water content

PI=Plasticity index, LL-PL

LI=Liquidity index, (W_n-PL)/PI

St=Sensitivity, Peak strength/Remolded strength

PP=Pocket penetrometer

TABLE 4. Radiocarbon dates

<u>LAB NUMBER</u>	<u>SAMPLE NUMBER</u>	<u>DEPTH</u> <u>ft (m)</u>	<u>AGE</u>	<u>MATERIAL</u>
BETA-42924 ETH-7674	CMF-3-1	46 (14)	3,900 +/- 60	Wood
BETA-42923 ETH-7673	CMF-5-4	17.5 (5.3)	170 +/- 60	Wood
BETA-42927 ETH-7677	ML-14-8	20 (6.1)	2,010 +/- 60	Shell
BETA-42930 ETH-7679	JR-32-10	43.9 (13.4)	6,365 +/- 65	Wood
BETA-42929 ETH-7678	JR-34-10	27.1 (8.3)	5,315 +/- 65	Charcoal
BETA-42925 ETH-7675	SP-45-7	26 (7.9)	355 +/- 60	Wood
BETA-42926 ETH-7676	SP-46-3	11 (3.4)	130 +/- 55	Charcoal
BETA-56125 CAMS-3823	FAR-61-13	15.3 (4.7)	230 +/- 70	Wood
BETA-56124 CAMS-3822	FAR-62-21	35.3 (10.8)	230 +/- 60	Wood
BETA-56123 CAMS-3821	MRR-67	15.3 (4.7)	260 +/- 50	Wood
BETA-56126 CAMS-3825	SIL-68	8.5 (2.6)	140 +/- 60	Wood
BETA-56127 CAMS-3826	PAJ-82-2	9.1 (2.8)	290 +/- 50	Wood
BETA-56122 CAMS-3820	RAD-99-11	21.7 (6.6)	220 +/- 60	Wood
BETA-56121 CAMS-3819	TAN-103-11	32 (9.8)	130 +/- 60	Wood
BETA-56120 CAMS-3818	TAN-105-7	15.1 (4.6)	130 +/- 60	Wood
USGS-849	SRS-117	37 (11.3)	970 +/- 90	Plant material

Note: Except for USGS-849, these sample were done using the AMS technique. The reported dates have been adjusted by carbon-13 for total isotope effect generated in both nature and during the physical and chemical laboratory procedures. The carbon-13 content was measured concurrently with that of carbon-14 and carbon-12 in the accelerator beam, allowing a precise correction.

These dates are reported as RCYBP (radiocarbon years before 1950 A.D.). By international convention, the half-life of radiocarbon is taken as 5568 years and 95% of the activity of the National Bureau of Standards Oxalic Acid (original batch) used as the modern standard. The quoted errors are from the counting of the modern standard, background, and sample being analyzed. They represent one standard deviation statistics (68% probability), based on the random nature of the radioactive disintegration process. Also by international convention, no corrections are made for DeVries effect, reservoir effects, or isotope fractionation in nature, unless specifically noted above. Stable carbon ratios are measured on request and are calculated relative to the PDB-1 international standard; the adjusted ages are normalized to -25 per mil carbon 13.

Table 5. Liquefaction Resistance

SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	(N1)60 FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ² KG/CM ²	Qc KG/CM ²	N Qc	STRESS RATIO REQUIRE	Fs Qc
							IND- UCED	REQ- URIED						
CMF1	0.529	11.3	-3	6	66	0.048			NA	0.9	9.2			NA
			-7	6	97	0.007			NA	4.25	43.4			NA
			-11	17	98	0.002			NA	1.84	18.8			NA
			-16	3	3.7	0.051	0.390	0.120	0.31	1.5	15.3	5.1	0.136	0.35
			-26	3	3.2	0.027	0.448	0.114	0.25	0.92	9.4	3.2	0.114	0.25
			-36	16	14.9	0.120	0.464	0.262	0.56	1.05	10.7	2.1	0.099	0.21
			-49.5	23	19.8	0.277	0.438	0.299	0.68	18.46	188.3	27.5	1.99	4.90
CMF2	0.529	16	-3	5	58	0.060			NA	0.58	5.9			NA
			-6	6	78	0.047			NA	0.83	8.5			NA
			-13.5	2	75	0.024			NA	2.16	22.0			NA
			-23	3	3.1	0.036	0.384	0.114	0.30	1.93	19.7	6.1	0.147	0.38
			-35	23	21.7	0.103	0.424	0.886	2.09	9.6	97.9	20.9	0.625	1.47
			-5.5	6	28	0.139			NA	2.53	25.8			NA
			-9	3	53	0.071			NA	2.37	24.2			NA
CMF3	0.529	16	-15	11	19	0.154			NA	4.89	49.9			NA
			-18.5	6	6.7	0.086	0.354	0.154	0.44	2.26	23.1	6.1	0.147	0.42
			-22	13	13.8	0.120	0.378	0.244	0.65	3.79	38.7	8.8	0.171	0.45
			-26	26	26.7	0.115	0.400	1.990	4.90	6.89	70.3	15.4	0.274	0.69
			-33	2	1.9	0.033	0.422	0.095	0.23	2.86	29.2	8.1	0.168	0.40
			-46	23	19.8	0.133	0.416	0.390	0.94	9.61	98.0	17.6	0.313	0.75
			-50	30	25	0.360	0.408	0.399	0.98	15.75	160.7	20.8	0.283	0.69
			-55	50	40.1	0.430	0.396	1.990	4.90	17.14	174.8	20.6	0.27	0.68
			-6	7	50	0.076			NA	1.41	14.4			NA
			-11	27	10	0.223			NA	12.87	131.3			NA
			-14	15	10	0.244			NA	8.49	86.6			NA
CMF5	0.529	15.3												

Table 5. Liquefaction Resistance

SITE	ACCEL g	WATER		DEPTH ft.	N BLOWS / FOOT	(N1)60 FINES %	D50 mm	STRESS RATIO			F _s N	Q _c MN/M ²	Q _c KG/CM ²	N Q _c	STRESS	
		TABLE ft.	IND - UCED					REQ - URIED	RATIO REQUIREL	F _s Q _c						
CMF8	0.529	14.5	-17.5	5	5.7	16	0.146	0.353	0.118	0.33	2.9	29.6	6.9	0.131	0.37	
			-23	20	21.4	13	0.185	0.391	0.327	0.84	8.78	89.6	18.2	0.269	0.69	
			-34.5	24	22.8	10	0.230	0.429	0.315	0.73	10.01	102.1	17.4	0.229	0.53	
			-9.25	4		74	0.054			NA	1.97	20.1			NA	
			-15	11	13.3	45	0.082	0.339	0.246	0.73	2.3	23.5	6.8	0.155	0.46	
CMF10	0.529	10	-19.5	9	10.1	17	0.143	0.377	0.173	0.46	8.83	90.1	20.7	0.351	0.93	
			-24.5	9	9.4	14	0.263	0.407	0.153	0.38	4.27	43.6	7.8	0.135	0.33	
			-34	44	42.3	12	0.310	0.435	1.990	4.90	15.7	160.1	25.1	0.429	0.99	
			-37	31	29.1	7	0.255	0.436	0.588	1.35	8.03	81.9	12.8	0.154	0.35	
			-11	11		98	0.004			NA	1.07	10.9			NA	
CMF12	0.529	15	-21	5		54	0.062			NA	1.43	14.6			NA	
			-25	12	13	20	0.152	0.460	0.255	0.55	8.53	87.0	19.2	0.335	0.73	
			-30.5	25	25.7	20	0.115	0.475	1.990	4.90	10.67	108.8	24.4	1.99	4.90	
			-34	45	44.7	14	0.180	0.477	1.990	4.90	13.6	138.7	26.4	1.99	4.90	
			-6.25	12		98	0.008			NA	0.8	8.2			NA	
ML14B	0.270	5	-10.5	19		75	0.032			NA	1.63	16.6			NA	
			-13.5	2		90	0.028			NA	0.63	6.4			NA	
			-17	6		86	0.013			NA	0.7	7.1			NA	
			-20.5	7		63	0.054			NA	1.27	13.0			NA	
			-28	11	10.9	41	0.099	0.418	0.212	0.51	1.2	12.2	2.8	0.109	0.26	
ML14B	0.270	5	-35	6		90	0.003			NA	2.13	21.7			NA	
			-6	24	36.7	1	1.200	0.190	1.990	4.90	6.87	70.1	15.2	0.178	0.94	
			-9	40	51.5	1	LS	0.222	1.990	4.90	10.63	108.4	26.0	0.33	1.49	
			-12	22	33.8	4	0.522	0.242	1.990	4.90	6.77	69.1	14.7	0.172	0.71	
			-15.5	31	43	5	0.270	0.255	1.990	4.90	11.57	118.0	27.9	0.382	1.50	

Table 5. Liquefaction Resistance

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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ²	Qc KG/CM ²	N Qc	STRESS		Fs Qc
							IND- UCED	REQ- URIED					RATIO	REQUIREC	
ML15A	0.270	5	-20	24	30.4	2	0.445	0.264	0.614	2.33	15.8	161.2	29.7	0.506	1.92
			-5	5	7.6	40	0.097	0.174	0.166	0.95	0.8	8.2	3.8	0.122	0.70
			-7	1	1.5	2	0.308	0.203	0.014	0.07	1.8	18.4	6.1	0.071	0.35
			-8	9	12	33	0.144	0.213	0.228	1.07	0.4	4.1	1.5	0.094	0.44
			-13	32	47.7	3	0.620	0.246	1.990	4.90	18.4	187.7	36.5	1.99	4.90
15A			-20	60	75.9	6	0.520	0.264	1.990	4.90	25.1	256.0	44.9	1.99	4.90
AIR16	0.380	7	-7.5	6	7.6	71	0.043	0.252	0.166	0.66	1.26	12.9	6.2	0.148	0.59
			-10.5	5		89	0.019			NA	0.3	3.1			NA
			-15	9	12.2	40	0.097	0.326	0.231	0.71	0.56	5.7	1.8	0.098	0.30
			-21.5	11	13.1	55	0.077	0.351	0.244	0.70	5.65	57.6	16.7	0.306	0.87
			-24.5	7		93	0.004			NA	0.62	6.3			NA
AIR18	0.380	8	-7.5	3		13	0.153			NA	1.1	11.2			NA
			-11	8	11.8	10	0.193	0.281	0.164	0.58	2.47	25.2	7.0	0.109	0.39
			-15	5	6.7	7	0.310	0.312	0.090	0.29	2.1	21.4	4.7	0.065	0.21
			-21	3	3.6	54	0.064	0.338	0.118	0.35	0.8	8.2	2.5	0.106	0.31
			-24.5	26	29.3	10	0.140	0.348	1.990	4.90	4.73	48.2	11.1	0.156	0.45
AIR21	0.380	7.8	-29.5	5	5.2	11	0.112	0.560	0.093	0.17	5.97	60.9	14.0	0.196	0.35
			-38	5		96	0.005			NA	0.73	7.4			NA
			-50	33	29	76	0.050	0.329	1.990	4.90	8.18	83.4	19.9	0.395	1.20
			-7	5		5	0.200			NA	1.2	12.2			NA
			-10	5	7.6	2	0.380	0.273	0.090	0.33	2.9	29.6	6.9	0.081	0.30
			-13	6	8.4	5	0.910	0.302	0.100	0.33	4.23	43.1	6.9	0.082	0.27
			-16	3	3.9	7	0.540	0.320	0.056	0.18	0.6	6.1	1.1	0.021	0.07
			-19	8	9.9	31	0.098	0.334	0.198	0.59	3.4	34.7	9.8	0.197	0.59
			-22	12	14.1	5	0.259	0.343	0.165	0.48	4.33	44.2	16.7	0.195	0.57

Table 5. Liquefaction Resistance
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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS /FOOT	(N1)60 FINES %	D50 mm	STRESS RATIO				F _s N	Q _c MN/M ²	Q _c KG/CM ²	N Q _c	STRESS	
							IND- UCED	REQ- URED	RATIO	F _s Q _c						
SCA23	0.230	5	-26.5	2	98					NA	1.93	19.7			NA	NA
			-35	17	12	0.198	0.358	0.244	0.68	5.4	55.1	10.0	0.152	0.42		
			-6	9	39	0.096	0.162	0.253	1.56	3	30.6	14.4	0.261	1.61		
			-13	11	32	0.097	0.210	0.301	1.43	1.87	19.1	6.5	0.152	0.72		
			-16	3	62	0.060	0.218	0.125	0.57	0.93	9.5	3.4	0.116	0.53		
			-21	1	86	0.040	0.226	0.091	0.40	0.4	4.1	1.5	0.094	0.42		
SCA28	0.230	4	-28	21	7	0.245	0.232	0.303	1.31	27.67	282.2	55.2	1.99	4.90		
			-5	1	99	0.005			NA	0.1	1.0			NA		
			-8.5	21	2	0.680	0.200	0.398	1.99	4.57	46.6	10.6	0.125	0.63		
			-15	33	4	0.780	0.226	1.990	4.90	13.83	141.1	24.5	0.303	1.34		
			-21	15	18.9	LS	0.234	0.222	0.95	11.5	117.3	20.8	0.246	1.05		
			-27.5	27	30.5	?	0.239	0.633	2.65	17.97	183.3	29.1	0.515	2.15		
SEA29	0.214	6.5	-41	5	CLAYEY				NA	0.87	8.9			NA		
			-3	15	95	0.005			NA	2.37	24.2			NA		
			-8.5	4	98	0.003			NA	0.57	5.8			NA		
			-12	2	48	0.080			NA	0.4	4.1			NA		
			-21	2	98	0.024			NA	0.53	5.4			NA		
			-25.5	32	8	0.262	0.206	1.990	4.90	16	163.2	31.8	1.99	4.90		
SEA31	0.214	2.6	-4	5	68	0.054	0.168	0.166	0.99	0.67	6.8	3.7	0.12	0.71		
			-11	5	28	0.098	0.218	0.177	0.81	1.03	10.5	4.1	0.123	0.56		
			-14	7	16	0.123	0.224	0.177	0.79	2.83	28.9	9.4	0.16	0.71		
			-17	9	22	0.240	0.227	0.225	0.99	3.67	37.4	9.3	0.177	0.78		
			-24	13	14	0.244	0.231	0.238	1.03	2.23	22.7	4.9	0.101	0.44		
			-28	10	11	0.258	0.231	0.163	0.71	5.5	56.1	11.0	0.159	0.69		
			-31	9	95	0.003			NA	0.87	8.9			NA		

Table 5. Liquefaction Resistance
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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	(N1)/60 FINES %	D50 mm	STRESS RATIO			Fs N	Qc MN/M ² KG/CM ²	Qc CM	N Qc	STRESS	
							IND- UCED	REQ- URIED	RATIO REQUIREC						
JRR32	0.205	5.9	-38	137	138.4	9	0.300	0.223	1.990	4.90	38.9	396.8	66.0	1.99	4.90
			-8	9	11.6	4	0.280	0.152	0.137	0.90	2.33	23.8	6.9	0.081	0.53
			-11	12	18.6	5	0.282	0.170	0.218	1.28	3.47	35.4	9.2	0.11	0.65
			-19.5	16	20.2	8	0.340	0.193	0.261	1.35	4.2	42.8	8.5	0.117	0.61
			-24	15	17.4	8	0.245	0.199	0.223	1.12	3.73	38.0	7.8	0.109	0.55
			-37	30	29.9	14	0.140	0.200	1.990	4.90	9.1	92.8	19.0	0.29	1.45
JRR34	0.205	5.5	-44	5			0.002			NA	0.97	9.9			NA
			-5	19		7	0.330			NA	9.3	94.9			NA
			-8	18	23.6	1	0.380	0.156	0.287	1.84	7.43	75.8	20.2	0.239	1.53
			-12	20	30.4	6	0.285	0.179	0.732	4.09	4.2	42.8	10.9	0.134	0.75
			-14	17		17	0.002	0.185	0.726	3.92	8.73	89.0	21.5	0.371	2.01
			-21	4		94	0.002			NA	0.57	5.8			NA
JRR121	0.205	11	-27	9		98	0.002			NA	1.03	10.5			NA
			-34	6		99	0.002			NA	0.8	8.2			NA
			-19	3	3.5	7	0.347	0.162	0.051	0.31	6.97	71.1	13.2	0.166	1.02
			-23	11	12.2	6	0.420	0.170	0.148	0.87	5.32	54.3	8.9	0.111	0.65
			-26	14	14.8	8	0.370	0.175	0.191	1.09	7.45	76.0	12.4	0.161	0.92
			-32	28	28.2	15	0.190	0.181	1.990	4.90	26.6	271.3	51.4	1.99	4.90
JRR141	0.205	6.8	-5	16		6	0.288			NA	11.4	116.3			NA
			-9	3		83				NA	2.05	20.9			NA
			-12	5	7.4	18	0.159	0.167	0.143	0.86	1.79	18.3	5.3	0.12	0.72
			-16	10	13.4	14	0.195	0.180	0.203	1.13	3.48	35.5	8.9	0.147	0.82
			-20	15	18.4	8	0.251	0.188	0.237	1.26	4.89	49.9	10.7	0.142	0.76
			-26	14	15.5	4	0.356	0.196	0.182	0.93	4.65	47.4	8.2	0.097	0.49

Table 5. Liquefaction Resistance

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SITE	WATER			DEPTH ft.	N BLOWS/FOOT	FINES %	D50 mm	STRESS RATIO			Fs N	STRESS				
	ACCEL g	TABLE ft.	IND – UCED					REQ – URIED	Qc MN/M ²	Qc KG/CM ²		N Qc	RATIO REQUIREC	Fs Qc		
JRR148	0.205	9	-21 -24 -27	V 8 11	5 8.9 11.7	5 0.350 0.405 0.440	0.177 0.182 0.186	0.106 0.154	NA 0.58 0.83	4.97 7.79 3.66	50.7 79.5 37.3	9.3 13.3 5.8	0.111 0.156 0.085	0.63 0.86 0.46		
JRR149	0.205	9	-19 -22 -25 -28 -31	5 12 14 12 26	6.1 13.8 15.4 12.6 26.9	2 0.370 0.401 0.398 0.378 0.370	0.173 0.178 0.183 0.186 0.188	0.071 0.173 0.203 0.169 0.417	0.41 0.97 1.11 0.91 2.22	4.21 4.64 5.79 3.48 4.58	42.9 47.3 59.1 35.5 46.7	8 8.2 9.8 5.7 7.3	0.095 0.109 0.136 0.089 0.103	0.55 0.61 0.74 0.48 0.55		
JRR150	0.205		-19 -22 -25	21 20 21	25.5 23.1 23.3	8 0.249 0.247 0.281	0.173 0.178 0.183	0.363 0.299 0.313	2.10 1.68 1.71	7.85 6.28 8.58	80.1 64.1 87.5	17 13 16.3	0.218 0.163 0.209	1.26 0.92 1.14		
LEN37	0.214	8.1	-5.5 -11 -15 -21 -26 -33 -39	6 9 3* 11 17 23 4	13.3 13 12 13.1 18.8 23.4	39 0.090 0.105 0.170 0.195 0.197 0.220 0.003	0.158 0.175 0.190 0.197 0.201	0.197	NA 1.25 NA 0.89 1.16 1.69 NA	2.1 3.1 4.37 4.7 8.67 11.03 0.77	21.4 31.6 44.6 47.9 88.4 112.5 7.9			NA 1.02 0.98 0.74 1.12 1.43 NA		
LEN39	0.214	6.1	-6 -11 -14 -21	2 10 7 8	15.4 9.9 9.7	53 0.060 0.185 0.232 0.305	0.176 0.188 0.203	0.215 0.133 0.116	NA 1.22 0.71 0.57	0.91 3.63 3.53 6.1	9.3 37.0 36.0 62.2			NA 0.89 0.66 0.72		
LEN51	0.214	6	-4.5	9	15	0.144				6.2	63.2					

Table 5. Liquefaction Resistance

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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS	(N1)60 /FOOT	FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ²	Qc KG/CM ²	N Qc	STRESS RATIO REQUIRE	Fs Qc
								IND- UCED	REQ- URIED						
LEN52A	0.214	8.8	-7.5	7	9.2	43	0.080	0.153	0.188	1.23	2.13	21.7	9.2	0.189	1.24
			-11	2	3.1	36	0.088	0.177	0.113	0.64	1.075	11.0	4.1	0.124	0.70
			-14	9	12.7	12	0.340	0.189	0.186	0.98	3.48	35.5	8.2	0.131	0.69
			-17	11	14.6	8	0.345	0.197	0.188	0.95	5.78	59.0	12.5	0.163	0.83
			-21	15	18.3	9	0.251	0.203	0.242	1.19	7.83	79.9	17.4	0.23	1.13
			-24	16	18.6	8	0.271	0.207	0.239	1.15	11.45	116.8	23.4	0.315	1.52
LEN52B	0.214	5	-6	1	1.5	38	0.101	0.138	0.095	0.69	0.46	4.7	2.2	0.102	0.74
			-11	10	14.5	12	0.159	0.152	0.208	1.37	5.65	57.6	21.2	0.313	2.06
			-16	23	29.7	13	0.270	0.173	1.990	4.90	14.28	145.7	34.5	0.999	5.77
			-19	23	27.9	7	0.200	0.181	0.452	2.50	14.54	148.3	36	0.999	5.52
			-24	6	6.7	9	0.220	0.191	0.101	0.53					
			-6	2	3.1	24	0.152	0.151	0.107	0.71	NA				
LEN53	0.214	7	-4	12		11	0.155			NA	5.04	51.4			
			-8	7	8.7	13	0.155	0.147	0.141	0.96	6.12	62.4	20.7	0.312	2.12
			-11	6	9.1	6	0.201	0.167	0.113	0.68	3.25	33.2	9.3	0.116	0.69
			-16	10	13.3	7	0.253	0.186	0.167	0.90	4.67	47.6	11.1	0.141	0.76
			-19	17	21.2	7	0.251	0.193	0.269	1.39	7.36	75.1	16.4	0.204	1.06
PAJ43	0.321	8.5	-3.5	27	41.3	4	0.210			NA	8.9	90.8			NA
			-6	**		6	0.260			NA					NA
			-12	19	26.9	19	0.150	0.240	1.990	4.90	7.13	72.7	20.7	0.369	1.54
			-15	76	100.8	10	0.275	0.258	1.990	4.90	21	214.2	48.2	1.99	4.90
			-20	65	78	11	0.248	0.278	1.990	4.90					NA
			-25	136	151.6	1	0.455	0.291	1.990	4.90		NA			NA

Table 5. Liquefaction Resistance
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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS/ FOOT	FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ²	Qc KG/CM ²	N Qc	STRESS	
							IND- UCED	REQ- URIED					RATIO	Fs Qc
P AJ44	0.321	11	-10.5	23	3	0.210			NA	8.33	85.0			NA
EST SIZE			-14	17	7	0.207	0.187	0.283	1.51	5.73	58.4	14.0	0.175	0.94
			-19	11	13	LS	0.207	0.163	0.79	8.37	85.4	18.8	0.22	1.06
			-23.5	38	3	0.251	0.219	1.990	4.90	13.8	140.8	27.3	0.363	1.66
			-28	5	98	0.002			NA	0.6	6.1			NA
			-31	25	11	0.215	0.231	0.424	1.84	18.03	183.9	34.0	1.99	4.90
P AJ79	0.326	5	-5	1	92	0.004			NA	0.31	3.2			NA
			-8	47	1	0.258	0.258	1.990	4.90	10.77	109.9	33.9	1.99	4.90
			-13	26	4	0.228	0.297	1.990	4.90	21.53	219.6	58.8	1.99	4.90
			-16	22	53		0.309	1.990	4.90	5.08	51.8	10.8	0.127	0.41
SPR45	0.489	14.4	-6	15	96	0.004			NA					NA
			-11	7	24	0.107			NA					NA
			-16	11	6	0.167	0.323	0.159	0.49	4.87	49.7	11.5	0.141	0.44
			-19	11	10	0.171	0.347	0.172	0.50	11.24	114.6	25.2	0.395	1.14
			-23	19	10	0.240	0.370	0.284	0.77					
			-26	12	10	0.300	0.384	0.170	0.44					
			-30	8	95	0.005			NA					
			-33	41	7	0.355	0.402	1.990	4.90					
			-36	22	9	0.355	0.404	0.270	0.67					
SPR48	0.489	17.5	-6	6	30	0.108			NA	2.11	21.5			NA
			-11	7	59	0.062			NA	1.6	16.3			NA
			-16	13	12	0.158			NA	6.32	64.5			NA
			-21	7	13	0.168	0.330	0.126	0.38	2.54	25.9	5.3	0.103	0.31
			-24	10	10.2	LS	0.347	0.158	0.46	4.35	44.4	8.9	0.143	0.41
			-28	11	10.7	0.164	0.365	0.168	0.46	5.32	54.3	10.3	0.164	0.45

Table 5. Liquefaction Resistance
C:\PETAL2\finSEED.WK3

SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	FINES %	D50 mm	STRESS RATIO				F _s N	Q _c MN/M ²	Q _c KG/CM ²	N Q _c	STRESS	
							IND- UCED	REQ- URIED	RATIO REQUIREC	F _s Q _c						
WAT54	0.548	27	-31	13	12.1	0.623	0.375	0.149	0.40	1.81	18.5	2.2	0.034	0.09		
			-36	11	9.7	0.225	0.382	0.130	0.34	12.63	128.8	21.5	0.28	0.73		
			-9	41		0.242			NA	4.52	46.1			NA		
			-21	7		0.015			NA	1.22	12.4			NA		
FAR58	0.538	15.92	-34.5	25	22.1	0.225	0.362	0.336	0.93	15	153.0	24.4	0.437	1.21		
			-2	3					NA					NA		
			-7	4		0.048			NA	1.62	16.5			NA		
			-11.5	10		0.085			NA	2.14	21.8			NA		
			-14.5	26		0.127			NA	1.06	10.8			NA		
			-20	21	23.2	0.290	0.372	0.280	0.75	10.56	107.7	19.8	0.234	0.63		
FAR59	0.538	15.8	-25	17	17.7	0.238	0.403	0.220	0.55	8.82	90.0	16.6	0.207	0.51		
			-4.5	2		0.074			NA	1.47	15.0			NA		
			-8	2		0.063			NA	1.05	10.7			NA		
			-11	4		0.006			NA	0.84	8.6			NA		
			-14	5		0.097			NA	2.58	26.3			NA		
			-17	9	10.3	0.159	0.349	0.128	0.37	2.42	24.7	5.6	0.071	0.20		
FAR61	0.538	13.75	-21	16	17.5	0.205	0.380	0.204	0.54	7.3	74.5	14.8	0.174	0.46		
			-26	21	21.6	0.205	0.409	0.275	0.67	11.58	118.1	22.5	0.289	0.71		
			-31	16	15.2	0.190	0.427	0.206	0.48	8.78	89.6	16.6	0.225	0.53		
			-3	4		0.049			NA	1.98	20.2			NA		
			-7.5	4		0.085			NA	2.08	21.2			NA		
			-9	12		0.047			NA	1.28	13.1			NA		
			-12	9		0.090			NA	4.74	48.3			NA		
			-15.5	13	15.7	0.300	0.358	0.190	0.53	3.36	34.3	6.8	0.086	0.24		
			-21.5	9	9.8	0.113	0.405	0.183	0.45	4.45	45.4	10.9	0.197	0.49		

Table 5. Liquefaction Resistance
C:\PETAL2\finSEED.WK3

SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M^2	Qc KG/CM^2	N Qc	STRESS		
							IND – UCED	REQ – URIED					RATIO REQUIREC	Fs Qc	
FAR62 all have clay>15	0.538	11.84	-29	28	28.4	9	0.200	0.439	0.721	1.64	10.18	103.8	19.6	0.26	0.59
			-3	10		98	0.005			NA	0.84	8.6			NA
			-6	3		96	0.019			NA	0.55	5.6			NA
			-13.5	1		98	0.014			NA	0.23	2.3			NA
			-16.5	6		99	0.005			NA	0.53	5.4			NA
			-31	7		98	0.002			NA	1.06	10.8			NA
MRR65	0.588	18.5	-36	9		96	0.029			NA	0.98	10.0			NA
			-6	2		84	0.048			NA	1.81	18.5			NA
			-14	7		42	0.087			NA	2.42	24.7			NA
			-17	5		30	0.104			NA	2.82	28.8			NA
			-21	6	6.3	59	0.066	0.387	0.149	0.39	2.35	24.0	6.3	0.15	0.39
			-25	13	12.9	12	0.159	0.414	0.188	0.45	7.22	73.6	14.5	0.208	0.50
MRR67	0.588	20.5	-30	20	19.4	11	0.156	0.438	0.274	0.63	7.71	78.6	14.6	0.205	0.47
			-2.5	2		97	0.028			NA	1.28	13.1			NA
			-8	3		56	0.004			NA	0.69	7.0			NA
			-17	4		99	0.011			NA	1.22	12.4			NA
			-21	25	26.1	15	0.203	0.368	1.990	4.90	14.36	146.5	28.4	1.99	4.90
			-25	4		69	0.036			NA	9.88	100.8			NA
SIL68	0.565	11.5	-28	3	2.8	40	0.112	0.412	0.110	0.27	16.27	166.0	35.6	1.99	4.90
			-6.5	2		54	0.066			NA	1.25	12.8			NA
			-15	13	16.4	20	0.149	0.404	0.280	0.69	5.33	54.4	13.9	0.238	0.59
			-20.5	7	8	15	0.175	0.448	0.141	0.31	4.56	46.5	10.3	0.167	0.37
			-25	15	16	11	0.298	0.472	0.224	0.47	9.24	94.2	16.8	0.235	0.50
			-31	16	15.8	15	0.247	0.491	0.244	0.50	11.67	119.0	21.2	0.343	0.70

Table 5. Liquefaction Resistance
C:\PETAL2\finSEED.WK3

SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	(N1)60 FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ² KG/CM ²	Qc KG/CM ²	N Qc	STRESS	
							IND- UCED	REQ- URIED					RATIO REQUIREC	Fs Qc
SIL71	0.565	16	-7	9	14	0.187			NA	9.3	94.8			NA
			-11	5	29	0.107			NA	1.5	15.1			NA
			-14	8	20	0.145			NA	10.8	110.1			NA
			-20	11	12	0.203	0.390	0.162	0.42	6.0	61.3	12.4	0.166	0.43
			-25	14	14.2	0.123	0.422	0.235	0.56	6.0	60.9	13.2	0.219	0.52
			-28	6	5.9	0.054	0.436	0.145	0.33	4.54	46.3	12.1	0.229	0.53
KET72	0.691	NONE	-30	13	12.5	0.200	0.443	0.219	0.49	4.04	41.2	7.3	0.15	0.34
			-5	26	62	0.018			NA	4.35	44.4			NA
			-4.5	1	47	0.095			NA	0.234	2.4			NA
			-9	14	17.9	0.670	0.569	0.277	0.49	4.97	50.7	11.0	0.176	0.31
			-13	6	82				NA	0.51	5.2			NA
			-16.5	7	9.5	0.132	0.658	0.193	0.29	1.14	11.6	3.3	0.115	0.17
SCR89	0.614	11.5	-20	10	96	0.002			NA	1.21	12.3			NA
			-3.5	6	17	0.179			NA	4.99	50.9			NA
			-6.5	11					NA	9.26	94.5			NA
			-15.5	7	8.8	0.280	0.444	0.110	0.25	5.4	55.1	11.6	0.142	0.32
			-21	11	70	0.040			NA	3.83	39.1			NA
			-24	6	90	0.010			NA	0.77	7.9			NA
RAD98	0.556	11.5	-3	13	94	0.029			NA	0.98	10.0			NA
			-6.5	11	12	0.259			NA	1.34	13.7			NA
			-10	8	11	0.189			NA	4.71	48.0			NA
			-13	16	21.1	0.174	0.375	0.302	0.81	7.02	71.6	18.2	0.255	0.68
			-18	14	16.7	0.350	0.424	0.220	0.52	9.03	92.1	17.2	0.228	0.54
			-25	19	20.5	0.297	0.465	0.251	0.54	6.76	69.0	12.2	0.149	0.32
			-31	29	29.3	0.360	0.483	0.462	0.96	15.1	154.0	24.2	0.297	0.61

Table 5. Liquefaction Resistance

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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	(N1)60 / FOOT	FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ²	Qc KG/CM ²	N Qc	STRESS	
								IND- UCED	REQ- URIED					RATIO	Fs Qc
RAD99	0.556	13.3	-35	31	30.2	37	0.095	0.486	1.990	4.90	7.17	73.1	15.9	0.29	0.60
			-5	3		95				NA	0.53	5.4			NA
			-10	5		99	0.002			NA	0.54	5.5			NA
			-15	11	13.5	13	0.147	0.372	0.200	0.54	2.73	27.8	6.9	0.121	0.33
			-18	13	15.2	16	0.153	0.400	0.240	0.60	4.63	47.2	11.0	0.181	0.45
			-21	8	8.9	22	0.135	0.421	0.172	0.41	3.94	40.2	9.3	0.177	0.42
			-25	26	27.7	19	0.195	0.444	1.990	4.90	8.18	83.4	16.6	0.279	0.63
			-33	14	13.3	17	0.200	0.468	0.215	0.46	8.9	90.8	16.5	0.266	0.57
TJR100	0.549	16.75	-42	24	21.8	26	0.197	0.464	0.739	1.59	3.52	35.9	5.7	0.133	0.29
			-14	6		36	0.107			NA	0.74	7.5			NA
			-21	5		92				NA	0.65	6.6			NA
			-24	4						NA	0.93	9.5			NA
			-27	12	11.8	25	0.171	0.412	0.221	0.54	0.58	5.9	1.1	0.086	0.21
			-30.5	8	7.6	55	0.064	0.425	0.165	0.39	6.24	63.6	15.3	0.278	0.65
			-34	25	23.7	21	0.133	0.432	1.027	2.38	8.82	90.0	17.8	0.298	0.69
TJR102 DRY OR TOO MUCH CLAY	0.549	23	-5	9		1				NA	1.1	11.2			NA
			-10	8		46	0.068			NA	4.1	41.8			NA
			-13	6		21				NA	4.14	42.2			NA
			-21	5		72				NA	4.25	43.4			NA
			-23	9		98				NA	3.44	35.1			NA
TAN103 .	0.187	15	-6	5		100				NA	0.7	7.1			NA
			-16.5	7	8.2	22	0.142	0.123	0.162	1.32	5.29	54.0	12.9	0.23	1.87
			-22	10	10.7	13	0.261	0.137	0.165	1.20	8.21	83.7	15.5	0.228	1.66
			-27	10	10	13	0.239	0.146	0.156	1.07	4.91	50.1	8.9	0.143	0.98

Table 5. Liquefaction Resistance
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SITE	ACCEL g	WATER		DEPTH ft.	N BLOWS / FOOT	(N1)60 FOOT	FINES %	D50 mm	STRESS RATIO		Fs N	Qc MN/M ²	Qc KG/CM ²	N Qc	STRESS	
		TABLE ft.							IND- UCED	REQ- URIED					RATIO REQUIREC	Fs Qc
EST 15% FINES				-34 -37	4 8	3.7 7.1	13* 14	LS 0.288	0.152 0.153	0.080 0.122	0.53 0.80	5.55 4.5	56.6 45.9	9.3 6.8	0.146 0.119	0.96 0.78
TAN105	0.187	13.75		-6 -11 -16 -19.5 -34 -37.5	5 10 6 9 10 12		61 27 41 19 18 11	0.060 0.111 0.078 0.180 0.154 0.213			NA NA 1.27 1.33 1.03 0.96	1.94 4.72 3.84 4.73 4.43 5.76	19.8 48.1 39.2 48.2 45.2 58.8			NA NA 1.74 1.35 0.96 0.88
MAR110	0.194	6		-4 -12 -16 -21 -27.5	3 4 7 16 19		99 13 23 15 10				NA 0.67 1.03 1.66 1.54	0.51 3.24 4.26 8.61 13.62	5.2 33.0 43.5 87.8 138.9			NA 0.94 1.25 1.59 4.90
MAR111	0.194	5.5		-4 -7 -11 -16 -21 -26	4 10 6 4 7 3		10 19 10 15 5 97				NA 1.83 0.82 0.62 0.54 NA	0.75 2.4 3.27 2.68 6.29 0.95	7.7 24.5 33.4 27.3 64.2 9.7			NA 1.28 0.87 0.71 0.87 NA
MAR112	0.194	9.5		-6 -11 -19.5 -27	1 1 11 6		71 17 57				NA NA 1.31 NA	0.98 0.38 6.63 1.69	10.0 3.9 67.6 17.2			NA NA 1.60 NA
MAR114	0.194	7.25		-9	1	1.2	60	0.084	0.137	0.091	0.66	3.58	36.5	15.8	0.258	1.88

Table 5. Liquefaction Resistance
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SITE	ACCEL g	WATER TABLE ft.	DEPTH ft.	N BLOWS / FOOT	(N1)60 FINES %	D50 mm	STRESS RATIO		F _s N	Q _c MN/M ²	Q _c KG/CM ²	N Q _c	STRESS RATIO		F _s Q _c
							IND – UCED	REQ – URIED							
SRB116 MECH CPT	0.159	21	-18	3	3.8	0.121	0.171	0.121	0.71	1.46	14.9	4.1	0.123		0.72
			-25.5	2	2.2	0.040	0.182	0.103	0.57	1.34	13.7	4.4	0.128		0.70
			-1	5		0.062			NA		32				NA
			-2	3	50	0.075			NA		22				NA
			-6.5	2	54	0.070			NA		20				NA
			-9.5	5	21	0.120			NA		28				NA
			-13	5	50	0.075			NA		36				NA
			-17	5	6	0.202			NA		40				NA
			-21	7	7.1	0.243	0.098	0.096	0.98		40	7.2	0.097		0.99
			-26	7	6.7	0.217	0.107	0.122	1.14		72	12.6	0.193		1.80
EST SIZE			-29.5	10	9.2	0.295	0.112	0.111	0.99		38	5.8	0.071		0.63
			-33	9	8	0.770	0.115	0.090	0.78		100	10.7	0.122		1.06
			-37	9	7.6	0.770	0.117	0.085	0.73		71	7.3	0.081		0.69
			-1	5		0.060			NA		32				NA
			-3	4	67	0.057			NA		22				NA
SRB117 MECH CPT	0.159	21	-6	3	50	0.074			NA		22				NA
			-9	5	23	0.118			NA		26				NA
			-13	5	35	0.096			NA		38				NA
			-17	6	10	0.150			NA		44				NA
			-21	7	7.1	0.225	0.098	0.123	1.26		46	8.4	0.134		1.37
			-25	10	9.7	0.255	0.106	0.140	1.32		64	10.8	0.153		1.44
			-29	10	9.3	0.072	0.112	0.183	1.63		60	13.7	0.244		2.18
			-33	17	15	0.750	0.115	0.169	1.47		86	9.3	0.106		0.92
			-37	14	11.8	0.790	0.117	0.132	1.13		50	5.1	0.055		0.47
			-41	20	17.4	0.076	0.117	0.302	2.58		78	15.3	0.262		2.24
			-45	10	7.7	0.019	0.117	0.156	1.33		15	4.8	0.124		1.06

Table 5. Liquefaction Resistance

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SITE	WATER			DEPTH ft.	N BLOWS / FOOT	FINES %	D50 mm	STRESS RATIO			F _s N	Q _c MN/M ²	Q _c KG/CM ²	N Q _c	STRESS	
	ACCEL g	TABLE ft.	IND – UCED					REQ – URIED	RATIO REQUIRE	F _s Q _c						
ML2 118 AND 119 MECH CPT	0.263	4	-13.5	12	15.9	7	0.520	0.254	0.198	0.78		38	7.9	0.105	0.41	
			-16	19	23.4	12	0.500	0.261	0.365	1.40		85	16.7	0.239	0.92	
			-33	49	45.6	20	0.300	0.271	1.990	4.90		122	21.2	0.401	1.48	
			-45	26	21.5	33	0.330	0.253	0.831	3.28		250	43.6	1.99	4.90	
GRA123	0.498	16.5	-4.5	6		70					1.42	14.5				
			-9.5	2		76					1.27	13.0				
			-14.5	2		75					0.93	9.5				
			-19.5	14	15.3	11	0.195	0.335	0.213	0.64	9.04	92.2	19.1	0.269	0.80	
MCG136			-25	8	8.1	27	0.150	0.367	0.171	0.47	4.41	45.0	9.2	0.186	0.51	
			-29	12	11.6	6	0.316	0.384	0.142	0.37	14.54	148.3	23.9	0.303	0.79	
			-36	16	14.2	11	0.261	0.396	0.192	0.48	15.74	160.5	26	0.457	1.15	
	0.379	6	-9	6	7.4	11	0.148	0.292	0.118	0.40	3.36	34.3	11.4	0.164	0.56	
MCG138			-18.5	9	11.6	7	0.252	0.353	0.147	0.42	9.96	101.6	22.8	0.295	0.84	
			-21.5	19	23	11	0.203	0.361	0.342	0.95	8.38	85.5	19.1	0.269	0.75	
			-24.5	20	23	8	0.320	0.368	0.308	0.84	16.43	167.6	31.1	1.99	4.90	
			-27.5	26	28.8	9	0.195	0.372	0.803	2.16	9.67	98.6	20.4	0.273	0.73	
MCG138	0.379	6	-6	1	1.5	31	0.110	0.244	0.095	0.39	1.81	18.5	8.3	0.176	0.72	
			-12	3	4.5	38	0.087	0.321	0.129	0.40	1.83	18.7	6.6	0.153	0.48	
			-21	2	2.4	46	0.080	0.360	0.106	0.29	0.64	6.5	1.9	0.099	0.28	
			-26	19	21.4	18	0.144	0.370	0.383	1.04	8.48	86.5	19.9	0.338	0.91	
		-29	29	31.5	12	0.162	0.373	1.990	4.90	17.81	181.7	38.8	1.99	4.90		

est size = sample was lost, median size or fines content was estimated

USGS GEOTECHNICAL LOG

HOLE NUMBER 1

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199999, Y: 584087

DATE DRILLED CPT 4-2-90, SPT 5-16-90

GROUNDWATER 11.3 ft.; 3.4 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 30.5 ft.; 9.3 m MSL

DEPTH (feet) <i>(meters)</i>	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
5				0.011	87	ml			Silt, dark brown, 10YR3/3, road base	
6			6	0.048	66	ML	D		Sandy SILT, very dark grayish brown, 2.5Y3/2	
15									Silt, olive brown, 2.5Y4/4, nonsticky, nonplastic	
2			6	0.036 0.007	91 97	MH	C		Elastic SILT, dark grayish brown, 2.5Y4/3, sticky, plastic, soft; two fining upward sequences, CO ₃ in tubular pores	
10			17	0.002	98	MH	C		Elastic SILT, olive yellow, 2.5Y6/6, few silt partings, 4-6mm, slightly effervescent, sticky, plastic, few distinct yellow brown, 10YR5/6, mottles; CO ₃ nodules to 1/2cm	
15			3	0.051	70	ML	L		Sandy SILT, dark grayish brown, 2.5Y4/2, loose, micaceous, trace organics; sandy SILT, olive brown, 2.5Y4/4, no CO ₃ ucs=0.25 ksc	
25			3	0.027	98	ML	L		SILT, light olive brown, 2.5Y5/4, grades downward into silty clay, dark gray, 2.5Y4/0, many distinct mottles, light olive brown, 2.5Y5/6 and strong brown, 10YR5/6, slightly sticky, slightly plastic, disseminated CO ₃	

REMARKS: Tentatively classified as off slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 1

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199999, Y: 584087

DATE DRILLED CPT 4-2-90, SPT 5-16-90

GROUNDWATER 11.3 ft.; 3.4 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 30.5 ft.; 9.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	16	0.120	34	SM	L		Silty SAND, very dark gray, 5Y3/1, loose, slight effervescence, CO ₃ disseminated, massive to thickly bedded, fines upward to sandy silt, ucs=0.5 ksc	Qof
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15			23	0.277	16	SM	H*		Silty SAND, very dark gray, 2.5Y3/2, medium dense, well sorted, no CO ₃ , probably minimum blow count, first blows in disturbed material	
15.5									End of boring, 50.2 ft., 15.3 m	
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 2
 LOCATION MILLER FARMS (CMF)
 DATE DRILLED CPT 2-4-90, SPT 5-16-90
 PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1200023, Y: 584341
 GROUNDWATER 21 ft.; 6.4 m
 ELEVATION 30.3 ft.; 9.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5			5	0.060	56	ML	D		Sandy SILT, light olive brown, 2.5Y5/4, grades up to clayey silt, dark gray brown, 2.5Y3/2, slightly sticky, slightly plastic, no moisture, no CO ₃ , few fine roots, ucs=2.75 ksc	
10			6	0.047	78	ML	D		SILT with sand, light olive brown, 2.5Y5/4, effervescent, massive, lean clay, dark grayish brown, 2.5Y4/2, disseminated CO ₃ in clay, no nodules in clay	
15			2	0.024	76	ML	C		Very stiff drilling	
20									SILT with sand, light olive brown, 2.5Y5/4, loose; trace clay, very soft, slightly sticky, slightly plastic, slightly effervescent (CO ₃ in fine tubular pores) ucs< 0.25 ksc	
25			3	0.036	96	ML	L			
30										
35			23	0.103	38	SM	H		Silty SAND, dark gray, 5Y4/1, medium dense; 40 to 50 mm-thick sand laminae alternately bedded with sandy silt; slightly effervescent, disseminated CO ₃ , few very fine roots in silt	

