UNITED STATES
DEPARTMENT OF THE INTERIOR
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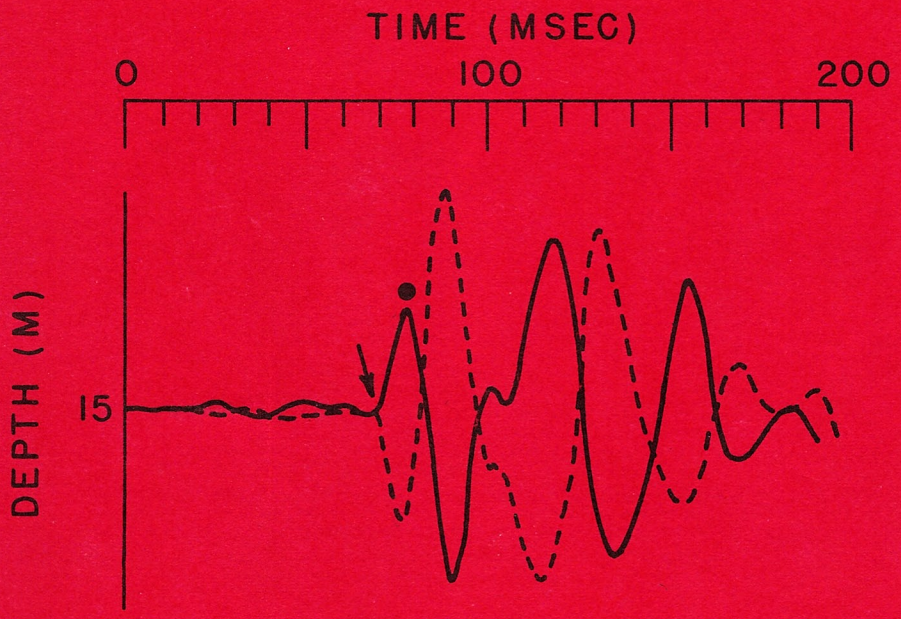
IN – SITU MEASUREMENTS OF SEISMIC VELOCITIES IN THE SAN FRANCISCO BAY REGION . . . PART III



OPEN-FILE REPORT 77-850

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

Menlo Park, California

1977

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National Center for Earthquake Research
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Menlo Park, California 94025

IN-SITU MEASUREMENTS OF SEISMIC VELOCITIES IN THE SAN FRANCISCO BAY REGION...PART III

by

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and Edward F. Roth

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CONTENTS

INTRODUCTION

Seismic wave velocities (compressional and shear) are important parameters for estimating the seismic response characteristics of various geologic units when subjected to strong earthquake ground shaking (Borcherdt, 1970; Joyner and Chen, 1975).

Seismic velocities of various units often show a strong correlation with the amounts of damage following large earthquakes and have been used as a basis for certain types of seismic zonation studies (Medvedev, 1965; Gibbs and others, 1975b).

In the current program seismic velocities have been measured at 59 locations in the San Francisco Bay Region. This report is the third in a series of open-file reports and describes the in-situ velocity measurements at locations 35-59 (figs. 64-87). 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 determined from drill cuttings, undisturbed (cored) samples, and penetrometer samples. The data provide a detailed comparison of geologic and seismic characteristics and provide parameters for estimating strong earthquake ground motions quantitatively at each of the sites (Joyner and Chen, 1975). A major emphasis of this program is to obtain a detailed comparison of geologic and seismic data on a regional scale for use in seismic zonation. There is a variety of geologic and seismic data available in the San Francisco Bay Region for use in developing the general zoning techniques which can then be applied to other areas.

Shear wave velocities in near-surface geologic materials are of especial interest for engineering seismology and seismic zonation studies, yet in general, they are difficult to measure because of contamination by compressional waves. A comparison of various in-situ techniques by Warrick (1974) establishes the reliability of the method utilizing a "horizontal

traction" source for sites underlain by bay mud and alluvium. Gibbs, and others (1975a) present data from 12 holes and establishes the reliability of the method for sites underlain by a variety of different rock units and suggest extending the measurements to a large number of sites. Data collected from the first 12 holes also provide an opportunity for developing a routine and efficient procedure for collection and reduction of the data. Gibbs and others (1975b) report preliminary comparisons of the data with the amplification data recorded from nuclear explosions (Gibbs and Borcherdt, 1974), and the intensity data for the 1906 earthquake (Lawson, 1908). These comparisons show that correlations exist between the three data sets. Average shear wave velocity in each geologic unit form the basis for the preliminary correlations, however, some of the geologic units (i.e. granite and Franciscan fm.) exhibit a wide range of shear wave velocity. It is apparent that other factors must be considered in these units, perhaps near surface weathering or fracture spacing. Work is continuing in this area.

SELECTION AND LOCATION OF SITES

Several types of data are available in the San Francisco Bay region which are applicable to the overall problem of estimating earthquake ground motions for seismic zonation. These are (1) distribution of intensity for the California earthquake of April 18, 1906, (2) ground motion from nuclear explosions recorded at 99 sites, and (3) detailed geologic mapping. Sites are selected on the basis of each of these data sets. The present locations of strong motion instrumentation are also considered. Once a site is selected, accessibility of the site is determined and formal permission is obtained from the property owners. A file of access data and sketch maps are being compiled for each site. The locations of the sites are presented on 7 1/2-minute map sheets (see figs 1-13).

DRILLING AND SAMPLING PROCEDURES

At each site selected, a hole 12.4 cm in diameter is drilled to a depth of 30 m using a "Failing 1500" 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 insures 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. For those holes which penetrate a single rock unit, material variations as a function of depth are due largely to weathering. For these holes the depths of 3, 7.5, and 30 m usually provided samples of deeply weathered, moderately weathered, and fresh rock. Additional samples are taken where unusually thick weathering zones are encountered. Cost and the need for a large number of holes distributed on a regional scale prohibited continuous sampling. In soils, standard penetration measurements are made and undisturbed samples are taken using a "Pitcher" core barrel and a "Shelby" thin tube liner. Undisturbed 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 an impact 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 high proportion of S- to P-wave energy. The timber is impacted 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 two signals 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 14a.

The P-waves generated by a vertical impact on the steel plate and the S-waves generated by impacting 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.

The seismic probe used in the first 12 drill holes (Gibbs, et al., 1975a) consists of three sensors (one vertical and two horizontal) (Mark Product L-10, natural frequency 14 Hz). This package is not easily oriented from the surface so that one horizontal seismometer is inline and the other transverse.

This instrument was used only as a backup unit in the present study. The downhole instrument now being used is a three-component unit built by Oyo Corp., Tokyo, Japan. The new instrument package has a delinometer and an inflatable diaphragm which under most circumstances permits orientation from the surface. Proper orientation aides in identifying the onset of the S-wave.

The signals from the downhole and surface seismometers and the impact switches are recorded on photographic paper and magnetic tape in analog form. 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.

REDUCTION OF 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 15. The sample descriptions are presented in the left-hand columns of figures 16-39.

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. 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.

Geologic Log

Geologic logs are compiled for each hole using the field log and descriptions of the samples (figures 16-39). 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 roadcuts and gullies.

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 material 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

Density measurements are required to calculate elastic moduli from measurements of seismic velocity. Densities are measured from most of the penetrometer, Pitcher tube, and diamond core samples (figs. 16-39). Densities are measured, where possible, by weighing a small piece of the sample and obtaining its volume by the mercury displacement method. A different method is used for very friable materials such as grus or poorly sorted materials which necessitated using a large sample. A slice is sawed from the Shelby tube containing the sample, its height and diameter measured, and the sample extruded for weighing.

For the mercury displacement method, measurements are made on three portions of a sample and the average reported.

While the accuracy of the density measurements is generally sufficient for calculation of elastic moduli, a number of the samples used to obtain densities do not completely represent the in-situ material. Materials that are sampled by penetration are compressed in sampling and several of these dried out before density measurements could be made. Densities of the hard rock samples are obtained using whole rock fragments from diamond core samples and are maximum densities. Depending on the amount and openness of fractures, these rock densities could be higher than in-situ densities by approximately 0.1-0.2 gm/cc.

REDUCTION OF 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 are superimposed and drafted on a common time base (figs. 40-63). 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 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 for each site are indicated on figures 40-63.

It was not possible at every site to control the orientation of the down-hole 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 (e.g., see fig. 41). 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. Moreover, several locations (e.g., see fig. 57 at 22.5, 25.0 and 28.2m) show early arrivals which have characteristics of S-waves (phase reversal, frequency, etc.) but plot on the travel time graph between P- and S-wave velocity. These arrivals are thought to be waves which travel part of their path as faster P and convert to S at a seismic boundary. With rare exception, these arrivals cannot be phase correlated for more than a few depths and are readily identified when consideration is given to the entire record section. 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 (figs. 40-63), the following times are measured with respect to a 100 Hz time code signal recorded on the records:

1) $t_1 \equiv$ time of break in signal from impact switch
2) $t_2 \equiv$ onset time of S-wave arrival on inline uphole geophone
3) $t_3 \equiv$ 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 value (t_A) is determined for the set of values, $t_2 - t_1$, measured at each depth. The travel time for the first S-arrival is given by

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

A corrected S-wave travel time (t_{s_c}), corresponding to the travel time for a vertical ray path, is computed from $t_{s_c} \equiv t_s + t_c$ where t_c corresponds to a timing correction (cosign 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-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 1-23.

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 1-23.

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 1-23) are plotted as a function of depth (figs. 64-87) and the geologic logs (figs. 16-39) are simplified and displayed graphically on the travel time curves (figs. 64-87). 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 350m/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. For purposes of a generalized comparison between the different sites, the interval 10-30 m is selected for routine computation of velocity.

Velocities are calculated for each of the selected intervals (tables 24-46) 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 of n pairs of time-depth coordinates $\{(x_1,t_1),\ldots,(x_n,t_n)\}$ is

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

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

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

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

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

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

$$\left(\frac{1}{b+S_b}, \frac{1}{b-S_b}\right) ,$$

where

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

is the standard error of the regression coefficient.

For these depth intervals with measurements of density (ρ), the shear modulus (SHEAR MOD, M) and bulk modulus (BULK MOD, K) is calculated (tables 24-46) using

$$M = \rho V_s^2$$

and

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

Poisson's ratio (σ) is calculated (tables 24-46) using

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

SUMMARY OF RESULTS

Details of the near surface velocity structure are being determined from down hole measurements of S-waves and P-waves in the San Francisco Bay region. The purpose of the study is to establish a data base for predicting ground motions for use in seismic zonation. The upper 30 meters at 59 locations have been logged for S-wave and P-wave velocities with several sites located in each major geologic unit. Geologic logs have been determined by continuously

monitoring drill cuttings and from analysis of cored samples. During the drilling operation standard penetration measurements were taken in soils at irregular intervals. The data are plotted on standard time-distance graphs and displayed on record sections showing S-wave and P-wave picks. A detailed velocity structure has been completed for each of these locations and work is in progress to develop a means of grouping geologic units which exhibit similar ground response characteristics.

This report is a compilation of the data from locations 36-59. Previous reports, Gibbs and others 1975a, present data from 12 locations for bedrock units in the San Francisco Bay region. Gibbs and others 1976, presents data from 23 locations for a variety of Quaternary sediments ranging from older alluvium to bay mud.

AKNOWLEDGEMENTS

We wish to especially thank Kenneth R. Lajoie for many helpful discussions of the geology of the San Franciso Bay area and for his help in site selection. T. Leslie Youd has participated in many helpful discussions and provided laboratory personnel and equipment for density measurements. We are deeply indebted to Richard E. Warrick, who pioneered the development of most of the S-wave apparatus and techniques used in this project.

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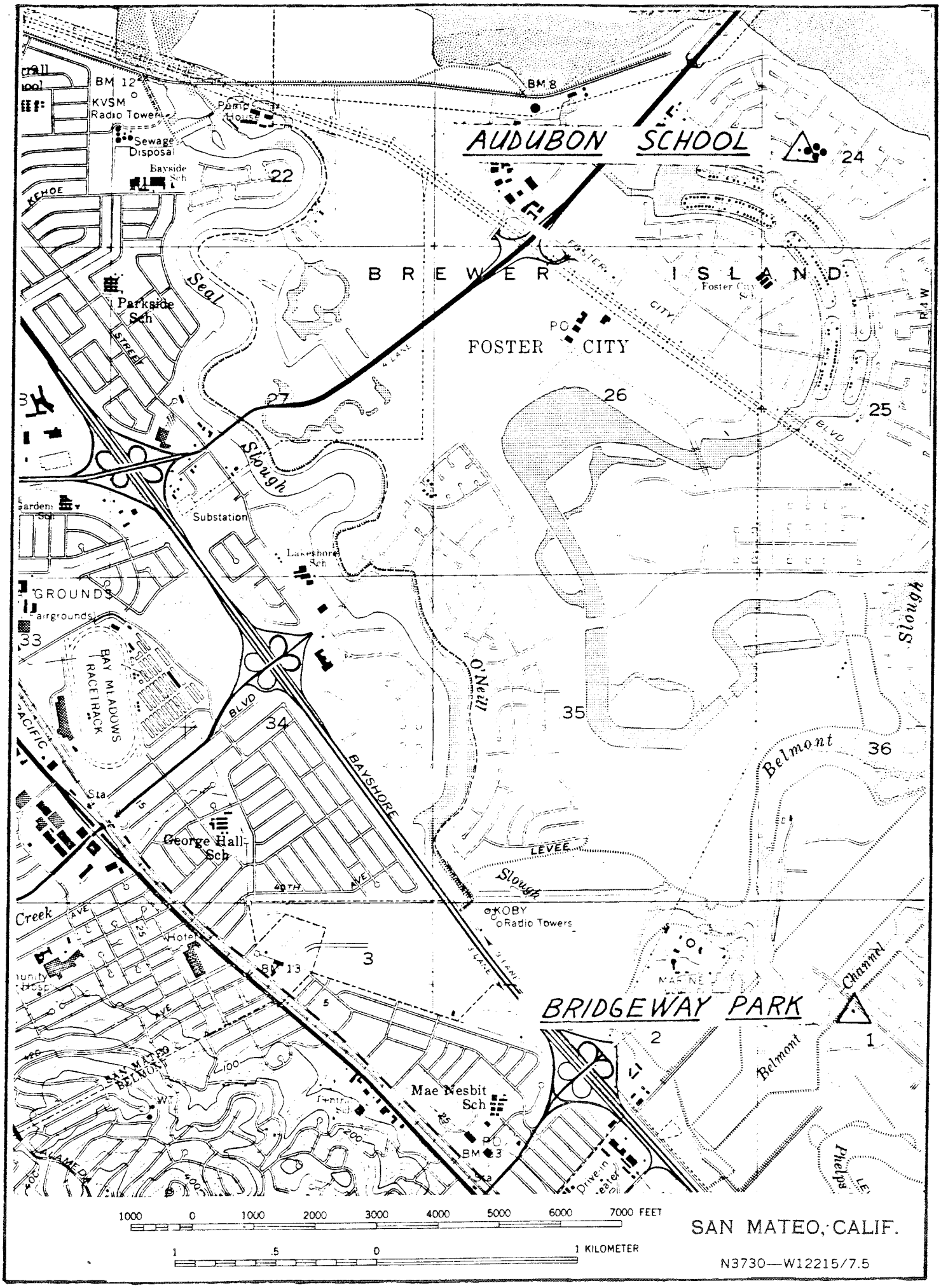
FIGURES

TABLES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KVSM Radio Tower
Pump House
Sewage Disposal
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KEHOE
Parkside Sch
STREET
Seal Slough
4 LANE
FOSTER CITY BLVD
R4W
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Lakeshore Sch
GROUNDS
Fairgrounds
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PACIFIC
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FIG. 1

