UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

IN-SITU MEASUREMENTS OF SEISMIC VELOCITY AT 22 LOCATIONS IN THE LOS ANGELES, CALIFORNIA REGION

by

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature

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CONTENTS

INTRODUCTION

Studies conducted in the San Francisco Bay region (Gibbs, Fumal and Borcherdt, 1980) have shown that average shear-wave velocity can be related to quantitative estimates of ground motion such as amplification from nuclear explosions and earthquake intensity. Furthermore, when certain physical properties of the geologic materials such as texture, hardness and fracture spacing are described during geologic mapping, a method can be used to predict shear-wave velocity from descriptions of geologic units (Fumal, 1978). By measuring shear-wave velocities in representative geologic units, regional maps depicting the earthquake hazard can be compiled.

These studies are presently being extended to the Los Angeles Basin and Oxnard-Ventura, California areas. To date, shear and compressional waves have been measured in boreholes at 68 locations. Two previous reports (Gibbs, Fumal and Roth, 1980; and Fumal, Gibbs and Roth, 1981) summarized geologic and seismic data at sites 1-27 and 28-46 respectively. This report presents data for sites 47-68. At each location seismic travel times are measured in drill holes, normally at 2.5 m intervals to a depth of 30 m. Geologic logs are compiled from drill cuttings, undisturbed samples and penetrometer samples. The data provide a detailed comparison of geologic and seismic characteristics and parameters for estimating strong earthquake ground motions quantitatively at each of the sites.

SELECTION AND LOCATION OF SITES

The selection of sites 47-68 (fig. 1) in this study was guided by the availability of other data in the Los Angeles area that are applicable to the overall problem of estimating earthquake ground motions. These data are (1) strong motion records from the 1971 San Fernando earthquake, (2) ground motion recorded from nuclear explosions and (3) geologic mapping. Sites are selected on the basis of each data set with priority given to the order listed.

DRILLING AND SAMPLING PROCEDURES

At each site selected, a hole 12 cm in diameter is drilled to a depth of 30 m using a truck-mounted drill and a rock bit with mud and water circulation. The boring is then cased with 7.6 cm diameter PVC plastic pipe and backfilled with drill cuttings and "pea" gravel. Casing insured accessibility of the hole and provided a secure clamping surface for the seismic probe.

Samples are taken in each of the holes at depths of approximately 3 m, 7.5 m, 30 m, and at boundaries defined by continuously monitoring the drill cuttings and the drill reaction. The type and number of samples taken at each site is determined by the type of material, the number of significant lithologic boundaries, and variations in weathering.

In soils, standard penetration measurements are made and undisturbed samples are taken using a "Pitcher" core barrel and a "Shelby" thin tube liner. Pitcher barrel samples are also taken in soils with large amounts of hard rock fragments and in firm rock. Samples are obtained in hard rock using a core barrel with a diamond core bit.

RECORDING PROCEDURES

Compressional waves are generated at each site by the vertical impact of a sledge hammer on a steel plate. A signal produced by the opening of a switch attached to the hammer is recorded for determining origin time.

Shear waves are generated using the horizontal traction source introduced by Kobayashi (1959) and discussed by Warrick (1974). Briefly, the method consists of applying a horizontal impact to a large timber (244 x 30 x 18 cm). The timber is placed on a flattened soil surface and held firmly in place by the front wheels of a truck. A steel pipe extends through the timber and supports a 30 kg hammer to which is attached an impact switch. The specially constructed hammer rolls on bearings and moves a distance of 45 cm along the pipe before impacting the timber. The "horizontal traction" source generates a signal with a high proportion of S-wave energy compared to P-wave energy. The timber is struck twice, once in each direction. The two impacts reverse the polarity of the S-waves but not the polarity of the smaller amounts of P-wave energy. Comparison of the signals from the two reversed impacts provides an important tool for identifying the onset of the S-wave.

The timber is offset 2.0 m from the hole and a three-component geophone package (natural frequency 14 Hz) is placed within 9 cm of its center. The signals recorded from the surface geophones are used to monitor the input signals and determine the origin time for the generated S-waves. The arrangement of timber, steel plate, and surface geophone package is illustrated in figure 2.

The P-waves generated by a vertical impact on the steel plate and the S-waves generated by striking the timber in both directions are recorded separately. This procedure is repeated for each 2.5 m interval (closer spacing is sometimes used to obtain a velocity in thin layers) in the drill hole.

Two downhole geophones were used in this study. One has an inflatable diaphragm and a declinometer which under most circumstances permits orientation of the horizontal geophones from the surface. Proper orientation (parallel and perpendicular to the source) aids in identifying the onset of the S-wave. A second downhole geophone was used as a backup instrument in several holes in this study. This geophone has a spring clamping mechanism and cannot be oriented from the surface. Both instruments detect three components of motion.

The signals from the downhole and surface seismometers and the impact switches are recorded on photographic paper. The velocity unit-impulse response of the recording system is essentially flat from 2 Hz to above 100 Hz. A detailed description of the recording instrumentation is presented by Warrick and others (1961). The recording oscillograph is modified for this project by adding 500 Hz galvanometers and increasing the paper speed to 46 cm/sec.

GEOLOGIC DATA

Description of Samples

Portions of each of the samples are examined and described in the laboratory. The terms used for the descriptions are summarized on figure 3. The sample descriptions are presented in the left-hand columns of figures 20-41.

The soil samples are described using the field techniques of the Soil Conservation Service and those specified for the Unified Soil Classification System. Descriptions include soil texture, color, amount and size of coarse grains, plasticity, dry and wet consistency, and moisture condition. Texture refers to the relative proportions of clay, silt, and sand particles less than 2 mm in diameter. The dominant color of the soil and prominent mottles are determined from the Munsell soil color charts.

Descriptions of rock samples include rock name, weathering condition, color, grain size, hardness, and fracture spacing. Classifications of rock hardness and fracture spacing are those used by Ellen and others (1972) in describing hillside materials in San Mateo County, California. The weathering classification is modified from that used by Aetron-Blume-Atkinson (1965) in describing Tertiary sedimentary rocks in the foothills of the Santa Cruz Mountains, California.

Geologic Log

Geologic logs are compiled for each hole using the field log descriptions of the samples (figures 20-41). The field log is based on the reaction of the drill rig, a continuous record of drill cuttings, preliminary on-site inspection of samples, and inspection of nearby exposures.

Most information needed for describing relatively well-sorted soils and such properties of rock as lithology, color, and hardness are readily obtained from cuttings. Inspection of samples and nearby outcrops is also necessary to determine the nature of poorly sorted materials and to determine fracture spacing. Reaction of the drill rig is also useful in determining degree of fracturing as the rate of penetration in rock is highest for very closely fractured and crushed materials and drilling roughness generally is at a maximum in closely to moderately fractured rock. In-situ consistency of soil is determined largely from standard penetration measurements and rate of drill penetration.

Density Measurements

Values for density are required to calculate elastic moduli from measurements of seismic velocity. Densities were measured for the diamond core samples and most of the penetration samples by weighing a small piece of sample and obtaining its volume by the mercury displacement method. A different procedure was used for very friable materials such as grus or poorly-sorted materials which necessitated using a large sample. A section was cut from the Shelby tube containing the sample, its height and diameter measured and the sample extruded for weighing.

While the accuracy of the density measurements is generally sufficient for calculation of elastic moduli, a number of the samples used to obtain densities were not entirely representative of the material in-situ.

Penetration samples were somewhat disturbed and many had dried out before measurements could be made. Densities of hard rock obtained using intact fragments may be higher than in-situ densities by approximately 0.1-0.2 gm/cc, depending on the amount and openness of fractures.

SEISMIC DATA

Identification of Shear Wave Onset

To aid in the identification of the shear wave arrivals, the signals recorded in the drill hole from impacting the timber in opposite directions and superimposed and drafted on a common time base (figs. 42-63). The S-wave group is easily identified when displayed in this manner, by a 180° phase inversion. The onset of the S-wave is chosen as the start of the first clearly inverted phase in the group. The interpretation proceeds from the bottom record, to the top using phase correlation at each recording depth. The onset of the S-wave arrival (arrows) and the first peak of the S-wave arrival (dots) are identified for each depth and are indicated on figures 42-63 for each site.

It was not possible at every site to control orientation of the downhole seismometer package because of high viscosity drilling mud left in the hole; hence, the relative amounts of S-wave energy recorded on the two horizontal seismometers vary with depth. The S-wave arrival is generally most easily identified on the horizontal seismogram with the largest amplitudes. Comparison of the signals recorded on the horizontal sensors with that recorded on the vertical sensor shows that the S-wave energy generated by the horizontal traction source is at least twice as large as the P-wave energy.

On many of the horizontal seismograms some P-wave energy prior to the onset of the S-wave is apparent. Some P-wave energy is generated by the horizontal traction source and some probably results from conversion of S to P at seismic boundaries. In some cases the polarity of this P-wave energy is reversed and careful consideration of the entire record section is required to identify the S-arrival. In general, the onset of the S-wave is easier to identify at sites underlain by the various types of soil than for sites underlain by the more consolidated rock units.

Travel Times and Average Velocities

To determine the travel time for the S-wave onset identified from the record sections (figures 42-63), the following times are measured with respect to a 100 Hz standard signal recorded on the records:

1) t_1 time of break in signal from impact switch
2) t_2 onset time of S-wave arrival on inline uphole geophone
3) t_3 onset time of identified S-wave arrival on downhole sensors

The time considered to be the origin time for the S-wave recorded on the downhole sensor is the onset time of the S-arrival on the uphole inline sensor. To reduce the uncertainties in determining this origin time, an average travel time from the source to the uphole geophone (t_A) is determined from the set of values, $t_2 - t_1$, measured at each depth. The travel time for the first S-arrival is given by

$$t_s \quad (t_3 - t_1) - t_A.$$

A corrected S-wave travel time (t_s), corresponding to the travel time for a vertical ray path, is computed from $t_{s_c} \approx t_s + C$ where C corresponds to a timing correction (cosine of the angle of ray incidence) due to the distance the plank is offset from the center of the hole (usually 2.0 m). Average velocities from the surface are determined by dividing the corrected travel time by the corresponding depth. The travel time for the first S-peak is determined similarly. The origin corrections ($t_2 - t_1$), the travel times of the first S-arrival and the first S-arrival and the first S-peak (t_s), the corrected travel times for the first S-arrival and the first S-peak (t_{s_c}), and the average corresponding velocities computed at each site are presented in tables 1-22.

The travel times for the P-waves generated by a vertical impact on a steel plate are determined in the same way as for the S-waves, except that the origin time for the P-wave is given by the impact switch and no origin correction is necessary. The travel times, the corrected travel times, and the average velocities for the P-waves are also presented in tables 1-22.

Interval Velocities and Elastic Moduli

Calculation of interval velocities and elastic moduli requires determination of depth intervals over which the velocity is approximately constant within the uncertainty of the travel-time measurements. To determine these depth intervals, the travel time data (tables 1-22) are plotted as a function of depth (figs. 64-85) and the geologic logs (figs. 20-41) are simplified and displayed graphically on the travel time curves (figs. 64-85). Depth intervals for velocity determinations are selected on the basis of distinct changes in slope of the travel time plots and evidence for lithologic boundaries. For those geologic materials with S-velocities greater than 350 m/sec, the intervals are required to contain at least four travel time measurements to avoid determining a velocity from a travel time differential due in large part to measurement error.

Velocities are calculated for each of the selected intervals (tables 23-44) from the slope of the linear regression line which best fits the travel time data in a least squares sense (Borcherdt and Healy, 1968, eqs. 3.1-3.5). The equation of the linear-regression line which best fits, in a least-squares sense, a sample on n pairs of time-depth coordinates $(x_1,t_1),\ldots.(x_n,t_n)$ is

$$t(x) = a + b\,(x - \bar{x})$$

where $\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$, $a = \frac{1}{n} \sum_{i=1}^{n} t_i$,

the intercept is $\text{INCPT} = \frac{1}{n} \sum_{i=1}^{n} t_i - b\bar{x}$, and

the slope is $b = \sum_{i=1}^{n} w_i t_i$

with $w_i = (x_i - \bar{x})/D$ and $D = \sum_{k=1}^{n} (x_k - \bar{x})^2$

The desired velocity (VEL) is given by V = 1/b. Assuming the standard statistical model (Borcherdt and Healy, 1968), the 68.3 confidence level, uncertainty interval (UNC INT) for the velocity is estimated by

$$\frac{1}{b+S_b}, \frac{1}{b-S_b} ,$$

where $S_b = \frac{1}{(n-2)D} \sum_{i=1}^{n} (t_i - t(x_i))^2$

is the standard error of the regression coefficient.

For these depth intervals with measurements of density (p), the shear modulus (SHEAR MOD, M) and bulk modulus (BULK MOD, K) is calculated (tables 23-44) using the linear elastic equation

$$M = \rho V_s^2$$

and

$$K = \rho V_p^2 - \frac{4}{3} M$$

Poisson's ratio (σ) is calculated (tables 23-44) using

$$\sigma = \frac{\left(\frac{V_p}{V_s}\right)^2 - 2}{2\left[\left(\frac{V_p}{V_s}\right)^2 - 1\right]}$$

SUMMARY

This report summarizes seismic velocities measured in the near surface geologic materials at 22 locations in the Antelope Valley and Los Angeles, California areas. S-wave and P-wave measurments were made at 2 1/2 m intervals in drill holes to a depth of 30 m. Geologic logs were compiled by continuously monitoring drill cuttings and by analysis of cored samples.

Density measurements were made from samples for the calculation of elastic moduli.

Previous studies in the San Francisco Bay region (Gibbs et al., 1980) have shown that average shear velocity can be correlated with ground motion amplification recorded from nuclear explosions and with observed intensities from the 1906 earthquake. A detailed study using shear velocity data from 59 locations (Fumal, 1978) has shown that certain physical properties of the near surface geologic materials can be used to predict velocity. Measurements of shear velocity at a number of strategic locations will permit a regional classification of seismically distinct velocity units which may be useful for seismic zonation.

ACKNOWLEDGMENTS

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FIGURES

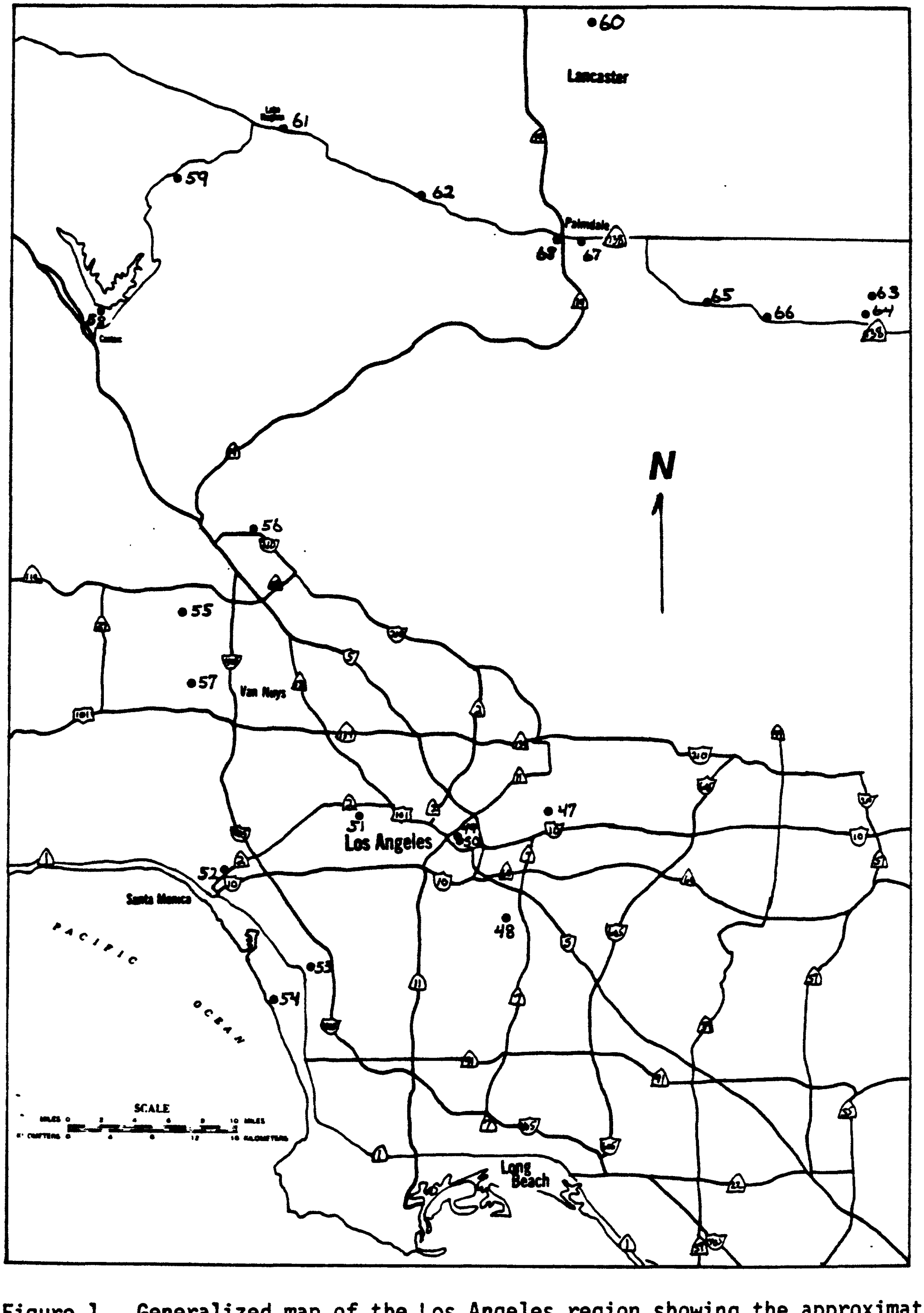


Figure 1. Generalized map of the Los Angeles region showing the approximate locations of shear-wave sites. Detailed locations are shown in figures 4-25

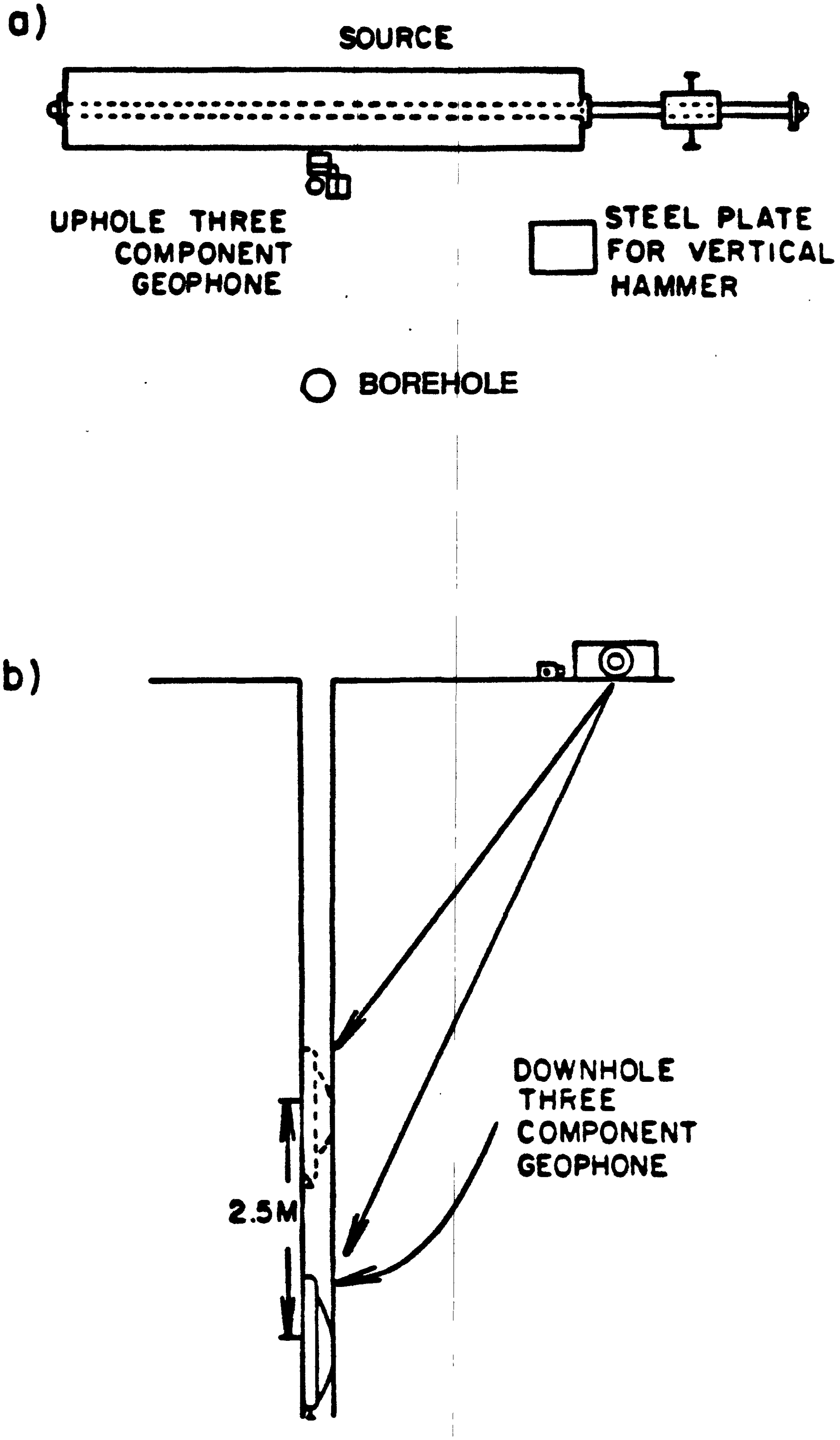


Figure 2. Details of field apparatus, (a) hammer and plank and (b) section showing three-component downhole geophone.

ALTITUDE: DATE:	LOCATION: Lat. Long. QUADRANGLE:	GEOLOGIC MAP UNIT: [1] California DWR, 1961 [2] Hanegan, 1973 [3] Lamar, 1970 [4] Tinsley, personal communication [5] Ponti, 1980, 1981 and personal commun.

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Graphic Log	Depth (meters)	DESCRIPTION

SAMPLING:

Standard penetration sample taken inside a 1 1/4" I.D. split-spoon driven 18" into the soil with a 140 lb. weight falling 30" at the top of the drill rod.

Blow count for last 12" or, if penetration <12", for depth driven as noted. (14; 54/3")

Pitcher undisturbed sample taken inside a 3" I.D. Shelby thin tube mounted in a Pitcher core barrel. (P)

Sample taken inside a 3" I.D. Shelby tube mounted on end of drill rod and pushed into soil. (S)

Rock core taken inside a NX size core barrel with a diamond bit. (C)

Rock hardness: response to hand and geologic hammer: (Ellen et al., 1972)

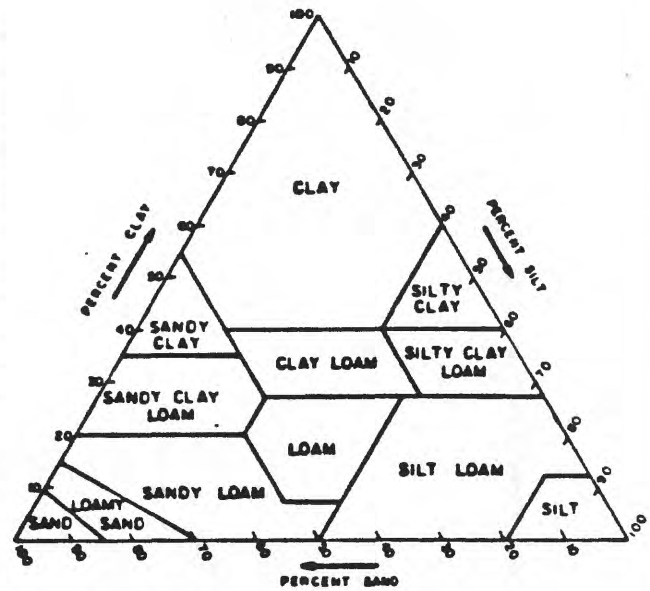
hard - hammer bounces off with solid sound
firm - hammer dents with thud, pick point dents or penetrates slightly
soft - pick point penetrates
friable material can be crumbled into individual grains by hand.

Fracture spacing: (Ellen at al., 1972)

cm	in	fracture spacing
0-1	0-1/2	v. close
1-5	1/2-2	close
5-30	2-12	moderate
30-100	12-36	wide
>100	>36	v. wide

Weathering: (Amtron-Blume-Atkinson, 1965)
Fresh: no visible signs of weathering
Slight: no visible decomposition of minerals, slight discoloration
Moderate: slight decomposition of minerals and disintegration of rock, deep and thorough discoloration
Decomposed: extensive decomposition of minerals and complete disintegration of rock but original structure is preserved.

Texture: the relative proportions of clay, silt, and sand below 2 mm. Proportions of larger particles are indicated by modifiers of textural class names. Determination is made in the field mainly by feeling the moist soil (Soil Survey Staff, 1951).



Color: Standard Munsell color names are given for the dominant color of the moist soil and for prominent mottles.

Plasticity: estimated from the strength of air dried sample and toughness of thread formed when soil is rolled at the plastic limit (Sowers and Sowers, 1970).

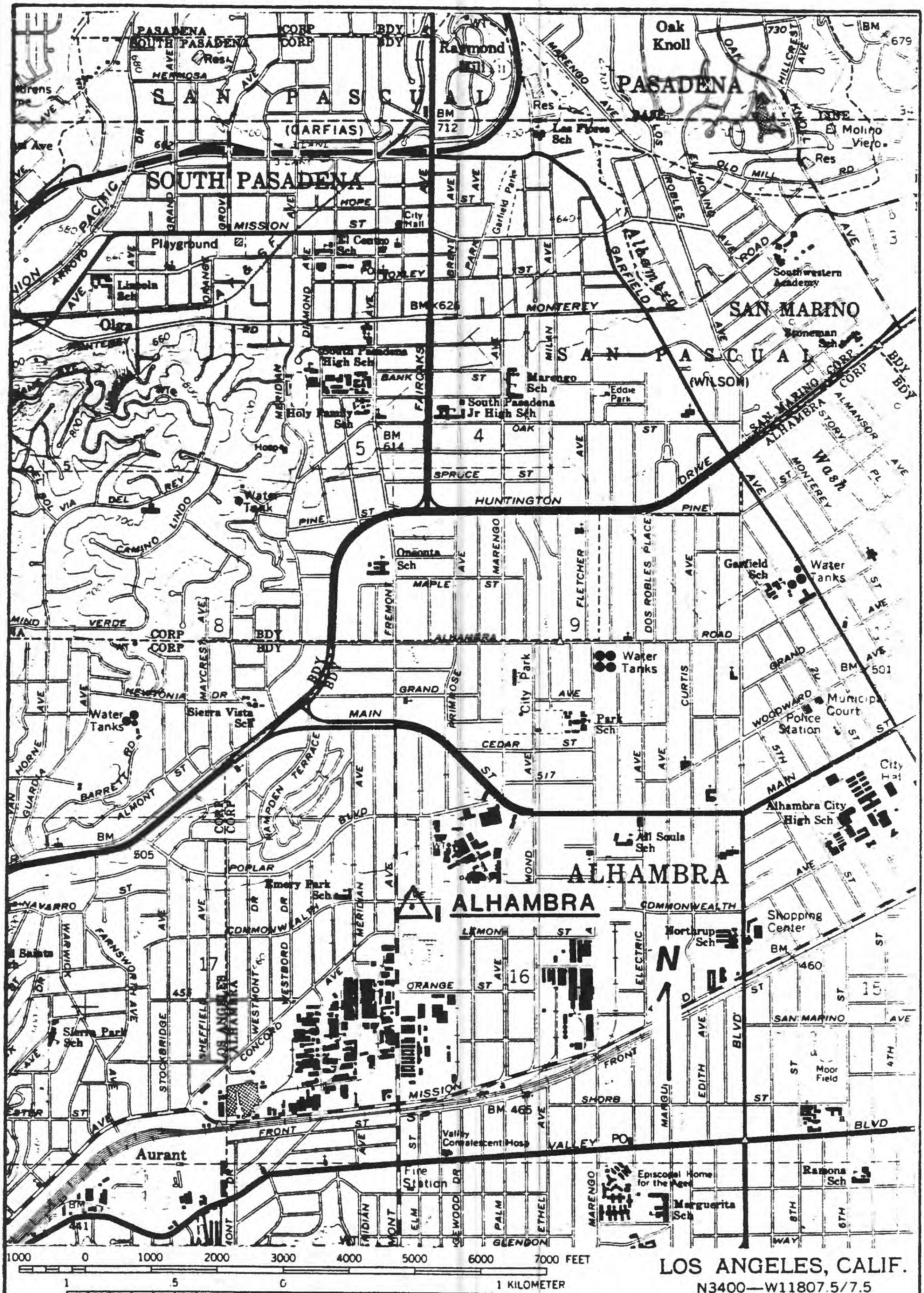
plasticity	dry strength	field test
non plastic	v. low	falls apart easily
slightly	slight	easily crushed
medium	medium	friable with difficulty
highly	high	cannot crush with fingers

Relative density of sand and consistency of clay is correlated with penetration resistance: (Terzaghi and Peck 1948)

blows/ft.	relative density	blows/ft.	consistency
0-4	v. loose	<2	v. soft
4-10	loose	2-4	soft
10-30	medium	4-8	medium
30-50	dense	8-15	stiff
>50	v. dense	15-30	v. stiff
		>30	hard

CL, MH, etc.: Unified Soil Classification Group Symbol (U. S. Army Corps of Engineers, 1960)

Figure 3



PASADENA
SOUTH PASADENA
SAN PASQUAL
Raymond Hill
Oak Knoll
(GARFIAS)
SOUTH PASADENA
SAN MARINO
(WILSON)
ALHAMBRA
Water Tanks
City Park
Alhambra City High Sch
Shopping Center
Aurant
Moor Field
Fine Station
Episcopal Home for the Aged
Marguerita Sch
Ramona Sch
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
LOS ANGELES, CALIF.
N3400—W11807.5/7.5

Figure 4


VERNON
MAYWOOD
BELL
CUDAHY
SAN ANTONIO
(LUGO)
SOUTH GATE
LOS ANGELES
LOS ANGELES RIVER
LONG BEACH FREEWAY
ATLANTIC BLVD
ATLANTIC AVE
SLAUSON AVE
FLORENCE AVE
FIRESTONE BLVD
GAGE AVE
RANDOLPH ST
PACIFIC BLVD
UNION PACIFIC
SALT LAKE
CORPORATE
BOUNDARY
Loma Vista Ave Sch
Fishburn Ave Sch
Civic Center
Hospital
City Park
Heliotrope Ave Sch
Corona Park
Fire Station
Carmelita Jr High Sch
City Hall
Water Tank
Woodlawn Ave Sch
Veterans Park
Little Bear Park
Corona Ave Sch
Bell High Sch
Recreation Center
Pritchard Field
Elizabeth St Sch
Blair Sch
State St Sch
Bell Gardens Sch
South Gate High Sch
San Gabriel Ave Sch
South Gate Jr High Sch
Drive-in Theater
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER
SOUTH GATE, CALIF.
N3352.5—W11807.5/7.5

Figure 5

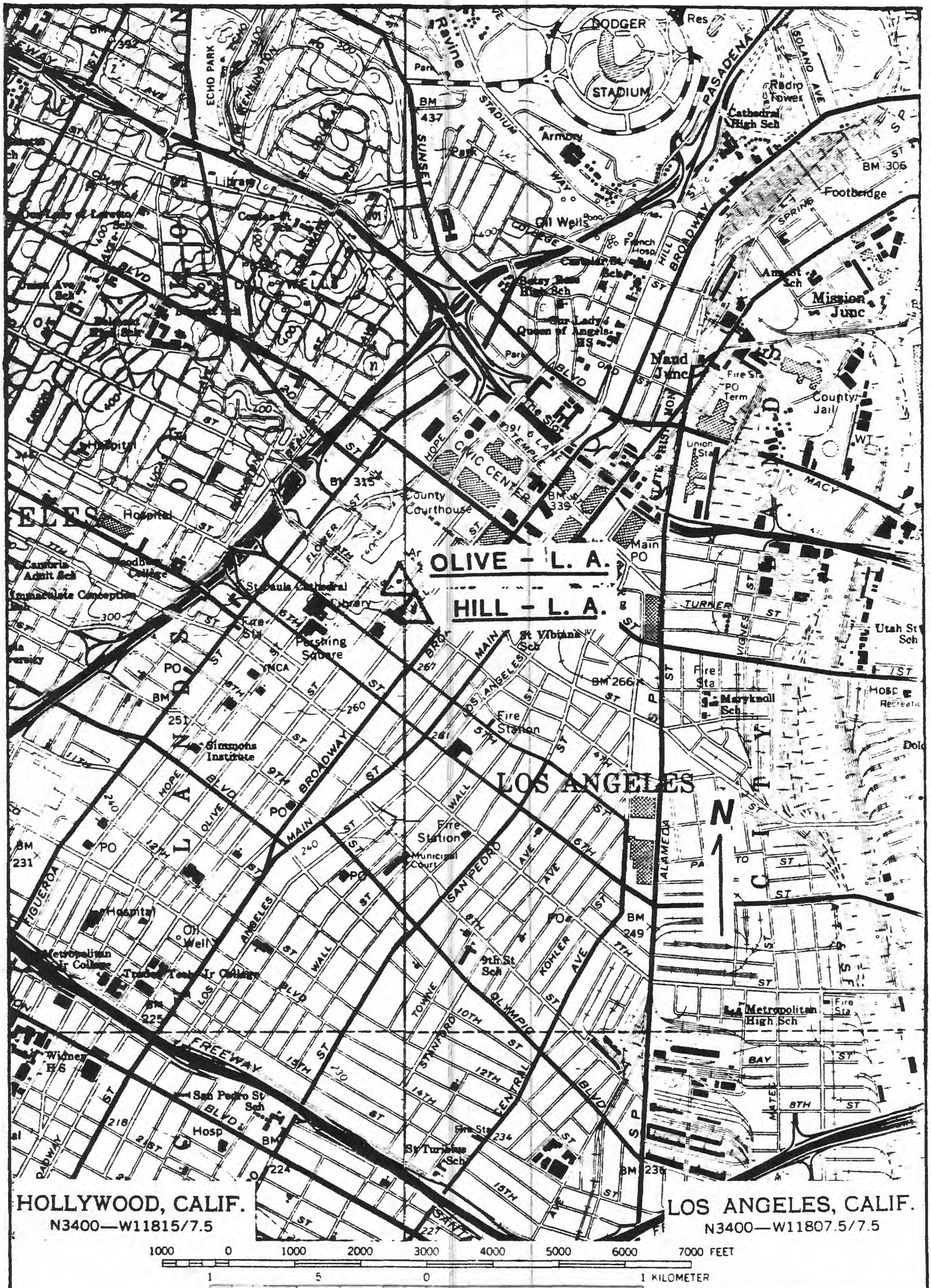

OLIVE - L. A.
HILL - L. A.
DODGER STADIUM
LOS ANGELES
Civic Center
County Courthouse
Pershing Square
Main PO
Union Sta
County Jail
Mission Junc
Cathedral High Sch
Metropolitan High Sch
Metropolitan Jr College
Trade-Tech Jr College
Simmons Institute
St Vibiana Sch
Maryknoll Sch
Utah St Sch
9th St Sch
San Pedro St Sch
Fire Station
Municipal Court
Footbridge
Radio Tower
Armory
HOLLYWOOD, CALIF.
N3400—W11815/7.5
LOS ANGELES, CALIF.
N3400—W11807.5/7.5
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

Figure 6

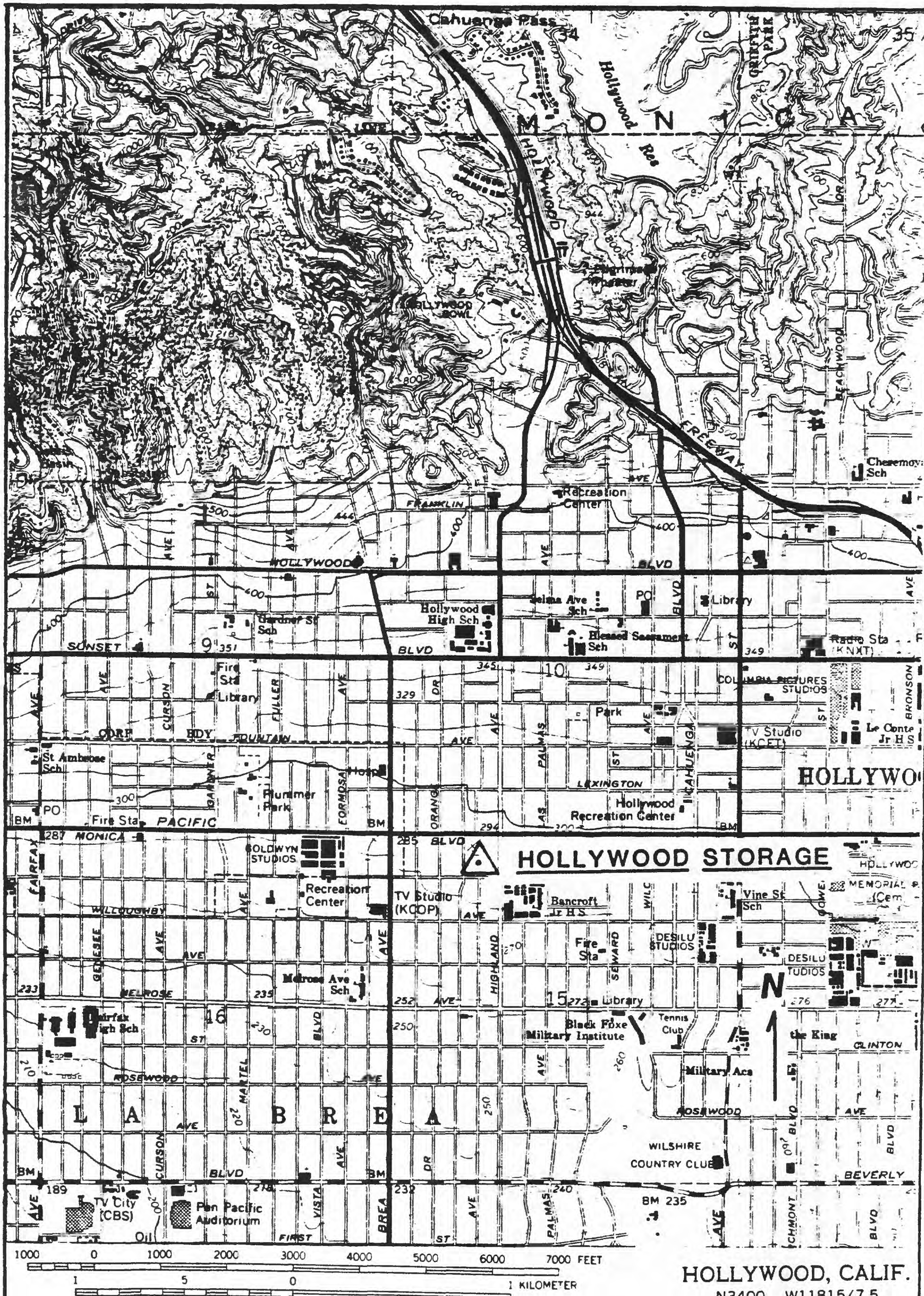

Cahuenga Pass
HOLLYWOOD STORAGE
HOLLYWOOD
FRANKLIN
SUNSET
BLVD
FOUNTAIN
LEXINGTON
PACIFIC
MONICA
WILLOUGHBY
MELROSE
ROSEWOOD
BEVERLY
FIRST
FAIRFAX
GENESEE
CURSON
GARDNER
FULLER
FORMOSA
MARTEL
VISTA
BREA
ORANGE
HIGHLAND
PALMAS
SEWARD
CAHUENGA
BRONSON
CLINTON
Hollywood High Sch
Gardner St Sch
Fire Sta
Library
St Ambrose Sch
Plummer Park
Hosp
GOLDWYN STUDIOS
Recreation Center
TV Studio (KCOP)
Bancroft Jr HS
Vine St Sch
DESILU STUDIOS
Fire Sta
Melrose Ave Sch
Fairfax High Sch
Black Foxe Military Institute
Tennis Club
Military Acs
WILSHIRE COUNTRY CLUB
TV City (CBS)
Pan Pacific Auditorium
COLUMBIA PICTURES STUDIOS
TV Studio (KCET)
Le Conte Jr H S
Radio Sta (KNXT)
Hollywood Recreation Center
L A B R E A
M O N I C A
FREEWAY
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
HOLLYWOOD, CALIF.
N3400—W11815/7.5