REMARKS Off slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 2

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1200023, Y: 584341

DATE DRILLED CPT 2-4-90, SPT 5-16-90

GROUNDWATER 21 ft.; 6.4 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 30.3 ft.; 9.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	23	0.103	38	SM	H			
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5									Dense sand	
15									End of sounding, 48.6 ft., 14.8 m	
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 3

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1200033, Y: 584611

DATE DRILLED CPT 4-2-90, SPT 5-15-90

GROUNDWATER 18.8 ft.; 5.7 m

PERSONNEL L: TINSLEY; D: BENNETT/CRILEY

ELEVATION 30.1 ft.; 9.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8		0.054	61	ML			Sandy SILT, very dark grayish brown 2.5Y3/2 (w), dark grayish brown, 2.5Y4/3 (m)	Gyl
5									Silt, pale olive, 5Y6/3 (d), friable	
1.5			6	0.139	28	SM	D		Silty SAND, pale olive, 5Y6/3 (m), well sorted, medium bedded	
2									Sand, medium grained, 20 % (?) silt, thick bedded	
2.5			3	0.071	53	ML	D		Sandy SILT, olive, 5Y5/3 (m), very moist, massive	
10										
3.5										
4										
15			11	0.154	19	SM	D		Silty SAND, olive, 5Y5/3, moist	
5										
5.5			6	0.086	41	SM	L		Silty SAND, very dark gray, 2.5Y3/2, well sorted, few charcoal fragments, 1mm	Gof
20										
6.5			13	0.120	22	SM	L		Silty SAND, olive gray, 5Y4/2, micaceous	
7										
25			26	0.115	23	SM	H*		Silty SAND, olive, 5Y5/3, silty near base, slightly effervescent, disseminated CO ₃	
8										
8.5										
30										
9										
9.5										
10			2	0.033	68	ML	L		Sandy SILT, dark gray, 5Y4.1 (m), many organic fragments, slight effervescence	
10.5										
35										

REMARKS: Tentatively classified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 3

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1200033, Y: 584611

DATE DRILLED CPT 4-2-90, SPT 5-15-90

GROUNDWATER 18.8 ft.; 5.7 m

PERSONNEL L: TINSLEY; D: BENNETT/CRILEY

ELEVATION 30.1 ft.; 9.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
45										
14			23	0.133	30	SM	L		Silty SAND, very dark gray, 2.5Y3/2, feldspathic; wood, slight effervescence	
14.5									14 m, uncorrected age, 3,900 +/- 60, 14C YBP	
15			30	0.360	12	SW-SM	L		SAND with silt, very dark gray, 5Y3/1, slight effervescence, silicious shale pebbles to 10 mm	
15.5										
16										
16.5			50	0.430	11	SW-SM	H*		SAND with silt, very dark gray, 5Y3/1, no effervescence	
55										
17										
17.5										
18										
18.5										
19										
19.5										
65									Silt	
20										
20.5									End of sounding, 66.3 ft., 20.2 m	
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 4
 LOCATION MILLER FARMS (CMF)
 DATE DRILLED 4-3-90
 PERSONNEL D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1199451, Y: 584523
 GROUNDWATER _____
 ELEVATION 29.7 ft.; 9.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5									Silty sand	
10										
15										
20										
25										
30										
35										

REMARKS: Tentatively classified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 4

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199451, Y: 584523

DATE DRILLED 4-3-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 29.7 ft.; 9.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8							Sand, dense	
11										
11.5										
12										
40										
12.5									End of sounding, 40.7 ft., 12.4 m	
13										
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 5

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199074, Y: 584491

DATE DRILLED CPT: 3-4-90, SPT: 5-22-90

GROUNDWATER 15.3 ft.; 4.7 m

PERSONNEL L: TINSLEY/DUPRE, D: BENNETT/CRILEY

ELEVATION 29.3 ft.; 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	Liq-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5			7	0.076	50	SM	D		Silty SAND, olive, 5Y5/3, micaceous, loose, subangular, effervescent, non-sticky, nonplastic, few beds of silty clay, pale olive, 5Y6/4, slightly sticky, slightly plastic; moderately effervescent	
10			27	0.223	10	SP-SM	D		SAND with silt, olive, 5Y5/3, and light yellowish brown, 2.5Y6/3, well sorted, medium dense, finely laminated in lower 1/3 of sample, nonsticky, nonplastic, slightly effervescent	
15			15	0.244	10	SP-SM	D		SAND with silt, light olive brown, 2.5Y5/4, well sorted, loose, nonsticky, nonplastic, slightly effervescent, poorly laminated in lower 2/3 of sample, massive in upper 1/3	
20			5	0.042 0.146	91 16	ML SM	L		SILT, very dark gray, 10YR3/1, slight effervescence, massive with organics	
25									5.1 m, uncorrected age, 170 +/- 60, 14C YBP	
30			20	0.185	13	SM	L		Silty SAND, light gray, 7.5YR7/0, and very dark gray, 7.5YR3/0	
35									Silty SAND, dark gray, 2.5Y3/0, slightly effervescent, medium dense	
									Silty sand, loose	
			24	0.230	10	SP-SM	L		SAND with silt, very dark gray, 2.5Y3/0, parallel laminations, slightly effervescent, pebbles up to 13 mm, disseminated CO ₃	

REMARKS. Tentatively classified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 5

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

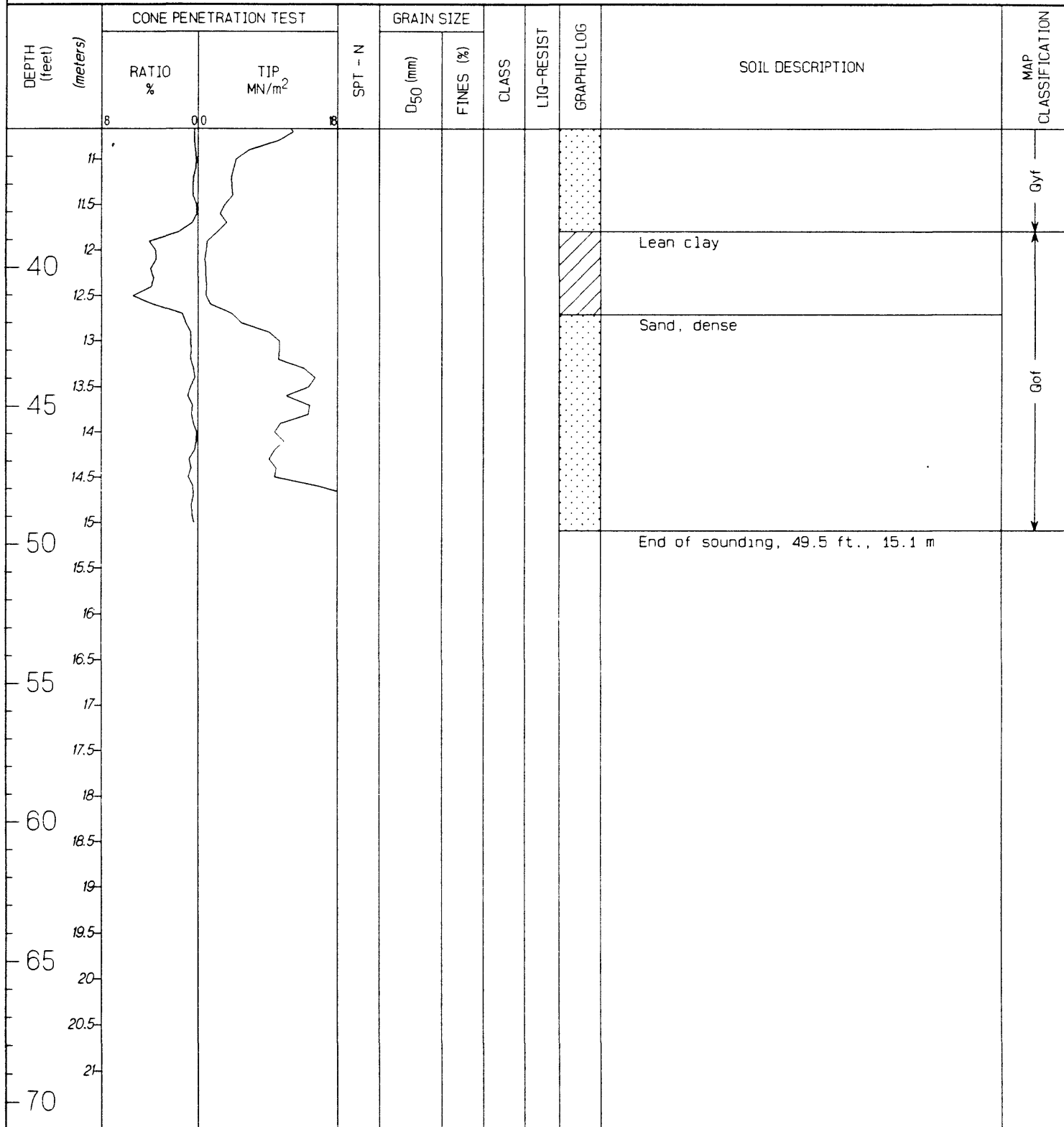
COORDINATES X: 1199074, Y: 584491

DATE DRILLED CPT: 3-4-90, SPT: 5-22-90

GROUNDWATER 15.3 ft.; 4.7 m

PERSONNEL L: TINSLEY/DUPRE, D: BENNETT/CRILEY

ELEVATION 29.3 ft.; 8.9 m MSL



Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 6

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198459, Y: 584447

DATE DRILLED 4-4-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 29.2 ft.; 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
35										

Sand, loose, very silty near 6 ft

Sand, medium dense, variable density

REMARKS. Tentatively classified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 6

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198459, Y: 584447

DATE DRILLED 4-4-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 29.2 ft.; 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0	8							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
55										
16.5										
17										
17.5										
60										
18										
18.5										
19										
65										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

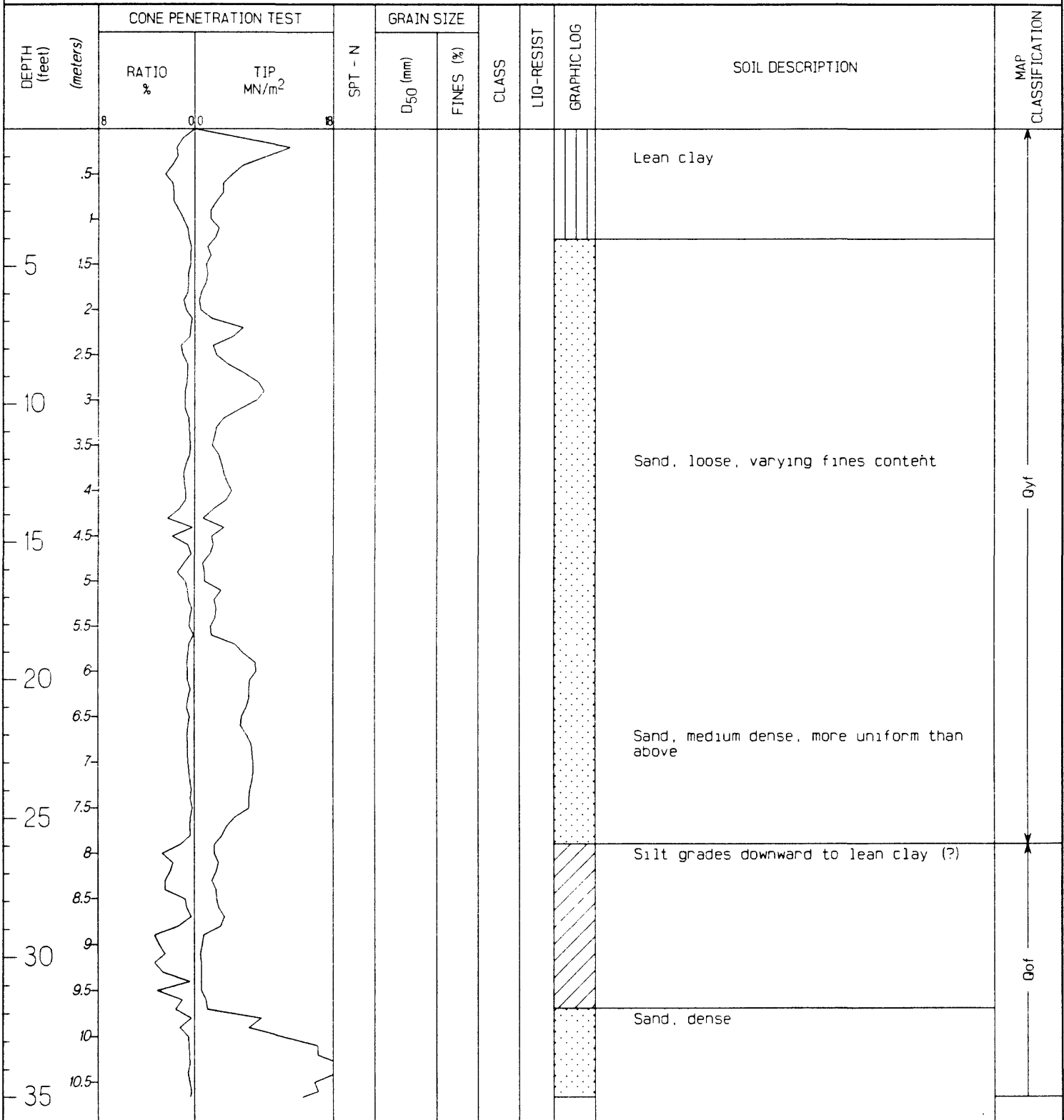
Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 7
 LOCATION MILLER FARMS (CMF)
 DATE DRILLED 4-4-90
 PERSONNEL D: BENNETT#RILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1198383, Y: 584867
 GROUNDWATER _____
 ELEVATION 29.5 ft.; 9.0 m MSL



REMARKS: Tentatively classified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 7

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198383, Y: 584867

DATE DRILLED 4-4-90

GROUNDWATER _____

PERSONNEL D: BENNETT-RILEY

ELEVATION 29.5 ft.; 9.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

End of sounding, 36.4 ft., 11.1

Gof

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 8

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198020, Y: 584820

DATE DRILLED CPT: 4-4-90, SPT: 5-22-90

GROUNDWATER 16 ft.: 4.9 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.3 ft.: 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		18							
5									Sand and silt, light gray, 2.5Y7/2, road base	
									Sand, fine grained, occasional silty layers	
10			4	0.054	77	ML	D		SILT with sand, olive brown, 2.5Y4/4 nonsticky, nonplastic; few faint mottles no roots; few small tubular pores, poorly bedded, slight disseminated CO ₃	
				0.077	49	SM			Silty SAND, dark olive gray, 5Y3/2, nonsticky, nonplastic, noneffervescent	
				0.060	58	ML			Sandy SILT, dark gray, 2.5Y4/0, slightly sticky, slightly plastic	
15			11	0.082	45	SM	L		Silty SAND, dark gray, 2.5Y4/0, nonsticky, nonplastic, micaceous, effervescent, ucs= 2.0 ksc	
20			9	0.143	17	SM	L		Silty SAND, very dark grayish brown, 2.5Y3/2, nonsticky, nonplastic, no CO ₃ , organic silt laminae 3-mm thick at bottom of sample	
25			9	0.263	14	SM	L		Silty SAND, gray, 2.5Y5/0, fines upward, massive, nonsticky, nonplastic well sorted, no CO ₃	
35			44	0.310 0.260	12 7	SW-SM SP-SM	H*		SAND with silt, well graded, dark gray, 5Y4/1, and SAND with silt, poorly graded, light yellowish brown, 2.5Y6/4, coarse to medium grained, few rounded chert clasts to 10 mm, no CO ₃	

REMARKS. On slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 8

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198020, Y: 584820

DATE DRILLED CPT: 4-4-90, SPT: 5-22-90

GROUNDWATER 16 ft.; 4.9 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.3 ft.; 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0		8							
11			31	0.255	7	SP-SM	H*		SAND with silt, light brownish gray, 2.5Y6/2, and medium to fine sand, dark gray, 5Y4/1, all samples are non-sticky and nonplastic, slight effervescence and disseminated CO ₃	Gyf
11.5										
12										
40										
12.5										
13										
45										
13.5										
14									Lean clay interbed	Gof
14.5										
15										
50									End of sounding, 49.2 ft., 15.0 m	
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 9

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

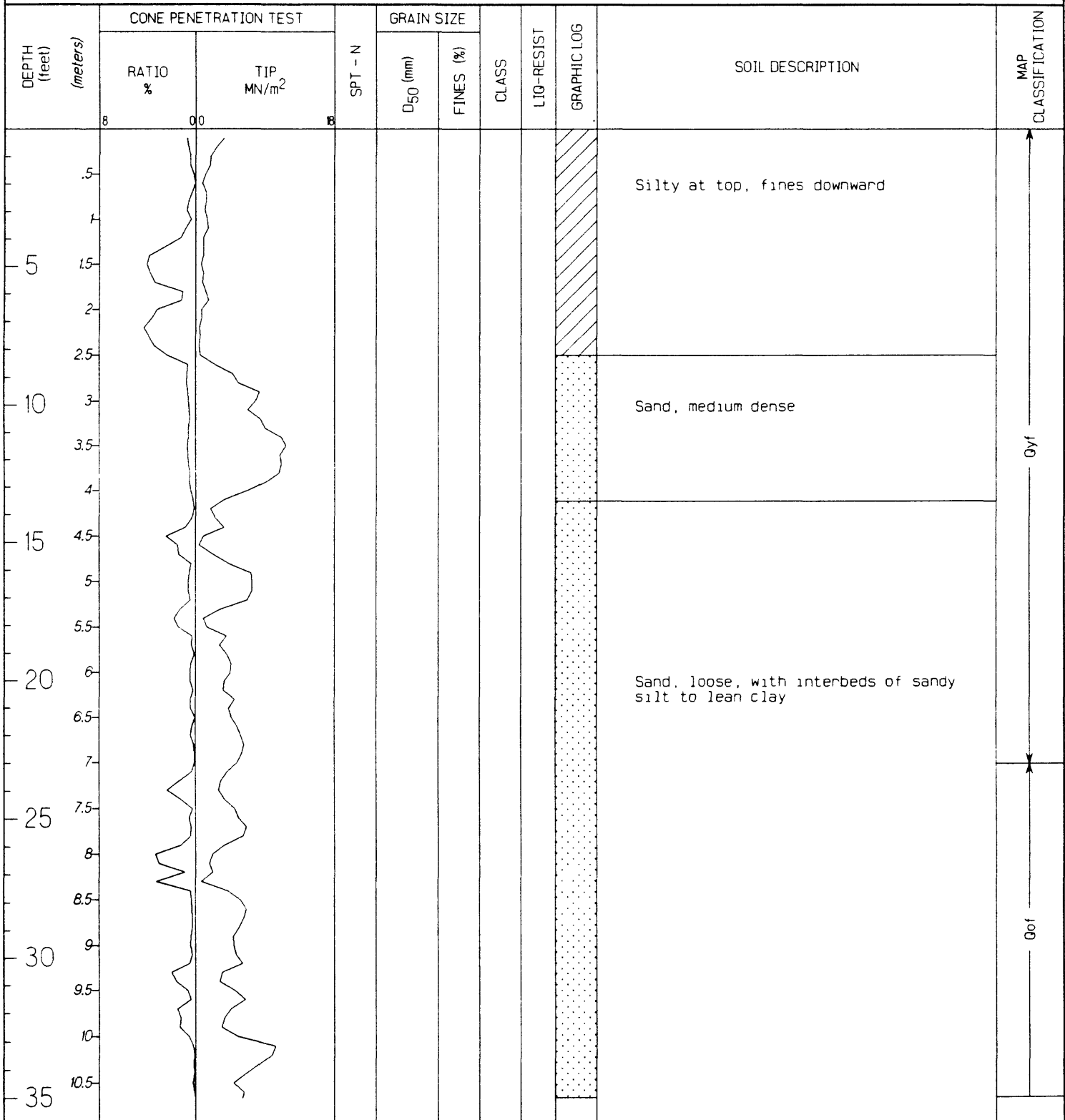
COORDINATES X: 1198046, Y: 584555

DATE DRILLED 4-4-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 28.5 ft.; 8.7 m MSL



REMARKS: Tentatively classified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 9

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198046, Y: 584555

DATE DRILLED 4-4-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 28.5 ft.; 8.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	0	0							
11										
11.5										
12										
40									Sand, dense	
12.5										
13										
13.5									End of sounding, 43 ft., 13.1 m	
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 10

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198096, Y: 584097

DATE DRILLED CPT: 4-4-90, SPT: 5-17-90

GROUNDWATER 10 ft.; 3.0 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Fine sand, light olive brown, 2.5Y5/4, loose, friable, nonsticky, nonplastic, no CO ₃ , road base	
1									Elastic silt, dark grayish brown, 2.5Y4/2, sticky and plastic, soft, no CO ₃	
1.5										
2									Lean clay, dark grayish brown, 2.5Y4/2 (m), slightly sticky and plastic, no CO ₃	
2.5										
3										
3.5			11	0.004	98	MH	C		Elastic SILT, dark brown, 10YR3/3, sticky, plastic, disseminated CO ₃ .	
4										
4.5										
5										
5.5										
6			5	0.062	54	ML	C		Sandy SILT, olive, 5Y5/3, slightly sticky, slightly plastic, two medium, distinct mottles, light brownish gray, 2.5Y6/2 and dark yellowish brown, 10YR4/4, few small tubular roots, trace CO ₃	
6.5										
7										
7.5			12	0.152	20	SM	L		Silty SAND, gray and brown mottled, no CO ₃ and silt, nonsticky, nonplastic, CO ₃ present, mottles, pale olive, 5Y6/3, and dark yellowish brown, 10YR4/6, silt percent increases upward, ucs=1 ksc	
8										
8.5										
9			25	0.115	20	SM	H		Silty SAND, olive brown, 2.5Y4/4, well sorted, cross laminated, nonsticky, nonplastic	
9.5										
10										
10.5			45	0.180	14	SM	H		Silty SAND, olive gray, 5Y4/2, nonsticky, nonplastic, 2-mm horizontal laminations, possible basal point bar sequence, grades upward into sand, olive, 5Y5/4, effervescent	

REMARKS: Tentatively classified as off slide

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 10

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198096, Y: 584097

DATE DRILLED CPT: 4-4-90, SPT: 5-17-90

GROUNDWATER 10 ft.; 3.0 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11									Lean clay	Gof
11.5										
12									Sand, dense	
12.5										
13									End of sounding, 42.3 ft., 12.9 m	
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 11

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

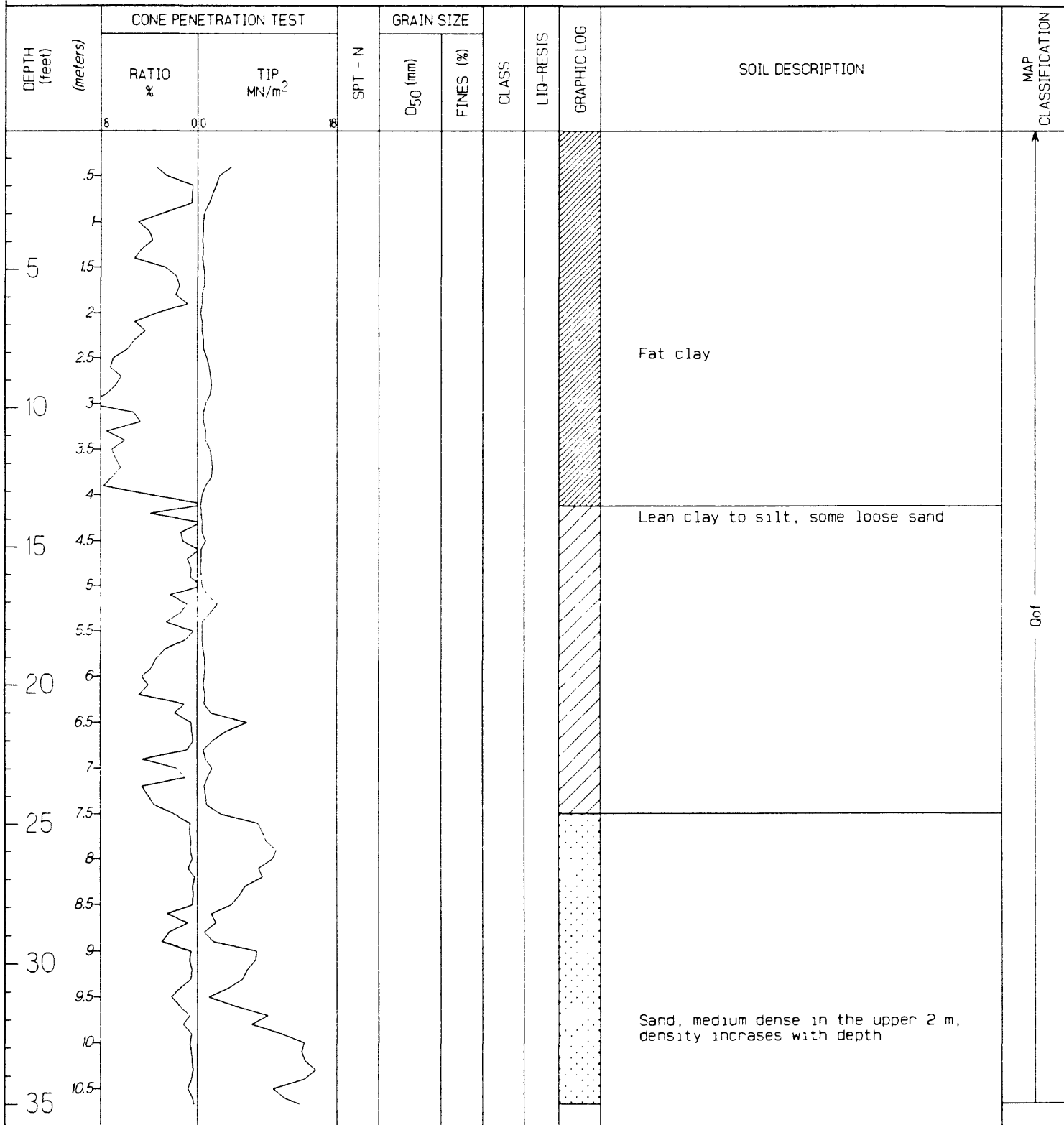
COORDINATES X: 1198434, Y: 584083

DATE DRILLED 4-3-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL



REMARKS: Tentatively classified as off slide.

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 11

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

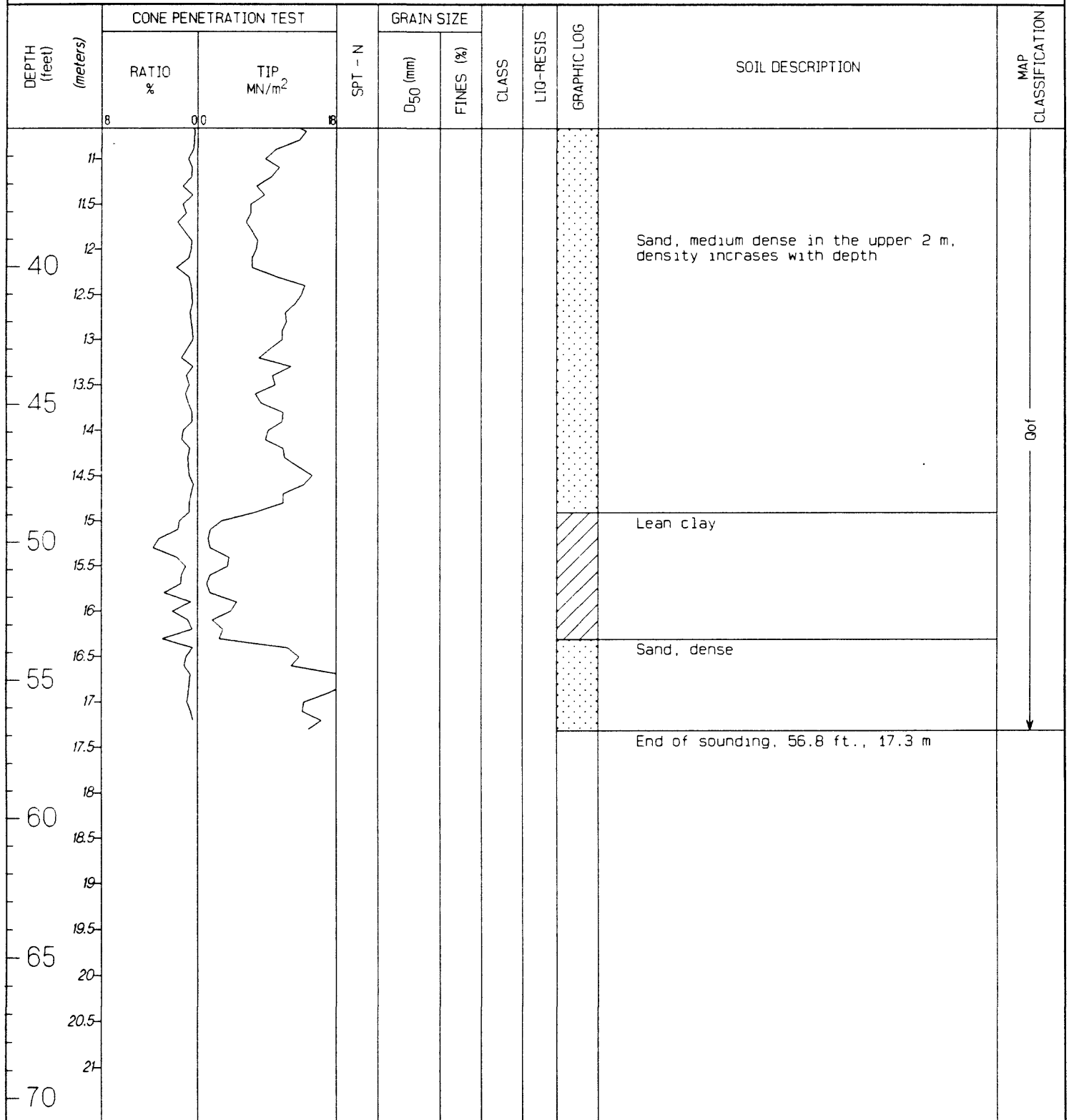
COORDINATES X: 1198434, Y: 584083

DATE DRILLED 4-3-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL



Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 12A

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199019, Y: 584232

DATE DRILLED CPT: 3-4-90, SPT: 5-21-90

GROUNDWATER 15 ft.; 4.6 m

PERSONNEL L: DUPRE/TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5			12	0.008 0.006	98 98	mh	C		The dominant size fraction in this boring is silt with varying amounts of sand and clay Elastic SILT, dark grayish brown, 10YR4/2, with streaks of CO ₃ , slightly blocky texture, not laminated, ucs=1.3 ksc, slightly coarser near top	
10			19	0.002 0.032	99 75	ch ml	C		Fat clay, yellowish brown, 10YR5/4, ucs=2-3 ksc, prismatic structure, some mottling with abundant roots; SILT with sand, poorly graded, dark grayish brown, 10YR4/2, ucs=0.4 ksc at base, common, fine, distinct strong brown, 10YR4/4, mottles, many roots, slight CO ₃	
15			2	0.068 0.028	54 90	ML	C		Sandy SILT, dark yellowish brown, 10YR4/4, usc=0.1 ksc, SILT, yellowish brown, 10YR5/4, ucs=1.6 ksc	
20			6	0.038 0.013	87 86	ML cl	C		Silt, dark yellowish brown, 10YR4/6, SILT, same as above, ucs=0.4 ksc, and lean clay, dark yellowish brown, 10YR4/6, micaceous, faint dark gray, 10YR4/1, and strong brown, 7.5Y4/8 mottles, clay is strong brown, 10YR4/6, usc=0.8 ksc	
25			7	0.114 0.054	35 63	SM ML	C		Silty SAND, strong brown, 7.5YR5/6, with grayish brown 10YR5/2 mottles, usc=0.3-1.2 ksc, sandy SILT, same color, no CO ₃ , ucs=0.6-1.0 ksc	
30			11	0.071 0.099	52 41	ML	L		Sandy SILT, greenish gray, 5GY5/1 (w), and, silty SAND, same color, no CO ₃ , ucs=.3 ksc	
35			6	0.180 0.003	30 90	SM mh	C		Silt, silty SAND, and elastic silt, gray, 10YR6/1	

REMARKS: Tentatively classified as off side.

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 12A

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199019, Y: 584232

DATE DRILLED CPT: 3-4-90, SPT: 5-21-90

GROUNDWATER 15 ft.; 4.6 m

PERSONNEL L: DUPRE/TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		6							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 12B

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199026, Y: 584231

DATE DRILLED CPT: 3-4-90, TUBES: 5-2-91

GROUNDWATER 15 ft.; 4.6 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 29.6 ft.; 9.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5										
1.5			T	0.002 0.007	99 95	CH mh	C		<p>Fat CLAY, light yellowish brown 2.5Y6/4, some CO₃ to, lean CLAY, olive brown, 2.5Y4/4, thinly laminated, occasional fine sand, slightly plastic and sticky, well bedded, vertically accreted, no cross beds, in silts CO₃ is disseminated and in tubular pores, no CO₃ in sands; also, bottom 15 cm is a lean clay, very dark grayish brown, 2.5Y3/2, sticky and plastic, top of buried soil, disseminated organics, common very fine roots, CO₃ disseminated. 7 sub-samples in this interval</p> <p>SILT, very dark grayish brown, sticky and plastic; and elastic SILT, very dark grayish brown, 10YR3/2, some olive brown, 2.5Y4/4 (m), sticky and plastic, massive, bioturbated, disseminated CO₃</p> <p>Fat CLAY to elastic SILT, olive, 2.5Y4/4, sticky and plastic, pelecypod shells at 2.5 m, common CO₃ nodules, poorly bedded, silty at base of sample and fines upward, finely laminated in bottom 1/4 of sample, bottom 10 cm of sample is slightly darker, paleosol, roots and organics are common</p> <p>Lean CLAY with sand, very dark brown, 2.5Y3/2 (m), laminated silt and clayey silt of overbank facies (?), sticky and plastic, many fine roots and tubular pores, disseminated CO₃; and fat CLAY, olive, 5Y4/4, stiff, few very fine distinct grayish brown, 2.5Y5/2 mottles, few CO₃ nodules to 7 mm at 3.7 m, paleosol from 3.4 to 3.8 m, very weakly developed except for CO₃ nodules</p> <p>SILT with sand, dark grayish brown, 2.5Y4/2, soft, slightly sticky and plastic, thick bedded to massive, trace disseminate CO₃, no nodules, no rooting present; and SILT with sand, olive, 2.5Y4/4, thinly laminated disseminated CO₃, slightly sticky and plastic, soft, few fine tubular roots and pores, ucs<0.5 ksc,</p> <p>End of sounding, 15 ft., 4.6 m</p>	
2			T	0.009 0.007	98	ML MH	C			
3			T	0.002 0.004	98 98	CH MH	C			
3.5			T	0.042 0.004	81 97	CL CH	C			
4			T	0.046 0.041	72 80	ML	C			
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

REMARKS: Tentatively classified as off slide.
NOTE: Scale change.

Magnitude= 7.1

Acceleration= 0.529 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 13

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199581, Y: 584202

DATE DRILLED CPT: 4-3-90, TUBES: 5-2-91

GROUNDWATER _____

PERSONNEL L: TINSLEY/BENNETT, D: BENNETT/CRILEY

ELEVATION 30.1 ft.; 9.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00									
5			T	0.077 0.113	49 22	SM SM	D		Silty SAND, olive brown, 2.5Y4/4, loose, thinly laminated to massive, not sticky or plastic, disseminated CO ₂ , fines upward, ucs=0.5 ksc, facies is point bar (?) to levee	
			T	0.027	85	CL	C		Silty sand, olive brown, 2.5Y4/4, ucs<0.5 ksc; and Lean CLAY with sand, dark grayish brown, 2.5Y4/2, firm, friable, slightly sticky and plastic, soft CO ₂ nodules in pores and ped faces, effervescent, no organics or fossils, ucs=1.0 ksc	
10			T	0.050 0.008	79 93	ML	C		SILT with sand, olive brown, 2.5Y4/4, thick bedded to massive, effervescent, disseminated CO ₂ , trace organics and detrital charcoal, ucs=1 ksc, lean CLAY, abrupt lower boundary; and SILT, very dark grayish brown, 2.5Y3/2, sticky and plastic, bioturbated with roots, CO ₂ in tubular pores and on ped faces, medium stiff, no discrete organics or fossils, (4 sub-samples)	
			T	0.008 0.012	93 97	ML	C		SILT, very dark grayish brown, 2.5Y3/2, sticky and plastic, medium effervescent, slightly bioturbated with roots, no discrete organics or fossils, ucs=1 ksc	
15			T	0.007	93	CL	C		Lean CLAY, olive brown, 3.5Y4/4, sticky and plastic, effervescent with disseminated CO ₂ , little bioturbation, no organics, ucs=0.5 to 1 ksc, CO ₂ nodules at 4 m	
20										
25										
30										
35										

REMARKS: Tentatively classified as off slide.

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 13

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1199581, Y: 584202

DATE DRILLED CPT: 4-3-90, TUBES: 5-2-91

GROUNDWATER _____

PERSONNEL L: TINSLEY/BENNETT, D: BENNETT/CRILEY

ELEVATION 30.1 ft.; 9.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8							
11										
11.5									Sand, dense	↓ Gof
12									End of sounding, 39 ft., 11.9 m	
40										
12.5										
13										
45										
13.5										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 49

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

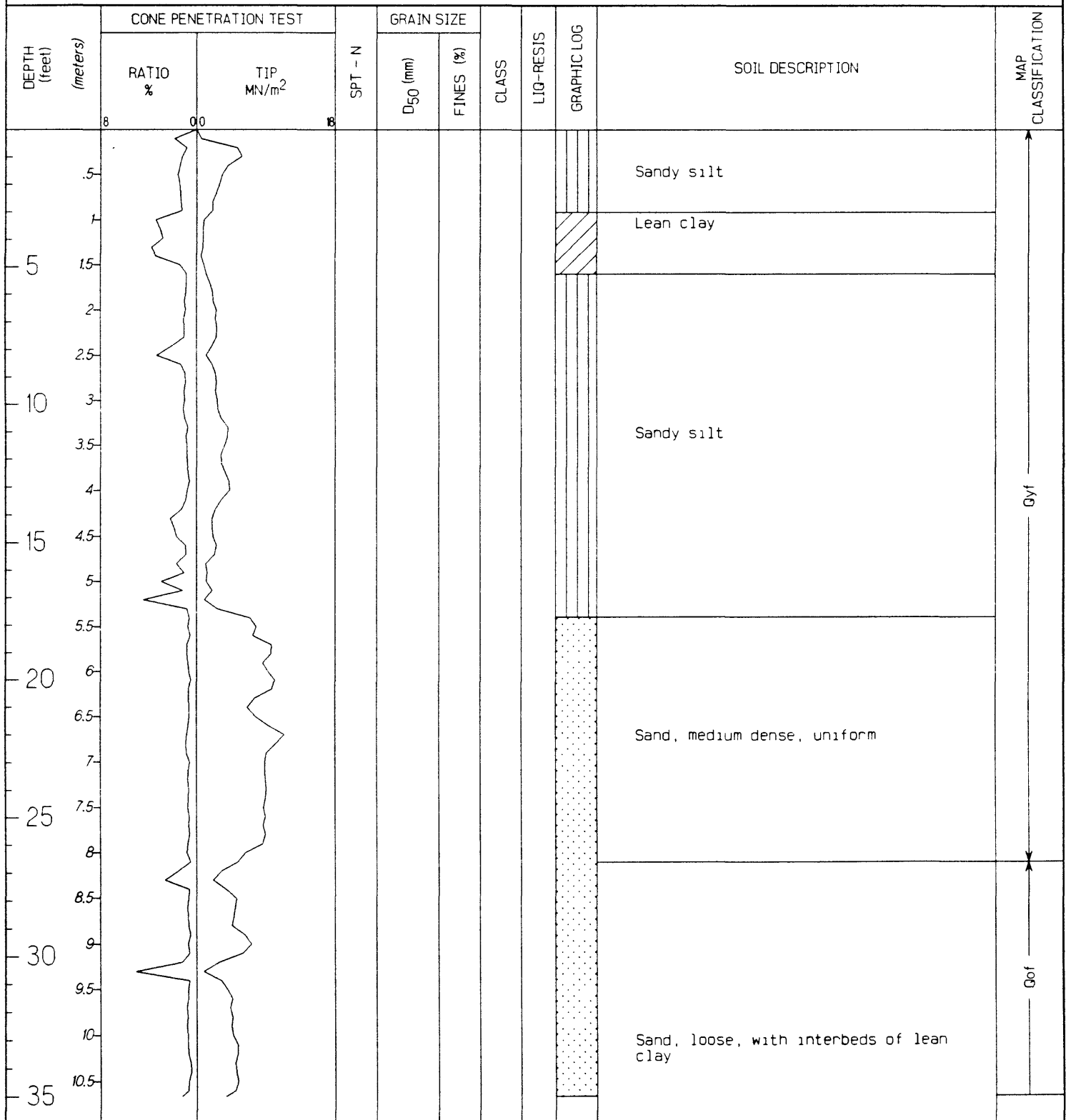
COORDINATES X: 1198500, Y: 584650

DATE DRILLED 5-2-91

GROUNDWATER _____

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 28 ft.; 8.5 m MSL



Tentatively identified as on slide

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 49

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARMS (CMF)

COORDINATES X: 1198500, Y: 584650

DATE DRILLED 5-2-91

GROUNDWATER _____

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 28 ft.; 8.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 50

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARM (CMF)

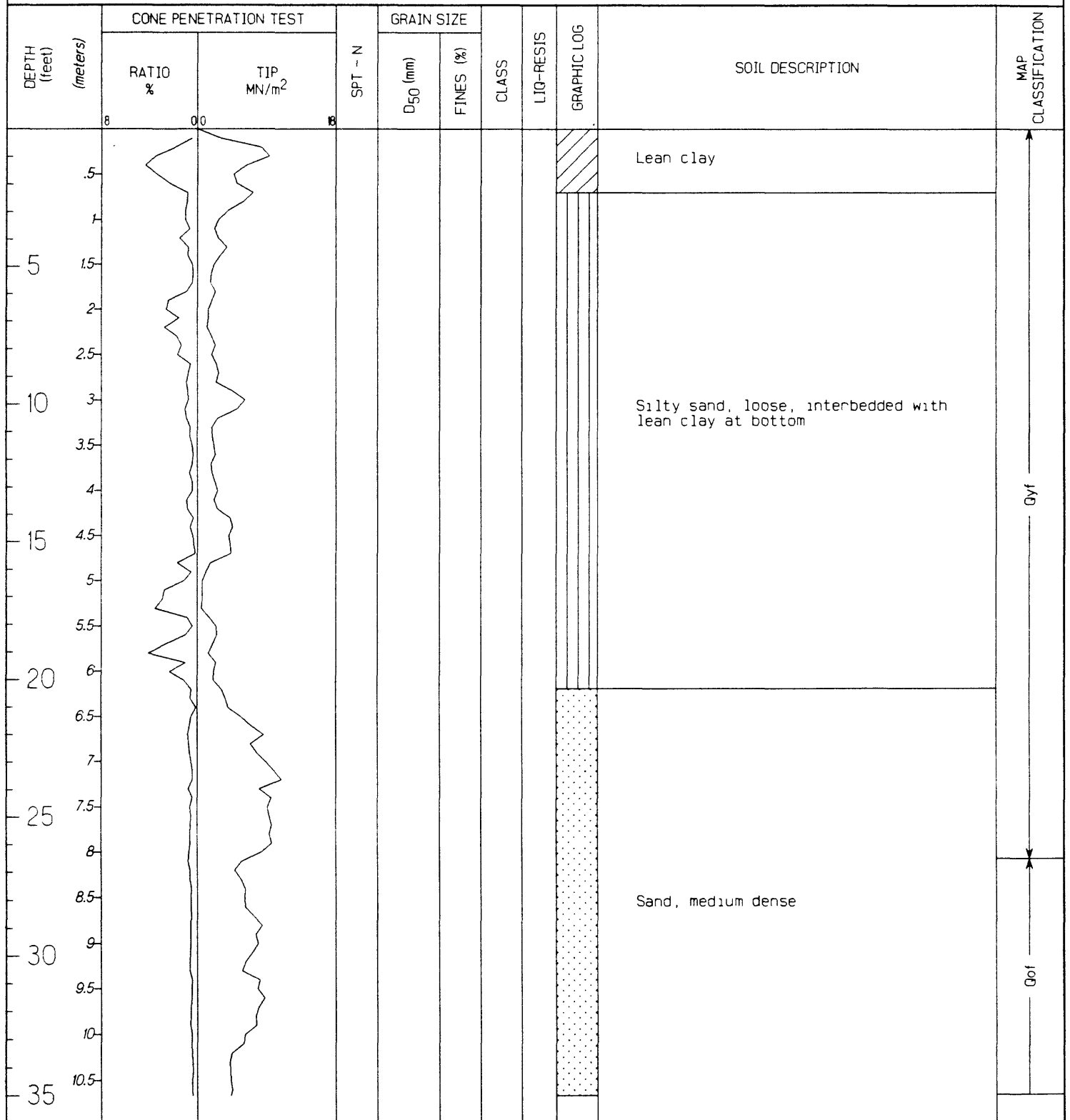
COORDINATES X: 1198500, Y: 584340

DATE DRILLED 5-2-91

GROUNDWATER _____

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 29 ft.; 8.8 m MSL



Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.529 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 50

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MILLER FARM (CMF)

COORDINATES X: 1198500, Y: 584340

DATE DRILLED 5-2-91

GROUNDWATER _____

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 29 ft.; 8.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		8							
11										
11.5										
12									Lean clay	
12.5										
13										
13.5									Sand, medium dense	
14										
14.5									End of sounding at 46.3 ft., 14.1 m	
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.529 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 14A

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MOSS LANDING (ML1)

COORDINATES X: 1184547, Y: 547698

DATE DRILLED CPT: 4-12-90, SPT: 5-24-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 4 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
5										
10										
15										
20										
25										
30										
35										

REMARKS: This is off slide, adjacent to the tank fence, SPT is next to 14B.