FIG. 2

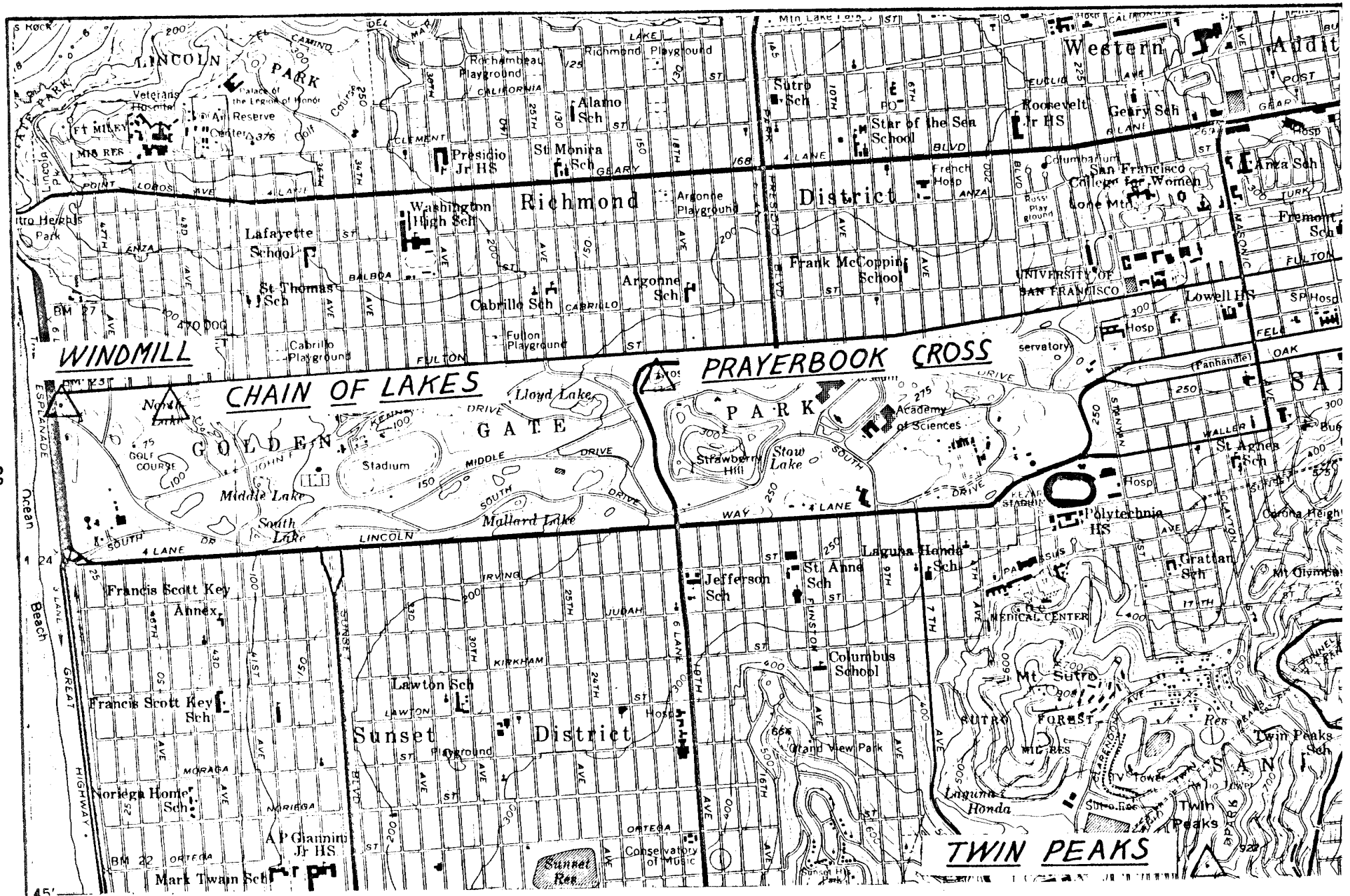

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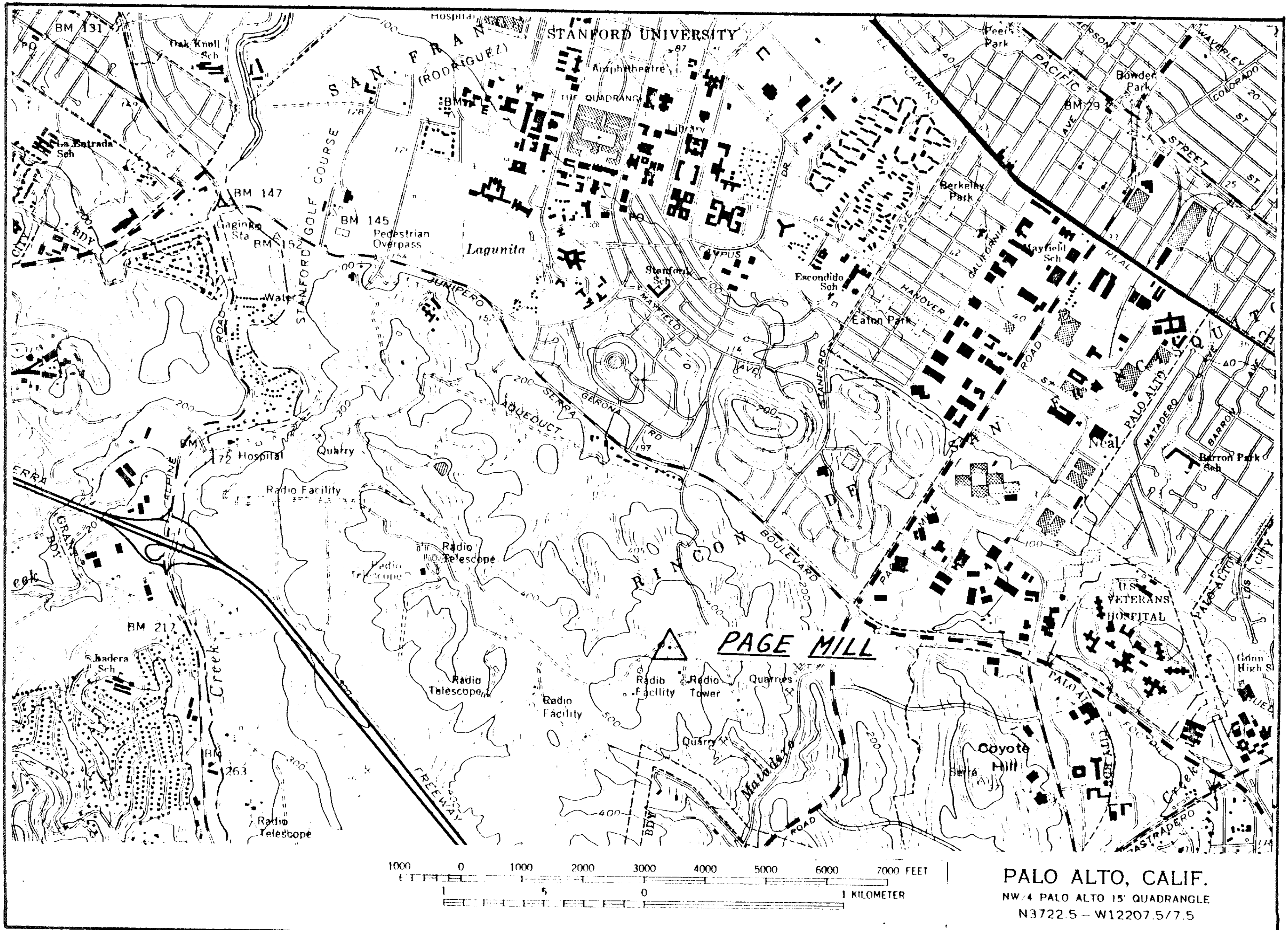
FIG. 3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AQUEDUCT
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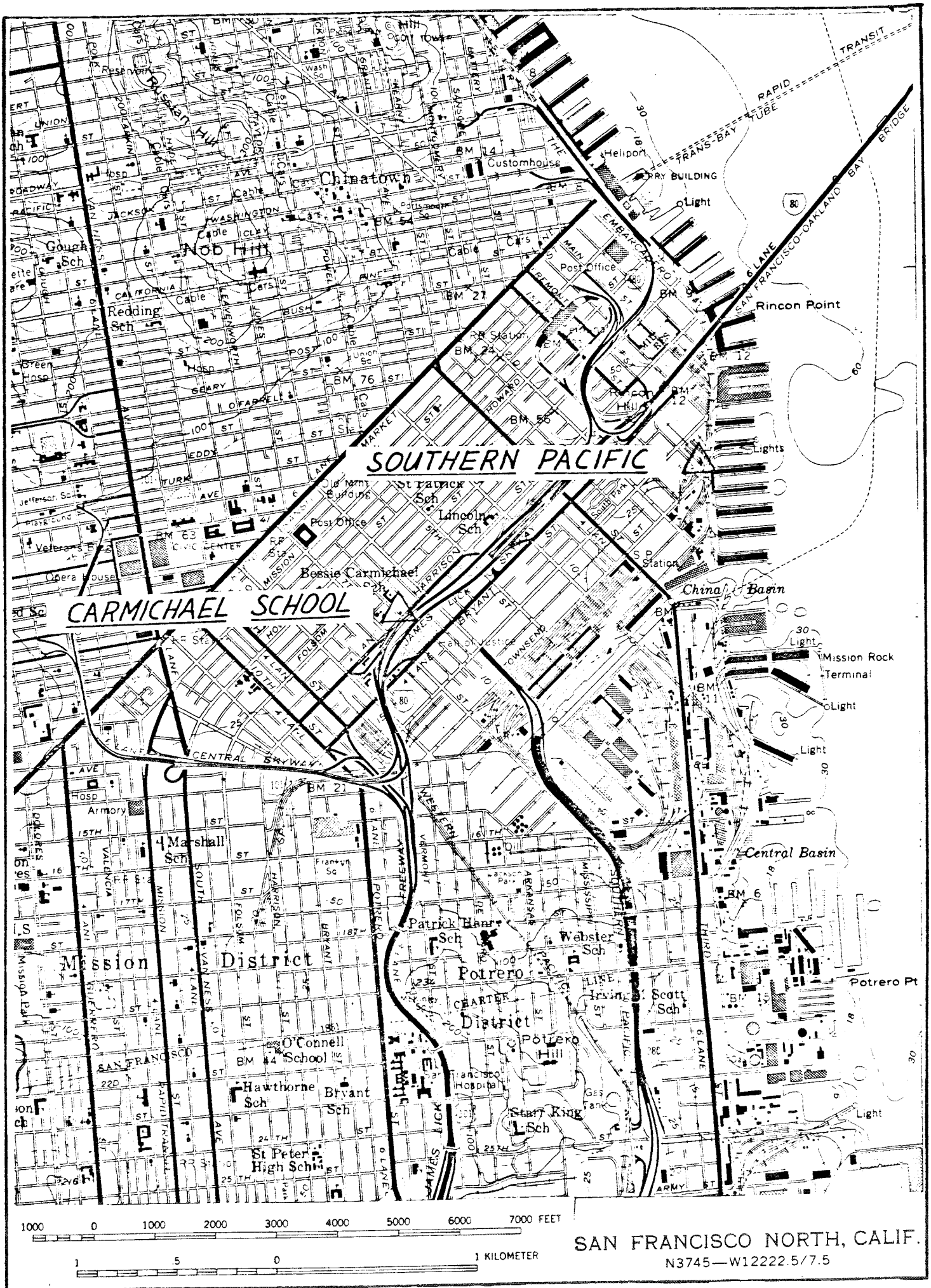
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Irving Scott Sch
Hawthorne Sch
Bryant Sch
St Peter High Sch
Starr King Sch
Lincoln Sch
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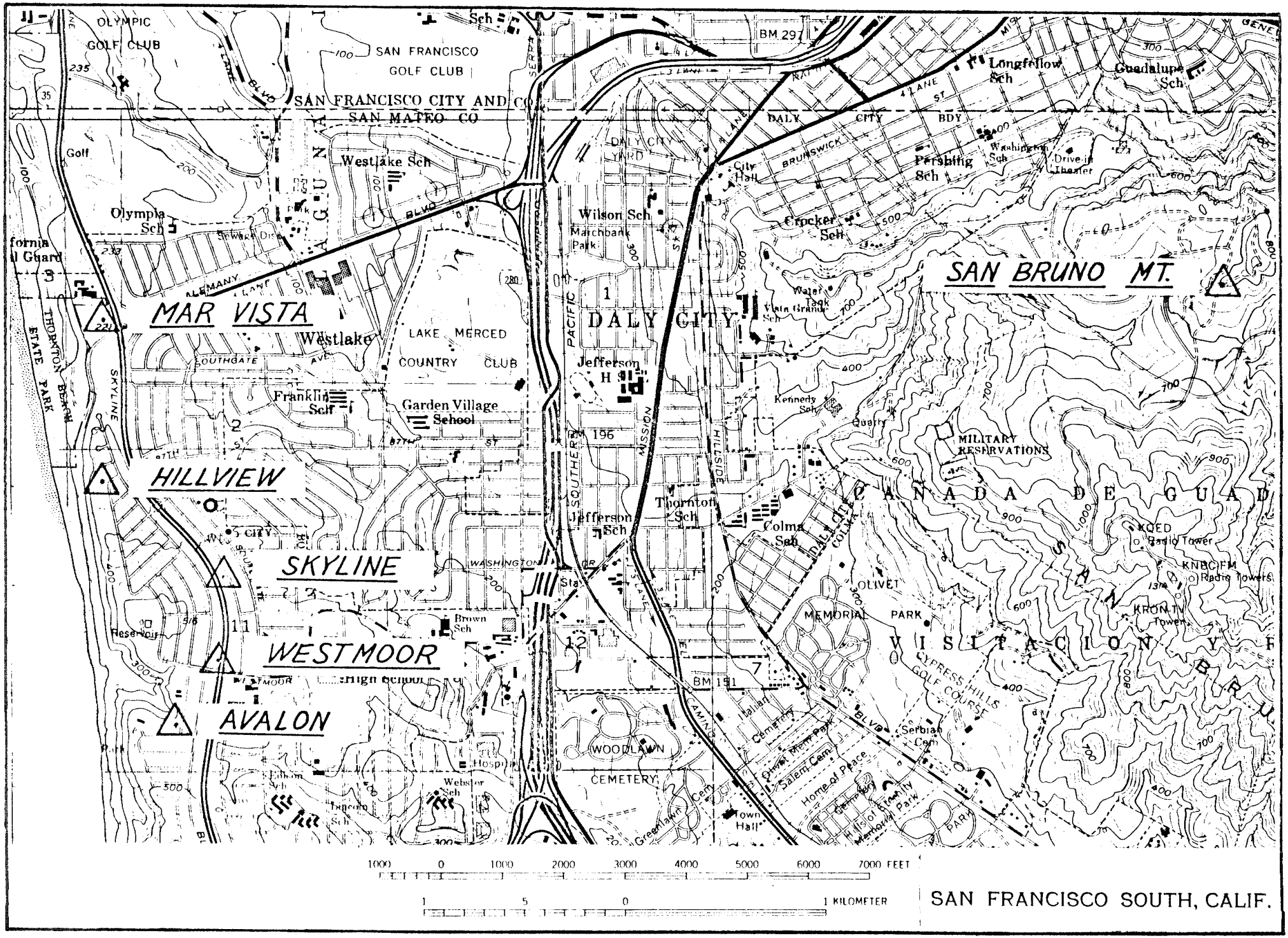
FIG. 4