Figure 7

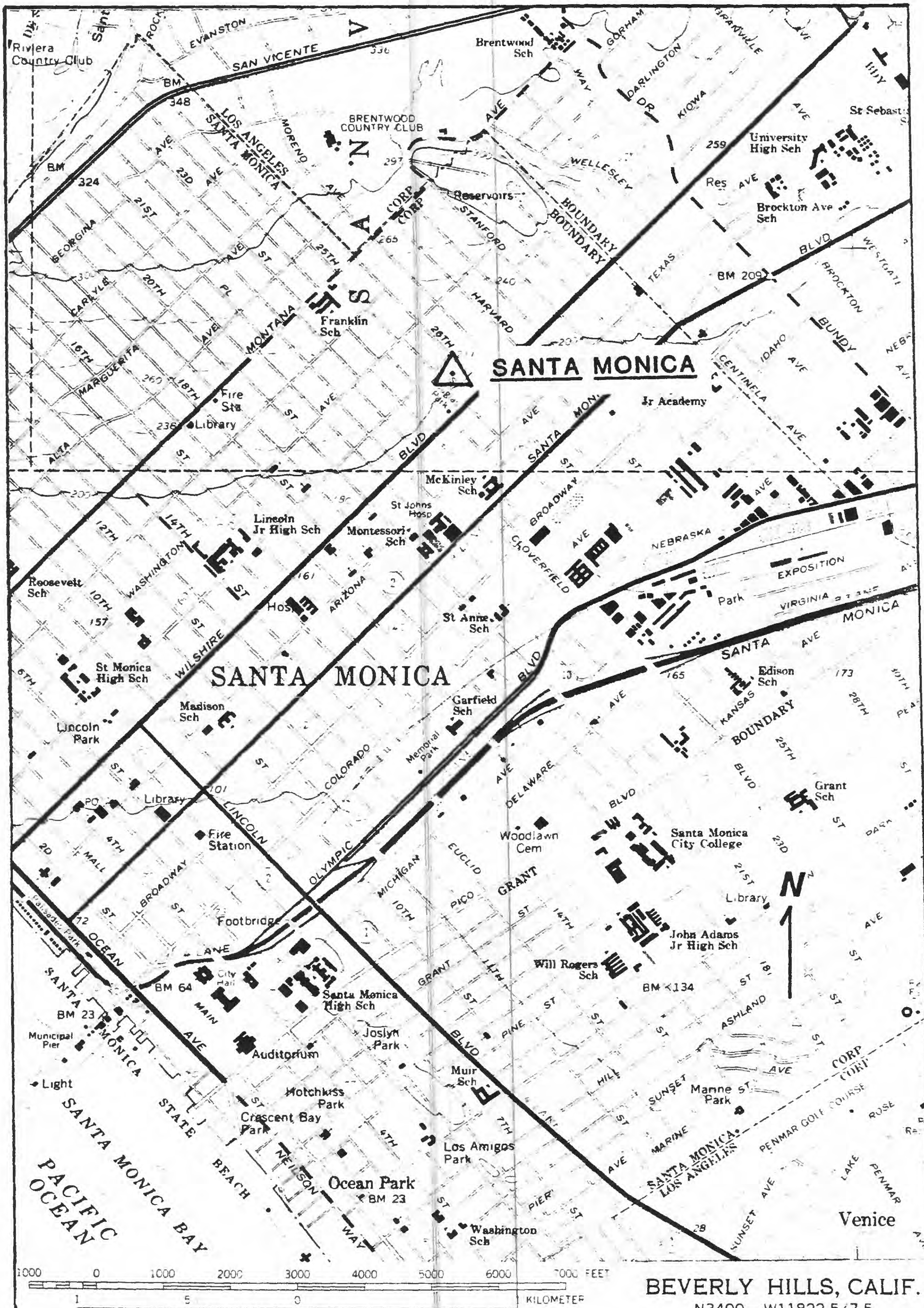

SANTA MONICA
SANTA MONICA
BEVERLY HILLS, CALIF.
N3400—W11822.5/7.5
PACIFIC OCEAN
SANTA MONICA BAY
SANTA MONICA STATE BEACH
Riviera Country Club
Brentwood Sch
BRENTWOOD COUNTRY CLUB
Reservoirs
University High Sch
Brockton Ave Sch
St Sebast
Franklin Sch
Fire Sta
Library
Jr Academy
McKinley Sch
St Johns Hosp
Lincoln Jr High Sch
Montessori Sch
Roosevelt Sch
Hosp
St Annes Sch
St Monica High Sch
Madison Sch
Garfield Sch
Memorial Park
Lincoln Park
Edison Sch
Grant Sch
PO
Library
Fire Station
Woodlawn Cem
Santa Monica City College
Library
Footbridge
John Adams Jr High Sch
Will Rogers Sch
City Hall
Santa Monica High Sch
Joslyn Park
Auditorium
Municipal Pier
Light
Muir Sch
Hotchkiss Park
Crescent Bay Park
Marine Park
Los Amigos Park
Ocean Park
Washington Sch
Venice
PENMAR GOLF COURSE
SAN VICENTE
EVANSTON
LOS ANGELES SANTA MONICA CORP BOUNDARY
MONTANA AVE
WILSHIRE BLVD
SANTA MONICA BLVD
OLYMPIC BLVD
LINCOLN BLVD
OCEAN AVE
BROADWAY
COLORADO
PICO BLVD
NEBRASKA
EXPOSITION
VIRGINIA
KANSAS
BUNDY
CENTINELA AVE
PIER AVE
MARINE
SUNSET AVE
BM 64
BM 23
BM 134
BM 209
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
N

Figure 8

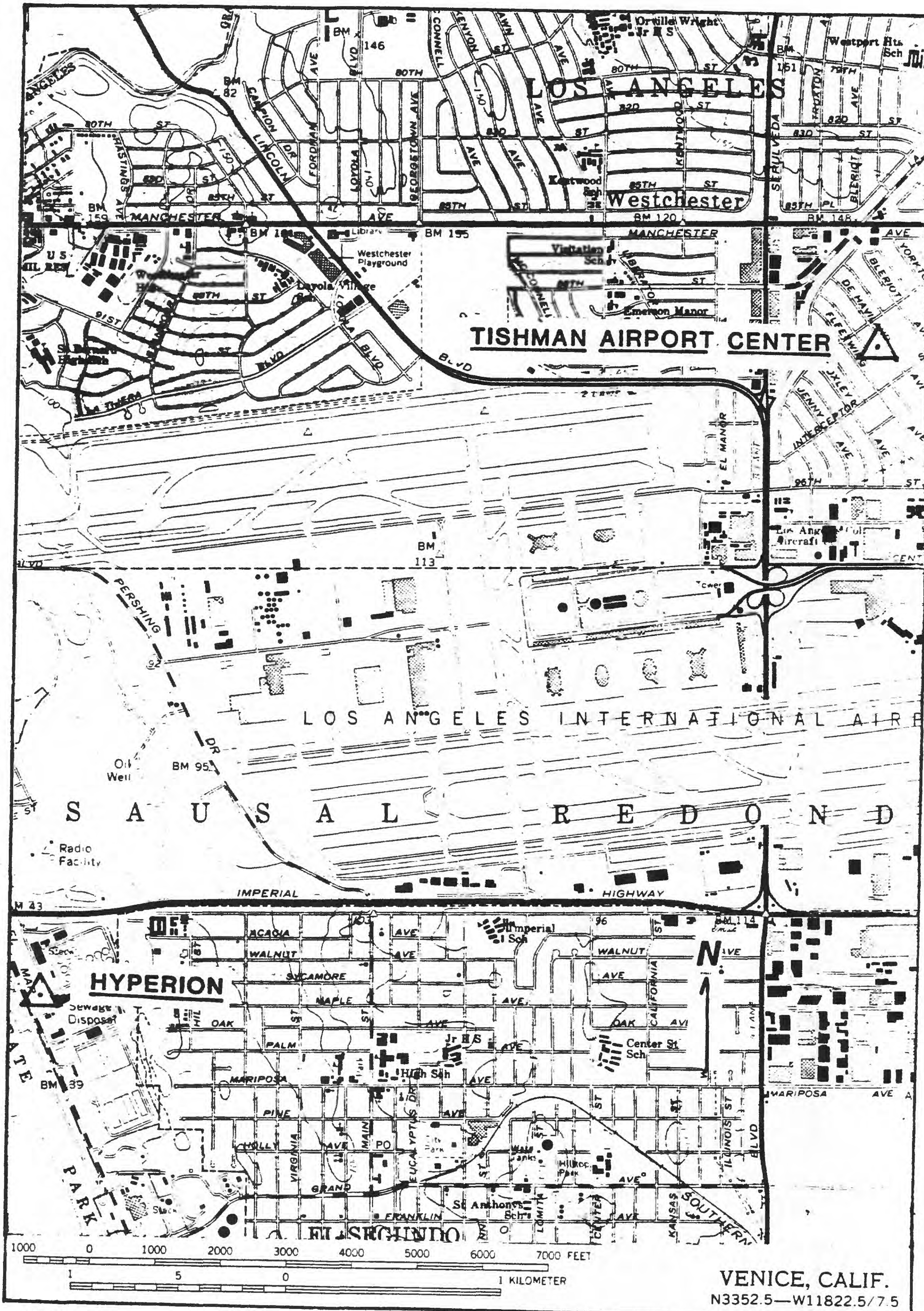

LOS ANGELES
Westchester
TISHMAN AIRPORT CENTER
LOS ANGELES INTERNATIONAL AIRP
SAUSAL REDOND
HYPERION
Sewage Disposal
EL SEGUNDO
MANCHESTER AVE
IMPERIAL HIGHWAY
PERSHING DR
LINCOLN
SEPULVEDA
Westchester Playground
Library
Radio Facility
Oil Well
Imperial Sch
Center St Sch
Jr H S
High Sch
St Anthonys Sch
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER
VENICE, CALIF.
N3352.5—W11822.5/7.5

Figure 9

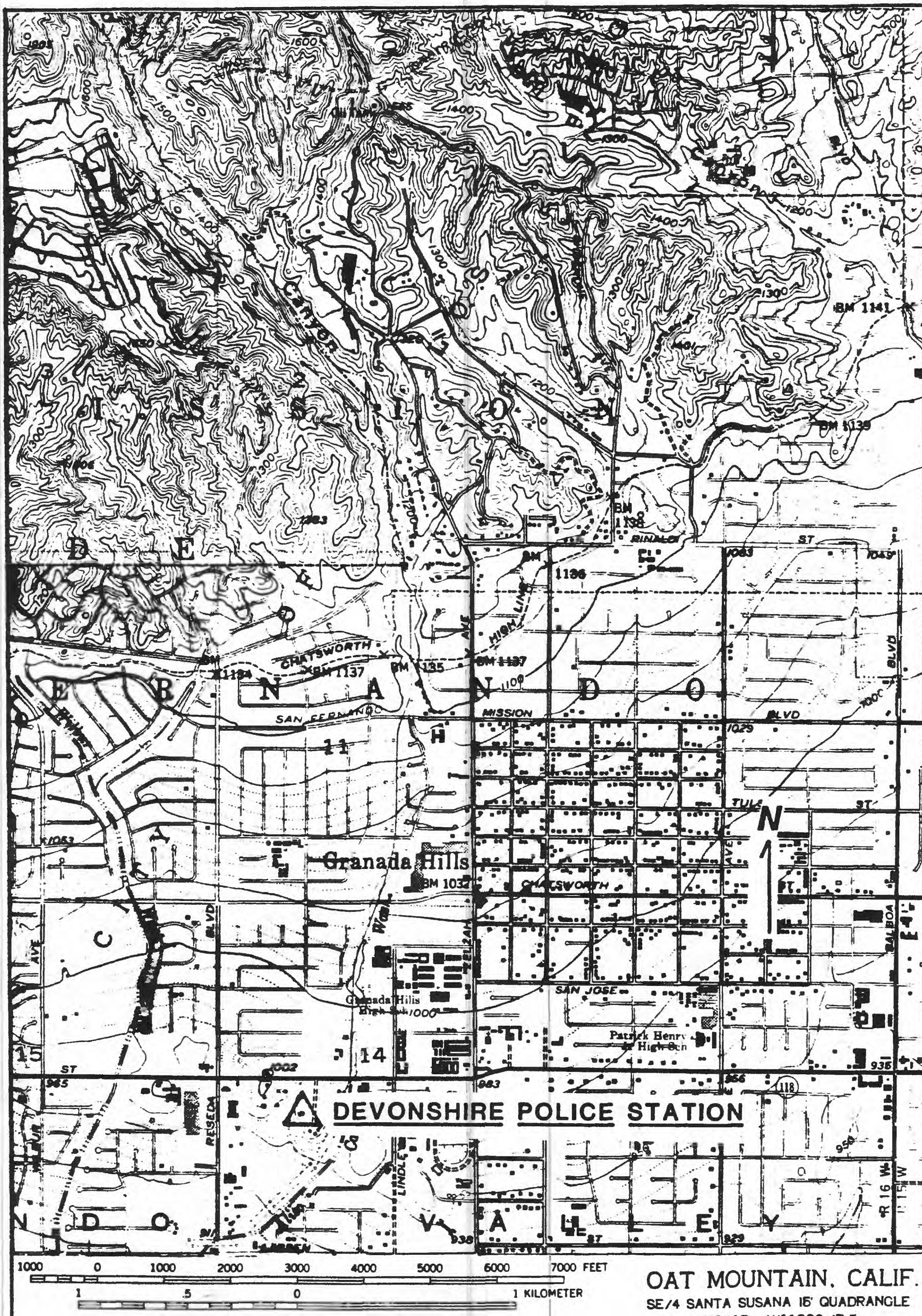

DEVONSHIRE POLICE STATION
Granada Hills
Granada Hills High Sch
Patrick Henry Jr High Sch
CHATSWORTH
SAN FERNANDO
MISSION
BLVD
TULSA
ST
SAN JOSE
RINALDI
RESEDA
BALBOA
ZELZAH
LINDLEY
CANYON
N
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
OAT MOUNTAIN, CALIF.
SE/4 SANTA SUSANA 15' QUADRANGLE
N3415—W11830/7.5

Figure 10

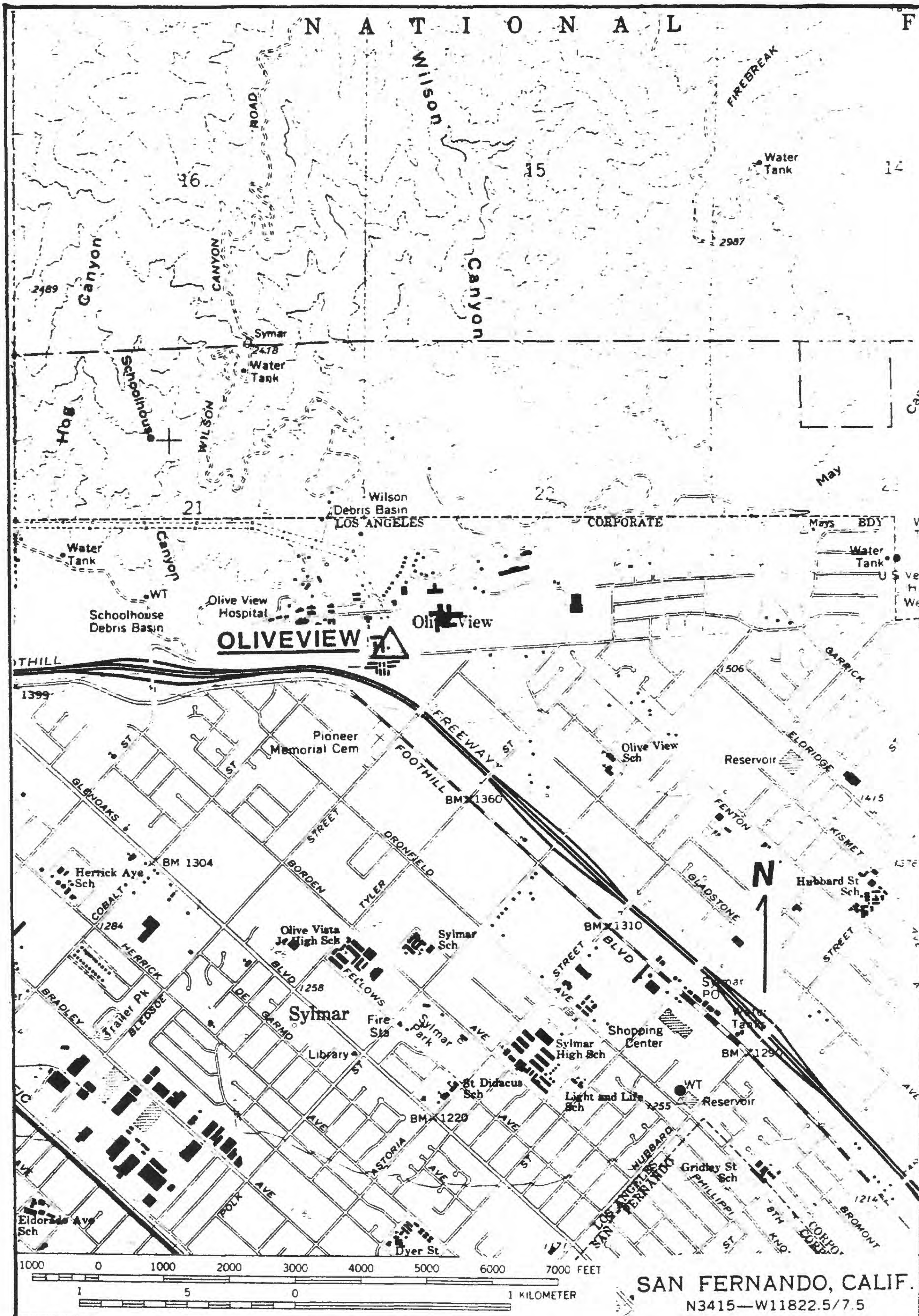
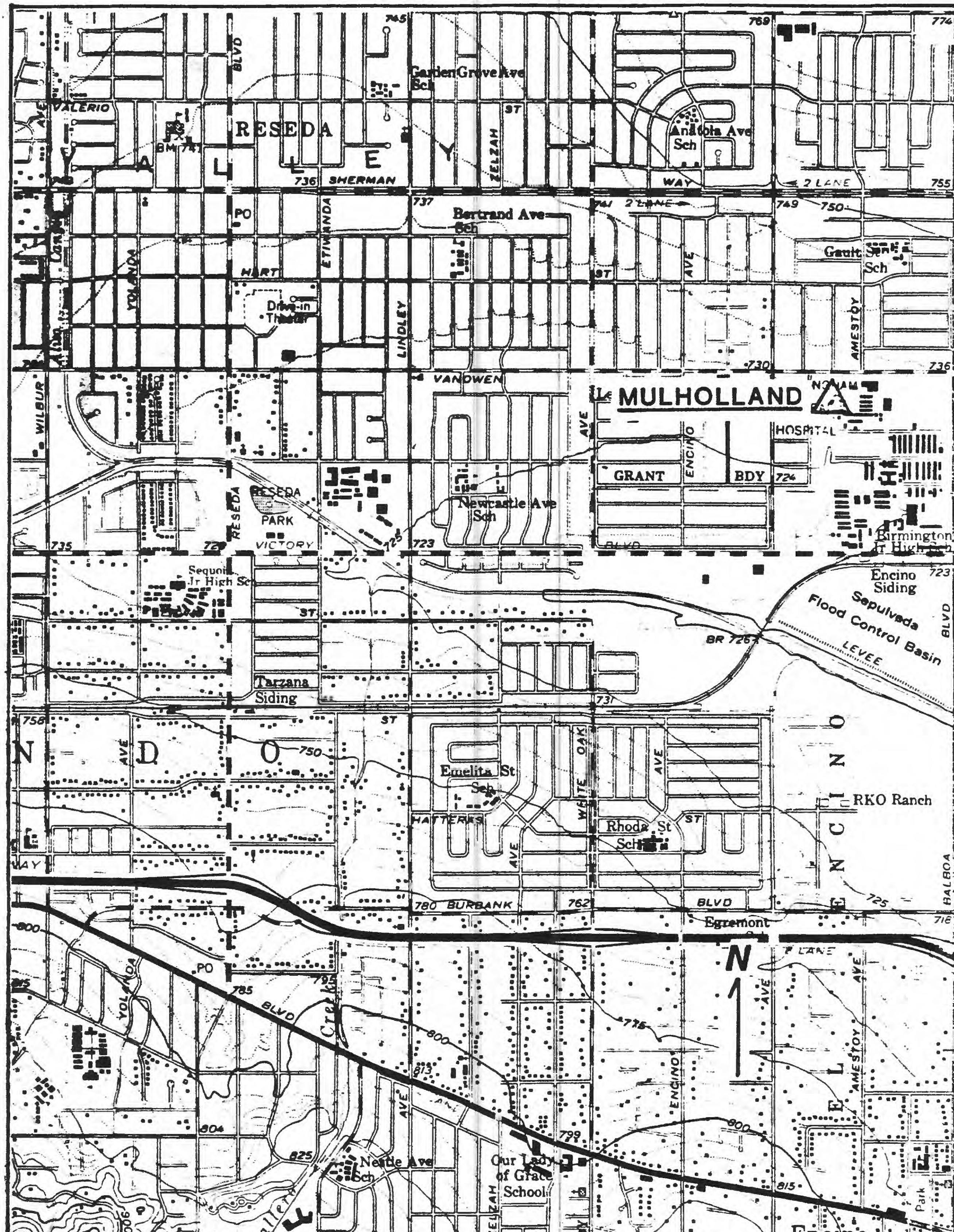
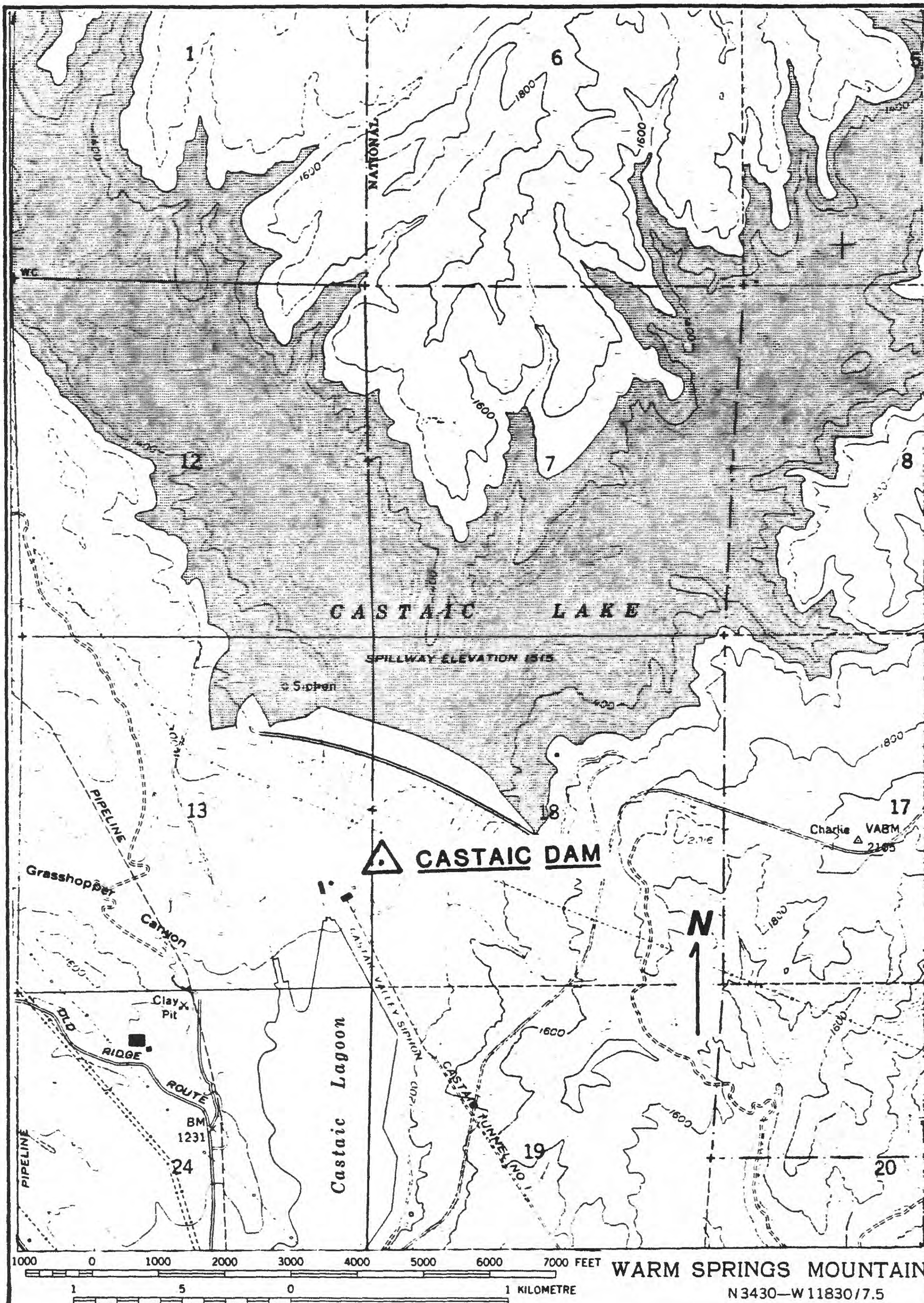

NATIONAL
Wilson
ROAD
FIREBREAK
Water Tank
16
15
14
2987
Canyon
CANYON
Canyon
2489
Symar
2478
Water Tank
Schoolhouse
Hog
WILSON
May
21
22
Wilson Debris Basin
LOS ANGELES
CORPORATE
BDY
Water Tank
Canyon
Water Tank
WT
Schoolhouse Debris Basin
Olive View Hospital
Olive View
OLIVEVIEW
1399
1506
GARRICK
FREEWAY
ST
Pioneer Memorial Cem
FOOTHILL
Olive View Sch
Reservoir
ELDRIDGE
GLENOAKS
STREET
BM 1360
FENTON
1415
KISMET
BORDEN
DRONFIELD
BM 1304
Herrick Ave Sch
TYLER
GLADSTONE
N
Hubbard St Sch
COBALT
1284
HERRICK
Olive Vista Jr High Sch
Sylmar Sch
BM 1310
BLVD
STREET
1258
FELLOWS
AVE
BRADLEY
Trailer Pk
BLEDSOE
Sylmar
Fire Sta
Sylmar Park
Shopping Center
Sylmar High Sch
Library
BM 1290
St Didacus Sch
Light and Life Sch
WT
1255
Reservoir
BM 1220
ASTORIA
HUBBARD
Gridley St Sch
LOS ANGELES
SAN FERNANDO
PHILLIPPI
POLK
Eldorado Ave Sch
Dyer St
8TH
BROMONT
1214
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER
SAN FERNANDO, CALIF.
N3415—W11822.5/7.5

Figure 11



RESEDA
VALERIO
BLVD
Garden Grove Ave Sch
Anatola Ave Sch
SHERMAN
WAY
2 LANE
ZELZAH
ST
Bertrand Ave Sch
Gault St Sch
PO
YOLANDA
ETIWANDA
HART
Drive-in Theater
LINDLEY
AMESTOY
VANOWEN
MULHOLLAND
HOSPITAL
WILBUR
ENCINO
GRANT
BDY
RESEDA PARK
Newcastle Ave Sch
Birmingham Jr High Sch
VICTORY
Sequoia Jr High Sch
Encino Siding
Sepulveda Flood Control Basin
LEVEE
Tarzana Siding
Emelita St Sch
WHITE OAK
AVE
HATTERAS
Rhoda St Sch
RKO Ranch
BURBANK
BALBOA
Egremont
N
Creek
Nestle Ave Sch
Our Lady of Grace School
Caballero
Encino
Park
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
CANOGA PARK, CALIF.
NE/4 CALABASAS 15' QUADRANGLE
N3407.5—W11830/7.5

Figure 12



CASTAIC LAKE
SPILLWAY ELEVATION 1515
Siphon
CASTAIC DAM
Grasshopper Canyon
PIPELINE
Clay Pit
OLD RIDGE ROUTE
BM 1231
Castaic Lagoon
CASTAIC VALLEY SIPHON
CASTAIC TUNNEL NO. 1
NATIONAL
Charlie VABM 2165
N
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE
WARM SPRINGS MOUNTAIN
N3430—W11830/7.5

Figure 13

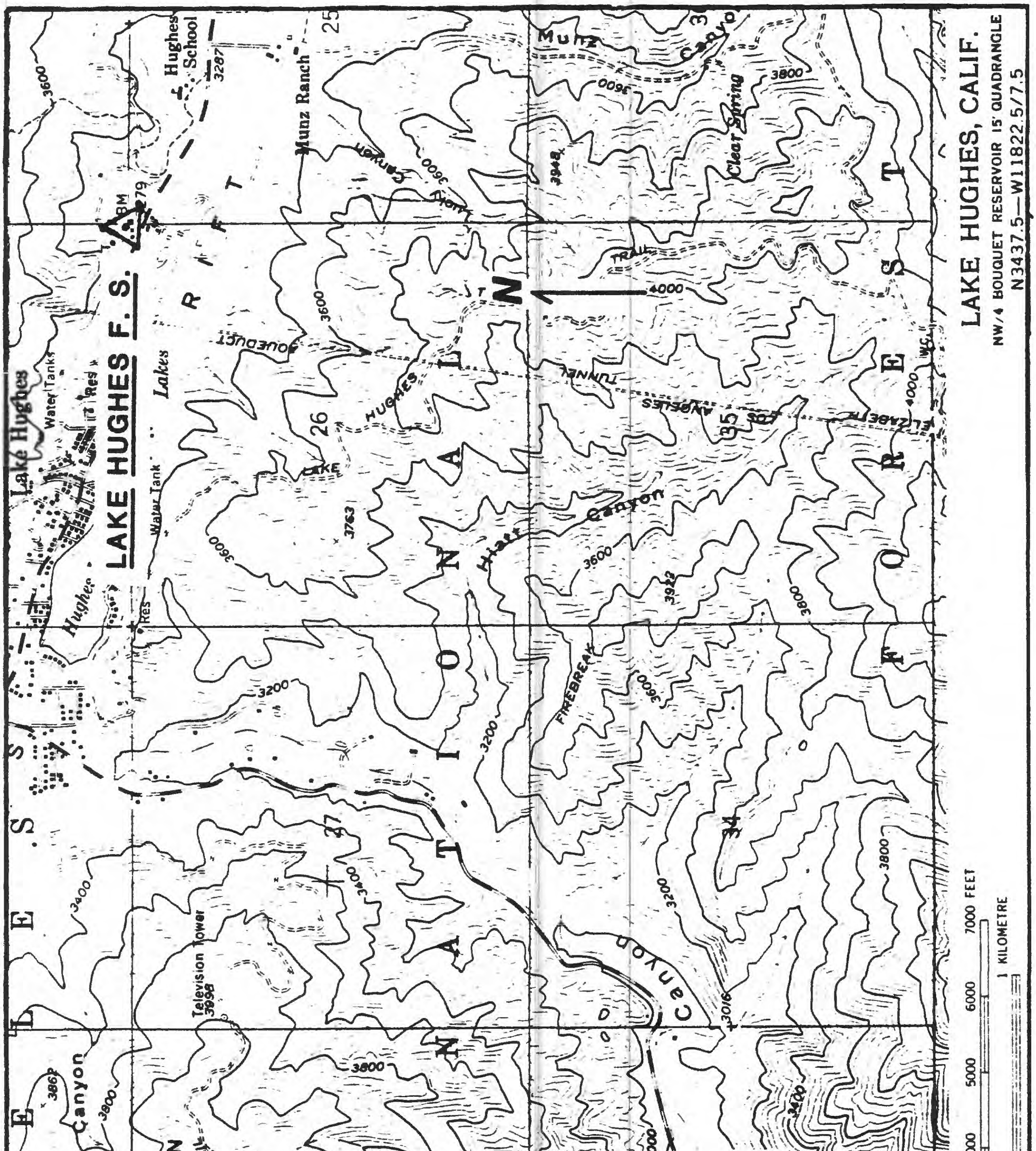
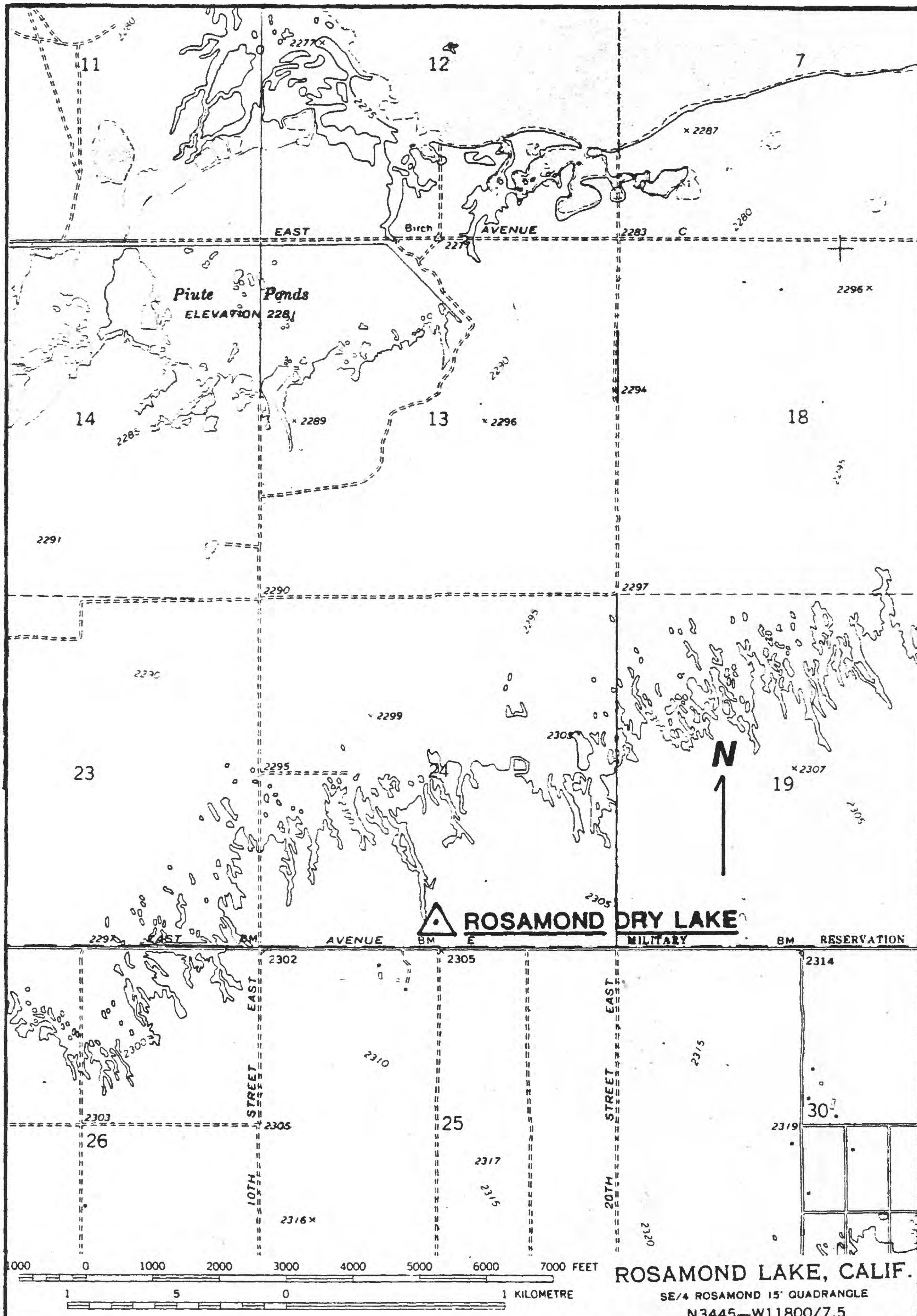

LAKE HUGHES, CALIF.
NW/4 BOUQUET RESERVOIR 15' QUADRANGLE
N3437.5—W11822.5/7.5
LAKE HUGHES F. S.
CAMP MUNZ
ANGELES NATIONAL FOREST
Lake Hughes
Hughes School
Munz Ranch
Munz Canyon
Clear Spring
Lakes
Water Tank
Television Tower
Abrams Canyon
MOUNTAIN
TRUCK TRAIL
FIREBREAK
Pine Canyon
Dead Canyon
Elizabeth Lake Canyon
LAKE HUGHES AQUEDUCT
ELIZABETH TUNNEL
7000 FEET
1 KILOMETRE

Figure 14



Piute Ponds
ELEVATION 2281
EAST
Birch
AVENUE
C
ROSAMOND DRY LAKE
EAST
AVENUE
E
MILITARY
RESERVATION
10TH STREET EAST
20TH STREET EAST
N
11
12
7
14
13
18
23
24
19
26
25
30
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE
ROSAMOND LAKE, CALIF.
SE/4 ROSAMOND 15' QUADRANGLE
N3445—W11800/7.5