Magnitude= 7.1

Acceleration= 0.270 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 14B

PROJECT LIQUEFACTION NEAR CASTROVILLE

LOCATION MOSS LANDING (ML1)

COORDINATES X: 1184555, Y: 547590

DATE DRILLED CPT: 4-12-90, SPT: 5-24-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 4 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5				0.300	0	SP			SAND, sample from nearby pit	
1										
1.5				0.305	1	SP			SAND, sample from nearby pit	
2			24	0.650 1.200	3 1	SP SP-SM	H*		SAND, olive gray, 5Y5/3, coarse to very coarse SAND, moderately sorted	
2.5										
3			40				H		Lost sample, some coarse to very coarse sand in sampler	
3.5										
4			22	0.435 0.522	2 4	SP	H*		SAND, pale brown, 10YR6/3, poorly sorted, with scattered pebbles (to 10 mm) and shell fragments, very coarse towards the top	
4.5										
5			31	0.710 0.270	1 5	SP	H		SAND, brown, 10YR5/3 (m), with some shell fragments, SAND with silt, dark grayish brown, 2.5Y4/2 (m), moderately sorted	
5.5										
6			24	0.445	2	SP	H		SAND, olive brown, 2.5Y6/2, shell fragments, coarse sand, dark blue gray, poorly sorted with abundant shell hash, estuarine channel (?)	
6.5									6.1 m, uncorrected age, 2.010 +/- 60, ¹⁴ C YBP	
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
35									Sand	

REMARKS: This sounding is next to a 5 ft deep pit.
This site is tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.270 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 14B

PROJECT LIQUEFACTION NEAR CASTROVILLE

LOCATION MOSS LANDING (ML1)

COORDINATES X: 1184555, Y: 547590

DATE DRILLED CPT: 4-12-90, SPT: 5-24-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 4 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	0	8							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.270 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 15A

PROJECT LIQUEFACTION NEAR CASTROVILLE

LOCATION MOSS LANDING (ML1)

COORDINATES X: 1184534, Y: 547764

DATE DRILLED CPT: 4-12-90, SPT: 5-24-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 4 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0	0								
0.5									Fine sand, light olive brown, 2.5Y5/4, moderately sorted	
1				0.052	62	ML			Sandy SILT, black, 2.5Y5/0	
1.5			5	0.069 0.097	51 40	ML SM	L		Sandy SILT, black, 2.5Y2/0, grades upward into black silt, thin (13 mm) medium sand stringers, some organic debris and shell hash, some pebbles (6 mm); and silty SAND, black, 2.5Y2/0, abundant shell fragments	
2										
2.5			9	0.144 0.006	33 93	SM mh	L		Silty SAND with shells, Elastic SILT, black, 2.5Y2/0 lost bottom 191 mm of sample	
3										
3.5										
4			32	0.620 0.460	3 0	SP	H		SAND, unlike previous units fine sand, dark olive gray, 5Y3/2, SAND, grayish brown, 2.5Y5/2	
4.5										
5										
5.5										
6			60	0.990 0.520	83 6	SP SP-SM	H		SAND, lean clay, gray, 5Y5/1, and SAND with silt, light gray, 5Y7/1	
6.5										
7										
7.5			11	0.270 -	20 68	SM cl	C		Silty SAND, very dark gray, 5Y3/1, abundant shell fragments (estuarine), sandy lean clay, gray, 5Y5/1	
8										
8.5										
9										
9.5										
10										
10.5										
35									Sandy silt to fat clay	

REMARKS: Hole ML-15B was made approximately 5 ft away.

Magnitude= 7.1

Acceleration= 0.270 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 15A

PROJECT LIQUEFACTION NEAR CASTROVILLE

LOCATION MOSS LANDING (ML1)

COORDINATES X: 1184534, Y: 547764

DATE DRILLED CPT: 4-12-90, SPT: 5-24-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 4 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
40										
45										
50										
55										
60										
65										
70										
End of sounding, 43.3 ft., 13.2 m										

Magnitude= 7.1

Acceleration= 0.270 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 15B

PROJECT LIQUEFACTION NEAR CASTROVILLE

LOCATION MOSS LANDING (ML1)

COORDINATES X: 1184540, Y: 547763

DATE DRILLED CPT: 4-12-90, SPT: 5-24-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 4.0 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	0.0	8						Sand, fine grained	Qb
5	1.5			0.100	44	SM			Silty SAND, very dark gray, 5YR3/1	
2	2		1	0.362 0.008	26 86	SM cl	L		Silty SAND, yellowish brown, 10YR5/4, lots of shell hash, silty SAND, black, 7.5YR2/0, with shells, lean clay, black, 2.5Y2/0; and SAND, very dark grayish brown, 2.5Y3/2, (4 sub-samples)	
10	3								End of boring, 8.5 ft., 2.3 m	
15	4.5									
20	6									
25	7.5									
30	9									
35	10.5									

REMARKS: Hole ML-15A was made approximately 5 ft away. The CPT shown is the same as 15A.

Magnitude= 7.1

Acceleration= 0.270 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 118

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MOSS LANDING LABORATORY (ML2)

COORDINATES X: 1184000, Y: 545700

DATE DRILLED 11/79

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL L: SARMIENTO/BENNETT, D: SHALER

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIG-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5				0.248	6	SP-SM			SAND with silt, poorly graded	
1				0.330	7	SP-SM				
1.5				0.010	88	CH			Lean clay, varies from fat CLAY to SILT, color varies from olive, dark greenish gray, to black	
2				0.008	95	ML				
2.5				0.010	96	CL			Oyster shells common	
3										
3.5										
4			12	0.520	7	SP-SM	L		Thick sands interbedded with thin clays	
4.5										
5				1.150	3	SP			Coarsens downward, 6 mm gravel common near 4.4 m, sand has few fines	
5.5			19				L*			
6									Dark grayish black coarse sand mixed with fine grained silt and clay	
6.5				0.430	25	SM				
7									Lean clay with sand, dark greenish gray some shells	
7.5				0.016	79	cl				
8										
8.5				0.550	6	SP-SM			SAND with silt, poorly graded	
9										
9.5				0.096	40	SC			Clayey SAND	
10										
10.5			49	0.305	25	SM	H		Silty SAND, abundant shell fragments	
				0.300	15	SM				

REMARKS: Samples from cork screw method, CPT (mechanical cone) by USGS, blow counts from Fugro, 1980, no. 14-08-0001-17790.

Magnitude= 7.1

Acceleration= 0.263 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 118

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MOSS LANDING LABORATORY (ML2)

COORDINATES X: 1184000, Y: 545700

DATE DRILLED 11/79

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL L: SARMIENTO/BENNETT, D: SHALER

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet)	(meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
		RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
		8	00	18							
40	11										
	11.5				0.058	56	ML			Sandy SILT, top half of layer contains abundant oyster shells, less sand in bottom half of layer	
	12									Silty sand	
	12.5										
	13									Lean clay	
45	13.5										
	14										
	14.5			26	0.320	18	SM	H		Silty SAND	
50	15										
	15.5									Silty SAND	
	16				0.095	47	SM				
	16.5									end of sounding, 52 ft., 15.9 m	
55	17										
	17.5										
60	18										
	18.5										
	19										
	19.5										
65	20										
	20.5										
70	21										

Magnitude= 7.1

Acceleration= 0.263 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 119

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MOSS LANDING LABORATORY (ML2)

COORDINATES X: 1184008, Y: 545708

DATE DRILLED 11/79

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL L: SARMIENTO, BENNETT, D: SHALER

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	0.0	8							
0.5				0.248	6	SP-SM			SAND with silt, poorly graded	
1				0.330	7	SP-SM				
1.5				0.010	88	CH			Varies between fat CLAY and silt, olive to dark greenish gray	
2				0.008	95	ML				
2.5				0.010	96	CL			organic rich	
3										
3.5										
4										
4.5			12	0.520	7	SP-SM	L		SAND with silt, poorly graded	
5									SAND, poorly graded	
5.5			19	1.150	3	SP	L*		Silty SAND	
6										
6.5				0.430	25	SM				
7										
7.5				0.016	79	cl				
8										
8.5										
9										
9.5				0.096	40	SC			Clayey SAND	
10				0.305	25	SM			Silty SAND, abundant shell fragments	
10.5			49	0.300	15	SM	H			
35										

REMARKS: Samples from cork screw method, CPT (mechanical cone) by USGS, blow counts from Fugro 1980, no. 14-08-0001-17790

Magnitude= 7.1

Acceleration= 0.263 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 119

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MOSS LANDING LABORATORY (ML2)

COORDINATES X: 1184008, Y: 545708

DATE DRILLED 11/79

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL L: SARMIENTO, BENNETT, D: SHALER

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5				0.058	56	ML			Sandy SILT	
12										
12.5									Silty sand	
13										
13.5									Lean clay	
14			26				H			
14.5				0.320	18	SM			Silty SAND	
15										
15.5										
16				0.095	47				Silty SAND	
16.5									End of sounding, 15.9 m	
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.263 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 16

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182745, Y: 574056

DATE DRILLED CPT: 4-11-90, SPT: 5-24-90

GROUNDWATER 7 ft.; 2.1 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 16.8 ft.; 5.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	0							
0.5									Lean clay, dark grayish brown, 10YR4/2, sticky, plastic and friable, diffuse CO ₃	
1										
1.5										
2			6	0.014 0.043	97 71	ML	L		Organic rich soil zone, SILT, brown, 10YR5/3, slightly sticky, slightly plastic; and SILT with sand, olive brown, 2.5Y4/4	Qyf (?)
2.5										
3			5	0.019	89	ML	C		Fat clay, dark grayish brown, 2.5Y4/2, SILT, grades up into mottled silt with 13 mm concretion, 6-mm-thick concretion layer at about 3.3 m, lean clay, very dark gray, 10YR3/1, sticky, plastic, organic rich soil, very fine sand, grayish brown, 10YR5/2, sticky, plastic, ucs=0.5 ksc	
3.5										
4										
4.5			9	0.097	40	SM	L		Silty SAND, olive, 5Y4/3, with scattered organics	Qof (?)
5										
5.5										
6										
6.5			11	0.043 0.067	78 55	ML	L		SILT with sand, very dark gray, 5Y3/1, no organics, faint parallel laminations; and sandy SILT, dark grayish brown, 10YR4/2, sharp contact between layers	
7										
7.5			7	0.004	93	CH	C		Fat CLAY, dark greenish gray, 5G4/1, sticky, plastic, some scattered dark organics, one shell, slightly effervescent	
8										
8.5										
9										
9.5										
10										
10.5										
35										Qb

REMARKS: This is tentatively identified as off slide.

Magnitude = 7.1

Acceleration = 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 16

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182745, Y: 574056

DATE DRILLED CPT: 4-II-90, SPT: 5-24-90

GROUNDWATER 7 ft.; 2.1 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 16.8 ft.; 5.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
12.5										
13										
13.5										
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67										
67.5										
68										
68.5										
69										
69.5										
70										

Magnitude= 7.1

Acceleration= 0.380 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 17

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182785, Y: 574035

DATE DRILLED 4-11-90

GROUNDWATER 6.8 ft.; 2.1 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.8 ft.; 5.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
5									Sandy silt grades downward to lean clay	
10									Sand, loose, with varying amounts of silt	
15									Lean clay	
20									Interbedded sandy silt and silty sand, with some lean clay	
25										
30									Lean to fat clay	
35										

REMARKS: May be on slide.

Magnitude= 7.1

Acceleration= 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 17

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182785, Y: 574035

DATE DRILLED 4-11-90

GROUNDWATER 6.8 ft.; 2.1 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.8 ft.; 5.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	18							
11										
11.5										
12										
40										
12.5										
13										
45										
13.5										
14										
14.5										
50										
15									Sand, dense	
15.5										
16									End of sounding, 51.2 ft., 15.6 m	
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
70										

Magnitude= 7.1

Acceleration= 0.380 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 18

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182820, Y: 574014

DATE DRILLED CPT: 4-11-90, SPT: 5-24-90

GROUNDWATER 8 ft.; 2.4 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 16.5 ft.; 5.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00									
5									Lean clay	
10			3	0.117 0.153	27 13	SM	D		Silty SAND, very dark grayish brown, 2.5Y3/2 (m), alternates with layers of fine sand, abundant organics, capped with silty clay, light brownish gray, 2.5Y6/2 (m)	Gyl
			8	0.087 0.193	39 10	SM SP-SM	L		Clayey sand, dark reddish brown, 5YR3/2, fine sand, brown, 10YR4/3, and SAND with silt, dark gray, 7.5YR4/1; Silty SAND, brown, 10YR5/3, and SAND with silt, dark gray, 5Y4/1	
15			5	0.107 0.310	34 7	SM SP-SM	L		Silty SAND, very dark grayish brown, 2.5Y3/2, and SAND with silt, very dark gray, 2.5Y3/0, loose; and lean clay, dark gray, 2.5Y4/0, sticky	
20			3	0.036 0.064	69 54	ML	L		Silty clay, greenish gray, 5GY5/1; sandy SILT, greenish gray, 5GY5/1, with shells; well sorted fine sand, sandy SILT, greenish gray, 5GY5/1, with organics, 3 mm clay laminations in sand, well sorted, dark gray	Qof (?)
25			26	0.150 0.140	24 10	SM SP-SM	L*		Silty SAND, olive gray, 5Y4/2, pebbles in upper 3-4 cm, SAND with silt, olive, 5Y5/3, faint parallel laminations, ucs=1.5 ksc; blow count probably high due to pebbles in sampler	
30			5	0.112	11	SP-SM	L		SAND with silt, dark greenish gray, 5G4/1, thin, 6 mm, clay stringers, dark greenish gray, 5GY4/1, and interbedded sand, faint parallel laminations in dense, well sorted sand, olive gray, 5Y4/2	
35										Gb (?)

REMARKS: This is tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.380 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 18

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182820, Y: 574014

DATE DRILLED CPT: 4-11-90, SPT: 5-24-90

GROUNDWATER 8 ft.; 2.4 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 16.5 ft.; 5.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	18							
11										
11.5			9	0.131 0.005	34 96	SM MH	C		Silty SAND, dark greenish gray, 5G4/1; Elastic SILT, dark greenish gray, 5G4/1, with thin, 6-12 mm interlaminae of silt, more silty at top, very slightly effervescent, disseminated organics throughout	
12										
12.5										
13										
13.5										
14										
14.5										
15			33	0.050	76	ML	H		SILT with sand, dark greenish gray, 5G4/1, very dense	
15.5										
16									End of sounding, 51.8 ft., 15.8 m	
16.5										
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Magnitude= 7.1

Acceleration= 0.380 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 19

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

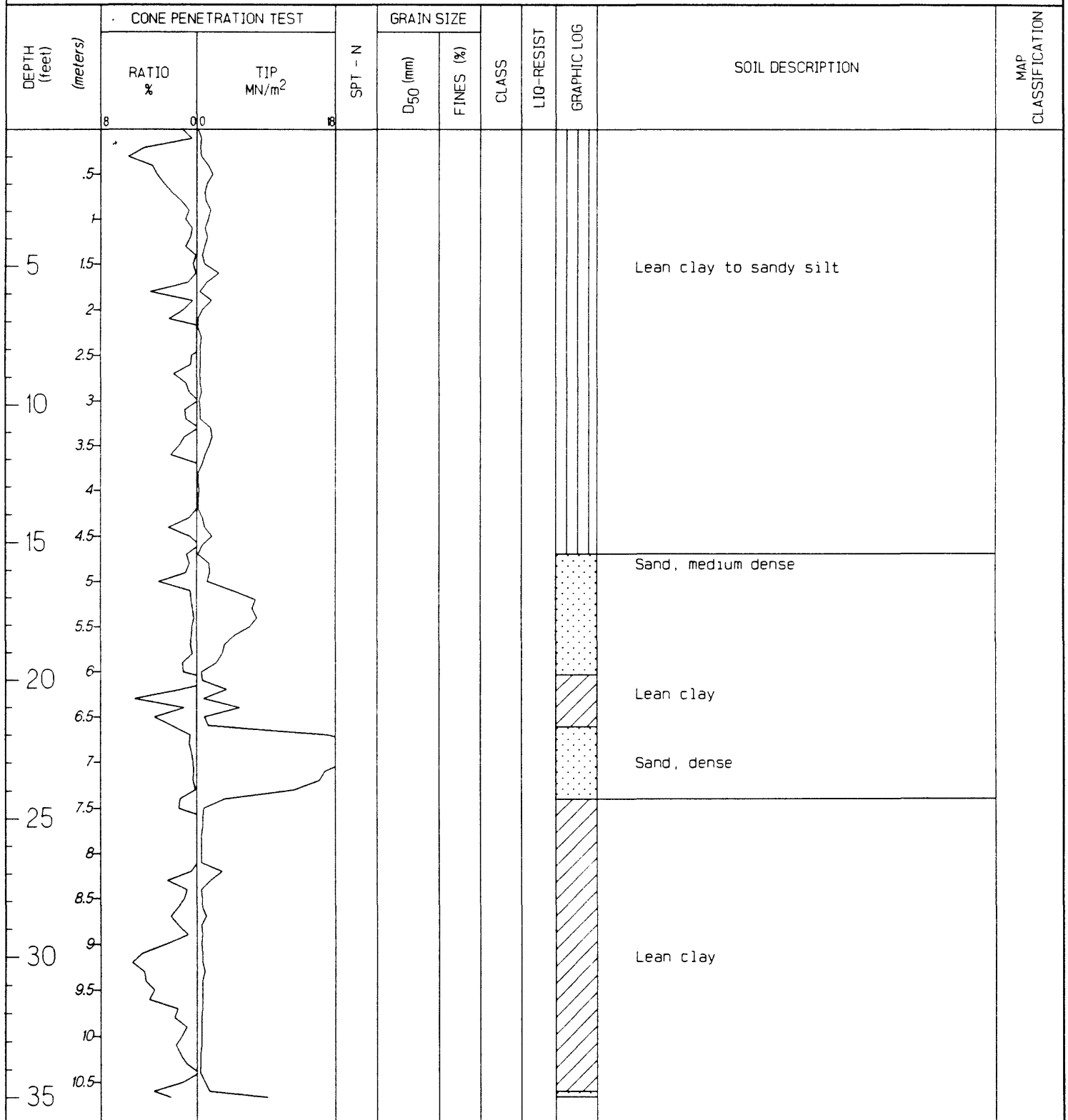
COORDINATES X: 1182543, Y: 573679

DATE DRILLED 4-11-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.4 ft.; 5.0 m MSL



REMARKS: This is tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 19

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182543, Y: 573679

DATE DRILLED 4-11-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.4 ft.; 5.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	8								
11									Sand, dense	
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
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Magnitude= 7.1

Acceleration= 0.380 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 20

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

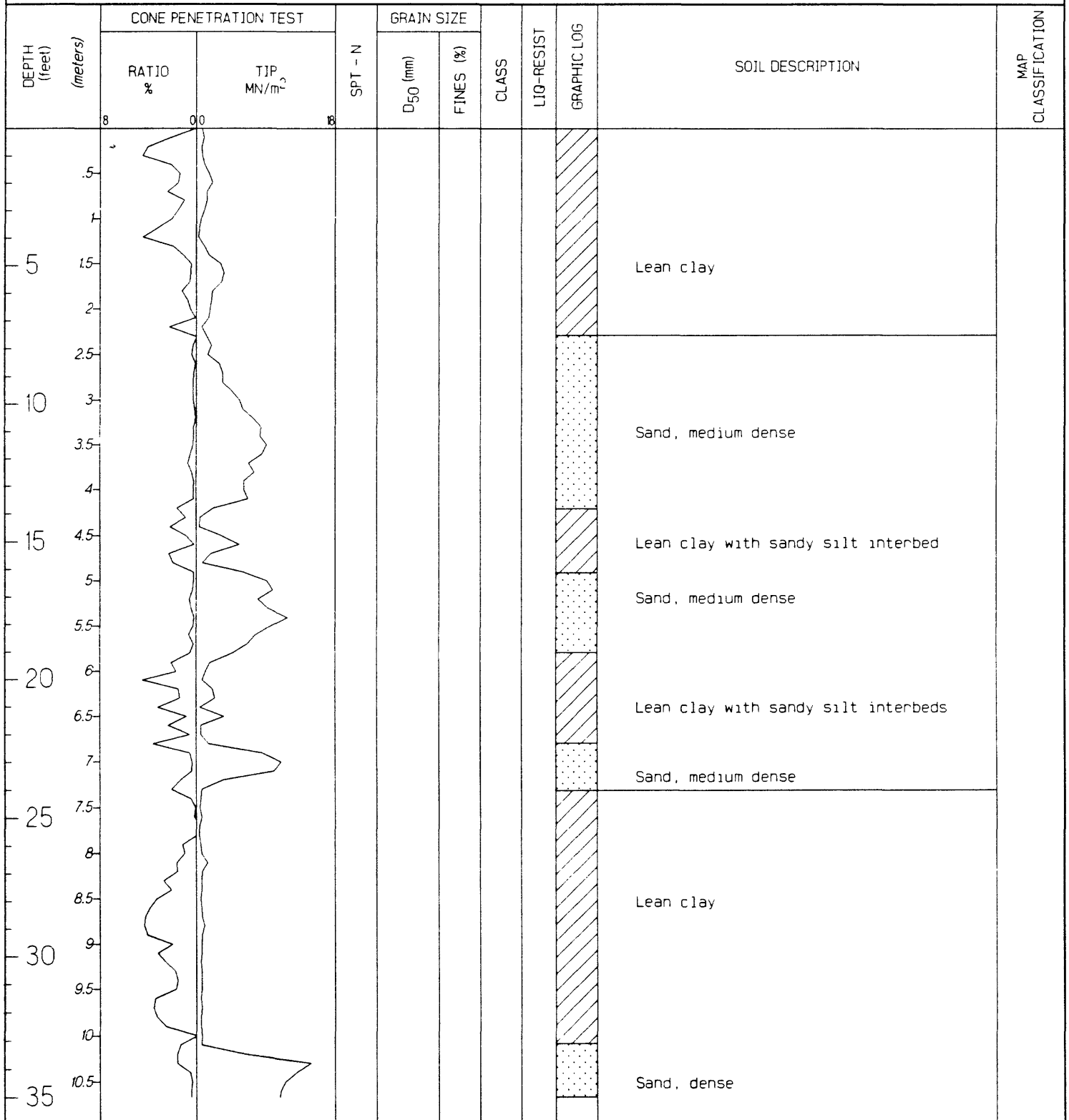
COORDINATES X: 1182618, Y: 573641

DATE DRILLED 4-11-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.0 ft.; 4.9 m MSL



REMARKS: This is tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 20

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182618, Y: 573641

DATE DRILLED 4-11-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.0 ft.; 4.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
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Magnitude= 7.1

Acceleration= 0.380 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 21

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182656, Y: 573619

DATE DRILLED CPT: 4-11-90, SPT: 5-25-90

GROUNDWATER 7.8 ft.; 2.4 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 15.8 ft.; 4.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0		18							
5									Lean clay	Q _{cl}
2			5	0.200	5	SP-SM	D		Lean clay	
2.5									SAND with SILT, dark grayish brown, 10YR4/2, well sorted fine sand, yellowish red, 5YR5/6; fine sand, very dark gray, 2.5Y3/0	Q _{cl}
10			5	0.380 0.236	2 8	SP SP-SM	L		SAND with silt, black, 2.5Y2/0, organics are very fresh; SAND, black 2.5Y2/0	
3.5									SAND with silt, dark gray, 10YR4/1; SAND with silt, yellowish brown, 10YR5/4, graded sequence, coarse at the bottom to fine at the top	Q _{cl}
4			6	0.370 0.910	7 5	SP-SM	L			
15			3	0.391 0.540	6 7	SP-SM	L		Graded sequence, coarse at bottom to finer at top. SAND with silt, gray, 5Y5/1	Q _{cl}
5.5									SAND, olive gray, 5Y5/2; 60 mm of dark gray silty clay(?). Silty SAND, dark grayish brown, 2.5Y4/2	
20			8	0.098 0.285	31 2	SM SP	L		SAND with silt, olive gray, 5Y5/2; Silty SAND, with thin layers of olive gray and black silty clay, the black clay has shells, SAND with silt, olive gray, 5Y5/2, with parallel laminations	Q _{cl} (?)
6.5			12	0.120 0.259	44 5	SM SP-SM	L			
7.5									Silty SAND, very dark gray, 2.5Y3/0, with shells and organics, fat clay (?), gray, 5Y5/1	Q _{cl}
25			2	0.402	26 98	SM ch	I			
8.5									Lean clay	Q _{cl}
30										
9.5									Silty SAND, dark gray, 2.5Y4/0	Q _{cl}
35			17	0.198	12	SM	L			

REMARKS. This is tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 21

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182656, Y: 573619

DATE DRILLED CPT: 4-11-90, SPT: 5-25-90

GROUNDWATER 7.8 ft.; 2.4 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 15.8 ft.; 4.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	17	0.198	12	SM	L			
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.380 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 22

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

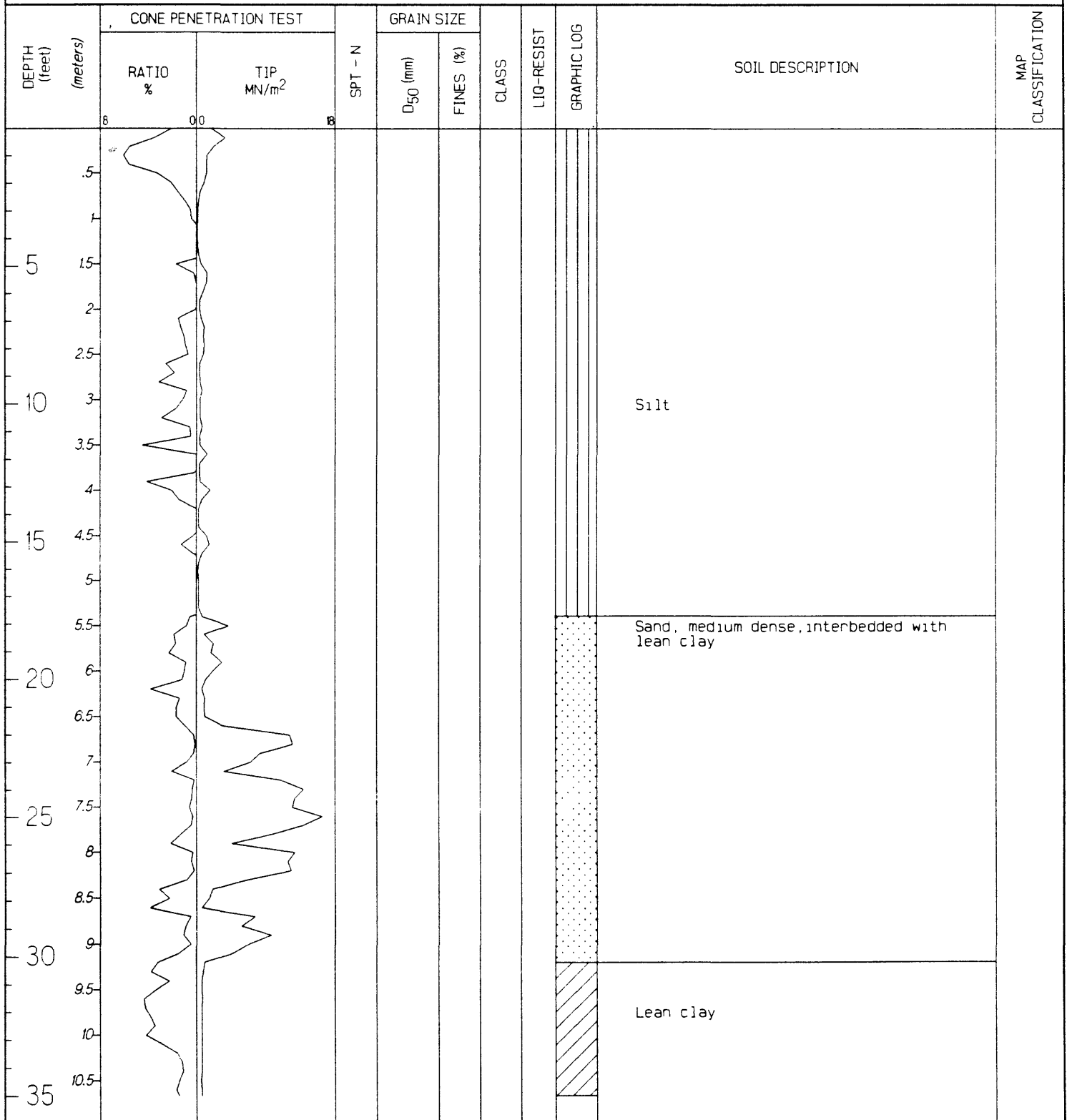
COORDINATES X: 1182426, Y: 573738

DATE DRILLED 4-12-90

GROUNDWATER _____

PERSONNEL CPT: BENNETT/CRILEY

ELEVATION 16.2 ft.; 4.9 m MSL



REMARKS: This is tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 22

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182426, Y: 573738

DATE DRILLED 4-12-90

GROUNDWATER _____

PERSONNEL CPT: BENNETT/CRILEY

ELEVATION 16.2 ft.; 4.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIT-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5									Sand, medium dense	
12										
12.5										
13										
13.5									Lean clay with some thin interbeds of sand	
14										
14.5										
15										
50									Sand, dense	
15.5										
16									End of sounding, 52.5 ft., 16.0 m	
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
70										

Magnitude= 7.1

Acceleration= 0.380 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 23

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182657, Y: 574122

DATE DRILLED 4-12-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.5 ft.; 5.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	0.0	18							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Lean clay to fat clay, varying plasticity

REMARKS: This is tentatively identified as off slide.
Outside of levee.

Magnitude= 7.1

Acceleration= 0.380 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 23

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MODEL AIRPORT (AIR)

COORDINATES X: 1182657, Y: 574122

DATE DRILLED 4-12-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 16.5 ft.; 5.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	18							
11										
11.5										
12										
12.5										
13										
13.5										
40										
45										
14									Sand	
14.5									Lean clay	
15										
50										
15.5									Sand, dense	
16										
16.5									End of sounding, 52.5 ft., 16.0 m	
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.380 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 23

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

COORDINATES X: 1182164, Y: 532722

DATE DRILLED CPT: 4-24-90, SPT: 8-28-90

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 5.5 ft.; 1.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	8							
5			9	0.096	39	SM	H		Silt, dark olive, 5Y3/2	
10			11	0.097	32	SM	H*		Silty SAND, olive, 5Y5/3(w), loose, lost lower 1/2 of sample, micaceous, silt increases upward, ucs=<0.25 ksc	
15			3	0.060	62	ML	L		Silty SAND, olive, 5Y4/5, nonsticky, nonplastic, slight effervescence, loose, micaceous, easily fluidized, silty SAND, dark olive gray, 5Y3/2, laminated to 2 mm thickness, loose, not fluidized by handling, silt decreases downward, ucs= 0.5 ksc	
20			1	0.040 0.057	86 64	ML	L		Sandy SILT, dark gray to dark olive gray, 5Y3/2, nonsticky, nonplastic, loose, micaceous	
25									SILT, dark gray, 2.5Y4/4, dark gray, with stringers of fine sand, four fining upward cycles, each 100-150 mm thick, nonsticky, nonplastic, 1-2 mm thick silt laminae, soft, silt ucs=0.5 ksc, sand ucs=1.5 ksc	
30			21	0.245	7	SP-SM	H		SAND with silt, dark gray, 5Y4/1, micaceous, nonplastic, nonsticky, no CO ₃ ucs=1.5 ksc	
35									End of boring, 28.9 ft., 8.8 m	

REMARKS: This is tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.230 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 24

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

COORDINATES X: 1182210, Y: 532822

DATE DRILLED 4-24-90

GROUNDWATER 5.7 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 7.5 ft.; 2.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	00		8							
0.5									Fat clay	
1										
1.5										
2									Sand, loose	
2.5										
3										
3.5									Silt to sandy silt	
4										
4.5										
5										
5.5									Sand, loose to medium dense with depth	
6										
6.5										
7										
7.5									Lean clay	
8									Sand, dense	
8.5										
9									End of sounding, 27.9 ft., 8.5 m	
9.5										
10										
10.5										

REMARKS.

Magnitude= 7.1

Acceleration= 0.230 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 25

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

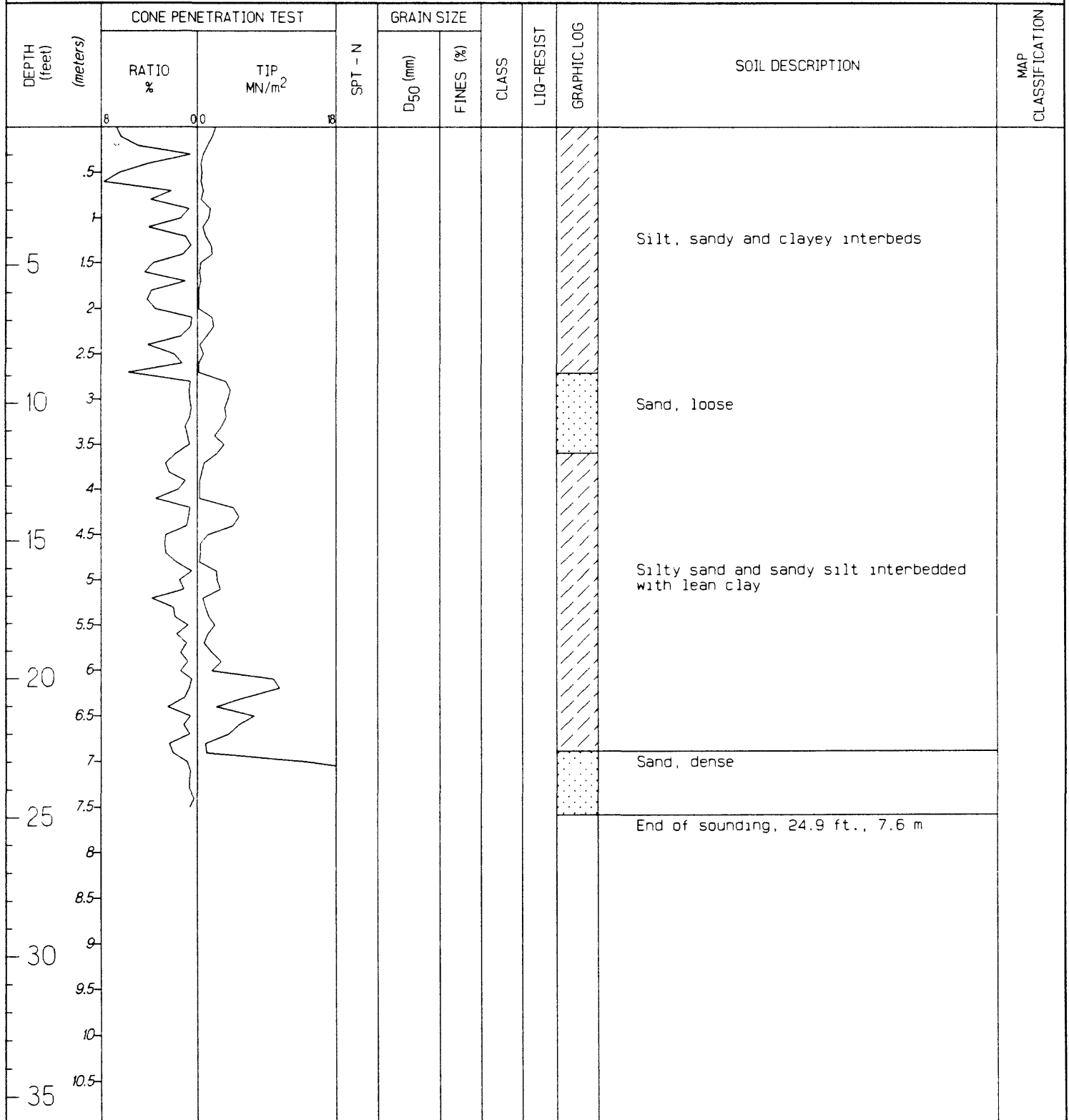
COORDINATES X: 1182276, Y: 532929

DATE DRILLED 4-24-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 8.1 ft.; 2.5 m MSL



REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.230 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 26

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

COORDINATES X: 1182312, Y: 533050

DATE DRILLED 4-24-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 8.3 ft.; 2.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Silt, very soft between the interval 1.6-2.4 m	
10									Sand, medium dense	
15									Lean clay	
20									Sand, dense	
25									Lean clay Sand, dense	
30									End of sounding, 26.6 ft., 8.1 m	
35										

REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.230 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 27

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

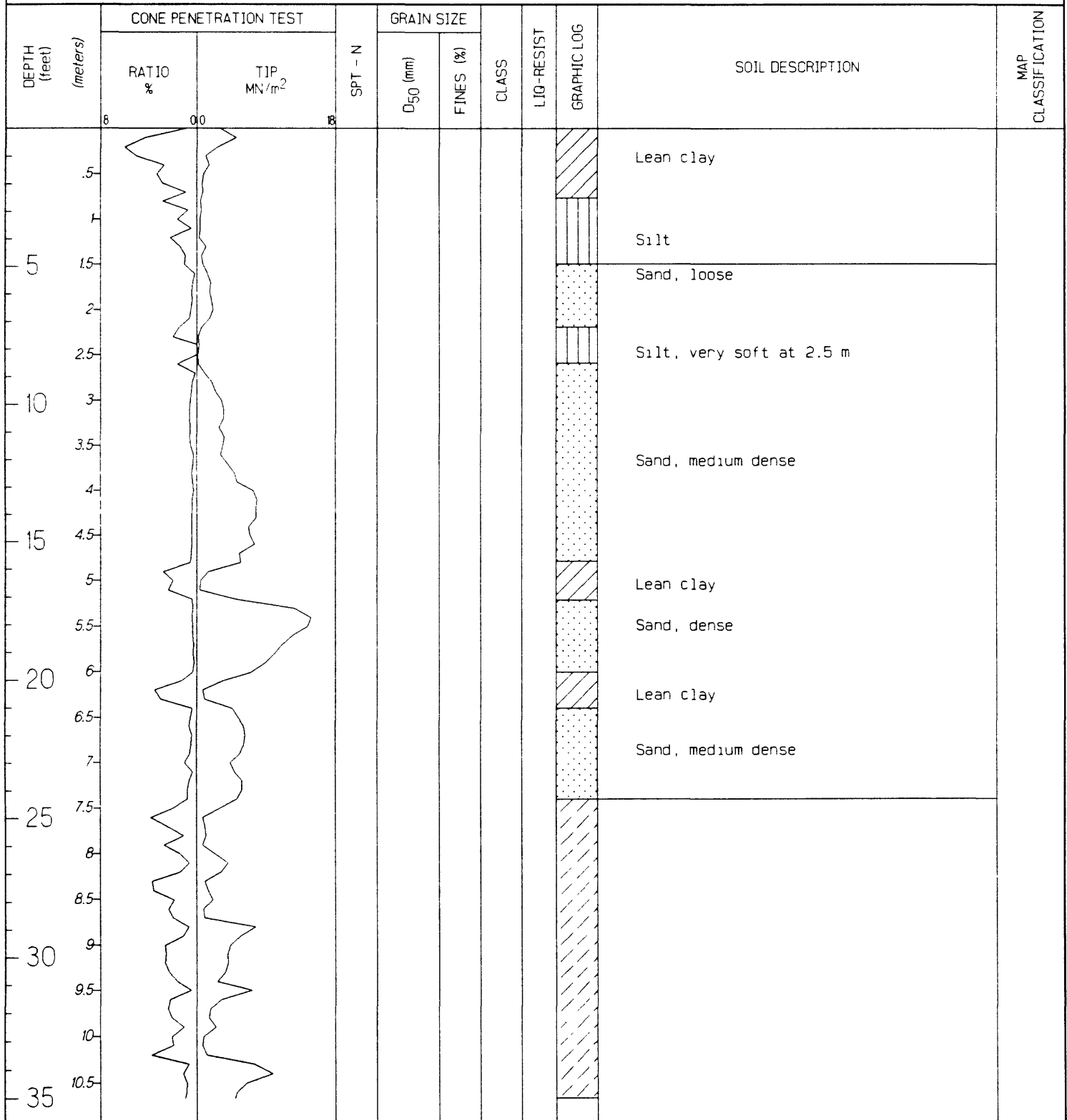
COORDINATES X: 1182359, Y: 533149

DATE DRILLED 4-13-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 8.4 ft.; 2.6 m MSL



REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.230 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 27

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

COORDINATES X: 1182359, Y: 533149

DATE DRILLED 4-13-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 8.4 ft.; 2.6 m MSL

DEPTH (feet)	(meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
		RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00										
11											
11.5											
12											
40											
12.5											
13											
13.5											
45											
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17.5											
18											
60											
18.5											
19											
19.5											
65											
20											
20.5											
21											
70											
End of sounding, 66.3 ft., 20.3 m											

Magnitude= 7.1

Acceleration= 0.230 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 28

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

COORDINATES X: 1182413, Y: 533261

DATE DRILLED CPT: 4-13-90, SPT: 8-28 & 29-90

GROUNDWATER 4 ft.; 1.2 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 8.5 ft.; 2.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5			1	0.005	99	mh	C		Fat clay to elastic silt, gray, 5Y5/1, micaceous, sticky, plastic soft, few fine, distinct dark yellowish brown, 10YR4/4, mottles, few pelecypod shell fragments, slightly effervescent	Gc
10			21	0.680	2	SP	H*		SAND, light olive gray, 5Y6/2, well sorted, sub rounded, no CO ₃ , no roots, no bedding, loose to medium dense	
15			33	0.780	4	SP	H		SAND, light olive gray, 5Y6/2, dense, no CO ₃ , medium to dense	
20			15				H*		Lean clay	Gof (?)
25									Lost sample	
30			27	0.640	6	SP-SM	H		SAND with silt, grayish brown, 5Y5/2, 2 clayey sand partings at 8.1 m and 8.2 m, clay parting at 8.4 m, dark greenish gray, 5GY4/1, soft, slightly sticky, slightly plastic, disseminated CO ₃	
35										

REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.230 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 28

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCATTINI (SCA)

COORDINATES X: 1182413, Y: 533261

DATE DRILLED CPT: 4-13-90, SPT: 8-28 & 29-90

GROUNDWATER 4 ft.; 1.2 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 8.5 ft.; 2.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40			5	0.410	6	SP-SM ch	C		SAND with silt, dark greenish gray, 5GY4/1, fossil shell fragments in sand, SO ₂ odor, H ₂ S(?), maybe slough from above. Fat clay to lean clay, greenish gray, 5G5/1, sticky, plastic, moderately effervescent, pelecypod fragments, estuarine(?) facies sandy interbeds common, ucs=0.75 ksc	0 of (?)
12.5										
13										
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										
									End of sounding, 66.6 ft., 20.3 m	

Magnitude= 7.1

Acceleration= 0.230 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 29

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SEA MIST (SEA)

COORDINATES X: 1183279, Y: 524235

DATE DRILLED CPT: 4-26-90, SPT 8-28-90

GROUNDWATER 6.5 ft.; 2.0 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 8.8 ft.; 2.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
0.5									Fat clay, dark olive gray, 5Y3/2, slightly sticky, slightly plastic	
1			15	0.005	96	CH	C		Fat CLAY, olive, 5Y5/3, sticky, plastic, some organic black residue, silt partings at 0.8 m and 0.9 m	
1.5										
2										
2.5			4	0.003	98	MH	C		Elastic SILT, olive gray, 5Y4/2, sticky, plastic, firm, fine roots common, trace organic residue on peds, few fine, distinct brown to dark brown, 10YR4/3 mottles, trace CO ₃ , ucs=1.25 ksc	
3										
3.5			2	0.080	48	SM	C		Silty SAND, dark gray, 5Y4/1, slightly sticky, slightly plastic, many fine roots, small irregular CO ₃ nodules up to 5 mm, ucs=0.23 ksc, 22 % clay	
4										
4.5										
5										
5.5										
6			2	0.024	98	ML	C		SILT, dark gray, 5GY4/1, micaceous nonsticky, nonplastic, organics at 6.1 m	
6.5										
7										
7.5			32	0.262	8	SP-SM	H		SAND with silt, gray, 5Y5/1, well sorted, massive, very friable, trace CO ₃ .	
8									End of boring, 25.9 ft., 7.9 m	
8.5										
9										
9.5										
10										
10.5										

REMARKS: Tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 30

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SEA MIST (SEA)