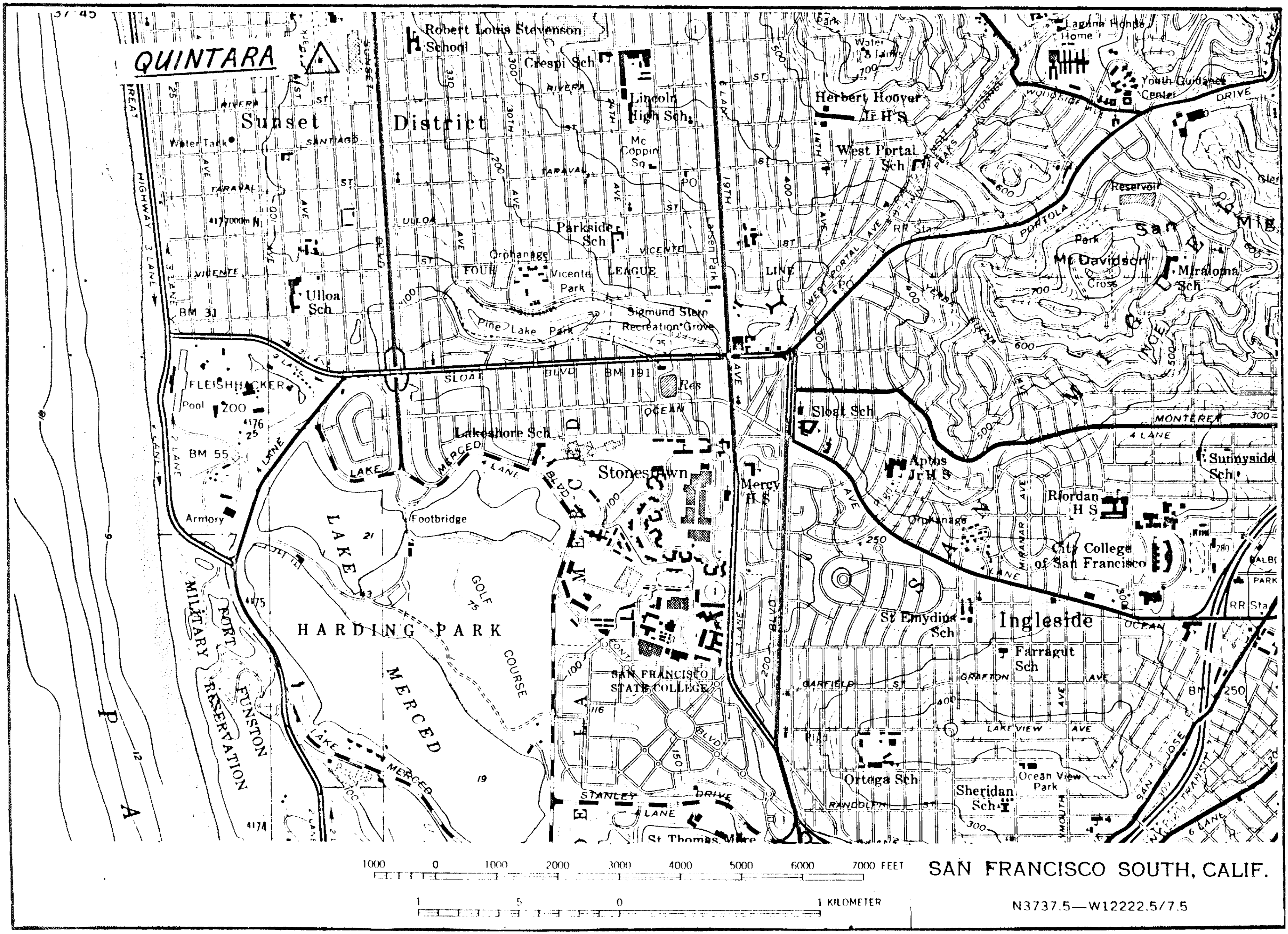
FIG 5



SAN FRANCISCO SOUTH, CALIF.

26

FIG. 6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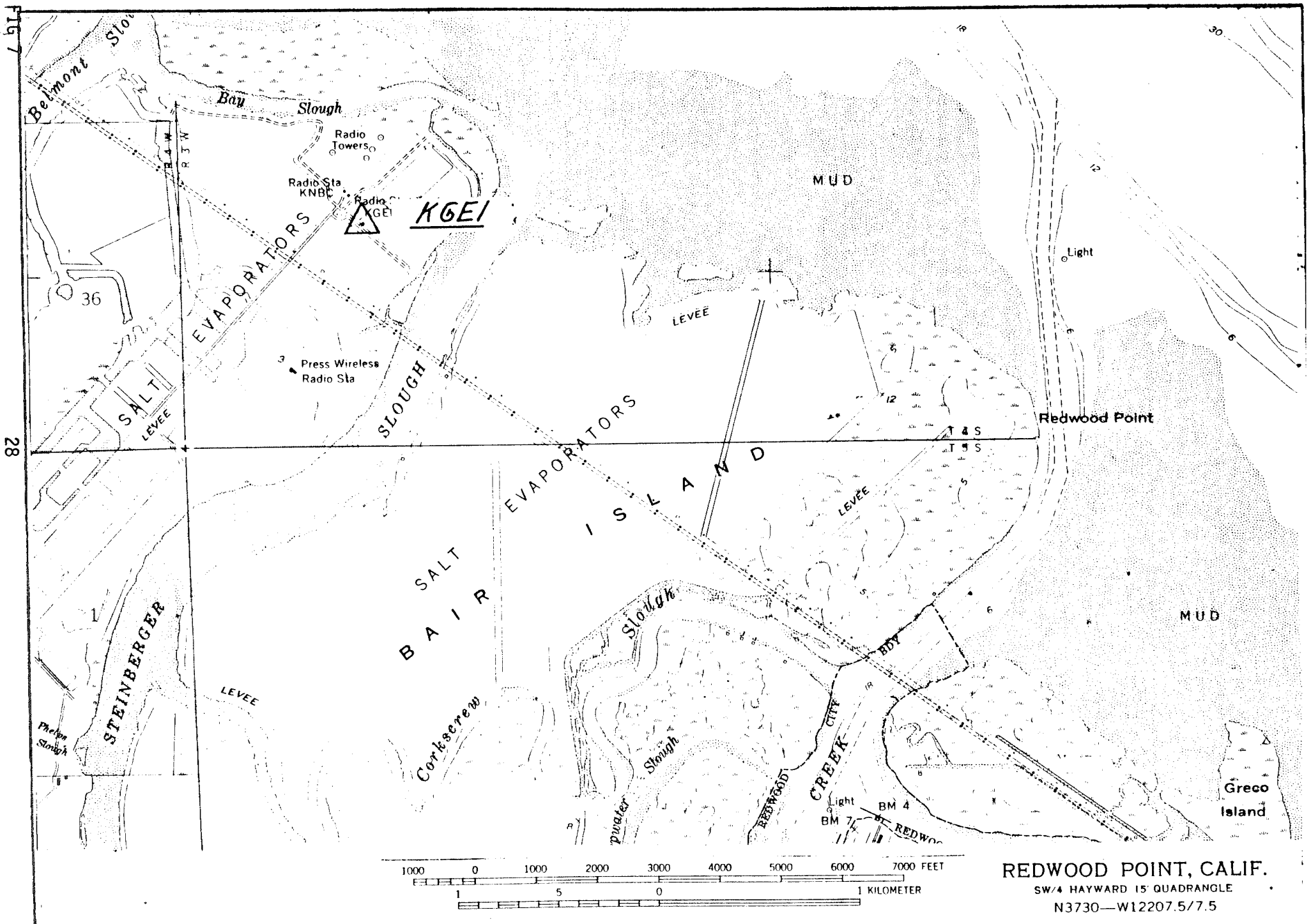
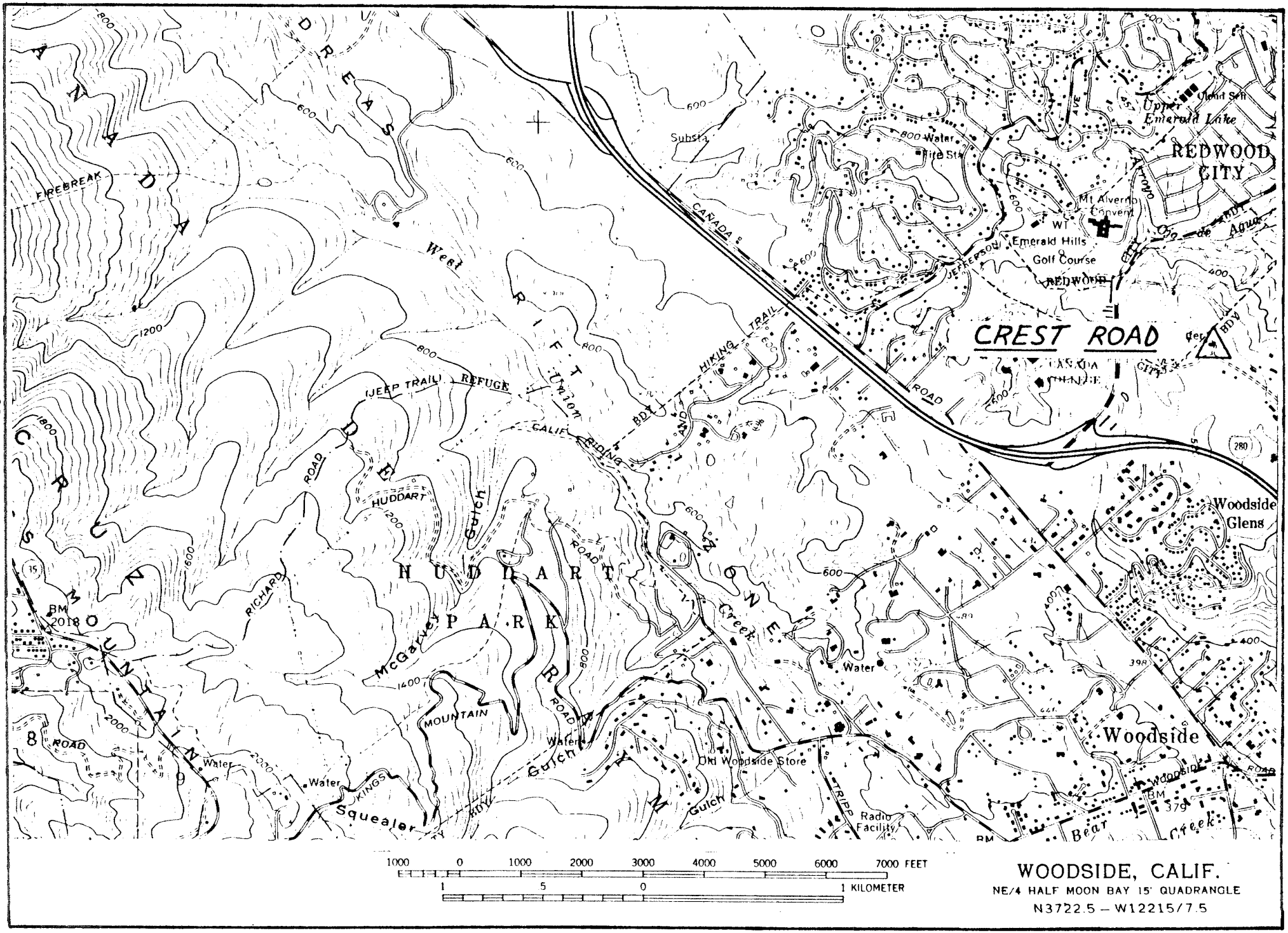
West Portal Sch
Laguna Honda Home
Youth Guidance Center
Reservoir
Mc Coppin Sq
Parkside Sch
Orphanage
Vicente Park
Ulloa Sch
Water Tank
Pine Lake Park
Sigmund Stern Recreation Grove
Mt Davidson
Miraloma Sch
FLEISHHACKER
Pool
ZOO
Armory
Footbridge
SLOAT BLVD
Sloat Sch
Lakeshore Sch
Stonestown
Mercy H S
Aptos Jr H S
Riordan H S
City College of San Francisco
LAKE
HARDING PARK
GOLF COURSE
MERCED
FORT FUNSTON
MILITARY RESERVATION
SAN FRANCISCO STATE COLLEGE
St Emydius Sch
Ingleside
Farragut Sch
Sunnyside Sch
Ortega Sch
Sheridan Sch
Ocean View Park
St Thomas More
MONTEREY
PORTOLA
OCEAN AVE
GARFIELD ST
LAKE VIEW AVE
STANLEY DRIVE
19TH AVE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER
SAN FRANCISCO SOUTH, CALIF.
N3737.5—W12222.5/7.5



REDWOOD POINT, CALIF.

SW/4 HAYWARD 15' QUADRANGLE

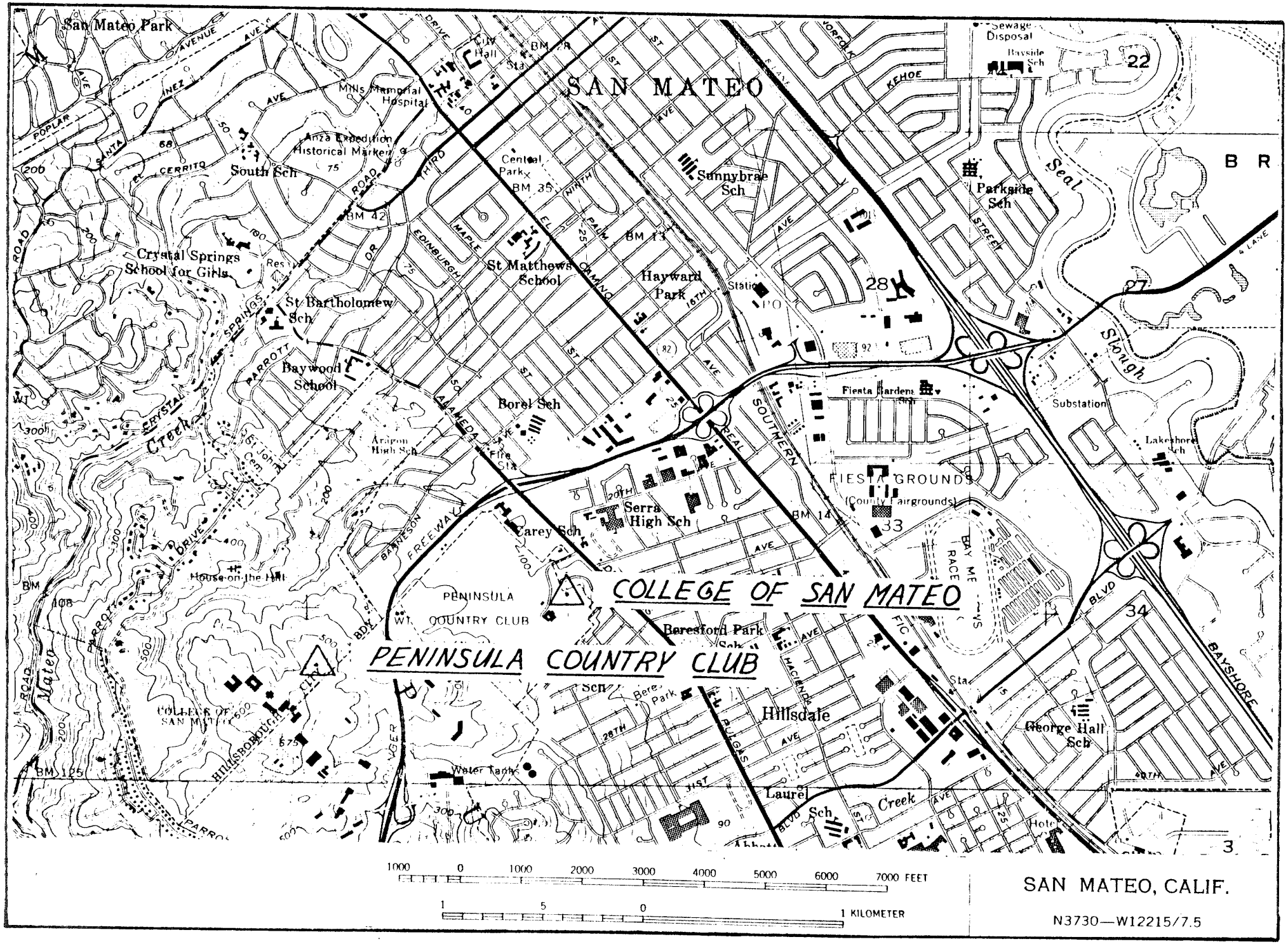
N3730—W12207.5/7.5



WOODSIDE, CALIF.