Figure 15

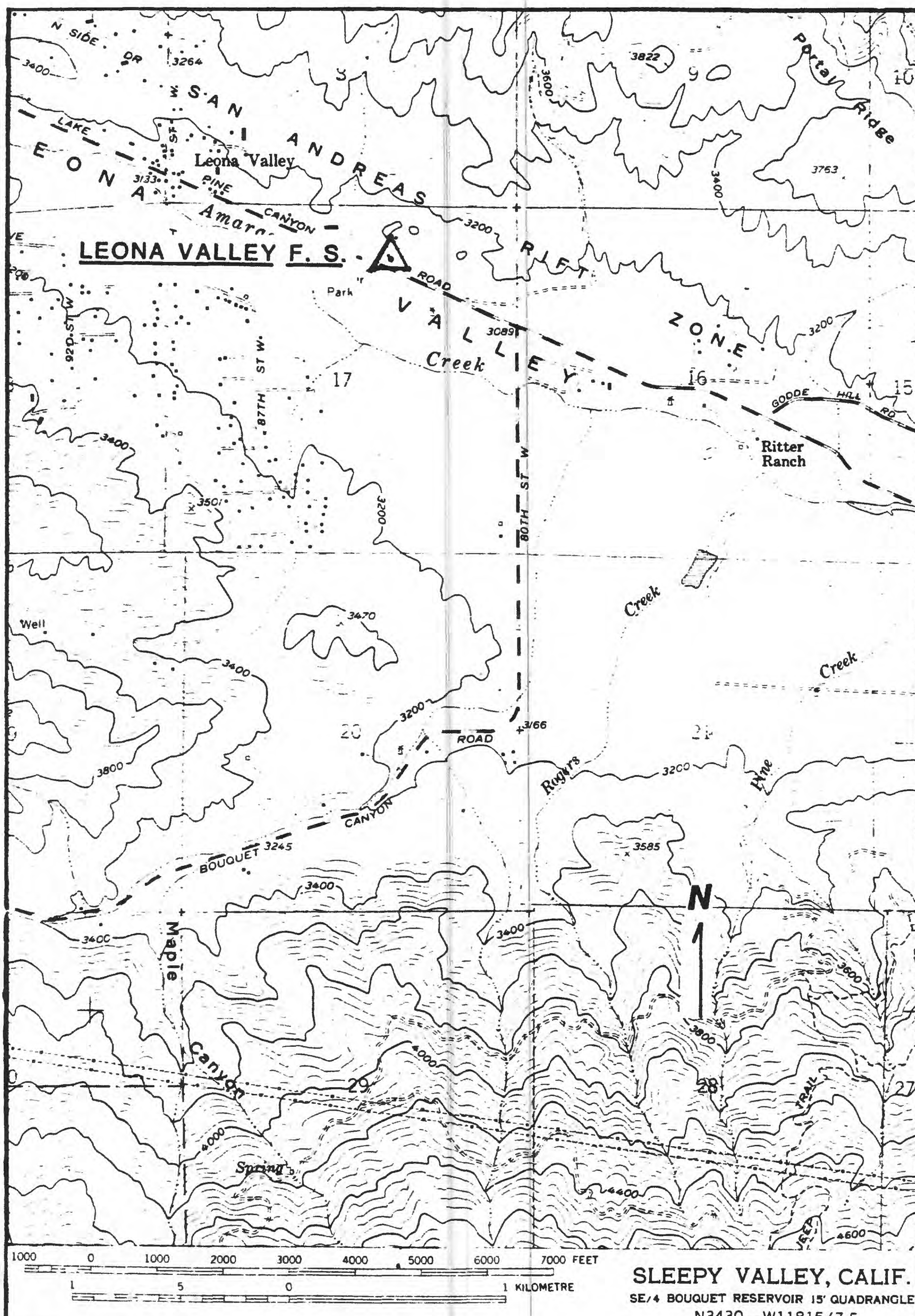
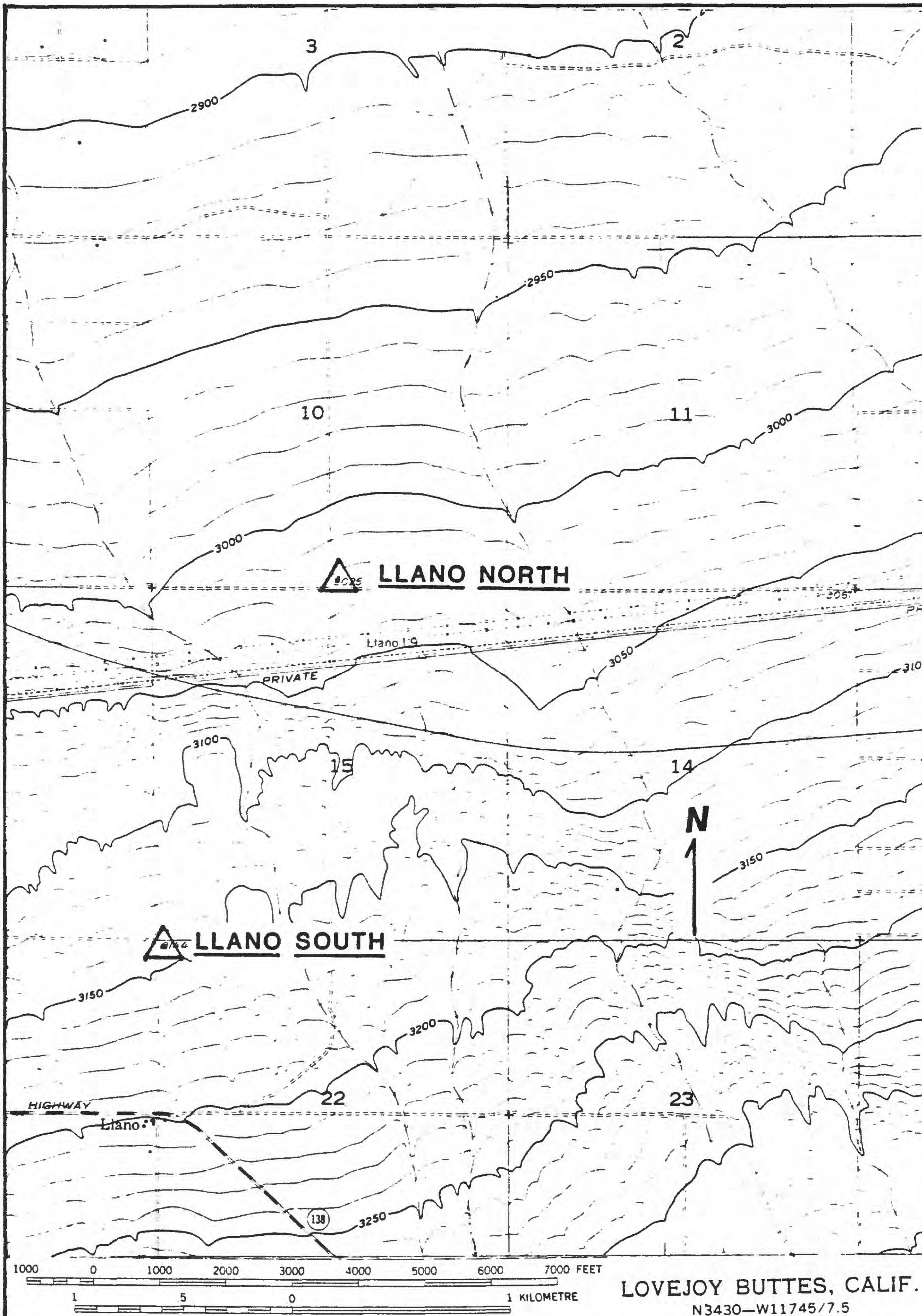

LEONA VALLEY F. S.
Leona Valley
SAN ANDREAS RIFT ZONE
LEONA VALLEY
Portal Ridge
Ritter Ranch
Creek
Rogers
Maple Canyon
Spring
BOUQUET CANYON ROAD
GODDE HILL RD
80TH ST W
87TH ST W
92D ST W
N
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE
SLEEPY VALLEY, CALIF.
SE/4 BOUQUET RESERVOIR 15' QUADRANGLE
N3430—W11815/7.5

Figure 16



3
2
2900
2950
10
11
3000
3000
LLANO NORTH
Llano 19
PRIVATE
3050
3100
15
14
N
3150
LLANO SOUTH
3150
3200
22
23
HIGHWAY
Llano
138
3250
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETRE
LOVEJOY BUTTES, CALIF.
N3430—W11745/7.5

Figure 17

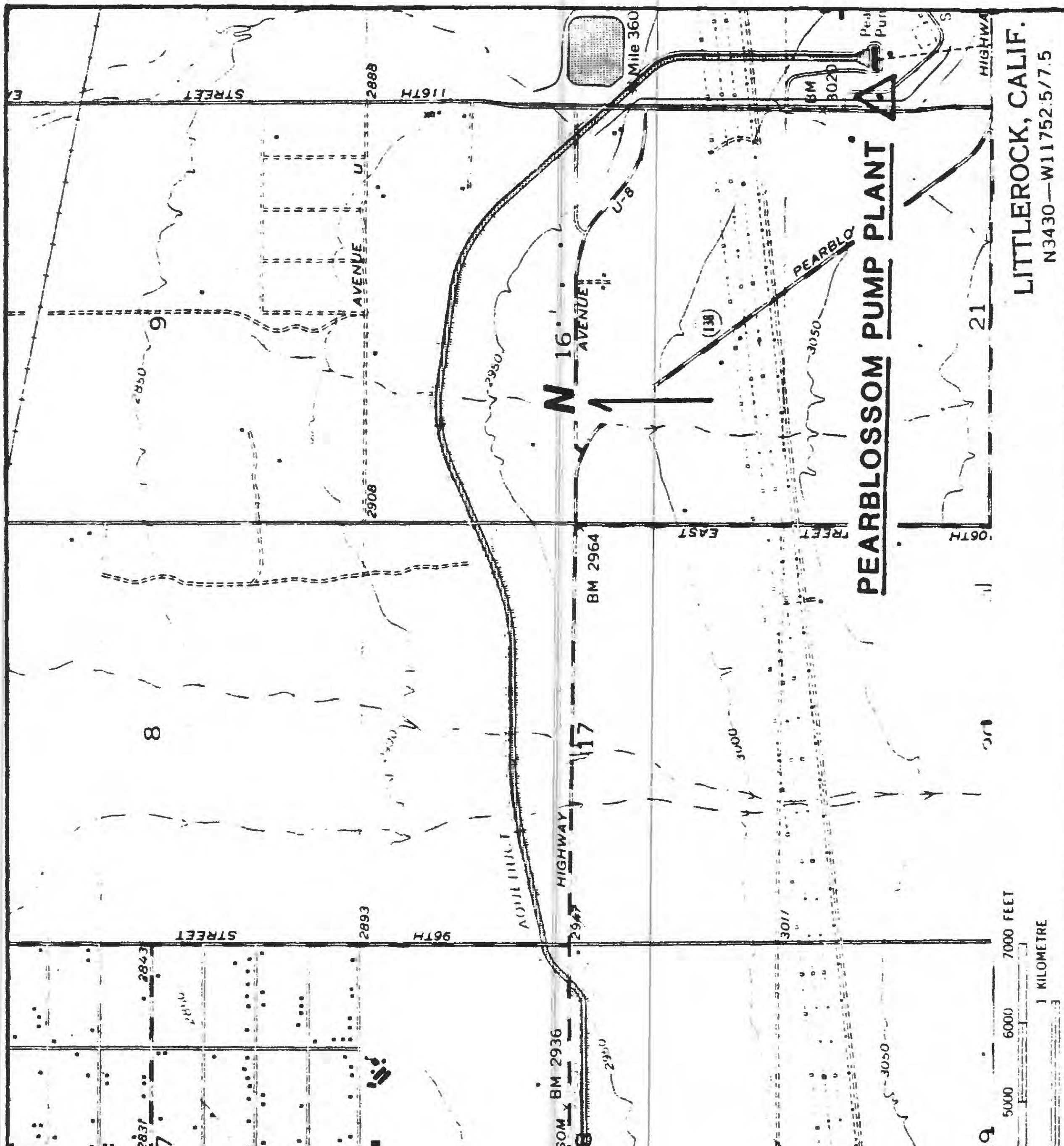

LITTLEROCK P. O.
PEARBLOSSOM PUMP PLANT
LITTLEROCK, CALIF.
N3430—W11752.5/7.5
Littlerock
Water Tank
Well
CALIFORNIA
DITCH
FORT TEJON
AVENUE U
AVENUE V
HIGHWAY
PEARBLO
BM 2936
BM 2964
BM 3020
Mile 360
Gate
7000 FEET
1 KILOMETRE

Figure 18

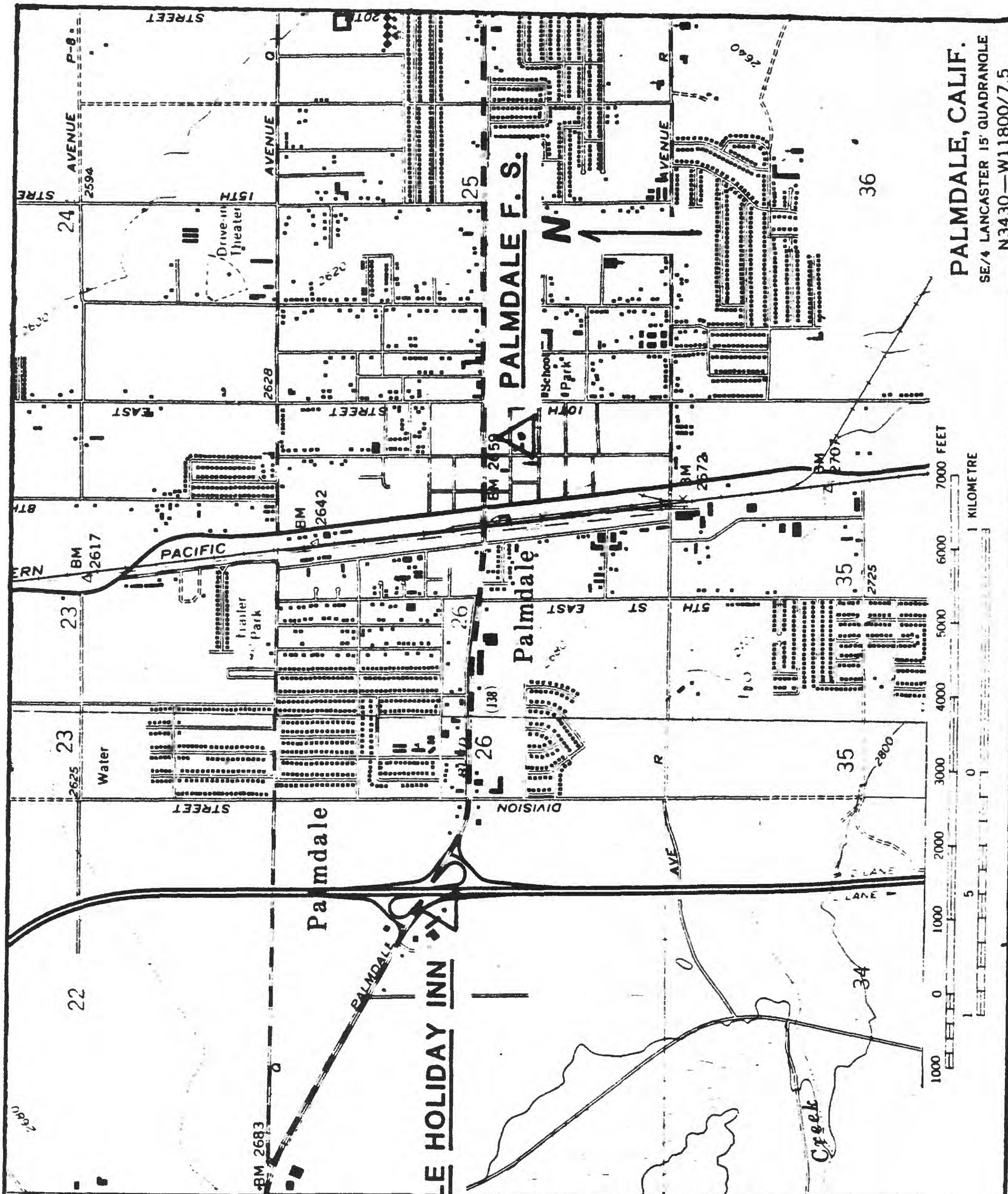

PALMDALE HOLIDAY INN
PALMDALE F. S.
Palmdale
PALMDALE, CALIF.
SE/4 LANCASTER 15' QUADRANGLE
N3430—W11800/7.5
RITTER RIDGE, CALIF.
SW/4 LANCASTER 15' QUADRANGLE
N3430—W11807.5/7.5
7000 FEET
1 KILOMETRE
PACIFIC
Trailer Park
School Park
Drive-in Theater
Water
DIVISION
AVENUE
STREET

Figure 19

ALTITUDE: 165'	LOCATION: Lat. 34°05'15" Long. 118°09'00"	HOLE No. 47
DATE: 8/20/80	QUADRANGLE: Los Angeles, CA	SITE: ALHAMBRA GEOLOGIC MAP UNIT: Holocene alluvium, medium-grained[4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
					0	SANDY LOAM, dk. brown, loose. mostly finer than medium sand (SC)
SANDY LOAM, dk. brown, mostly finer than medium sand, medium plasticity, loose (SC)		3				
					5	
						LOAM, dk. brown, sand to coarse size low plasticity, dense (SM)
LOAM, dk. brown, sand to coarse size, dense, low plasticity (SM)		23			10	
						GRAVELLY SAND, lt. yellowish brown, moderately well sorted, up to 25% fine granitic gravel, angular to subangular (SW)
						COARSE SANDY LOAM and COARSE LOAMY SAND, brown, poorly sorted, some fine granitic gravel, weakly cemented (SW)
LOAMY COARSE SAND, brown, poorly sorted, some fine gravel, granitic, v. dense, weakly cemented, moist (SW)	2.12		P		15	
						GRAVELLY SAND (SP)
						SANDY LOAM, mostly medium sand or finer.
					20	GRAVELLY V. COARSE SAND, lt. yellowish brown, granitic (SP)
						SANDY LOAM, dense (SW)
						GRAVELLY COARSE SAND, v. dense (SP)
					25	
						COARSE SANDY LOAM, dk. yellowish brown, v. dense (SM)
					30	

Figure 20

COMMENTS: Alluvium denser (slower drilling) below 20.7 m

ALTITUDE: 165' **DATE:** 8/20/80	**LOCATION:** **Lat.** 33°59'48" **Long.** 118°11'32" **QUADRANGLE:** South Gate, CA	**HOLE No.** 48 **SITE:** VERNON **GEOLOGIC MAP UNIT:** Holocene alluvium, medium-grained [4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	LOAMY SAND, dk. greyish brown
SAND, brown, well-sorted, mostly fine to medium grained, slightly moist, dense (SP)		32			SAND, brown, well-sorted, mostly fine to medium grained (SP)
				5	
					coarse
					coarse
SILT LOAM, olive grey, v. low plasticity, quick, v. firm, moist (ML)	1.85		P	10	SILT LOAM, olive grey to greenish grey, v. firm, v. low plasticity, quick, moist softer and organic rich below 11 m (L)
CLAY LOAM, dk. brown, sand is v. fine grained, high plasticity, hard, moist (CL-CH)		59		15	CLAY LOAM, olive to dk. brown, sand is up to v. coarse size, medium to high plasticity, moist (CL)
					SANDY LOAM, lt. greyish brown
					SILT LOAM, olive (ML)
				20	
					SANDY LOAM, olive, sand to coarse size, grading to:
SAND, dk. yellowish brown, moderately well-sorted, mostly medium to v. coarse grained, some to 4 mm, angular to subangular, moist	2.07		P	25	SAND, dk. yellowish brown, moderately well-sorted, mostly medium to v. coarse grained, some fine gravel, angular to subangular, moist (SW)
					SANDY CLAY LOAM, olive (CL)
				30	

Figure 21

COMMENTS:

ALTITUDE: 360'	**LOCATION:** Lat. 34°03'06" Long. 118°15'01"
DATE: 8/21/80	**QUADRANGLE:** Los Angeles, CA

HOLE No. 49
SITE: LA - OLIVE
GEOLOGIC MAP UNIT: Fernando Formation of Lamar (1970)[3]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	SANDY CLAY LOAM, v. dk. greyish brown, poorly sorted, some fine granitic gravel, stiff (CL)
CLAY LOAM, v. dk. grey (CL) LOAMY SAND, yellowish brown, well-sorted, fine to v. fine grained (SP)		14			LOAMY SAND, yellowish brown
					pale yellowish brown
				5	SILTY CLAY LOAM, v. dk. greyish brown to lt. olive brown, some fine to medium sand, medium plasticity, stiff (CL)
SILTY CLAY LOAM, lt. olive brown, some fine to medium sand, medium plasticity, stiff (CL)		18		10	
SILT LOAM, olive brown, v. firm, slightly quick, low plasticity (ML)	1.90		S	15	SILT LOAM, olive brown
				20	SANDY GRAVEL, cemented, hard, v. dk. grey
SILTY CLAY LOAM, v. dk. grey, medium plasticity, hard (CL)		54		25	
				30	

Figure 22

COMMENTS: Lost circulation at 7.9 m

ALTITUDE: 280'	**LOCATION:** **Lat.** 34°03'01" **Long.** 118°14'57"	**HOLE No.** 50
DATE: 8/25/80	**QUADRANGLE:** Los Angeles, CA	**SITE:** LA - HILL
		GEOLOGIC MAP UNIT: Pleistocene alluvium, coarse-grained[4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SANDY LOAM, yellowish brown, loose
					CLAY LOAM, brown, loose dry (CL)
COARSE SANDY CLAY LOAM, brown medium plasticity, moist, stiff (CL)		11			LOAMY V. COARSE SAND grading to: COARSE SANDY CLAY LOAM, brown, medium plasticity, moist, stiff (CL)
				5	
					GRAVELLY COARSE SAND grading to SANDY GRAVEL
					SILTY CLAY LOAM and SILT LOAM, olive grading to v. dk. grey below 8 m (CL-ML)
SILTY CLAY LOAM, v. dk. grey, medium plasticity, hard (CL)		50			
				10	
				15	
SILT LOAM, v. dk. greenish grey, some angular granitic gravel to 15 mm. One granodiorite pebble 50 x 25 mm (ML)	1.72		P		
				20	
				25	
				30	

Figure 23

COMMENTS:

ALTITUDE: 290' **DATE:** 8/13/80	**LOCATION:** **Lat.** 34°05'13" **Long.** 118°20'15" **QUADRANGLE:** Hollywood, CA	**HOLE No.** 51 **SITE:** HOLLYWOOD STORAGE **GEOLOGIC MAP UNIT:** Holocene alluvium, fine-grained 4

SAMPLE DESCRIPTION

Sample description	Density (gm/cc)	Blows/Feet	Sampling
CLAY, v. dk. greyish brown, medium plasticity, stiff (CL)		14	
CLAY LOAM, brown, poorly sorted sand is mostly finer than medium, some gravel to 20 mm, medium plasticity, v. stiff (CL)		19	
LOAM, brown, poorly sorted to v. coarse sand size, low plasticity, v. firm, moist (SM)	2.02		P
CLAY LOAM, brown, sand is fine grained, medium plasticity, hard (CL)		44	

DESCRIPTION

Depth (meters)	Description
0	CLAY and SILTY CLAY, v. dk. greyish brown, some sand to v. coarse size, medium plasticity, stiff (CL)
	SAND, poorly sorted, mostly medium to coarse
5	CLAY LOAM, greyish brown to brown, poorly sorted, sand is mostly finer than medium, some fine gravel, medium plasticity, v. stiff (CL)
10	
15	LOAM, dk. yellowish brown to brown, poorly sorted to v. coarse size, low plasticity, dense, moist (SM)
20	CLAY LOAM, yellowish brown to brown, sand is fine grained, medium plasticity, hard (CL)
	SILT LOAM
25	SANDY LOAM, brown, poorly sorted, sand is mostly medium to coarse, some fine gravel (SM)
	SAND, mostly medium to coarse, some gravel to 20 mm
30	SANDY CLAY LOAM

Figure 24

COMMENTS:

ALTITUDE: 205'	LOCATION: Lat. 34°02'11" Long. 118°28'40"	HOLE No. 52
DATE: 8/17/80	QUADRANGLE: Beverly Hills, CA	SITE: SANTA MONICA
		GEOLOGIC MAP UNIT: Late Pleistocene, medium-grained [4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SILTY CLAY and SILTY CLAY LOAM, dk. brown, high plasticity, v. stiff (CH)
SILTY CLAY, dk. brown, high plasticity, v. stiff, moist (CH)		27			
				5	SANDY LOAM, dk. brown, poorly sorted, 10-20% fine, angular black shale gravel (SM) grading coarser to: GRAVELLY SAND, 30-40% black shale gravel (SW)
CLAY LOAM, dk. reddish brown, poorly sorted, some v. coarse sand and fine black shale gravel, high plasticity, moist, hard (CH)		32		10	CLAY LOAM, dk. reddish brown, poorly sorted, some v. coarse sand and fine gravel, hard (CH)
					SANDY LOAM and SANDY CLAY LOAM, brown to greyish brown, poorly sorted, some thin gravel layers (SM-SC)
				15	GRAVELLY SILTY CLAY LOAM, brown, poorly sorted, 20-30% fine gravel to 10 mm (CL)
GRAVELLY SILTY CLAY LOAM, dk. brown, poorly sorted, 20-30% fine gravel to 10 mm, v. firm (CL)	2.13		P	20	
LOAMY SAND, brown, well-sorted fine to medium grained, wet, v. dense (SP)		50/5"		25	FINE SANDY LOAM, yellowish brown grading to: SAND, yellowish brown to brown, well-sorted, fine to medium grained, v. dense (SP)
				30	

Graphic Log:

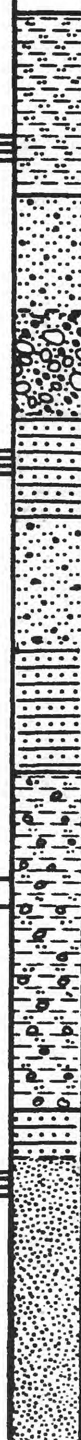


Figure 25

COMMENTS:

ALTITUDE: 106'	**DATE:** 8/11/80
LOCATION: Lat. 33°57'24" Long. 118°22'52"	**QUADRANGLE:** Venice, CA
HOLE No. 53	**SITE:** TISHMAN AIRPORT CENTER
GEOLOGIC MAP UNIT: Pleistocene alluvium medium-grained	

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SAND, dk. brown to yellowish brown, well-sorted, fine to medium grained dense (SP)
SAND, dk. yellowish brown, well-sorted, fine to medium grained subangular to rounded, moist, dense (SP)		36			
				5	
SAND, yellowish brown, well-sorted, fine to medium grained (SP)			P		
CLAY, olive, black stains on fracture surfaces, v. firm	1.89			10	CLAY and SILTY CLAY, olive grey mottled, strong brown to dk. grey, medium plasticity, v. stiff. Contains lenses of SANDY LOAM
CLAY, olive grey with common fracture stains of strong brown, medium plasticity, moist, v. stiff (CL)		25			
				15	
					LOAMY SAND, yellowish brown, mostly medium to v. coarse grained (SP). Contains thin lenses of SANDY GRAVEL.
				20	
LOAMY SAND, brown, poorly sorted, mostly medium to v. coarse grained, 10-20% gravel to 10 mm (SW)	1.97		P		
					grading to: SAND, well sorted, fine to medium grained
				25	
					SILT LOAM, olive
SILT LOAM, olive mottled lt. olive brown, micaceous	2.05		P	30	
LOAMY FINE SAND, yellowish brown					

Figure 26

COMMENTS:

ALTITUDE: 38' **DATE:** 8/18/80	**LOCATION:** **Lat.** 33°55'35" **Long.** 118°25'53" **QUADRANGLE:** Venice, CA	**HOLE No.** 54 **SITE:** HYPERION **GEOLOGIC MAP UNIT:** Qsa Upper Pleistocene dune sand[2]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	SAND, dk. yellowish brown, well-sorted, fine to medium grained, loose (SP)
					GRAVELLY SAND, to 10 mm weathered
					SAND, dk. yellowish brown to brownish yellow, well-sorted, medium to coarse grained, v. dense (SP)
SAND, brownish yellow, well-sorted medium to coarse grained, subrounded to sub-angular, moist, v. dense (SP)		50/4"		5	
SAND, dk. yellowish brown, v. well sorted, medium to coarse grained, rounded to sub-angular, moist (SP)	1.70		P	10	
					GRAVELLY SAND
				15	
SAND, brown, well-sorted, mostly v. coarse grained, some gravel to 15 mm, wet (SP)	2.02		P		GRAVELLY SAND
SAND, lt. yellowish brown to brownish yellow, v. well-sorted, mostly medium to coarse grained, weakly cemented, wet (SP)	2.05		P	20	
				25	SILTY CLAY, yellowish brown
					SILTY CLAY, yellowish brown
SAND, lt. yellowish brown, poorly sorted up to 5 mm		70/6"		30	

Figure 27

COMMENTS:

ALTITUDE: 880'	**LOCATION:** Lat. 34°15'19" Long. 118°31'50"	**HOLE No.**	55
DATE: 8/19/80	**QUADRANGLE:** Oat Mountain, CA	**SITE:**	DEVONSHIRE POLICE STATION
		GEOLOGIC MAP UNIT:	Pleistocene alluvium fine-grained

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SANDY LOAM, loose
					CLAY LOAM, dk. greyish brown to brown
CLAY LOAM, dk. brown, sand is v. fine to fine grained, some v. coarse sand and fine shale gravel, medium plasticity, v. stiff (CL)		16			
				5	SANDY FINE GRAVEL, brown, mostly angular to subangular flat shale frags to 10 mm
					SANDY LOAM, yellowish brown grading finer to: CLAY LOAM, yellowish brown with calcareous stringers of pale brown. Some fine, angular, shale gravel, medium plasticity, hard (CL)
CLAY LOAM, yellowish brown with calcareous stringers of pale brown, some fine, angular, shale gravel, medium plasticity, hard (CL)		49		10	
					GRAVELLY SAND, poorly sorted to 5 mm size
					SANDY LOAM, yellowish brown, poorly sorted
				15	grading finer to:. SILTY CLAY LOAM, yellowish brown with calcareous stringers of pale brown
SILTY CLAY LOAM, yellowish brown with common stringers of v. pale brown, moist, v. firm (CL)	2.07		S		
				20	
					GRAVELLY SAND
				25	
				30	

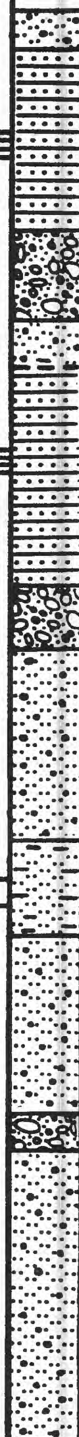


Figure 28

COMMENTS:

ALTITUDE: 1430'	**LOCATION:** **Lat.** 34°18'58" **Long.** 118°26'51"	**HOLE No.** 56
DATE: 8/20/80	**QUADRANGLE:** San Fernando, CA	**SITE:** OLIVE VIEW **GEOLOGIC MAP UNIT:** Holocene alluvium, coarse-grained[4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
					0	GRAVELLY SAND, v. dk. greyish brown, v. poorly sorted, up to 30% gravel to 30 mm, v. dense (SW)
GRAVELLY SAND, v. dk. greyish brown, v. poorly sorted, mostly finer than coarse sand, 25% gravel to 30 mm, v. dense (SW)		55/7"				
					5	V. COARSE SAND, dk. greyish brown. Contains some thin gravel lenses (SP)
						SANDY GRAVEL, some cobbles
					10	V. COARSE SAND, v. dense
						GRAVELLY SAND
					15	
						V. COARSE SAND, v. dense
					20	
					25	
					30	

Figure 29

COMMENTS:

ALTITUDE: 730' **DATE:** 8/21/80	**LOCATION:** **Lat.** 34°11'33" **Long.** 118°30'22" **QUADRANGLE:** Canoga Park, CA	**HOLE No.** 57 **SITE:** MULLHOLAND JR. H.S. **GEOLOGIC MAP UNIT:** Holocene alluvium, fine-grained[4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SILT LOAM, dk. brown, low plasticity, dk. yellowish brown
					SILTY CLAY LOAM
SILTY CLAY LOAM, olive brown, medium plasticity, moist, medium stiff (CL)		7			
				5	
SAND, pale brown to yellowish brown, well sorted, fine to medium grained (SP)		28			
SANDY CLAY LOAM, dk. brown sand is mostly fine grained, medium plasticity, v. stiff (CL)				10	
					SANDY LOAM, greyish brown, grading to SAND, well-sorted mostly medium to coarse
					FINE SANDY LOAM, olive brown
FINE SANDY LOAM, olive brown, v. firm	2.13		P	15	
				20	
					V. COARSE SAND
					V. COARSE SAND
no recovery		26		25	
LOAM, olive, sand is fine to v. fine grained, low plasticity, moist, v. firm (SM)	2.03		S	30	

Figure 30

COMMENTS:

ALTITUDE: 1170'	**LOCATION:** **Lat.** 34°30'58" **Long.** 118°36'23"	**HOLE No.** 58
		SITE: CASTAIC DAM
DATE: 9/17/80	**QUADRANGLE:** Warm Springs Mt., CA	**GEOLOGIC MAP UNIT:** Artificial fill / Castaic Formation

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	SANDY LOAM, greyish brown, poorly sorted to fine gravel size
GRAVELLY CLAY LOAM, dk. olive grey, 30% angular siltstone gravel to 30 mm (CL)		13			GRAVELLY CLAY LOAM, dk. olive grey, 30% angular siltstone gravel to 30 mm (decomposed siltstone)
				5	SANDY CLAY LOAM and SANDY LOAM, dk. brownish grey, poorly sorted, dense (SC-SM)
SANDY LOAM, dk. brownish grey, poorly sorted, dense (SM)		31		10	
				15	SHALE, v. dk. grey, firm to hard, closely fractured
GRAVELLY SAND, brown, v. poorly sorted almost all coarser than medium sand, 25-30% gravel to 60 mm, subangular to subrounded mixed lithology (SW)	2.05		P		PEBBLY SANDSTONE, brown, firm to hard, closely to moderately fractured
				20	
				25	
				30	

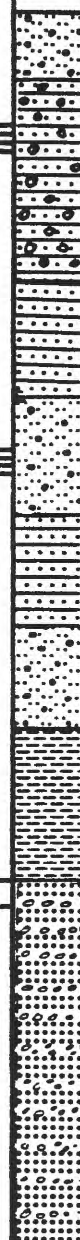


Figure 31

COMMENTS: Artificial fill to a depth of 15 m. Drilling stopped at 26 m because of it.