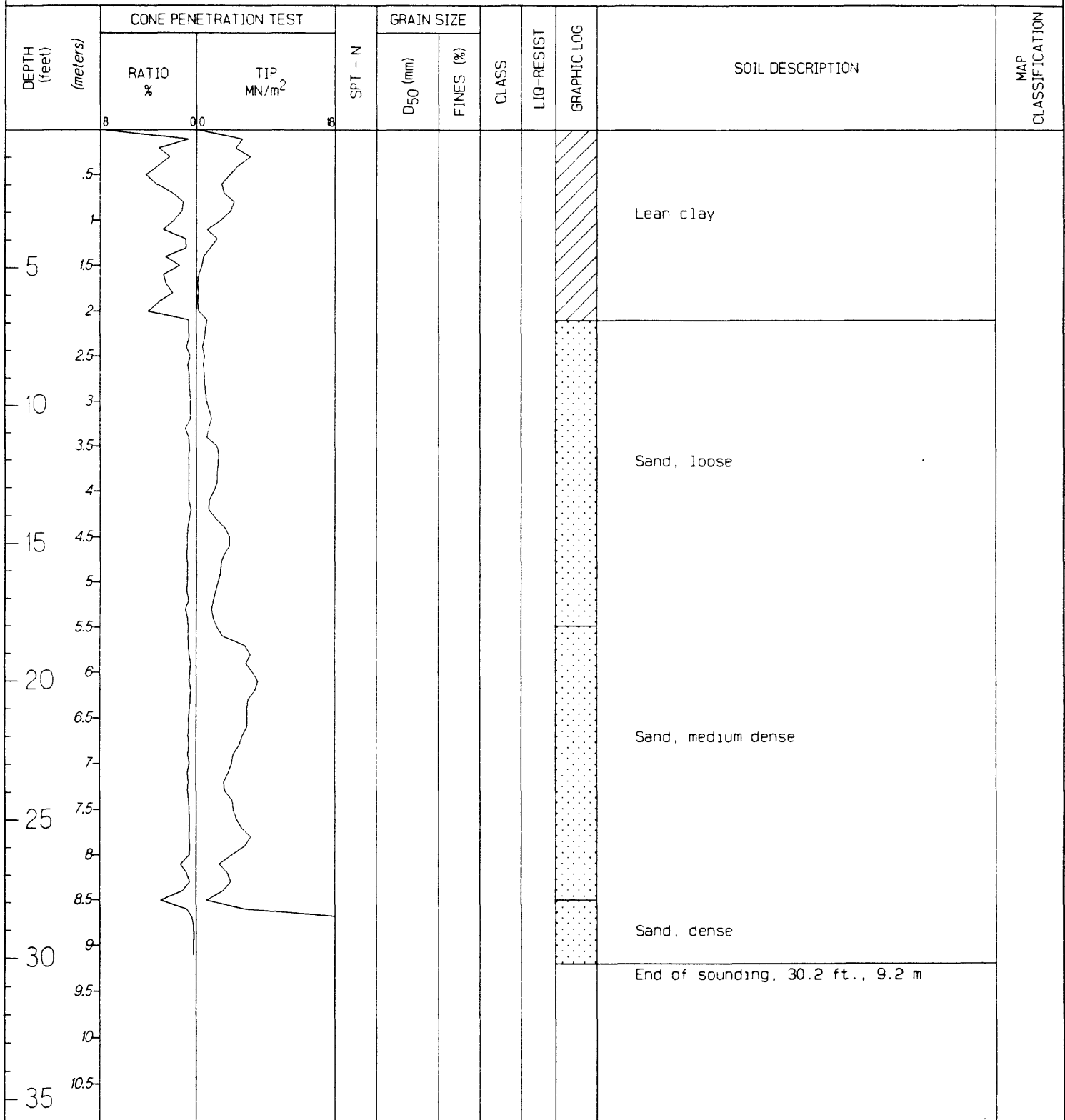
COORDINATES X: 1183141, Y: 524074

DATE DRILLED 4-26-90

GROUNDWATER _____

PERSONNEL D. BENNETT/CRILEY

ELEVATION 7 ft.; 2.1 m MSL



REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 31

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SEA MIST (SEA)

COORDINATES X: 1183002, Y: 523954

DATE DRILLED CPT: 4-25-90, SPT: 8-27-90

GROUNDWATER 2.6 ft; .8 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 4.2 ft; 1.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5			5	0.054	68	ML	L		<p>Silt, dark grayish brown, 2.5Y4/2 (m), light gray, 2.5Y7/2 (d), slightly sticky, slightly plastic, soft, description only no sample</p> <p>Silt, olive gray, 5Y5/3, micaceous, nonsticky, nonplastic, thinly laminated many fine distinct brown, 7.5YR4/4, mottles, many fine roots of marsh grasses, effervescent; sandy SILT, dark gray, 5Y4/1, not sticky or plastic, massive at base, fines upward to thinly laminated silty sand below mottled zone</p>	Gyf
10			5	0.098	29	SM	L		<p>Silty SAND, dark gray, 5Y4/1, not sticky or plastic, massive, organic silt at 3.4 m, well sorted, slightly effervescent</p>	
15			7	0.123	16	SM	L		<p>Silty SAND, olive, 5Y5/3, micaceous, massive, no CO₃, well sorted</p>	
20			9	0.240	22	SM	L		<p>Silty SAND, olive gray, 5Y5/2, with few pebbles to 5 mm, 2 micaceous, 25 mm thick silt partings at 5.2 m, massive but fines upward</p>	Gof (?)
25			13	0.244	14	SP-SM	L*		<p>SAND with silt, olive gray, 5Y5/2, no CO₃, well sorted, micaceous, massive</p>	
30			10	0.258	11	SP-SM	L		<p>SAND with silt, olive gray, 5Y5/2, massive, very friable, micaceous, no CO₃, moderately sorted</p>	
35			9	0.223 0.003	11 95	SP-SM CL	C		<p>SAND with silt, grayish brown, 2.5Y5/2, maybe slough from above; Lean CLAY, greenish gray, 5G5/1 organics, shells common, sticky, plastic ucs=1.5 ksc</p>	

REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 31

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SEA MIST (SEA)

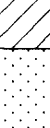
COORDINATES X: 1183002, Y: 523954

DATE DRILLED CPT: 4-25-90, SPT: 8-27-90

GROUNDWATER 2.6 ft.; .8 m

PERSONNEL L: TINSELY D.; BENNETT/CRILEY

ELEVATION 4.2 ft.; 1.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11.5			137	0.300 0.040	9 73	SP-SM ml	I		SAND with silt, light gray, 5Y6/1 micaceous, very dense, no CO ₃ , 11.5 m, organics and wood, clayey parting is SILT with sand, dark gray, 5Y5/1	Gof (?)
12									End of boring, 38.5 ft., 11.7 m	
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.214 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 32

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

COORDINATES X: 1188115, Y: 520676

DATE DRILLED CPT: 4-27-90, SPT: 8-30-90

GROUNDWATER 5.9 ft.; 1.8 m

PERSONNEL L:TINSELY, D: BENNETT/CRILEY

ELEVATION 5.0 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0									
0.5									Sand, fine, light brownish gray, 2.5Y6/2, micaceous, some gastropod fragments, no organics, disseminated CO ₃	
1										
1.5										
2										
2.5			9	0.280	4	SP	L		SAND, olive gray, 5Y4/2, micaceous, no organics, massive, trace CO ₃ , angular to subangular grains, ucs=0.75-1.0 ksc	
3										
3.5			12	0.289 0.282	4 5	SP	L		SAND, olive gray, 5Y5/2, poorly stratified, two 10-mm pebbles at base, wood fragments at 3.3 m, silty sand at base of sample	
4										
4.5										
5										
5.5										
6			16	0.340	8	SP-SM	H*		SAND with silt, olive gray, 5Y5/2 micaceous, 10 mm chert pebble at 5.5 m, 4 mm-thick soft gray clay (5Y5/1) at 5.7 m, fine sand with silt (5.8 m), well stratified, H ₂ S odor, no shells or organics, trace disseminated CO ₃	
6.5										
7										
7.5			15	0.245	8	SP-SM	H*		SAND with silt, olive gray, 5Y5/2 micaceous, moderate sorting, well stratified, 2-3 mm laminations in lower 1/3 of sample, trace CO ₃ , no shells or H ₂ S odor, ucs=1.5 ksc	
8										
8.5										
9										
9.5										
10										
10.5										
35										

REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 32

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

COORDINATES X: 1188115, Y: 520676

DATE DRILLED CPT: 4-27-90, SPT: 8-30-90

GROUNDWATER 5.9 ft.: 1.8 m

PERSONNEL L:TINSELY, D: BENNETT/CRILEY

ELEVATION 5.0 ft.: 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11			30	0.140	14	SM	H		Silty SAND, dark olive gray, 5Y3/2, trace CO ₃ , thin laminae 3-6 mm thick, no organics or shell fragments, effervescent	
11.5										
12										
12.5										
13										
13.5			5	0.002	87	ch	C		Fat clay, dark greenish gray, 5GY4/1 sticky, plastic; root and tubular pore linings are black, few charcoal chunks, no fossils, disseminated CO ₃ , ucs=1 ksc	
14									13.4 m, uncorrected age, 6,365 +/-65, ¹⁴ C YBP	
14.5										
15										
15.5										
16										
16.5										
17									Interbedded silty sand and lean clay	
17.5										
18										
18.5										
19									Lean clay, some sandy silt	
19.5										
20										
20.5									End of sounding, 66.3 ft., 20.2 m	
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 33

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

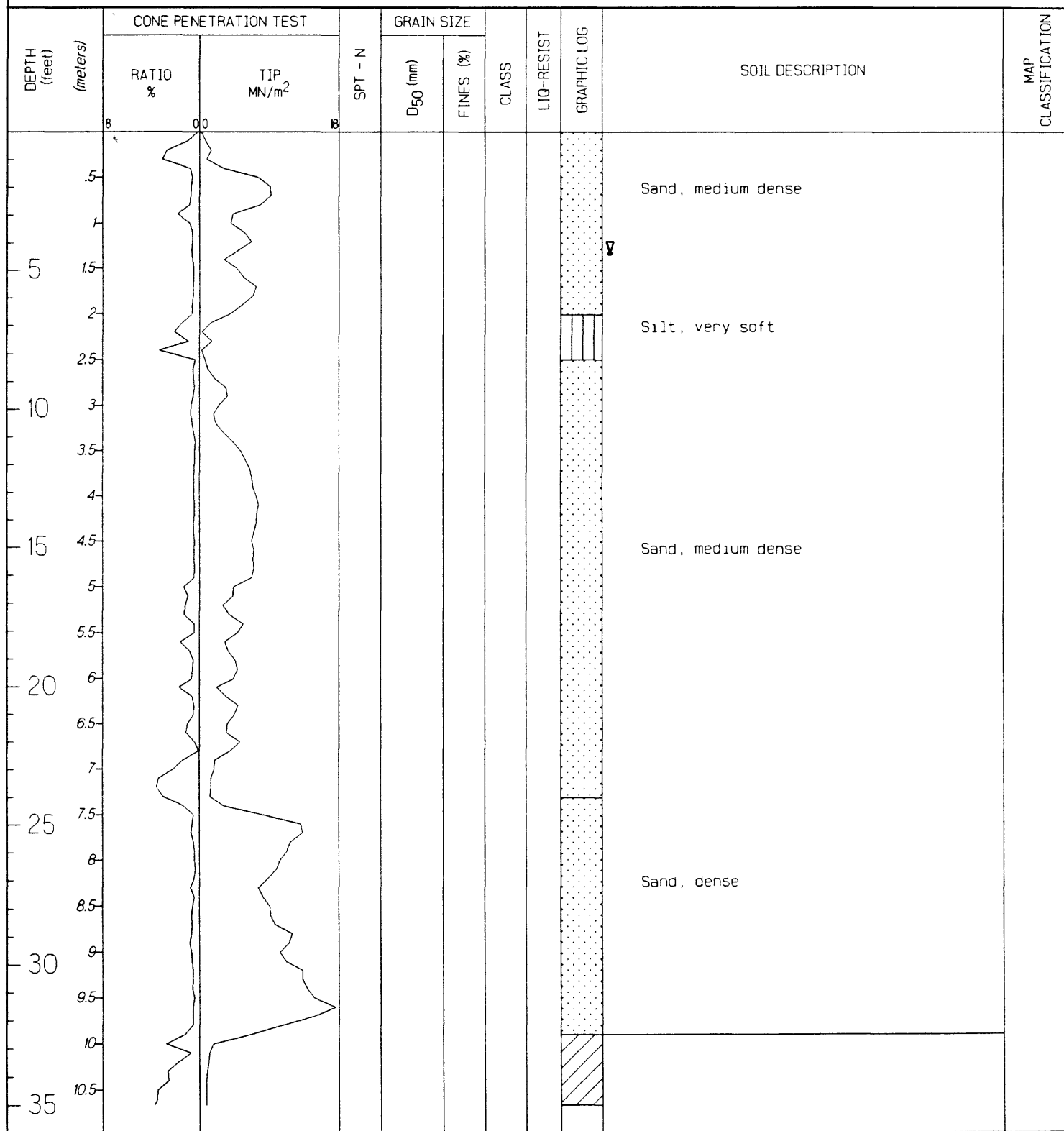
COORDINATES X: 1188199, Y: 520364

DATE DRILLED 4-27-90

GROUNDWATER 4.3 ft.; 1.3 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 7.0 ft.; 2.1 m MSL



REMARKS. Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 33

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

COORDINATES X: 1188199, Y: 520364

DATE DRILLED 4-27-90

GROUNDWATER 4.3 ft.; 1.3 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 7.0 ft.; 2.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
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97.5										
98										
98.5										
99										
99.5										
100										

Lean clay to fat clay or elastic silt, uniform

Lean clay and silty sand interbedded

End of sounding, 66.6 ft., 20.3 m

Magnitude= 7.1

Acceleration= 0.205 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 34
 LOCATION JEFFERSON RANCH (JRR)
 DATE DRILLED CPT: 4-27-90, SPT: 8-30-90
 PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1188064, Y: 520143
 GROUNDWATER 5.5 ft.; 1.7 m
 ELEVATION 8 ft.; 2.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0		8							
5			19	0.330	7	SP-SM	D		Silty sand, light olive brown, 2.5YR5/4, and light yellowish brown, 2.5YR6/4, micaceous, nonsticky, nonplastic, loose, sample described from auger cuttings	
			18	0.380	2	SP	H		SAND with silt, olive, 5Y5/3, micaceous, trace CO ₃ , no organics or shells, sandy silt at 1.6 m, olive, 5Y5/4 well stratified, partings 50 mm, ucs=1.25 ksc	
10			20	0.285	6	SP-SM	H*		SAND, light olive gray, 5Y6/2, micaceous, well sorted, well bedded, no organics, shells or CO ₃ , cross laminated lowermost 1/4 of sample ucs=0.9 ksc	
15			17	0.279 0.002	17 95	SM mh	H		SAND with silt, olive gray 5Y4/2, moderate sorting, cross laminations in lower 1/3, no organics, shells, or CO ₃ ucs=0.75-1.0 ksc	
									Silty sand, medium to fine grained, dark olive gray, 5Y3/2, micaceous, well bedded, no CO ₃ , organics or H ₂ S, poorly sorted, and elastic silt, blue gray, 5GY4/1, sticky and plastic, poor partings to massive, no CO ₃ or H ₂ S, ucs=0.7 ksc; relation between sample and CPT shows variability in layering	
20			4	0.002	94	mh	C		Elastic SILT, greenish gray, 5GY5/1, slightly sticky, plastic; few thin laminae less than 2 mm, no shells or H ₂ S, trace CO ₃ , bottom 90 mm of sample is dark gray, 5Y3/1; organics abundant on cutans and ped faces	
25			9	0.002	98	MH	C		Elastic SILT, dark greenish gray, 5GY4/1, sticky, plastic, trace organics at 8.3 m, a few fine roots, some stress cutans, ucs=1.6 ksc	
30									8.3 m, uncorrected age, 5,315 +/- 65, 14C YBP	
35			6	0.002	99	MH	C		Elastic SILT, greenish gray, 5GY5/1, slightly sticky, plastic, distinct mottles, distinct H ₂ S, trace CO ₃ , reed fragments, ucs=0.9-1.2 ksc	

REMARKS: Tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 34

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

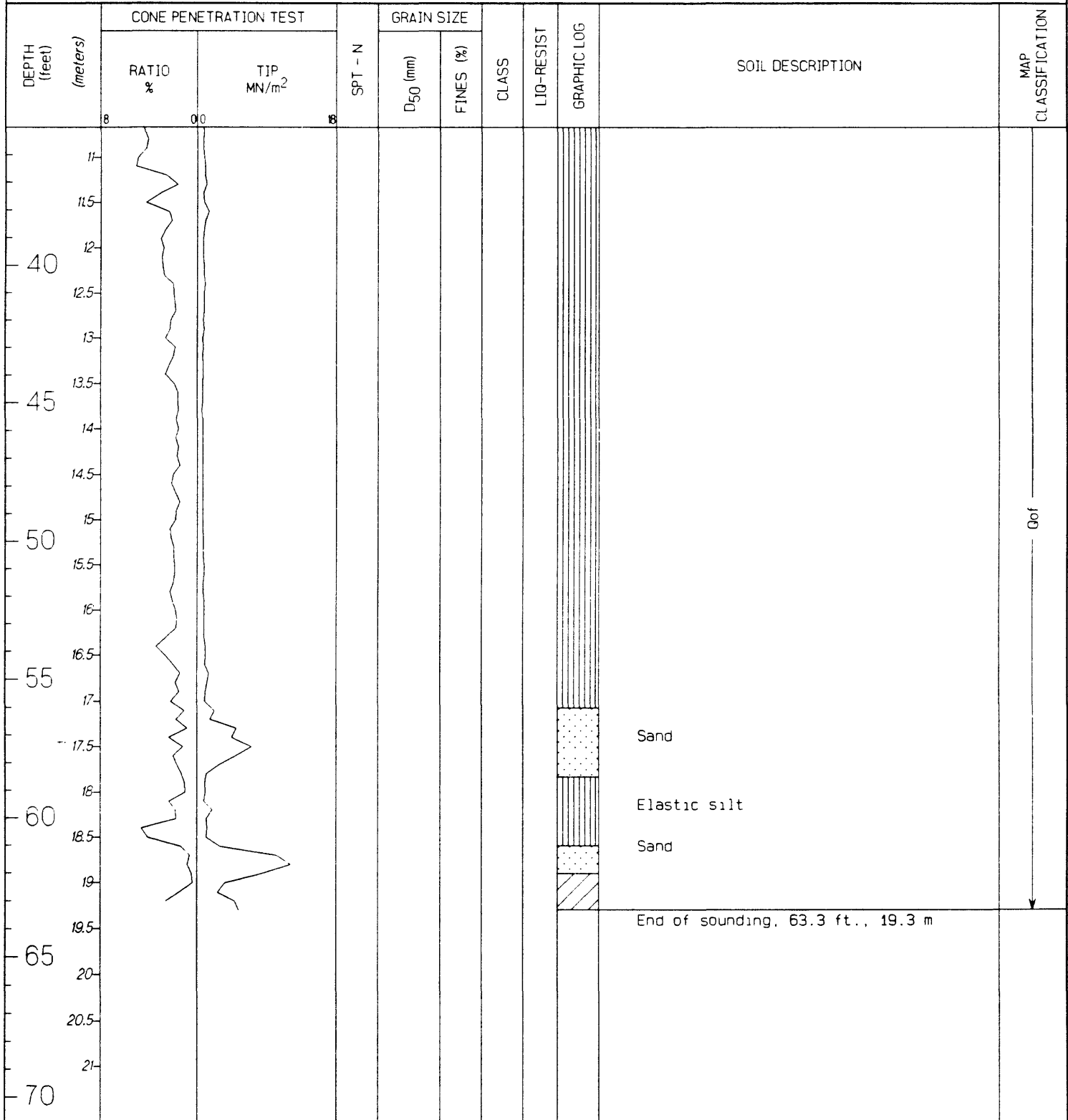
COORDINATES X: 1188064, Y: 520143

DATE DRILLED CPT: 4-27-90, SPT: 8-30-90

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 8 ft.; 2.4 m MSL



Magnitude= 7.1

Acceleration= 0.205 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 35

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

COORDINATES X: 1187757, Y: 520028

DATE DRILLED 4-27-90

GROUNDWATER 10.8 ft.; 3.3 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 9 ft.; 2.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0		8							
0.5									Lean clay	
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

REMARKS: Tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 35

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

COORDINATES X: 1187757 , Y: 520028

DATE DRILLED 4-27-90

GROUNDWATER 10.8 ft.; 3.3 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 9 ft.; 2.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	8							
11										
11.5										
12										
40									Lean clay to fat clay, with rare sandy layers	
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19									Silty sand	
19.5										
65										
20										
20.5									End of sounding, 66.6 ft., 20.3 m	
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 36

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

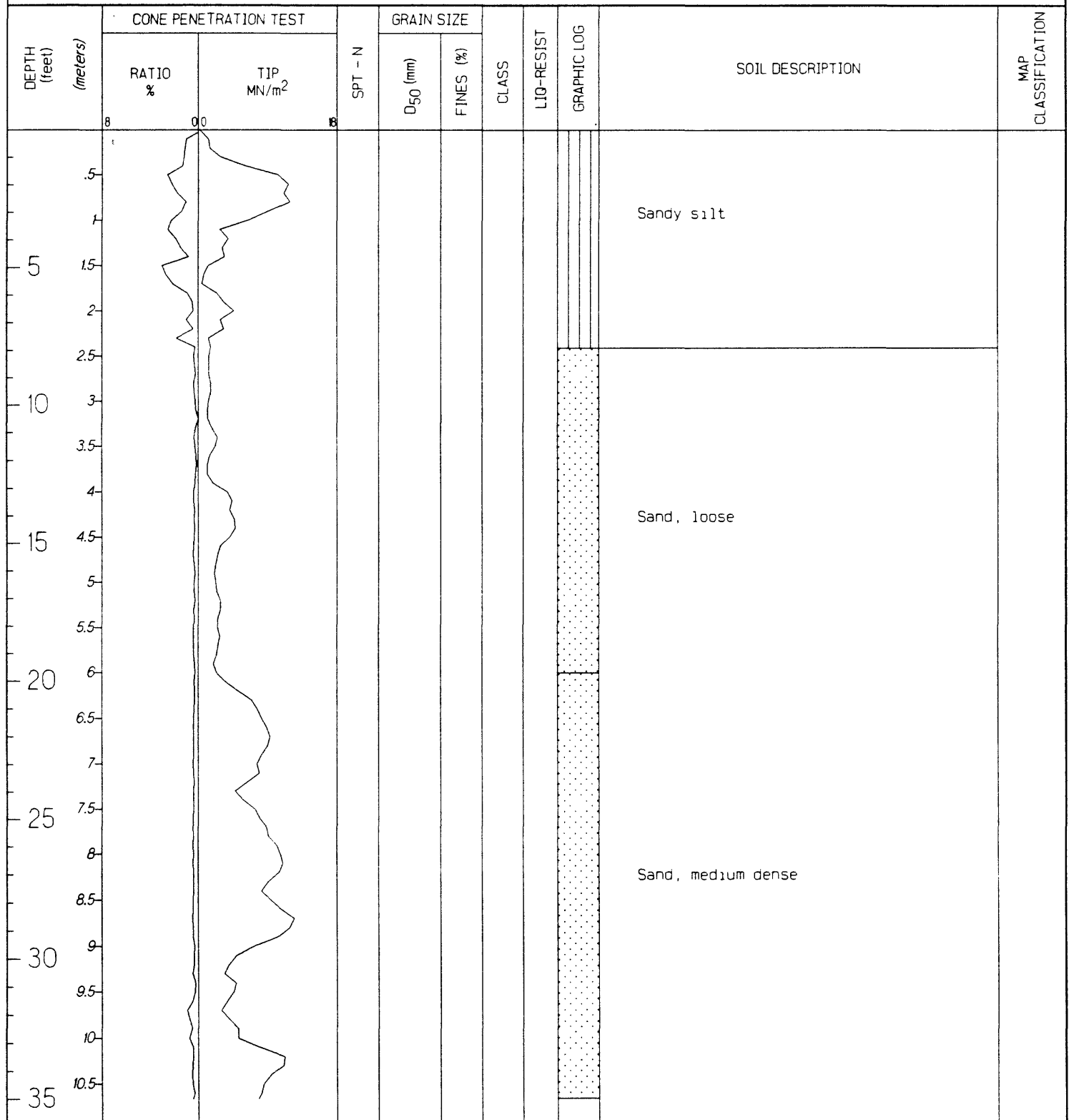
COORDINATES X: 1187045, Y: 519870

DATE DRILLED 4-27-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 8 ft.; 2.4 m MSL



REMARKS: Tentatively identified as off slide.

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 36

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON RANCH (JRR)

COORDINATES X: 1187045, Y: 519870

DATE DRILLED 4-27-90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 8 ft.; 2.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
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63.5										
64										
64.5										
65										
65.5										
66										
66.5										
67										
67.5										
68										
68.5										
69										
69.5										
70										

Lean to fat clay or elastic silt

Sand, dense

End of sounding, 61.7 ft., 20.3 m

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 121

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186133, Y: 517836

DATE DRILLED CPT and SPT: 7/9/93

GROUNDWATER 11 ft.; 3.4 m

PERSONNEL L: TINSLEY; D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5				0.002	99	ch			Fat clay, olive, 5Y4/3, soft, very sticky and plastic, no CO ₃ , SO ₄ , H ₂ S, fossils, or organic mater, ucs<0.5 ksc	
				0.005	98	cl			Clay, dark greenish gray, 5GY4/1, soft, very sticky and plastic, ucs<0.5 ksc	
10										
			T	0.005 0.008	89 100	cl			Lean clay, black to very dark gray, 5Y2.5/1 to 5Y3/1, soft to very soft, uniform, no bedding, roots, shells, or concretions, some disseminated CO ₃ , slightly sticky and plastic, ucs=0.25 ksc	
15										
			T	0.003 0.011	99 93	cl ch			Lean clay, black, 5Y2.5/2, soft, uniform, no bedding, shells, or concretions, some carbonized plant fragments, ucs=0.25-0.4 ksc	
20			3	0.347	7	SP-SM L*			Sand with silt, dark gray, 5Y4/1, micaceous, lithic, well sorted, not sticky or plastic, chert pebbles at 5.7 m, massive, occasional frosted sand grains	
			11	0.420	6	SP-SM L			Sand with silt, olive gray, 5Y5/2, micaceous, lithic, moderately sorted, not sticky or plastic, silt partings at 7.2 m, no precipitates, fossils, or organic carbon	
25										
			14	0.370	8	SP-SM L*			Sand with silt, olive gray, 5Y4/2, micaceous, lithic, moderately sorted, not sticky or plastic, fine laminae 5 mm thick, no precipitates, organics, or fossils	
30									Sandy silt	
			28	0.190 0.006	15 83	SM cl	H		Sand, pale olive, 5Y6/3, micaceous, spherical grains with 20 % frosted quartz grains, no precipitates, organic carbon, or fossils, and, PASO ROBLES (?) formation, mudstone, 5Y5/3, with Fe ₂ O ₃ concretions and laminae, no CO ₃	
35									End of sounding, 32.5 ft., 9.9 m	

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 122

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

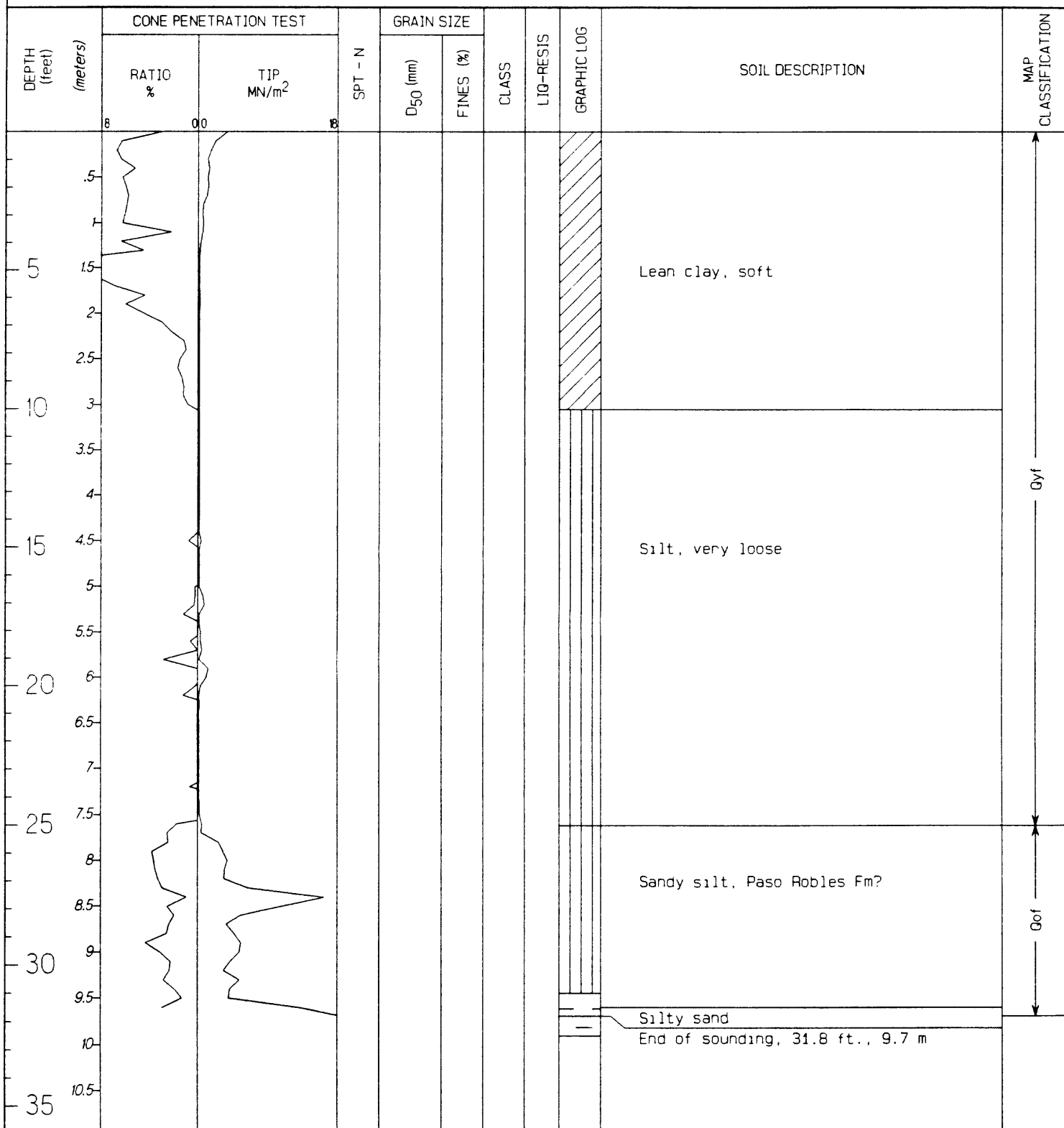
COORDINATES X: 1186398 , Y: 517715

DATE DRILLED CPT: 7/9/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.: 3.0 m MSL



Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 141

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186999, Y: 519640

DATE DRILLED CPT: 8/26/93; SPT: 9/9/93

GROUNDWATER 6.8 ft.; 2.1 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		18							
5			16	0.288	6	SP-SM			Sandy silt, dark grayish brown, 2.5Y4/2 (dry), slightly compact	
									Silty sand, light yellowish brown, 2.5Y6/4, micaceous	
									Sand, olive, 5Y5/3, olive, micaceous with trace of silt, massive, no chemical precipitates, fossils, organics, roots or pores	
10			3	0.086 xxx	38 83	SM ML			Sandy silt, olive, 5Y4/3, slight CO ₃ and silt, very dark gray, 5Y3/1, soft, not sticky or plastic, laminations 1-3 mm thick, organics in top 3 cm, some organic-rich silt in lower 1/3	
			5	0.107 0.159	34 18	SM	L		Sand with silt, very dark gray, 5Y3/2 (wet), micaceous, massive, silt, black, 2/5Y2.5/1, micaceous, soft, slightly sticky and plastic, and...	
15									sand, olive gray, 2.5Y4/2 (wet), loose, not sticky or plastic, massive	
			10	0.195	14	SM	H*		Sand with silt, dark gray, 5Y4/1, micaceous, well bedded, 10-15 cm thick, some layers are olive gray, 5Y5/2	
20			15	0.194 0.251	13 8	SM SP-SM	H*		Silty sand, dark gray, 5Y4/1, moderately well sorted, micaceous, coarsens downward, thin laminations and cross laminations present, not sticky or plastic	
25			14	0.356	4	SP	L		Sand, olive gray, 5Y4/2, well sorted, slightly dense, not sticky or plastic, no chemical precipitates, few pores, large grains to 3 mm	
30										

REMARKS: 463 ft east of hydraulic valve.
***NOTE SCALE CHANGE

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 141

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186999, Y: 519640

DATE DRILLED CPT: 8/26/93; SPT: 9/9/93

GROUNDWATER 6.8 ft.: 2.1 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 10 ft.: 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	18							
9.5									Sand, dark olive gray, 5Y3/2, moderately sorted, and...	qoy
10			t	0.400 ≤0.075	7 53	SP-SM ML			Sand, dark olive gray, 5Y3/2, loose, no bedding, maximum grain size 8 mm, and lean clay, very dark gray, 5Y3/1, mottled with olive gray, 5Y4/2, stiff, concretions abundant, up to 12-mm diameter, soil, 32-mm thick, stiff mottled lean clay is interbedded between a fine uniform gray silty sand below and a coarse undedded sand above, the contact with the overlying sand is irregular	
10.5			a	xxx	74	ml				
11										
11.5										
12										
12.5										
13										
13.5										
14									Lean clay	qof
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18									Interbedded sand and lean clay	
60										

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 141

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186999, Y: 519640

DATE DRILLED CPT: 8/26/93; SPT: 9/9/93

GROUNDWATER 6.8 ft.; 2.1 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										
21.5										
22										
22.5										
75										
23										
23.5										
24										
80										
24.5										
25										
25.5										
85										
26										
26.5										
27										
90										

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 142

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186875, Y: 519548

DATE DRILLED CPT: 8/26/93

GROUNDWATER 6.3 ft.; 1.9 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Sand	
1									Lean clay	
1.5									Sand	
2									Lean clay	
2.5										
3										
3.5										
4										
4.5									Sand	
5										
5.5										
6										
6.5										
7										
7.5									Lean clay	
8										
8.5									Sand	
9										
9.5										
10									Lean clay	
10.5										

REMARKS: 314.5 ft east of water hydrant

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 142

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186875, Y: 519548

DATE DRILLED CPT: 8/26/93

GROUNDWATER 6.3 ft.; 1.9 m

PERSONNEL D. BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 143

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186769, Y: 519448

DATE DRILLED CPT: 8/26/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	00	0								
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Interbedded sand, silty sand and lean clay

Sand

REMARKS: 166.5 ft east of water hydrant

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 143

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186769, Y: 519448

DATE DRILLED CPT: 8/26/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	8							
11										
11.5										
12									Lean clay	
12.5										
13										
13.5										
45										
14										
14.5									Sand	
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18									Interbedded sand and lean clay	
60										
18.5										
19										
19.5									End of sounding, 63.7 ft, 19.4 m	
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 144

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186655, Y: 519357

DATE DRILLED CPT: 8/26/93

GROUNDWATER 9 ft.; 2.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Sandy silt	
10										
15									Sand	
20									Interbedded sand and lean clay	
25										
30									Sand	
35									Lean clay	

REMARKS: 17 ft east of water hydrant

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 144

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186655, Y: 519357

DATE DRILLED CPT: 8/26/93

GROUNDWATER 9 ft.; 2.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5									Sand	
12										
40										
12.5										
13										
45									Interbedded sand and sandy silt	
13.5										
14										
14.5										
50										
15										
15.5										
55									Lean clay to silt	
16										
16.5										
17										
17.5										
60									Silty sand	
18										
18.5										
19										
19.5									End of sounding, 63.6 ft, 19.3 m	
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 145

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186348, Y: 517732

DATE DRILLED CPT: 8/27/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
11										
11.5										
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27.5										
28										
28.5										
29										
29.5										
30										
30.5										
31										
31.5										
32										
32.5										
33										
33.5										
34										
34.5										
35										

REMARKS: 227 ft north of board

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 146

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186313, Y: 517764

DATE DRILLED CPT: 8/27/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

REMARKS. 281 ft north of board

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 147

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186265, Y: 517766

DATE DRILLED CPT: 8/27/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0	0	0							
5									Clay, fat to elastic silt	
10									Silt	
15										
20										
25										
30									Sandy silt (?), Paslo Robles Fm (?)	
35									End of sounding, 32.2 ft, 9.8 m	

REMARKS. 335 ft north of board

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 148

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186188, Y: 517798

DATE DRILLED CPT: 8/27/93; 9/15/93

GROUNDWATER _____

PERSONNEL L: TINSLEY; D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet)	(meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
		RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
		8	00	8							
5	1.5									Clay, fat to elastic silt	
10	3.0									Silt	
15	4.5										
20	6.0			13	0.350	5	SP-SM	L		Sand with silt, gray, 5Y5/1, massive, loose, not sticky or plastic, no roots or pores, some silt stringers, bad blow count	
25	7.5			8	0.405	5	SP-SM	L		Sand, olive gray, 5Y5/2, massive, micaceous, loose, not sticky or plastic, no organic, sample appears disturbed in sampler	
30	9.0			11	0.440	8	SP-SM	L		Sand, gray, 5Y5/1, micaceous, thin bedded (8 cm), occasional thin silty sand partings, 5 mm thick at decimeter intervals, no organics, roots, pores, or chemical precipitates	
										Sandy silt (?), Paso Robles Fm(?)	
										End of sounding, 30.5 ft, 9.3 m	

REMARKS: 391 ft north of board

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 149

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186069, Y: 517856

DATE DRILLED CPT: 8/27/93; 9/15/93

GROUNDWATER _____

PERSONNEL L: TINSLEY; D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Clay, fat to elastic silt	
10									Silt	
20			5	0.370	2	SP	L		Silt with sand, dark olive gray, 5Y3/2. Sand, light brownish gray, 2.5Y6/2, well sorted, massive, cross laminations, loose, not sticky or plastic; and, clay, dark greenish gray, 5G4/1, medium to hard, very plastic and sticky, no fossils, organics or CO ₃ , ucs=2.25 ksc	
25			12	0.401	7	SP-SM	L		Sand, olive gray, 5Y5/2, micaceous, not sticky or plastic, massive, no roots or pores, and sand, grayish brown, 2.5Y5/2, similar to above, ucs=0.5 ksc	
30			14	0.398	9	SP-SM	H*		Sand, grayish brown, 2.5Y5/2, micaceous, few siliceous shale pebbles, 2 mm silt stringers in lower 1/3, massive in upper 2/3, not sticky or plastic	
35			12	0.378 0.328	9 17	SP-SM SM	L		Sand with silt to silty sand, grayish brown, 2.5Y5/2, slightly dense, massive, not sticky or plastic; no fossils, and...	
			26	0.370 xx	8 89	SP-SM ml?	L*		Sand and silt interbeds, olive gray, 5Y5/2, 5-mm to 10-mm thick	
				xx	76	ml?			Claystone, gray, 5Y5/1, thin laminations, 1-2 mm, dense, slightly sticky and plastic, laminations are strong brown, 5YR5/6, PASO ROBLES (?) Formation	

REMARKS: 500.5 ft north of board

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 149

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186069, Y: 517856

DATE DRILLED CPT: 8/27/93; 9/15/93

GROUNDWATER _____

PERSONNEL L: TINSLEY; D: BENNETT/CRILEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8							
11										
11.5									End of sounding, 37.1 ft, 11.3 m	
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 150

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186536, Y: 517789

DATE DRILLED CPT: 9/16/93; SPT: 9/16/93

GROUNDWATER 9 ft.; 2.7 m

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	0.0	8							
0.5									Fat (?) clay, dark greenish brown, 2.5Y4/2 (moist), soft to firm,	
1									Silt, olive brown, 2.5Y4/3, trace of clay	
1.5									Clay, dark grayish brown, 2.5Y4/2, root and mottles, dark yellowish brown, 10YR3/6, probably floodbasin prior to field leveling	
2									Turns to gray clay before 3.4 m	
2.5									Lean clay, black, 5Y2.5/1, very soft, no bedding, roots, concretions or shells, sticky and plastic, some oxidation and silt partings in upper most sample, ucs=0.2-0.6 ksc	
3										
3.5			t	0.018 0.007	92 100	MH	C			
4										
4.5										
5										
5.5										
6			21	0.249	8	SP-SM	H		Sand, gray, 5Y5/1, clean and well sorted, micaceous, massive, not sticky or plastic, slightly dense, ucs<0.3 ksc, no fossils or organics	
6.5										
7			20	0.247	7	SP-SM	H*		Sand, gray, 5Y5/1, micaceous, well sorted and clean, massive, not sticky or plastic, no roots or tube pores, no fossils	
7.5										
8			21	0.281 0.020	8 95	SP-SM ml	H		Sand, gray, 5Y5/1, micaceous, no fossils or H ₂ S, and...	
8.5									sandy silt, dense, ucs=3.7 ksc	
9										
9.5										
10										
10.5										
30									Sandy silt (?), Paso Robles Fm (?)	

REMARKS: from Jef-122, 120° N75W, near large sand boil in Salinas River photo 2-1

Magnitude= 7.1

Acceleration= 0.205 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 150

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186536, Y: 517789

DATE DRILLED CPT: 9/16/93; SPT: 9/16/93

GROUNDWATER 9 ft.; 2.7 m

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8*	0.0	0.0	8							
11										
11.5									End of sounding, 37.4 ft, 11.4 m	
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 151

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

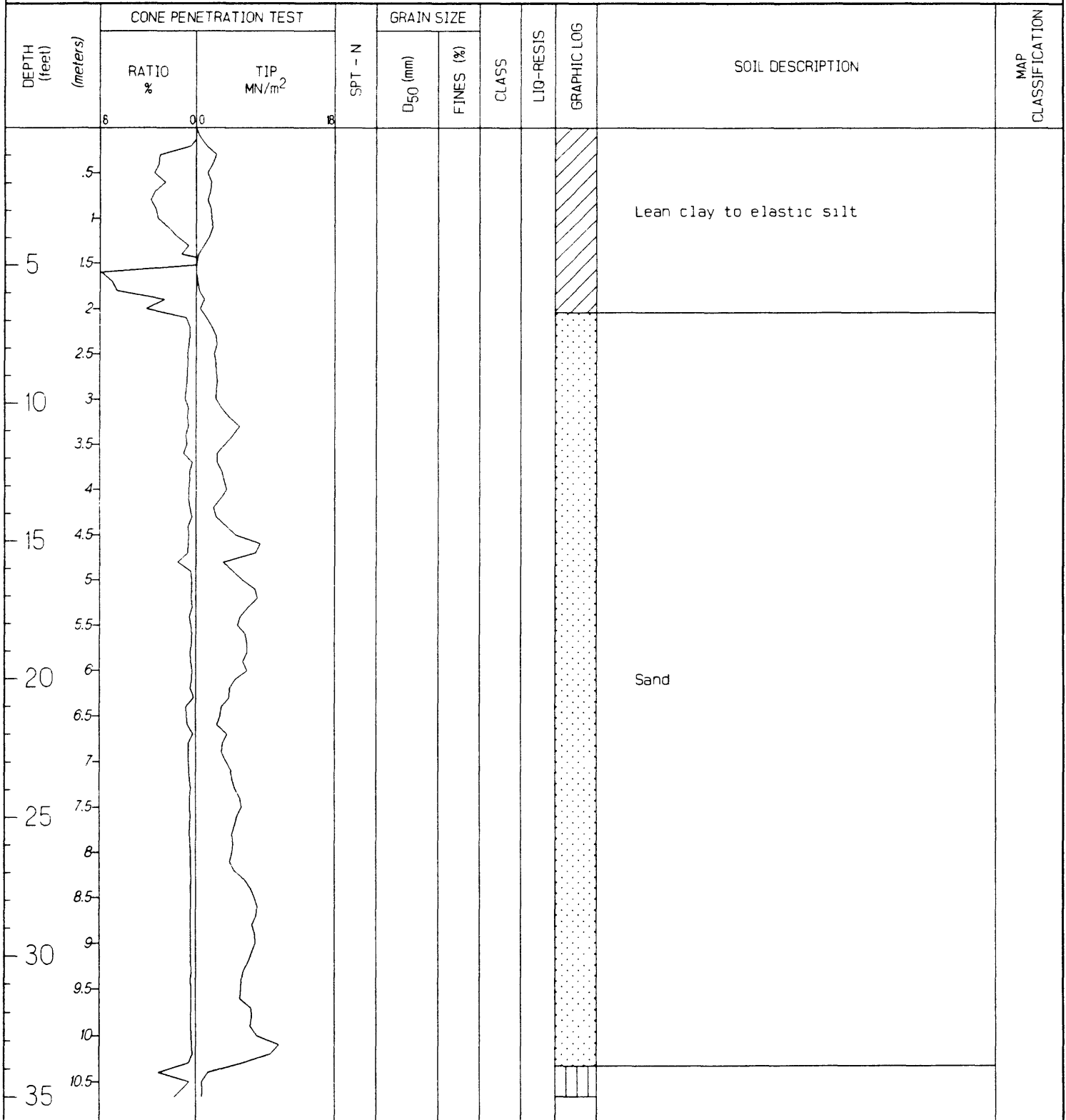
COORDINATES X: 1186769, Y: 517845

DATE DRILLED CPT: 9/16/93

GROUNDWATER _____

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL



REMARKS: 50 ft of C/L of field road,
in line with 122 and 150

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 151

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION JEFFERSON (JEF)

COORDINATES X: 1186769, Y: 517845

DATE DRILLED CPT: 9/16/93

GROUNDWATER _____

PERSONNEL D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
38		0.0	18							
40									Sandy silt (?), Paso Robles Fm(?)	
42									End of sounding, 42 ft., 12.8 m	
44										
46										
48										
50										
52										
54										
56										
58										
60										
62										
64										
66										
68										
70										

Magnitude= 7.1

Acceleration= 0.205 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 37

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI (LEN)

COORDINATES X: 1184441, Y: 522681

DATE DRILLED CPT: 4-26-90, SPT: 8-29-90

GROUNDWATER 8.1 ft.; 2.5 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 8.0 ft.; 2.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5			6	0.090	39	SM	D		Sandy SILT, olive, 5Y4/3, micaceous, nonsticky, nonplastic, very friable, described from auger cuttings Silty SAND, dark grayish brown, 2.5Y4/2, (dry 2.5Y7/2), nonsticky, nonplastic trace CO ₃ , no shells, ucs=0.5 ksc	
10			9	0.105	13	SP-SM	H		SAND with silt, olive gray, 5Y5/2 micaceous, nonsticky, nonplastic, laminated 3-5 mm, no apparent fining trends, trace disseminated CO ₃ , ucs=0.5 ksc	
15			NA	0.170	13	SP-SM	L		SAND with silt, olive gray, 5Y4/2 micaceous, nonsticky, nonplastic, very friable, no organics, trace disseminated CO ₃ , mistake in blow count, sample O.K.	
20			11	0.195	8	SP-SM	L		SAND with silt, olive gray, 5Y5/2 micaceous, nonsticky, nonplastic, very friable, trace CO ₃ , no organics or shells	
25			17	0.197	6	SP-SM	H		SAND with silt, olive, 5Y5/2, gray, micaceous, nonsticky, nonplastic, cross laminations 7.8-8.1 m, trace of disseminated CO ₃ , no organics or shells	
30									Lean clay	
35			23	0.220	10	SP-SM	H		SAND with silt, gray, 5Y6/1, nonsticky, nonplastic, cross laminations 10.1-10.2 m, trace CO ₃ , no organics or shells	

REMARKS: Off slide.