NE/4 HALF MOON BAY 15' QUADRANGLE

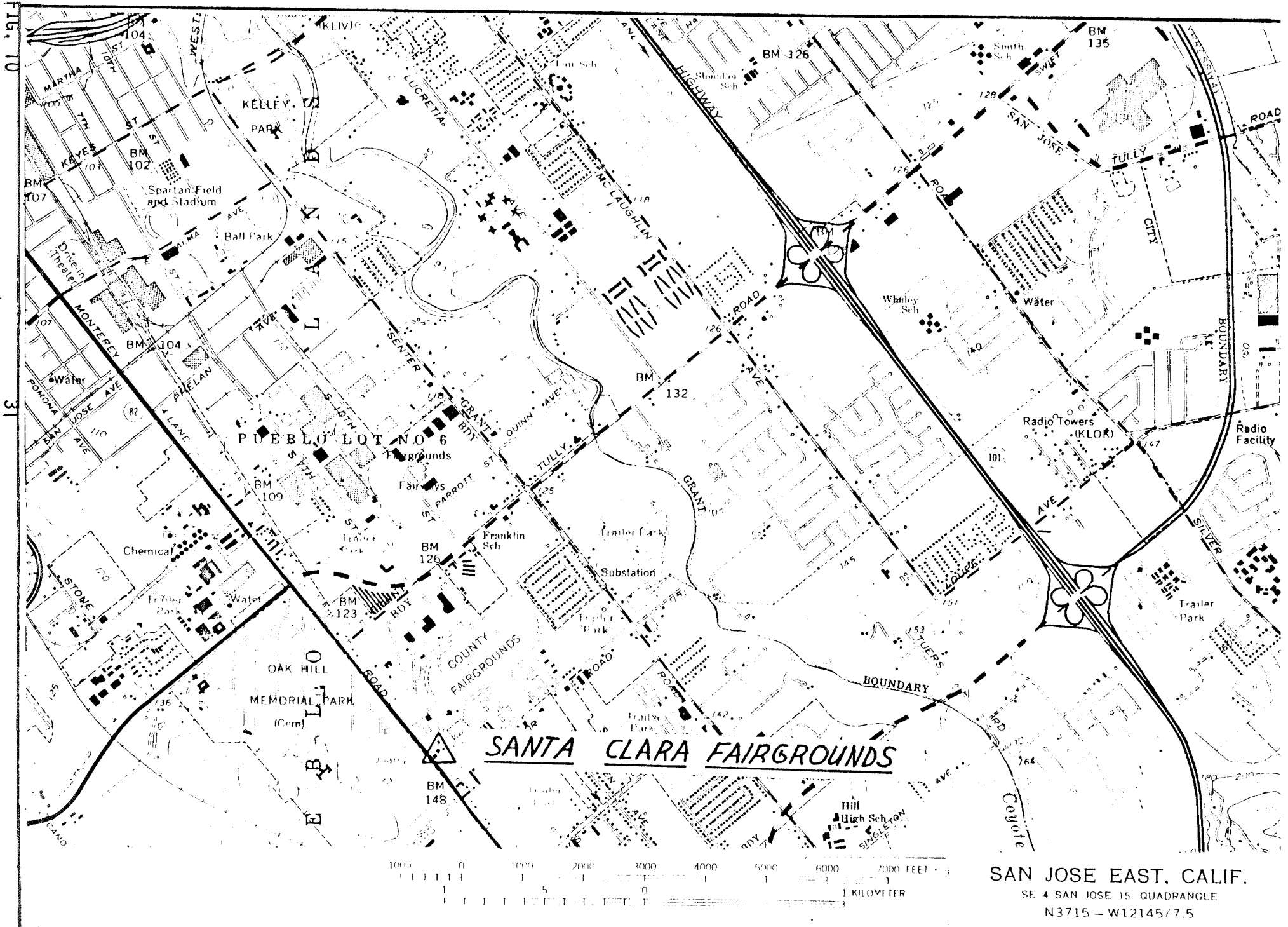
N3722.5 — W12215/7.5



SAN MATEO, CALIF.

N3730—W12215/7.5

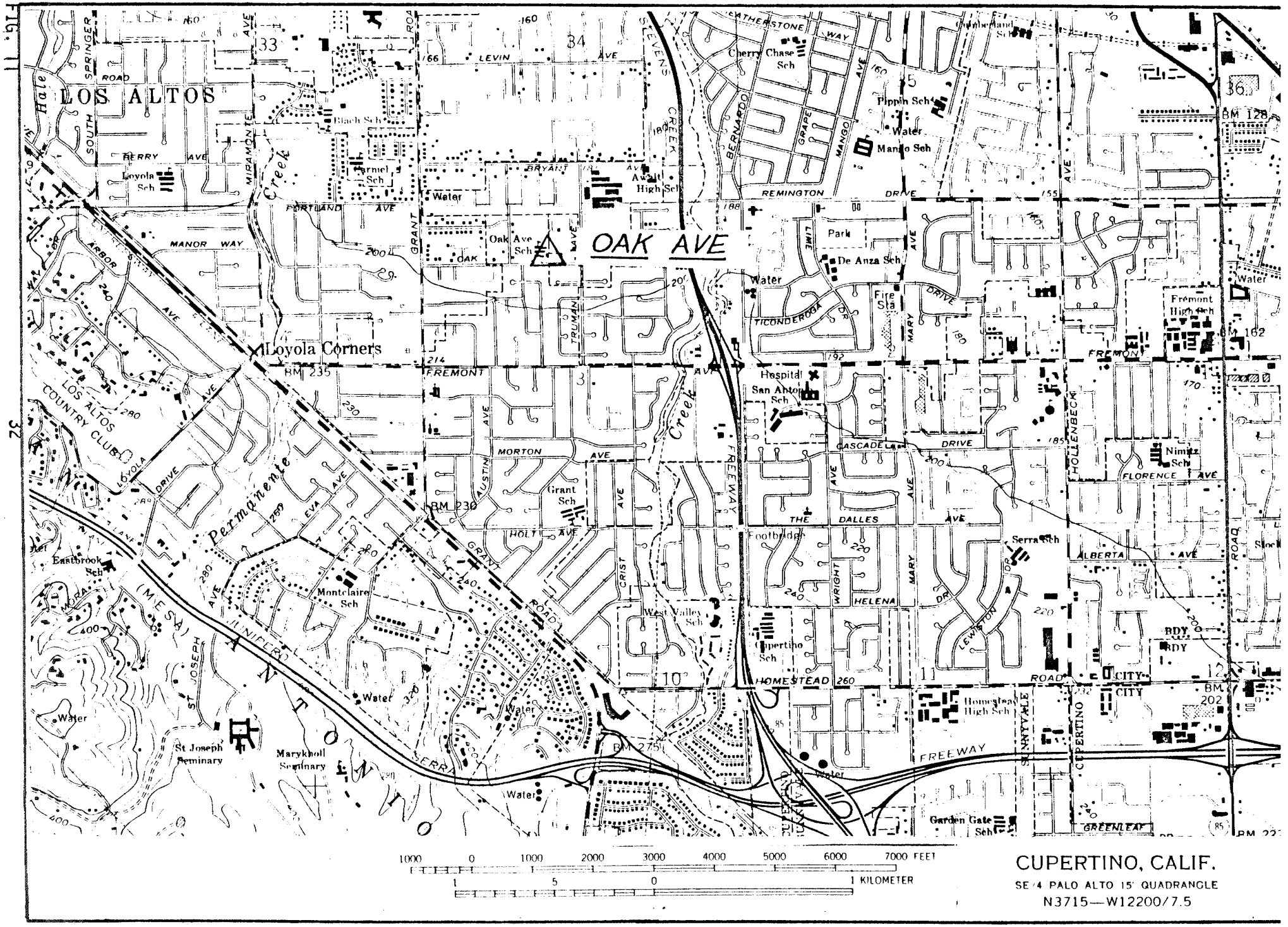
FIG. 10



SAN JOSE EAST, CALIF.

SE 4 SAN JOSE 15' QUADRANGLE

N3715 — W12145/7.5

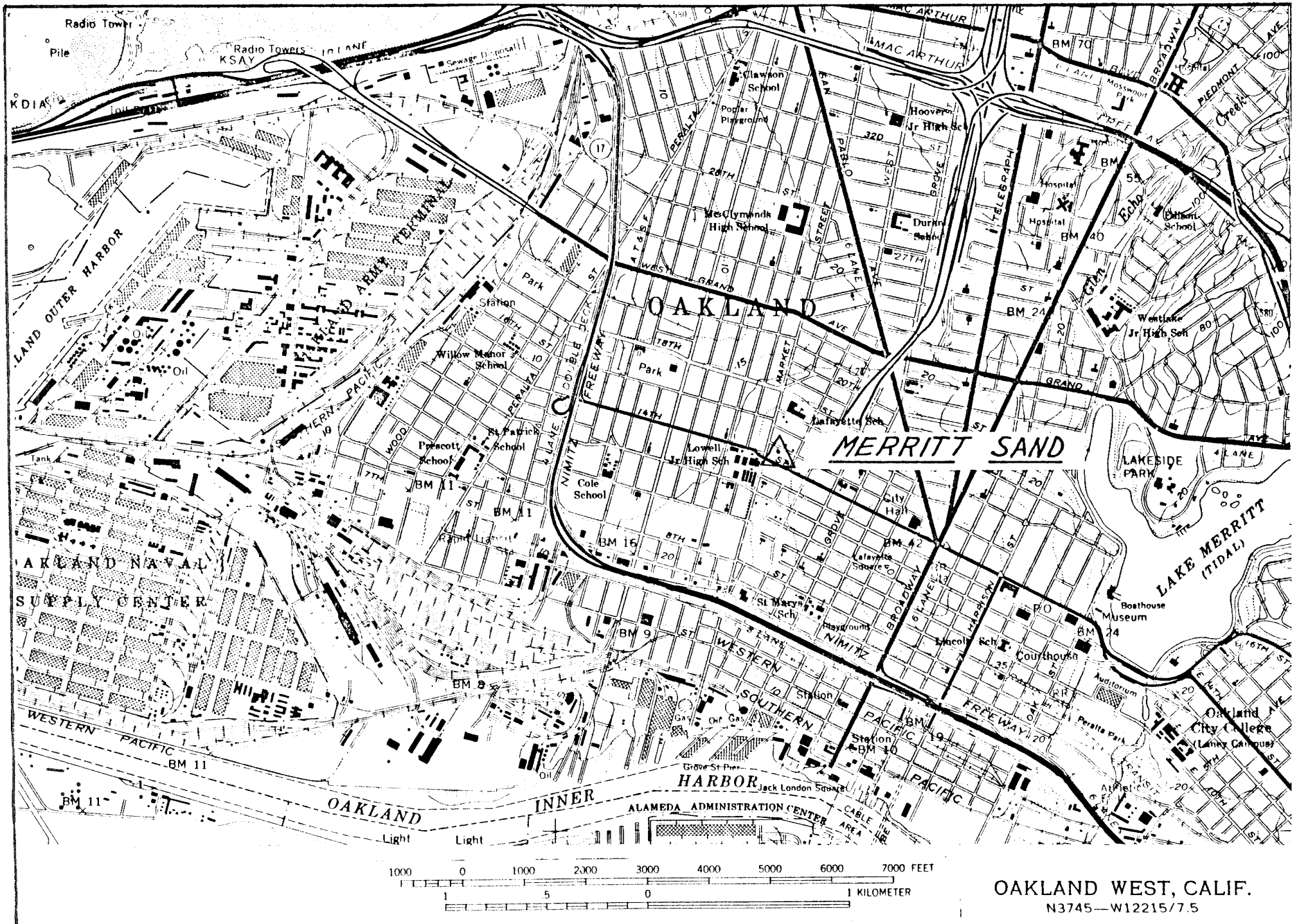


CUPERTINO, CALIF.

SE/4 PALO ALTO 15' QUADRANGLE

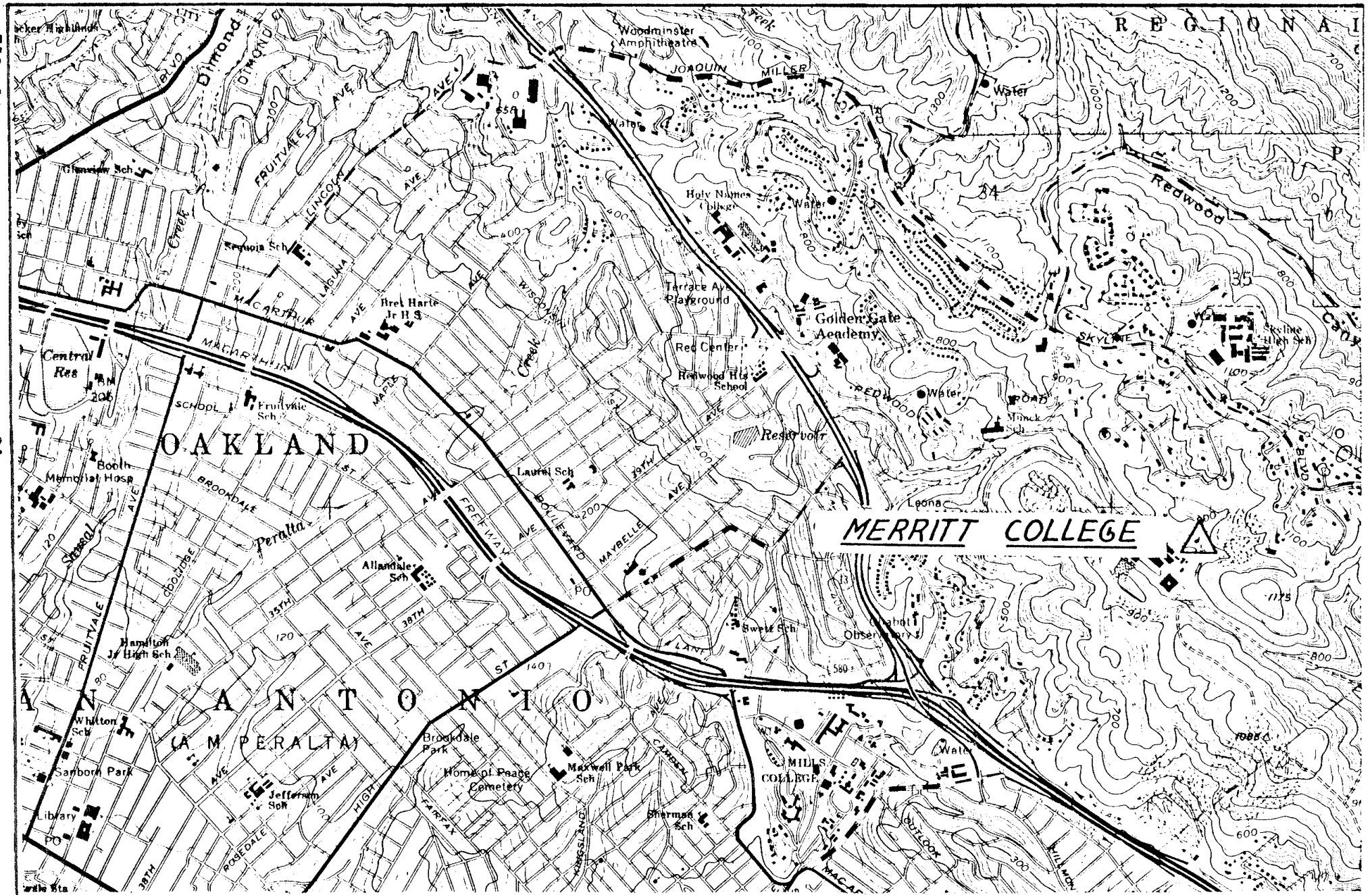
N3715—W12200/7.5

FIG. 12



OAKLAND WEST, CALIF.
N3745—W12215/7.5

FIG. 13



OAKLAND EAST, CALIF.