ALTITUDE: 2880' **DATE:** 9/18/80	**LOCATION:** **Lat.** 34°39'06" **Long.** 118°28'49" **QUADRANGLE:** Lake Hughes, CA	**HOLE No.** 59 **SITE:** CAMP MUNZ **GEOLOGIC MAP UNIT:** Holocene alluvium, medium-grained [4]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	SAND, brown, well-sorted, mostly medium to v. coarse grained. Includes lenses of SANDY LOAM. Loose to medium dense (SP-SM)
SANDY LOAM, brown, finer than medium sand, loose (SM)		9			
				5	
no recovery - loose sand washed away			P	10	
GRANODIORITE GRUS, mottled black, white, dk. brown and strong brown, crumbles easily to coarse to v. coarse sand size.	2.22		P		GRANODIORITE GRUS, mottled black, white, grey, dk. brown and strong brown, crumbles easily to coarse to v. coarse sand size
				15	
GRANODIORITE GRUS, mostly white to grey quartz and feldspar 20% yellowish brown biotite, crumbles easily to coarse to v. coarse sand	2.30		P		
				20	
				25	
				30	

Graphic Log:

Figure 32

COMMENTS:

ALTITUDE: 2295'

DATE: 9/19/80

LOCATION:
Lat. 34°45'50"
Long. 118°06'12"

QUADRANGLE: Rosamond Lake, CA

HOLE No. 60

SITE: ROSAMOND DRY LAKE

GEOLOGIC MAP UNIT: Early-Late Holocene lacustrine deposits[5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/ Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SILT LOAM, greyish brown (ML)
LOAMY FINE SAND, lt. olive brown v. dense (SM)		59			LOAMY FINE SAND, lt. olive brown, moderately well-sorted, v. dense (SM)
				5	grading to SAND to v. coarse size, some fine gravel (SP)
					SILT LOAM, greyish brown (ML)
					CLAY LOAM, greyish brown (CL)
				10	SAND, greyish brown (SP)
					grading to SANDY GRAVEL, to 10 mm, most is granitic (GW)
				15	SILT LOAM (ML)
					SAND, greyish brown, moderately well-sorted to v. coarse size, some fine gravel to 5 mm (SP)
				20	FINE SANDY LOAM, grey (SM)
					CLAY, dk. greenish grey, v. stiff (CH)
				25	
CLAY, dk. greenish grey, v. firm, wet (CH)			P		
					Stiffer - olive grey mottled brownish yellow
				30	

continued on next page

Figure 33

COMMENTS:

ALTITUDE:	LOCATION: Lat. Long. QUADRANGLE:	HOLE No. 60 SITE: ROSAMOND DRY LAKE GEOLOGIC MAP UNIT:
DATE:		

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
					30	
CLAY, olive grey mottled brownish yellow, mottling decreases toward bottom of sample, v. stiff (CL)		28				
					35	
					40	CLAY, dk. greenish grey with laminations of V. FINE SAND, grey (CH)
					45	
CLAY, dk. greenish grey, occasional laminations of v. fine grey SAND, v. firm, moist (CH)	1.78		P			
					50	
					55	
					60	

Figure 33 continued

COMMENTS:

ALTITUDE: 3280' **DATE:** 9/19/80	**LOCATION:** **Lat.** 34°39'55" **Long.** 118°25'45" **QUADRANGLE:** Lake Hughes, CA	**HOLE No.** 61 **SITE:** LAKE HUGHES F.S. **GEOLOGIC MAP UNIT:** Early-Late Holocene alluvium[5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	SAND and LOAMY SAND, dk. brown, moderately well to poorly sorted, mostly medium to v. coarse grained, some gravel to 30 mm, v. dense (SP)
LOAMY SAND, dk. brown, poorly sorted, mostly finer than coarse sand, some gravel to 30 mm, moist, v. dense		46			
				5	
					SANDY LOAM, brown
				10	GRAVELLY COARSE SAND
				15	
				20	GRANODIORITE GRUS, mottled white and v. dk. brown, firm but easily friable to sand size, dry
GRANODIORITE GRUS, mottled white and v. dk. brown, firm but easily friable to sand size, dry	2.16		P		
				25	
				30	

Graphic Log

Figure 34

COMMENTS:

ALTITUDE: 3110' **DATE:** 9/20/80	**LOCATION:** **Lat.** 34°36'53" **Long.** 118°16'35" **QUADRANGLE:** Sleepy Valley, CA	**HOLE No.** 62 **SITE:** LEONA VALLEY F.S. **GEOLOGIC MAP UNIT:** Late Holocene alluvium 5

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
					0	SAND, yellowish brown, moderately well-sorted, most is medium to v. coarse, some fine gravel to 10 mm, granitic, angular to subangular. Contains thin lenses of sandy loam.
					5	
					10	SANDY CLAY LOAM, mottled v. dk. grey, red, yellow. dk. brown, white, poorly sorted, substantial is v. coarse sand, some gravel, medium plasticity, v. stiff (CL)
SANDY CLAY LOAM, mottled v. dk. grey, red, yellow, dk. brown, white, poorly sorted, substantial is v. coarse sand size, some gravel, medium plasticity, v. stiff	2.21		P			
					15	GRAVELLY SAND, brown, mostly finer than 4 mm some to 10 mm, mixed lithology, mostly granitic and black schist, angular to subangular (SW)
					20	
					25	
					30	

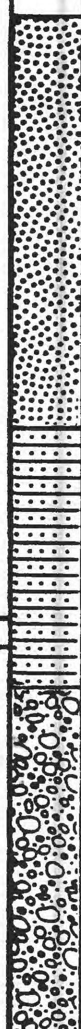


Figure 35

COMMENTS:

ALTITUDE: 3025' **DATE:** 9/9/80	**LOCATION:** **Lat.** 34°31'43" **Long.** 117°48'29" **QUADRANGLE:** Lovejoy Buttes, CA	**HOLE No.** 63 **SITE:** LLANO NORTH **GEOLOGIC MAP UNIT:** Q6 Early Holocene alluvium[5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
					0	SAND, dk. brown, well-sorted, mostly medium to coarse grained (SP) grading coarser to: SANDY GRAVEL, mostly brown to black schist, some quartz, granitic, angular to subangular, gravel to 30 mm (GW)
SANDY GRAVEL, mostly brown to black schist, some white quartz, sand is mostly medium to v. coarse grained, gravel to 30 mm (GW)		62			5	
LOAMY SAND, poorly sorted to 4 mm, angular to subangular (SM)		26			10	SANDY LOAM, brown yellowish brown to reddish brown grading to: SAND, strong brown, moderately well sorted, mostly medium to v. coarse grained, angular to subangular, medium to v. dense
					15	GRAVELLY COARSE SAND
SAND, brown, poorly sorted, mostly finer than coarse sand, some fine granitic gravel (SW)		50/5"			20	SANDY LOAM and SAND, brown, poorly sorted, mostly finer than coarse sand, some fine granitic gravel (SW-SM)
COBBLE GRAVEL, brown, subangular to subrounded, granitic	2.10		P		25	GRAVELLY SAND, brown, poorly sorted up to cobble size, granitic. Contains lenses of SANDY LOAM.
					30	

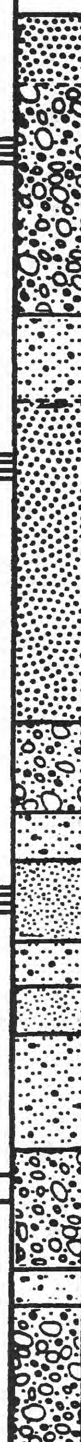
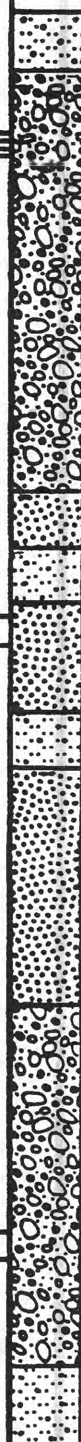


Figure 36

COMMENTS:

ALTITUDE: 3144' **DATE:** 9/10/80	**LOCATION:** **Lat.** 34°30'46" **Long.** 117°48'59" **QUADRANGLE:** Lovejoy Buttes, CA	**HOLE No.** 64 **SITE:** LLANO SOUTH **GEOLOGIC MAP UNIT:** Q3 Pleistocene alluvium[5]

SAMPLE DESCRIPTION | Density (gm/cc) | Blows/Foot | Sampling | Graphic Log | Depth (meters) | **DESCRIPTION**



Sample Description	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	Description
				0	SANDY LOAM, dk. reddish brown, poorly sorted, some fine gravel (SW)
GRAVELLY SAND, dk. yellowish brown, poorly sorted, mostly medium to v. coarse sand, 30-40% gravel to 20 mm, angular to subangular, brown schist and granitic lithology v. dense (SW)		50/4"			GRAVELLY SAND, strong brown to dk. yellowish brown, 30-40% gravel to 20 mm, angular to subangular, brown schist and granitic lithology, v. dense (SW)
				5	
				10	SAND, yellowish brown, mostly medium to v. coarse grained, some fine gravel. Contains lenses of SANDY LOAM (SW)
SAND, yellowish brown, mostly medium to v. coarse grained, some fine gravel (SW)	1.98		P		
				15	
				20	GRAVELLY SAND, weathered granitic and brown schist clasts (SW)
				25	
GRAVELLY SAND, brown, poorly sorted up to cobble size	2.13		P		
					SANDY LOAM, yellowish brown, poorly sorted
				30	

Figure 37

COMMENTS:

ALTITUDE: 2890' **DATE:** 9/21/80	**LOCATION:** **Lat.** 34°31'16" **Long.** 117°58'50" **QUADRANGLE:** Littlerock, CA	**HOLE No.** 65 **SITE:** LITTLEROCK POST OFFICE **GEOLOGIC MAP UNIT:** Q6 Early Holocene alluvium[5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SAND, brown, poorly sorted to v. coarse size, some gravel to 10 mm. Loose to medium dense. Contains lenses of FINE SANDY LOAM (SW-SM)
FINE SANDY LOAM, brown, low plasticity, loose (SM)		9			
				5	
CLAY LOAM, brown, sand to coarse size, medium plasticity moist, v. firm	2.16		P		CLAY LOAM, reddish brown to brown, sand to coarse size, medium plasticity, v. firm (CL)
				10	GRAVELLY SAND, poorly sorted to 10 mm, angular to subangular, mostly granitic, some black schist. Contains beds of COBBLE GRAVEL (SW-GW)
				15	
				20	
					SANDY CLAY LOAM (CL)
SAND, strong brown, to v. coarse size, granitic, angular to subangular, v. dense (SW)	2.08		P	25	SAND, strong brown to yellowish brown, poorly sorted to v. coarse size, angular to subangular, granitic (SW) greyish brown
				30	

Graphic Log:

Figure 38

COMMENTS:

ALTITUDE: 3038'	**LOCATION:** Lat. 34°30'37" Long. 117°55'18"
DATE: 8/19/80	**QUADRANGLE:** Littlerock, CA
HOLE No.	66
SITE:	PEARBLOSSOM PUMP PLANT
GEOLOGIC MAP UNIT:	Q4 Late Pleistocene alluvium[5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Feet	Sampling	Depth (meters)	DESCRIPTION
				0	SANDY LOAM, brown, poorly sorted to v. coarse size, loose
FINE SANDY LOAM, yellowish brown SAND, brown, mostly finer than medium sand		32			SAND, dk. yellowish brown to brown, poorly sorted, angular to subangular granitic. Includes lenses of GRAVELLY SAND and SANDY LOAM (SW-SM)
				5	
SAND, brown, poorly sorted, mostly finer than coarse size, some fine granitic gravel to 15 mm, v. dense (SW)		73		10	
					SANDY LOAM and SANDY CLAY LOAM, yellowish brown, v. poorly sorted, some cobbles to 60 mm, low to medium plasticity, wet (SM-CL)
COARSE SANDY CLAY LOAM, yellowish brown, v. poorly sorted, medium plasticity, wet (CL)	2.05		P	15	
				20	GRANITE, mottled white, pink and strong brown, hard, v. closely fractured, moderately weathered strong brown, hard, v. closely fractured, moderately weathered
GRANITE, mottled white and strong brown, hard, v. closely fractured, moderately weathered	2.32		P		
				25	
				30	

Graphic Log

Figure 39

COMMENTS:

ALTITUDE: 2747'	LOCATION: Lat. 34°34'50" Long. 118°07'23"	HOLE No. 67
DATE: 9/22/80	QUADRANGLE: Ritter Ridge, CA	SITE: HOLIDAY INN PALMDALE GEOLOGIC MAP UNIT: Q3 Pleistocene alluvium[5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	SANDY LOAM, dk. yellowish brown, dk. reddish brown
LOAMY SAND, yellowish brown to strong brown, poorly sorted, substantial is coarse to v. coarse grained, some fine granitic gravel, medium dense (SW)		16			LOAMY SAND, yellowish brown to strong brown, poorly sorted, substantial is coarse to v. coarse grained, granitic (SP)
					SANDY LOAM, brown (SM)
				5	SAND, lt. yellowish brown, moderately well-sorted to v. coarse grained, granitic, angular to subangular (SP)
SAND, lt. yellowish brown, moderately well-sorted, mostly v. fine to fine grained, some fine gravel to 15 mm, v. dense (SP)		50/4"		10	SANDY LOAM, lt. yellowish brown, mostly v. fine to fine grained. Contains lenses of SAND
SAND, reddish yellow moderately well-sorted, medium to v. coarse grained, angular to subangular, 10-15% fine gravel, moist (SP)	1.97		P	15	SAND, reddish yellow, moderately well-sorted, medium to v. coarse grained, angular to subangular, 10-15% fine gravel, moist (SP)
				20	SANDY LOAM, yellowish brown (SM) grading to: LOAMY SAND, poorly sorted to coarse size, granitic, micaceous (SW)
FINE SANDY LOAM, yellowish brown, low plasticity, v. firm (SM)	2.17		P	25	grading to: FINE SANDY LOAM, yellowish brown, low plasticity (SM)
				30	

Figure 40

COMMENTS:

ALTITUDE: 2650'	**LOCATION:** **Lat.** 34°34'31" **Long.** 118°06'07"	**HOLE No.** 68
		SITE: PALMDALE F.S.
DATE: 9/22/80	**QUADRANGLE:** Palmdale, CA	**GEOLOGIC MAP UNIT:** Q6 Early Holocene alluvium [5]

SAMPLE DESCRIPTION	Density (gm/cc)	Blows/Foot	Sampling	Depth (meters)	DESCRIPTION
				0	FINE SANDY LOAM, dk. brown
GRAVELLY SAND, dk. brown, most is medium to v. coarse sand, 25% gravel to 15 mm, medium dense (SW)		19			GRAVELLY SAND, dk. brown, mostly medium to v. coarse sand, 25% gravel to 15 mm, angular to subangular, mixed lithology, medium dense (SW)
				5	SANDY LOAM, brown, denser
					GRAVELLY SAND, dk. brown, mostly coarse to 4 mm, angular to subangular brown to black schist (SW)
				10	
LOAMY SAND, dk. yellowish brown, poorly sorted, mostly finer than coarse sand, some black schist gravel to 10 mm, v. dense (SW)		60			LOAMY SAND, dk. yellowish brown, poorly sorted, mostly finer than coarse sand, some black schist gravel to 10 mm, v. dense (SW)
				15	CLAY LOAM
				20	SANDY LOAM, yellowish brown, poorly sorted, mostly finer than medium sand, some to v. coarse size, granitic, micaceous. Contains lenses of SANDY CLAY LOAM (SM-SC)
	2.15		P		
				25	
				30	

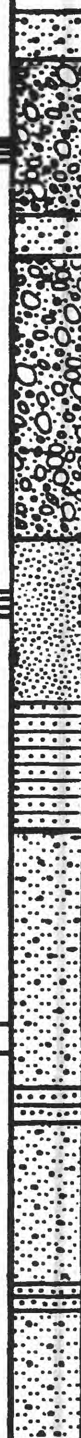


Figure 41

COMMENTS:

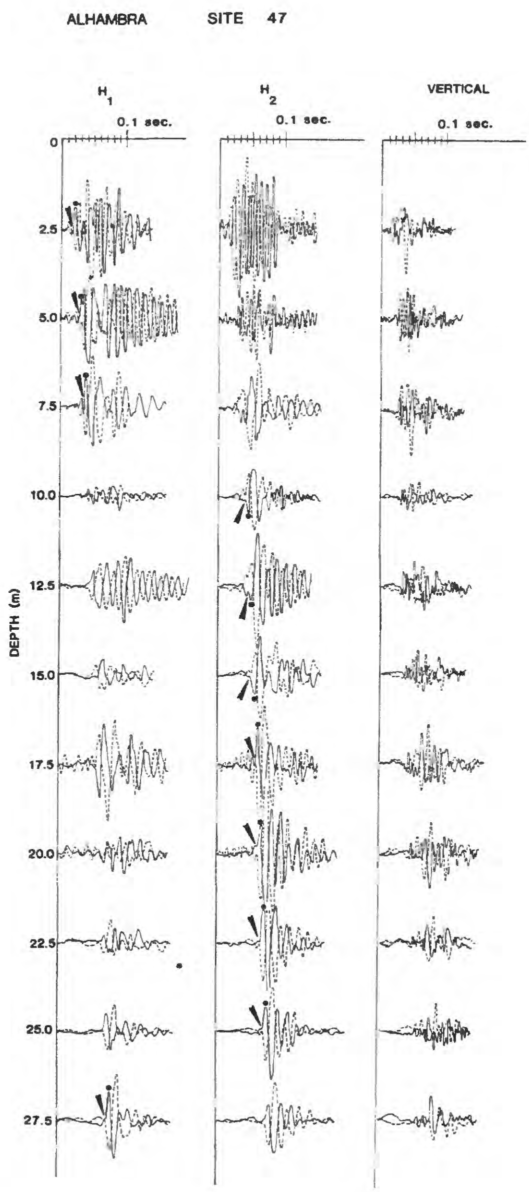


Figure 42

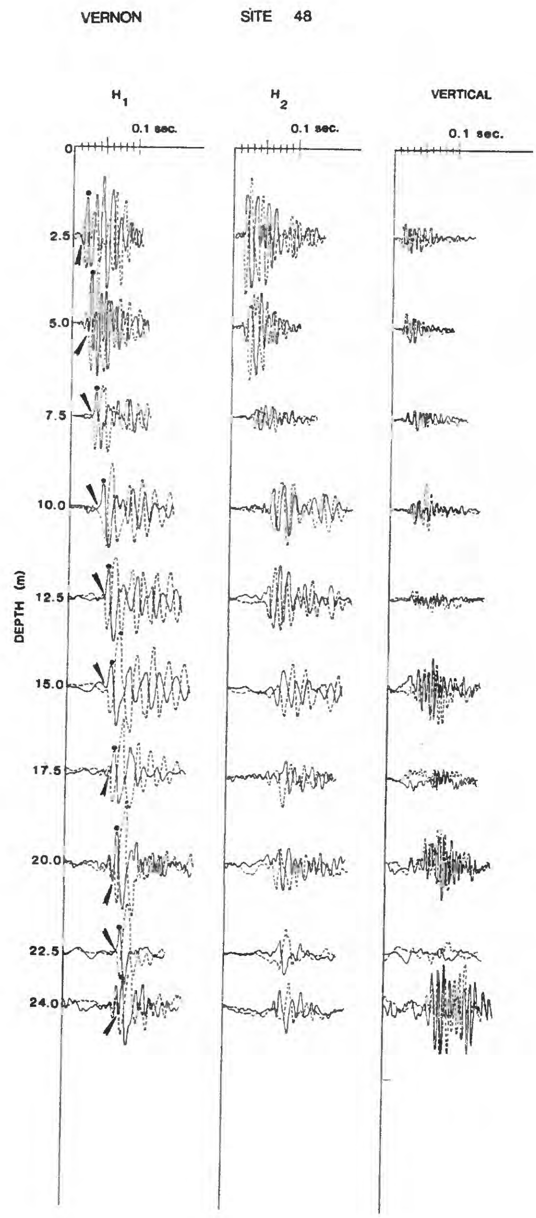


Figure 43

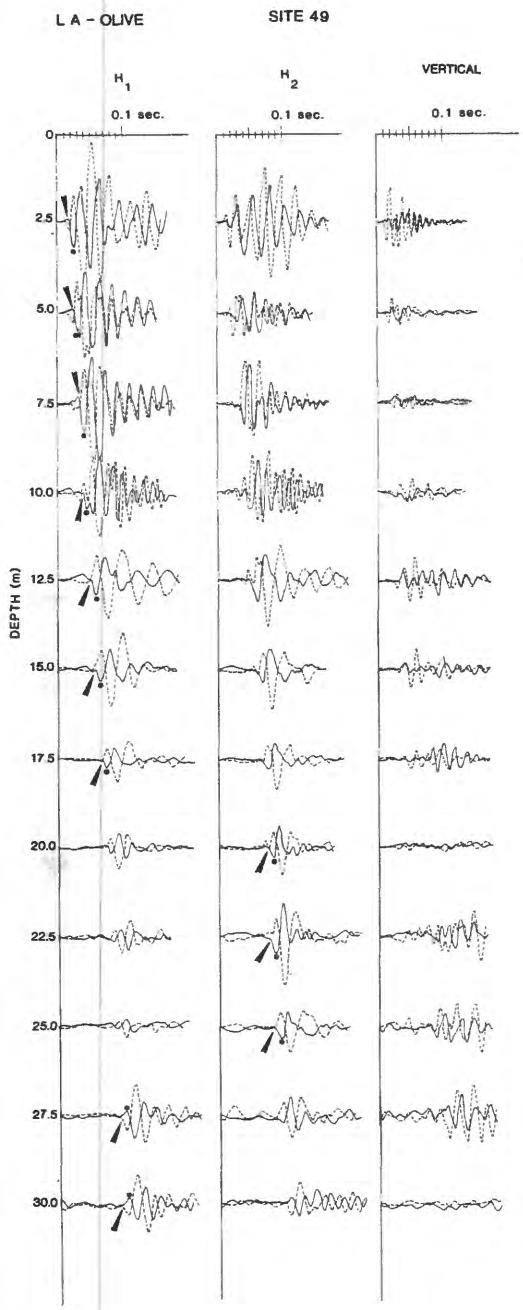


Figure 44

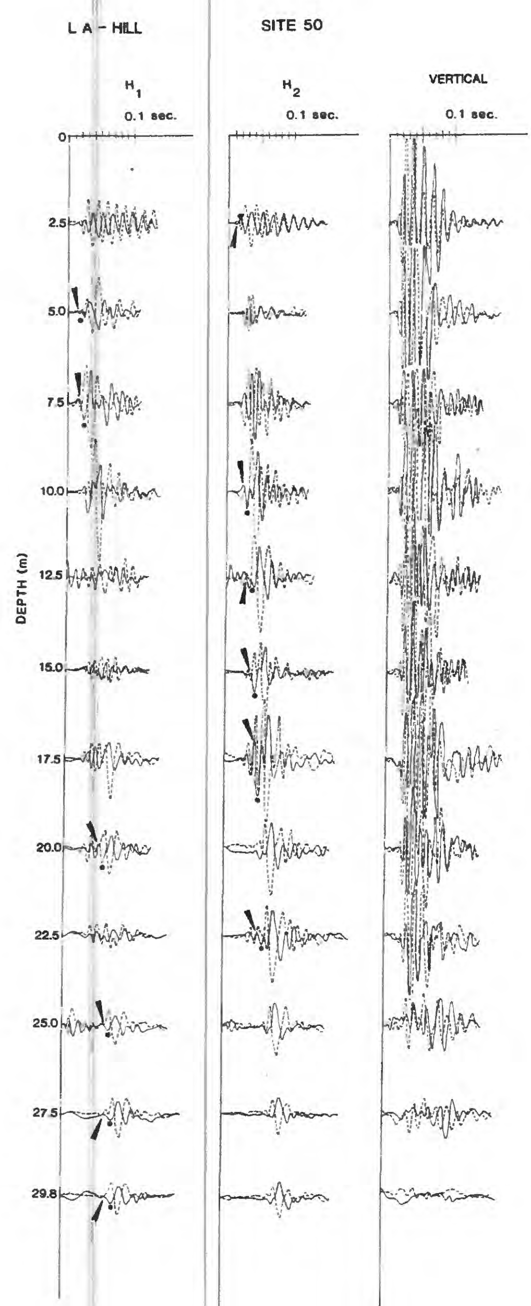


Figure 45

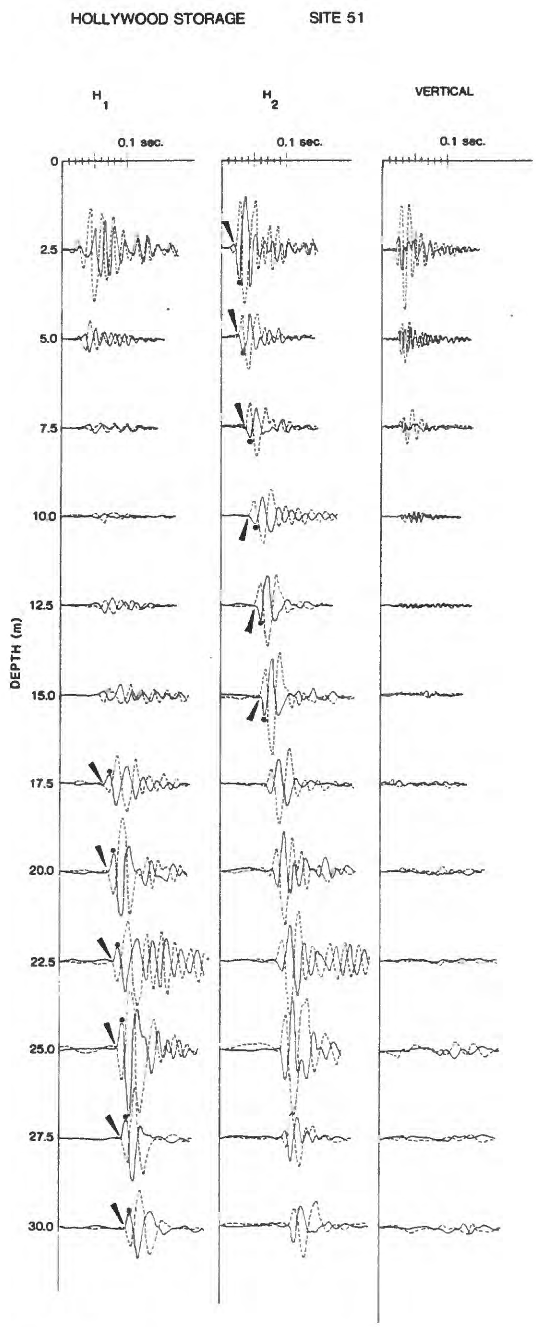


Figure 46

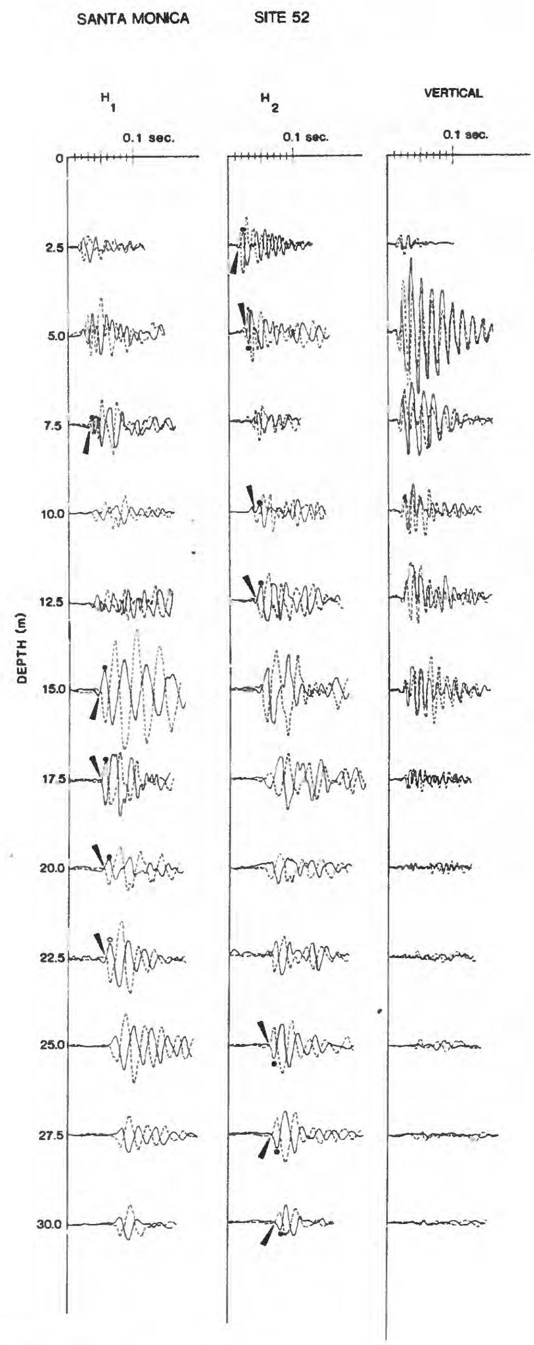


Figure 47

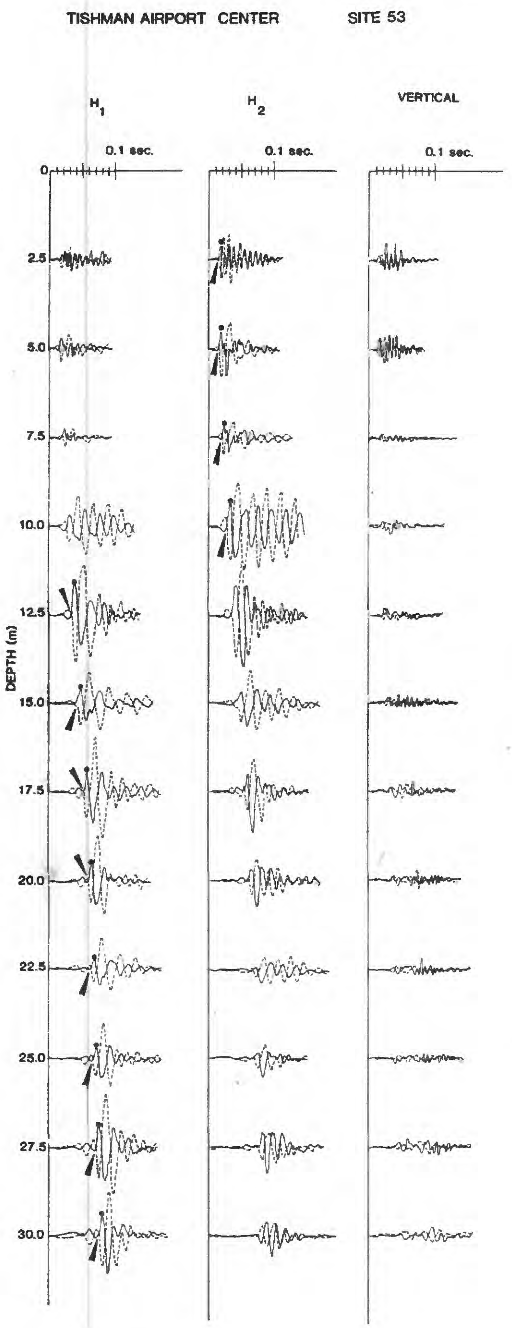


Figure 48

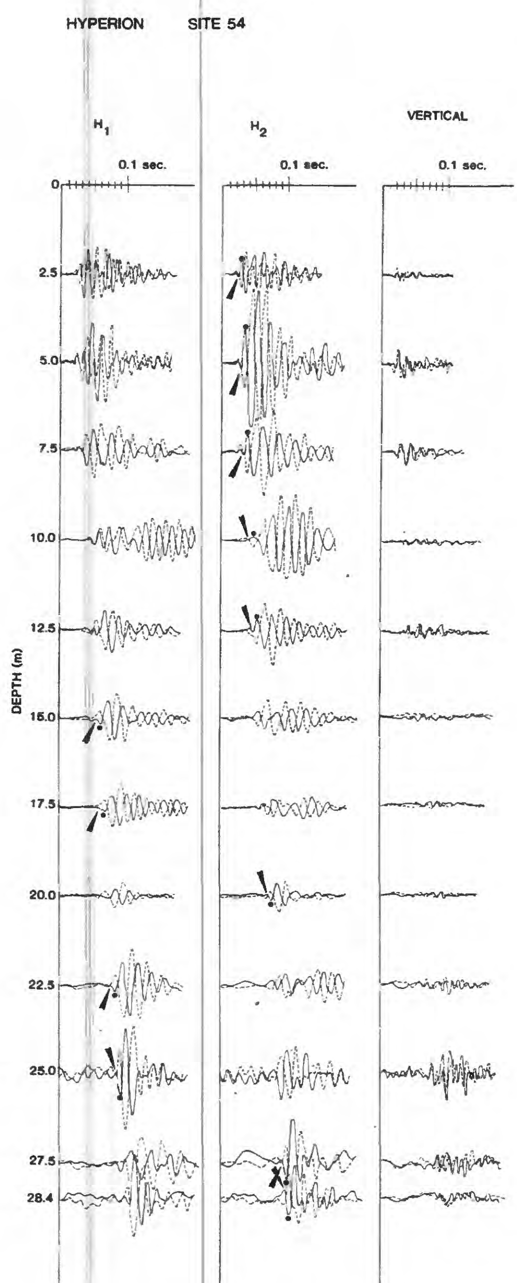


Figure 49

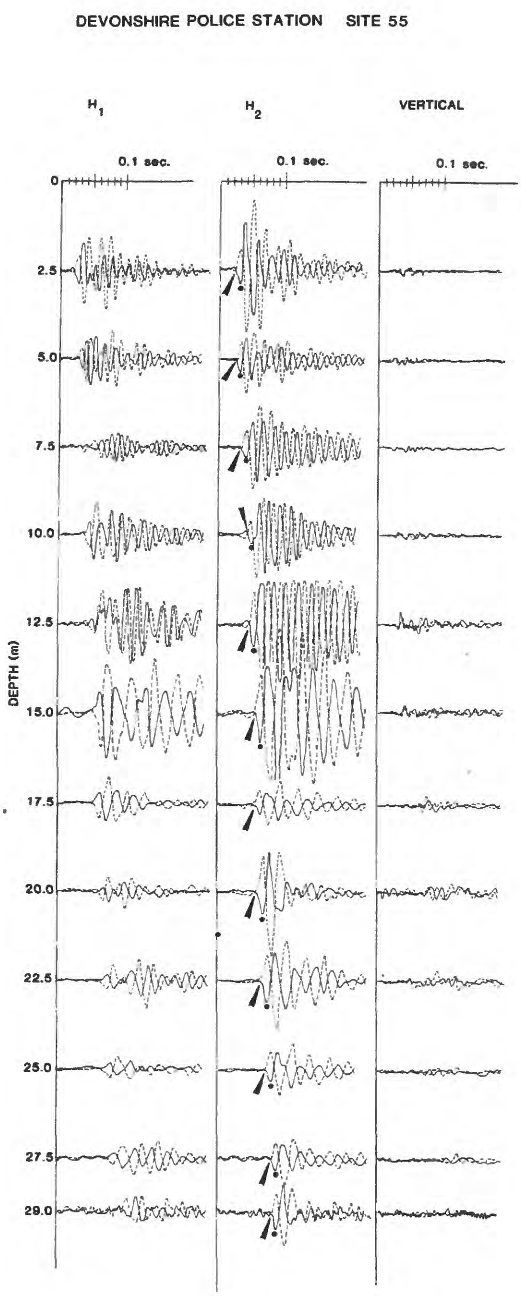


Figure 50

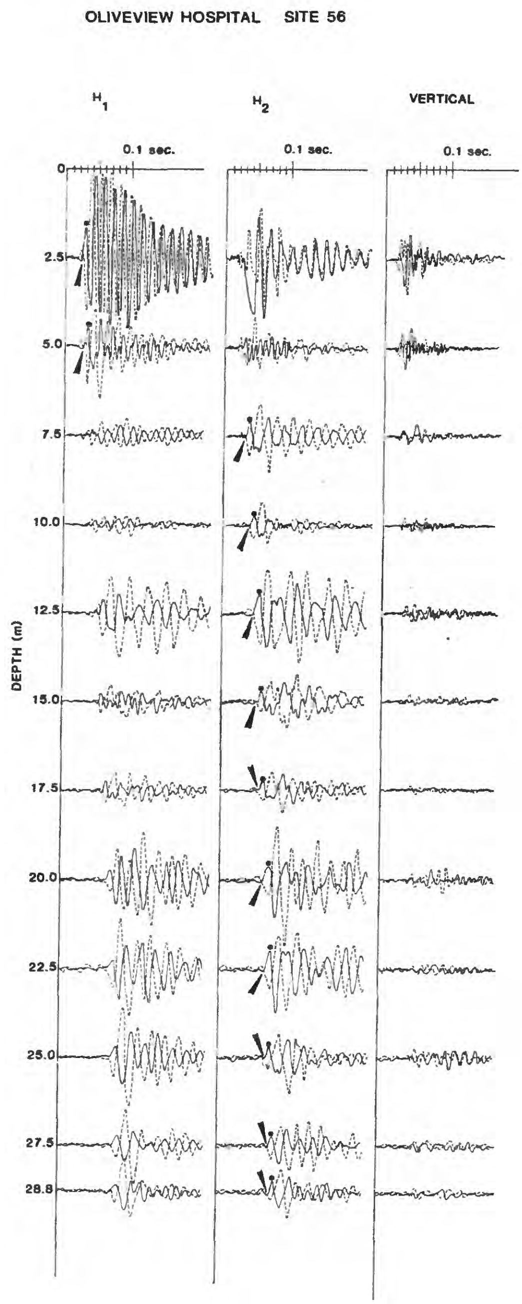


Figure 51

MULHOLLAND JR. HIGH SCHOOL SITE 57

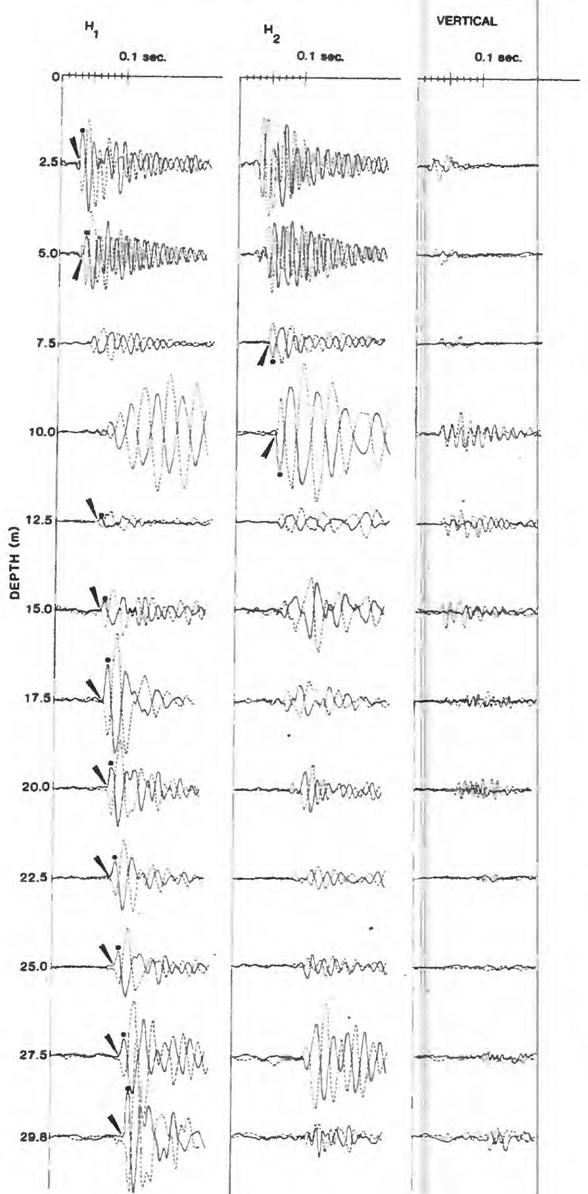


Figure 52

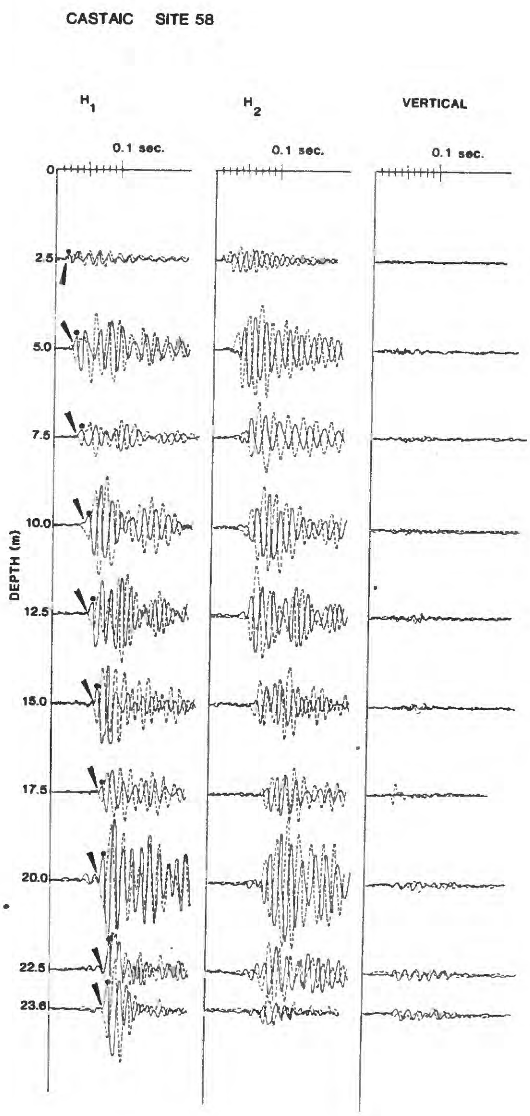


Figure 53

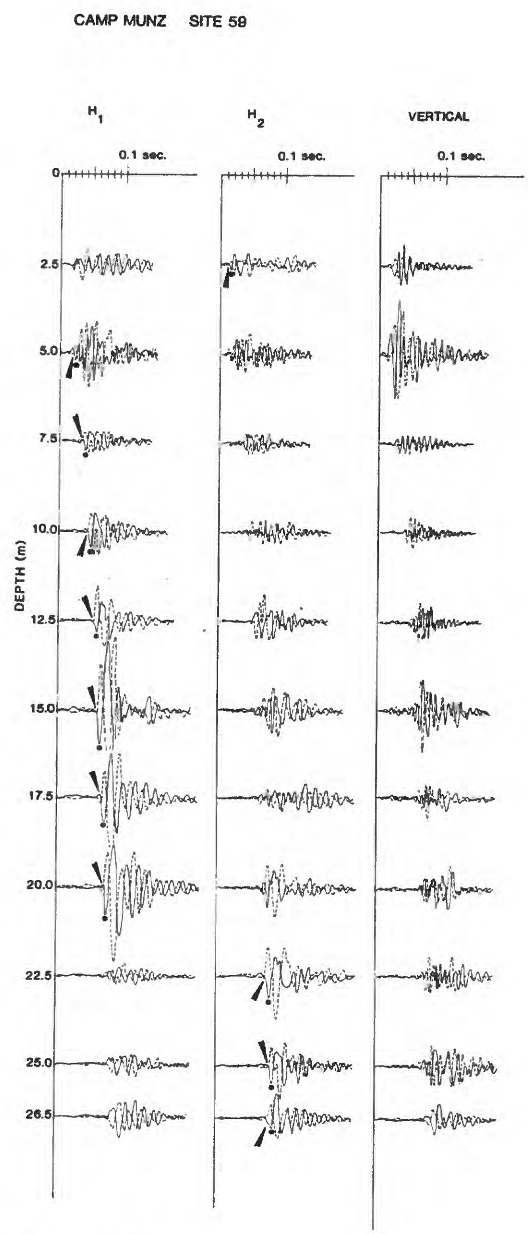


Figure 54

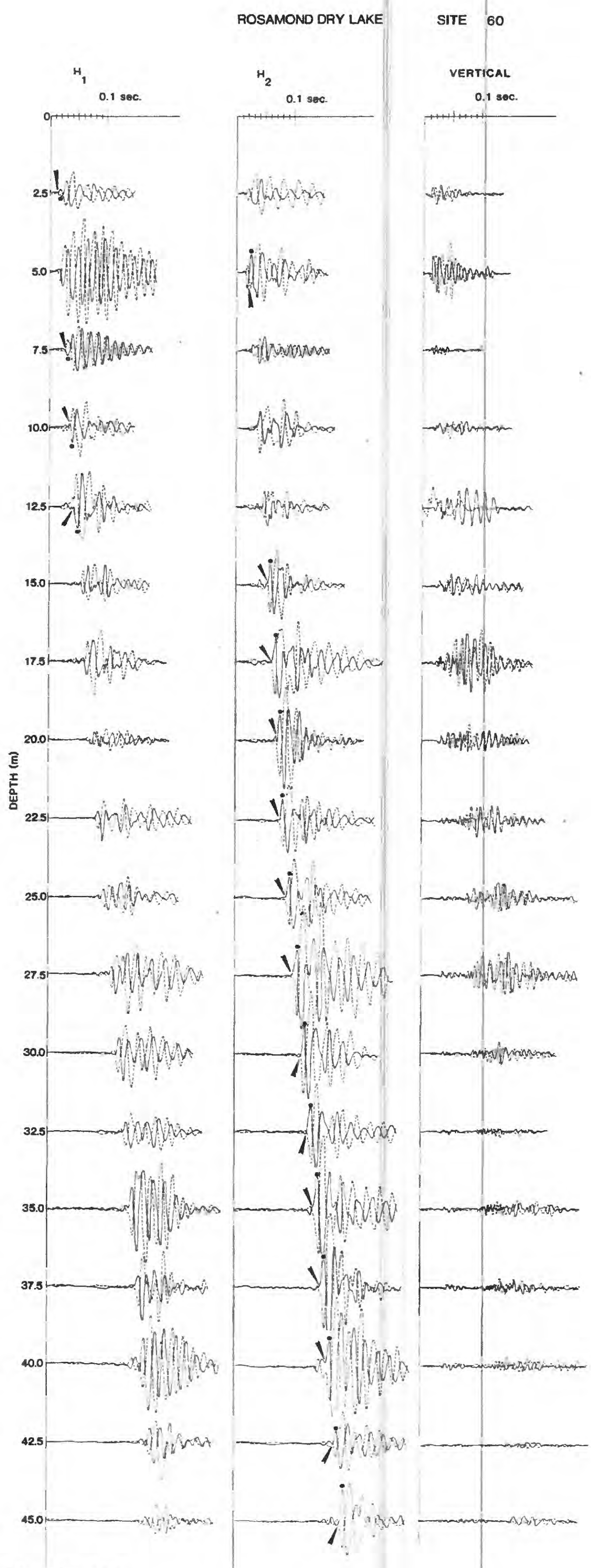

ROSAMOND DRY LAKE SITE 60
H1
0.1 sec.
H2
0.1 sec.
VERTICAL
0.1 sec.
DEPTH (m)
0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
27.5
30.0
32.5
35.0
37.5
40.0
42.5
45.0