* BAD SPT, true blow count greater than 3.

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 37

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI (LEN)

COORDINATES X: 1184441, Y: 522681

DATE DRILLED CPT: 4-26-90, SPT: 8-29-90

GROUNDWATER 8.1 ft.; 2.5 m

PERSONNEL L: TINSELY, D: BENNETT/CRILEY

ELEVATION 8.0 ft.; 2.4 m MSL

[illegible]

Magnitude= 7.1

Acceleration= 0.214 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 38

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI (LEN)

COORDINATES X: 1184348, Y: 522553

DATE DRILLED 4-26-90

GROUNDWATER 5.3 ft.; 1.6 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 7.5 ft.; 2.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
0.5										
1									Sandy silt	
1.5										
2										
2.5									Sand, loose to medium dense with depth	
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9									Silt, very soft	
9.5										
10										
10.5										
35										

REMARKS: Tentatively identified as on slide.

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 38

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI (LEN)

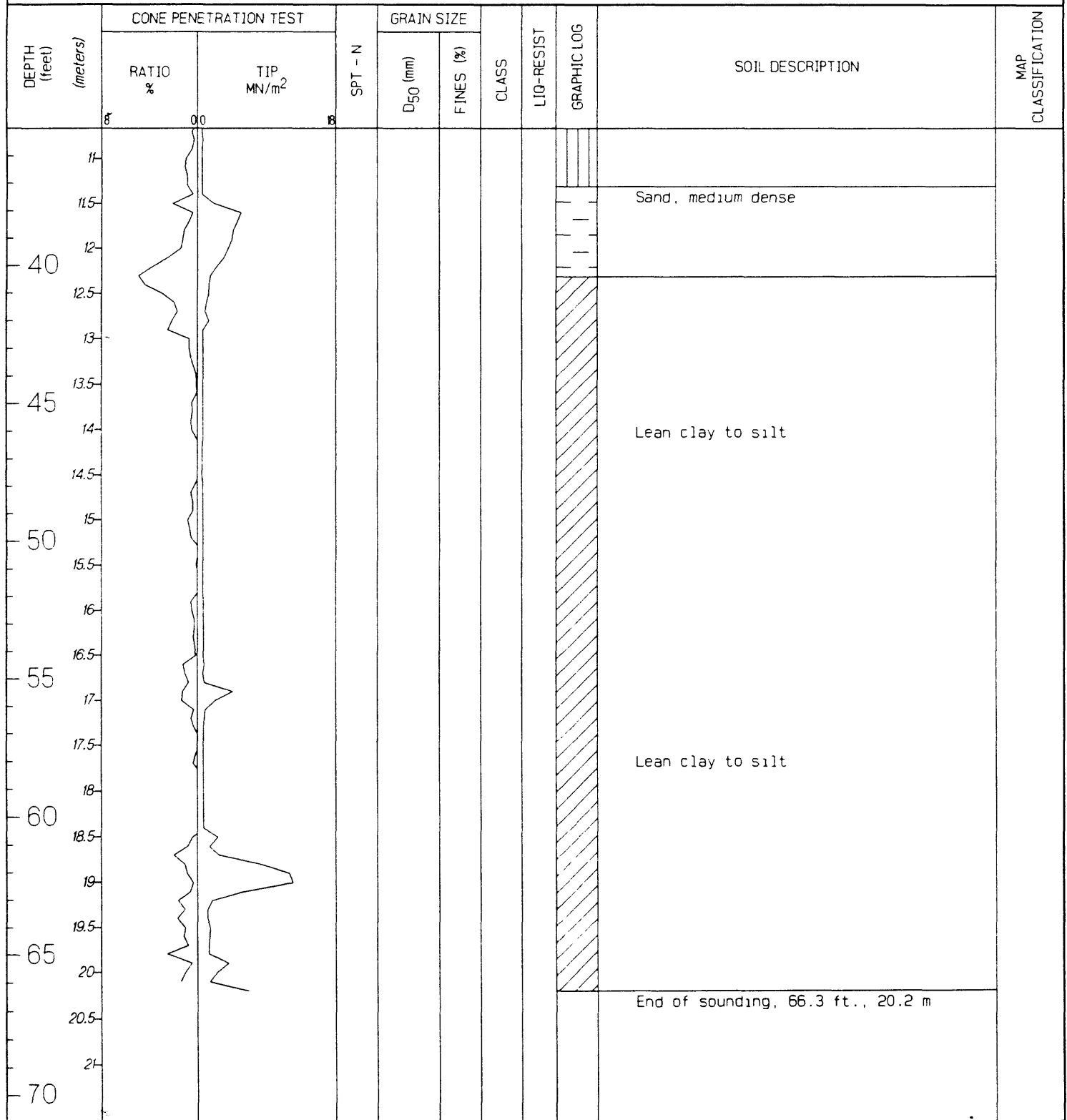
COORDINATES X: 1184348, Y: 522553

DATE DRILLED 4-26-90

GROUNDWATER 5.3 ft.; 1.6 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 7.5 ft.; 2.3 m MSL



Magnitude= 7.1

Acceleration= 0.214 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 39

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI (LEN)

COORDINATES X: 1184231, Y: 522364

DATE DRILLED CPT: 4-26-90, SPT: 8-29-90

GROUNDWATER 6.1 ft.; 1.9 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 7.0 ft.; 2.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Sandy silt, dark brown, 10YR3/3, nonsticky, nonplastic, very friable, no CO ₃	
1									Lean clay, black, 2.5Y2/0, slightly sticky, slightly plastic	
1.5			2	0.060	53	ML	C		Sandy SILT, soft peaty texture, dark gray to gray to black, 5Y4/1, slightly sticky, slightly plastic, few medium sand stringers, organic peaty layers 5-mm- thick cap sedimentation events at 1.81 m and 1.84 m; ucs=0.25 ksc	
2										
2.5										
3			10	0.185	11	SP-SM	L*		Silty SAND, olive gray, 5Y6/1(d), 5Y4/2(w), micaceous, well stratified, not sticky or plastic; and SAND with silt, grayish brown, 2.5Y5/2, not sticky or plastic	
3.5										
4			7	0.188 0.232	14 8	SM SP-SM	L		SAND with silt, olive gray, 5Y4/2 not sticky or plastic, well stratified 4.27-4.42 m; olive, 5Y5/3, no CO ₃ , common porcellaneous grains	
4.5										
5										
5.5										
6			8	0.305	5	SP-SM	L		SAND with silt, olive gray, 5Y5/2 loose, micaceous, not sticky or plastic no CO ₃	
6.5										
7										
7.5										
8										
8.5									Silt to lean clay	
9										
9.5										
10										
10.5									Sand, dense	
35										

REMARKS. On slide.

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 39

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI (LEN)

COORDINATES X: 1184231, Y: 522364

DATE DRILLED CPT: 4-26-90, SPT: 8-29-90

GROUNDWATER 6.1 ft.; 1.9 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 7.0 ft.; 2.1 m MSL

[illegible]

Magnitude= 7.1

Acceleration= 0.214 g

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USGS GEOTECHNICAL LOG

 HOLE NUMBER 51

 PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

 LOCATION LEONARDINI NEAR HWY 1 (LEN)

 COORDINATES X: 1186600, Y: 523470

 DATE DRILLED CPT: 5-3-91; SPT: 7-8-93

 GROUNDWATER 6 ft.; 1.8 m

 PERSONNEL L: TINSLEY, D: BENNETT/TINSLEY

 ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0.5	8.00	00	8						Lean clay	
1.5			9	0.144	15	SM	D		Silty SAND, olive, 5Y4/3, thinly laminated and cross laminated, slightly plastic and sticky, no CO ₃ , SO ₄ , or H ₂ S, no organic carbon or fossils	
2.5			7	0.080	43	SM	H		Silty SAND, olive gray, 5Y4/2, and olive, 5Y4/3, thinly laminated, 3 mm. no cross laminations, slightly sticky and plastic, friable, micaceous, no CO ₃ , SO ₄ , or H ₂ S, one 2 mm root; 2 gray silt laminae	
3.5			2	0.088	36	SM	L		Silty SAND, dark olive gray, 5Y3/2, very soft	
4.5			9	0.345	8	SP-SM	L		SAND with silt, gray, 2.5Y5/5, fragments of mollusc shell (Macoma sp?) ; massive, slightly sticky and plastic, no disseminated CO ₃ , SO ₄ , H ₂ , or organic carbon, few angular chert pebbles, ucs= 1.75 ksc	
5.5			11	0.340	12	SP-SM	L		SAND with silt, gray, 5Y5/1, massive, slightly micaceous, slightly sticky and plastic, few shell fragments	
6.5			15	0.251	9	SP-SM	H		SAND with silt, dark gray, 5Y4/1, micaceous, slightly sticky and plastic, no obvious shell fragments, no CO ₃ , SO ₄ , or H ₂ S, no organic carbon	
7.5			16	0.271	8	SP-SM	H		SAND with silt, olive gray, 5Y4/2, thickly bedded, chert pebbles to 10 mm, no CO ₃ , SO ₄ , or H ₂ S, no organic carbon, occasional silty clay parting about 10 mm-thick	
8.5										
9.5				0.002	99	CH			Fat clay, dark greenish gray, 5GY4/1, stiff, sticky, plastic, few fine roots and tube pores, trace CO ₃ and H ₂ S	
10.5				0.003	98	CH			Clay below riverine/estuarine sand, clay, dark greenish gray, 5GY4/1, soft, sticky and slightly plastic, trace CO ₃ and H ₂ S	
11.5				0.003	94	ch			Clay, dark greenish gray, 5GY4/1, no fossils, trace CO ₃ and H ₂ S	

REMARKS. Tentatively identified as in channel

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 51

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI NEAR HWY 1 (LEN)

COORDINATES X: 1186600, Y: 523470

DATE DRILLED CPT: 5-3-91; SPT: 7-8-93

GROUNDWATER 6 ft.; 1.8 m

PERSONNEL L: TINSLEY, D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	18	0.003	94	ch				
11										
11.5									Sandy silt, thin interbed	
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50									Lean clay to silt	
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5									Sand (?), dense	
65									End of sounding, 63.3 ft., 19.3 m	
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.214 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 52a

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI NEAR HWY 1 (LEN)

COORDINATES X: 1185463, Y: 524081

DATE DRILLED CPT: 5-3-91; SPT: 7/7/93

GROUNDWATER 8.8 ft.; 2.7 m

PERSONNEL L: TINSLEY; D: BENNETT/TINSLEY

ELEVATION 12 ft.; 3.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
0.5			a	0.060	56	ML			Sandy SILT, olive brown, 2.5Y4/0, micaceous, lithic pebbles of silic shale, slightly sticky and plastic, no SO ₄ , CO ₃ , fossils or organic carbon, occasional laminae of fine clayey silt, probably overbank facies	
1										
1.5			1	0.063 0.101	56 38	ML SM	D		Sandy SILT, dark grayish brown, 2.5Y4/2, massive, 2 mm-thick, 15 mm-long reed, very soft near 2 m, and silty SAND, very dark grayish brown, 2.5Y3/2, slightly sticky and plastic, no SO ₄ , CO ₃ , fossils or odor in either	
2										
2.5										
3			10	0.159	12	SP-SM	H		SAND with silt, olive brown, 2.5Y4/4, clean, massive except for laminated zone at 3.2 m, no SO ₄ , CO ₃ , H ₂ S, fossils, or organics, coarse sand at base, in tip of sampler, silt, dark gray, 5GY4/1, abrupt contact with overlying sand, occasional mottled, light olive brown, 2.5Y5/4, sand in lower 15 cm of sample	
3.5										
4										
4.5			23	0.270	13	SP-SM	H		Silty SAND, olive gray, 5Y5/2, moist, micaceous, slightly sticky and plastic, slightly dense, no CO ₃ , SO ₄ , H ₂ S, or organic carbon	
5										
5.5			23	0.200	7	SP-SM	H		SAND with silt, laminated with organic charcoal fragments, 60 mm-thick, at 5.8 m; and sand, olive gray, 5Y5/2, thickly bedded with zones of rounded, platy, silic shale fragments 2-5 mm diameter, sand is clean, not effervescent, no SO ₄ , H ₂ S, CO ₃ , or fossils	
6										
6.5										
7			6	0.220 0.002	8 93	SP-SM ch	C		SAND with silt, grayish brown, 2.5Y5/2, moist, micaceous, massive, no CO ₃ , SO ₄ , H ₂ S, fossils or organics, abrupt contact with underlying clay, possibly scoured, and	
7.5										
8									Fat clay, very dark gray, 5Y3/1, stiff, sticky and plastic, ucs=1.25 ksc	
8.5										
9										
9.5			T	0.010 0.117	100 23	cl SM			Lean CLAY to SILT, dark olive gray, 5Y3/2, soft, uniform texture, no bedding, no shells, few roots, no concretions, some slight greenish gray mottling, upper silty part shows some reaction to shaking, ucs=0.8 ksc, and... Silty SAND, dark gray, 5GY4/1, micaceous, no CO ₃ , SO ₄ , H ₂ S, or fossils, ucs=0.6 ksc	
10										
10.5									End of boring, 32 ft., 7.2 m	

REMARKS. Tentatively identified as out of channel
Blow count at 23 ft probably too high, wire wrapped
around tower

Magnitude= 7.1

Acceleration= 0.214 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 52b

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI NEAR HWY 1 (LEN)

COORDINATES X: 1185209, Y: 523394

DATE DRILLED SPT: 7/7/93

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: TINSLEY; D: BENNETT/TINSLEY

ELEVATION 12 ft.; 3.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8	a		71	ml			Silt, dark grayish brown, 2.5Y4/2, to olive brown, 2.5Y4/4, trace of fine sand and clay, slightly sticky and plastic, no SO ₄ , CO ₃ , organics, or fossils Sandy silt and silty clay, very dark grayish brown, 2.5Y3/2, slightly sticky and plastic, no SO ₄ , CO ₃ , organics or fossils Sand, very dark grayish brown, 2.5Y3/2, with occasional 1 cm partings of silt, loose, with silicious shale lithic grains abundant, no CO ₃ , SO ₄ , organics, or odors End of sounding, 6.5 ft., 2.0 m	
5			a	0.06	53	ML				
1.5			2	0.152	24	SM				
2										
2.5										
10										
3										
3.5										
4										
15										
4.5										
5										
5.5										
20										
6										
6.5										
7										
25										
7.5										
8										
8.5										
30										
9										
9.5										
10										
35										
10.5										

REMARKS. Started SPT 52 in wrong place this hole then became len-52b. xyz is mb estimate

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 53

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI NEAR HWY 1 (LEN)

COORDINATES X: 1186180, Y: 522800

DATE DRILLED CPT: 5/3/91; SPT: 7/8/93

GROUNDWATER 7 ft.; 2.1 m

PERSONNEL L: TINSLEY, D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0									
0.5									Fat clay, olive brown, 2.5Y4/3, soft, no CO ₃ or fossils	
1			12	0.155	11	SP-SM	D		Silty sand, fine, olive brown, 2.5Y4/3, micaceous, cross laminations and thinly laminated throughout, loose, friable, no chemical precipitates, no large organics or fossils, not sticky or plastic	
1.5										
2										
2.5			7	0.175 0.155	8 13	SP-SM SM	H*		Silty sand, fine, olive brown, 2.5Y4/3, micaceous, cross laminated in lower 13 cm, massive with occasional disrupted 6 mm silt beds in upper section	
3										
3.5			6	0.162 0.201	13 6	SM SP-SM	L		Sand, dark grayish brown, 2.5Y4/2, to grayish brown, 2.5Y5/2, 20 cm thick bedding, massive within beds, loose, very friable, no chemical precipitates, no organics or fossils, not sticky or plastic	
4										
4.5										
5			10	0.253	7	SP-SM	L		Sand, dark gray, 5Y4/1, micaceous, loose, thick bedded (17-20 cm) no chemical precipitates, no organics or fossils, not sticky or plastic	
5.5										
6			17	0.251	7	SP-SM	H		Sand, dark gray, 5Y4/1, micaceous with lithic fragments, 2-3 mm laminations, not sticky or plastic, clay, dark gray, in tip	
6.5										
7										
7.5										
8										
8.5				0.013	85	ML			SILT with sand, dark greenish gray, 5BG4/1, sticky and plastic, no chemical precipitates, ucs=0.4 ksc	
9										
9.5										
10									Silty sand interbed	
10.5										

REMARKS: Tentatively identified as in channel

Magnitude= 7.1

Acceleration= 0.214 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 53

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION LEONARDINI NEAR HWY 1 (LEN)

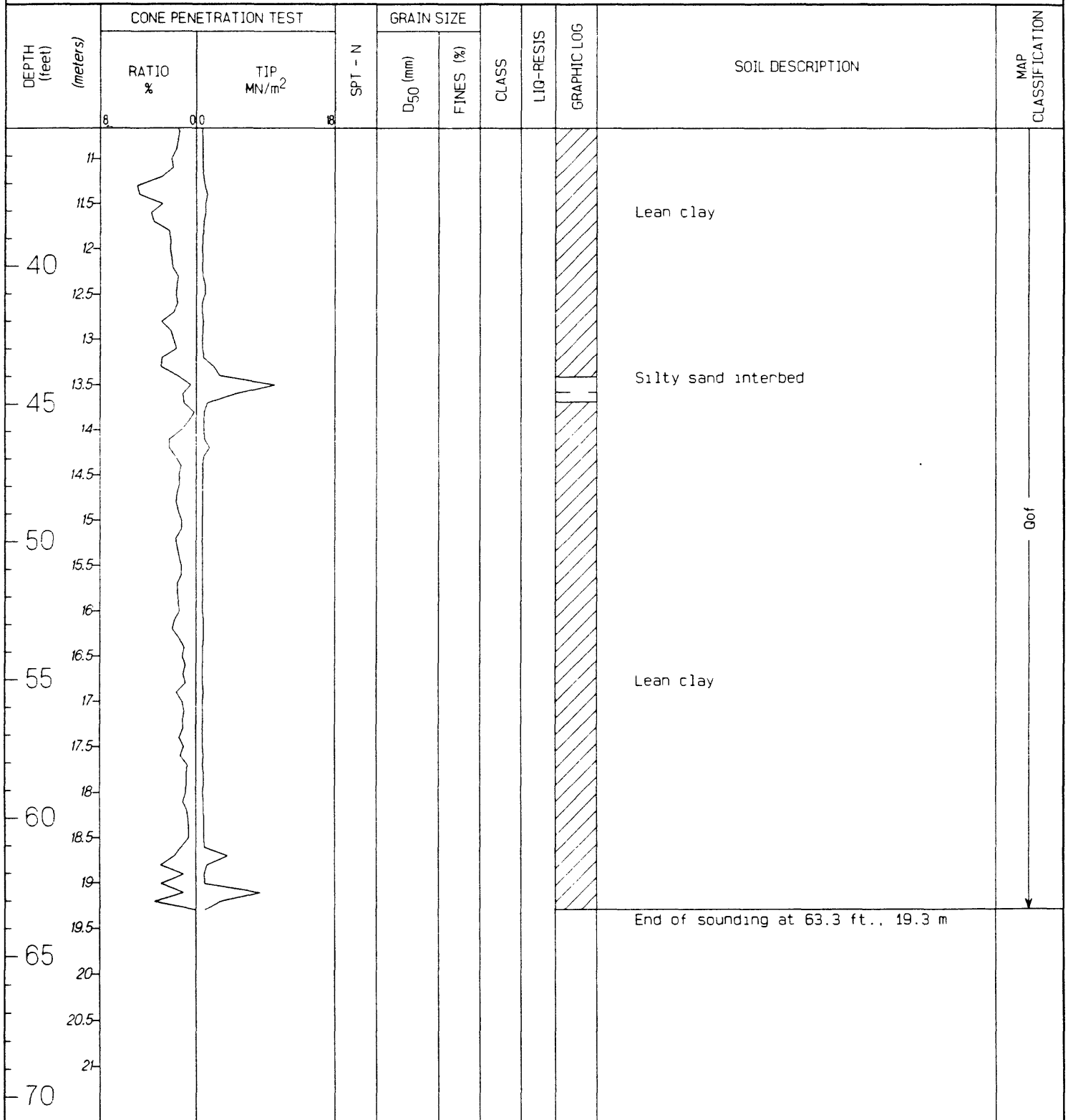
COORDINATES X: 1186180, Y: 522800

DATE DRILLED CPT: 5/3/91; SPT: 7/8/93

GROUNDWATER 7 ft.; 2.1 m

PERSONNEL L: TINSLEY, D: BENNETT/TINSLEY

ELEVATION 10 ft.; 3.0 m MSL



Magnitude= 7.1

Acceleration= 0.214 g

Page 2 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 40

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION WATER TREATMENT PLANT (WST)

COORDINATES X: 1185509, Y: 577535

DATE DRILLED 5/9/90

GROUNDWATER 8.2 ft.; 2.5 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) <i>(meters)</i>	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Lean to fat clay, varying plasticity

REMARKS. Outside of water treatment plant.

Magnitude= 7.1

Acceleration= 0.408 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 40

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION WATER TREATMENT PLANT (WST)

COORDINATES X: 1185509, Y: 577535

DATE DRILLED 5/9/90

GROUNDWATER 8.2 ft.; 2.5 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
11										
11.5									Sand, medium dense	
12										
12.5										
13										
13.5										
14									Lean to fat clay	
14.5										
15										
15.5										
16										
16.5									Sand, dense	
17										
17.5									End of sounding, 56.4 ft., 17.2 m	
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.408 g

Page 2 of 2

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USGS GEOTECHNICAL LOG

HOLE NUMBER 41

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION WATER TREATMENT PLANT (WST)

COORDINATES X: 1186109, Y: 577223

DATE DRILLED 5/9/90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 20 ft.; 6.1m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
21.5										
22										
22.5										
23										
23.5										
24										
24.5										
25										
25.5										
26										
26.5										
27										
27.5										
28										
28.5										
29										
29.5										
30										
30.5										
31										
31.5										
32										
32.5										
33										
33.5										
34										
34.5										
35										

REMARKS: Inside of water treatment plant,
adjacent to large water tank.

Magnitude= 7.1

Acceleration= 0.408 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 42

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION WATER TREATMENT PLANT (WST)

COORDINATES X: 1185907, Y: 577139

DATE DRILLED 5/9/90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 20 ft.; 6.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIO-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	6							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
35										

Lean to fat clay, variable plasticity

REMARKS: Inside of water treatment plant, south side of plant near fence.

Magnitude= 7.1

Acceleration= 0.408 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 42

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION WATER TREATMENT PLANT (WST)

COORDINATES X: 1185907, Y: 577139

DATE DRILLED 5/9/90

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 20 ft.: 6.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12									Sand, medium dense	
12.5										
13										
13.5										
14										
14.5										
15										
15.5									Lean clay	
16										
16.5										
17										
17.5										
18										
18.5										
19									End of sounding, 62.3 ft., 19.0 m	
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.408 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 43

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PDI)

COORDINATES X: 1178160, Y: 565670

DATE DRILLED CPT: 5/10/90, SPT: 5/22/90

GROUNDWATER 8.5 ft.; 2.6 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Silty SAND, dark gray, 5Y4/1	
1			27	0.195	18	SM	D		Biotite silty SAND, very dark gray, 10YR3/1 and light brown, 7.5YR6/4; organic silty clay, black, 2.5Y2/0, to dark gray, 5Y4/1, with abundant organics	
1.5										
2			NA	0.003 0.260	71 6	MH SP-SM	D		Silty SAND, dark gray, 7.5YR4/0; elastic SILT, gray, 2.5Y5/0, abundant organics, yellowish brown, 10YR5/4, mottles; SAND with silt, dark grayish brown, 2.5Y4/2	
2.5										
3									3-3.4 m, elastic silt to fat clay, dark greenish gray, 5G4/1, with organics	
3.5			19	0.150	19	SM	H		Silty SAND, dark gray, 2.5Y4/0, abundant shell fragments	
4										
4.5			76	0.345 0.275	5 10	SP-SM	H		SAND with silt, very dark gray, 2.5Y3/0, poorly sorted with shell fragments; SAND with silt, dark gray, 5Y4/1, moderately sorted	
5										
5.5										
6			65	0.248	11	SP-SM	H		SAND with silt, gray, 5Y5/1	
6.5										
7										
7.5			136	0.455	1	SP	H		SAND with gravel, dark gray, 5Y4/1	
8									End of boring, 25.5 ft., 7.8 m	
8.5										
9										
9.5										
10										
10.5										
35										

REMARKS: Along side road. Blow count at 5-6.5 ft not made, sample is ok.

Magnitude= 7.1

Acceleration= 0.321 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 44

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PDI)

COORDINATES X: 1178430, Y: 565430

DATE DRILLED CPT: 5/10/90, SPT: 5/22/90

GROUNDWATER 11 ft.; 3.4 m

PERSONNEL L: DUPRE D; BENNETT/CRILEY

ELEVATION 12 ft.; 3.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
0.5										
1										
1.5										
2										
2.5										
3			23	0.210	3	SP	D		SAND, grayish brown, 2.5Y5/2	
3.5										
4			17	0.207 0.219	7 3	SP	L*		SAND, black, 10YR5/2 (m); SAND with silt, black, 2.5Y2/0; and SAND, black, 7.5YR2/0	
4.5										
5										
5.5			11				H*		Sample fell out	
6										
6.5										
7			38	0.251	3	SP	H		SAND, gray, 5Y5/1, lost most of sample	
7.5										
8										
8.5			5	0.002	96	ch	C		Fat clay, dark gray, 2.5Y4/0, thin layer of clayey sediment, white, 2.5Y8/0, at base	
9										
9.5			25	0.215	11	SP-SM	H		SAND with silt, dark gray, 5Y4/1, basal 51 mm in sharp contact with overlying medium grained sand with abundant shell fragments, probably estuarine (?)	
10										
10.5									End of sounding, 32.5 ft., 9.9 m	

REMARKS. In parking lot, within failure zone.

Magnitude= 7.1

Acceleration= 0.321 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 78

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1176535, Y: 569175

DATE DRILLED 6-20-91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY/CARTER

ELEVATION 5 ft., 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
0.5									Sand, medium dense	
1										
1.5									Fat clay, very soft	
2										
2.5										
3									Sand, dense	
3.5										
4									Silt	
4.5										
5									Sand, dense	
5.5										
6									End of sounding, 16.7 ft., 5.1 m	
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Magnitude= 7.1

Acceleration= 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 79

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1176590, Y: 568995

DATE DRILLED CPT: 6/20/91, SPT: 7/23/91

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/CARTER

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Sandy silt	
1										
1.5			1	0.004	92	mh	C		Elastic silt, dark olive gray, 5Y3/2 to dark gray 5Y4/1, soft, stratified upper 1/3, few prominent yellowish red 5YR5/8 mottles, occasional 1 mm laminae of fine sand; dark olive gray, 5Y3/2, sand stringer 12-mm-thick, root common	
2										
2.5			47	0.258	1	SP	H		SAND, poorly graded, very dark gray, 5Y3/1, faint parallel laminations near base	
3										
3.5			T	0.209 0.218 0.259	12 7 16	SW-SM SP-SM SM			SAND with silt, poorly graded, to silty SAND with depth, thin clayey silt (not sampled) layer at about 3 m, poorly graded sands are mostly dark olive gray, 5Y3/2, silty sands are black, 2.5Y2/0, during sampling and extrusion clayey silt layer was highly disturbed	
4			26	0.418 0.228	2 4	SP	H		SAND, poorly graded, top 1/2 is very dark gray, 5Y3/1, bottom 1/2 is black, 5Y2.5/1, two halves separated by 3 cm layer of clay, olive, 5Y5/3	
4.5										
5			22	0.390	3	SP	H*		SAND, poorly graded, very dark gray, 5Y3/1, with clayey interbed, upper 1/2 dark gray, 5Y4/1, lower 1/2 dark olive gray, 5Y4/2, sands contain shell fragments	
5.5										
6									Sandy SILT, possible dune soil(?)	
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20									End of sounding, 19 ft., 5.8 m	
20.5										
21										
21.5										
22										
22.5										
23										
23.5										
24										
24.5										
25										
25.5										
26										
26.5										
27										
27.5										
28										
28.5										
29										
29.5										
30										
30.5										
31										
31.5										
32										
32.5										
33										
33.5										
34										
34.5										
35										

Magnitude= 7.1

Acceleration= 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 80

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1176640, Y: 569000

DATE DRILLED 6/20/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY/CARTER

ELEVATION 4 ft.; 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	00								Sandy silt	
5									Fat clay	
10									Sand, dense	
16.1									End of sounding, 16.1 ft., 4.9 m	

Magnitude= 7.1

Acceleration= 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 81
 LOCATION PAJARO DUNES (PD2)
 DATE DRILLED 7/1/91
 PERSONNEL D: BENNETT/CRILEY/CARTER

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1176660, Y: 569040
 GROUNDWATER _____
 ELEVATION 4 ft., 1.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIO-RESJS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Sand, loose	
1										
1.5									Fat clay	
2									Silt	
2.5										
3									Sand, medium dense	
3.5									Sandy silt interbed	
4										
4.5									Sand, dense	
5									Lean clay interbed	
5.5									Sand, dense	
6									End of sounding, 17.1 ft., 5.2 m	
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Magnitude= 7.1

Acceleration= 0.326 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 82

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1176700, Y: 569060

DATE DRILLED CPT: 7/1/91, TUBES: 7/23/91

GROUNDWATER 5.9 ft.; 1.8 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Silty SAND, olive brown, 2.5Y4/4, eolian(?)	
1			A	0.190	24	SM				
1.5										
2			T	0.008 0.004	98 96	CH			Fat CLAY, dark olive gray, 5Y3/2 to dark gray, 5Y4/1, one 3-cm-thick black, 2.5Y2/0, layer, brown oxidized roots are common in zones, soft	
2.5										
3			T	0.003 0.178	99 27	MH SM			Graded. SILT with sand, fines downward to fat CLAY and elastic SILT, then coarsens downward to lean CLAY and silty SAND, fine sediment at top is basically black, 2.5Y2/0 with a zone of dark greenish gray, 5GY4/1, middle section is very dark gray, 5Y3/1, entire sample is very soft, roots are common in zones, silty sand is slightly plastic	
3.5										
4										
4.5									2.8 m, uncorrected age, 290+/-50, 14C YBP	
5									Fat clay to elastic silt, very soft	
5.5										
6										
6.5			T	0.350 0.004	9 95	SP-SM CH			SAND with silt, poorly graded, dark yellowish brown, 10YR3/6, some shell fragments; fat CLAY, very dark gray, 5Y3/1, sticky and plastic. SAND with silt, poorly graded, black, 2.5Y2.5/1, 2 mm clay lamination kept 10 cm sample in tube, about 15 cm of sand sample fell out	
7			A	0.112	45	SM				
7.5									Silty sand	
8									End of sounding, 24.9 ft., 7.6 m	
8.5										
9										
9.5										
10										
10.5										

Grassy area outside of road

Magnitude = 7.1

Acceleration = 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 83

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

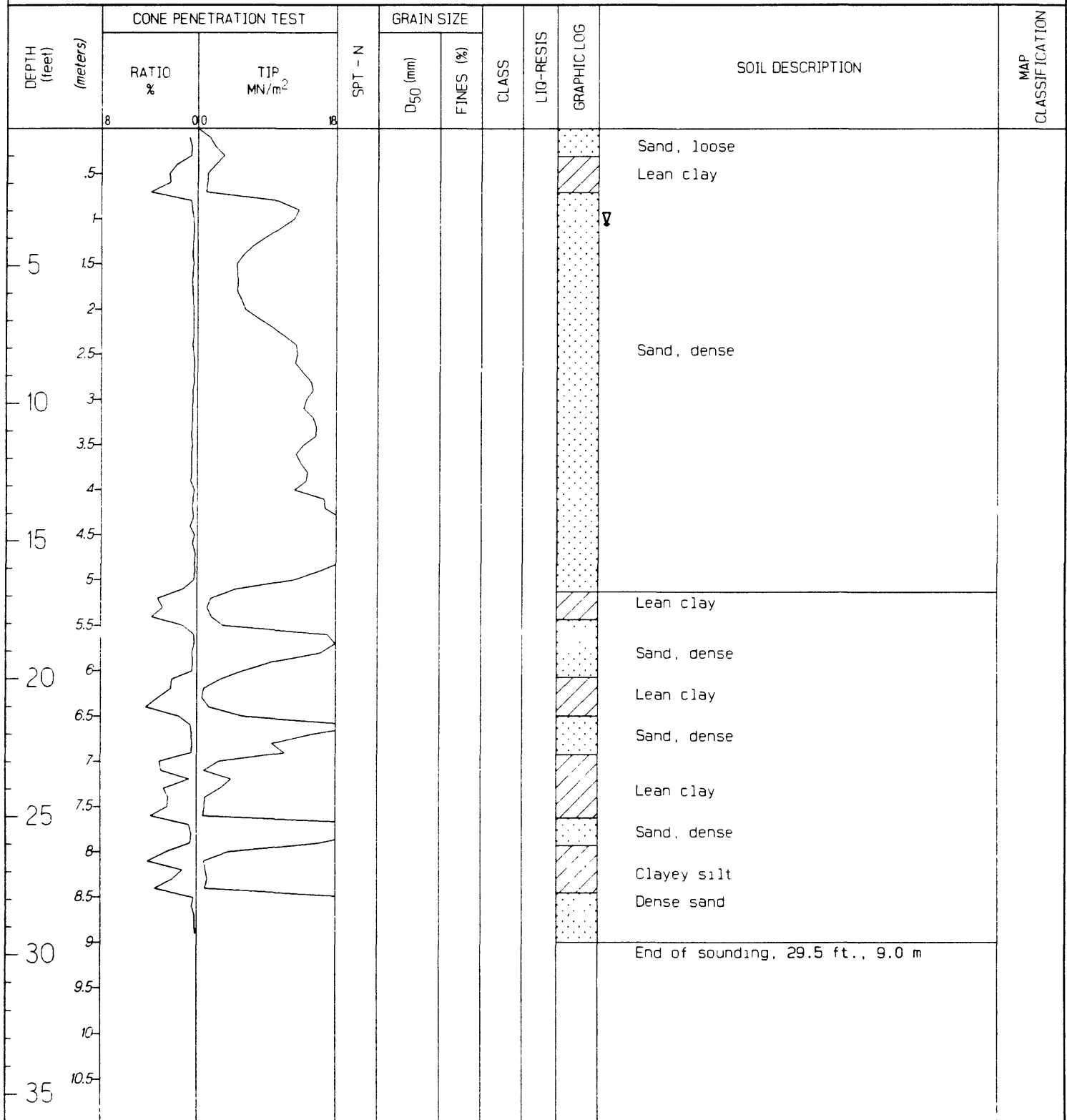
COORDINATES X: 1177220, Y: 567395

DATE DRILLED 6/20/91

GROUNDWATER 3.4 ft.; 1.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 5 ft.; 1.5 m MSL



Magnitude= 7.1

Acceleration= 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 85

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1177650, Y: 566820

DATE DRILLED 6/20/91

GROUNDWATER 3.7 ft.; 1.1 m

PERSONNEL L: BENNETT/CRILEY

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	0							
0.5									Sand, loose	
1									Lean clay, coarsens upward	
1.5										
2									Sand, medium dense	
2.5										
3										
3.5										
4										
4.5									Sand, dense	
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
11										
11.5										
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25										
25.5										
26										
26.5										
27										
27.5										
28										
28.5										
29										
29.5										
30										
30.5										
31										
31.5										
32										
32.5										
33										
33.5										
34										
34.5										
35										

REMARKS. 6.6 m from asphalt, 10.2 m from wood deck, very wet at 1.1 m. No PAJ-84

Magnitude= 7.1

Acceleration= 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 86

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1177700, Y: 566825

DATE DRILLED 6/20/91

GROUNDWATER 3.25 ft.; 1.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0										
0.5									Sand, loose	
1									Lean clay	
1.5										
2										
2.5										
3									Sand, dense	
3.5										
4										
4.5										
5										
5.5										
6									Lean clay	
6.5										
7										
7.5										
8									Interbedded sandy silt and silty sand	
8.5										
9									Sand, dense	
9.5										
10									End of sounding, 31.5 ft., 9.6 m	
10.5										

REMARKS. 5.5 m from asphalt, 12.5 m from #85

Magnitude= 7.1

Acceleration= 0.326 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 87

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION PAJARO DUNES (PD2)

COORDINATES X: 1177500, Y: 566840

DATE DRILLED 6/20/91

GROUNDWATER 2.5 ft.; .8 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 5 ft.; 1.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8						Silty sand	
0.5									Lean clay	
1										
1.5										
2										
2.5										
3									Sand, medium to dense	
3.5										
4										
4.5										
5										
5.5										
6										
6.5									Interbedded silty sand and lean clay	
7										
7.5										
8									Sand, dense	
8.5										
9									End of sounding, 27.9 ft., 8.5 m	
9.5										
10										
10.5										
35										

REMARKS: 5.5 m from asphalt, 14 m from # 86

Magnitude= 7.1

Acceleration= 0.326 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 45

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SP BRIDGE (SPR)

COORDINATES X: 1195342, Y: 582526

DATE DRILLED CPT: 6/20/90, SPT: 8/31/90

GROUNDWATER 14.4 ft., 4.4 m

PERSONNEL L: TINSLEY, D: VREUGDENHIL/BENNETT/CRILEY

ELEVATION 23 ft., 7.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Fat clay, olive, 5Y4/3, stiff, slightly sticky, slightly plastic, moderately effervescent	
1										
1.5			15	0.004	96	CH	C		Fat CLAY, dark grayish brown, 2.5Y4/2, sticky, plastic, some CO ₃ , no organics, shells or H ₂ S, silty partings 30-40 mm, few CO ₃ veinlets, fine micaceous sand at tip, olive, 5Y4/3	
2										
2.5										
3			7	0.107	24	SM	D		Silty SAND, olive, 5Y5/3, micaceous nonsticky, nonplastic, thinly laminated locally cross laminated in top half, 2-3 mm thick, trace disseminated CO ₃ , no organics, shells, roots or H ₂ S, ucs=1.2 ksc	
3.5										
4										
4.5			11	0.167	6	SP-SM	L		SAND with silt, very dark gray, 5Y3/1, micaceous, peaty silt at 4.6 m to 4.8 m, sand, olive gray, 5Y4/2, ucs=0.8-1.2 ksc	
5										
5.5			11	0.171	10	SP-SM	L*		SAND with silt, olive gray, 5Y4/2 micaceous, thinly laminated 2.5 mm, not sticky or plastic, disseminated CO ₃ , no organics, shells, or H ₂ S, ucs=1.25-1.8 ksc	
6										
6.5			19	0.240	11	SP-SM	L		SAND with silt, olive gray, 5Y4/2 micaceous, few dark gray clay stringers to 3 mm, sets 80-100 mm thick, not sticky or plastic, no organics, H ₂ S, shells, no bedding features preserved except clay partings; disseminated CO ₃	
7										

REMARKS: Dirt patch, south end of bridge, west side of tracks.
Upper CPT record unavailable due to pre-drilling.
NOTE!! SCALE CHANGE TO ACCOMMODATE TEXT.*****

Magnitude = 7.1

Acceleration = 0.489 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 45

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SP BRIDGE (SPR)

COORDINATES X: 1195342, Y: 582526

DATE DRILLED CPT: 6/20/90, SPT: 8/31/90

GROUNDWATER 14.4 ft.; 4.4 m

PERSONNEL L: TINSLEY, D: VREUGDENHIL/BENNETT/CRILEY

ELEVATION 23 ft.; 7.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		18							
7.5										
8			12	0.300	6	SP-SM	L		SAND with silt, dark gray, 2.5Y4/1, not sticky or plastic; well stratified, 1 fining upward sequence, sandstone clast (20 mm), medium sand fines up to silty fine sand; more below	
8.5									organic silt at 7.7 m, organic silty clay, black, 2.5Y2/1, no shells or odor	
29			A	0.007	75	MH			7.9 m, uncorrected age, 355 +/- 60, ¹⁴ C YBP	
9			B	0.005 0.475	95 9	mh SP-SM	C		Elastic SILT, no further description	
9.5									Elastic silt, dark gray, 5GY4/1, sticky, plastic, few fine roots, trace organics, disseminated CO ₂ , ucs=0.75-0.9 ksc, no stratification; and, see below	
10			41	0.355	7	SP-SM	H		SAND with silt, dark gray, 2.5Y4/1, massive, not sticky or plastic, clay, as above, in tip of sampler	
34									SAND with silt, olive, 5Y5/3, not sticky or plastic; moderately well sorted, massive, disseminated CO ₂ , no shells, organics or odor, ucs=1.75 ksc	
10.5										
11			22	0.355	9	SP-SM	L		SAND with silt, olive, 5Y5/3, micaceous, poorly stratified, not sticky or plastic, disseminated CO ₂ , no organics, odor, or shells, ucs=0.75-0.9 ksc	
11.5										
39									End of sounding, 36.5 ft., 11.1 m	
12										
12.5										
13										
44										
13.5										
14										
14.5										

Magnitude= 7.1

Acceleration= 0.489 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 46

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SP BRIDGE (SPR)

COORDINATES X: 1195878, Y: 581676

DATE DRILLED 6/20/90

GROUNDWATER 10.5 ft.; 3.2 m

PERSONNEL D: VREUGDENHIL/BENNETT/CRILEY

ELEVATION 23 ft.; 7.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Silt	
1									Silty sand	
1.5									Lean clay	
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
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30										
30.5										
31										
31.5										
32										
32.5										
33										
33.5										
34										
34.5										
35										

REMARKS: On field road far outside channel.

Magnitude= 7.1

Acceleration= 0.489 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 47

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SP BRIDGE (SPR)

COORDINATES X: 1195552, Y: 582425

DATE DRILLED 6/21/90

GROUNDWATER 14.8 ft.; 4.5 m

PERSONNEL D: VREUGDENHIL/BENNETT/CRILEY

ELEVATION 23 ft.; 7.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	Liq-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
5									Dry and unknown soil type	
10										
15									Sand, medium dense	
20										
25									Lean clay	
30									Sand, medium to dense	
35									End of sounding, 32.8 ft., 10.0 m	

REMARKS: Out side of channel next to railroad tracks.
Upper CPT record unavailable due to pre drilling.