SW/4 CONCORD 15' QUADRANGLE

N3745—W12207.5/7.5

34

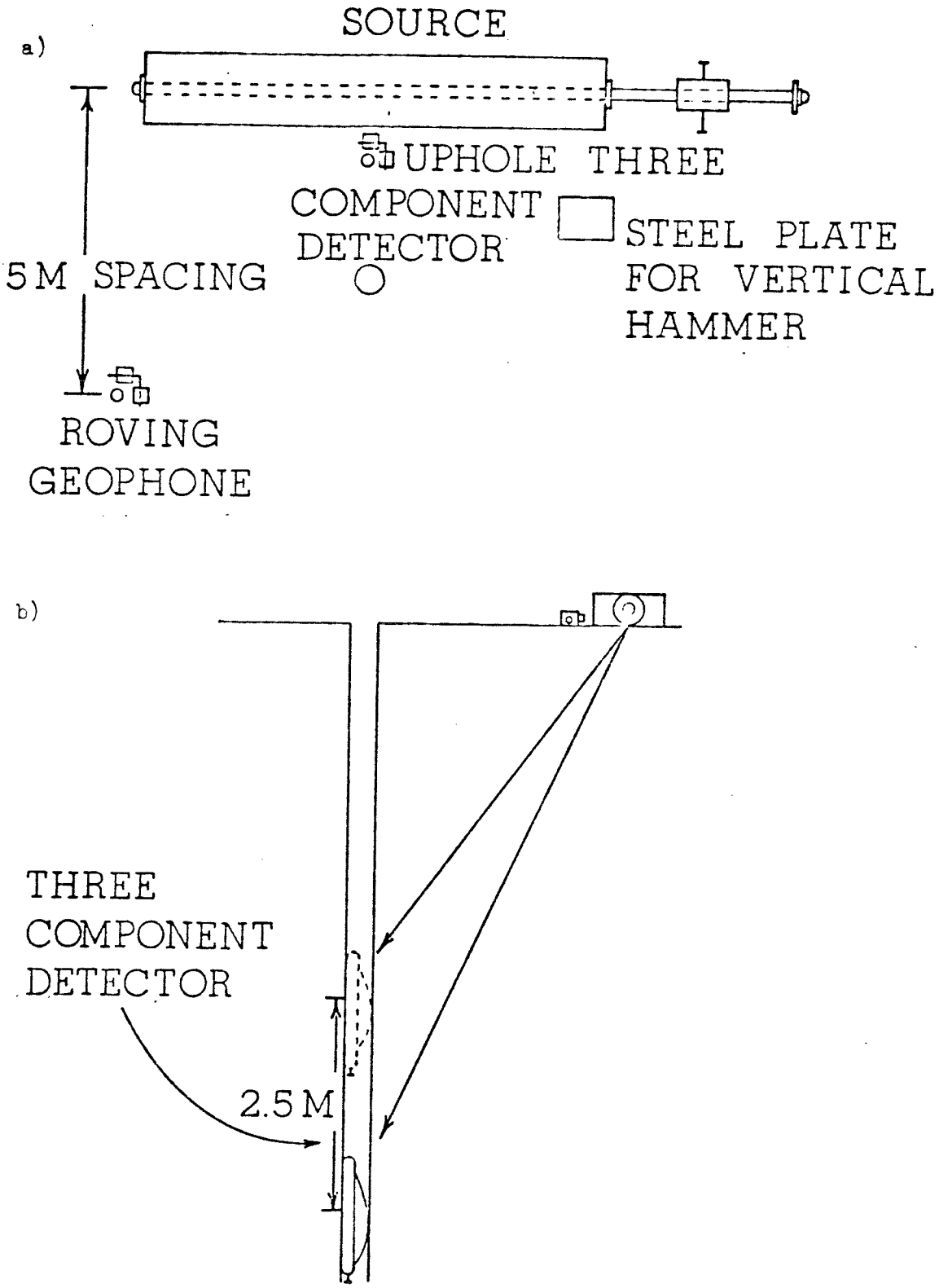

a)
SOURCE
UPHOLE THREE COMPONENT DETECTOR
STEEL PLATE FOR VERTICAL HAMMER
5 M SPACING
ROVING GEOPHONE
b)
THREE COMPONENT DETECTOR
2.5 M

Fig. 14

ELEVATION:	LOCATION : LAT. LONG.	HOLE NO: Brabb (1970) SITE : Brabb and Pampeyan (1972) GEOLOGIC MAP UNIT: Helley and Brabb (1971) Helley et. al. (1972) Lajoie et. al. (1974) Robinson (1956)
DATE :	7½' QUAD	

SAMPLE DESCRIPTION

DRILLING | BLOWS/ft | SAMPLING

DRILLING:

Auger —

Rotary-wash (mud drilling fluid) —

Drilling rate (min./ft) — 2

SAMPLING:

Standard penetration sample taken inside a 1⅜" I.D. split spoon driven 18" into the soil by 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 — 36 / 88/7

California penetration sample taken inside a 2" I.D. split spoon driven into the soil by 425 lb. slip jars falling inside the boring. — Ca

Shelby sample taken inside a 3" I.D. thin-walled tube mounted on end of drill rod and pushed into soil by drill rig. — S

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

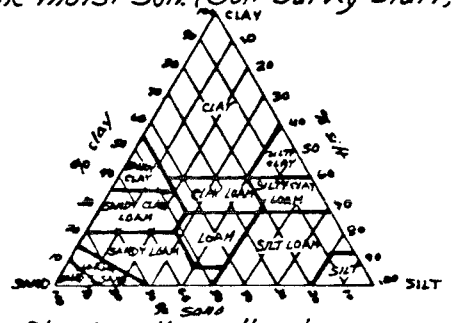
Rock core sample taken inside a NX (2⅛") size core barrel with a diamond bit. — C

DENSITY:
Results of laboratory tests

DESCRIPTION

DESCRIPTION:

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)

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.

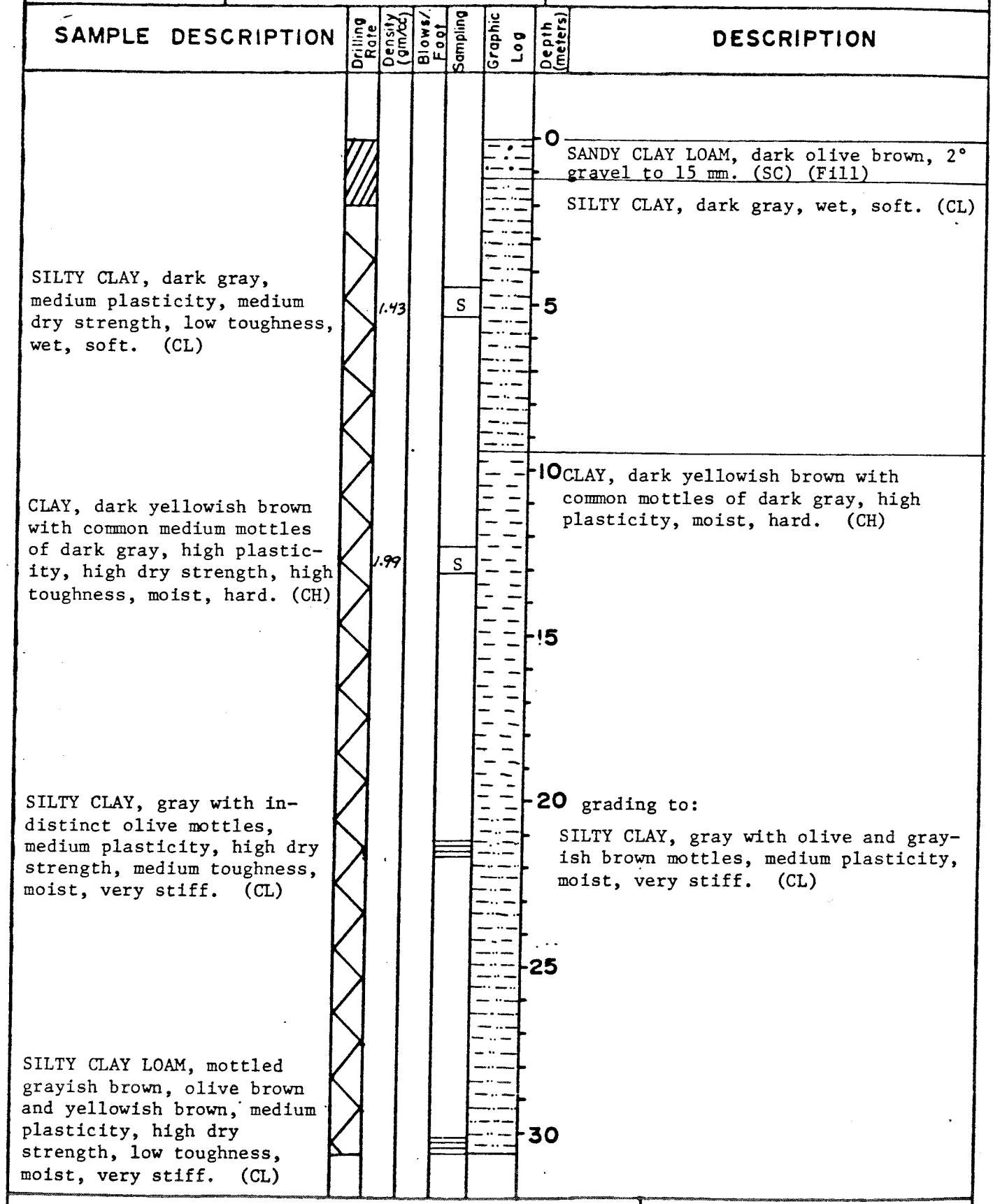
Fig. 15

ELEVATION:	LOCATION: LAT.	HOLE NO:
	LONG.	SITE:
DATE:	7½' QUAD	GEOLOGIC MAP UNIT:

SAMPLE DESCRIPTION	DESCRIPTION
	Fracture spacing: (Ellen et. al., 1972) cm — in — fracture spacing 0-1 — 0-½ — v. close 1-5 — ½-2 — close 5-30 — 2-12 — moderate 30-100 — 12-36 — wide >100 — >36 — v. wide Weathering: (Aetron-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, moderate discoloration Deep: moderate decomposition of minerals, extensive disintegration of rock, deep and thorough discoloration Decomposed: extensive decomposition of minerals and complete disintegration of rock but original structure is preserved

Fig. 15 Cont.

ALTITUDE: 2'	LOCATION: Lat. 37°31'43" Long. 122°15'09" QUADRANGLE: 7½' SAN MATEO, CALIF.	HOLE No. 36 SITE: BRIDGEWAY PARK GEOLOGIC MAP UNIT: Qaf ARTIFICIAL FILL
DATE: 12/12/75		



COMMENTS:	LOGGED BY: T. Fumal

FIG. 16.

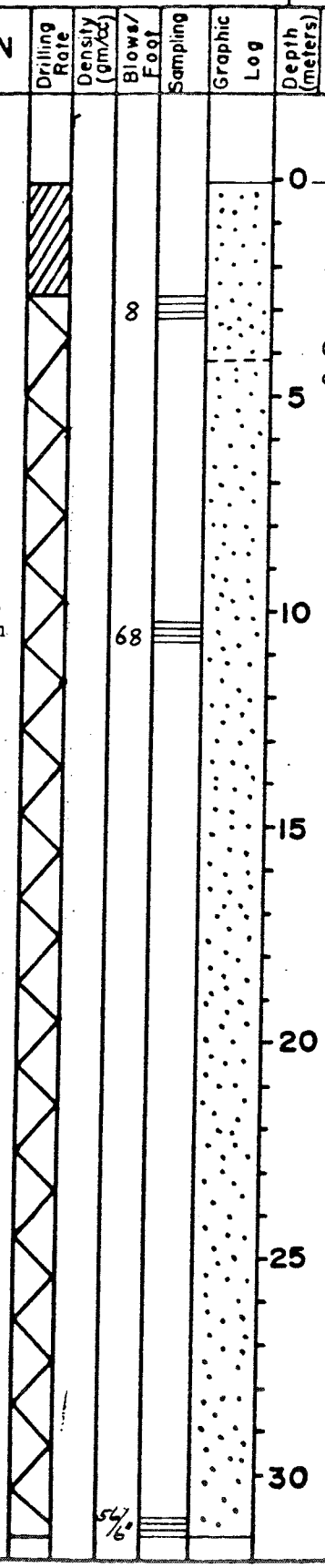
ALTITUDE: 20'	LOCATION: Lat. 37°46'20" Long. 122°30'33"	HOLE No. 37
DATE: 11/18/75	QUADRANGLE: 7½' SAN FRANCISCO NORTH, CALIF.	SITE: WINDMILL
		GEOLOGIC MAP UNIT: Qd DUNE SAND

SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
SAND, very dark olive brown, well sorted, fine to medium grained, rounded to sub-rounded, moist, medium dense. (SP)			24			0	SAND, very dark olive brown, well sorted, fine to medium grained, rounded to subrounded, moist, loose to medium dense. (SP)
						5	Grading dark yellowish brown and denser.
No sample recovered.			50/6"			10	
						15	
						20	
						25	SAND, strong brown, fine to medium grained. Grading to dark yellowish brown.
						30	

COMMENTS:	LOGGED BY: T. Fumal

FIG. 17

ALTITUDE: 80'	**LOCATION:**	**HOLE No.** 38
	Lat. 37°46'20"	**SITE:** CHAIN OF LAKES
DATE: 11/18/75	**Long.** 122°30'12"	**GEOLOGIC MAP UNIT:** Qd
	QUADRANGLE: 7½' SAN FRANCISCO NORTH, CALIF.	DUNE SAND



SAMPLE DESCRIPTION

SAND, olive, very well sorted, medium grained, rounded to subrounded, moist, loose. (SP)

SAND, dark yellowish brown, well sorted, fine to medium grained, rounded to sub-rounded, quite moist, very dense. (SP)

No sample recovered.

DESCRIPTION

SAND, olive, very well sorted, medium grained, rounded to subrounded, moist, loose. (SP)

Grading dark yellowish brown and denser.

COMMENTS: Hole cased to 21.5 m only due to caving sand.	**LOGGED BY:** T. Fumal

FIG. 18

ALTITUDE: 300'	**LOCATION:**	**HOLE No.** 39
	Lat. 37°46'28"	**SITE:** PRAYER BOOK CROSS
DATE: 11/17/75	**Long.** 122°28'38"	**GEOLOGIC MAP UNIT:** fc
	QUADRANGLE: 7½' SAN FRANCISCO NORTH, CALIF.	FRANCISCAN CHERT