Figure 55

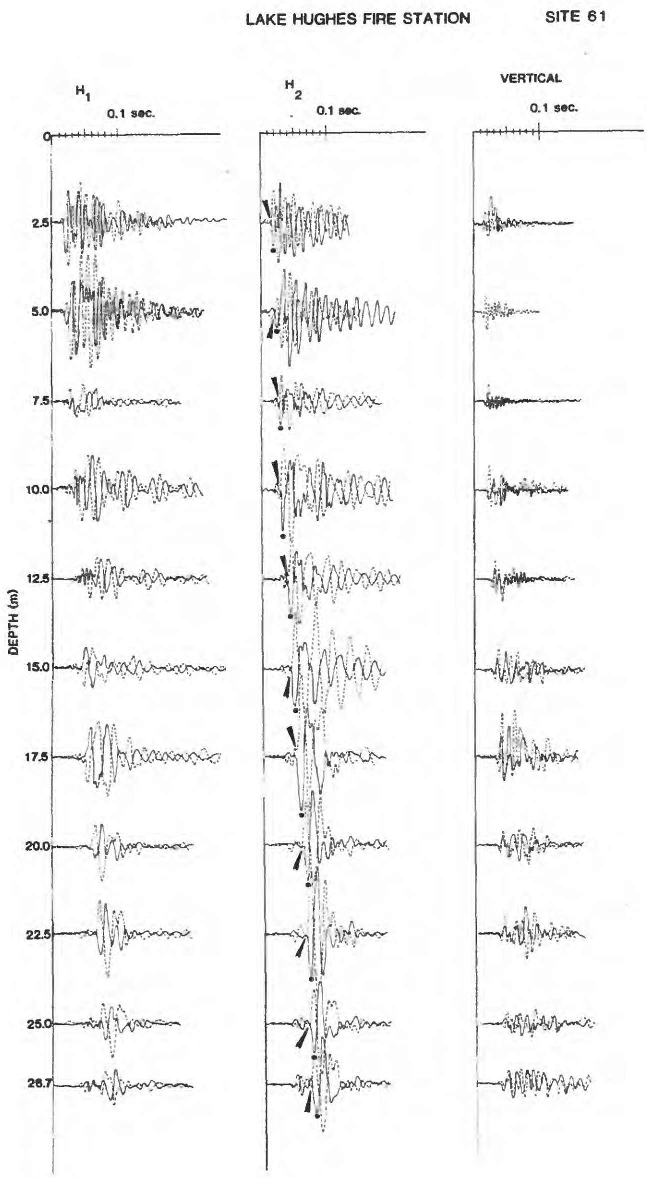


Figure 56

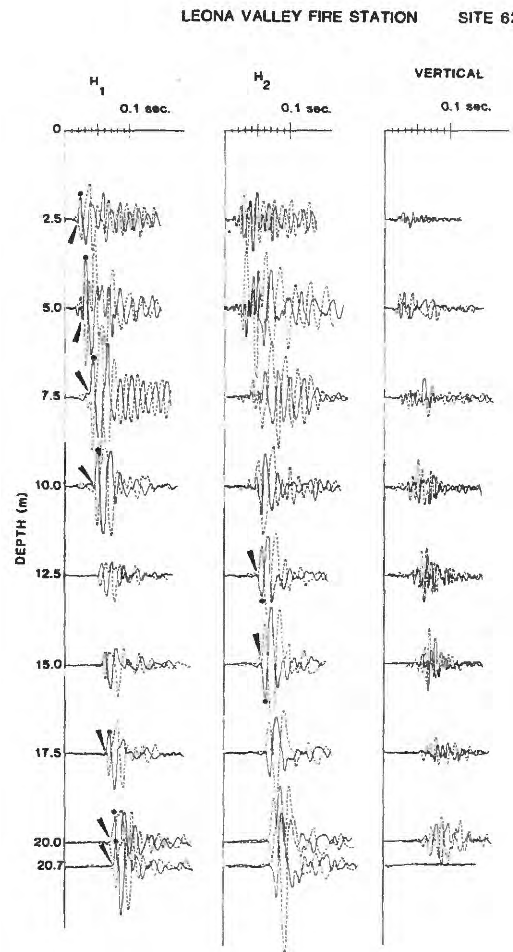


Figure 57

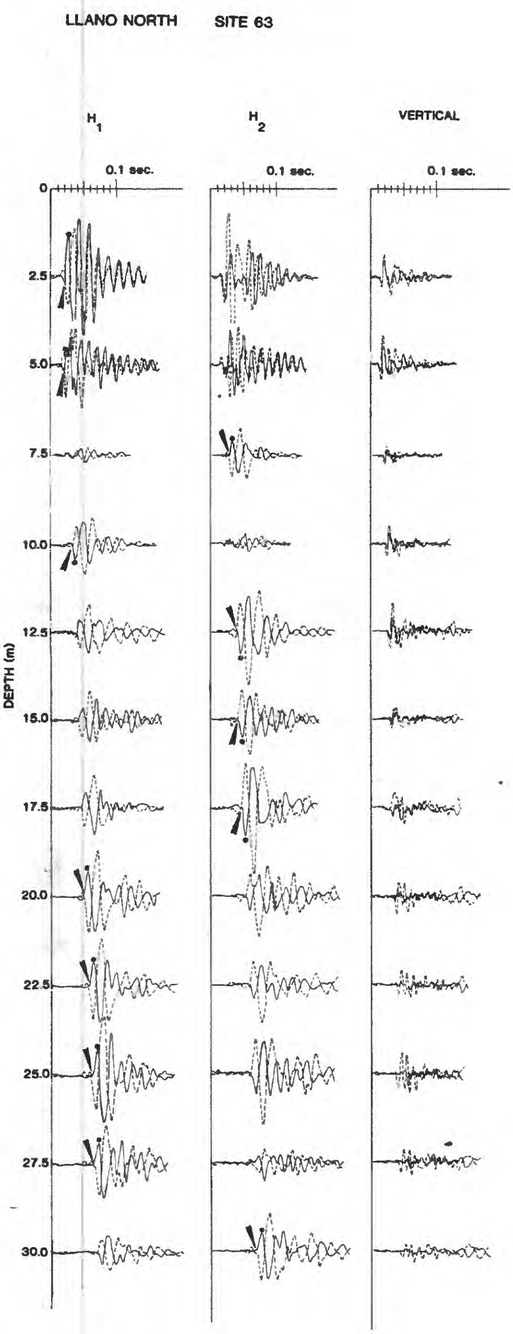


Figure 58

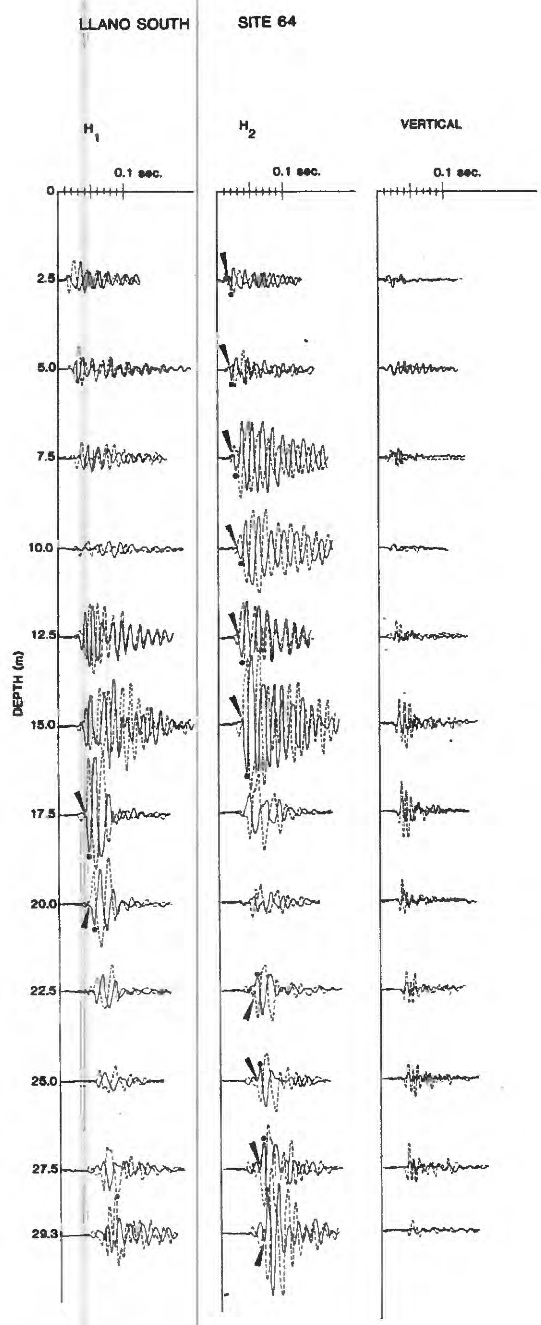


Figure 59

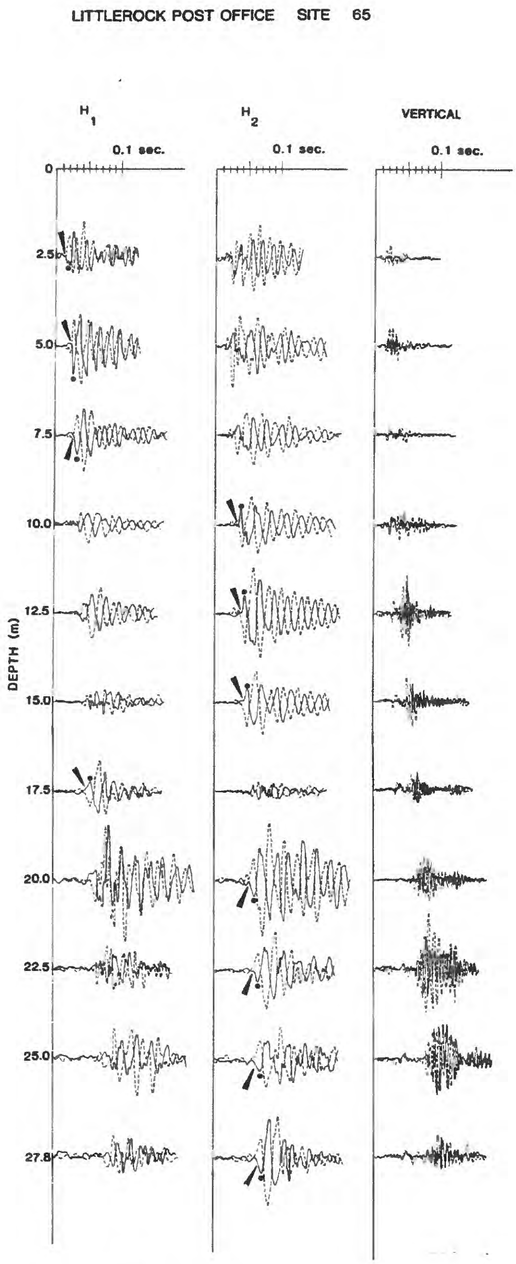


Figure 60

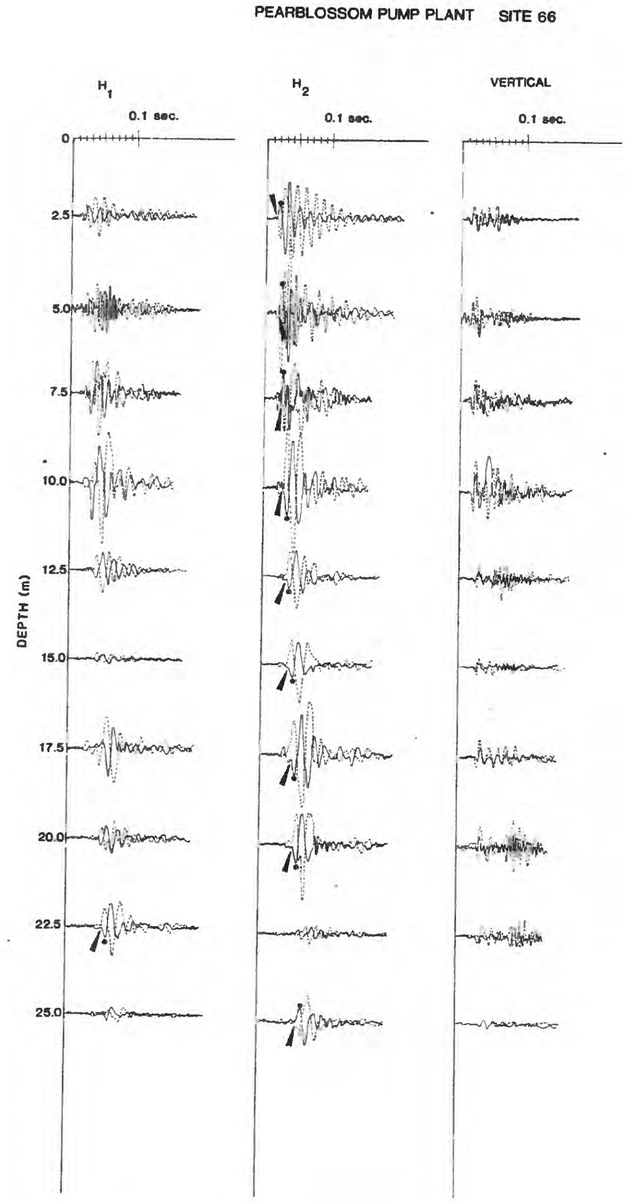


Figure 61

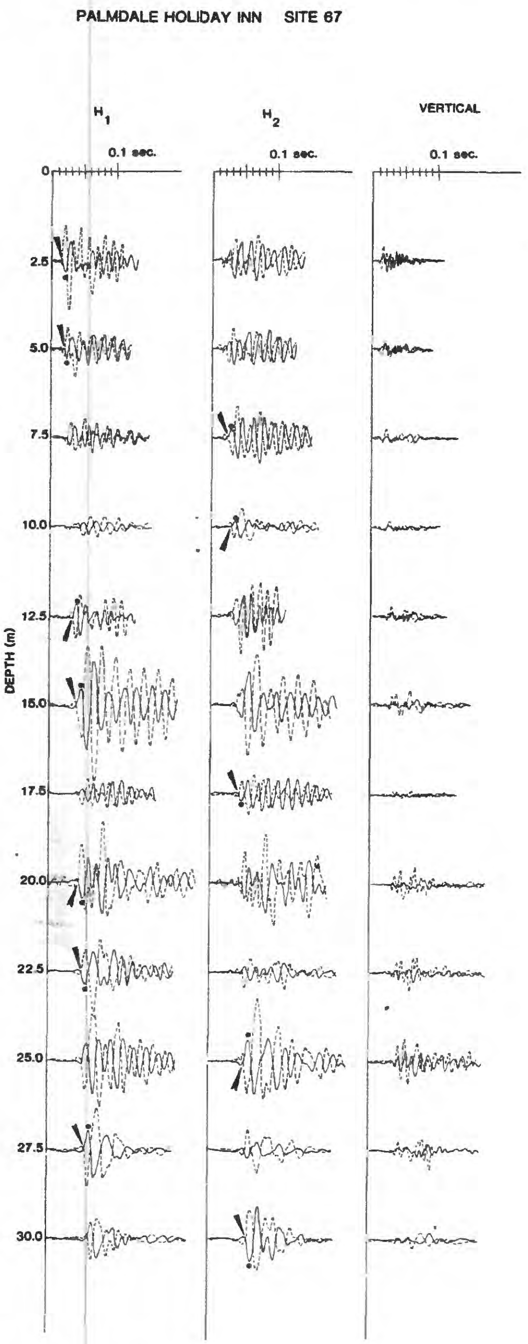


Figure 62

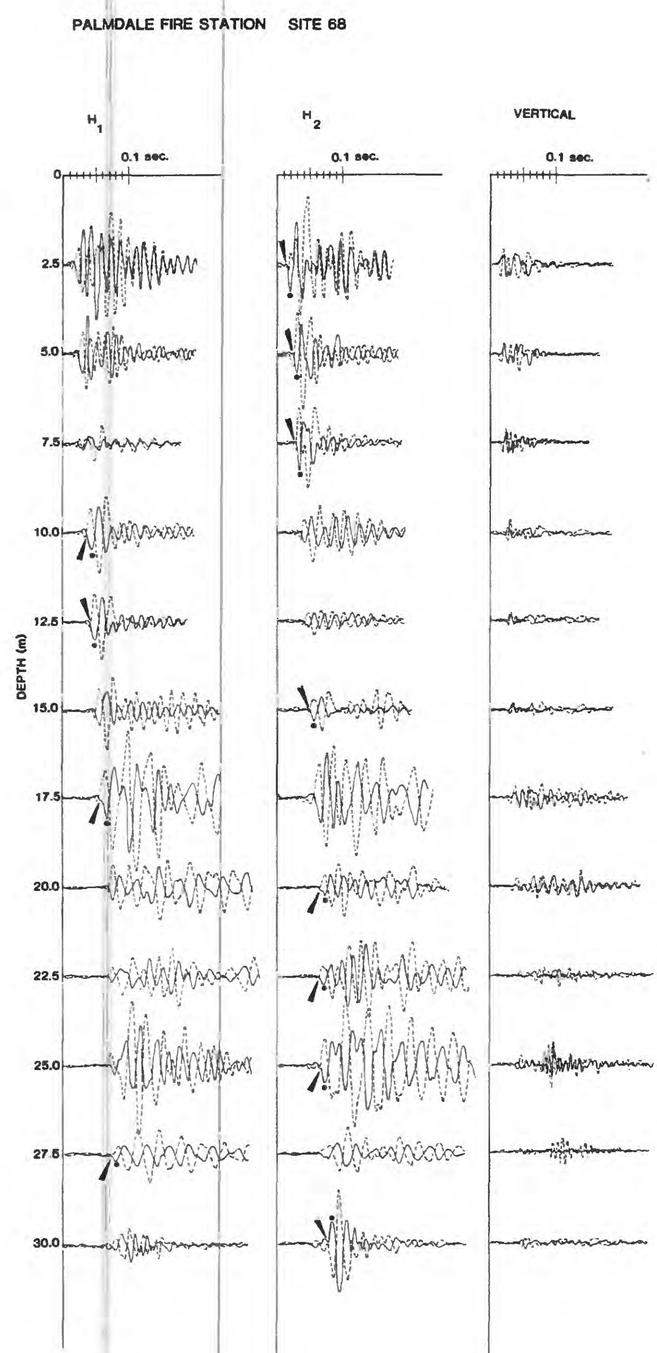


Figure 63

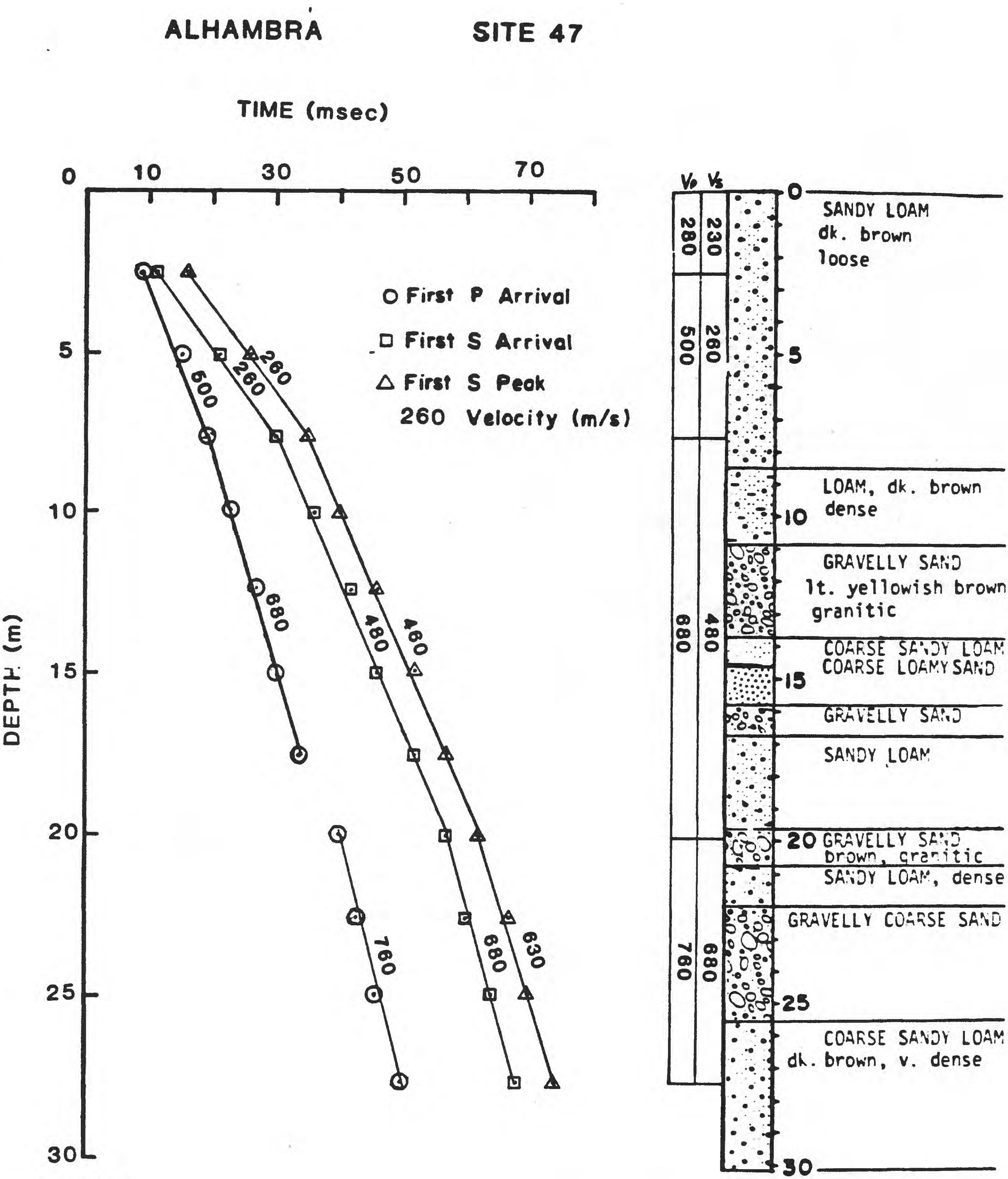

ALHAMBRA
SITE 47
TIME (msec)
0
10
30
50
70
DEPTH (m)
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
260 Velocity (m/s)
260
260
600
680
480
460
760
680
630
V_p
V_s
280
230
500
260
680
480
760
680
0
SANDY LOAM
dk. brown
loose
LOAM, dk. brown
dense
GRAVELLY SAND
lt. yellowish brown
granitic
COARSE SANDY LOAM
COARSE LOAMY SAND
GRAVELLY SAND
SANDY LOAM
GRAVELLY SAND
brown, granitic
SANDY LOAM, dense
GRAVELLY COARSE SAND
COARSE SANDY LOAM
dk. brown, v. dense

FIGURE 64

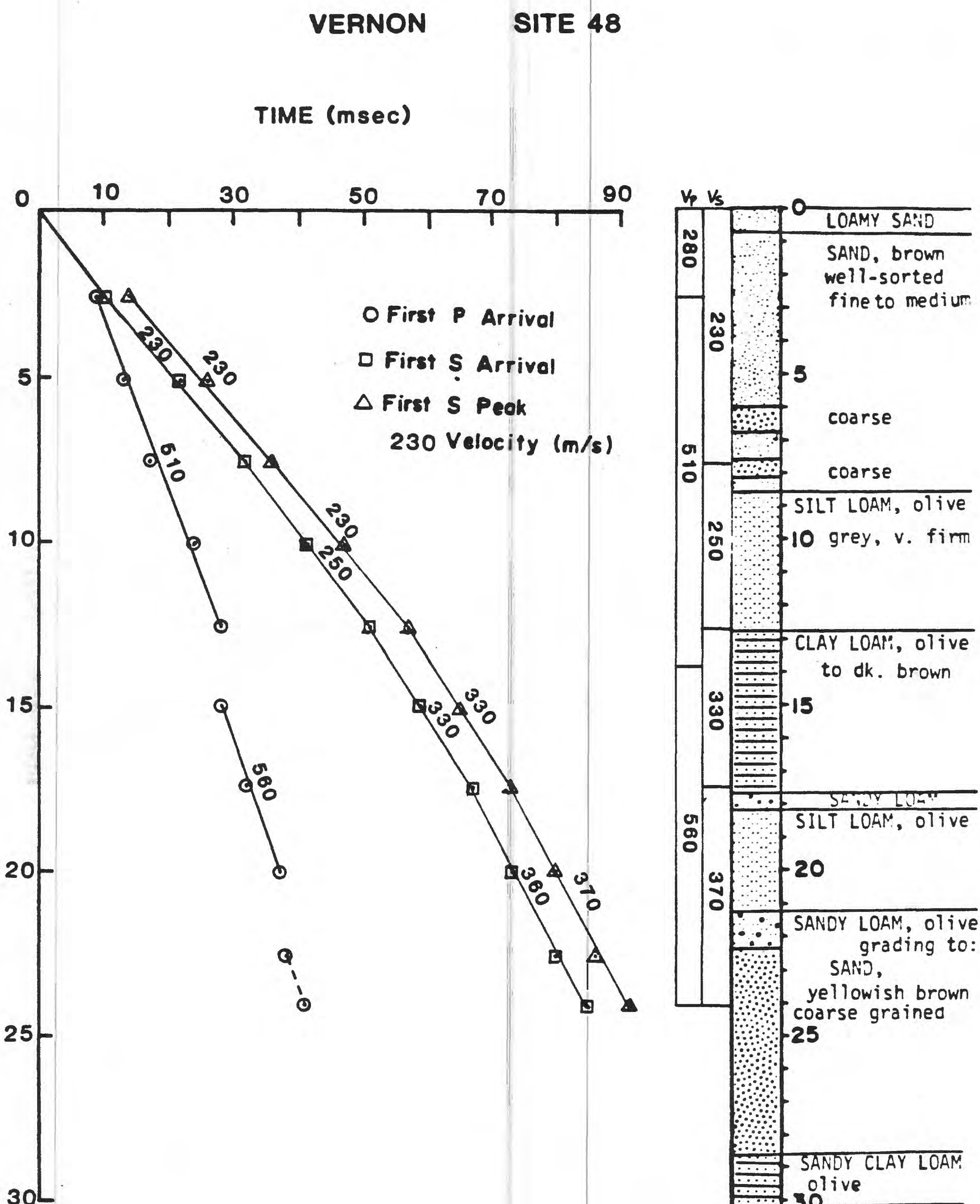

VERNON SITE 48
TIME (msec)
0
10
30
50
70
90
5
10
15
20
25
30
O First P Arrival
□ First S Arrival
△ First S Peak
230 Velocity (m/s)
230
230
510
230
250
330
330
560
360
370
Vp
Vs
280
230
510
250
330
560
370
LOAMY SAND
SAND, brown well-sorted fine to medium
coarse
coarse
SILT LOAM, olive grey, v. firm
CLAY LOAM, olive to dk. brown
SILT LOAM, olive
SANDY LOAM, olive grading to:
SAND, yellowish brown coarse grained
SANDY CLAY LOAM olive

FIGURE 65

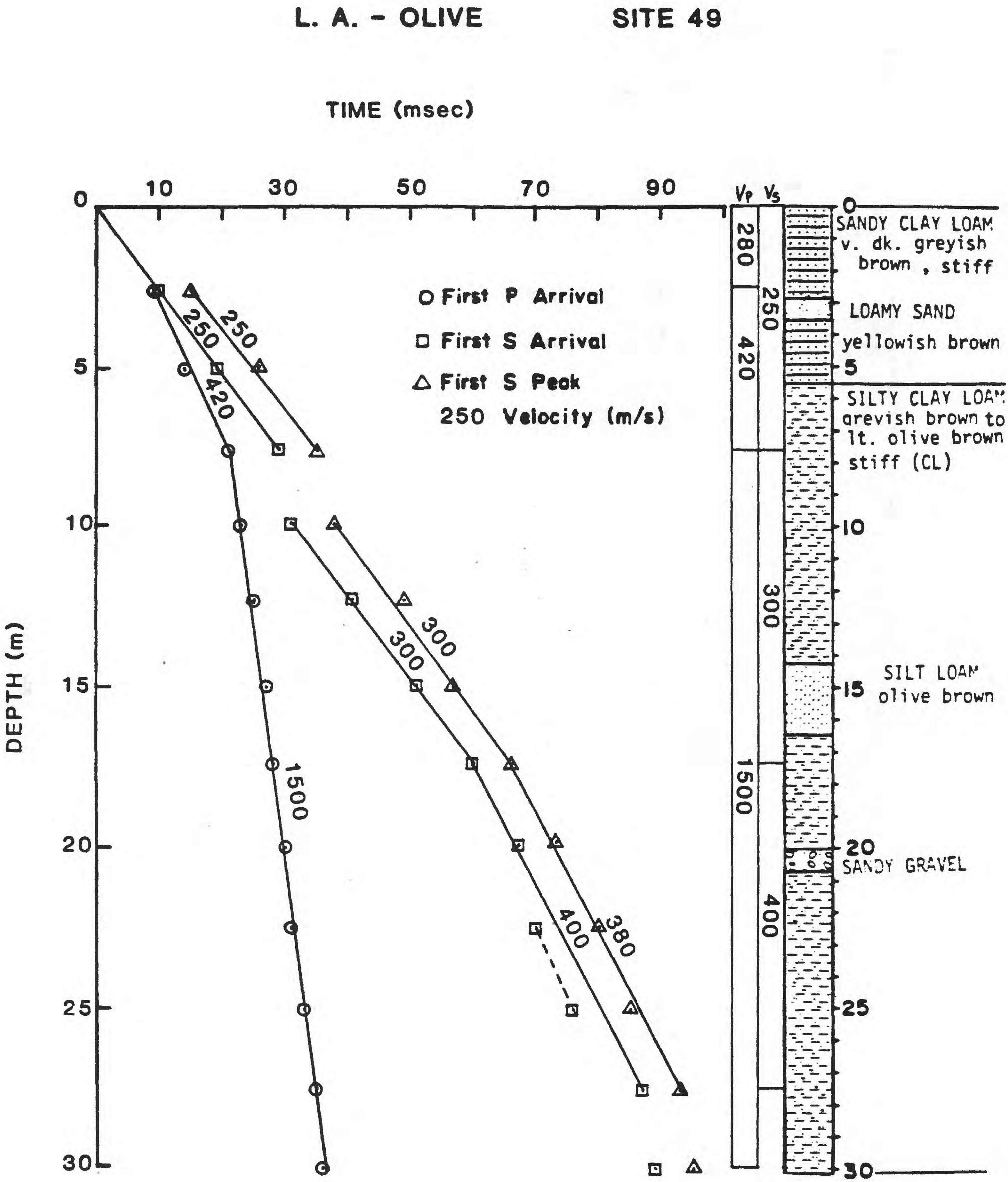
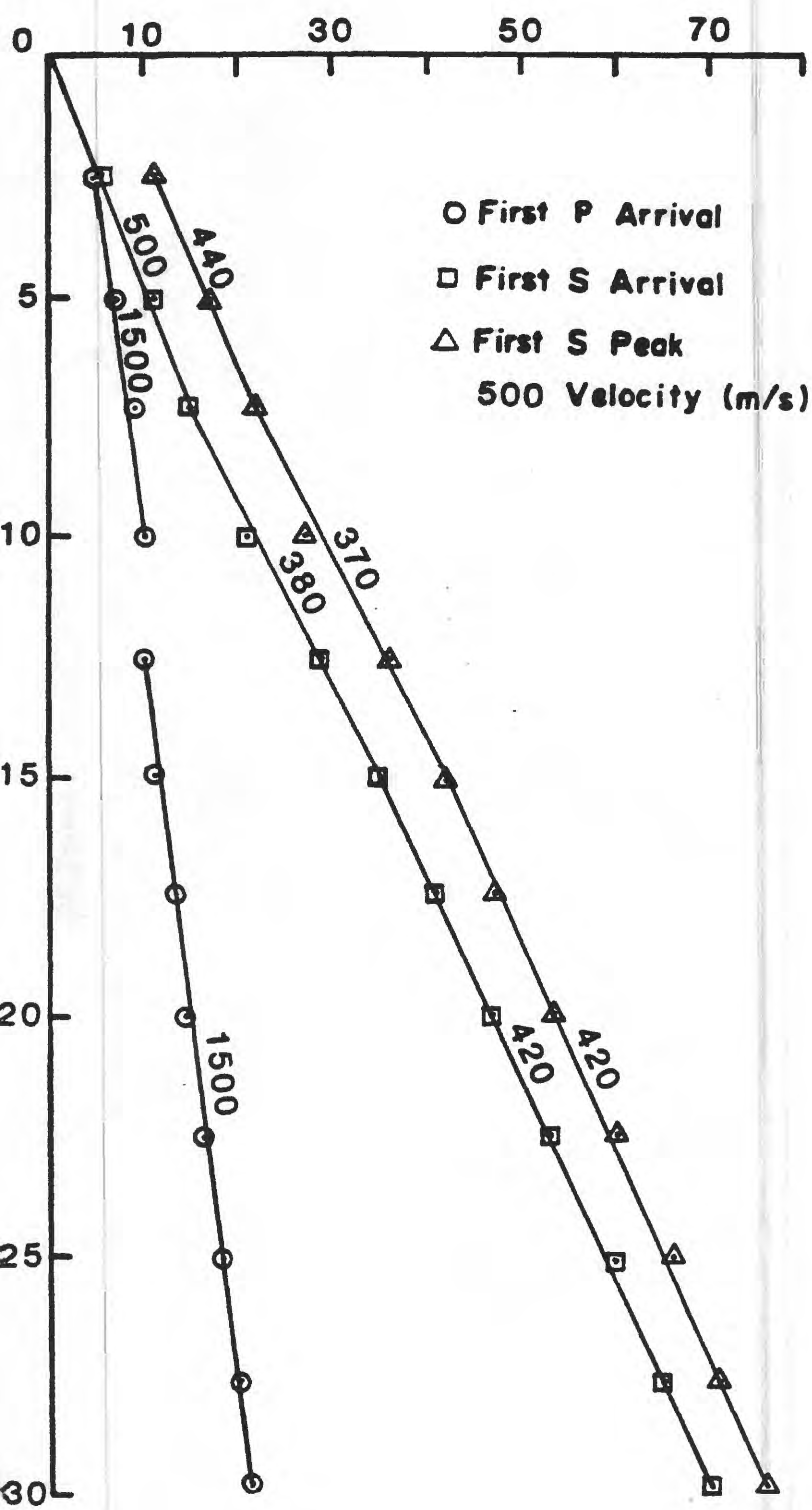

L. A. - OLIVE
SITE 49
TIME (msec)
10
30
50
70
90
DEPTH (m)
0
5
10
15
20
25
30
O First P Arrival
□ First S Arrival
△ First S Peak
250 Velocity (m/s)
250
250
420
300
300
1500
400
380
Vp
Vs
280
420
1500
250
300
400
SANDY CLAY LOAM
v. dk. greyish
brown , stiff
LOAMY SAND
yellowish brown
SILTY CLAY LOAM
greyish brown to
lt. olive brown
stiff (CL)
SILT LOAM
olive brown
SANDY GRAVEL