Magnitude= 7.1

Acceleration= 0.489 g

Page 1 of 1

USGS GEOTECHNICAL LOG

HOLE NUMBER 48

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SP BRIDGE (SPR)

COORDINATES X: 1195221, Y: 582801

DATE DRILLED CPT: 6/27/90, SPT: 8/31/90

GROUNDWATER 17.5 ft.; 5.3 m

PERSONNEL L: TINSLEY, D: VREUGDENHIL/BENNETT/CRILEY

ELEVATION 18.0 ft.; 5.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18						Fill, silt, railroad gravel and rubbish	
0.5									Silt, olive, 5Y5/3, not sticky or plastic, loose	
1										
1.5			6	0.108	30	SM	D		Silty SAND, grayish brown, 2.5Y5/2, well sorted, thinly laminated, 5-7 mm not sticky or plastic; no shells, organics, or odor; trace of disseminated CO ₃	Gyl
2										
2.5										
3			7	0.062	59	ML	D		Sandy SILT, light olive brown, 2.5Y5/4, lower 178 mm well-stratified, laminated mini fining upward sequences, well disseminated CO ₃ , organics in lower 1/4 of sample with detrital charcoal, no shells or odor	
3.5										
4									3.4 m, uncorrected age, 130 +/- 55, ¹⁴ C YBP	
4.5			13	0.158	12	SP-SM	D		SAND with silt, very dark gray, 2.5Y3/0, micaceous, and sandy silt, 3 fining upward sequences, well stratified poorly sorted, not sticky or plastic, disseminated CO ₃ , no organics, shells, or odor	
5										
5.5										
6			7	0.168	13	SP-SM	L		SAND with silt, very dark gray to black, 2.5Y3/0, organic rich, reeds, wood, charcoal throughout core, non-sticky, nonplastic, no odor or shells, trace CO ₃	
6.5										
7			10				L		No recovery, residue in sampler was fine dark sand as above, no organics	
7.5										
8										
8.5			11	0.164	14	SP-SM	L		Silty SAND, very dark gray, 2.5Y3/0, micaceous, massive, not sticky or plastic, no shells, trace of disseminated CO ₃	
9										
9.5			13	0.623	7	SP-SM	L		SAND with silt, gray, 5Y5/1 not sticky or plastic, no shells or organics; trace disseminated CO ₃ , chert clast, subrounded to 40-mm long in tube	
10										
10.5										
35										

REMARKS: In Pajaro river channel next to channel.
Initially identified as SP46.

Magnitude= 7.1

Acceleration= 0.489 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 48

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SP BRIDGE (SPR)


COORDINATES X: 1195221, Y: 582801

DATE DRILLED CPT: 6/27/90, SPT: 8/31/90

GROUNDWATER 17.5 ft.; 5.3 m

PERSONNEL L: TINSLEY, D: VREUGDENHIL/BENNETT/CRILEY

ELEVATION 18.0 ft.; 5.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIST	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		11	0.225	9	SP-SM	L		SAND with silt, olive gray, 5Y5/2, micaceous, gravelly at base, 30 mm granitic clast lodged in tip, not sticky or plastic; no shells, organics, or odor, trace CO ₂	Gof
11									End of boring, 36.5 ft., 11.1 m	
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.489 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 54

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MUNICIPAL AIRPORT (WAT)

COORDINATES X: 1185490, Y: 594580

DATE DRILLED CPT: 6/6/91, SPT: 6/6/91

GROUNDWATER 27 ft.; 8.2 m

PERSONNEL L: CARTER/TINSLEY, D: BENNETT/CRILEY

ELEVATION 142 ft.; 43.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	8						Sand, medium dense	
0.5										
1			T	0.060 0.045	52 43	CL			Sandy lean CLAY, light to dark yellowish brown, 10YR-6/4, 5/6, 4/4, and 4/6, very hard, ucs=4.5 ksc, open root pores, gravel in lower parts	
1.5			A	0.060	51	CL			Sandy lean CLAY	
2										
2.5			41	0.242	35	SM	D		Silty SAND, brown with yellow and red mottles, no CO ₂ , gravelly layer at 2.6 m, fine white sandy layer at 2.8 m, ucs=4.5 ksc	
3										
3.5										
4			T	0.182 0.305	36 27	SM			Silty SAND, dark yellowish brown 10YR3/6 to dark brown 7.5YR3/4, very hard to break by hand, well indurated, very poorly sorted, gravel present in all parts	
4.5										
5										
5.5										
6			7	0.015	83	CL	C		Lean CLAY with sand, gray with red mottles (oxidized tubular pores), slight to no CO ₂ , disseminated organic carbon throughout, coarse gravel at 6.1 m, ucs=1.25 ksc	
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10			T	0.003 0.268	86 13	CH SM			Silty SAND, dark yellowish brown 10YR3/6 and 4/6, ucs=4.5 ksc	
10.5			25	0.225 0.128	14 27	SM	H*		Silty SAND, dark yellowish brown, 10YR4/4, no CO ₂ , fossils or organics, scattered rounded to subangular pebbles, dense	

Magnitude = 7.1

Acceleration = 0.548 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 55

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

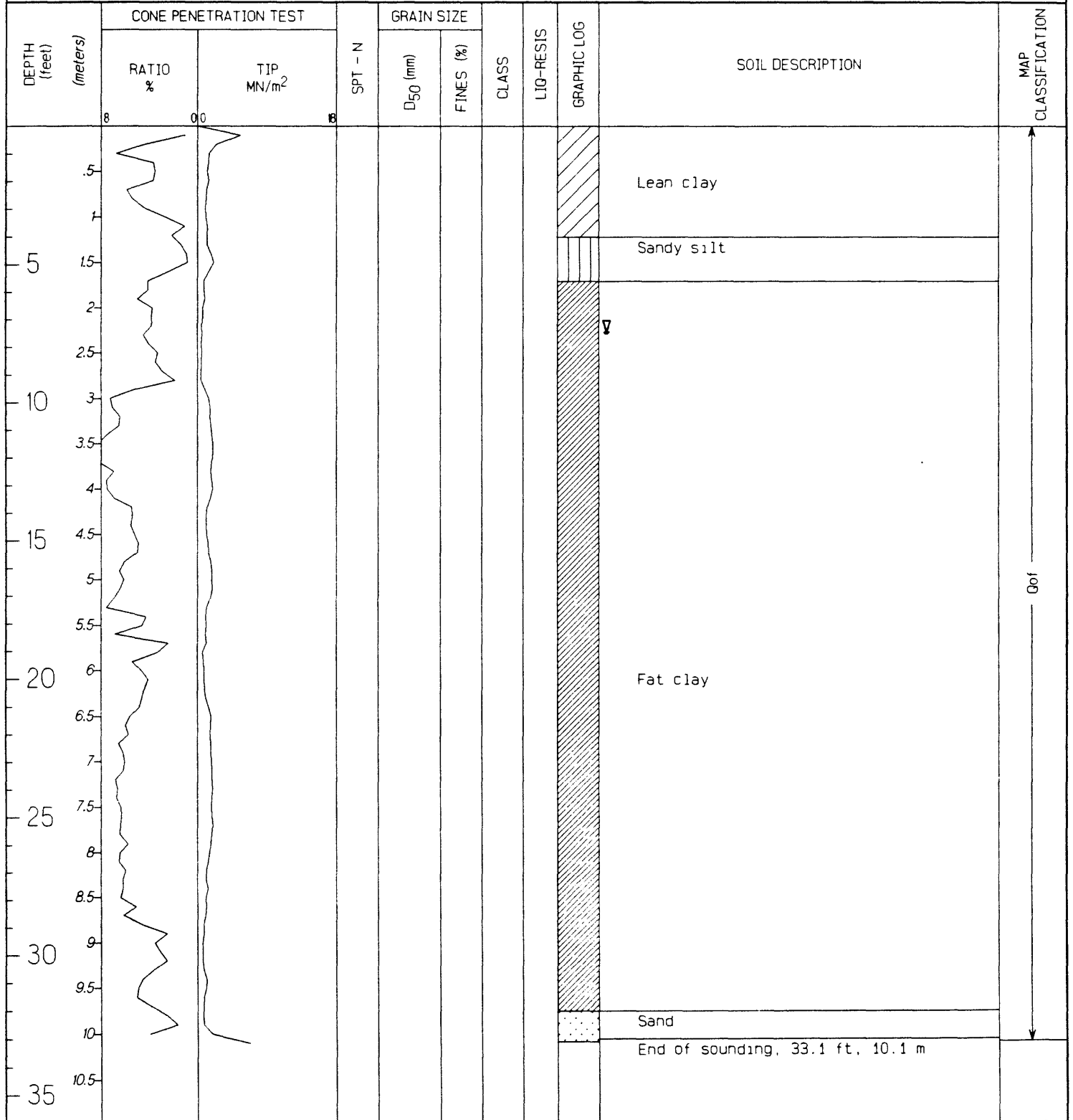
COORDINATES X: 1198614, Y: 585864

DATE DRILLED 6/7/91

GROUNDWATER 7.4 ft.; 2.3 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL



Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 56

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

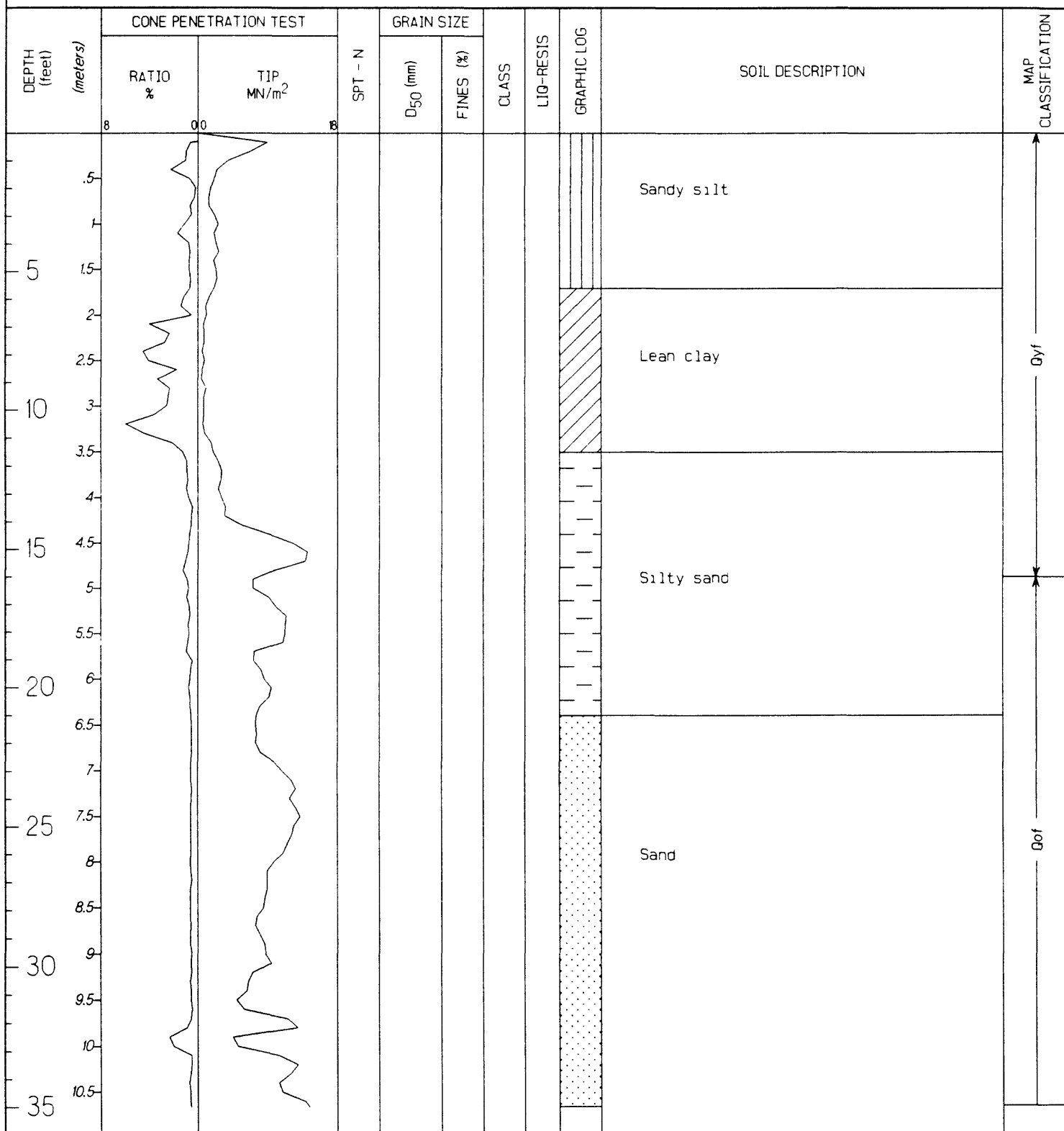
COORDINATES X: 1198784, Y: 585413

DATE DRILLED 6/7/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL



Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 56

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1198784, Y: 585413

DATE DRILLED 6/7/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		8							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

End of sounding, 38 ft, 11.6 m

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 57

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

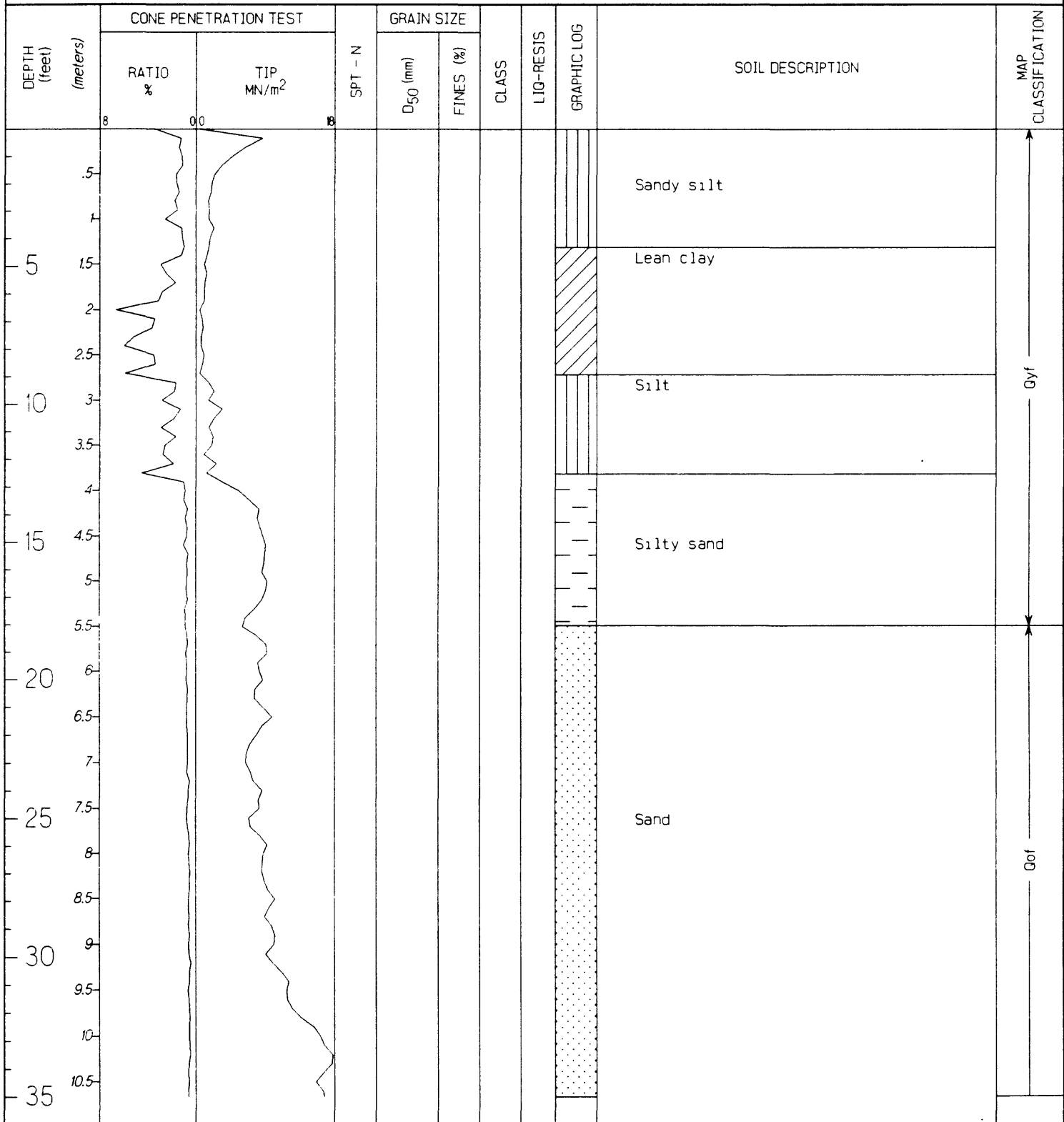
COORDINATES X: 1198838, Y: 585278

DATE DRILLED 6/7/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL



Magnitude= 7.1

Acceleration= 0.538 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 57

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1198838, Y: 585278

DATE DRILLED 6/7/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
21										
40										
45										
50										
55										
60										
65										
70										

Sandy silt, may grade to silt or lean clay

End of sounding, 63.7 ft, 19.4 m

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 58

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1199085, Y: 585004

DATE DRILLED CPT: 6/7/91, SPT: 7/18/91

GROUNDWATER 15.9 ft.; 4.8 m

PERSONNEL L: TINSLEY/CARTER, D: BENNETT/CRILEY

ELEVATION 32 ft.; 9.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5			3	0.185 0.048	13 66	ML	D		Silty SAND, yellowish brown 10YR5/4, massive, loose, slight CO ₃ , no organics, mottles or pores; Sandy SILT, dark yellowish brown 10YR4/4, interbeds of 3-mm thick clay, thin laminations of organics, strongly CO ₃ , no roots, pores or mottles	Gyl
1										
1.5										
2			4	0.085 0.029	43 91	SM ML	D		Silty SAND, yellowish brown 10YR5/8, no bedding, trace organics, no mottling, root pores or CO ₃ ; SILT, dark yellowish brown 10YR4/4, top 2/3, thinly laminated, trace organic carbon, 1-mm iron red mottles throughout, possible root pores, loose	
2.5										Gyl
3										
3.5			10	0.020 0.127	90 15	ML SM	D		SILT, grayish brown 10YR5/2, massive, red mottles 5 to 10 mm diameter, root pores throughout but no roots, very firm, sticky and plastic, abundant CO ₃ , ucs=1 ksc; more in next unit.	
4										
4.5			26	0.115	16	SM	D		Silty SAND, grayish brown 10YR5/2, 1-mm thick cross laminations throughout, 25-mm thick clay layer at 3.6 m, slight CO ₃	Gyl
5									Silty SAND, dark gray 10YR4/1, massive, heavy mineral layers 2-mm thick separated by 1 cm of coarse sand, no mottles, organics, roots, pores, trace CO ₃	
5.5										
6			21	0.290	2	SP	L		Poorly graded SAND, very dark gray 7.5Yn3/0, massive, no organics or bedding, no CO ₃	
6.5										Gyl
7										
7.5			17	0.262 0.238	4 7	SP SP-SM	L		Poorly graded SAND, dark brown 7.5Y4/2, massive, no organics, roots, tubular pores, or mottles, poorly graded SAND with silt, dark gray 2.5Yn4/0, massive, very similar to above except for color	
8										
8.5										Gyl
9										
9.5										
10									Lean clay	
10.5									Sand, dense	
35										

REMARKS: Inside of levee. PVC casing installed for temporary piezometer installation.

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 58

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1199085, Y: 585004

DATE DRILLED CPT: 6/7/91, SPT: 7/18/91

GROUNDWATER 15.9 ft.; 4.8 m

PERSONNEL L: TINSLEY/CARTER, D: BENNETT/CRILEY

ELEVATION 32 ft.; 9.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Interbedded sand and lean clay

Sand, dense

End of sounding, 58.7 ft, 17.9 m

Qof

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 59

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1198593, Y: 585310

DATE DRILLED CPT AND SPT: 6/7/91

GROUNDWATER 15.8 ft.; 4.8 m

PERSONNEL L: CARTER, D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5			A	0.056	58	ML			Sandy SILT, grayish brown	
1										
1.5			2	0.074 0.051	51 61	ML	D		Sandy SILT, grayish brown, trace of organics throughout top part, at base of top part is 5 mm clay band; bottom part is bedded with thin layers of finer sediment 0.5 to 5 cm in thickness, no organics	
2										
2.5			2	0.045 0.063	76 58	ML	D		SILT with sand, grayish brown, no organics, 2-mm-thick silty laminae throughout, disseminated CO ₂ , sandy SILT, grayish brown, trace organics throughout, slight CO ₂	
3			A	0.022	86	ML				
3.5										
4			4	0.006 0.031	99 89	CL	C		SILT	
4.5									Lean CLAY, brownish gray, disseminated CO ₂ , no organics; and lean CLAY, brownish gray, disseminated CO ₂ , finest at base, ucs=1.0 ksc	
5			5	0.113 0.097	17 30	SM	D		Silty SAND, grayish brown, top 1/2 is massive with orange mottling throughout, trace organics, no CO ₂ , bottom 1/2 contains soil horizon, laminated interbedded orange and gray 1-mm layers, mottled with red and orange, oxidized organics throughout, mottling along roots, moderate disseminated CO ₂ , ucs=1.5 ksc	
5.5										
6			9	0.113 0.159	25 6	SM SP-SM	L		Silty SAND, olive gray, roots and bark throughout, 1-mm thick medium to coarse sand laminations inclined slightly, most organics in layers 3-cm thick and 3 cm apart, more in next unit;	
6.5										
7			16	0.205	5	SP-SM	L		SAND with silt, poorly graded, greenish brown, no organics, massive, medium to slight CO ₂ , ucs=1.25 ksc	
7.5									SAND with silt, poorly graded, olive brown, 2.5Y4/4, massive, top 1/2 contains trace organics and is darker	
8			21	0.200	7	SP-SM	L		SAND with silt, poorly graded, grayish brown, 2.5Y5/2, massive, trace disseminated CO ₂ throughout, slight organic layer, 1-mm thick, 3 cm from bottom of sample, ucs=0.6 ksc	
8.5										
9										
9.5			16	0.200 0.190	7 10	SP-SM	L		Poorly graded SAND with silt, dark olive gray, 5Y4/2, massive, bottom is lighter gray, no organics, disseminated CO ₂ throughout	
10										
10.5										

REMARKS: Alongside outer levee road.

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 59

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1198593, Y: 585310

DATE DRILLED CPT AND SPT: 6/7/91

GROUNDWATER 15.8 ft.; 4.8 m

PERSONNEL L: CARTER, D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

End of sounding, 36.4 ft, 11.1 m

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 60

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

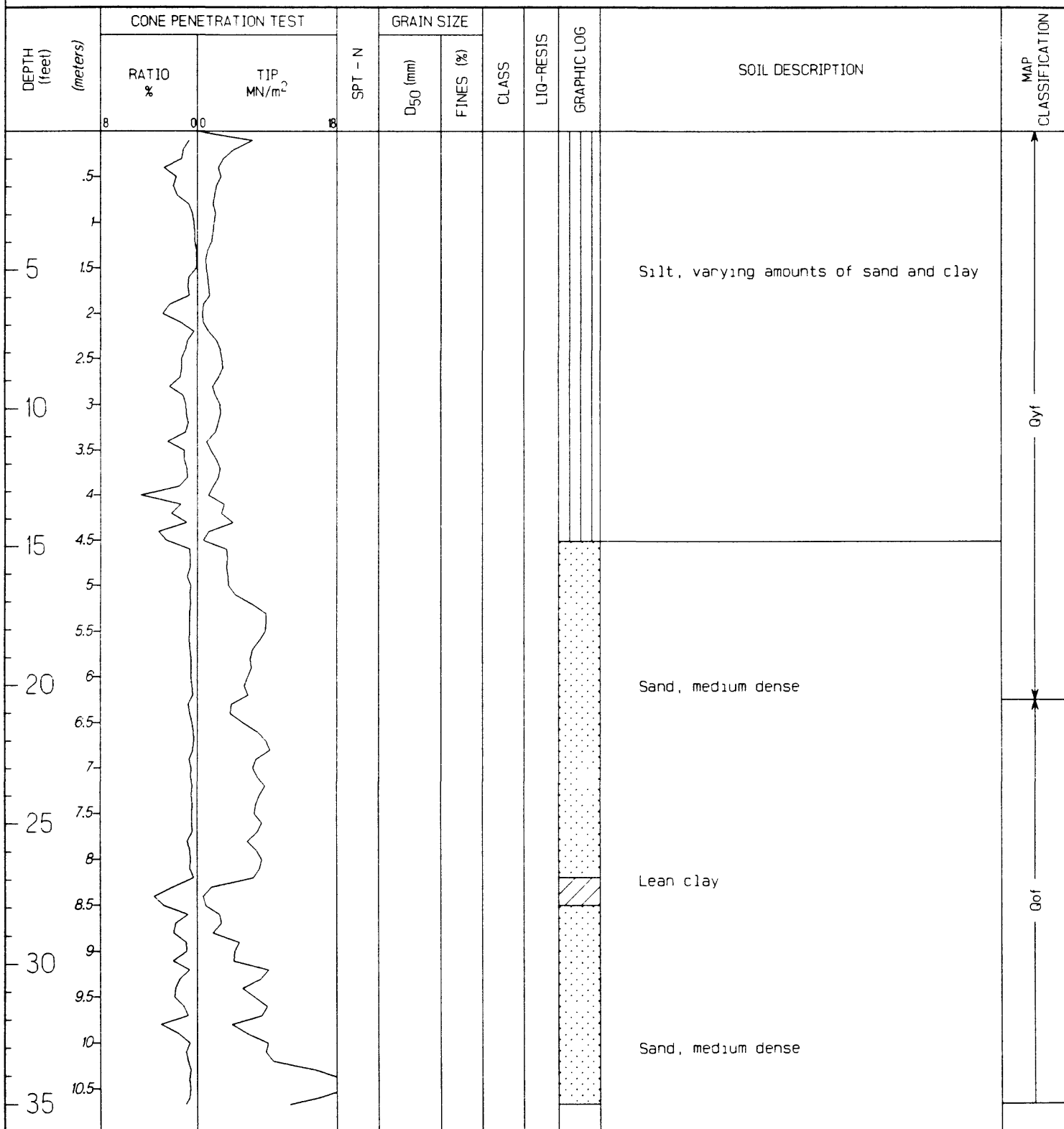
COORDINATES X: 1197902, Y: 585418

DATE DRILLED 6/14/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL



Magnitude= 7.1

Acceleration= 0.538 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 60

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197902, Y: 585418

DATE DRILLED 6/14/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5									Lean clay	
12										
12.5									Sand, dense	
13										
13.5									End of sounding, 43.3 ft, 13.5 m	
40										
45										
50										
55										
60										
65										
70										

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 61

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197682, Y: 585485

DATE DRILLED CPT: 6/17/91, SPT: 7/9/91

GROUNDWATER 13.75 ft.; 4.2 m

PERSONNEL L: TINSLEY, LANEY, D: BENNETT/CRILEY/LANEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	0.0	8						Sandy silt, dark grayish brown, 2.5Y4/2	
0.5										
1			4	0.049	77	ML	D		SILT with sand, light olive brown, 2.5Y5/4, trace CO ₃ , few medium roots, not sticky or plastic with some sandy silt	
1.5										
2			4	0.085	43	SM	D		Silty SAND, olive 2.5Y4/4, not plastic or sticky, micaceous, trace organics, no CO ₃ , clay partings 2.3 and 2.4 m; bottom most, soft clay, strong brown 7.5YR4/6, distinct fine mottles, ucs=0.75 ksc	
2.5			12	0.047	72	ML	D			
3									SILT with sand, light olive brown 2.5Y5/4, micaceous, not sticky or plastic, fines upward to silt, olive brown 2.5Y4/4, trace disseminated CO ₃ , trace detrital charcoal throughout	
3.5			9	0.090	38	SM	D			
4										
4.5			13	0.300	6	SP-SM	L		Silty SAND, dark grayish brown 2.5Y4/2, micaceous, not plastic or sticky, finely cross laminated, some ripple-drift cross laminations, no CO ₃ , organics or fossils	
5									Silt, dark greenish gray 5GY4/1, soft; clay, greenish gray 5GY5/1, soft, organic-rich, needs, trace CO ₃ , H ₂ S odor, sand, dark gray 5Yn/4, cross laminated, occasional pebbles to 1 cm, massive clot of organic plant fragments at 4.7 m, SAND with silt, same dark color, no pebbles; lower most sand thinly laminated	
5.5									4.7 m, uncorrected age, 230+/-70, 14C YBP	
6			9	0.113	21	SM	L		Silty SAND, olive gray 5Y4/2, 0.5 cm-thick laminae, slight CO ₃ , no fossils or H ₂ S, ucs=1.5 ksc	
6.5										
7										
7.5										
8										
8.5										
9			28	0.200	9	SP-SM	L*		SAND with silt, poorly graded, olive 5Y5/3, micaceous, not plastic or sticky, massive, upper part is olive gray	
9.5										
10										
10.5									Lean clay	
35										

REMARKS. Tentatively identified as in the failure zone.

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 61

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197682, Y: 585485

DATE DRILLED CPT: 6/17/91, SPT: 7/9/91

GROUNDWATER 13.75 ft.; 4.2 m

PERSONNEL L: TINSLEY, LANEY, D: BENNETT/CRILEY/LANEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	18							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
40									Sandy silt	
45										
50									Sand, dense	
55									End of sounding, 49.2 ft, 15 m	
60										
65										
70										

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 62

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197644, Y: 585632

DATE DRILLED CPT: 6/17/91, SPT: 7/9/91

GROUNDWATER 11.8 ft.; 3.6 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY/LANEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8						Fat clay, dark grayish brown 2.5Y4/2, stiff, plastic and sticky	
0.5										
1			10	0.005	98	mh	C		Elastic silt, olive brown 2.5Y4/3, few organics-charcoal, no CO ₃ , occasional silt partings less than 0.25 mm-thick, ucs=2.5-3 ksc	
1.5										
2			3	0.019	96	ML	C		SILT, olive brown, 2.5Y4/4, thinly laminated, clay partings 1-2 cm-thick, trace CO ₃ , no organics, fossils, or SO ₄ , ucs=0.5 ksc	
2.5										
3										
3.5										
4			1	0.014 0.007	98 95	ML mh	C		SILT, dark yellowish brown 10YR4/4, trace CO ₃ , roots near 4 m, plastic and sticky, soft	
4.5										
5			6	0.005	99	MH	C		Elastic SILT, olive brown 2.5Y4/4, mottled, no H ₂ S, few CO ₃ nodules, trace disseminated CO ₃	
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5			7	0.002	98	mh	C		Elastic SILT, dark gray 5Y4/1, many fine tubular pores, CO ₃ on fracture surfaces but not in pores, few large distinct mottles, good bioturbation, probably paleosol, no deep root penetration, also, elastic silt, gray, bioturbated, ucs=2 ksc, few laminae, sticky and plastic; lowermost sample is soft clay, dark greenish gray, 5G4/1, thinly laminated	
10										
10.5										

REMARKS: Outside failure zone

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 62

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197644, Y: 585632

DATE DRILLED CPT: 6/17/91, SPT: 7/9/91

GROUNDWATER 11.8 ft.; 3.6 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY/LANEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8	0.003	95	mh	c		Elastic silt, dark greenish gray, 5BG4/1. more in next unit;	
11			9	0.029	96	ML			10.8 m, uncorrected age, 230+/-60, 14C YBP	
11.5									SILT, dark greenish gray 5BG4/1. soft, not sticky or plastic. few organics as roots remain, ucs=<0.5 ksc, no fossils or SO ₄ , trace disseminated CO ₃ and H ₂ S	
12									Silt	
12.5										
13										
13.5										
14									Sand, dense	
14.5									End of sounding, 46.3 ft., 14.1 m	
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.538 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 63

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197765, Y: 585852

DATE DRILLED 6/17/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.: 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5										
10										
15										
20										
25										
30										
35										

Fat clay

Very soft between 7.4 and 8.4 m

Got

REMARKS: Outside failure zone.

Magnitude= 7.1

Acceleration= 0.538 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 63

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197765, Y: 585852

DATE DRILLED 6/17/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		00	8							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.538 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 64

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197898, Y: 586193

DATE DRILLED 6/17/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5	1.5									
10	3									
15	4.5								Fat clay, stiff and soft zones alternate	
20	6									
25	7.5									
30	9								Sandy silt	
35	10.5								Fat clay	

REMARKS: Outside failure zone.

Magnitude= 7.1

Acceleration= 0.538 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 64

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION FARRIS (FAR)

COORDINATES X: 1197898, Y: 586193

DATE DRILLED 6/17/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 33 ft.; 10.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5									Sandy silt	Gof
12									End of sounding, 39 ft., 11.9 m	
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.538 g

Page 2 of 2

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USGS GEOTECHNICAL LOG

HOLE NUMBER 65

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARINOVICH (MRR)

COORDINATES X: 1207354, Y: 586955

DATE DRILLED CPT: 6/19/91, SPT: 7/24/91

GROUNDWATER 18.5 ft.; 5.6 m

PERSONNEL L: DUPRE/TINSLEY, D: BENNETT/CRILEY

ELEVATION 45 ft.; 13.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0								
5			A	0.011	91	CH			Fat CLAY	
1.5			2	0.035 0.048	89 84	ML	D		SILT to SILT with sand, olive brown, 2.5Y4/6, faint parallel laminations	
2.5									Lean clay, soft	
10			7	0.087	42	SM	D		Silty SAND, olive brown, 2.5Y4/6, some parallel laminations with trace of organics	
15			5	0.104	30	SM	D		Silty SAND, olive brown, 2.5Y4/4, micaceous, thick bedded, few roots throughout, few distinct olive gray, 5Y4/2, and dark grayish brown 2.5Y4/2, mottles, plastic, slight disseminated CO ₃ , ucs=1 ksc	
20			6	0.056 0.066	63 59	ML	L		Sandy SILT, dark greenish gray, 5G4/1, disseminated organics in upper 15 cm, very thinly laminated throughout, no SO ₄ , trace CO ₃ , not sticky or plastic	
25			13	0.159	12	SM	L		Silty SAND, olive gray 5Y4/2, micaceous, not sticky or plastic, thinly laminated, few fine roots, trace disseminated CO ₃ , 1-cm-diameter clay ball in sample at 7.6 m	
30			20	0.156	11	SP-SM	L		SAND with silt, poorly graded, olive gray 5Y5/2, cross laminated in upper 1/2 of sample, massive in lower 1/2, not sticky or plastic, trace CO ₃ , no fossils or SO ₄ , ucs=3.0 ksc	

Magnitude= 7.1

Acceleration= 0.588 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 65

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARINOVICH (MRR)

COORDINATES X: 1207354, Y: 586955

DATE DRILLED CPT: 6/19/91, SPT: 7/24/91

GROUNDWATER 18.5 ft.; 5.6 m

PERSONNEL L: DUPRE/TINSLEY, D: BENNETT/CRILEY

ELEVATION 45 ft.; 13.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	18								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

End of sounding, 45.6 ft., 13.9 m

Magnitude= 7.1

Acceleration= 0.588 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 66

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARINOVICH (MRR)

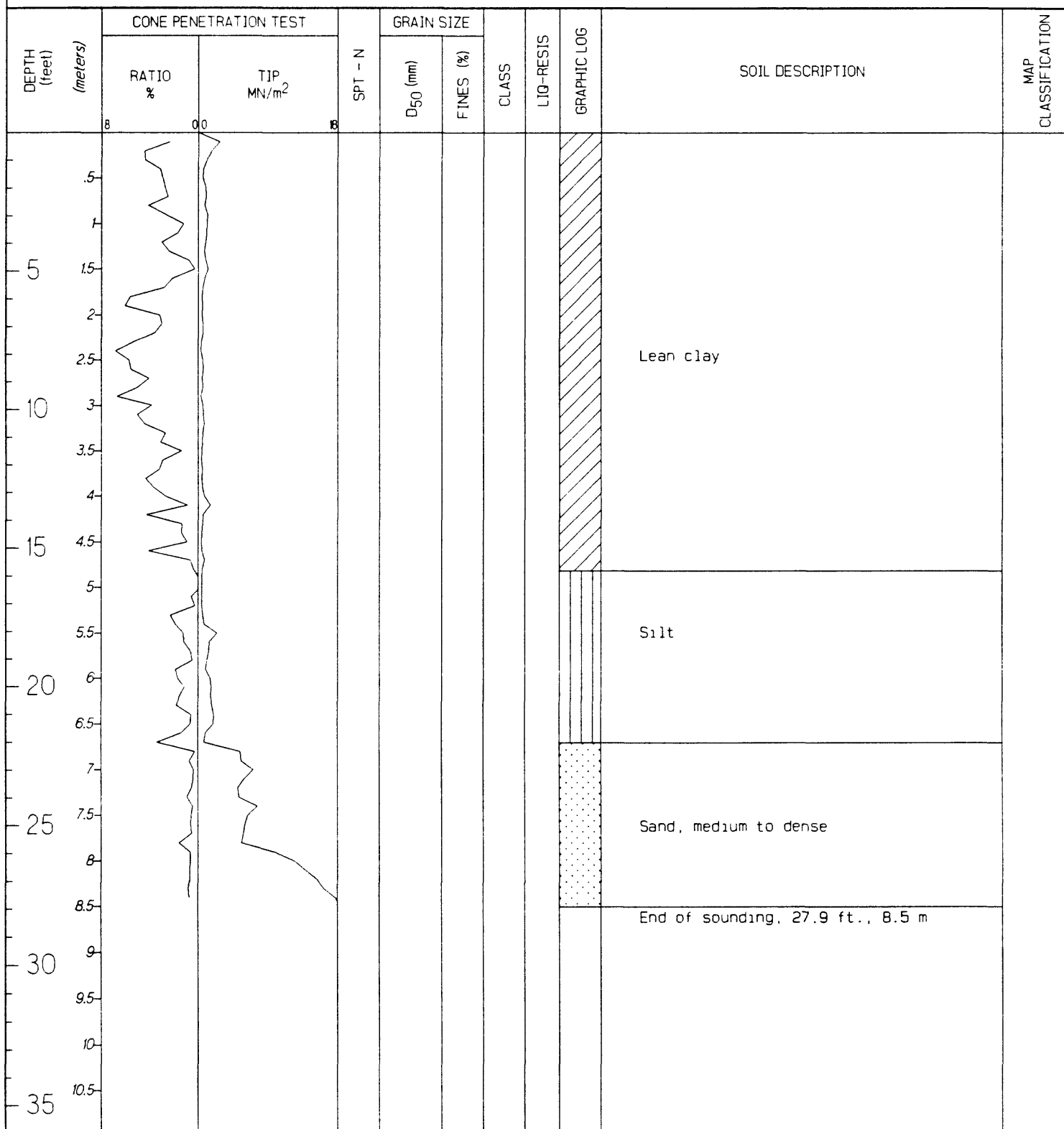
COORDINATES X: 1207635, Y: 587328

DATE DRILLED 6/11/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 45 ft.; 13.7 m MSL



USGS GEOTECHNICAL LOG

HOLE NUMBER 67

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARINOVICH (MRR)

COORDINATES X: 1207397, Y: 587763

DATE DRILLED CPT: 6/11/91, SPT: 8/1/91

GROUNDWATER 20.5 ft.; 6.2 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 45 ft.; 13.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00									
5			2	0.060 0.028	64 97	ML	C		Sandy SILT, olive brown, 2.5Y4/4, parallel laminations; SILT, dark grayish brown, 2.5Y4/2, parallel laminations, organic and clay stringers	Gyf
10			3	0.004	100	CH	C		Fat CLAY, dark grayish brown, 2.5Y4/2, scattered organic zones, thin vertical cracks filled with oxidized organics(?), some vertical pores (roots?) to 0.5 mm	
			A	0.006	99	CH			Fat CLAY, very dark gray, 2.5Y3/0	
			A	0.017	98	CL			Lean CLAY, very dark gray, 2.5Y3/0	
15			A	0.016	99	CL			Lean CLAY, similar to 10 ft.	Gof
			T	0.003 0.008	99 99	MH CL			SILT, black, 5Y2.5/1, elastic SILT, dark gray, 5Y4/1; SILT, black, 5Y2.5/2; lean CLAY, variegated, dark greenish gray, 5G4/1, and black, 5Y2.5/2	
			4	0.011	99	MH	C		4.7 m, uncorrected age, 260+/-50, 14C YBP	
									Elastic SILT, dark gray, 2.5Y4/0, some rootlets, color bands 2-4 mm- thick of lighter color	
20			25	0.220 0.203	15 15	SM	H		Silty SAND, olive brown, 2.5Y4/4, faint parallel laminations; dark grayish brown, 2.5Y4/2	Gof
25			4	0.016 0.036	77 69	ML	C		SILT with sand, grayish brown 2.5Y5/2, and light olive brown 2.5Y5/4, sandy SILT, olive brown, 2.5Y4/4, band of strong brown 7.5YR5/6 at top	
			3	0.062 0.112	57 40	ML SM	H*		Sandy SILT, color bands 0.5-1 cm thick, dark grayish brown 2.5Y4/2 and yellowish brown 10YR5/8, silty SAND, light olive brown, 2.5Y5/4	
30									End of sounding, 28.2 ft., 8.6 m	
35										

Magnitude= 7.1

Acceleration= 0.588 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 68

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206534, Y: 585026

DATE DRILLED CPT: 6/11/91, SPT: 7/31/91

GROUNDWATER 11.5 ft.; 3.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 38 ft.; 11.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	Liq-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5				0.029	73	ML			SILT with sand, 1-2 cm-thick silt interbeds and abundant rootlets	
1			outcp	0.395	8	SW-SM			SAND with silt, well graded, gravel up to 4 cm	
1.5				0.308	12	SW-SM			SAND with silt, well graded	
2			2	0.093 0.066	39 54	SM ML	D		Silty SAND, light olive brown, 2.5Y5/4; Sandy SILT, dark grayish brown, 2.5Y4/2, parallel laminations, some 1-2 mm silty clay layers	
2.5			T	0.027 0.188	86 27	CL SM			Lean CLAY, dark olive brown, 5Y3/3, at the top to silty SAND, dark yellowish brown, 10YR3/6 at the base. in between are alternating layers of silty SAND and sandy SILT, these layers represent a general fining upward sequence and are uniform olive, 5Y4/3, abundant wood and roots in growth position at 2.6 m	
3									is underlain by one piece of 2-cm gravel	
3.5									2.6 m, uncorrected age, 140+/-60, 14C YBP	
4										
4.5			13	0.156 0.149	19 20	SM	L		Silty SAND, dark grayish brown, 2.5Y4/2, faint parallel laminations; coarsens upward	
5										
5.5										
6			7	0.175	15	SM	L		Silty SAND, dark olive, 5Y3/2, abraded shell fragments	
6.5										
7										
7.5			15	0.298	11	SM-SP	L		Sand with silt, poorly graded, dark greenish gray, 5Gy4/1, no bedding, scattered gravel up to 1 cm (estuarine?)	
8										
8.5										
9										
9.5			16	0.199 0.247	15 15	SM	L		Silty SAND, dark greenish gray, 5BG(?) 4/1, gravel up to 2 cm	
10										
10.5										

REMARKS: Inside levee. In SPT column above, outcp stands for samples taken from a nearby outcrop.

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 68

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206534, Y: 585026

DATE DRILLED CPT: 6/11/91, SPT: 7/31/91

GROUNDWATER 11.5 ft.; 3.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 38 ft.; 11.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5									Lean clay	Gof
12									Sand, medium dense	
12.5										
13									End of sounding, 42 ft., 12.8 m	
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 69

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206406, Y: 585195

DATE DRILLED 6/11/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 38 ft.; 11.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
5									Lean clay	
10									Sand, loose	
15									Interbedded sandy silt and silty sand, with varying amounts of clay	
20										
25										
30										
35									Silty sand	

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 69

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206406, Y: 585195

DATE DRILLED 6/11/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 38 ft.; 11.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
45									Sand, dense	
14										
14.5										
15										
50										
15.5										
16									Interbedded sand, silt, and lean clay	
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5									End of sounding, 63.7 ft., 19.4 m	
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 70

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206415, Y: 585614

DATE DRILLED 6/11/91

GROUNDWATER 13.17 ft.; 4.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 39 ft.; 11.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5									Lean clay	
10									Fat clay	
15										
20									Sand, medium dense to dense with depth	
25										
30									Sand, medium dense with interbeds of lean clay or clayey silt	
35										

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 70

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)


COORDINATES X: 1206415, Y: 585614

DATE DRILLED 6/11/91

GROUNDWATER 13.17 ft.; 4.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 39 ft.; 11.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	18							
11									Sand, dense	
11.5									End of sounding, 36.8 ft., 11.2 m	
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 71

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206589, Y: 585898

DATE DRILLED CPT: 6/11/91, SPT: 7/30/91

GROUNDWATER 16 ft.; 4.9 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 40 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Silty sand, dark brown, 10YR3/3	
1										
1.5										
2			9	0.187	14	SM	D		Silty SAND, pale brown, 10YR6/3, no bedding	
2.5										
3										
3.5			5	0.047 0.107	77 29	ML SM	D		SILT with sand, olive brown, 2.5Y4/4; and silty SAND, light yellowish brown, 10YR6/3, parallel laminations, sharp contacts; underlying sediment is silt with sand and is similar to uppermost silt with sand	
4										
4.5			8	0.145	20	SM	D		Silty SAND, light olive brown, 2.5Y5/4, faint horizontal laminations	
5										
5.5										
6			11	0.203	9	SP-SM	L		SAND with silt, poorly graded, olive brown, 2.5Y4/4, no laminations	
6.5										
7										
7.5			14	0.123	18	SM	L		Silty SAND, light olive brown, 2.5Y5/2, no bedding	
8										
8.5			6	0.054	69	ML	L		Sandy SILT, dark grayish brown, 2.5Y4/2	
9										
9.5			13	0.064 0.200	56 21	ML SM	L		Sandy SILT, 2.5Y4/4, olive brown, with interbedded 6-mm thick silt drape, grayish brown, 2.5Y5/2; silty SAND, light olive brown, 2.5Y4.5/2, parallel laminations	
10										
10.5										
35										

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 71

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SILLIMAN (SIL)

COORDINATES X: 1206589, Y: 585898

DATE DRILLED CPT: 6/11/91, SPT: 7/30/91

GROUNDWATER 16 ft.; 4.9 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 40 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	0	0							
11										
11.5									Interbedded sand and lean clay	
12										
12.5										
13										
13.5									Sand, dense	
14										
14.5										
15										
15.5										
16										
16.5										
17									Lean clay	
17.5										
18										
18.5										
19										
19.5									End of sounding, 62.3 ft., 19.0 m	
20										
20.5										
21										
21										
70										

Magnitude= 7.1

Acceleration= 0.565 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 72

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1205086, Y: 600195

DATE DRILLED CPT: 6/12/91, SPT: 7/25/91

GROUNDWATER _____

PERSONNEL L: DURPE, D: BENNETT/CRILEY

ELEVATION 139.8 ft.; 42.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5			A	0.044	55	ml			Sandy silt, dark yellowish brown, 10YR3/4, with some 1-cm gravel	
1			A	0.060	53	ml			Sandy silt, pale brown, 10YR6/3 and strong brown, 7.5YR5/8, clayey	
1.5			A	0.009	64	ML			Sandy SILT, dark yellowish brown, 10YR4/6, clayey	
2			26	0.018	62	ml	C		Sandy silt, dark yellowish brown, 10YR4/6, mottled with dark yellowish brown, 10YR4/4, very hard	
2.5			T	0.010 0.026	79 65	CH CL			Fat CLAY with sand, dark yellowish brown, 10YR4/6, very poorly sorted, some grains to 0.3 mm, high vane strength but crumbles at peak strength, fractures along semi-regular planar surfaces at 90 degrees; to sandy lean CLAY, dark yellowish brown, 10YR4/6, some 2-mm quartz grains	
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
15									Lean clay to silt, soft, (sensitive?)	
20										
25									Fat to lean clay, increasing fines and increasing stiffness downward	
26.6									End of sounding, 26.6 ft., 8.1 m	

REMARKS: Next to main gate

Magnitude = 7.1

Acceleration = 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 73

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1205011, Y: 600302

DATE DRILLED 6/12/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 132.7 ft.; 40.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
5									Lean clay, soft	
10										
15									Lean clay, variable stiffness, varying amounts of silt and sand	
20										
25									Sand, loose	
30									Lean clay	
35										

REMARKS: Located 4.6 m south of original mark.
Elevation difference between 72-73
is approximately 2.9 m.