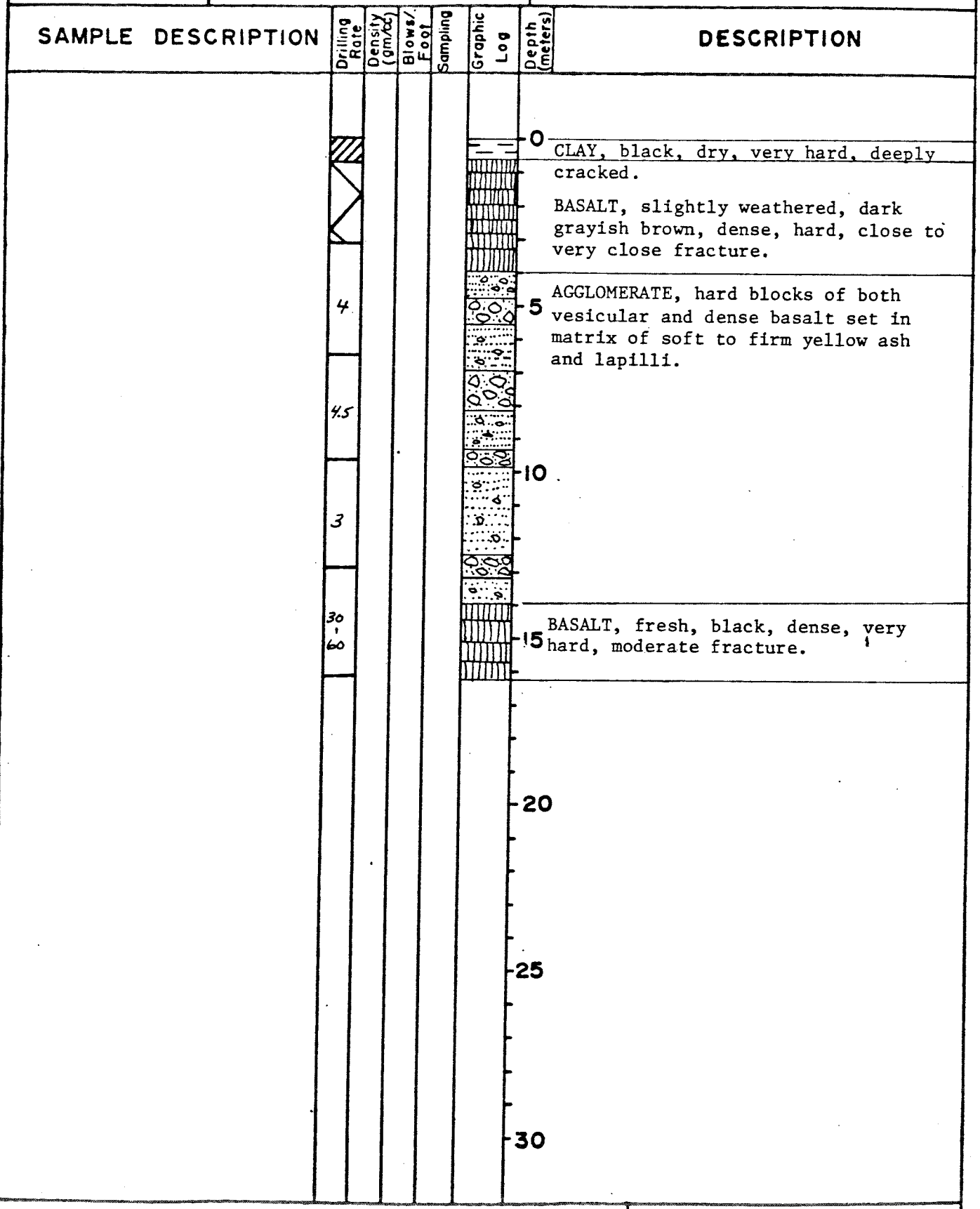
SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/ Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
						0	CHERT, dark red, hard, close fracture, thin to medium bedded with thin partings of soft dark red shale.
	1					5	
	1					10	
	1						SHALE, black, hard, closely fractured with some sheared zones. Includes masses of closely to moderately fractured red CHERT.
SHALE, black, sheared to <4 mm, texture is gravelly sand.	2	2.31				15	
	2					20	
	2						CHERT, dark red, hard, close to moderate fracture, thin to medium bedded with partings of soft dark red shale.
	1.5					25	
	2.5					30	

COMMENTS:

LOGGED BY: T. Fumal

FIG. 19

ALTITUDE: 590'	LOCATION: Lat. 37°24'17" Long. 122°09'55"	HOLE No. 40
DATE: 12/15/75	QUADRANGLE: 7½' PALO ALTO, CALIF.	SITE: PAGE MILL
		GEOLOGIC MAP UNIT: Tpm PAGE MILL BASALT



COMMENTS: Drilling stopped at 16 m due to extremely slow drilling rate in hard basalt flow.

LOGGED BY: T. Fumal

FIG. 20

ALTITUDE: 3'	LOCATION:	HOLE No. 41
	Lat. 37°46'59"	SITE: SOUTHERN PACIFIC
DATE: 1/6/76	Long. 122°23'15"	GEOLOGIC MAP UNIT: Qaf
	QUADRANGLE: 7½' SAN FRANCISCO NORTH, CALIF.	ARTIFICIAL FILL

SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
						0	SANDY CLAY LOAM, dark brown, gravelly dry. (SC)
						5	SILTY CLAY, very dark gray, soft. (CL) grading to: SILT LOAM, dark gray
SILT LOAM, dark gray, low plasticity, quick, wet, (ML) and SAND, olive gray, well sorted, fine to medium grained, quick, wet. (SP)		1.99					SAND, olive gray, grading to dark yellowish brown, well sorted, fine to medium grained, wet, dense. (SP)
SAND, dark yellowish brown, well sorted, fine to medium grained, wet, dense. (SP)		2.10	50			10	
						15	CLAY, brownish gray, grading to grayish green, very stiff.
LOAMY FINE SAND, yellowish brown, very dense, weakly cemented by clay and iron oxide, slightly moist. (SC)		2.00	89/6"			20	LOAMY FINE SAND, yellowish brown, very dense, weakly cemented by clay and iron oxide, slightly moist. (SC)
							SHALE, very dark gray, hard, closely fractured with zones sheared to gravelly sandy loam.
						25	
SHALE, very dark gray, moist, texture is sandy loam with 30% angular shale fragments.			50/4"			30	

COMMENTS: Steel casing was set to 7 m because of water loss in fill material.

LOGGED BY: T. Fumal

FIG. 21

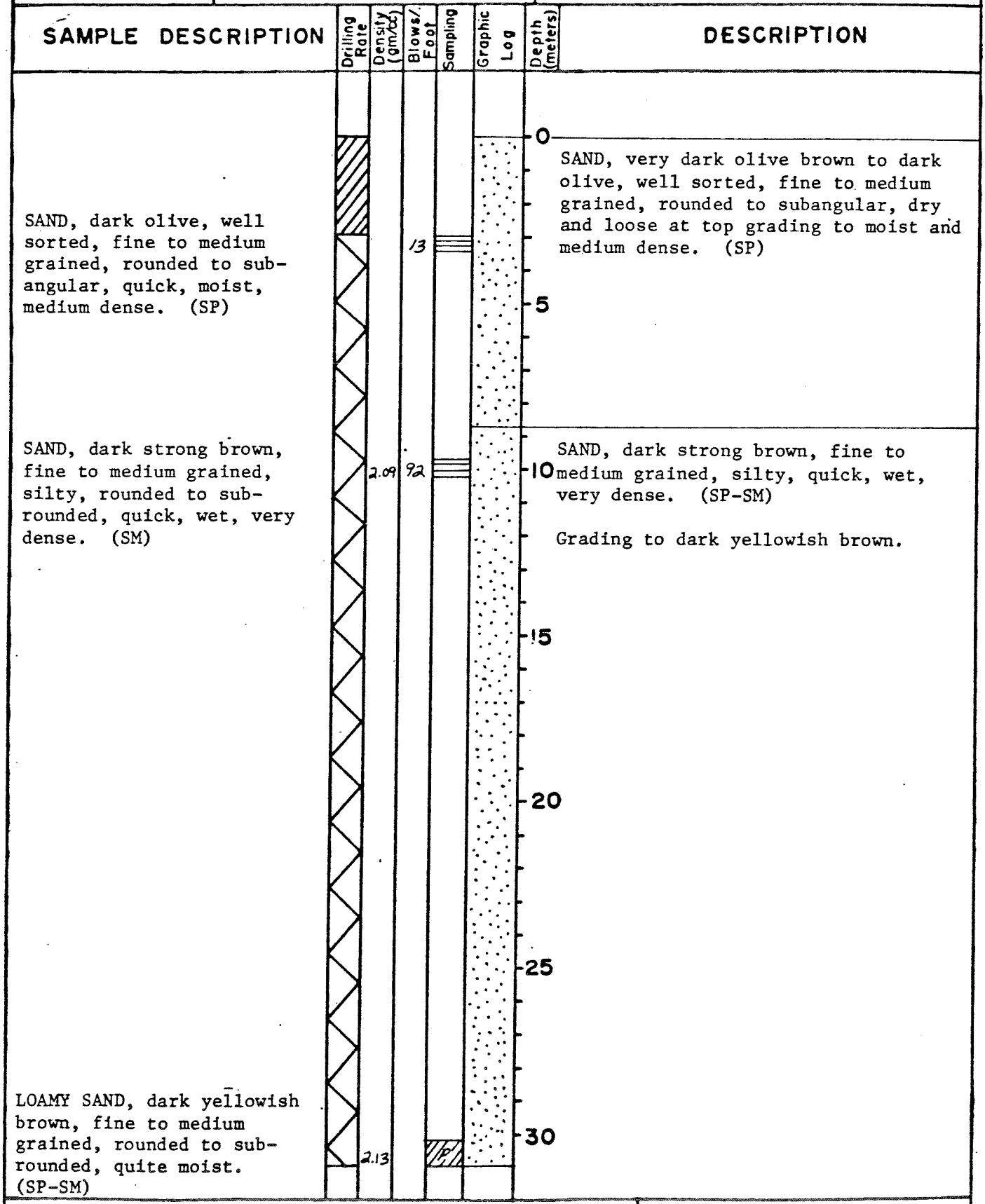
ALTITUDE: 225'	LOCATION: Lat. 37°41'56" Long. 122°29'42" QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	HOLE No. 42 SITE: MAR VISTA GEOLOGIC MAP UNIT: Qc COLMA FORMATION
DATE: 11/21/75		

SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
						0	SANDY LOAM, dark brown
SAND, brown, well sorted, medium grained, moist, dense. (SP)			45				SAND, brown, well sorted, medium grained, moist, dense. (SP)
						5	
SAND, very dark olive brown, well sorted, fine grained, moist, very dense. (SP)			91			10	SAND, dark olive brown, well sorted, fine grained, abundant heavy minerals.
							SILT LOAM, pale olive
							SAND, dark olive brown, well sorted, fine grained, abundant heavy minerals. (SP)
						15	
CLAY, dark gray, high plasticity, high dry strength, medium toughness, moist, hard. (CH)			33				CLAY, dark gray, high plasticity, moist, hard. (CH)
						20	
							FINE SANDY CLAY LOAM, strong brown and pale brown. Contains iron oxide concretions. (SC)
						25	grading to: SAND, olive brown, well sorted, fine to medium grained, rounded to subrounded, wet. (SP)
SAND, olive brown with some mottles of dark gray, well sorted, fine to medium grained, rounded to subrounded, wet. (SP)							
						30	

COMMENTS:	LOGGED BY: T. Fumal

FIG. 22

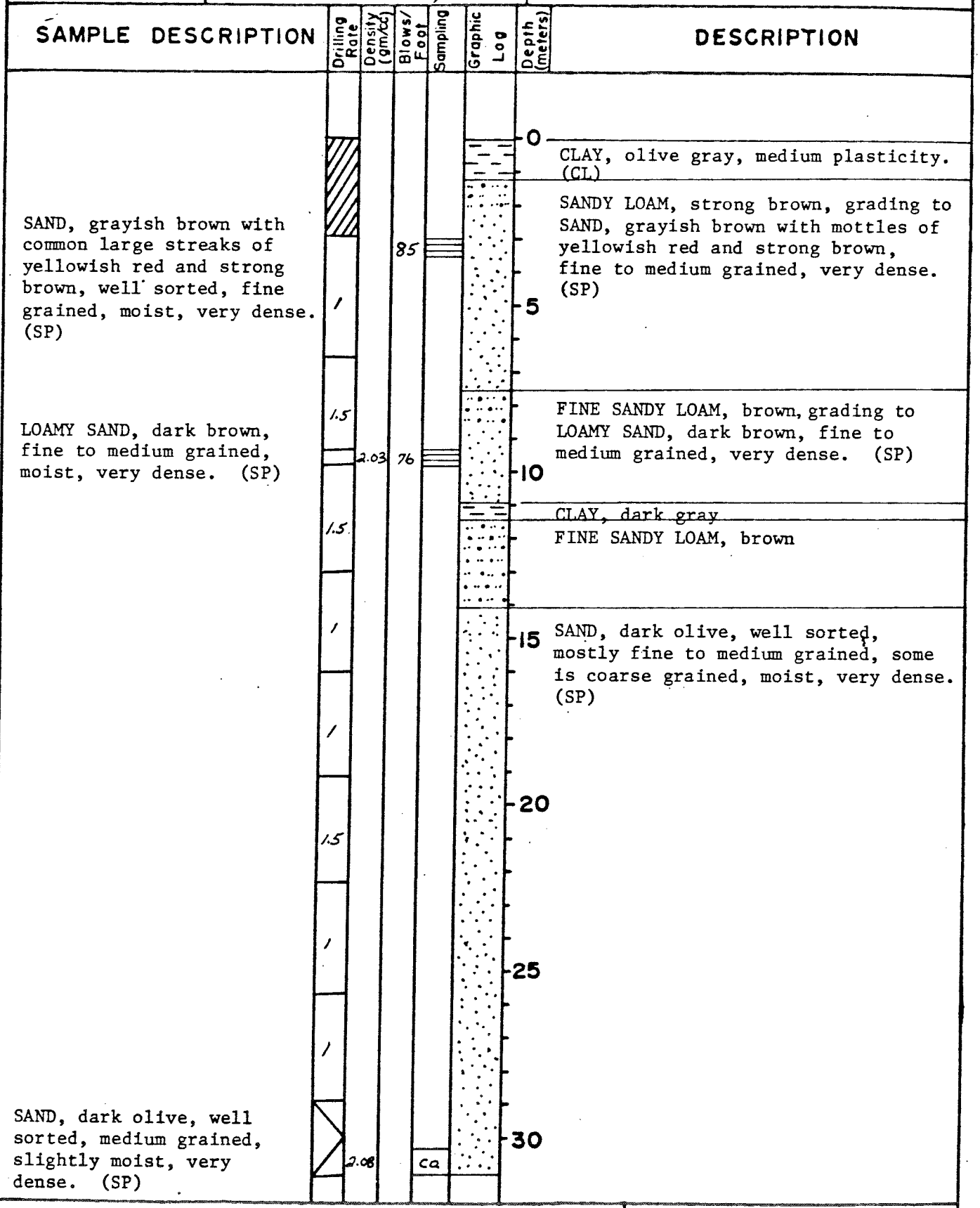
ALTITUDE: 125'	LOCATION: Lat. 37°45'53" Long. 122°29'49"	HOLE No. 43
DATE: 11/19/75	QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	SITE: QUINTARA
		GEOLOGIC MAP UNIT: Qd DUNE SAND



COMMENTS:	LOGGED BY: T. Fumal

FIG. 23

ALTITUDE: 250'	LOCATION: Lat. 37°41'30" Long. 122°29'42"	HOLE No. 44
DATE: 11/26/75	QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	SITE: HILLVIEW
		GEOLOGIC MAP UNIT: QTm MERCED FORMATION

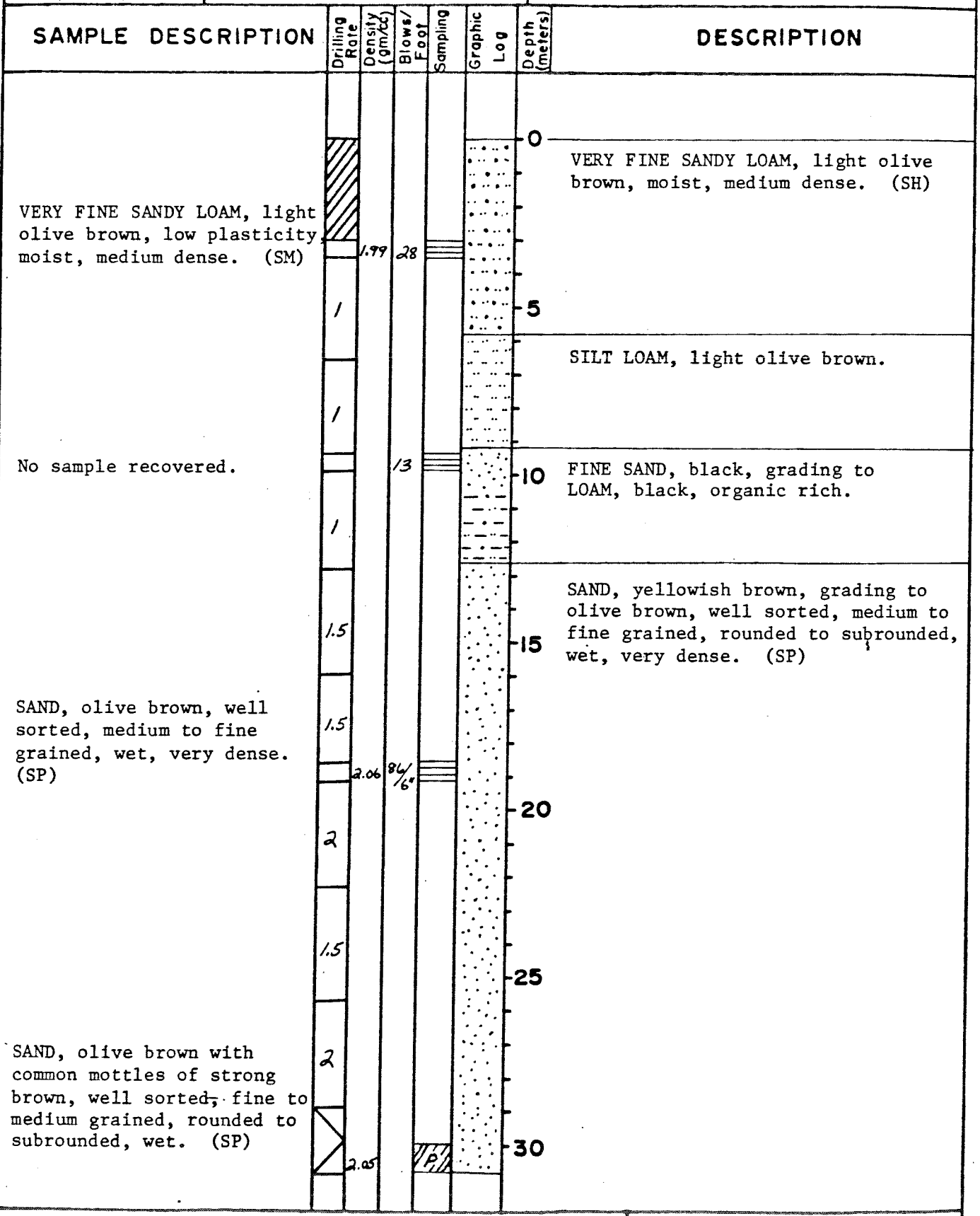


COMMENTS:

LOGGED BY: T. Fumal

FIG. 24

ALTITUDE: 470'	LOCATION: Lat. 37°40'50" Long. 122°29'27"	HOLE No. 45
DATE: 11/24/75	QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	SITE: AVALON
		GEOLOGIC MAP UNIT: QTm MERCED FORMATION



COMMENTS:	LOGGED BY: T. Fumal

FIG. 25

ALTITUDE: 825'	LOCATION:	HOLE No. 46
	Lat. 37°45'01"	SITE: TWIN PEAKS
DATE: 11/20/75	Long. 122°26'52"	GEOLOGIC MAP UNIT: fg
	QUADRANGLE: 7½' SAN FRANCISCO NORTH, CALIF.	FRANCISCAN GREENSTONE

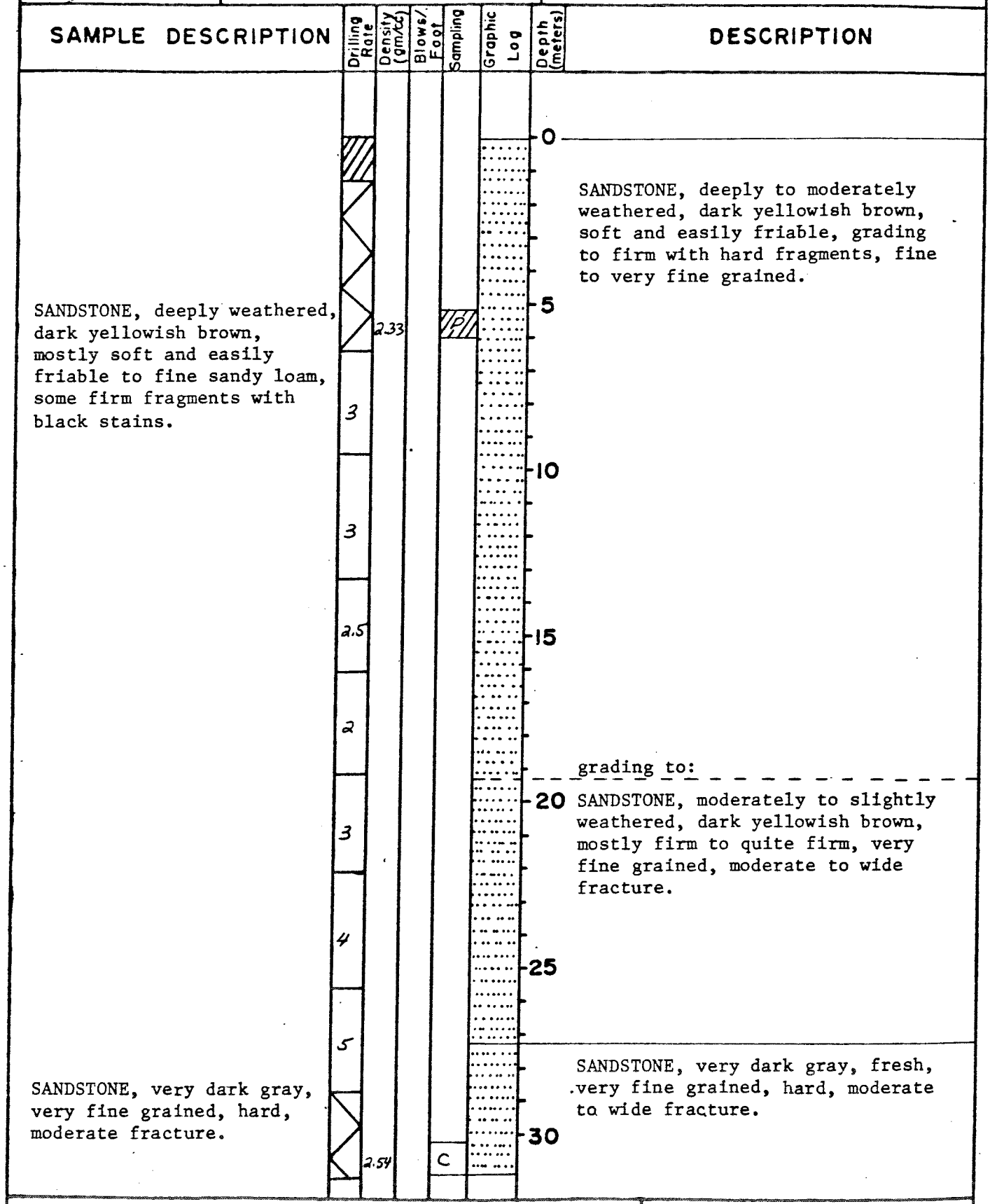
SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
No sampling was attempted because large, hard fragments of rock frequently became lodged above the bit, making it very difficult to remove the drill 100.	2.5 3 3 4 4 4 4 4.5	2.75				0 5 10 15 20 25 30	GREENSTONE, moderately to slightly weathered, olive brown to dark grayish green, hard, close to moderate fracture, some clay coatings on fracture surfaces, contains some lenses of closely fractured chert. grading to: GREENSTONE, fresh, dark grayish green, hard, close to moderate fracture.

COMMENTS: Site is located on cut area with several meters of soil and rock removed.

LOGGED BY: T. Fumal

FIG. 26

ALTITUDE: 800'	LOCATION: Lat. 37°42'02" Long. 122°25'55"	HOLE No. 47
DATE: 12/1/75	QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	SITE: SAN BRUNO MOUNTAIN
		GEOLOGIC MAP UNIT: KJs SANDSTONE at SAN BRUNO MTN

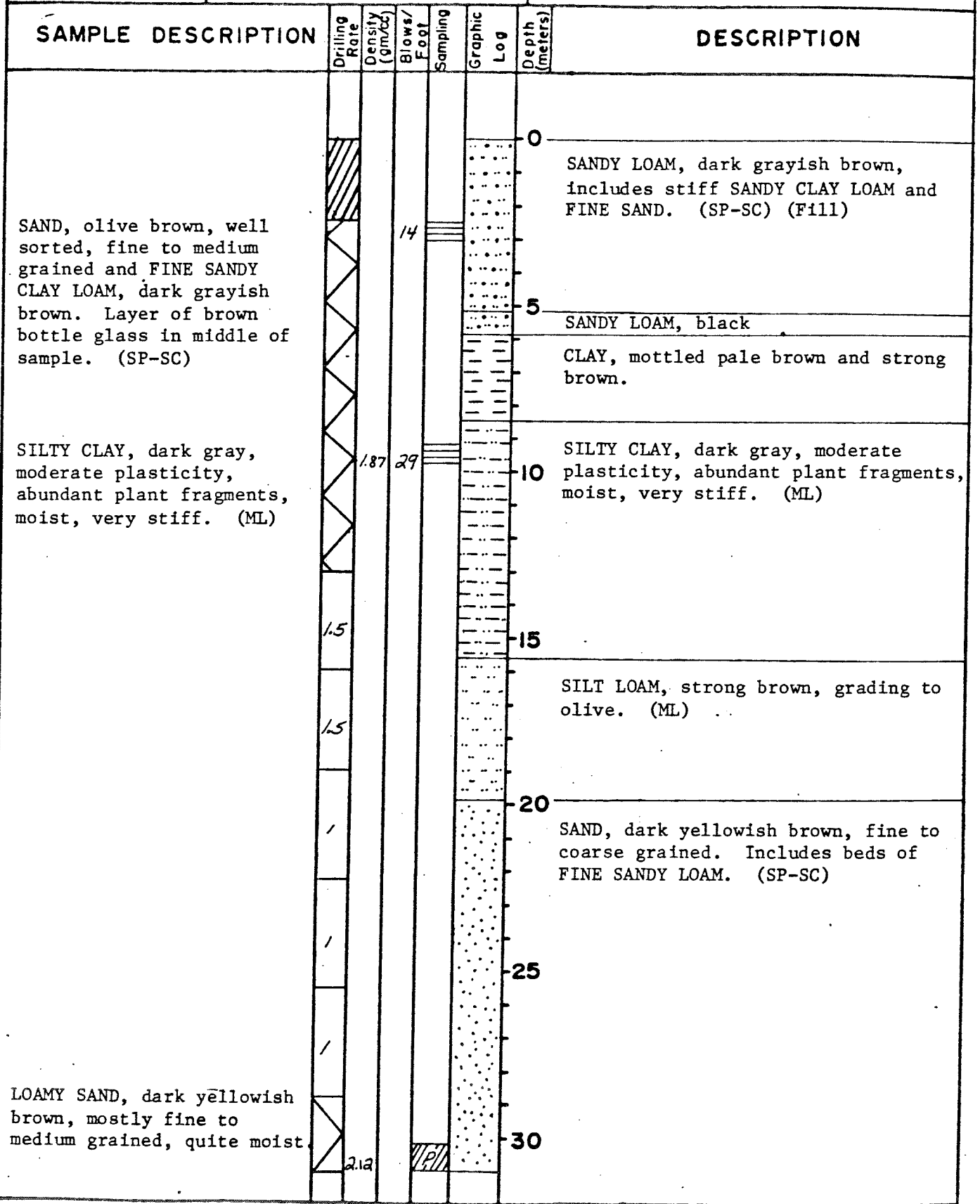


COMMENTS:

LOGGED BY: T. Fumal

FIG. 27

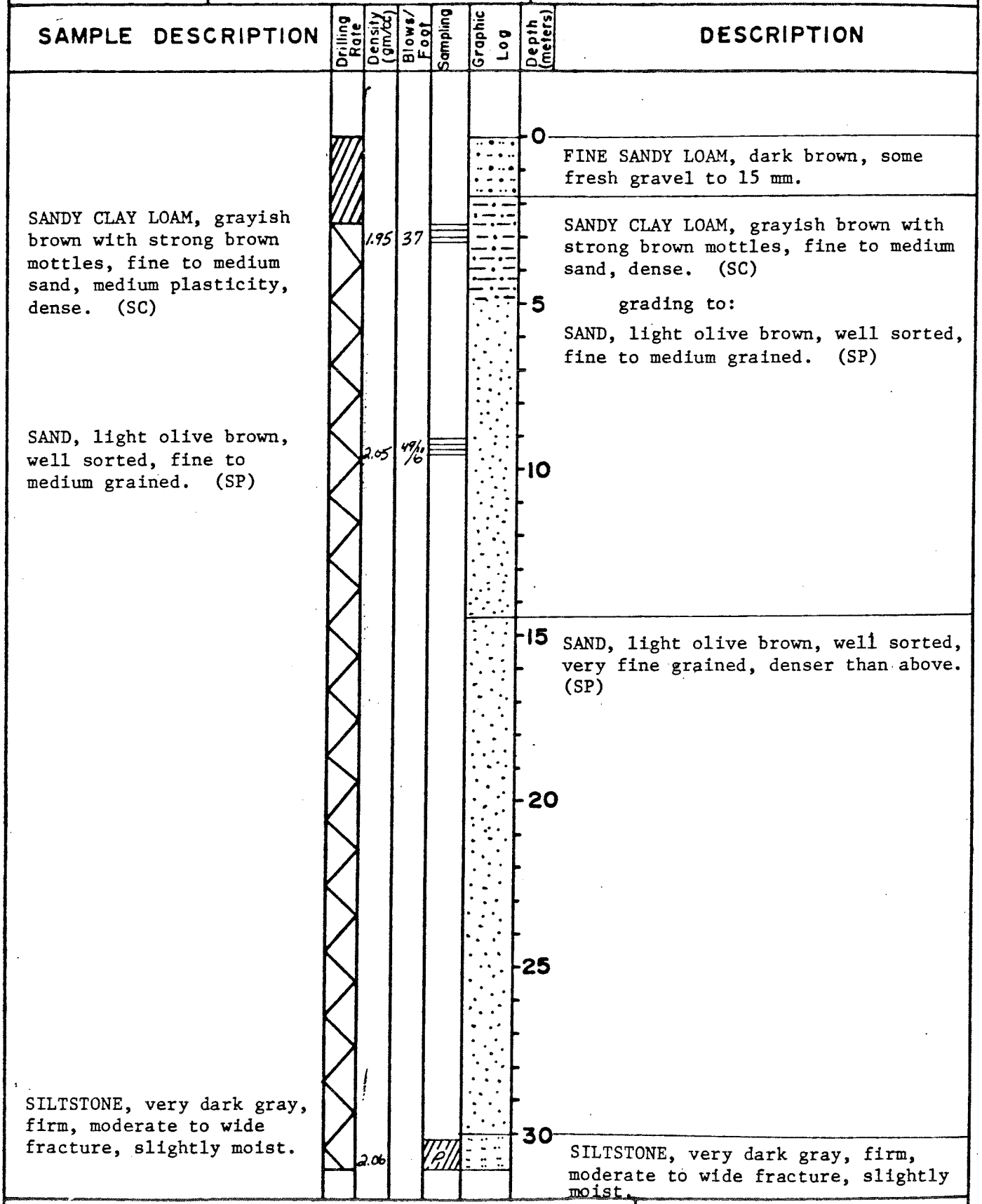
ALTITUDE: 460'	LOCATION: Lat. 37°41'08" Long. 122°29'15"	HOLE No. 48
DATE: 11/25/75	QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	SITE: SKYLINE
		GEOLOGIC MAP UNIT: Qaf/Qoa ARTIFICIAL FILL/OLDER ALLUVIUM



COMMENTS: Rapid water loss in clay between 5.8 m and 8.5 m.	LOGGED BY: T. Fumal

FIG. 28

ALTITUDE: 470'	LOCATION: Lat. 37°41'02" Long. 122°29'19"	HOLE No. 49
DATE: 11/25/75	QUADRANGLE: 7½' SAN FRANCISCO SOUTH, CALIF.	SITE: WESTMOOR
		GEOLOGIC MAP UNIT: QTm MERCED FORMATION