FIGURE 66

L. A. HILL SITE 50



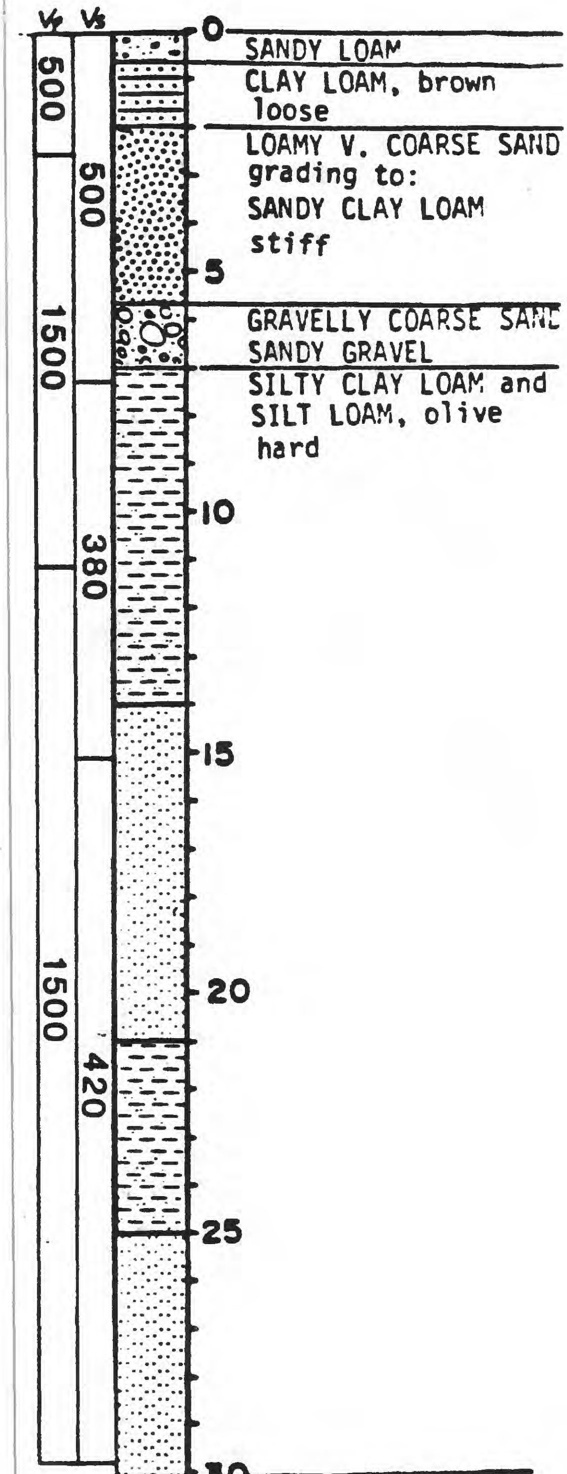
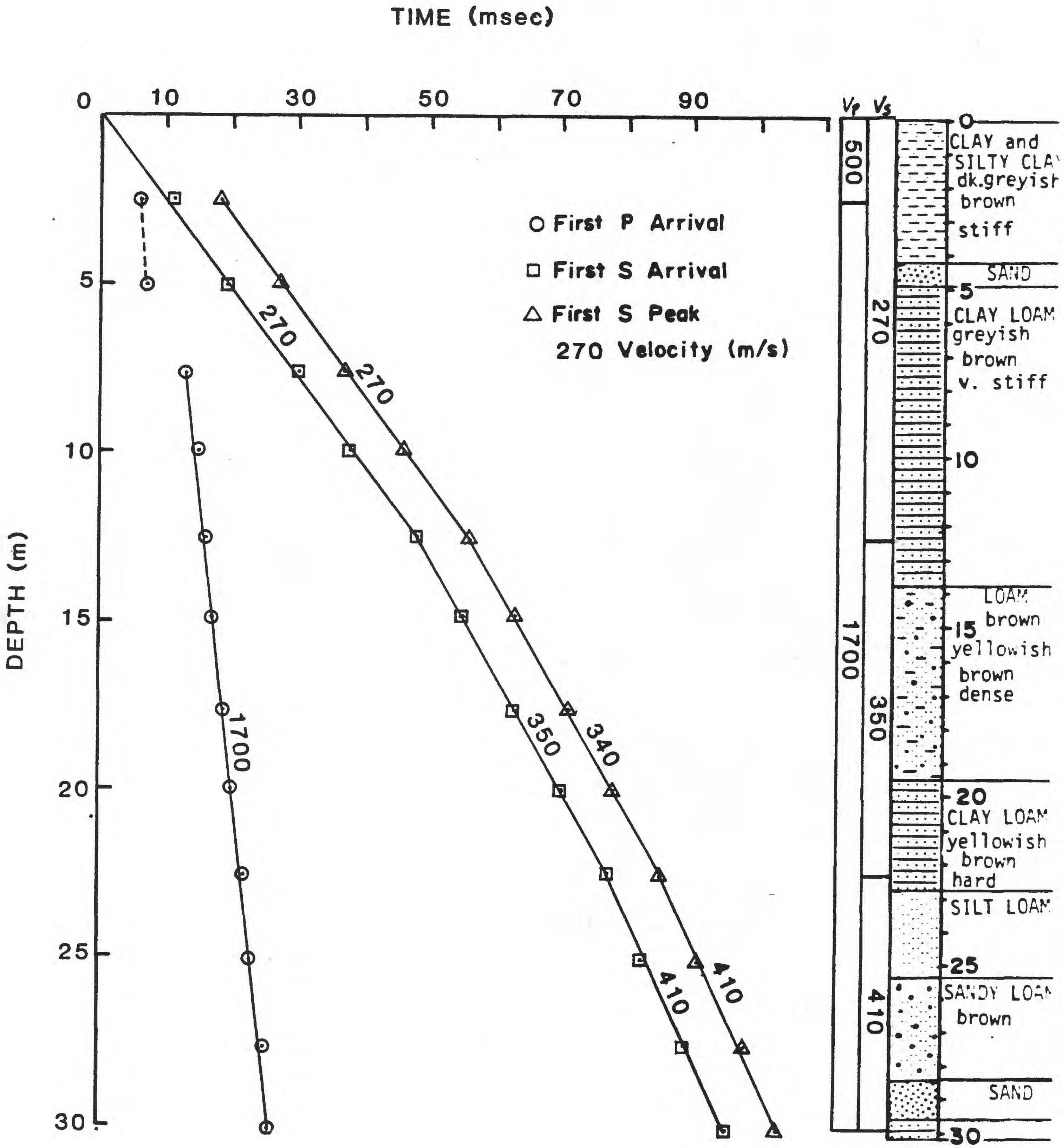


FIGURE 67

HOLLYWOOD STORAGE SITE 51



SANTA MONICA SITE 52

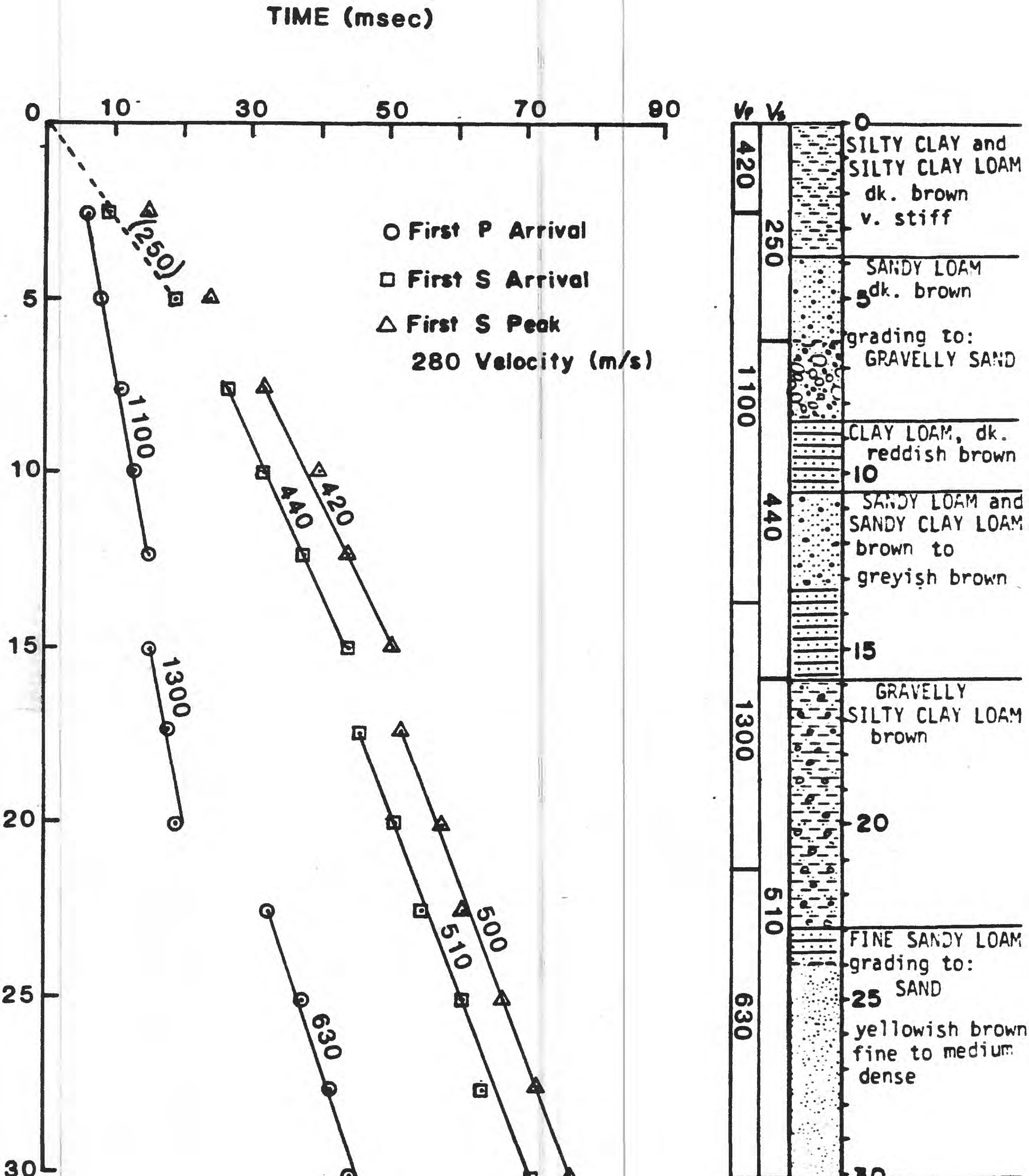


FIGURE 69

TISHMAN AIRPORT CENTER SITE 53

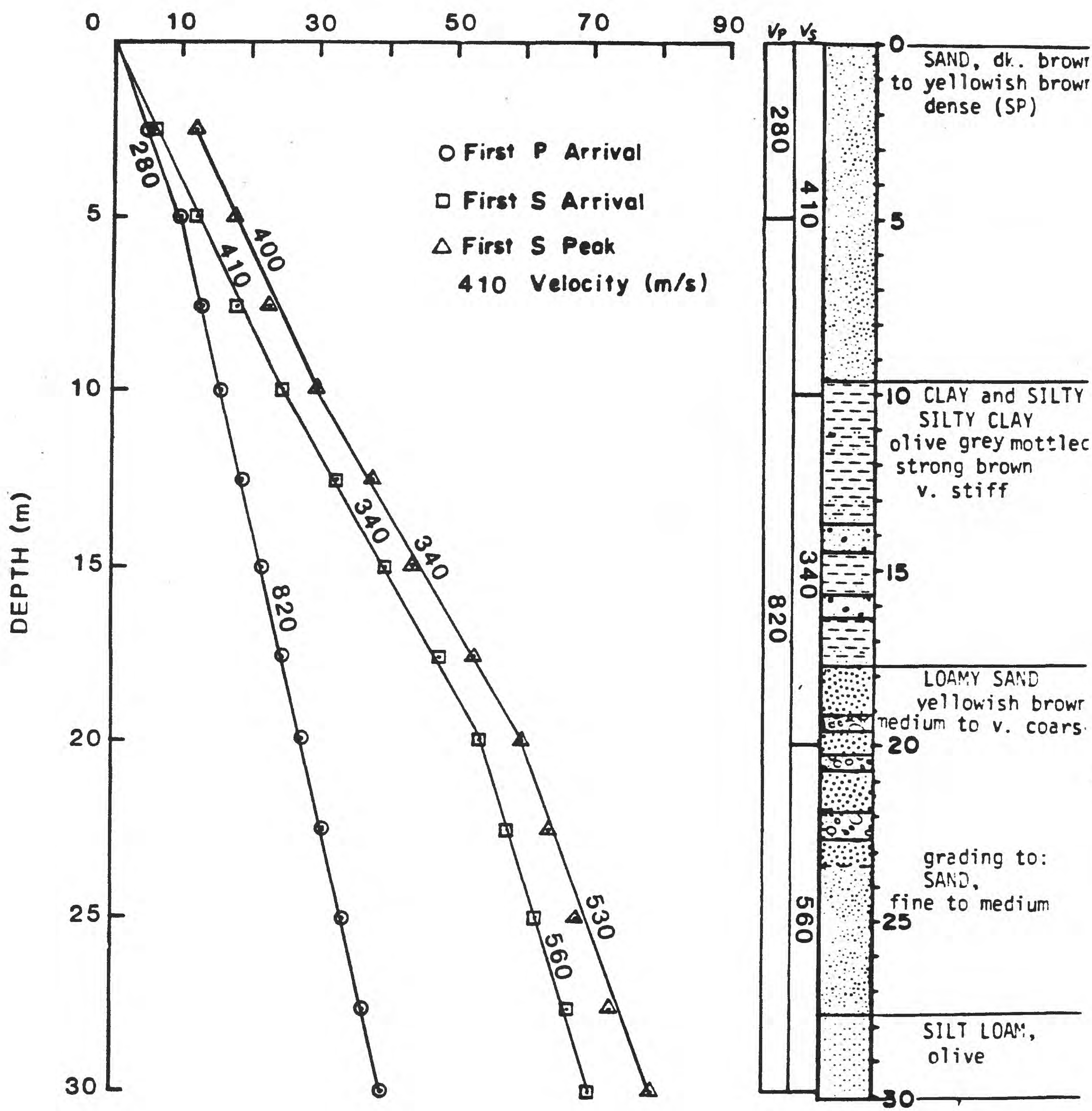


FIGURE 70

HYPERION SITE 54

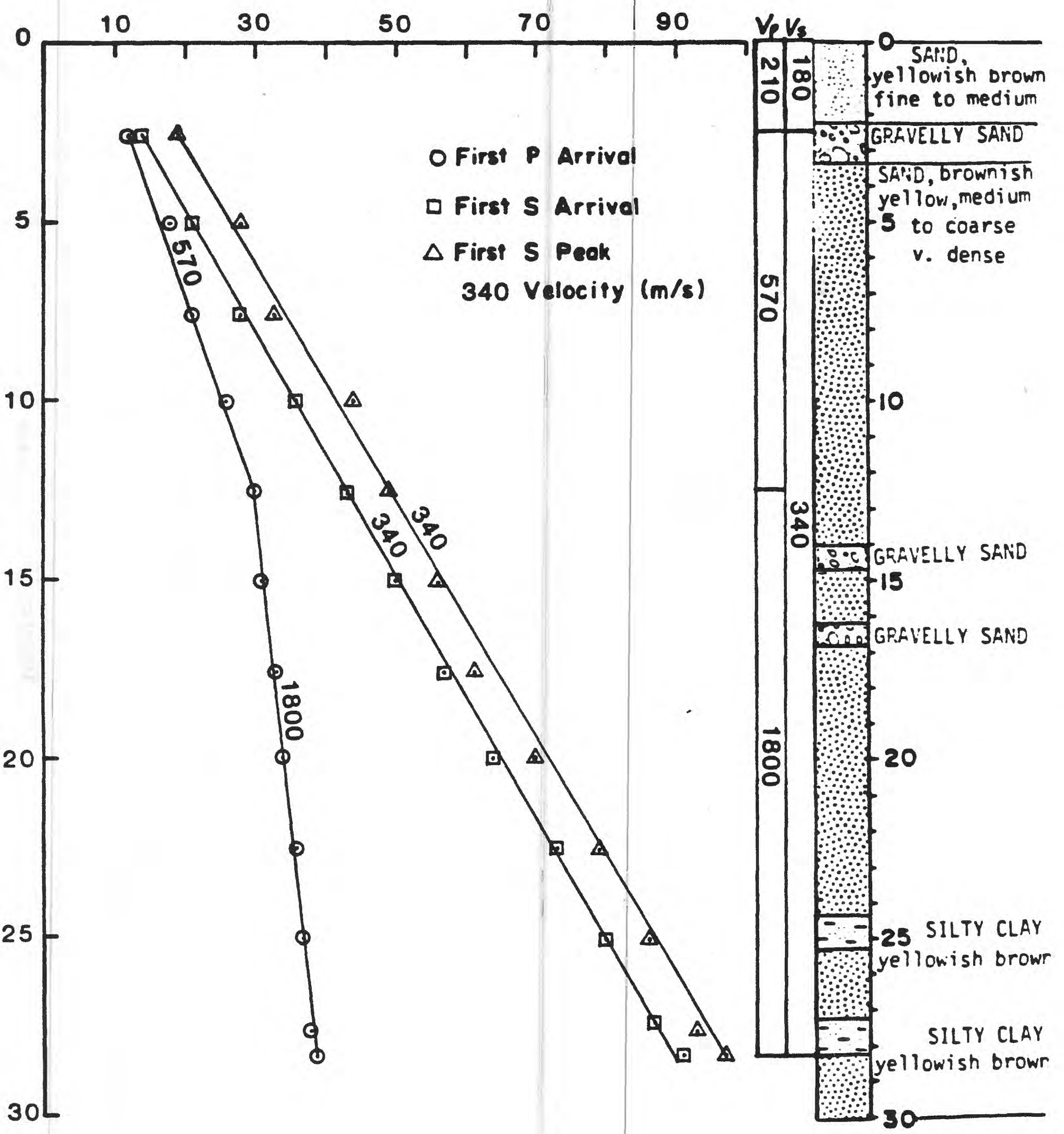


FIGURE 71

DEVONSHIRE POLICE STATION SITE 55

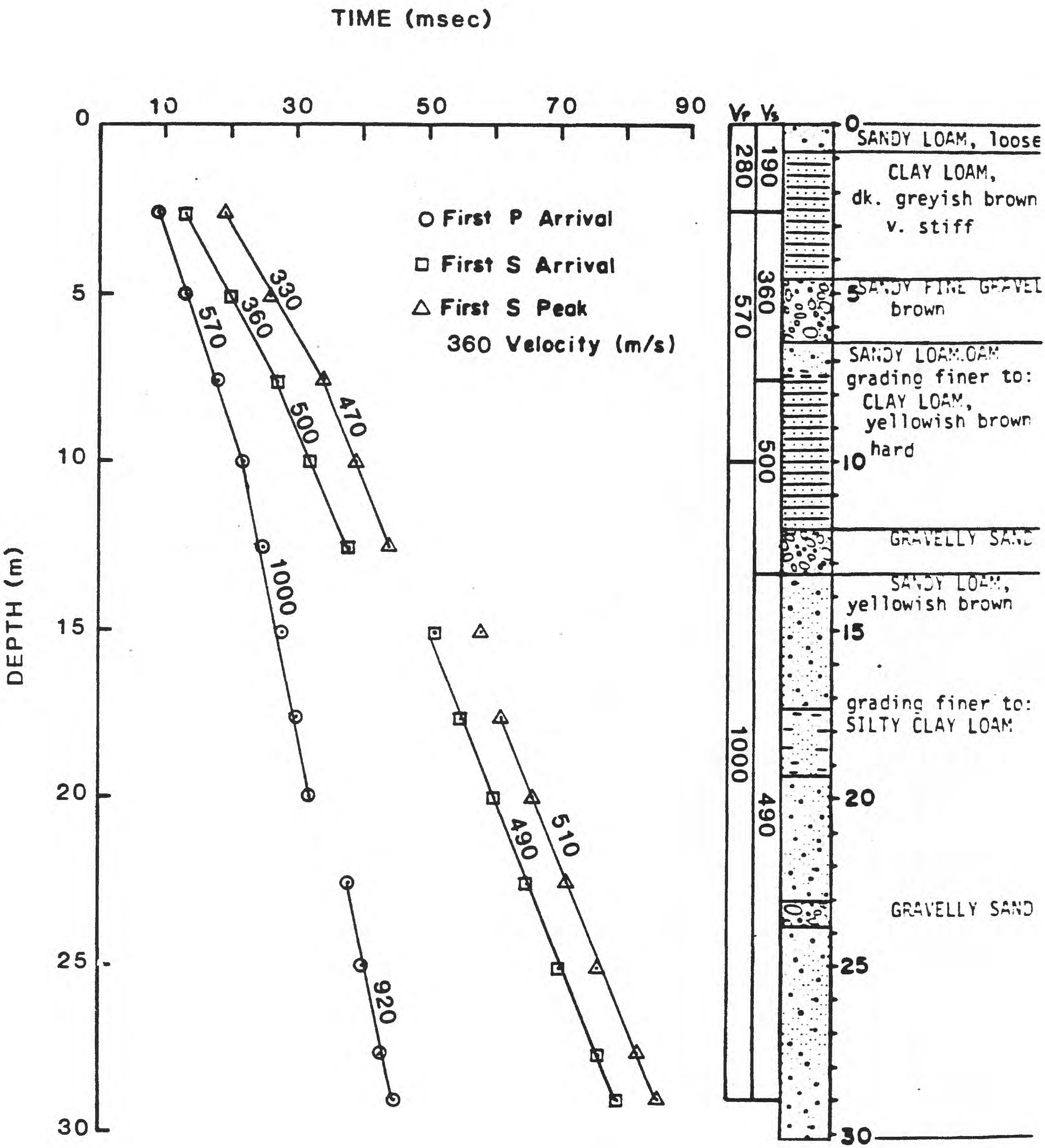


FIGURE 72

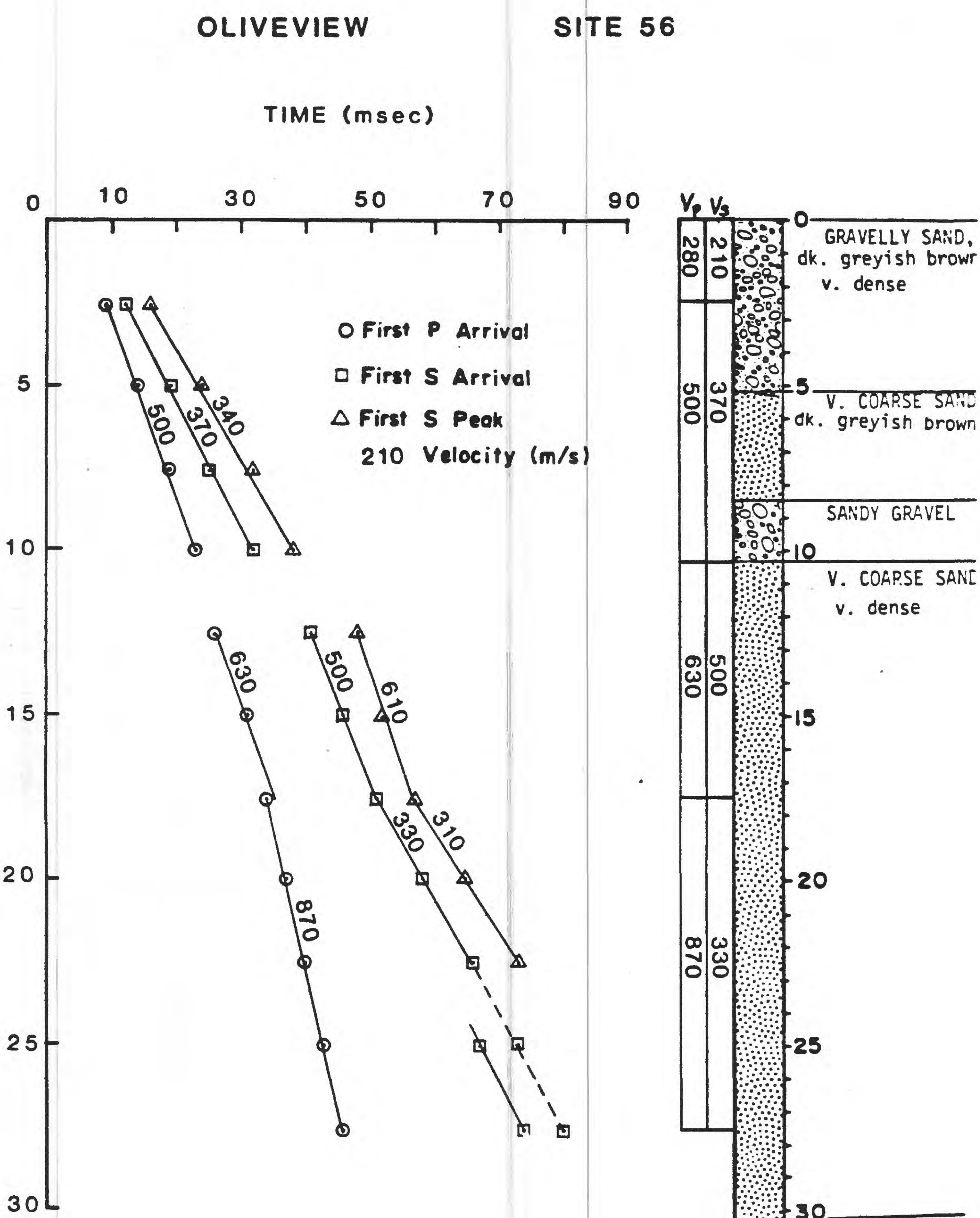

OLIVEVIEW
SITE 56
TIME (msec)
0
10
30
50
70
90
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
210 Velocity (m/s)
500
370
340
630
500
610
330
310
870
Vp
Vs
280
210
500
370
630
500
870
330
GRAVELLY SAND, dk. greyish brown v. dense
V. COARSE SAND dk. greyish brown
SANDY GRAVEL
V. COARSE SAND v. dense

FIGURE 73

MULHOLLAND JR. H. S. SITE 57

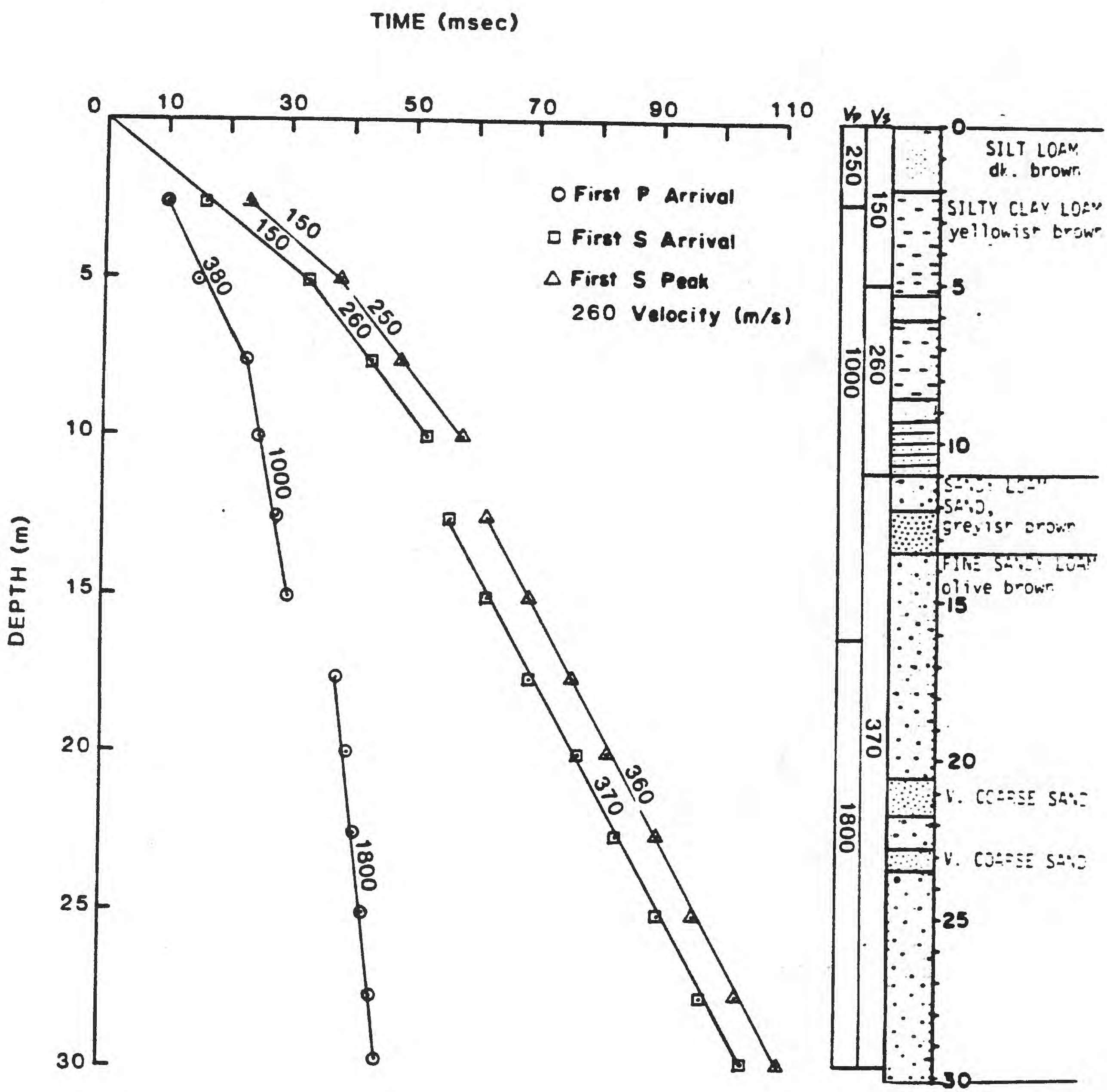


FIGURE 74

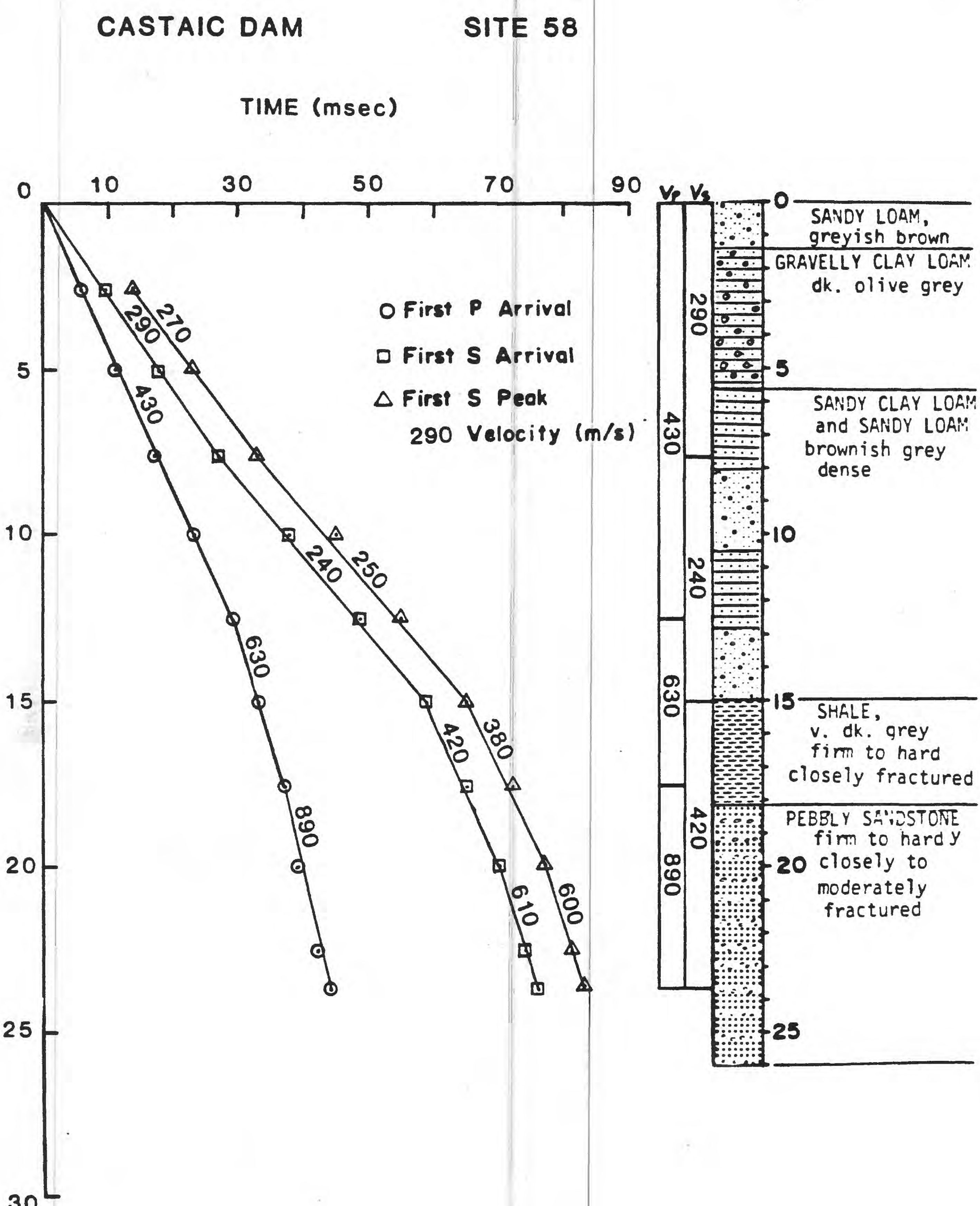

CASTAIC DAM
SITE 58
TIME (msec)
0
10
30
50
70
90
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
290 Velocity (m/s)
270
290
430
250
240
630
380
420
890
600
610
Vp
Vs
290
430
240
630
420
890
0
5
10
15
20
25
SANDY LOAM, greyish brown
GRAVELLY CLAY LOAM dk. olive grey
SANDY CLAY LOAM and SANDY LOAM brownish grey dense
SHALE, v. dk. grey firm to hard closely fractured
PEBBLY SANDSTONE firm to hardly closely to moderately fractured

FIGURE 75

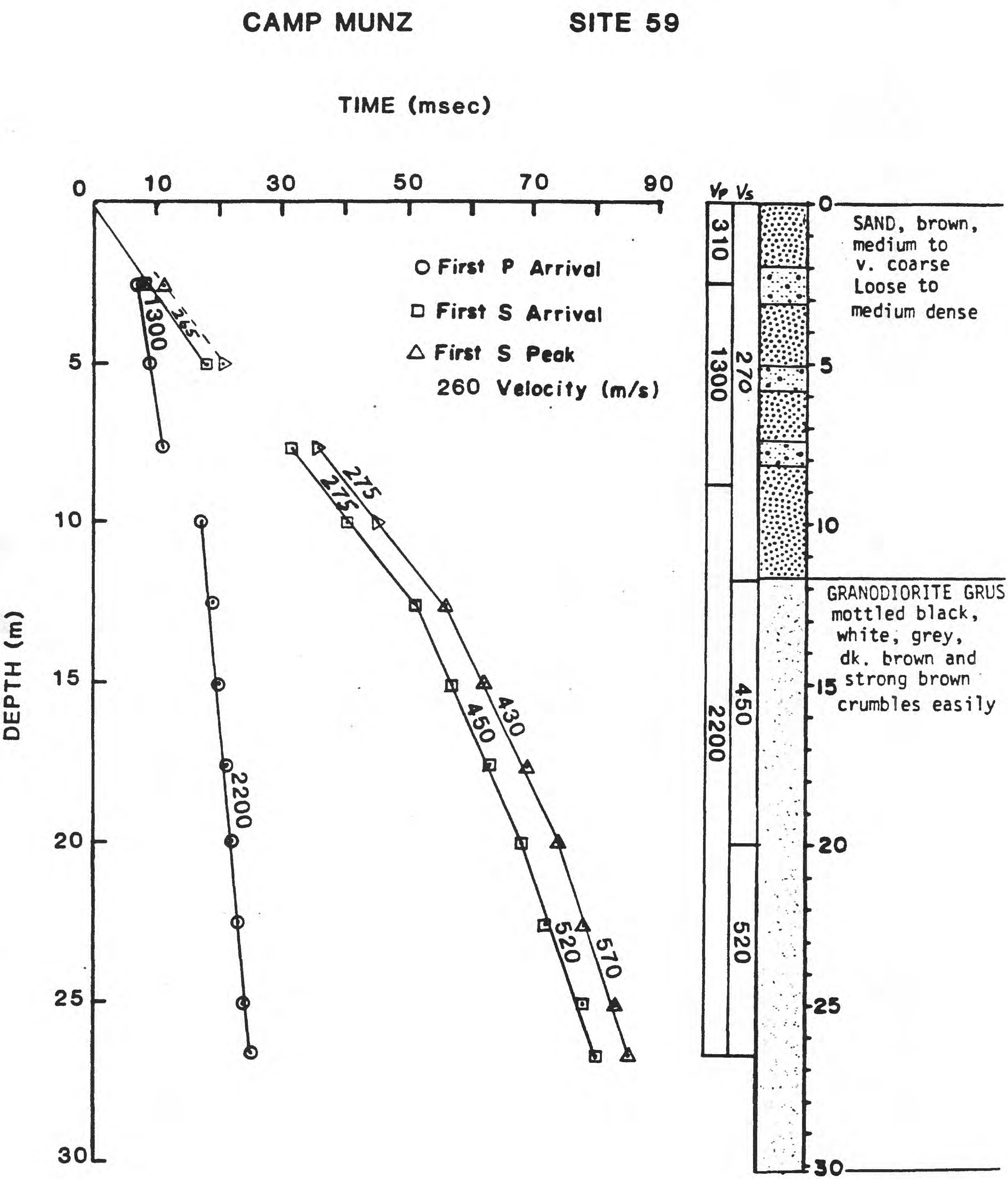

CAMP MUNZ
SITE 59
TIME (msec)
0
10
30
50
70
90
DEPTH (m)
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
260 Velocity (m/s)
1300
365
275
275
2200
430
450
520
570
Vp
Vs
310
270
1300
450
2200
520
SAND, brown, medium to v. coarse Loose to medium dense
GRANODIORITE GRUS mottled black, white, grey, dk. brown and strong brown crumbles easily