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 73

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1205011, Y: 600302

DATE DRILLED 6/12/91

GROUNDWATER

PERSONNEL D: BENNETT/CRILEY

ELEVATION 132.7 ft.; 40.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		8							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

End of sounding, 36.8 ft., 11.2 m

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 74

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1204952, Y: 600353

DATE DRILLED CPT: 6/12/91, SPT: 7/25/91

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/CARTER

ELEVATION 132.7 ft.; 40.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5			A	0.120	42	SM			Silty SAND with gravel, dark yellowish brown, 10YR3/4, dense	Gf
1			A	0.034	62	CL			Sandy lean CLAY, very dark grayish brown, 10YR3/2	
1.5			I	0.010 0.095	87	cl SM	D		Lean clay, dark grayish brown, 10YR4/2, slightly mottled; and, silty SAND, very dark grayish brown, 2.5Y3/2, sharp upper contact, possible paleosol	
2										
2.5			14	0.670	15	SM	L		Silty SAND, very dark grayish brown, 2.5Y3/2, maximum gravel size is 4 cm	Gwa
3										
3.5										
4			6	0.006	82	cl	C		Lean clay with sand, black, 10YR3/1, cutans mottled brown	
4.5										
5			7	0.132 0.201	38 24	SM SM	L		Silty SAND, loose, dark grayish brown, 10YR4/2	
5.5										
6			10	0.002 0.191	96 27	ch SM	C		Fat clay, dark grayish brown, 10YR4/2; with an interbed of silty SAND, yellowish brown, 10YR5/8	
6.5			A	0.009	76	CL			Lean CLAY with sand	
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

REMARKS: South end of north field

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 74

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1204952, Y: 600353

DATE DRILLED CPT: 6/12/91, SPT: 7/25/91

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/CARTER

ELEVATION 132.7 ft.; 40.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		8							Gwa
11										
11.5									End of sounding, 36.4 ft., 11.1 m	
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 75

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1204886, Y: 600392

DATE DRILLED 6/12/91

GROUNDWATER 3 ft.; .9 m

PERSONNEL D: BENNETT/CRILEY/CARTER

ELEVATION 132.3 ft.; 40.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Lean to fat clay, stiff near surface, becomes softer with depth	
1										
1.5										
2									Silt to sandy silt, very loose	
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
30.5									End of sounding, 30.5 ft., 9.3 m	

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 76

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1204823, Y: 600467

DATE DRILLED 6/19/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY/CARTER

ELEVATION 133.3 ft.; 40.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5	1.5								Lean to fat clay, very stiff	
10	2.5								End of sounding, 8.5 ft., 2.6 m	
15	4.5									
20	6.5									
25	7.5									
30	9.5									
35	10.5									

REMARKS: Dry at 1.0 m.

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 77

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1204711, Y: 600613

DATE DRILLED 6/19/91

GROUNDWATER 1.8 ft.; .5 m

PERSONNEL D: BENNETT/CRILEY/CARTER

ELEVATION 137.1 ft.; 41.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	0							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Silt to sandy silt, very loose

Sandy silt to lean clay, silt dominates
with varying amounts of sand and clay
some sand beds

Magnitude= 7.1

Acceleration= 0.691 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 77

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION KETT (KET)

COORDINATES X: 1204711, Y: 600613

DATE DRILLED 6/19/91

GROUNDWATER 1.8 ft.; .5 m

PERSONNEL D: BENNETT/CRILEY/CARTER

ELEVATION 137.1 ft.; 41.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	18							
11										
11.5										
12										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

End of sounding, 45.9 ft., 14.0 m

Magnitude= 7.1

Acceleration= 0.691 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 88

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184010, Y: 601450

DATE DRILLED 6/21/91

GROUNDWATER 8.75 ft.; 2.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 143 ft.; 43.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
5									Silty sand	
10										
15										
20									Lean clay with occasional interbeds of silty sand or sand	
25										
30										
35										

REMARKS: 13.3 m from C/L road and
1.5 m from creek side vegetation

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 88

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

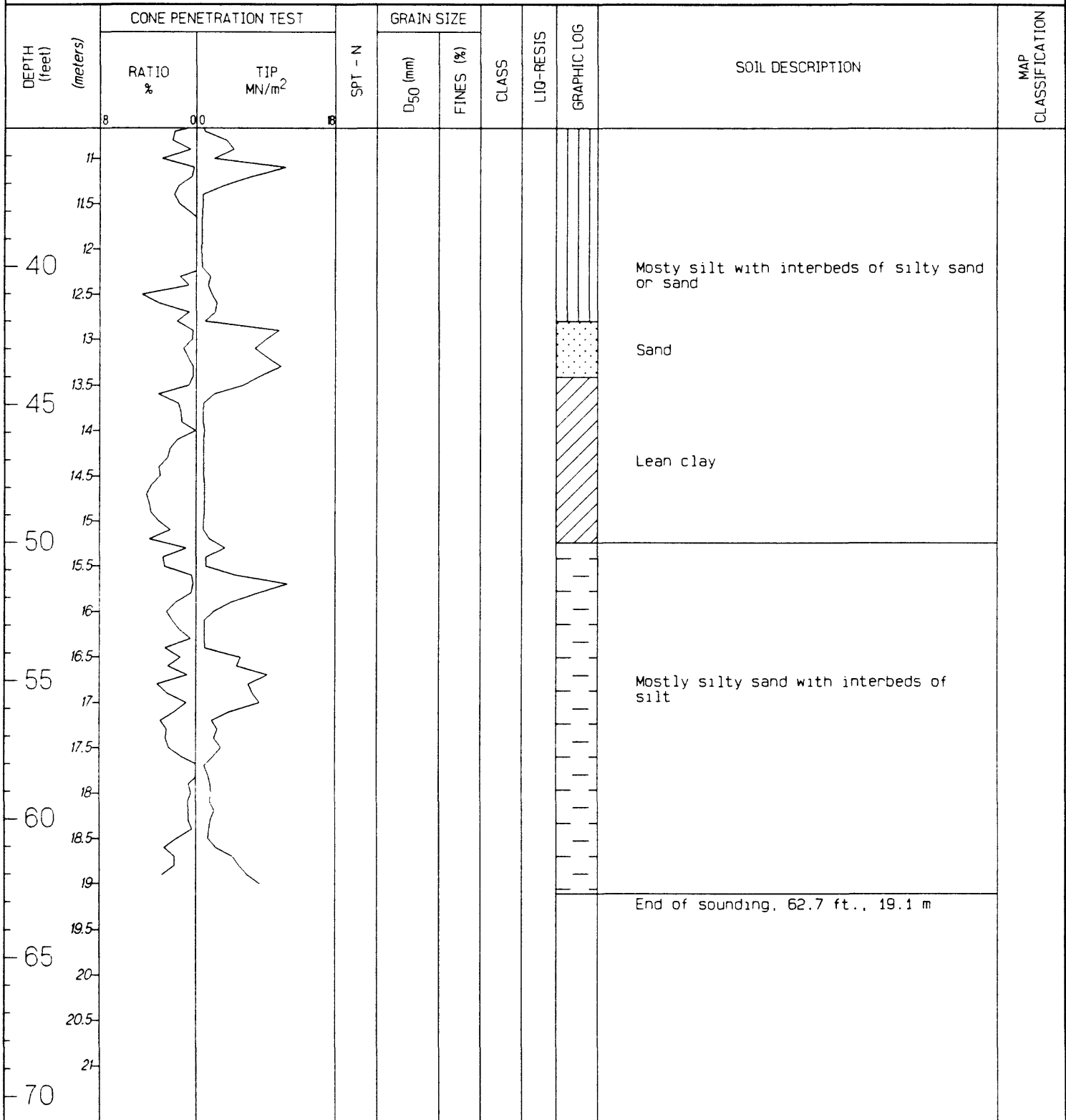
COORDINATES X: 1184010, Y: 601450

DATE DRILLED 6/21/91

GROUNDWATER 8.75 ft.; 2.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 143 ft.; 43.6 m MSL



USGS GEOTECHNICAL LOG

HOLE NUMBER 89

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184060, Y: 601490

DATE DRILLED CPT: 6/21/91, SPT: 7/24/91

GROUNDWATER 11 ft.; 3.4 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 142 ft.; 43.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1			6	0.179	17	SM	D		Silty SAND, yellowish brown, 10YR5/4, average gravel size 1 cm, max size 1.5 cm	
1.5										
2			11	0.259	2	SP	D		SAND, poorly graded, yellowish brown, 10YR5/4, fines downward to clay, very dark grayish brown, 10YR3/4	
2.5										
3			A	0.165	31	SM			Silty SAND	
3.5										
4										
4.5										
5			7	0.169 0.280	10 6	SP-SM	L		Silt	
5.5										
6										
6.5			11	0.026 0.040	67 70	ML	C		SAND with silt, poorly graded, dark grayish brown, 10YR4/2, bottom 8 cm is clayey, dark gray, 5Y4/1, with faint brownish mottles	
7										
7.5			6	0.007 0.010	95 90	CL	C		Sandy SILT, olive gray to dark gray, 5YR4/2 to 5YR4/1, slightly mottled	
8									Lean CLAY, dark gray, 5Y4/1, plastic, mottled slightly	
8.5										
9									Lean clay	
9.5										
10										
10.5									Interbedded sandy silt and silty sand	

Magnitude= 7.1

Acceleration= 0.614 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 89

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184060, Y: 601490

DATE DRILLED CPT: 6/21/91, SPT: 7/24/91

GROUNDWATER 11 ft.; 3.4 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY

ELEVATION 142 ft.; 43.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		00	18							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 90

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184110, Y: 601570

DATE DRILLED 6/21/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 141 ft.; 43.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Magnitude= 7.1

Acceleration= 0.614 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 90

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184110, Y: 601570

DATE DRILLED 6/21/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 141 ft.; 43.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		18							
11									Silt at top grades to sandy silt with depth	
11.5										
12										
12.5										
13									Silty sand	
13.5										
14										
14.5									Lean clay	
15										
15.5										
16										
16.5									Silty sand, varying amounts of silt and clay	
17										
17.5										
18										
18.5									End of sounding, 59.4 ft., 18.1 m	
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 91

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184210, Y: 601680

DATE DRILLED 6/21/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 141 ft.; 43.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									Silty sand	
1										
1.5										
2										
2.5									Lean clay	
3										
3.5										
4										
4.5									Sandy silt	
5										
5.5										
6									Sandy silt	
6.5										
7										
7.5									Lean clay	
8										
8.5										
9										
9.5										
10									Interbedded silty sand and silt	
10.5										
35										

REMARKS: Closest to buildings.

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 91

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184210, Y: 601680

DATE DRILLED 6/21/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 141 ft.: 43.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RETS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

End of sounding. 11.8 m

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 92

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184060, Y: 602550

DATE DRILLED 6/21/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 140 ft.; 42.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Silty sand to sandy silt	
10										
15										
20									Sandy silt	
25									Lean clay, abundant silt, thin sandy interbeds present	
30									Sandy silt	
35									Sandy silt	

REMARKS: Intersection, levee road and access road.

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 92

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184060, Y: 602550

DATE DRILLED 6/21/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 140 ft.; 42.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		8						Sandy silt	
11										
11.5									Interbedded silty sand and lean clay	
12										
40 12.5										
13										
13.5									End of sounding, 43.6 ft., 13.3 m	
45 14										
14.5										
50 15										
15.5										
16										
16.5										
55 17										
17.5										
18										
60 18.5										
19										
19.5										
65 20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 93

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184210, Y: 602550

DATE DRILLED 7/1/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 139 ft.; 42.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	00									
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
35										

REMARKS: Middle of road, half way to creek.

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 93

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SCURICH (SCR)

COORDINATES X: 1184210, Y: 602550

DATE DRILLED 7/1/91

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 139 ft.; 42.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5									Sand	
12										
12.5										
13									Silty sand	
13.5										
14										
14.5									End of sounding, 46.9 ft., 14.3 m	
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 94
 LOCATION SCURICH (SCR)
 DATE DRILLED 6/21/91
 PERSONNEL D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1184360, Y: 602550
 GROUNDWATER _____
 ELEVATION 139 ft.; 42.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Silty sand	
10										
15										
20									Interbedded silty sand and silt	
25										
30									End of sounding, 28.5 ft., 8.7 m	
35										

REMARKS: Near intersection of two farm roads.

Magnitude= 7.1

Acceleration= 0.614 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 95

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208636, Y: 585075

DATE DRILLED 2/7/91

GROUNDWATER 10 ft.; 3.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 40 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5									Lean clay to fat clay	
10										
15									Sand, medium dense	
20										
25										
30									Lean clay to fat clay	
35									Sand, medium dense	

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 95

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208636, Y: 585075

DATE DRILLED 2/7/91

GROUNDWATER 10 ft.; 3.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 40 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00		8							
11									End of sounding, 35.8 ft., 10.9 m	
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 96

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

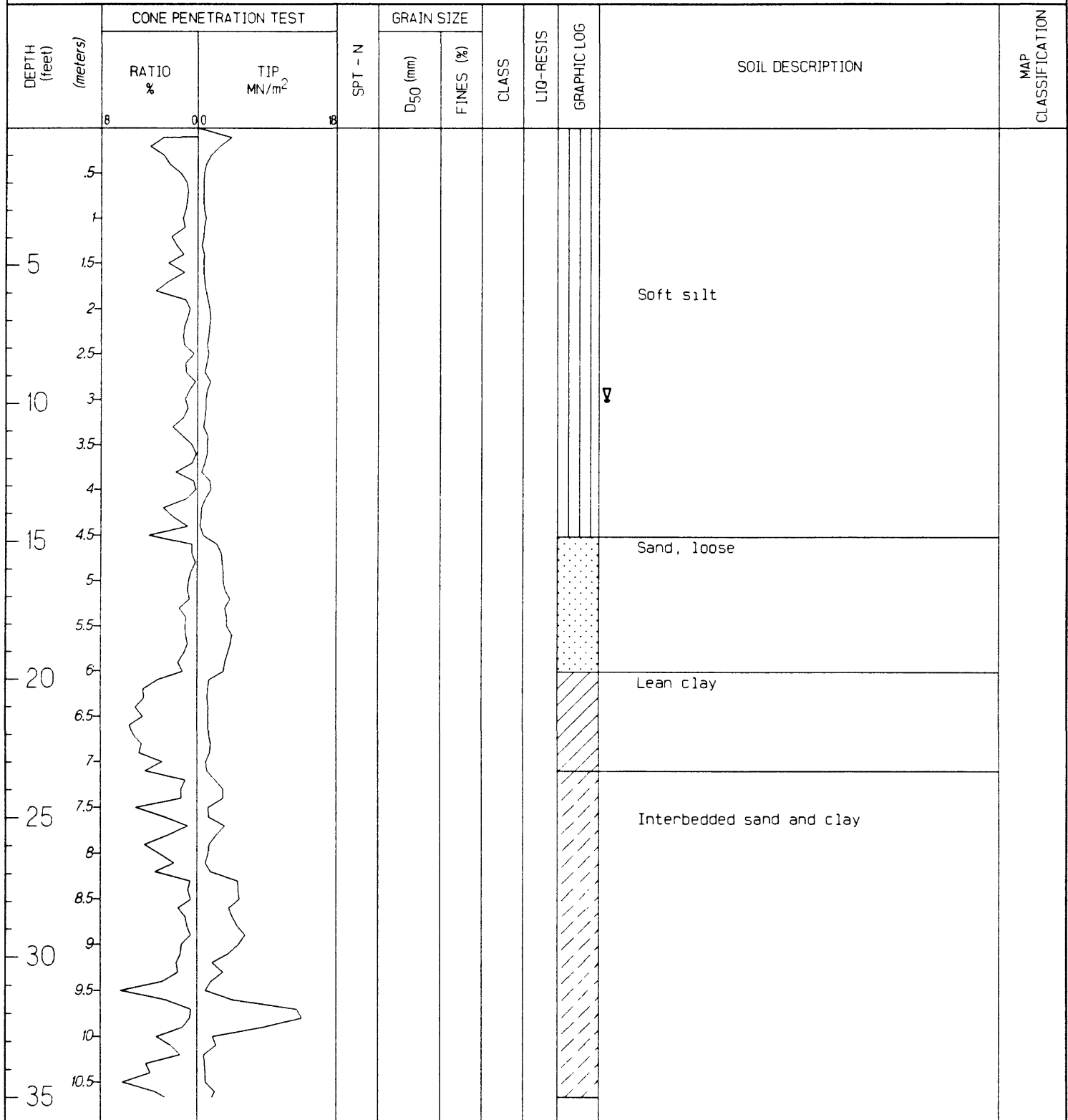
COORDINATES X: 1208232 Y: 585074

DATE DRILLED 2/7/91

GROUNDWATER 9.8 ft.; 3.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 39.9 ft.; 12.2 m MSL



USGS GEOTECHNICAL LOG

HOLE NUMBER 96

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208232, Y: 585074

DATE DRILLED 2/7/91

GROUNDWATER 9.8 ft.; 3.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 39.9 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		00	18							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude = 7.1

Acceleration = 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 97

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208215, Y: 584726

DATE DRILLED 3/7/91

GROUNDWATER 10.8 ft.; 3.3 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 40.7 ft.; 12.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5										
10										
15										
20										
25										
30										
35										

Lean clay, varying amounts of silt,
some interbeds of silt or sandy silt,
stiffness also variable

Sand, medium dense

Interbedded sandy silt and lean clay

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 97

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208215, Y: 584726

DATE DRILLED 3/7/91

GROUNDWATER 10.8 ft.; 3.3 m

PERSONNEL D. BENNETT/CRILEY

ELEVATION 40.7 ft.; 12.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40										
12.5									Sand, dense	
13									End of sounding, 40.7 ft., 12.4 m	
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 98

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1209020, Y: 584719

DATE DRILLED CPT: 7/2/91, SPT: 7/19/91

GROUNDWATER 11.5 ft.; 3.5 m

PERSONNEL L: CARTER, D: BENNETT/CRILEY

ELEVATION 41 ft.; 12.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5										
1			13	0.010 0.029	98 94	ML	C		SILT, very dark grayish brown, 10YR3/2, top 1/2 more plastic, no organics, no mottling, firm, disseminated CO ₃ throughout	
2			11	0.004 0.259	93 12	MH SP-SM	D		Elastic silt, very dark grayish brown, 10YR3/2, ucs=2.0 ksc, moderately plastic, no organics or mottles, interstitial pores common, abundant disseminated CO ₃	
10			8	0.189	11	SP-SM	D		SAND with silt, poorly graded, olive brown, 2.5Y4/4, no bedding, mottling, organics, or CO ₃	
15			16	0.205 0.174	18 11	SM SP-SM	L		SAND with silt, poorly graded, olive brown, 2.5Y4/4, gravelly, no structures, few small roots, disseminated CO ₃ throughout	
20			14	0.196 0.350	5 9	SP-SM	L		Silty SAND, olive, 5Y4/4, no structures, fine gravel throughout, silty "rip-up clasts" in middle, disseminated CO ₃ throughout, but stronger at bottom, no organics	
25			19	0.297	6	SP-SM	L		SAND with silt, poorly graded, dark grayish brown, 10YR4/2, slight CO ₃ , no organics or structures	
30			29	0.250 0.360	3 4	SP	L		SAND, poorly graded, olive, 5Y4/4, no bedding, large (2 cm) yellowish brown, 10YR5/8, silty "rip-up clasts" at about 9.5 m, large gravel (granite) at 9.6 m, slight CO ₃ throughout, entire sample fines upward	
35			31	0.403 0.095	11 37	SP-SM SM	H*		SAND with silt, poorly graded, olive, 5Y4/4, similar to above sand, fine gravel throughout, very slight CO ₃ throughout, more below	

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 98

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1209020, Y: 584719

DATE DRILLED CPT: 7/2/91, SPT: 7/19/91

GROUNDWATER 11.5 ft.: 3.5 m

PERSONNEL L: CARTER, D: BENNETT/CRILEY

ELEVATION 41 ft.: 12.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	18	31				H*		Silty SAND, olive brown, 2.5Y4/4, interbedded with 5-mm thick grayish clayey silt layers, no organics or mottles	Gof (?)
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5									End of sounding, 46.3 ft., 14.1 m	
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 99

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208780, Y: 584724

DATE DRILLED CPT: 7/3/91, SPT: 7/19/91

GROUNDWATER 13.3 ft.; 4.1 m

PERSONNEL L: CARTER, D: BENNETT/CRILEY

ELEVATION 40.8 ft.; 12.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	0							
5			3	0.019 0.005	99 95	ML CL	C		SILT, dark grayish brown, 2.5Y4/2 and dark grayish brown, silt is not sticky or plastic, CO ₃ throughout, no organics, and lean clay, no bedding or mottling, lower most part of sample marked by 1 mm-thick dark clay laminae, slight CO ₃	
10			5	0.002 0.003	97 96	MH	C		Elastic SILT to fat clay(?), dark grayish brown, 2.5Y4/2, stiff, sticky and plastic, very compact, dark brown mottles, no pores; bottom half-interstitial pores more common, no structures, root pores common, ucs=1.5 ksc	
15			11	0.035 0.147	92 13	ML SM	L		SILT, dark grayish brown, 2.5Y4/2, sticky, massive, roots throughout, no mottles, slight disseminated CO ₃ ; more sample below	
20			13	0.198 0.037	5 83	SP-SM ML	L		Silty SAND, dark brown, 10YR4/3, loose, cross bedded throughout, highlighted by red color, roots throughout, slight CO ₃	
25			8	0.178 0.135	14 22	SM	L		SAND with silt, poorly graded, to SILT with sand, dark grayish brown, 10YR4/2, no structures, organics or odor, disseminated CO ₃ ; silt is sticky and roots are common, no structures or mottles, loose; sandy layers (3-mm thick) are separated by 1-mm thick organic rich layers, sand fines upward, slight CO ₃	
30			26	0.195	19	SM	L*		Silty SAND, dark yellowish brown, 10YR4/4, no bedding, organics, mottles or CO ₃ , loose, 2-mm thick organic layers in middle of sample	
35			14	0.200	17	SM	L		6.5 m, uncorrected age, 220+/-60, 14C YBP Silty SAND, very dark grayish brown, 2.5Y3/2, no structures, mottles, or organics, slight CO ₃	
									Silty SAND, dark grayish brown, 2.5Y4/2, no bedding, mottles, or organics, slight CO ₃ , sand flushed out of auger, blow count may be disturbed	

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 99

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION RADOVICH (RAD)

COORDINATES X: 1208780, Y: 584724

DATE DRILLED CPT: 7/3/91, SPT: 7/19/91

GROUNDWATER 13.3 ft.; 4.1 m

PERSONNEL L: CARTER, D: BENNETT/CRILEY

ELEVATION 40.8 ft.; 12.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00									
11										
11.5										
12										
40			A	0.037	82	ML			SILT with sand, slightly plastic	
12.5			24	0.240 0.033	11 90	SP-SM ML	L*		SAND with silt, poorly graded, dark grayish brown, 2.5Y4/2, loose, several small (0.5 mm) clayey "rip-up clasts" or nodules present near 12.7 m, very micaceous, slight CO ₃ ; SILT, very dark gray, 5Y3/1, disseminated CO ₃ throughout, H ₂ abundant, very few organics, mostly leaves or roots(?), no structures, lower 1 cm becomes dark greenish gray, 5Y4/1, stiff but not plastic; and silty SAND, dark greenish gray, 5G4/1, similar to above sand with silt except for color and absence of "rip-up clasts"	
13										
45										
13.5										
14										
14.5										
50									End of sounding, 45.9 ft., 14.0 m	
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.556 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 100

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TOM JONES RANCH (TJR)

COORDINATES X: 1206743, Y: 584510

DATE DRILLED CPT: 7/1/91, SPT: 7/30/91

GROUNDWATER 16.8 ft.; 5.1 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 39.8 ft.; 12.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5									SILT, dark grayish brown, 10YR4/2	
1			A	0.010	95	ML	C			
1.5									Sandy lean CLAY, yellowish brown, 10YR5/4	
2			A	0.044	53 83	CI	C			
2.5			T	0.069 0.028	61	ML	D		Sandy SILT to SILT, olive, 5Y4/3, uniform color, no bedding, no mottling, ucs=0.25-1.4 ksc	
3										
3.5										
4										
4.5			6	0.072 0.107	51 36	ml SM	D		Sandy SILT, olive brown, 2.5Y4/4, slightly mottled with dark organic (?) stained zones, 1-4 mm irregular layers, silty clay, yellowish brown, 10YR5/4	
5										
5.5										
6										
6.5			5	0.005 0.038	98 92	CH ML	C		Fat CLAY, light olive brown, 2.5Y5/4, finer parts have carbonate nodules up to 5 mm in diameter, some blobs of dark organic staining, and SILT, light olive brown, 2.5Y5/4, some blobs of organic (?) staining 3 mm, micaceous, sharp contact with overlying clay	
7										
7.5			4	0.036	90	ML	L		SILT, olive brown, 2.5Y4/4, grades up to clayey silt, olive brown, 2.5Y5/4, light olive brown, 2.5Y 5/4 mottles, parallel laminae in upper part	
8										
8.5			12	0.171 0.276	25 14	SM	L		Silty SAND, dark yellowish brown, 10YR4/4, Silty SAND, dark olive, 5Y2.5/2	
9										
9.5			8	0.040 0.064	66 55	ML	L		Sandy SILT, olive brown, 2.5Y4/4, 1 mm-thick clay stringer, faint parallel laminations, fines upward	
10										
10.5			25	0.116 0.133	27 21	SM	L*		Silty SAND, olive brown, 2.5Y4/4	
35										

REMARKS. Approximately 0.3 m higher than TJR 102

Magnitude= 7.1

Acceleration= 0.549 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 100

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TOM JONES RANCH (TJR)

COORDINATES X: 1206743, Y: 584510

DATE DRILLED CPT: 7/1/91, SPT: 7/30/91

GROUNDWATER 16.8 ft.; 5.1 m

PERSONNEL L: DUPRE, D: BENNETT/CRILEY/FOSS

ELEVATION 39.8 ft.; 12.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50									End of sounding, 48.6 ft., 14.8 m	
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.549 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 101

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TOM JONES RANCH (TJR)

COORDINATES X: 1206828, Y: 584302

DATE DRILLED 7/2/91

GROUNDWATER 19.8 ft.; 6.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 39.9 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay to fat clay	
10									Silty sand	
15										
20									Lean clay	
25									Silty sand	
30									Lean clay	
35									Silty sand	

Magnitude= 7.1

Acceleration= 0.549 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 101

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TOM JONES RANCH (TJR)

COORDINATES X: 1206828, Y: 584302

DATE DRILLED 7/2/91

GROUNDWATER 19.8 ft.; 6.0 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 39.9 ft.; 12.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		00								
11										
11.5										
12										
40									Silt	
12.5										
13										
13.5										
45										
14										
14.5									Interbedded silty sand and lean clay	
15										
50										
15.5										
16										
16.5									End of sounding, 52.8 ft., 16.1 m	
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.549 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 102

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TOM JONES RANCH (TJR)

COORDINATES X: 1206822, Y: 584008

DATE DRILLED CPT: 7/2/91, SPT: 7/30/91

GROUNDWATER 23 ft.; 7.0 m

PERSONNEL L: DURPE, D: BENNETT/CRILEY/FOSS

ELEVATION 39.4 ft.; 12.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RSIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5			9	0.003 0.009	99 99	ch ml	C		Sandy loam, very dark grayish brown, 2.5Y3/2 Fat clay, light olive brown, 2.5Y4/4, bedding (10 cm) reflects varying clay content	
10			8	0.068	54	ML	D		Sandy SILT, light olive brown, 2.5Y5/4, grayish brown, 2.5Y5/2, mottles, no bedding	
15			6	0.055 0.051	64 79	ML	D		Sandy SILT, light olive brown, 2.5Y5/4, and SILT with sand, grayish brown, 2.5Y5/2, no bedding	
20			T	0.060 0.037 0.046	60 79 73	ML ML CL			Sandy SILT, olive brown, 2.5Y4/4, more below SILT with sand, olive, 5Y4/3, no bedding, slight plasticity, coarsens upward, some olive brown, 2.5Y4/4, mottles	
25			5	0.048 0.051	72 72	ML	D		SILT with sand, light olive brown, 2.5Y5/4, faint parallel bedding small amount organics, uppermost has laminated bands of clay	
30			9	0.056 0.033	73 98	ML	D		SILT, olive brown, 2.5Y4/4, SILT with sand, olive brown, 2.5Y4/4, and SILT, grayish brown, 2.5Y5/2, oxidized areas 1-3 mm	
35									Dense sand	

REMARKS. Approximately 0.3 m lower than TJR 100.

Magnitude= 7.1

Acceleration= 0.549 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 102

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TOM JONES RANCH (TJR)

COORDINATES X: 1206822, Y: 584008

DATE DRILLED CPT: 7/2/91, SPT: 7/30/91

GROUNDWATER 23 ft.; 7.0 m

PERSONNEL L: DURPE, D: BENNETT/CRILEY/FOSS

ELEVATION 39.4 ft.; 12.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40									End of sounding, 39 ft., 11.9 m	
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.549 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 103

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TANIMURA (TAN)

COORDINATES X: 1194430, Y: 507092

DATE DRILLED CPT: 8/26/91, SPT: 9/5/91

GROUNDWATER 15 ft.; 4.6 m

PERSONNEL L: BLACK/TINSLEY, D: BENNETT/BLACK

ELEVATION 21.2 ft.; 6.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5			5	0.013	100	MH	C		Elastic SILT, brown, 10YR4/3, thinly laminated, many rootlets, occasional horizontal laminae of organics, sticky and plastic; moderate disseminated CO ₃ , no SO ₄ , few fine tubular pore; ucs=1.5 ksc	
10			T	0.062 0.005	65 97	ML MH	C		Sandy SILT to elastic SILT, varying plasticity, dark yellowish brown, 10YR3/6, at the top, olive, 5Y4/3, in the middle and olive brown, 2.5Y3/4 at bottom; no fine bedding, occasional 3-4 cm thick layers of silty clay alternating with silt, few roots	
15			T	0.022 0.041	98 84	CL ML	D		SILT, top 1/3 is dark yellowish brown, 10YR3/6 and 3/4, bottom 2/3 is olive, 5Y4/3; overall slight fingering upward, slight plasticity, roots are present but not throughout, fine laminations and inclined bedding are present in sandy layers, ucs=2.5 ksc	
20			7	0.142	22	SM	H		Silty SAND, olive, 5Y5/3, micaceous, poorly bedded to massive, not plastic or sticky, no organics, SO ₄ , or CO ₃	
25			10	0.261	13	SM	H		Silty SAND, olive, 5Y5/3, few 2 mm lithic fragments, not sticky or plastic, moderate disseminated CO ₃ , no bedding, SO ₄ , or organics	
30			10	0.239	13	SM	L		Silty SAND, olive, 5Y5/3, lowest 10 cm shows horizontal imbrication of flat grains, also slightly enriched in organics, not plastic or sticky, very slight disseminated CO ₃ , no roots, SO ₄ , 2-4 mm diameter shaley fragments at base	
35			A	0.014	74	ML			SILT with sand, dark gray, 5Y4/1, sticky and plastic, CO ₃ concretions, pieces of reeds, twigs and organic present	
			4				L		9.8 m, uncorrected age, 130+/-60, 14C YBP	
									Lost sample	

REMARKS. Closest to the river.

Magnitude= 7.1

Acceleration= 0.187 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 103

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TANIMURA (TAN)

COORDINATES X: 1194430, Y: 507092

DATE DRILLED CPT: 8/26/91, SPT: 9/5/91

GROUNDWATER 15 ft.; 4.6 m

PERSONNEL L: BLACK/TINSLEY, D: BENNETT/BLACK

ELEVATION 21.2 ft.; 6.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	8	0.260 0.288	12 14	SM	H		Silty SAND, top 1/2 olive, 5Y4/3, bottom, pale olive, 5Y6/3, no bedding, organics or SO ₄ in top 1/2; bottom 1/2, bedding clearly developed, 15 mm clasts at bottom grade upward to 0.5 mm grains, one 2-mm thick layer of black organic silty material, no fossils, roots, SO ₄ , not sticky or plastic	
11										
11.5										
12										
12.5										
13										
13.5										
45									Lean clay	
14										
14.5										
15										
50										
15.5										
16										
16.5									Sand, dense	
55										
17										
17.5									End of sounding, 56.1 ft., 17.1 m	
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.187 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 104

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TANIMURA (TAN)

COORDINATES X: 1194562, Y: 507100

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 22 ft.: 6.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
0.5									Sand, medium dense	
1										
1.5									Fat clay	
2										
2.5										
3									Silt, varying plasticity	
3.5										
4										
4.5										
5										
5.5										
6									Sand, medium dense	
6.5										
7										
7.5										
8										
8.5										
9									Lean clay	
9.5										
10										
10.5									Sand, dense	
35										

Magnitude= 7.2

Acceleration= 0.187 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 104

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TANIMURA (TAN)

COORDINATES X: 1194562, Y: 507100

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 22 ft., 6.7 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	0							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Lean clay with several sandy interbeds

Sand, dense

End of sounding, 53.8 ft., 16.4 m

Magnitude= 7.2

Acceleration= 0.187 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 105

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TANIMURA (TAN)

COORDINATES X: 1194842, Y: 507095

DATE DRILLED CPT: 8/27/91, SPT: 9/5/91

GROUNDWATER 13.8 ft.; 4.2 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 22.6 ft.; 6.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean CLAY, dark grayish brown, 2.5Y4/2, slightly sticky and plastic	
1			A	0.009	91	CL				
1.5									Sandy SILT, light olive brown, 2.5Y5/4, fines upward, mostly massive, some 5 mm horizontal laminations, not sticky or plastic, few roots, no fossils, SO ₄ or CO ₃	
2			5	0.060	61	ML	C			
2.5										
10			10	0.111	27	SM	D		Silty SAND, olive brown, 5Y4/4, horizontal bedding due to color and silt laminations (less than 2 mm); few organic inclusions in micaceous sand, no SO ₄ or CO ₃ , not sticky or plastic	
3.5										
4										
15			6	0.078	41	SM	H		Silty SAND, dark olive, 5Y4/3, well bedded, organic layers 1 to 5 mm, sandy beds 5 to 40 mm, roots common, few mottles with red halos, between 4.6 and 4.9 m stems, roots and leaves in a sandy matrix is almost peaty	
5.5									4.6 m, uncorrected age, 130+/-60, 14C YBP	
20			9	0.129 0.195	24 16	SM	H		Silty SAND, olive, 5Y5/3, fines upward, no organics, fossils, SO ₄ , CO ₃ , lowermost 5 cm is a silty clay, grayish brown, 2.5Y5/2	
6.5										
7										
25										
7.5										
8										
8.5										
30			T	0.031 0.059	92 59	ML			Sample fines upward; sandy SILT to SILT with sand, to SILT, very dark gray, 5Y3/1, no roots, no bedding, lower portions of the sample show faster reaction to shaking, sensitive (?)	
9										
9.5										
10			10	0.154	18	SM	H*		Silty SAND, dark greenish gray, 5GY4/1, fines upward, few plant stems, no SO ₄ , slight CO ₃ , organic rich at 10.2 m	
10.5										
35										

Magnitude= 7.2

Acceleration= 0.187 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 105

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION TANIMURA (TAN)

COORDINATES X: 1194842, Y: 507095

DATE DRILLED CPT: 8/27/91, SPT: 9/5/91

GROUNDWATER 13.8 ft.; 4.2 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 22.6 ft.; 6.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12			12	0.213	11	SP-SM	L		SAND with silt, poorly graded, upper, dark gray. 5Y4/1, lower olive, 5Y4/3, a few clasts greater than 4 mm, common 2 mm pebbles, no bedding no SO ₄ , slight disseminated CO ₃ , dark sand is very micaceous	
12.5										
13										
13.5										
40										
14										
14.5										
15										
50										
15.5										
16										
16.5									Lean clay to silt, soft	
55										
17										
17.5										
18									Sand, medium dense	
60										
18.5										
19										
19.5									End of sounding, 64 ft., 19.5 m	
65										
20										
20.5										
21										
70										

Magnitude= 7.2

Acceleration= 0.187 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 106

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204113, Y: 506657

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 34.2 ft.; 10.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

REMARKS: The description column is divided into units that represent fining upward sequences. Four units are identified.