FIGURE 76

ROSAMOND DRY LAKE SITE 60

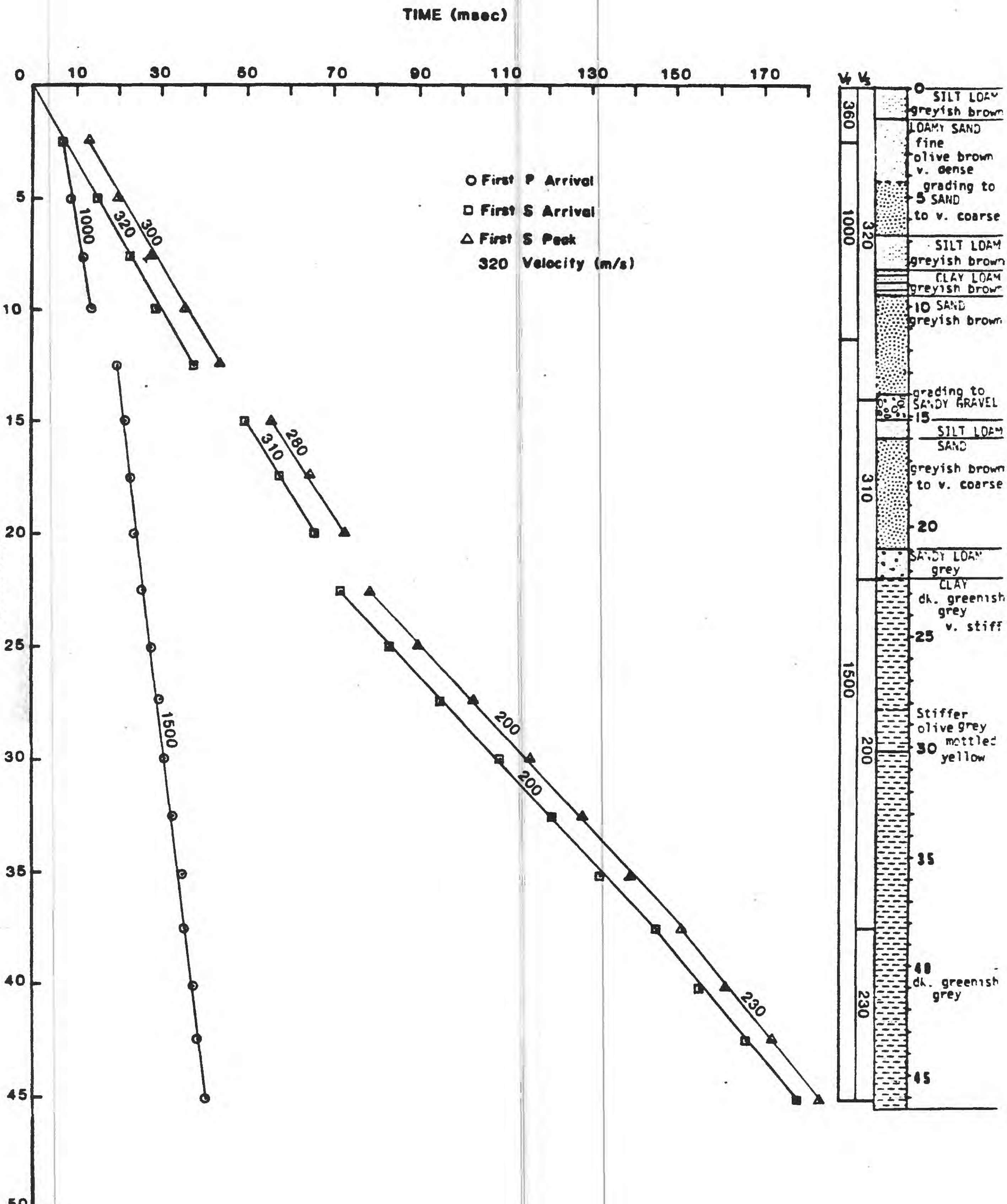


FIGURE 77

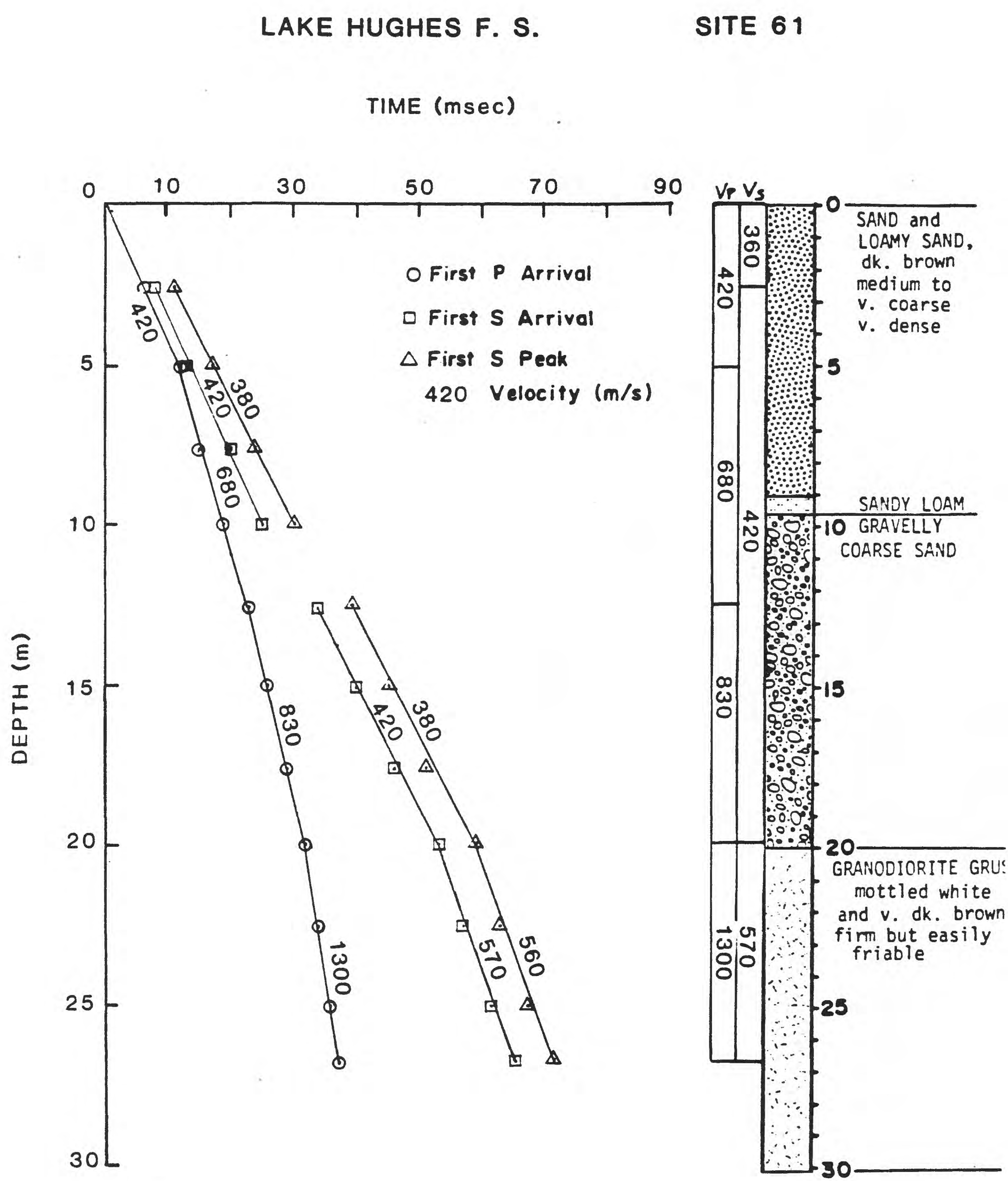

LAKE HUGHES F. S.
SITE 61
TIME (msec)
0
10
30
50
70
90
DEPTH (m)
5
10
15
20
25
30
O First P Arrival
□ First S Arrival
△ First S Peak
420 Velocity (m/s)
420
380
680
830
1300
570
560
Vp Vs
360
SAND and
LOAMY SAND,
dk. brown
medium to
v. coarse
v. dense
SANDY LOAM
GRAVELLY
COARSE SAND
GRANODIORITE GRUS
mottled white
and v. dk. brown
firm but easily
friable

FIGURE 78

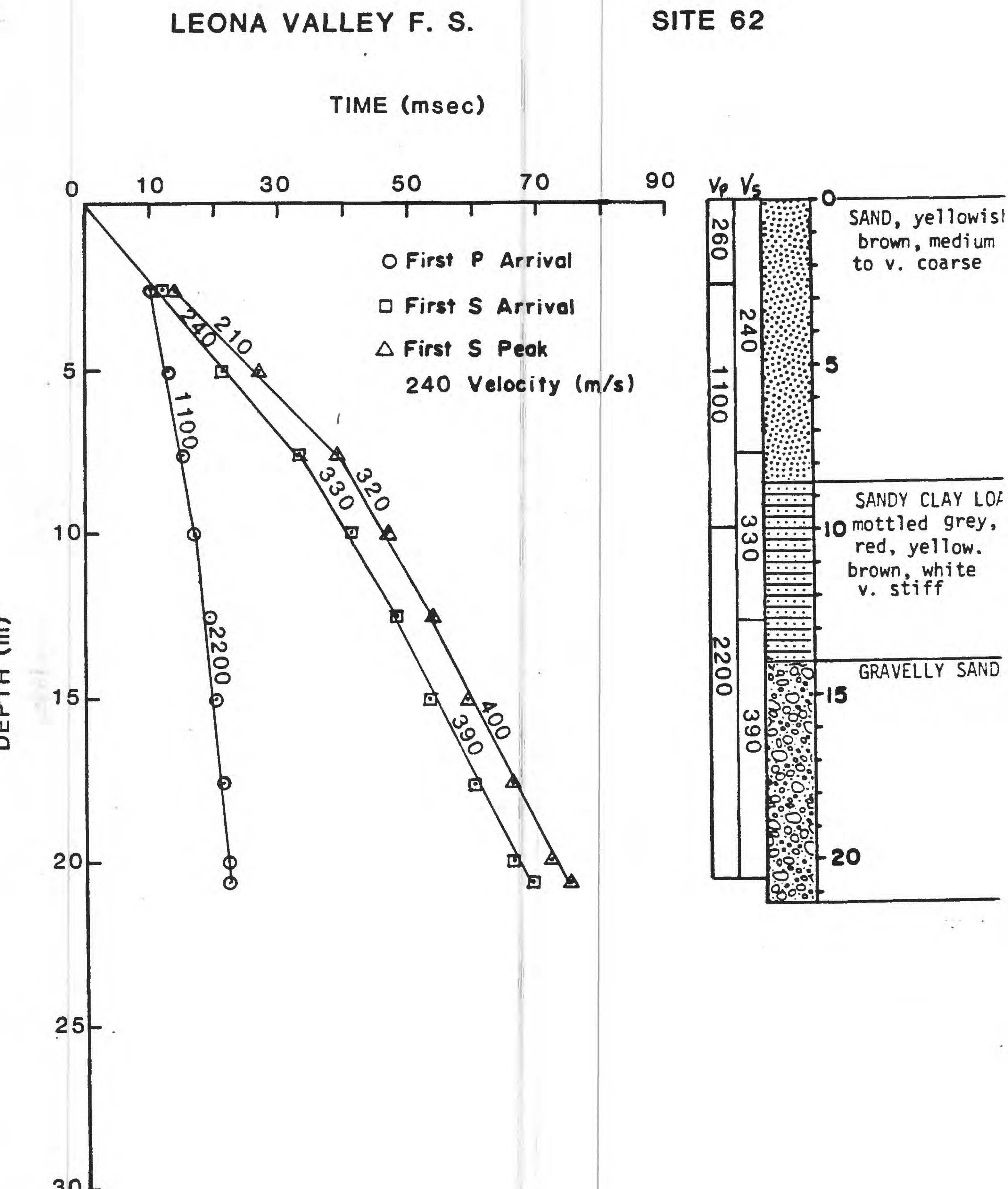

LEONA VALLEY F. S.
SITE 62
TIME (msec)
0
10
30
50
70
90
DEPTH (m)
5
10
15
20
25
30
○ First P Arrival
□ First S Arrival
△ First S Peak
240 Velocity (m/s)
210
240
1100
320
330
2200
400
390
V_p V_s
260
240
1100
330
2200
390
SAND, yellowish brown, medium to v. coarse
SANDY CLAY LOAM mottled grey, red, yellow. brown, white v. stiff
GRAVELLY SAND

FIGURE 79

LLANO NORTH SITE 63

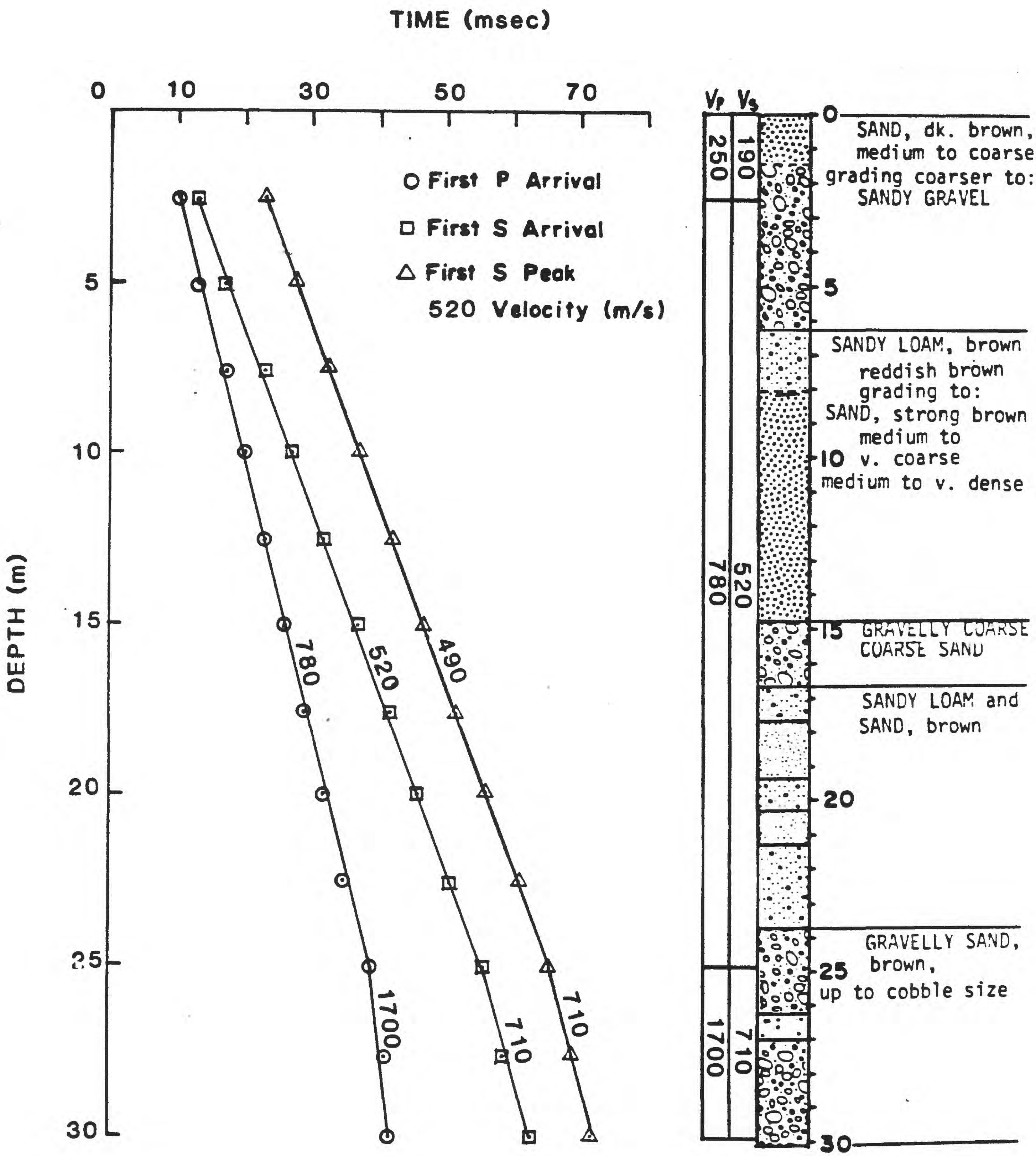


FIGURE 80

LLANO SOUTH SITE 64

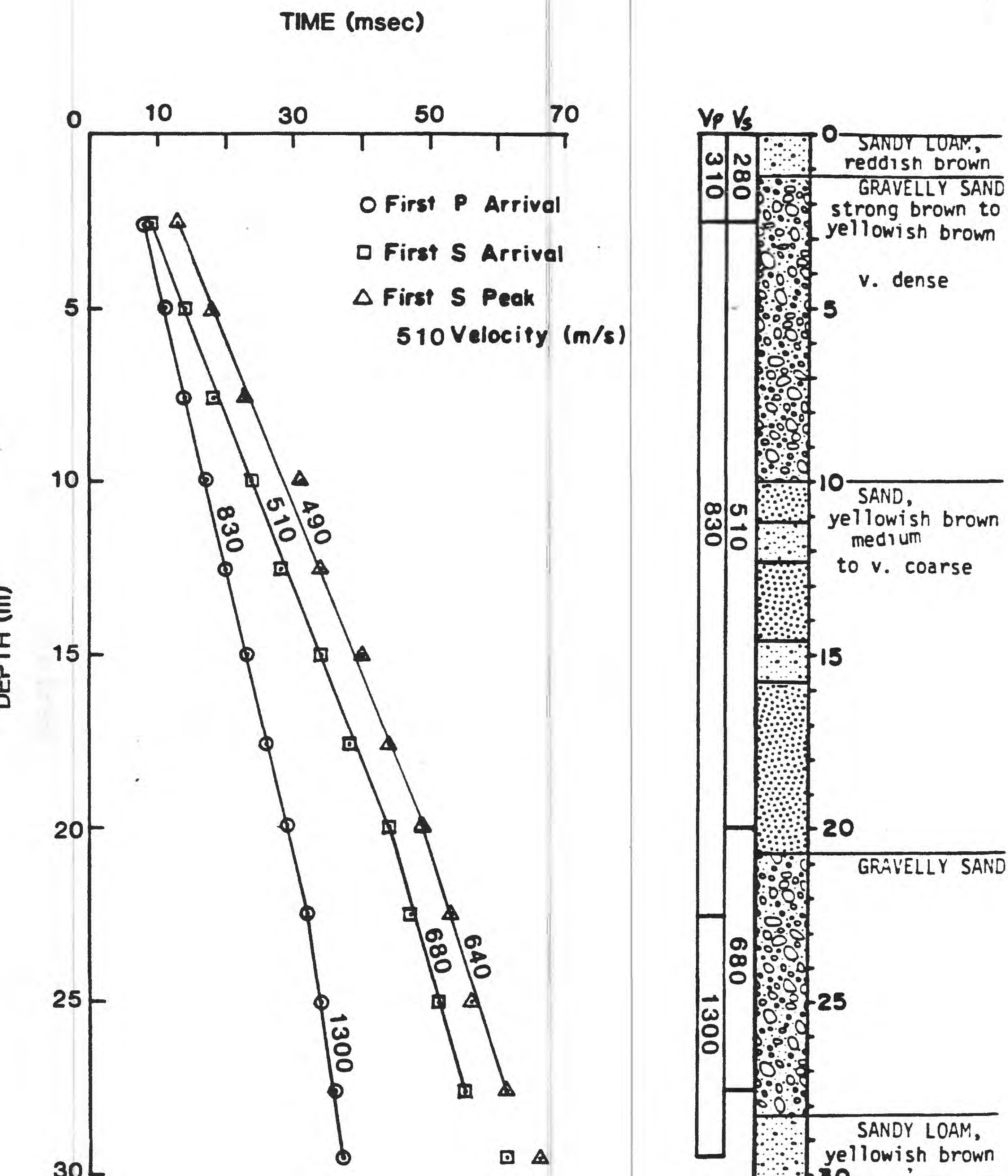


FIGURE 81

LITTLEROCK P. O.   SITE 65

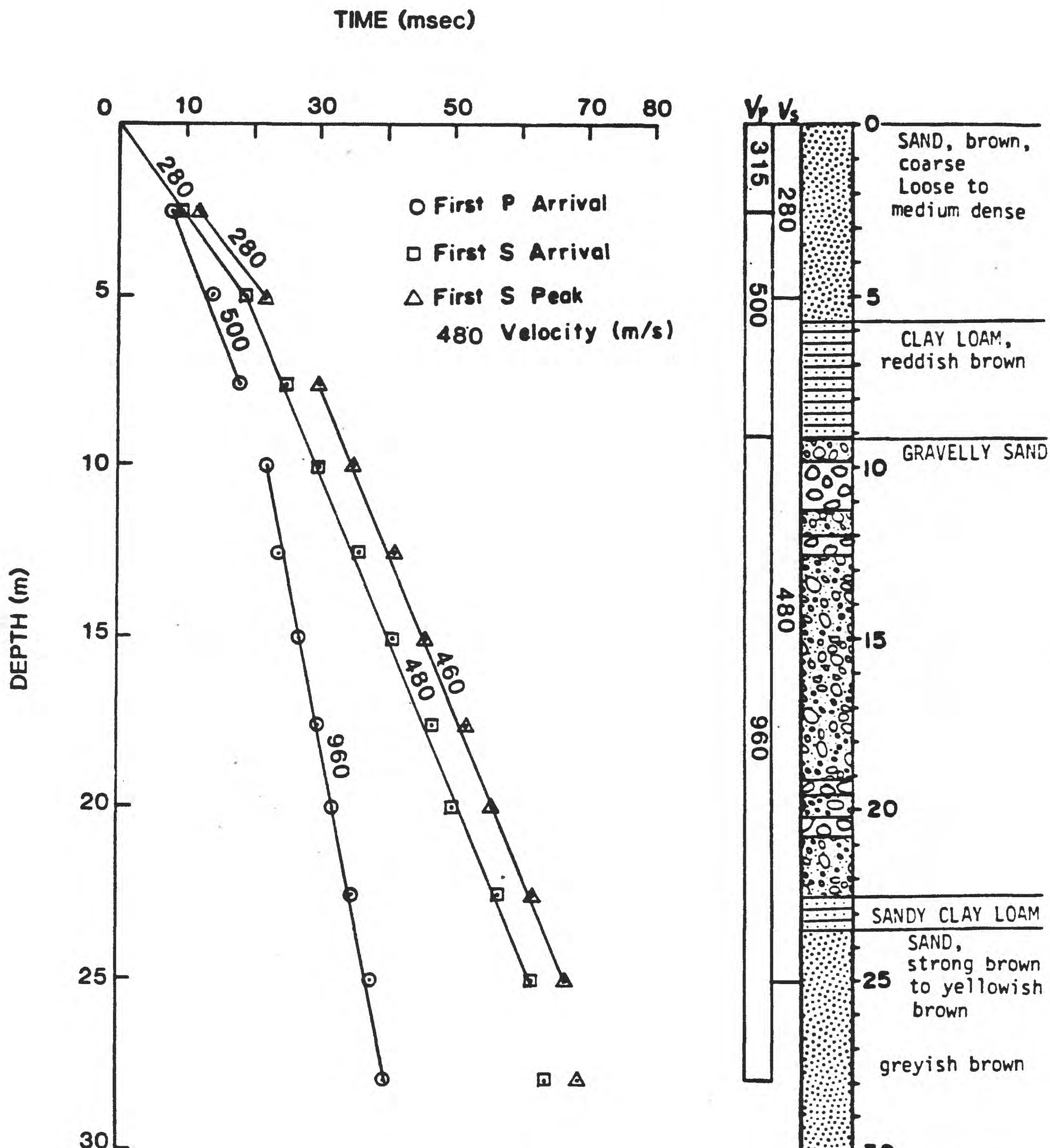


FIGURE 82

PEARBLOSSOM PUMP PLANT SITE 66

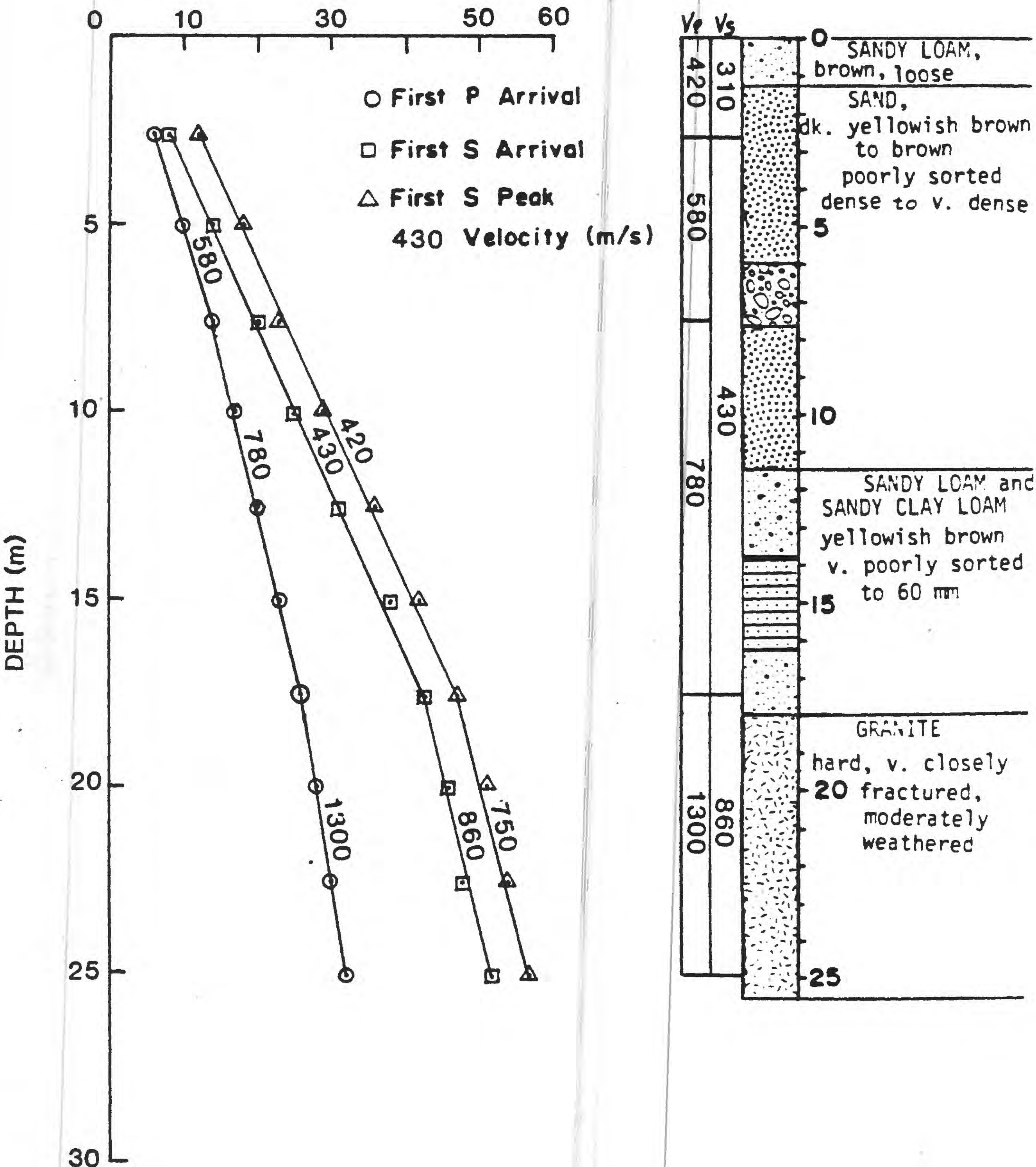


FIGURE 83

PALMDALE HOLIDAY INN SITE 67

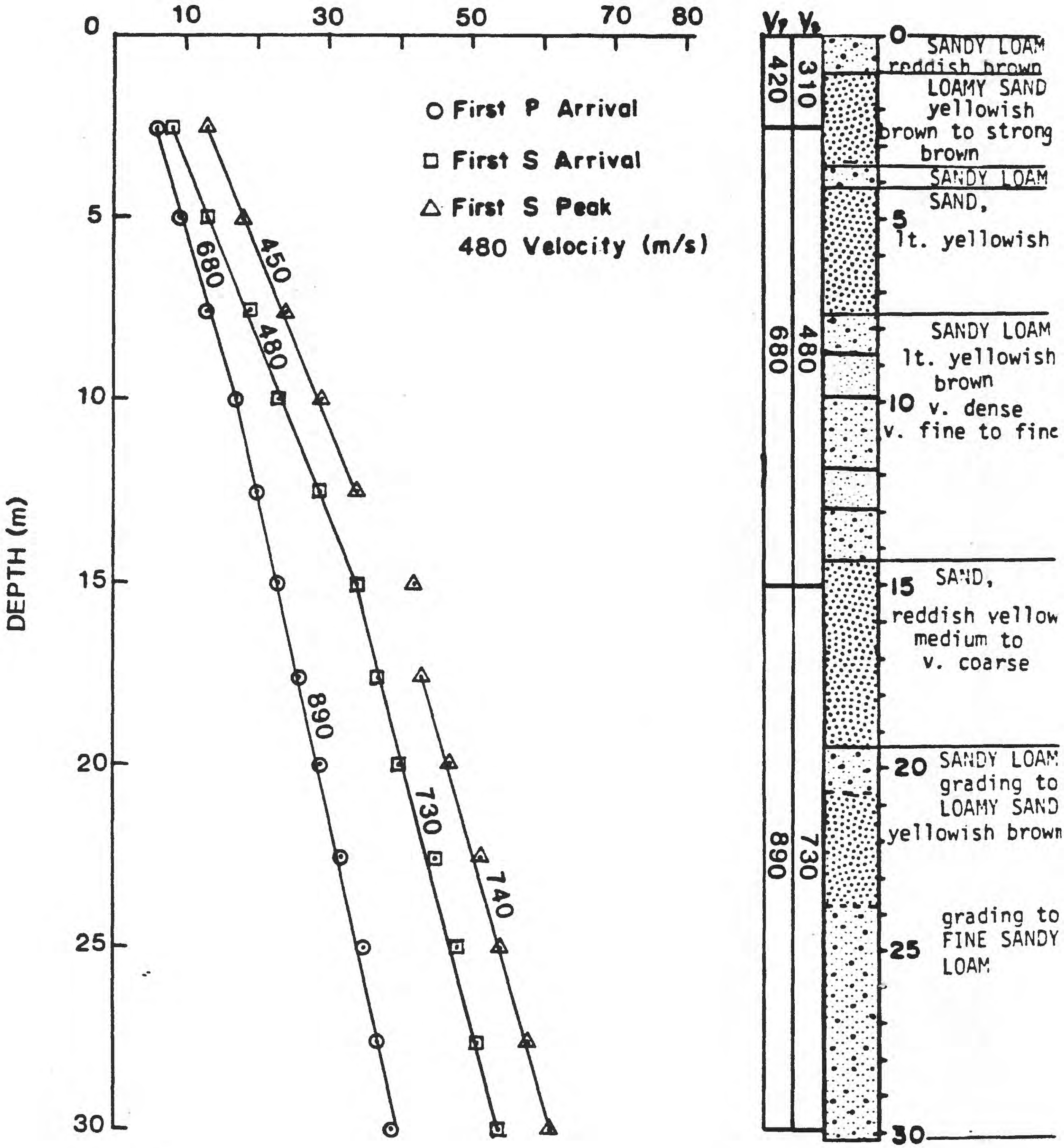
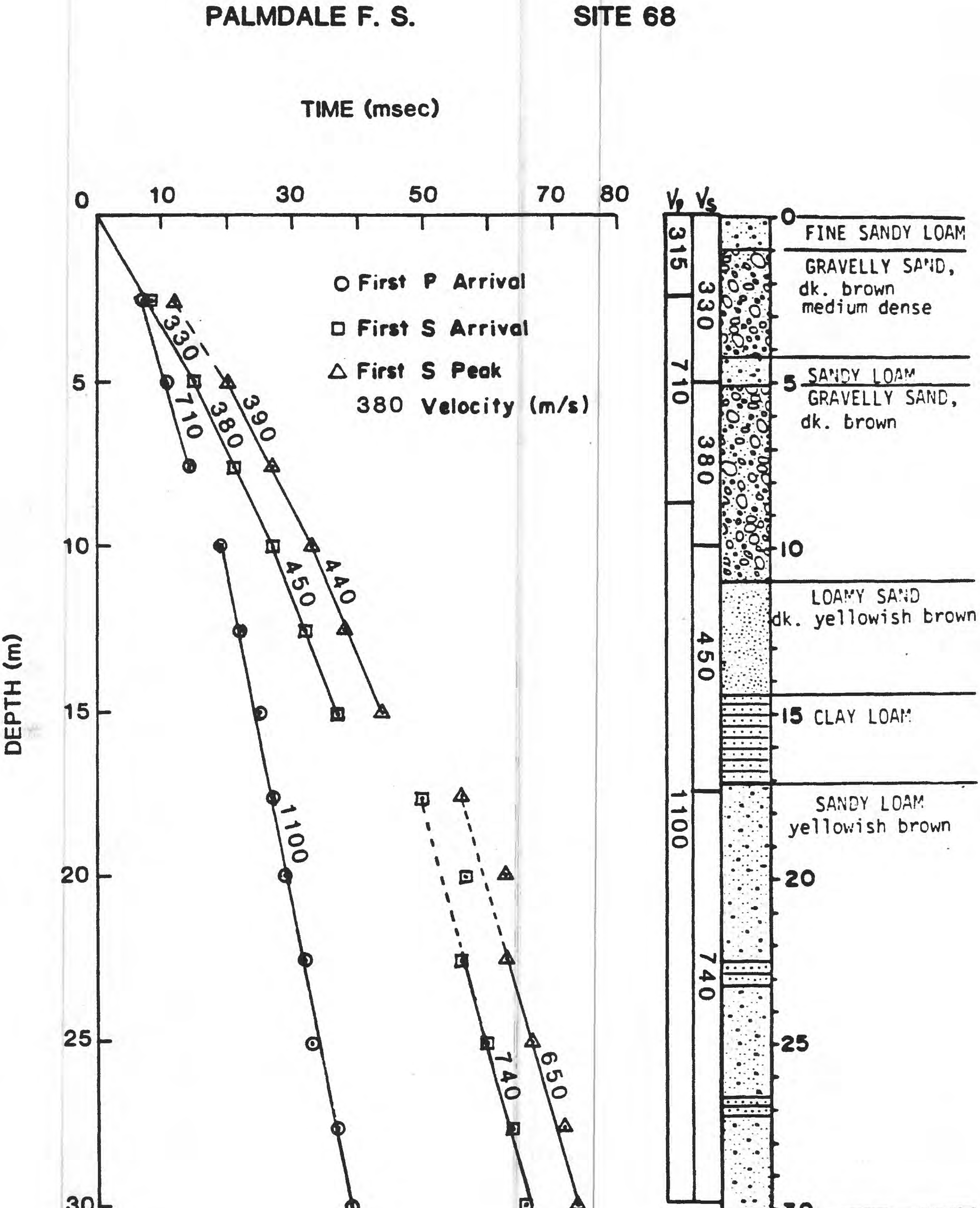


FIGURE 84



PALMDALE F. S.
SITE 68
TIME (msec)
0
10
30
50
70
80
DEPTH (m)
5
10
15
20
25
30
○ First P Arrival
□ First S Arrival
△ First S Peak
380 Velocity (m/s)
330
710
380
390
450
440
1100
740
650
V_p
V_s
315
330
710
380
450
1100
740
FINE SANDY LOAM
GRAVELLY SAND, dk. brown medium dense
SANDY LOAM
GRAVELLY SAND, dk. brown
LOAMY SAND dk. yellowish brown
CLAY LOAM
SANDY LOAM yellowish brown

FIGURE 85

TABLE 1

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 47 ALHAMBRA DATE LOGGED 10-21-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.002

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.002	0.014	0.011	230
5.0	0.002	0.023	0.022	230
7.5	0.002	0.031	0.030	250
10.0	0.002	0.037	0.037	270
12.5	0.002	0.043	0.043	290
15.0	0.002	0.046	0.046	330
17.5	0.002	0.052	0.052	340
20.0	0.002	0.057	0.057	350
22.5	0.001	0.060	0.060	380
25.0	0.001	0.064	0.064	390
27.5	0.001	0.068	0.068	400

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.020	0.016	0.012	0.009	280
5.0	0.028	0.026	0.016	0.015	330
7.5	0.036	0.035	0.020	0.019	390
10.0	0.041	0.040	0.023	0.023	430
12.5	0.047	0.047	0.027	0.027	460
15.0	0.052	0.052	0.030	0.030	500
17.5	0.057	0.057	0.034	0.034	510
20.0	0.062	0.062	0.040	0.040	500
22.5	0.067	0.067	0.043	0.043	520
25.0	0.070	0.070	0.046	0.046	540
27.5	0.074	0.074	0.050	0.050	550

TABLE 2

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 48 VERNON DATE LOGGED 10-22-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.002

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.002	0.013	0.010	250
5.0	0.002	0.024	0.022	230
7.5	0.002	0.033	0.032	230
10.0	0.002	0.042	0.041	240
12.5	0.001	0.052	0.052	240
15.0	0.002	0.059	0.059	250
17.5	0.001	0.067	0.067	260
20.0	0.002	0.073	0.073	270
22.5	0.002	0.080	0.080	280
24.0	0.002	0.085	0.085	280

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.018	0.014	0.012	0.009	280
5.0	0.028	0.026	0.014	0.013	380
7.5	0.037	0.036	0.019	0.018	420
10.0	0.048	0.047	0.024	0.024	420
12.5	0.058	0.057	0.029	0.028	450
15.0	0.065	0.065	0.028	0.028	540
17.5	0.073	0.073	0.032	0.032	550
20.0	0.080	0.080	0.037	0.037	540
22.5	0.086	0.086	0.038	0.038	590
24.0	0.091	0.091	0.041	0.041	590

TABLE 3

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 49 IA-CLIVE DATE LOGGED 10-22-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.006

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.005	0.011	0.009	280
5.0	0.005	0.020	0.019	260
7.5	0.006	0.030	0.023	260
10.0	0.005	0.035	0.035	290
12.5	0.006	0.043	0.043	290
15.0	0.005	0.051	0.051	290
17.5	0.006	0.060	0.060	290
20.0	0.006	0.067	0.067	300
22.5	0.006	0.070	0.070	320
25.0	0.006	0.076	0.076	330
27.5	0.006	0.087	0.087	320
30.0	0.006	0.089	0.089	340

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.019	0.015	0.011	0.009	280
5.0	0.028	0.026	0.015	0.014	360
7.5	0.036	0.035	0.022	0.021	360
10.0	0.041	0.041	0.023	0.023	430
12.5	0.050	0.050	0.025	0.025	500
15.0	0.058	0.058	0.027	0.027	560
17.5	0.066	0.066	0.028	0.028	630
20.0	0.073	0.073	0.030	0.030	670
22.5	0.080	0.080	0.031	0.031	730
25.0	0.085	0.085	0.033	0.033	760
27.5	0.093	0.093	0.035	0.035	790
30.0	0.095	0.095	0.036	0.036	830

TABLE 4

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 50 LA-HILL DATE LOGGED 10-23-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.003	0.008	0.006	420
5.0	0.004	0.012	0.011	450
7.5	0.003	0.016	0.016	470
10.0	0.005	0.021	0.021	480
12.5	0.003	0.030	0.030	420
15.0	0.002	0.035	0.035	430
17.5	0.003	0.041	0.041	430
20.0	0.002	0.047	0.047	430
22.5	0.002	0.054	0.054	420
25.0	0.002	0.060	0.060	420
27.5	0.002	0.065	0.065	420
29.8	0.004	0.070	0.070	430

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.014	0.011	0.007	0.005	500
5.0	0.016	0.015	0.008	0.007	710
7.5	0.023	0.022	0.009	0.009	830
10.0	0.027	0.027	0.010	0.010	1000
12.5	0.037	0.037	0.010	0.010	1300
15.0	0.042	0.042	0.011	0.011	1400
17.5	0.047	0.047	0.013	0.013	1300
20.0	0.053	0.053	0.014	0.014	1400
22.5	0.060	0.060	0.016	0.016	1400
25.0	0.066	0.066	0.018	0.018	1400
27.5	0.071	0.071	0.020	0.020	1400
29.8	0.076	0.076	0.021	0.021	1400

TABLE 5

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 51 HOLLYWOOD STORAGE DATE LOGGED 10-24-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.003	0.014	0.011	230
5.0	0.003	0.021	0.019	260
7.5	0.003	0.031	0.030	250
10.0	0.003	0.039	0.038	260
12.5	0.003	0.048	0.047	270
15.0	0.004	0.056	0.055	270
17.5	0.003	0.063	0.062	280
20.0	0.003	0.070	0.069	290
22.5	0.003	0.077	0.076	300
25.0	0.003	0.082	0.081	310
27.5	0.003	0.089	0.088	310
30.0	0.006	0.095	0.094	320

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.023	0.018	0.007	0.005	500
5.0	0.029	0.027	0.008	0.007	710
7.5	0.038	0.036	0.013	0.013	580
10.0	0.047	0.046	0.015	0.015	670
12.5	0.056	0.055	0.016	0.016	780
15.0	0.064	0.063	0.017	0.017	880
17.5	0.071	0.070	0.018	0.018	970
20.0	0.078	0.077	0.020	0.020	1000
22.5	0.085	0.084	0.022	0.022	1000
25.0	0.091	0.090	0.023	0.023	1100
27.5	0.098	0.097	0.025	0.025	1100
30.0	0.103	0.102	0.026	0.026	1200

TABLE 6

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 52   SANTA MONICA-WILSHIRE   DATE LOGGED 10-27-80
PLANK DIST= 2.0   PLATE DIST= 2.0   AVE ORIGIN CORR= 0.002

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.002	0.012	0.009	280
5.0	0.002	0.021	0.019	260
7.5	0.002	0.028	0.027	280
10.0	0.002	0.033	0.032	310
12.5	0.002	0.038	0.038	330
15.0	0.002	0.044	0.044	340
17.5	0.002	0.046	0.046	380
20.0	0.002	0.051	0.051	390
22.5	0.002	0.055	0.055	410
25.0	0.002	0.061	0.061	410
27.5	0.002	0.064	0.064	430
30.0	0.002	0.071	0.071	420

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.019	0.015	0.008	0.006	420
5.0	0.026	0.024	0.009	0.008	630
7.5	0.033	0.032	0.011	0.011	680
10.0	0.041	0.040	0.013	0.013	770
12.5	0.044	0.043	0.015	0.015	830
15.0	0.051	0.051	0.015	0.015	1000
17.5	0.052	0.052	0.018	0.018	970
20.0	0.058	0.058	0.019	0.019	1100
22.5	0.061	0.061	0.033	0.033	680
25.0	0.067	0.067	0.038	0.038	660
27.5	0.072	0.072	0.042	0.042	650
30.0	0.077	0.077	0.045	0.045	670

TABLE 7

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 53 TISHMAN AIRPORT CENTER DATE LOGGED 10-28-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.002	0.008	0.007	360
5.0	0.003	0.013	0.012	420
7.5	0.003	0.019	0.019	390
10.0	0.003	0.025	0.025	400
12.5	0.003	0.033	0.033	380
15.0	0.003	0.040	0.040	380
17.5	0.003	0.048	0.048	360
20.0	0.004	0.054	0.054	370
22.5	0.002	0.058	0.058	390
25.0	0.002	0.062	0.062	400
27.5	0.002	0.067	0.067	410
30.0	0.002	0.072	0.072	420

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.015	0.012	0.007	0.005	500
5.0	0.019	0.018	0.010	0.009	560
7.5	0.024	0.024	0.013	0.013	580
10.0	0.031	0.031	0.016	0.016	630
12.5	0.038	0.038	0.019	0.019	660
15.0	0.044	0.044	0.022	0.022	680
17.5	0.053	0.053	0.025	0.025	700
20.0	0.060	0.060	0.028	0.028	710
22.5	0.064	0.064	0.031	0.031	730
25.0	0.068	0.068	0.034	0.034	740
27.5	0.073	0.073	0.037	0.037	740
30.0	0.079	0.079	0.040	0.040	750

TABLE 8

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 54 HYPERION DATE LOGGED 10-28-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.006

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.006	0.018	0.014	180
5.0	0.006	0.022	0.020	250
7.5	0.006	0.029	0.028	270
10.0	0.006	0.037	0.036	280
12.5	0.006	0.044	0.043	290
15.0	0.006	0.050	0.049	310
17.5	0.006	0.057	0.057	310
20.0	0.006	0.064	0.064	310
22.5	0.006	0.073	0.073	310
25.0	0.006	0.080	0.080	310
27.5	0.007	0.087	0.087	320
28.4	0.006	0.091	0.091	310

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.024	0.019	0.015	0.012	210
5.0	0.030	0.028	0.019	0.018	280
7.5	0.034	0.033	0.022	0.021	360
10.0	0.045	0.044	0.027	0.026	380
12.5	0.050	0.049	0.030	0.030	420
15.0	0.057	0.056	0.031	0.031	480
17.5	0.061	0.061	0.033	0.033	530
20.0	0.070	0.070	0.034	0.034	590
22.5	0.079	0.079	0.036	0.036	630
25.0	0.086	0.086	0.037	0.037	680
27.5	0.093	0.093	0.038	0.038	720
28.4	0.097	0.097	0.039	0.039	730

TABLE 9

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 55 DEVONSHIRE POLICE STA DATE LOGGED 10-29-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.004

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.004	0.017	0.013	190
5.0	0.006	0.022	0.020	250
7.5	0.005	0.028	0.027	280
10.0	0.004	0.033	0.032	310
12.5	0.004	0.038	0.037	340
15.0	0.005	0.051	0.050	300
17.5	0.005	0.055	0.054	320
20.0	0.005	0.060	0.059	340
22.5	0.004	0.064	0.064	350
25.0	0.004	0.069	0.069	360
27.5	0.004	0.075	0.075	370
29.0	0.004	0.078	0.078	370

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.024	0.018	0.011	0.009	280
5.0	0.028	0.026	0.014	0.013	380
7.5	0.035	0.033	0.019	0.018	420
10.0	0.040	0.039	0.022	0.022	450
12.5	0.045	0.044	0.025	0.025	500
15.0	0.059	0.058	0.028	0.028	540
17.5	0.060	0.060	0.030	0.030	580
20.0	0.065	0.065	0.032	0.032	630
22.5	0.070	0.070	0.038	0.038	590
25.0	0.075	0.075	0.040	0.040	630
27.5	0.081	0.081	0.043	0.043	640
29.0	0.084	0.084	0.045	0.045	640

TABLE 10

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 56   OLIVE VIEW   DATE LOGGED 10-29-80
PLANK DIST= 2.0   PLATE DIST= 2.0   AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.006	0.015	0.012	210
5.0	0.005	0.020	0.018	280
7.5	0.005	0.026	0.025	300
10.0	0.005	0.033	0.032	310
12.5	0.005	0.042	0.041	300
15.0	0.005	0.046	0.045	330
17.5	0.005	0.051	0.051	340
20.0	0.005	0.058	0.058	340
22.5	0.005	0.066	0.066	340
25.0	0.005	0.067	0.067	370
27.5	0.006	0.074	0.074	370
28.8	0.005	0.071	0.071	410

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.021	0.016	0.012	0.009	280
5.0	0.026	0.024	0.015	0.014	360
7.5	0.033	0.032	0.020	0.019	350
10.0	0.039	0.038	0.024	0.024	420
12.5	0.049	0.048	0.026	0.026	480
15.0	0.052	0.051	0.031	0.031	480
17.5	0.057	0.056	0.034	0.034	510
20.0	0.065	0.065	0.037	0.037	540
22.5	0.073	0.073	0.040	0.040	560
25.0	0.073	0.073	0.042	0.042	600
27.5	0.080	0.080	0.046	0.046	600
28.8	0.080	0.080	0.047	0.047	610

TABLE 11

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 57 FUIHCLLAND JHS DATE LOGGED 10-30-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.005	0.021	0.016	160
5.0	0.006	0.036	0.033	150
7.5	0.006	0.045	0.043	170
10.0	0.006	0.053	0.052	190
12.5	0.005	0.057	0.056	220
15.0	0.005	0.063	0.062	240
17.5	0.006	0.069	0.068	260
20.0	0.005	0.077	0.076	260
22.5	0.005	0.083	0.082	270
25.0	0.005	0.090	0.089	280
27.5	0.005	0.096	0.095	290
29.8	0.005	0.104	0.103	290

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.030	0.023	0.013	0.010	250
5.0	0.041	0.038	0.017	0.016	310
7.5	0.050	0.048	0.024	0.023	330
10.0	0.059	0.058	0.026	0.025	400
12.5	0.063	0.062	0.028	0.028	450
15.0	0.070	0.069	0.030	0.030	500
17.5	0.076	0.075	0.038	0.038	460
20.0	0.082	0.081	0.040	0.040	500
22.5	0.090	0.089	0.041	0.041	550
25.0	0.096	0.095	0.041	0.041	610
27.5	0.103	0.102	0.044	0.044	630
29.8	0.111	0.110	0.045	0.045	660

TABLE 12

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 58 CASTAIC DATE LOGGED 10-30-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.005	0.013	0.010	250
5.0	0.005	0.019	0.018	280
7.5	0.006	0.028	0.027	280
10.0	0.005	0.039	0.038	260
12.5	0.006	0.049	0.048	260
15.0	0.005	0.059	0.058	260
17.5	0.004	0.065	0.064	270
20.0	0.005	0.070	0.070	290
22.6	0.005	0.074	0.074	310
23.6	0.005	0.076	0.076	310

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.018	0.014	0.008	0.006	420
5.0	0.025	0.023	0.012	0.011	450
7.5	0.034	0.033	0.018	0.017	440
10.0	0.046	0.045	0.023	0.023	430
12.5	0.055	0.054	0.029	0.029	430
15.0	0.064	0.063	0.033	0.033	450
17.5	0.072	0.071	0.037	0.037	470
20.0	0.077	0.077	0.039	0.039	510
22.6	0.081	0.081	0.042	0.042	540
23.6	0.083	0.083	0.044	0.044	540

TABLE 13

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 59 CAMP MUNZ DATE LOGGED 10-30-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.003	0.010	0.008	310
5.0	0.003	0.019	0.018	275
7.5	0.003	0.033	0.032	235
10.0	0.003	0.042	0.041	245
12.5	0.003	0.052	0.051	250
15.0	0.003	0.058	0.058	260
17.5	0.003	0.063	0.063	280
20.0	0.003	0.068	0.068	290
22.5	0.002	0.072	0.072	310
25.0	0.003	0.078	0.078	320
26.5	0.003	0.080	0.080	330

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.014	0.011	0.009	0.007	360
5.0	0.022	0.021	0.010	0.009	560
7.5	0.038	0.037	0.011	0.011	680
10.0	0.047	0.046	0.017	0.017	590
12.5	0.057	0.056	0.019	0.019	660
15.0	0.063	0.063	0.020	0.020	750
17.5	0.069	0.069	0.021	0.021	830
20.0	0.074	0.074	0.022	0.022	910
22.5	0.078	0.078	0.023	0.023	980
25.0	0.083	0.083	0.024	0.024	1000
26.5	0.085	0.085	0.025	0.025	1100

TABLE 14

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 60 ROSAMOND DRY LAKE DATE LOGGED 11-4-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.004

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.004	0.009	0.007	360
5.0	0.004	0.016	0.015	330
7.5	0.004	0.024	0.023	330
10.0	0.004	0.030	0.029	340
12.5	0.004	0.039	0.039	320
15.0	0.004	0.050	0.050	300
17.5	0.004	0.058	0.058	300
20.0	0.005	0.066	0.066	300
22.5	0.004	0.072	0.072	310
25.0	0.004	0.083	0.083	300
27.5	0.004	0.096	0.096	290
30.0	0.004	0.109	0.109	280
32.5	0.004	0.121	0.121	270
35.0	0.004	0.132	0.132	270
37.5	0.004	0.145	0.145	260
40.0	0.003	0.155	0.155	260
42.5	0.004	0.166	0.166	260
45.0	0.004	0.178	0.178	250

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.015	0.012	0.009	0.007	360
5.0	0.022	0.020	0.010	0.009	560
7.5	0.029	0.028	0.012	0.012	630
10.0	0.037	0.036	0.014	0.014	710
12.5	0.045	0.044	0.020	0.020	630
15.0	0.056	0.056	0.022	0.022	680
17.5	0.065	0.065	0.023	0.023	760
20.0	0.073	0.073	0.024	0.024	830
22.5	0.079	0.079	0.026	0.026	870
25.0	0.090	0.090	0.028	0.028	890
27.5	0.103	0.103	0.030	0.030	920
30.0	0.116	0.116	0.031	0.031	970
32.5	0.128	0.128	0.033	0.033	980
35.0	0.139	0.139	0.035	0.035	1000
37.5	0.151	0.151	0.036	0.036	1000
40.0	0.161	0.161	0.038	0.038	1100
42.5	0.172	0.172	0.039	0.039	1100
45.0	0.183	0.183	0.041	0.041	1100

TABLE 15

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 61 LAKE HUGHES F S DATE LOGGED 11-5-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.006	0.010	0.007	360
5.0	0.006	0.014	0.013	380
7.5	0.005	0.021	0.020	380
10.0	0.005	0.026	0.025	400
12.5	0.006	0.035	0.034	370
15.0	0.006	0.040	0.039	380
17.5	0.005	0.046	0.045	390
20.0	0.005	0.053	0.052	380
22.5	0.005	0.057	0.056	380
25.0	0.005	0.061	0.060	400
26.7	0.005	0.065	0.064	420

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.014	0.011	0.009	0.007	360
5.0	0.018	0.016	0.013	0.012	420
7.5	0.025	0.024	0.016	0.015	500
10.0	0.031	0.030	0.019	0.019	530
12.5	0.039	0.038	0.023	0.023	540
15.0	0.045	0.044	0.026	0.026	580
17.5	0.051	0.050	0.029	0.029	600
20.0	0.059	0.058	0.032	0.032	630
22.5	0.063	0.062	0.034	0.034	660
25.0	0.067	0.066	0.036	0.036	690
26.7	0.071	0.070	0.037	0.037	720

TABLE 16

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 62 LEONA VALLEY DATE LOGGED 11-5-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.003	0.015	0.012	210
5.0	0.003	0.023	0.021	240
7.5	0.003	0.034	0.033	230
10.0	0.003	0.042	0.041	240
12.5	0.003	0.049	0.048	260
15.0	0.003	0.053	0.053	280
17.5	0.003	0.060	0.060	290
20.0	0.003	0.066	0.066	300
20.7	0.003	0.069	0.069	300

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.019	0.015	0.013	0.010	250
5.0	0.029	0.027	0.014	0.013	380
7.5	0.040	0.039	0.016	0.015	500
10.0	0.048	0.047	0.017	0.017	590
12.5	0.055	0.054	0.019	0.019	660
15.0	0.060	0.059	0.020	0.020	750
17.5	0.066	0.066	0.021	0.021	830
20.0	0.072	0.072	0.022	0.022	910
20.7	0.075	0.075	0.022	0.022	940

TABLE 17

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 63 LLANO NORTH DATE LOGGED 11-6-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.004

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.004	0.017	0.013	190
5.0	0.004	0.018	0.017	290
7.5	0.004	0.024	0.023	330
10.0	0.004	0.028	0.027	370
12.5	0.004	0.032	0.032	390
15.0	0.004	0.037	0.037	410
17.5	0.004	0.042	0.042	420
20.0	0.004	0.046	0.046	430
22.5	0.004	0.051	0.051	440
25.0	0.004	0.056	0.056	450
27.5	0.004	0.059	0.059	470
30.0	0.004	0.063	0.063	480

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.024	0.019	0.013	0.010	250
5.0	0.024	0.022	0.014	0.013	380
7.5	0.029	0.028	0.018	0.017	440
10.0	0.034	0.033	0.020	0.020	500
12.5	0.039	0.039	0.023	0.023	540
15.0	0.043	0.043	0.026	0.026	580
17.5	0.049	0.049	0.029	0.029	600
20.0	0.053	0.053	0.032	0.032	630
22.5	0.059	0.059	0.036	0.036	630
25.0	0.064	0.064	0.039	0.039	640
27.5	0.067	0.067	0.041	0.041	670
30.0	0.071	0.071	0.042	0.042	710

TABLE 18

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 64 LLANO SOUTH DATE LOGGED 11-6-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.003	0.012	0.009	280
5.0	0.003	0.015	0.014	360
7.5	0.003	0.020	0.019	390
10.0	0.003	0.026	0.025	400
12.5	0.003	0.028	0.028	450
15.0	0.003	0.034	0.034	440
17.5	0.003	0.038	0.038	460
20.0	0.004	0.044	0.044	450
22.5	0.003	0.047	0.047	480
25.0	0.003	0.051	0.051	490
27.5	0.003	0.055	0.055	500
29.3	0.003	0.061	0.061	480

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.017	0.013	0.010	0.008	310
5.0	0.019	0.018	0.012	0.011	450
7.5	0.025	0.024	0.015	0.014	540
10.0	0.032	0.031	0.017	0.017	590
12.5	0.034	0.033	0.020	0.020	630
15.0	0.040	0.040	0.023	0.023	650
17.5	0.044	0.044	0.026	0.026	670
20.0	0.049	0.049	0.029	0.029	690
22.5	0.053	0.053	0.032	0.032	700
25.0	0.056	0.056	0.034	0.034	740
27.5	0.061	0.061	0.036	0.036	760
29.3	0.066	0.066	0.037	0.037	790

TABLE 19

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 65   LITTLEROCK P O   DATE LOGGED 11-7-80
PLANK DIST= 2.0   PLATE DIST= 2.0   AVE ORIGIN CORR= 0.004

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.003	0.011	0.008	310
5.0	0.003	0.020	0.018	280
7.5	0.004	0.026	0.025	300
10.0	0.004	0.031	0.030	330
12.5	0.004	0.036	0.035	360
15.0	0.004	0.041	0.040	380
17.5	0.005	0.047	0.046	380
20.0	0.005	0.050	0.049	410
22.5	0.005	0.057	0.056	400
25.0	0.006	0.062	0.061	410
27.8	0.005	0.064	0.063	440

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.016	0.012	0.010	0.008	310
5.0	0.024	0.022	0.015	0.014	360
7.5	0.031	0.030	0.019	0.018	420
10.0	0.036	0.035	0.022	0.022	450
12.5	0.041	0.040	0.024	0.024	520
15.0	0.046	0.045	0.027	0.027	560
17.5	0.052	0.051	0.030	0.030	580
20.0	0.056	0.055	0.032	0.032	630
22.5	0.062	0.061	0.035	0.035	640
25.0	0.067	0.066	0.038	0.038	660
27.8	0.069	0.068	0.040	0.040	700

TABLE 20

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 66 PEARBLOSSOM PUMP PLANT DATE LOGGED 11-7-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.005	0.010	0.008	310
5.0	0.005	0.015	0.014	360
7.5	0.004	0.021	0.020	380
10.0	0.005	0.025	0.024	420
12.5	0.004	0.031	0.031	400
15.0	0.006	0.038	0.038	390
17.5	0.005	0.043	0.043	410
20.0	0.005	0.046	0.046	430
22.5	0.005	0.048	0.048	470
25.0	0.007	0.052	0.052	480

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.015	0.012	0.008	0.006	420
5.0	0.019	0.018	0.011	0.010	500
7.5	0.024	0.023	0.013	0.013	580
10.0	0.030	0.029	0.017	0.017	590
12.5	0.036	0.035	0.020	0.020	630
15.0	0.042	0.042	0.023	0.023	650
17.5	0.047	0.047	0.026	0.026	670
20.0	0.051	0.051	0.028	0.028	710
22.5	0.054	0.054	0.030	0.030	750
25.0	0.057	0.057	0.032	0.032	780

TABLE 21

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 67 PALMDALE HOLIDAY INN DATE LOGGED 11-8-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.006

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.006	0.010	0.008	310
5.0	0.006	0.014	0.013	380
7.5	0.006	0.020	0.019	390
10.0	0.006	0.023	0.023	430
12.5	0.006	0.029	0.029	430
15.0	0.006	0.034	0.034	440
17.5	0.005	0.037	0.037	470
20.0	0.006	0.040	0.040	500
22.5	0.005	0.045	0.045	500
25.0	0.007	0.048	0.048	520
27.5	0.006	0.051	0.051	540
30.0	0.005	0.054	0.054	560

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.017	0.013	0.008	0.006	420
5.0	0.019	0.018	0.010	0.009	560
7.5	0.025	0.024	0.013	0.013	580
10.0	0.030	0.030	0.017	0.017	590
12.5	0.034	0.034	0.020	0.020	630
15.0	0.042	0.042	0.023	0.023	650
17.5	0.043	0.043	0.026	0.026	670
20.0	0.047	0.047	0.028	0.028	710
22.5	0.051	0.051	0.032	0.032	700
25.0	0.054	0.054	0.035	0.035	710
27.5	0.058	0.058	0.037	0.037	740
30.0	0.061	0.061	0.039	0.039	770

TABLE 22

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 68 PALMDALE P S DATE LOGGED 11-8-80
PLANK DIST= 2.0 PLATE DIST= 2.0 AVE ORIGIN CORR= 0.006

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.005	0.010	0.008	310
5.0	0.006	0.016	0.015	330
7.5	0.005	0.022	0.022	340
10.0	0.006	0.028	0.028	360
12.5	0.005	0.032	0.032	390
15.0	0.005	0.039	0.039	380
17.5	0.005	0.050	0.050	350
20.0	0.006	0.057	0.057	350
22.5	0.006	0.056	0.056	400
25.0	0.007	0.060	0.060	420
27.5	0.005	0.064	0.064	430
30.0	0.006	0.066	0.066	450

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.5	0.016	0.013	0.010	0.008	310
5.0	0.022	0.021	0.013	0.012	420
7.5	0.028	0.027	0.016	0.015	500
10.0	0.034	0.034	0.020	0.020	500
12.5	0.038	0.038	0.022	0.022	570
15.0	0.045	0.045	0.025	0.025	600
17.5	0.056	0.056	0.027	0.027	650
20.0	0.063	0.063	0.029	0.029	690
22.5	0.063	0.063	0.032	0.032	700
25.0	0.067	0.067	0.033	0.033	760
27.5	0.072	0.072	0.037	0.037	740
30.0	0.074	0.074	0.039	0.039	770

TABLE 23

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 47 ALHAMBRA

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)	FIRST S PEAK INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.002	260	(240, 290)	0.006	260	(250, 270)
7.5-20.0	6	0.015	480	(460, 500)	0.019	460	(450, 470)
20.0-27.5	4	0.027	680	(650, 710)	0.031	630	(590, 680)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.004	500	(450, 570)
7.5-17.5	5	0.008	680	(660, 690)
20.0-27.5	4	0.013	760	(720, 800)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
260	2.5- 7.5	500	2.5- 7.5					0.308
480	7.5-20.0	680	7.5-17.5	15.3	2.12	4800	3200	-.002
680	20.0-27.5	760	20.0-27.5					*****

TABLE 24

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 48 VERNON

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0- 7.5	3	-.001	230	(220, 240)	0.004	230	(220, 240)
7.5-12.5	3	0.002	250	(240, 270)	0.004	230	(230, 240)
12.5-17.5	3	0.014	330	(320, 350)	0.019	330	(320, 340)
17.5-24.0	4	0.018	360	(350, 380)	0.025	370	(350, 380)

		FIRST P ARRIVAL		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-12.5	5	0.004	510	(490, 530)
15.0-20.0	3	0.001	560	(520, 590)
15.0-20.0	3	0.001	560	(520, 590)
15.0-20.0	3	0.001	560	(520, 590)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
230	0.0- 7.5	510	2.5-12.5					0.376
250	7.5-12.5	560	15.0-20.0	9.2	1.85	1200	4200	0.373
330	12.5-17.5	560	15.0-20.0					0.219
360	17.5-24.0	560	15.0-20.0					0.128

TABLE 25

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 49   IA-CLIVE

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
0.0- 7.5	3	-.001	250	(250, 250)	0.005	250	(230, 270)
10.0-17.5	4	0.002	300	(300, 310)	0.007	300	(290, 300)
17.5-27.5	5	0.015	400	(350, 450)	0.020	380	(360, 390)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.003	420	(380, 460)
10.0-30.0	9	0.017	1500	(1500,1600)
10.0-30.0	9	0.017	1500	(1500,1600)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
250	0.0- 7.5	420	2.5- 7.5					0.219
300	10.0-17.5	1500	10.0-30.0	15.3	1.90	1700	43000	0.480
400	17.5-27.5	1500	10.0-30.0					0.465

TABLE 26

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 50 IA-HILL

DEPTH INT (M)	NC MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
0.0- 7.5	3	0.001	500	(500, 500)	0.005	440	(380, 540)
7.5-15.0	4	-.004	380	(350, 410)	0.001	370	(330, 410)
15.0-29.8	7	-.001	420	(410, 430)	0.006	420	(410, 430)

DEPTH INT (M)	NC MEAS	FIRST P ARRIVAL INCPT (S)	FIRST P ARRIVAL VEL (M/S)	FIRST P ARRIVAL UNC INT (M/S)
2.5-10.0	4	0.003	1500	(1300,1600)
12.5-29.8	8	0.001	1500	(1500,1600)
12.5-29.8	8	0.001	1500	(1500,1600)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
500	0.0- 7.5	1500	2.5-10.0					0.435
380	7.5-15.0	1500	12.5-29.8					0.466
420	15.0-29.8	1500	12.5-29.8	18.3	1.72	3000	35000	0.458

TABLE 27

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 51 HOLLYWOOD STORAGE

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0-12.5	5	0.002	270	(270, 280)
12.5-22.5	5	0.011	350	(340, 350)
22.5-30.0	4	0.021	410	(390, 430)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.008	270	(260, 270)
0.019	340	(340, 350)
0.029	410	(390, 430)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
7.5-30.0	10	0.009	1700	(1700,1800)
7.5-30.0	10	0.009	1700	(1700,1800)
7.5-30.0	10	0.009	1700	(1700,1800)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
270	0.0-12.5	1700	7.5-30.0					0.487
350	12.5-22.5	1700	7.5-30.0	15.3	2.02	2400	57000	0.479
410	22.5-30.0	1700	7.5-30.0					0.470

TABLE 28

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 52 SANTA MONICA-WILSHIRE

		First S Arrival			First S Peak		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0- 7.5	3	0.000	280	(260, 300)	0.007	290	(280, 310)
7.5-15.0	4	0.010	440	(430, 450)	0.015	420	(380, 470)
17.5-30.0	6	0.012	510	(490, 540)	0.017	500	(490, 520)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-12.5	5	0.004	1100	(1000,1100)
15.0-20.0	3	0.003	1300	(970,1800)
22.5-30.0	4	-.003	630	(580, 680)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
280	0.0- 7.5	1100	2.5-12.5					0.465
440	7.5-15.0	1300	15.0-20.0					0.430
510	17.5-30.0	630	22.5-30.0	18.3	2.13	5600	800	-.554

TABLE 29

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 53   TISHPAN AIRPORT CENTER

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0-10.C	4	0.001	410	(390, 430)	0.006	400	(390, 420)
10.0-20.0	5	-.004	340	(330, 350)	0.001	340	(330, 350)
20.0-30.C	5	0.018	560	(540, 580)	0.022	530	(500, 560)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
5.0-30.0	11	0.004	820	(810, 830)
5.0-30.C	11	0.004	820	(81C, 830)
9.2- 1.9	1	*****	0	(0, 0)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	(G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
410	C.0-1C.C	82C	5.0-30.0	5.0	****	50000	130000	0.334
340	1C.0-2C.C	820	5.0-30.0					0.395

TABLE 30

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 54 HYPERION

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-28.4	12	0.006	340	(330, 340)	0.012	340	(330, 350)
2.5-28.4	12	0.006	340	(330, 340)	0.012	340	(330, 350)

		FIRST P ARRIVAL		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-12.5	5	0.008	570	(540, 600)
12.5-28.4	8	0.023	1800	(1700, 1800)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
340	2.5-28.4	570	2.5-12.5	9.2	1.70	1900	2900	0.228
340	2.5-28.4	570	2.5-12.5	15.3	2.02	2300	3500	0.228
340	2.5-28.4	570	2.5-12.5	20.1	2.05	2300	3500	0.228
340	2.5-28.4	1800	12.5-28.4	9.2	1.70	1900	51000	0.481
340	2.5-28.4	1800	12.5-28.4	15.3	2.02	2300	61000	0.481
340	2.5-28.4	1800	12.5-28.4	20.1	2.05	2300	62000	0.481

TABLE 31

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 55   DEVONSHIRE POLICE STA

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.006	360	(360, 360)	0.011	330	(330, 340)
7.5-12.5	3	0.012	500	(500, 500)	0.017	470	(470, 480)
15.0-29.0	7	0.019	490	(480, 500)	0.027	510	(490, 540)

		FIRST P ARRIVAL		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.005	570	(550, 590)
10.0-20.0	5	0.012	1000	(940,1100)
22.5-29.0	4	0.013	920	(860,1000)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
360	2.5- 7.5	570	2.5-10.0					0.173
500	7.5-12.5	1000	10.0-20.0					0.333
490	15.0-29.0	920	22.5-29.0	18.2	2.07	5000	11000	0.301

TABLE 32

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 56 OLIVE VIEW

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)	FIRST S PEAK INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.005	370	(360, 380)	0.009	340	(330, 350)
12.5-17.5	3	0.016	500	(450, 570)	0.027	610	(530, 700)
17.5-22.5	3	-.002	330	(320, 350)	0.000	310	(310, 310)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.004	500	(500, 500)
12.5-17.5	3	0.006	630	(550, 730)
17.5-28.8	6	0.014	870	(840, 900)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M) (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
370	2.5-10.0	500	2.5-10.0				-.128
500	12.5-17.5	630	12.5-17.5				-.389
330	17.5-22.5	870	17.5-28.8				0.413

TABLE 33

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 57 POINCILAND JHS

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
5.0-10.0	3	0.014	260	(260, 270)	0.018	250	(250, 260)
5.0-10.0	3	0.014	260	(260, 270)	0.018	250	(250, 260)
12.5-29.8	8	0.022	370	(360, 380)	0.027	360	(360, 370)

		FIRST P ARRIVAL		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.003	380	(370, 400)
7.5-15.0	4	0.016	1000	(980,1100)
17.5-29.8	6	0.029	1800	(1600,2100)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
260	5.0-10.0	380	2.5- 7.5					0.060
260	5.0-10.0	1000	7.5-15.0					0.466
370	12.5-29.8	1800	17.5-29.8	15.3	2.13	2900	68000	0.479

TABLE 34

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 58   CASTAIC

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)	FIRST S PEAK INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0- 7.5	3	0.001	290	(280, 300)	0.005	270	(260, 270)
7.5-15.0	4	-.004	240	(240, 250)	0.003	250	(240, 260)
15.0-20.0	3	0.022	420	(420, 420)	0.024	380	(340, 440)
20.0-23.6	3	0.037	610	(570, 650)	0.043	600	(570, 640)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0-12.5	5	-.000	430	(420, 440)
12.5-17.5	3	0.009	630	(630, 630)
17.5-23.6	4	0.017	890	(800,1000)
17.5-23.6	4	0.017	890	(800,1000)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	(G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
290	0.0- 7.5	430	0.0-12.5					0.064
240	7.5-15.0	630	12.5-17.5					0.411
420	15.0-20.0	650	17.5-23.6	18.3	2.35	4100	13000	0.361
610	20.0-23.6	890	17.5-23.6					0.064

TABLE 35

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 59 CAMP MUNZ

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0 - 5.0	3	-0.001	275	(260, 290)	0.003	275	(250, 290)
7.5 - 12.5	3	0.003	265	(250, 280)	0.007	265	(250, 280)
12.5-20.0	4	0.024	450	(420, 480)	0.028	430	(420, 440)
20.0-26.5	4	0.029	520	(490, 560)	0.039	570	(550, 600)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.005	1300	(1300,1300)
10.0-26.5	8	0.013	2200	(2100,2300)
10.0-26.5	8	0.013	2200	(2100,2300)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
450	12.5-20.0	2200	10.0-26.5	19.8	2.30	4600	110000	0.479
520	20.0-26.5	2200	10.0-26.5					0.471

TABLE 36

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 60 ROSAMOND DRY LAKE

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
0.0-12.5	5	-.001	320	(310, 330)	0.004	310	(300, 310)
15.0-20.0	3	0.002	310	(310, 310)	0.004	290	(280, 300)
22.5-37.5	7	-.038	200	(200, 210)	-.031	210	(200, 210)
37.5-45.0	4	-.020	230	(220, 230)	-.010	230	(230, 240)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.005	1000	(980,1100)
12.5-45.0	14	0.012	1500	(1500,1600)
12.5-45.0	14	0.012	1500	(1500,1600)
12.5-45.0	14	0.012	1500	(1500,1600)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
320	0.0-12.5	1000	2.5-10.0					0.448
310	15.0-20.0	1500	12.5-45.0					0.478
200	22.5-37.5	1500	12.5-45.0					0.491
230	37.5-45.0	1500	12.5-45.0	45.0	1.78	920	41000	0.489

TABLE 37

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 61 LAKE HUGHES P S

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)	FIRST S PEAK INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.001	420	(390, 430)	0.004	380	(370, 390)
12.5-20.0	4	0.003	420	(400, 440)	0.004	380	(360, 400)
20.0-26.7	4	0.017	570	(540, 610)	0.023	560	(530, 600)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
5.0-12.5	4	0.004	680	(650, 710)
12.5-20.0	4	0.008	830	(830, 830)
20.0-26.7	4	0.017	1300	(1300,1400)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
410	0.0-10.0	680	5.0-12.5					0.209
420	12.5-20.0	830	12.5-20.0					0.333
570	20.0-26.7	1300	20.0-26.7	21.3	2.16	7000	28000	0.386

TABLE 38

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 62 LEONA VALLEY

		First S Arrival			First S Peak		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.0- 7.5	3	0.001	240	(220, 260)	0.003	210	(210, 210)
10.0-20.7	6	0.016	390	(380, 400)	0.023	400	(390, 410)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.008	1100	(1000,1200)
10.0-20.7	6	0.013	2200	(2000,2400)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
240	0.0- 7.5	1100	2.5-10.0					0.475
390	10.0-20.7	2200	10.0-20.7	13.0	2.21	3400	100030	0.484

TABLE 39

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 63 LLANO NORTH

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
2.5-25.0	10	0.008	520	(520, 530)	0.013	490	(490, 500)
25.0-30.0	3	0.021	710	(660, 780)	0.028	710	(660, 770)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-25.0	10	0.007	780	(770, 790)
25.0-30.0	3	0.024	1700	(1400,2100)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
520	2.5-25.0	780	2.5-25.0	24.3	2.10	5700	5230	0.099
710	25.0-30.0	1700	25.0-30.0					0.387

TABLE 40

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 64 LLANO SOUTH

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
2.5-20.0	8	0.004	510	(500, 520)	0.009	490	(470, 510)
20.0-27.5	4	0.014	680	(650, 710)	0.017	640	(600, 680)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-22.5	9	0.005	830	(830, 830)
22.5-29.3	4	0.015	1300	(1300, 1400)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
510	2.5-20.0	830	2.5-22.5	13.0	1.98	5100	6900	0.203
680	20.0-27.5	1300	22.5-29.3	25.8	2.13	9700	25000	0.330

TABLE 41

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 65 LITTLEROCK P O

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
5.0-25.0	9	0.009	480	(470, 490)	0.013	460	(450, 470)
5.0-25.0	9	0.009	480	(470, 490)	0.013	460	(450, 470)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	FIRST P ARRIVAL VEL (M/S)	FIRST P ARRIVAL UNC INT (M/S)
2.5- 7.5	3	0.003	500	(450, 570)
10.0-27.8	8	0.011	960	(940, 980)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
480	5.0-25.0	500	2.5- 7.5	6.6	2.16	4900	-1172	*****
480	5.0-25.0	500	2.5- 7.5	24.4	2.08	4700	-1128	*****
480	5.0-25.0	960	10.0-27.8	6.6	2.16	4900	13000	0.334
480	5.0-25.0	960	10.0-27.8	24.4	2.08	4700	13000	0.334

TABLE 42

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 66 PEARBLOSSOM PUMP PLANT

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)	FIRST S PEAK INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-17.5	7	0.002	430	(420, 440)	0.006	420	(420, 430)
17.5-25.0	4	0.023	860	(790, 950)	0.024	750	(710, 790)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
7.5-17.5	5	0.004	780	(750, 810)
17.5-25.0	4	0.012	1300	(1200, 1300)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
430	2.5-17.5	780	7.5-17.5	16.0	2.05	3700	7500	0.287
860	17.5-25.0	1300	17.5-25.0	22.2	2.32	17000	13000	0.046

TABLE 43

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 67 PALMDALE HOLIDAY INN

		FIRST S ARRIVAL			FIRST S PEAK		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-15.0	6	0.003	480	(470, 490)	0.007	450	(430, 470)
15.0-30.C	7	0.013	730	(710, 750)	0.020	740	(710, 770)

		FIRST P ARRIVAL		
DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	4	0.002	680	(650, 710)
10.0-30.C	9	0.006	890	(870, 910)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
480	2.5-15.0	680	2.5-10.0					-.013
730	15.0-30.0	890	10.0-30.0	15.3	1.97	10000	1600	-.538
730	15.0-30.0	890	10.0-30.0	24.4	2.17	12000	1700	-.538

TABLE 44

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 68 PALMDALE P S

DEPTH INT (M)	NO MEAS	FIRST S ARRIVAL INCPT (S)	FIRST S ARRIVAL VEL (M/S)	FIRST S ARRIVAL UNC INT (M/S)	FIRST S PEAK INCPT (S)	FIRST S PEAK VEL (M/S)	FIRST S PEAK UNC INT (M/S)
5.0-10.0	3	0.002	380	(370, 400)	0.008	390	(380, 390)
10.0-15.0	3	0.005	450	(390, 540)	0.011	440	(390, 520)
22.5-30.0	4	0.026	740	(670, 820)	0.029	650	(590, 730)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.005	710	(660, 780)
10.0-30.0	9	0.010	1100	(1000,1100)
10.0-30.0	9	0.010	1100	(1000,1100)

S VEL (M/S)	DEPTH INT (M)	P VEL (M/S)	DEPTH INT (M)	DENSITY DEPTH (M)	DENSITY (G/CC)	SHEAR MOD (BARS)	BULK MOD (BARS)	POISSONS RATIO
380	5.0-10.0	710	2.5- 7.5					0.296
450	10.0-15.0	1100	10.0-30.0					0.386
740	22.5-30.0	1100	10.0-30.0					0.030