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 106

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204113, Y: 506657

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 34.2 ft.; 10.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00									
11									Elastic silt	
11.5										
12										
40									Sandy silt	
12.5										
13										
13.5									Elastic silt	Unit 4
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55									Silty sand	
17										
17.5										
18										
60										
18.5										
19									End of sounding, 61 ft., 18.6 m	
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 107

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204194, Y: 507280

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 34.2 ft.; 10.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay Unit 1	
10									Sandy silt	
15									Lean clay Unit 2	
20									Silty sand	
25									Silt with sand to lean clay	
30									Silt Unit 3	
35										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 107

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204194, Y: 507280

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 34.2 ft.; 10.4 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	0	8							
11									Elastic silt	
11.5										
12									Sandy silt	
12.5										
13									Elastic silt	Unit 4
13.5										
14										
14.5									Silty sand	
15										
15.5										
16										
16.5										
17										
17.5										
18									Interbedded sand and lean clay	
18.5										
19										
19.5									End of sounding, 64 ft., 19.5 m	
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 108

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204123, Y: 508437

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 31.1 ft.; 9.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5									Lean clay Unit 1	
10									Sandy silt	
15									Lean clay Unit 2	
20									Sandy interbeds	
25									Silt Unit 3	
30										
35										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 108

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204123, Y: 508437

DATE DRILLED 8/27/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 31.1 ft.; 9.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0						Elastic silt	
11										
11.5										
12										
40									Sandy silt Unit 4	
12.5										
13										
13.5										
45									Silty sand	
14										
14.5										
50										
15										
15.5										
16										
16.5										
55									Interbedded lean clay and sand	
17										
17.5									End of sounding, 57.1 ft., 17.4 m	
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

USGS GEOTECHNICAL LOG

HOLE NUMBER 109

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204124, Y: 509406

DATE DRILLED 8/28/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 30.4 ft.; 9.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5									Lean clay to silt	
10									Sand, loose	
15										
20									Sand, medium dense to dense	
25										
30									Lean clay	
35										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 109

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1204124, Y: 509406

DATE DRILLED 8/28/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 30.4 ft.; 9.3 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Interbedded sand and clay

End of sounding, 42.7 ft., 13.0 m

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 110
 LOCATION MARTELLA (MAR)
 DATE DRILLED CPT: 8/28/91, SPT: 9/4/91
 PERSONNEL L: BLACK, D: BENNETT/BLACK

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1205316, Y: 509559
 GROUNDWATER 6 ft.; 1.8 m
 ELEVATION 29.8 ft.; 9.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
5			3	0.010	99	ML	C		SILT, olive, 5Y5/3, soft, sticky, plastic, common small tubular pores, no organics, SO ₄ or fossils, trace disseminated CO ₃	Ob
10			4	0.160	13	SM	L		Silty SAND, pale olive, 5Y6/3, micaceous, not plastic or sticky, cross-laminated, probably point bar facies, no organics, SO ₄ , CO ₃ , or fossils, fines upwards	
15			7	0.165	14	SM	H		Silty SAND, olive, 5Y5/3, not sticky or plastic, lower half is cross-laminated, common, medium, distinct, olive gray, 5Y4/2 and olive, 5Y5/3, mottles, no roots or organics, SO ₄ , trace of disseminated CO ₃ , few platy silicious shale pebbles, silt partings at 4.7 m and 4.9 m	
20			16	0.303	10	SP-SM	H		SAND with silt, poorly graded, olive gray, 5Y4/2, micaceous, well bedded, parallel laminae, no SO ₄ , CO ₃ , or organics	Gof
25			T	0.240 0.005 0.211	15 92 13	SM CH SM	H		Silty SAND, olive, 5Y4/4, no bedding, organics or mottling, tube sample	
30			19	0.195	10	SP-SM	H		Fat CLAY, top is olive, 5Y3/2, grades downward to dark greenish gray 5G4/1 and 5GY4/1, clay is fissured and filled with fine sand, fissures are oriented in all directions, all are less than 2-mm thick, clay in the middle of unit has rectilinear fracture pattern, tube sample	
35			A	0.002	94	CH			Silty SAND, dark gray, 5Y4/1, tube sample	
									SAND with silt, poorly graded, greenish gray, 5GY5/1, massive, few large tubular pores, no organics, SO ₄ or CO ₃	
									Fat CLAY, brown, 10YR5/3, sample came off tip of auger, location doesn't seem to match with CPT log, may be from interbed at 8.1 m	

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 110

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1205316, Y: 509559

DATE DRILLED CPT: 8/28/91, SPT: 9/4/91

GROUNDWATER 6 ft.; 1.8 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 29.8 ft.; 9.1 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	0	0							
11										
11.5										
12										
40									Sand, dense	Gof
12.5										
13										
13.5										
45									End of sounding, 44.6 ft., 13.6 m	
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 111
 LOCATION MARTELLA (MAR)
 DATE DRILLED CPT: 8/28/91, SPT: 8/29/91
 PERSONNEL L: BLACK, D: BENNETT/BLACK

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1205351, Y: 508550
 GROUNDWATER 5.5 ft.; 1.7 m
 ELEVATION 32.4 ft.; 9.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0									
0.5									Clay, dark olive gray, 2.5Y3/2 (m), sticky and plastic	
1			A	0.175	21	SM			Silty SAND, olive brown, 2.5Y5/3	
1.5			4	0.010	90	ml	C		Silt, olive, 5Y4/3, trace organics, sticky and plastic, soft 4 mm CO ₃ nodules common	
2			10	0.150	19	SM	H		Silty SAND, olive, 5Y5/3, micaceous, massive, trace disseminated CO ₃ , no organics or tubular pores, no SO ₄	
2.5										
3			6	0.181	10	SP-SM	L		SAND with silt, poorly graded, olive, 5Y5/3, no organics, tubular pores or roots, well sorted clean quartz-feldspar sand	
3.5										
4										
4.5			4	0.207	15	SM	L		Silty SAND, olive, 5Y5/3, micaceous, thinly bedded, in lower part of sample trace disseminated CO ₃ , fines upward	
5										
5.5										
6			7	0.240	5	SP-SM	L		SAND with silt, poorly graded, olive, 2.5Y5/3, massive, no organics SO ₄ or fossils, few siliceous shale grains to 3 mm	
6.5										
7										
7.5			T	0.380 0.032	6 80	SP-SM ML			SAND with silt, poorly graded, olive, 5Y5/3, more in next unit	
8			3	0.030	97	ML	C		SILT with sand, olive, 5Y4/3, uniform in color and texture, very soft, UCS=0.1 ksc	
8.5									SILT, olive, 5Y5/4, slightly sticky and plastic, no organics, clay coats on ped surfaces, massive to finely bedded, upper 2 cm has decomposed plant parts, sedge stems and roots, gleyed pockets of fine clay, moderate angular blocky structure, slight disseminated CO ₃	
9										
9.5										
10										
10.5										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 111

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1205351, Y: 508550

DATE DRILLED CPT: 8/28/91, SPT: 8/29/91

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 32.4 ft.; 9.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	0							
11									Lean clay	
11.5										
12										
12.5										
13										
13.5									Sand, dense	
14										
14.5									End of sounding, 46.3 ft., 14.1 m	
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 112
 LOCATION MARTELLA (MAR)
 DATE DRILLED CPT: 8/23/91, SPT: 9/4/91
 PERSONNEL L: BLACK, D: BENNETT/BLACK

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1206109, Y: 509651
 GROUNDWATER 9.5 ft.; 2.9 m
 ELEVATION 32.2 ft.; 9.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	00		8							
5			1		79	ml	D		Clay, dark olive, 5Y3/2, slightly sticky and plastic	
10			T	0.096 0.060 0.058	33 65 63	SM ML ML			Sandy silt, dark grayish brown, 2.5Y4/2 Silty sand, olive brown, 2.5Y4/4 Silt with sand, dark grayish brown, 2.5Y4/2, slightly sticky and plastic, 1 cm micaceous fine sand at bottom, olive brown, 2.5Y4/4, lost most of sample Silty SAND, olive brown, 2.5Y4/4; Sandy SILT, olive brown, 2.5Y3/4(w), no bedding, mottling, or roots, and Sandy SILT, olive, 5Y4/3, uniform, no roots, bedding, or organics SILT with sand, olive brown, 2.5Y4/3, micaceous, thinly laminated (3 mm), soft, not sticky or plastic, no organics, fossils, SO ₄ , trace disseminated CO ₃ , ucs=0.5 ksc	
15			1	0.046	71	ML	C			
20			11	0.155	17	SM	H		Silty SAND, grayish brown, 2.5Y5/2, micaceous, 2-5 mm laminae, trace of cross-bedding throughout, no organics or CO ₃ , fines upward	
25				0.004	93	CH			Fat CLAY, black, 5Y2.5/1, plastic and sticky	
30			6	0.060	57	ML	C		Sandy SILT and silty clay, greenish gray, 5GY5/1, 20-30 mm-thick bedding, occasional pebbles, clay is sticky and plastic, ucs=0.6 ksc	
35									Silt, becomes finer and stiffer with depth	

Magnitude = 7.1

Acceleration = 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 112

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1206109, Y: 509651

DATE DRILLED CPT: 8/23/91, SPT: 9/4/91

GROUNDWATER 9.5 ft.; 2.9 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 32.2 ft.; 9.8 m MSL

DEPTH (feet) (meters)	+ CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		00	15							
11										
11.5										
12										
12.5										
13									Elastic silt	
13.5										
14										
14.5										
15										
15.5									Interbedded sand and clay	
16										
16.5										
17									Lean to fat clay or elastic silt	
17.5										
18										
18.5										
19									Interbedded sand and lean clay	
19.5										
20									End of sounding, 64 ft., 19.5 m	
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

Page 2 of 2

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USGS GEOTECHNICAL LOG

HOLE NUMBER 113

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1206266, Y: 508642

DATE DRILLED 9/6/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 33.5 ft.; 10.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay	
10									Silty sand, loose	
15									Sandy silt to silt	
20										
25									Silty sand, medium dense	
30										
35										

Magnitude= 7.1

Acceleration= 0.194 g

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311

USGS GEOTECHNICAL LOG

HOLE NUMBER 113

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1206266, Y: 508642

DATE DRILLED 9/6/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 33.5 ft.; 10.2 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	18						Sand, fines upward	
11										
11.5										
12										
40										
12.5										
13									Sandy silt to silt	
13.5										
45										
14										
14.5										
15									Interbedded sand and lean clay	
50										
15.5										
16										
16.5										
55										
17										
17.5										
18									Elastic silt	
60										
18.5										
19										
19.5										
65									End of sounding. 64 ft., 19.5 m	
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

Page 2 of 2

312

USGS GEOTECHNICAL LOG

HOLE NUMBER 114

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1203309, Y: 507770

DATE DRILLED CPT: 8/29/91, SPT: 8/30/91

GROUNDWATER 7.3 ft.; 2.2 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 29.1 ft.; 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	8							
0.5										
1			A	0.012	82	ML			SILT with sand, dark brown, 10YR3/3, micaceous, moderately disseminated CO ₃	
1.5										
2										
2.5			1	0.005 0.084	99 40	MH ML	H*		Elastic silt to silt, olive, 5Y4/3, angular blocky structure, sticky and plastic, no organics, fossils, roots, or pores, thin clay coats on faces, no mottles, ucs=0.9 ksc; more below	
3									Silty SAND, olive, 5Y4/4, not sticky or plastic, slight CO ₃ throughout, no organics, bedding, fossils, SO ₄ , roots or pores, and sandy SILT, olive brown, 2.5Y4/4, same lack of features, as above SILT to sandy SILT, olive, 5Y4/3, 5Y4/4 fine layers are slightly sticky, slightly plastic, no organics, fossils, roots or pore, thin clay coats on faces ucs=0.9 ksc	
3.5										
4										
4.5			T	0.009 0.019 0.008	98 97 100	MH CL CH			Elastic SILT, very dark grayish brown, 2.5Y3/2, no bedding or organics, coarsens downward to lean CLAY, olive, 5Y4/3, distinct color change from above, less plastic, no bedding, or organics, fines downward to fat CLAY, olive, 5Y4/3, at the base, CO ₃ concretions and stringers common in lower 1/4 of sample	
5										
5.5			3	0.121	28	SM	L		Lean clay, dark grayish brown, 2.5Y4/2, sticky and plastic, abrupt contact with, silty SAND, olive, 5Y4/3, no organics, slight disseminated CO ₃ ; abrupt contact with, lean clay, very dark gray, 5Y3/1, sticky, plastic, no bedding, roots or organics, bottom 10 cm is clay, black, 5Y3/1, plastic, no roots, SO ₄ or CO ₃	
6										

REMARKS: Off Martella property.
NOTE SCALE CHANGE

Magnitude= 7.1

Acceleration= 0.194 g

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313

USGS GEOTECHNICAL LOG

HOLE NUMBER 114

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1203309, Y: 507770

DATE DRILLED CPT: 8/29/91, SPT: 8/30/91

GROUNDWATER 7.3 ft.; 2.2 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 29.1 ft.; 8.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8							
6.5										
7			T	0.036 0.017	81 97	ML			SILT with sand, dark grayish brown, 2/5Y4/2, roots are present, 3-4 mm CO ₃ concretions present; fines downward to SILT, olive gray, 5Y4/2, few roots, tubular pores are present, no bedding, CO ₃ concretions are very abundant in bottom 6 cm, ucs=0.5-1.4 ksc	
7.5										
25			2	0.040	85	ML	L		SILT with sand, olive gray, 5Y4/2, sticky and plastic, few fine pores, fine angular blocky structure (1-3 mm), slight CO ₃ , top 4 cm; bottom 30 cm, SILT with sand, olive, 5Y5/3 with gray 5Y5/1 mottles, not sticky or plastic, fine pores, slightly laminated, dark oxidized organics and few fine roots	
8										
8.5										
9			T	0.005 0.003	88 98	MH CH			Elastic SILT to fat CLAY, uniform in texture, color changes from very dark grayish brown, 2.5Y3/2 at top to dark gray, 5Y4/1, to dark olive gray, 5Y3/2 at the bottom, plastic but not sticky, clay coats faces, no bedding, roots or organics, ucs=1.5-2.2 ksc	qb
9.5			A	0.003	98	MH			Elastic SILT, dark greenish gray, 5G4/1, very sticky and plastic, no organics, CO ₃ , or SO ₄ , few red concretions, decomposed lithic fragments of shale	
10										
10.5										
35										
11										
11.5										
12										
40										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 114

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

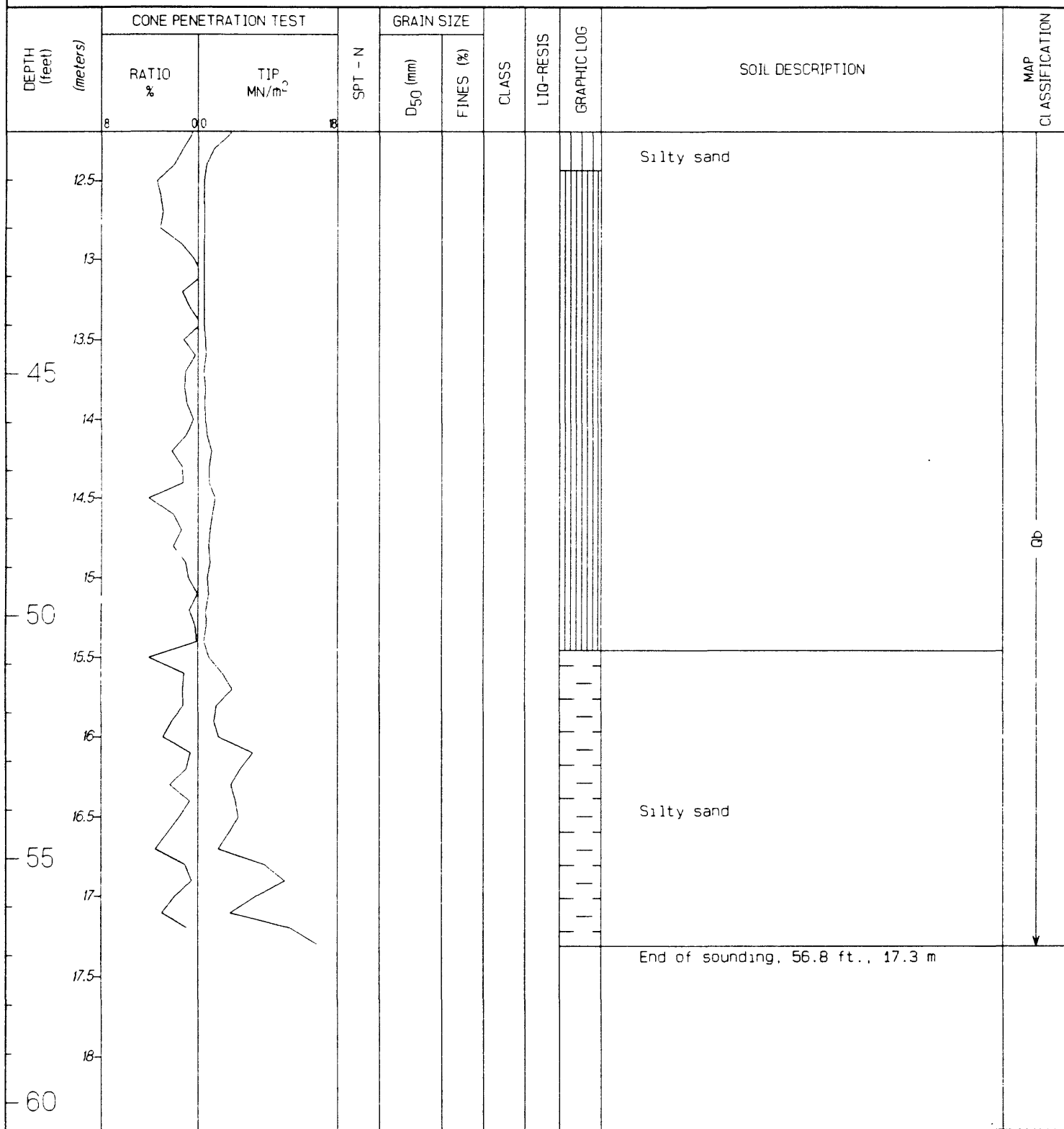
COORDINATES X: 1203309, Y: 507770

DATE DRILLED CPT: 8/29/91, SPT: 8/30/91

GROUNDWATER 7.3 ft.; 2.2 m

PERSONNEL L: BLACK, D: BENNETT/BLACK

ELEVATION 29.1 ft.; 8.9 m MSL



Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 115

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1205381, Y: 507964

DATE DRILLED 9/6/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 28.8 ft.; 8.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay Unit 1	
10									Sandy silt	
15									Lean clay to silt Unit 2	
20									Silty sand	
25									Lean clay (?), less plastic than below (?)	
30									Elastic silt Unit 4 apparently no unit 3	
35										

Magnitude= 7.1

Acceleration= 0.194 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 115

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MARTELLA (MAR)

COORDINATES X: 1205381, Y: 507964

DATE DRILLED 9/6/91

GROUNDWATER _____

PERSONNEL D: BENNETT/BLACK

ELEVATION 28.8 ft.; 8.8 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ - RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40										
12.5										
13									Silty sand	
13.5										
45										
14										
14.5									End of sounding, 46.3 ft., 14.1 m	
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.194 g

Page 2 of 2

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USGS GEOTECHNICAL LOG

HOLE NUMBER 116

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SALINAS RIVER BRIDGE (SRB)

COORDINATES X: 1214767, Y: 482717

DATE DRILLED 8/20/79

GROUNDWATER 21 ft.; 6.4 m

PERSONNEL L: HOOSE, D: SHALER/BENNETT

ELEVATION 41 ft.; 12.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	5	0.062	62	ML	D		Sandy SILT, light gray, 10YR7/2	Qyf
0.5			3	0.075	50	SM	D		Silty SAND, light gray, 10YR7/2	
1										
1.5										
2			2	0.070	54	ML	D		Sandy SILT, pale brown, 10YR6/3, loose	
2.5										
3			5	0.120	21	SM	D		Silty sand, light gray, 10YR7/2, no bedding	
3.5										
4			5	0.075	50	SM	D		Silty SAND, light yellowish brown, 10YR6/4, rusty mottling	
4.5										
5			5	0.202	6	SP-SM	D		SAND with silt, poorly graded, light gray, 5YR7/1, faint bedding	
5.5										
6										
6.5			7	0.243	7	SP-SM	L		SAND with silt, poorly graded, gray, 10YR6/1, loose, wet, no bedding, mica present	
7										
7.5										
8			7	0.217	14	SM	H		Silty SAND, gray, 2.5Y5/0, top half; bottom half, dark brown, 10YR4/3	
8.5										
9			10	0.295	6	SP-SM	L		SAND with silt, poorly graded, dark gray, 2.5Y4/0	
9.5										
10			9				H*		Lost sample, coarse sand (?)	
10.5										

REMARKS: Mechanical cone

Magnitude= 7.1

Acceleration= 0.159 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 116

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SALINAS RIVER BRIDGE (SRB)

COORDINATES X: 1214767, Y: 482717

DATE DRILLED 8/20/79

GROUNDWATER 21 ft.; 6.4 m

PERSONNEL L: HOOSE, D: SHALER/BENNETT

ELEVATION 41 ft.; 12.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
11									Lost sample, coarse sand (?)	
11.5			9				L			
12										
12.5										
13										
13.5										
14										
14.5										
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98.5										
99										
99.5										
100										

Magnitude= 7.1

Acceleration= 0.159 g

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USGS GEOTECHNICAL LOG

 HOLE NUMBER 117

 PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

 LOCATION SALINAS RIVER BRIDGE (SRB)

 COORDINATES X: 1214772, Y: 482722

 DATE DRILLED 8/20/79

 GROUNDWATER 21 ft.; 6.4 m

 PERSONNEL L: BENNETT, D: SHALER/BENNETT

 ELEVATION 41 ft.; 12.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	5	0.060	60	ML	D		Sandy SILT, very pale brown, 10YR7/4, loose, no bedding	Gyl
0.5			4	0.057	67	ML	D		Sandy SILT, very pale brown, 10YR7/3, mica common, no bedding	
1										
1.5			3	0.074	51	ML	D		Sandy SILT, light gray, 2.5Y7/2, 1-2 mm laminations	Gyl
2										
2.5			5	0.118	23	SM	D		Silty SAND, light yellowish brown, 2.5Y6/4, faint bedding, mica common	
3										Gyl
3.5										
4			5	0.096	35	SM	D		Silty SAND, light yellowish brown, 2.5Y6/4, horizontal laminations, slight plasticity	
4.5										Gyl
5			6	0.050 0.150	84 10	ML SP-SM	D		Sandy SILT, olive brown, 2.5Y4/4, more.	
5.5									SAND with silt, poorly graded, light gray, 10YR7/1, bedding defined by dark minerals	
6										Gyl
6.5			7	0.225	13	SM	D		Silty SAND, greenish gray, 5BG5/1, no bedding, less mica than above	
7										
7.5			10	0.360 0.255	5 10	SP-SM	H		SAND with silt, poorly graded, dark greenish gray, 5G5/1, SAND with silt, poorly graded, greenish gray, 5G5/1 wood fragments present	Gyl
8										
8.5										
9			10	0.072	52	ML	H		Sandy SILT, dark greenish gray, 5G4/1, coarsest sand 2-4 mm	Gyl
9.5										
10			17	0.143 0.750	23 2	SM	H		Silty SAND, gray, 2.5Y5/0, fines upward SAND, poorly graded, gray, 2.5Y5/0, "pea gravel" at bottom	
10.5										

REMARKS. Mechanical cone

Magnitude= 7.1

Acceleration= 0.159 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 117

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SALINAS RIVER BRIDGE (SRB)

COORDINATES X: 1214772, Y: 482722

DATE DRILLED 8/20/79

GROUNDWATER 21 ft.; 6.4 m

PERSONNEL L: BENNETT, D: SHALER/BENNETT

ELEVATION 41 ft.; 12.5 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
6	0.0	18								
11			14	0.790	4	SP	H*		SAND, poorly graded, greenish gray, 5B65/1, coarse, plastic clay at bottom	
11.5									11.3 m, uncorrected age, 970+/-90, 14C YBP	
12									Lean clay	
12.5			20	0.076	50	SM	H*		Silty SAND, olive gray, 5Y4/2, fines upward to clay	
13										
13.5			10	0.019	89	ML	H		Sandy SILT, greenish gray, 5GY5/1, coarsens upward	
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
21									End of sounding, 63 ft., 18.0 m	

Magnitude= 7.1

Acceleration= 0.159 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 120

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SALINAS RIVER BRIDGE (SRB)

COORDINATES X: 1214480, Y: 483420

DATE DRILLED 8/22/79

GROUNDWATER _____

PERSONNEL L: BENNETT, D: SHALER/BENNETT

ELEVATION 48 ft.; 14.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	00	00	0							
0.5										
1										
1.5									Lean clay	
2										
2.5									Sandy silt	
3										
3.5									Lean clay	
4				0.021	76	ML			Sand	
4.5				2.600	10	SP-SM				
5				0.001	97	ch				
5.5										
6				0.009	93	cl				
6.5										
7				0.003	80	ml				
7.5										
8				0.002	98	ch				
8.5										
9				0.004	87	ml			Lean to fat clay	
9.5										
10				0.003	91	cl				
10.5										
11				0.030	65	ml				
11.5										
12				0.073	51	ml				
12.5										
13										
13.5										
14										
14.5										
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35										

REMARKS: Mechanical cone and cork screw sampling method. Samples were pulled off solid stem augers.

Magnitude= 7.1

Acceleration= 0.159 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 120

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION SALINAS RIVER BRIDGE (SRB)

COORDINATES X: 1214480, Y: 483420

DATE DRILLED 8/22/79

GROUNDWATER _____

PERSONNEL L: BENNETT, D: SHALER/BENNETT

ELEVATION 48 ft.; 14.6 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0	0.178	17	SM				
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
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65										
65.5										
66										
66.5										
67										
67.5										
68										
68.5										
69										
69.5										
70										

Magnitude= 7.1

Acceleration= 0.159 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 123

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195845, Y: 582837

DATE DRILLED CPT: 7/22/93; SPT: 9/9/93

GROUNDWATER 16.5 ft.; 5.0 m

PERSONNEL L: TINSLEY D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8						Fill, gravel, pounded through with hammer for CPT	
0.5									Silty sand, olive brown, 2.5Y4/4, soft, not sticky or plastic, micaceous	
1										
1.5			6	0.046	70	ML	D		Silt, olive brown, 2.5Y4/4, micaceous, with occasional clay seams to 6 mm and one sandy seam 3 mm, not sticky or plastic, finely laminated, no fossils or chemical precipitates, disseminated CO ₃ , ucs=1.5 ksc	
2										
2.5										
3			2	0.043	76	ML	D		Silt with sand, 2.5Y4/2, dark grayish brown (moist), slightly sticky and plastic, few tabular root pores, FeO lines root pores, and disseminated CO ₃ in matrix, friable, ucs=0.8 ksc; and clay, light olive brown, 2.5Y5/4, with common medium distinct mottles, reddish brown, 5YR4/4 (moist)	
3.5										
4										
4.5			2	0.044	75	ML	D		Silt with sand, dark grayish brown, to olive brown, 2.5Y4/3 (moist), slightly sticky and plastic, micaceous, one long root sampled, no chemical precipitates, finely bedded with thin laminae defined by very fine sand seams, ucs=0.8 ksc	
5										
5.5										
6			14	0.195	11	SP-SM	L		Sand, olive gray, 5Y4/2, well sorted, not sticky or plastic, no chemical precipitates, no fossils or organics, one 2-cm thick clay parting, dark grayish brown, 2.5Y4/2, ucs=2.1 ksc	
6.5										
7										
7.5			8	0.225 0.150	8 27	SP-SM SM	L		Top 1/2, sand, brown, 5Y4/2, micaceous, thinly bedded, not slightly or plastic, no chemical precipitates, fossils, or organics, and bottom 1/2, dark greenish gray, 5GY4/1, silty SAND, not sticky or plastic, thinly laminated as above	
8										
8.5										
9			12	0.316	6	SP-SM	L		Sand, very dark gray, 5Y3/1, micaceous, massive, well sorted, fines upward from gravelly sand, detrital ¹⁴ C as roots, trace CO ₃ in ¹⁴ C zone, ucs=1.2 ksc	
9.5										
10										
10.5										

REMARKS: On top of sand boil, next to equipment.
ucs= unconfined compressive strength, kg/cm², pocket penetrometer
JT collect sand boil sample. 7/15-94; MB collected 7/22/94

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 123

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195845, Y: 582837

DATE DRILLED CPT: 7/22/93; SPT: 9/9/93

GROUNDWATER 16.5 ft.; 5.0 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	18	16	0.261	11	SP-SM	H*		Sand, dark gray, 5Y4/1, micaceous, massive, coarsening upward, friable to slightly dense, not sticky or plastic, no root pores, few disseminated organics/charcoal	Qof
11										
11.5										
12										
40										
12.5										
13										
13.5									End of sounding, 42.7 ft, 13 m	
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 124

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

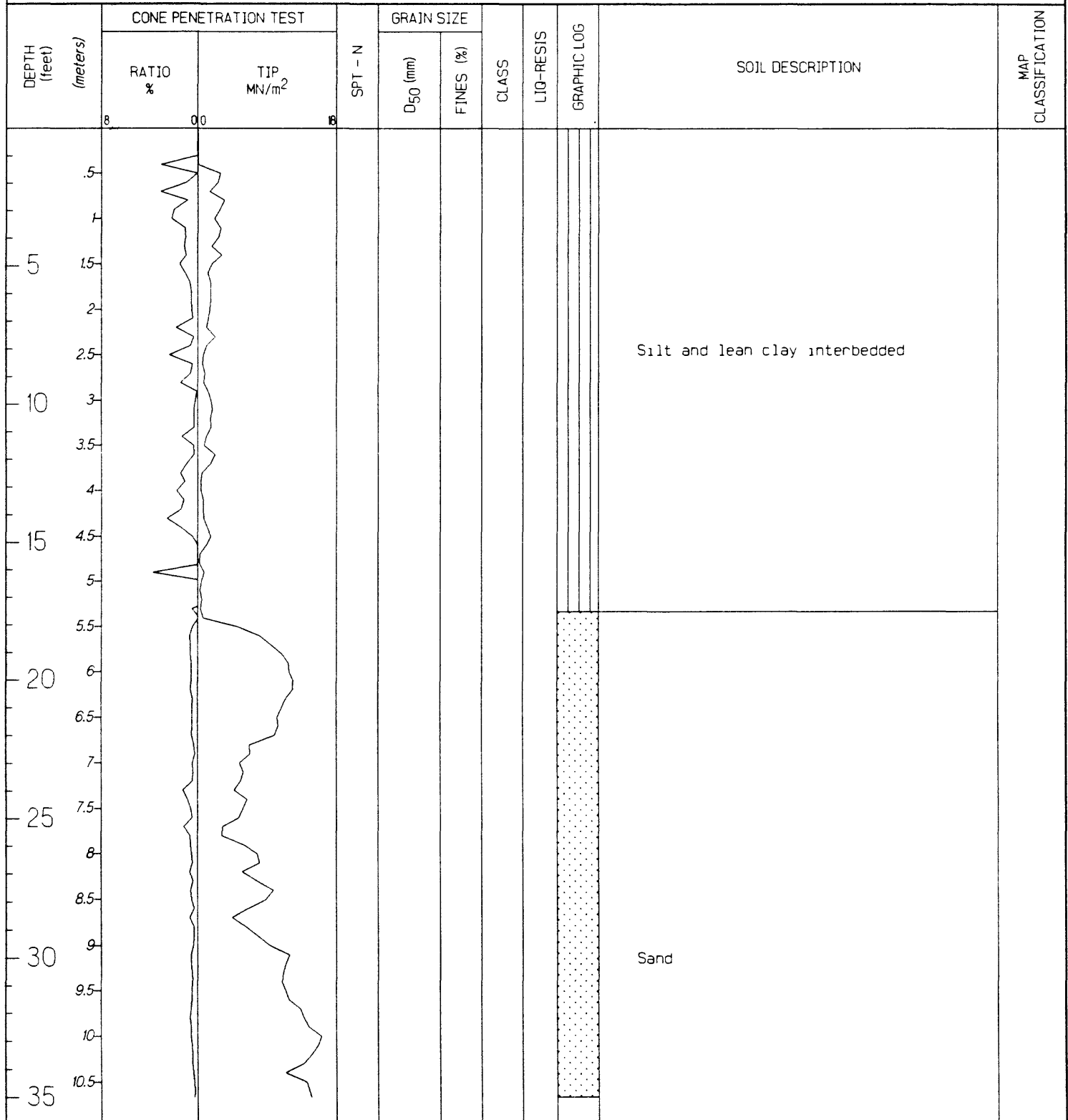
COORDINATES X: 1195817, Y: 582928

DATE DRILLED CPT: 7/22/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL



REMARKS. Very close to sandboil, between storage bins
JT collected sand boil sample, 7/15/94, MB collected 7/22/94

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 124

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195817, Y: 582928

DATE DRILLED CPT: 7/22/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 26 ft., 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
6	00	18								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

End of sounding, 61.7 ft, 18.8 m

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 125

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195523, Y: 582678

DATE DRILLED CPT: 7/22/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8.0	0.0	8							
5									Silt and lean clay interbedded	
10										
15										
20									Sand	
25										
30										
35										

REMARKS:

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 125

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195523, Y: 582678

DATE DRILLED CPT: 7/22/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Sand, medium dense, and lean clay interbedded

End of sounding, 47.6 ft, 14.5 m

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 126

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195499, Y: 582699

DATE DRILLED CPT: 7/22/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	0							
5									Silt and lean clay interbedded	
10										
15										
20										
25										
30									Sand, thin clay interbeds common	
35										

REMARKS:

Magnitude= 7.1

Acceleration= 0.498 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 126

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION GRANITE CONSTRUCTION (GRA)

COORDINATES X: 1195499, Y: 582699

DATE DRILLED CPT: 7/22/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 26 ft.; 7.9 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5										
12										
40										
12.5										
13										
13.5										
45									End of sounding, 44 ft, 13.4 m	
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.498 g

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331

USGS GEOTECHNICAL LOG

HOLE NUMBER 127

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183761, Y: 573329

DATE DRILLED CPT: 7/23/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5	1.5									
10	3									
15	4.5									
20	6								Lean clay	
25	7.5									
30	9									
35	10.5									

REMARKS: 464 ft west of c/l McGowan Rd.

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 127

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183761, Y: 573329

DATE DRILLED CPT: 7/23/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		00	8							
11										
11.5										
12										
12.5										
13										
13.5										
45										
14										
14.5									Sand	
15										
50									End of sounding, 50.2 ft, 15.3 m	
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 128

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183469, Y: 573001

DATE DRILLED CPT: 8/24/93

GROUNDWATER 3 ft.; .9 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
35										

Fat clay

REMARKS: 591 ft east of property line road center line

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 128
 LOCATION MCGOWAN FARM (MCG)
 DATE DRILLED CPT: 8/24/93
 PERSONNEL D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1183469, Y: 573001
 GROUNDWATER 3 ft.; .9 m
 ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	8								
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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335

USGS GEOTECHNICAL LOG

HOLE NUMBER 129

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183194, Y: 572691

DATE DRILLED CPT: 8/24/93

GROUNDWATER 2.5 ft.; .8 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5										
10										
15										
20									Fat clay	
25										
30										
35										

REMARKS: 146 ft east of property line road center line

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 129

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183194, Y: 572691

DATE DRILLED CPT: 8/24/93

GROUNDWATER 2.5 ft.; .8 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	8							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

End of sounding, 52.2 ft, 15.9 m

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 130

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183003, Y: 572719

DATE DRILLED CPT: 7/23/93

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
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18.5										
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19.5										
20										
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21										
21.5										
22										
22.5										
23										
23.5										
24										
24.5										
25										
25.5										
26										
26.5										
27										
27.5										
28										
28.5										
29										
29.5										
30										
30.5										
31										
31.5										
32										
32.5										
33										
33.5										
34										
34.5										
35										

REMARKS: 449 ft south of property marker

Magnitude= 7.1

Acceleration= 0.379 g

Page 1 of 2

USGS GEOTECHNICAL LOG

HOLE NUMBER 130

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183003, Y: 572719

DATE DRILLED CPT: 7/23/93

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	0							
11										
11.5										
12										
40										
12.5										
13										
13.5										
45										
14										
14.5										
15										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

End of sounding, 48.6 ft., 14.8 m

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 131

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1182890, Y: 572892

DATE DRILLED CPT: 7/23/93

GROUNDWATER 6 ft.; 1.8 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5	1.5									
10	3									
15	4.5									
20	6								Lean clay	
25	7.5									
30	9									
35	10.5									

REMARKS: 247 ft south of property marker

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 131

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1182890, Y: 572892

DATE DRILLED CPT: 7/23/93

GROUNDWATER 6 ft.; 1.8 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	00	0							
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 132

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1182766, Y: 573100

DATE DRILLED CPT: 7/23/93

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										
35										

REMARKS: Intersection of two field roads.
19 ft south of property marker, 8 ft east of marker.

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 132

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1182766, Y: 573100

DATE DRILLED CPT: 7/23/93

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8		0.0	18							
11										
11.5									Sand, dense	
12									End of sounding, 37.4 ft, 11.4 m	
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 133

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1182896, Y: 573389

DATE DRILLED CPT: 8/23/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	0.0	0.0	0							
0.5										
1										
1.5										
2										
2.5										
3										
3.5										
4										
4.5										
5										
5.5										
6										
6.5										
7										
7.5										
8										
8.5										
9										
9.5										
10										
10.5										

Lean clay

REMARKS: 325 east of property line marker

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 133

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1182896, Y: 573389

DATE DRILLED CPT: 8/23/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	0							
11										
11.5										
12										
40										
12.5										
13										
45										
13.5										
14										
14.5										
50										
15.5										
16										
16.5										
55										
17										
17.5										
18										
60										
18.5										
19										
19.5										
65										
20										
20.5										
21										
70										

Sand, dense
End of sounding, 39 ft, 11.9 m

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 134

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183004, Y: 573583

DATE DRILLED CPT: 8/23/93

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay	
10										
15									Sand, with interbeds of lean clay	
20										
25										
30									Lean clay	
35										

REMARKS: 591 ft east of property line marker.

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 134

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183004, Y: 573583

DATE DRILLED CPT: 8/23/93

GROUNDWATER 5.5 ft.; 1.7 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LTO-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	8								
11										
11.5									Sand	
12										
12.5										
13										
13.5									Lean clay	
14										
14.5										
15										
15.5										
16										
16.5									Sand, dense	
17										
17.5									End of sounding, 56.4 ft, 17.2 m	
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 135

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183172, Y: 573871

DATE DRILLED CPT: 8/23/93

GROUNDWATER 6.3 ft.; 1.9 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	18							
5									Lean clay	
10										
15										
20										
25									Sand, dense	
24.9									End of sounding, 24.9 ft, 7.6 m	
30										
35										

REMARKS. 879 ft east of property line marker.

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 136

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183283, Y: 574123

DATE DRILLED CPT: 8/23/93; SPT: 9/4/93

GROUNDWATER 8 ft.; 2.4 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
0.5				0.010	85	cl			Lean clay, dark olive gray, 5Y4/2, soft, slightly sticky and plastic, disseminated CaCO ₃	
1				0.012	95	cl			Lean clay, dark grayish brown, 2.5Y4/2, soft, slightly sticky and plastic, disseminated CaCO ₃	
1.5									Lean clay, very dark brown, 10YR2/2, to olive brown, 2.5Y4/4, with depth, organic rich zone near 2.1 m, some soil development, no bedding, concretions common at 2.1 m, more follows...	
2			t	0.006 0.164	96 18	cl SM				
2.5			6	0.148	11	SP-SM	L		Fine silty sand, olive brown, 2.5Y4/4, moist but not wet, uniform, no bedding, concretions, shells or organics	
3									Fine sand, dark grayish brown, 2.5Y4/2, micaceous, loose, massive, coarsens upward, ucs<0.5 ksc, trace CO ₃ , no H ₂ S, SO ₄ , or fossils	
3.5										
4			t	0.142 0.005	19 99	SM ch			Sand, 5Y4/3, olive, uniform, no bedding, few roots, and, lean clay, olive, 5Y4/3, to olive gray, 5Y4/2, soil development near 4.4 m, concretions common, roots very common, up to 10-cm long, mottled, and, fine sand, olive, 5Y4/3, grades upward into lean clay, ucs=1.75 ksc	
4.5										
5										
5.5			9	0.252	7	SP-SM	L		Lean clay, olive gray, 5Y4/2, ucs<0.5 ksc, and...	
6									Sand, olive gray, 5Y4/2, micaceous, no CO ₃ , SO ₄ , or fossils, few shaley pebbles, ucs<0.5 ksc	
6.5			19	0.203	11	SP-SM	L		Sand, olive, 5Y4/3, micaceous, not sticky or plastic, thin layers of coarse to silty fine sand 3 cm thick, only limited traces of CO ₃ , no SO ₄ , ucs= 1.65-1.90 ksc	
7										
7.5			20	0.320	8	SP-SM	H*		Sand, dark olive gray, 2.5Y3/2, lost 20 cm of sample, massive to thick bedded, well sorted, no SO ₄ , CO ₃ , H ₂ S, or fossils	
8										
8.5			26	0.195	9	SP-SM	H*		Sand, dark olive gray, 5Y3/2, fine, silty, micaceous, no CO ₃ , SO ₄ , H ₂ S, or fossils	
9										
9.5										
10										
10.5			t	0.030 0.001	100 89	ML CH			SILT, dark greenish gray to very dark gray, 5GY4/1, to 5Y4/1, uniform, not sticky or plastic, dense, no bedding, in sharp contact with underlying fat CLAY, mostly dark gray, 5Y4/1, uniform, no bedding to slight color banding, roots sporadically dispersed, no concretions, one small snail shell, ucs=0.25-0.5 ksc	

REMARKS: 1216 ft east of property line marker.

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 136

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183283, Y: 574123

DATE DRILLED CPT: 8/23/93; SPT: 9/4/93

GROUNDWATER 8 ft.; 2.4 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	18	0.030	100	ML				
11				0.001	89	CH				
11.5										
12										
12.5										
13										
13.5										
14										
14.5									Interbedded, sand and lean clay	
15										
15.5										
16									Sand, dense	
16.5									End of sounding, 54.1 ft, 16.5 m	
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 137

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183479, Y: 574411

DATE DRILLED CPT: 8/23/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay	
10									Interbedded sand and lean clay	
15										
20									Sand	
25										
30										
35										

REMARKS: 1556 ft east of property line marker.

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 137

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183479, Y: 574411

DATE DRILLED CPT: 8/23/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	00	18								
11										
11.5										
12										
40										
12.5										
13									Lean clay	
13.5										
45										
14										
14.5										
50										
15										
15.5										
16										
16.5										
55										
17									Interbedded sand and lean clay	
17.5										
18										
60										
18.5										
19									Sand	
19.5									End of sounding, 63 ft., 19.2 m	
65										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 138

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183609, Y: 574301

DATE DRILLED CPT: 8/31/93; SPT: 9/3/93

GROUNDWATER 5.8 ft.; 1.8 m

PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	0						Overbank silt with clay and trace of fine sand	
0.5				0.010	82	CL			Lean clay, dark grayish brown, 2.5Y4/2, soft, pelletoidal, no SO ₄ , CO ₃ , H ₂ S, organics or fossils	
1										
1.5			1	0.110	31	SM	L		Sand with silt, olive brown, 2.5Y4/3, massive, soft, not sticky or plastic, trace CO ₃ blebs at 1.9 m	
2										
2.5			t	0.023 0.060	77 56	ML			Silt, olive, 5Y4/3, uniform, no bedding, roots or concretions, silt to sandy silt at top, fines downward to silt that is slightly sticky and plastic	
3										
3.5			3	0.087 0.160	38 20	SM	L		Silt, olive gray, 5Y5/2, grades down into silty sand or sandy silt, olive brown, 2.5Y4/3, then sand, olive, 5Y4/3, then back into silt, 5Y4/2, beds average 10 to 15 cm thick, locally a trace of CO ₃ , no SO ₄ or H ₂ S, silt is not sticky or plastic	
4										
4.5										
5										
5.5			t	0.071 0.012	51 98	ML CL			Lean clay, dark to very dark gray, 5Y4/1-5Y3/1, with layer of sandy silt, dark olive gray, 5Y3/2 (20-cm thick), roots present only at bottom of sample, middle of sample has minor to moderate concretion development, no shells, only bedding is large scale; ucs top 1/3=0.1 ksc, bottom 2/3= 0.6-1.2 ksc	
6										
6.5			2	0.080	46	SM	L		Sandy silt, dark gray, 2.5Y4/4, with occasional thin beds of sand and clay, no sign of chemical precipitates, not sticky or plastic, roots in clay at 6.4 m	
7			t	0.067 0.149	53 11	SP-SM ML			Silt, black, 5Y2.5/1, very soft, slightly sticky and plastic, no shells, roots or bedding, becomes less plastic with depth, and...	
7.5										
8			19	0.144	18	SM	H*		Silty sand to sand, black, 5Y2.5/1, coarsens downward, no bedding, no concretions or roots, 10 cm above the base a fish scale or shell was found, 2.5 cm above that the only sign of bedding, 3-mm thick clay lamination, ucs=0.1-1.2 ksc	
8.5										
9			29	0.162	12	SM	H		Sand with silt, olive gray, 5Y4/2, not sticky or plastic, no chemical precipitates, slightly dense, moderate to well sorted	
9.5										
10									Sand, dark olive gray, 5Y3/2, trace of silt, dense, well bedded (layers up to 75 mm), well sorted, not sticky or plastic, no chemical precipitates, occasional 4-mm thick clay lamination	
10.5										

REMARKS: 10.5 ft east of c/l access road and 173 ft south of road next to levee

Magnitude= 7.1

Acceleration= 0.379 g

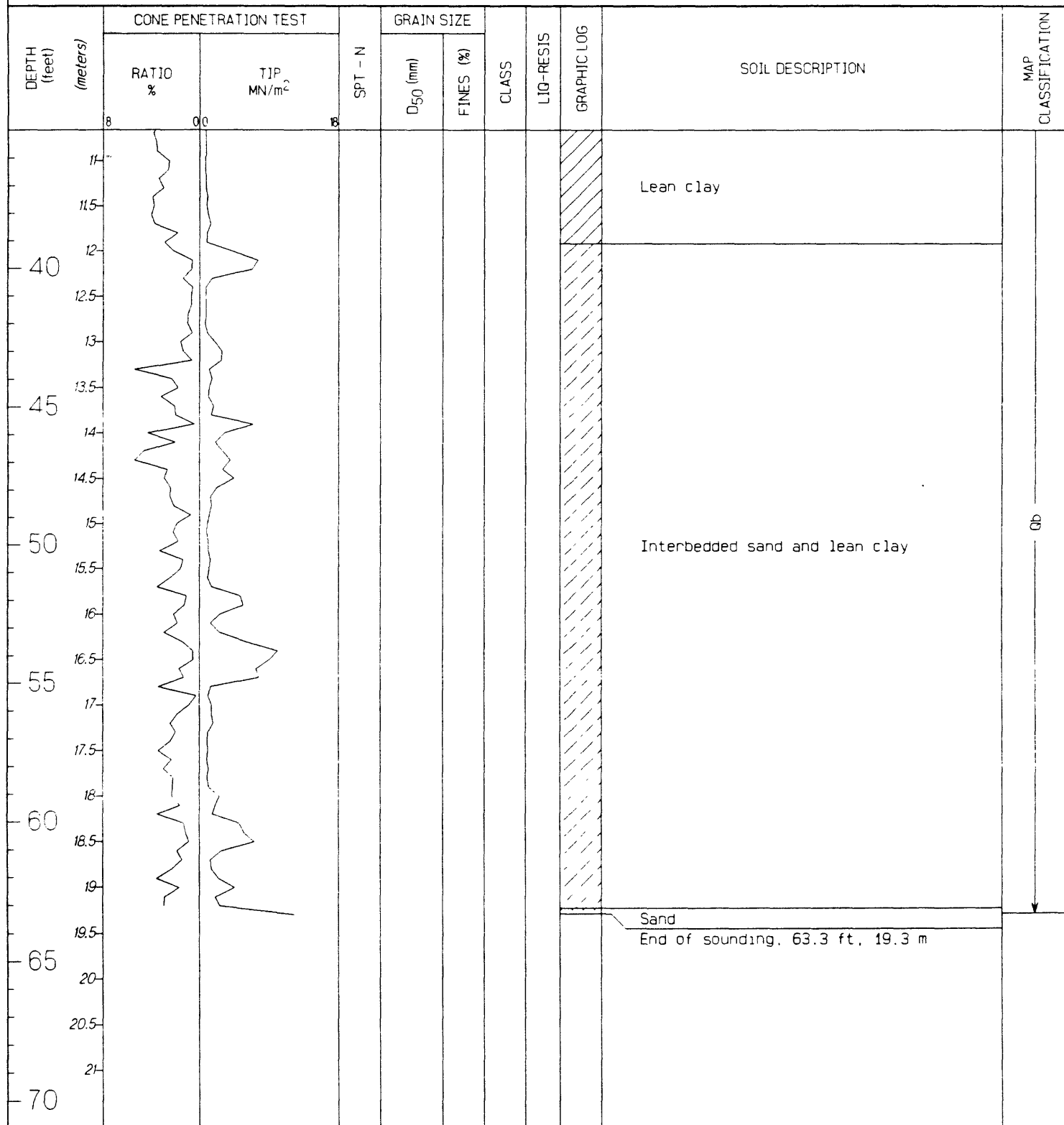
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USGS GEOTECHNICAL LOG

HOLE NUMBER 138
 LOCATION MCGOWAN FARM (MCG)
 DATE DRILLED CPT: 8/31/93; SPT: 9/3/93
 PERSONNEL L: TINSLEY, D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1183609, Y: 574301
 GROUNDWATER 5.8 ft.; 1.8 m
 ELEVATION 13 ft.; 4.0 m MSL



Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 139
 LOCATION MCGOWAN FARM (MCG)
 DATE DRILLED CPT: 8/31/93
 PERSONNEL D: BENNETT/CRILEY

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES
 COORDINATES X: 1183768, Y: 574094
 GROUNDWATER 5 ft.; 1.5 m
 ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5										
10										
15										
20									Lean clay	
25										
30										
35										

REMARKS: c/l access road and
 416 ft south of levee road

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 139

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183768, Y: 574094

DATE DRILLED CPT: 8/31/93

GROUNDWATER 5 ft.; 1.5 m

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIQ-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	0.0	8							
11										
11.5										
12										
12.5										
13										
13.5									Interbedded sand and clay	
14										
14.5									End of sounding, 47.9, 14.6 m	
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 140

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183689, Y: 574206

DATE DRILLED CPT: 8/31/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	L10-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
0	8	00	8							
5									Lean clay	
10										
15										
20									Sand, many clayey interbeds	
25										
30										
35									Lean clay	

REMARKS. c/l access road and
279 ft south of levee road

Magnitude= 7.1

Acceleration= 0.379 g

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USGS GEOTECHNICAL LOG

HOLE NUMBER 140

PROJECT NEHRP, MONTEREY BAY LIQUEFACTION STUDIES

LOCATION MCGOWAN FARM (MCG)

COORDINATES X: 1183689, Y: 574206

DATE DRILLED CPT: 8/31/93

GROUNDWATER _____

PERSONNEL D: BENNETT/CRILEY

ELEVATION 13 ft.; 4.0 m MSL

DEPTH (feet) (meters)	CONE PENETRATION TEST		SPT - N	GRAIN SIZE		CLASS	LIT-RESIS	GRAPHIC LOG	SOIL DESCRIPTION	MAP CLASSIFICATION
	RATIO %	TIP MN/m ²		D ₅₀ (mm)	FINES (%)					
8	0.0	8								
11										
11.5										
12										
12.5										
13										
13.5										
14										
14.5										
15										
15.5										
16										
16.5										
17										
17.5										
18										
18.5										
19										
19.5										
20										
20.5										
21										
70										

Magnitude= 7.1

Acceleration= 0.379 g

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