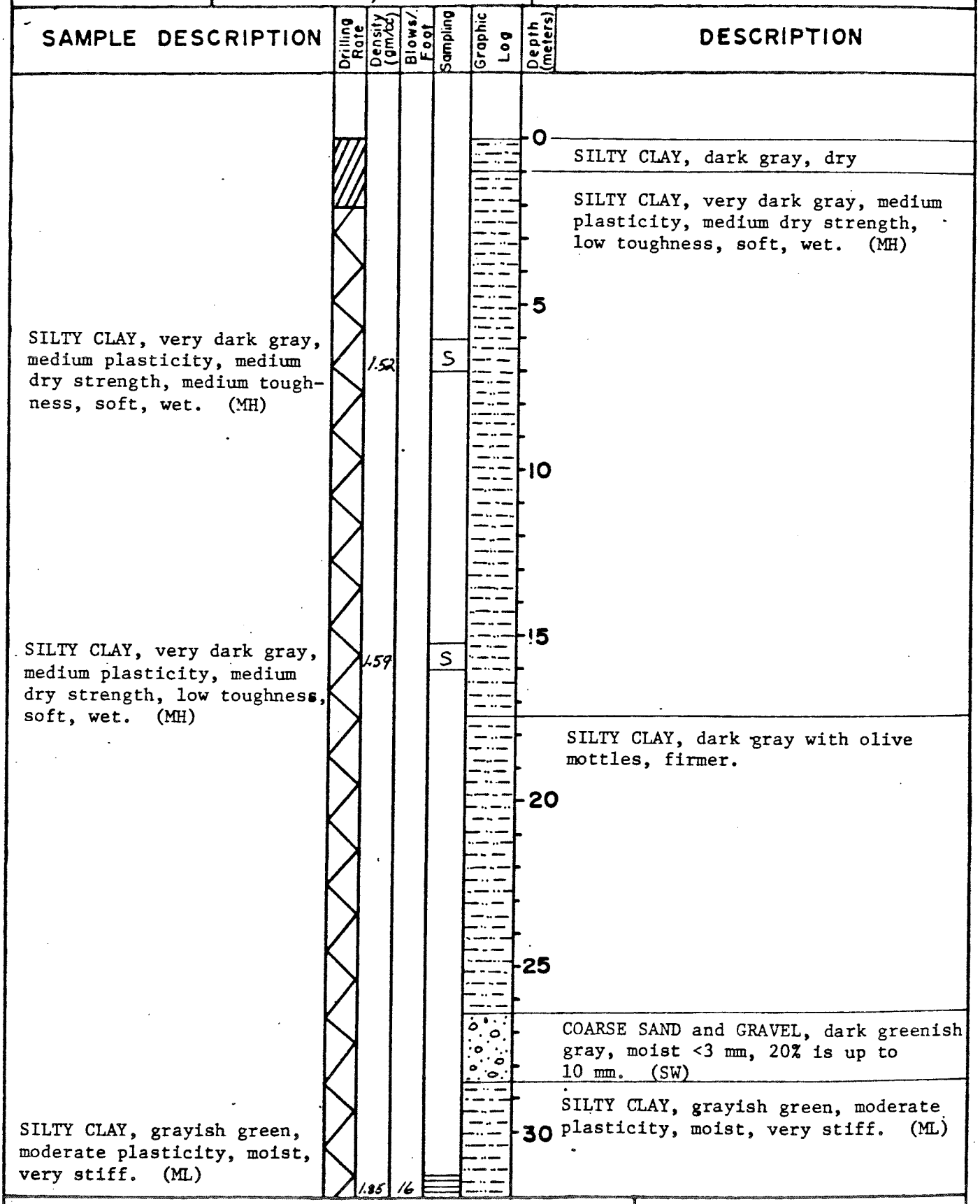


COMMENTS:

LOGGED BY: T. Fumal

FIG. 29

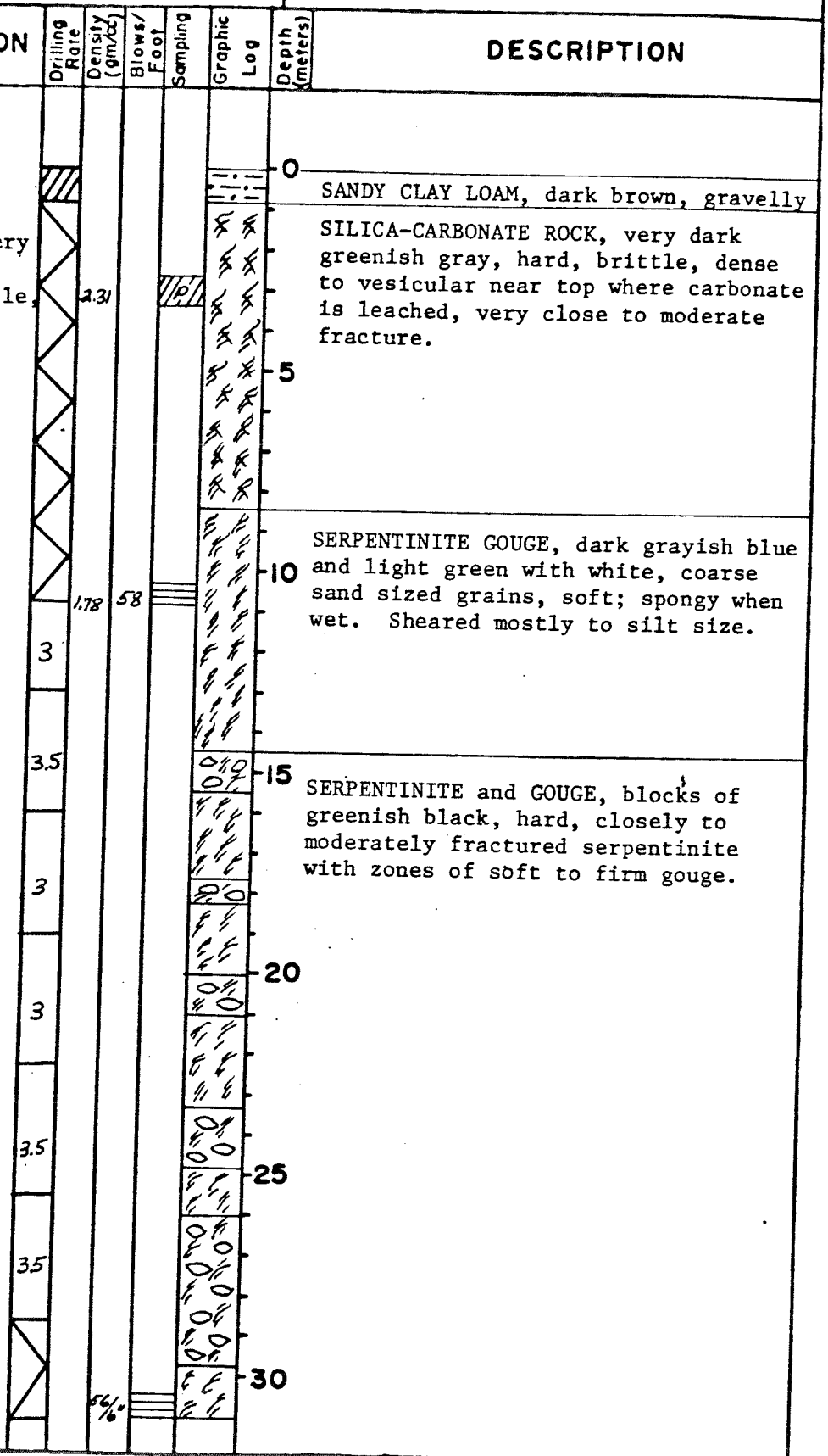
ALTITUDE: 2'	LOCATION: Lat. 37°32'38" Long. 122°14'06"	HOLE No. 50
DATE: 12/4/75	QUADRANGLE: 7½' REDWOOD POINT, CALIF.	SITE: KGEI
		GEOLOGIC MAP UNIT: Qm BAY MUD



COMMENTS:	LOGGED BY: T. Fumal

FIG. 30.

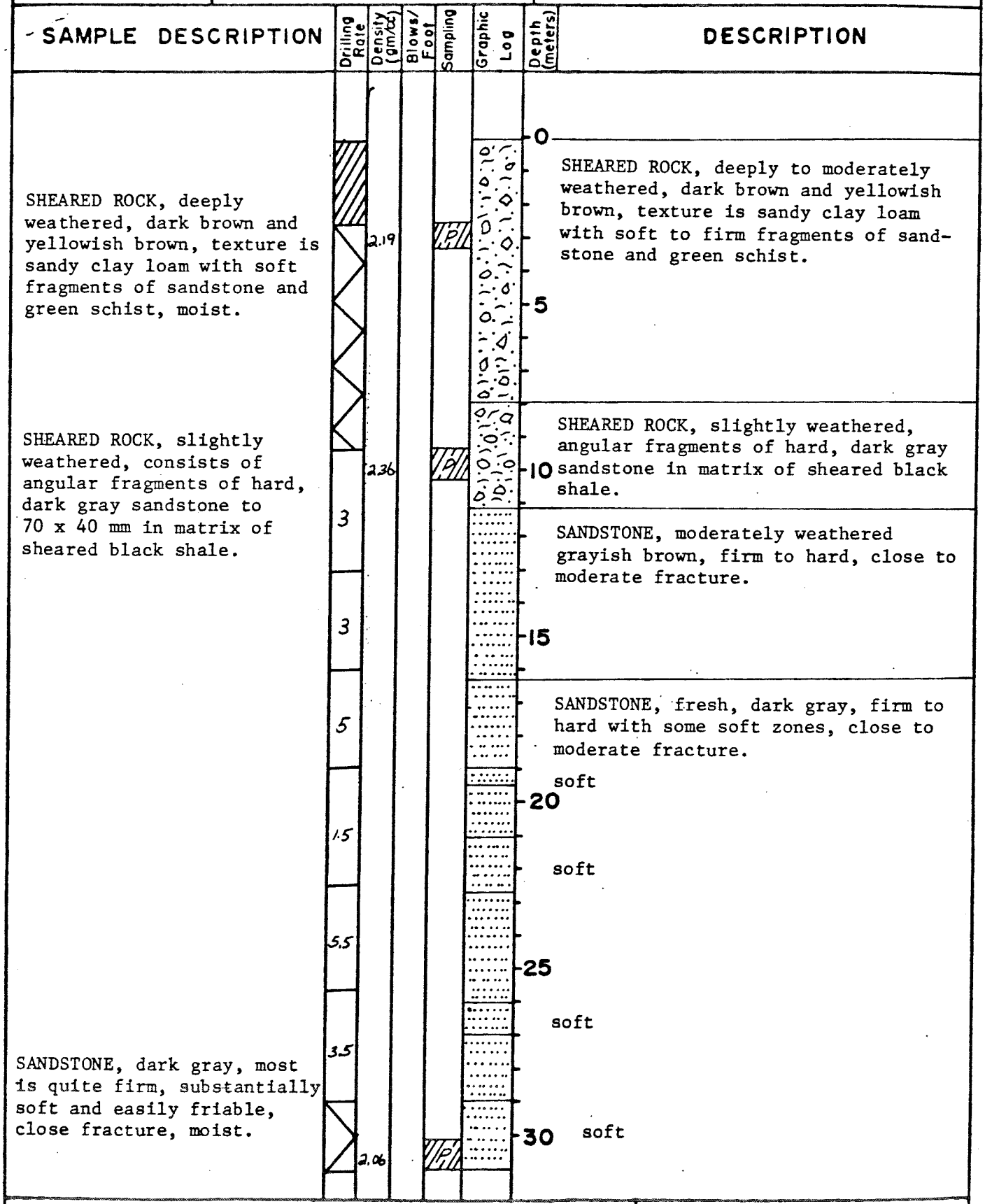
ALTITUDE: 560'	LOCATION: Lat. 37°26'55" Long. 122°15'08"	HOLE No. 51
DATE:	QUADRANGLE: 7½' WOODSIDE, CALIF.	SITE: CREST ROAD
		GEOLOGIC MAP UNIT: SERPENTINE



COMMENTS:	LOGGED BY: T. Fumal

FIG. 31

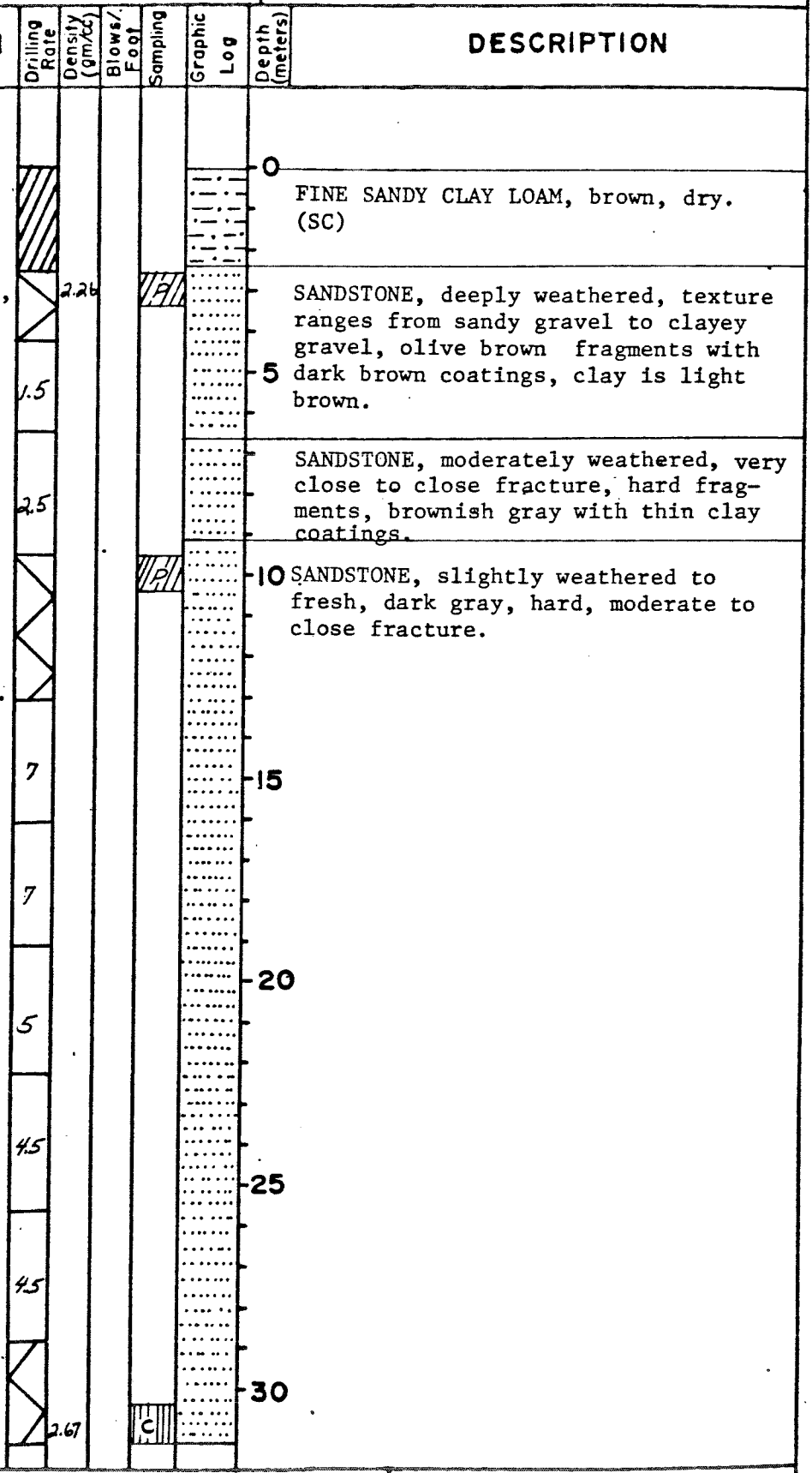
ALTITUDE: 565'	LOCATION: Lat. 37°32'18" Long. 122°20'00"	HOLE No. 52
DATE: 12/5/75	QUADRANGLE: 7½' SAN MATEO, CALIF.	SITE: COLLEGE OF SAN MATEO
		GEOLOGIC MAP UNIT: fsr FRANCISCAN SHEARED ROCK



COMMENTS:	LOGGED BY: T. Fumal

FIG. 32

ALTITUDE: 150'	LOCATION: Lat. 37°32'32" Long. 122°19'08"	HOLE No. 53
DATE: 12/8/75	QUADRANGLE: 7½' SAN MATEO, CALIF.	SITE: PENINSULA COUNTRY CLUB
		GEOLOGIC MAP UNIT: fs FRANCISCAN SANDSTONE

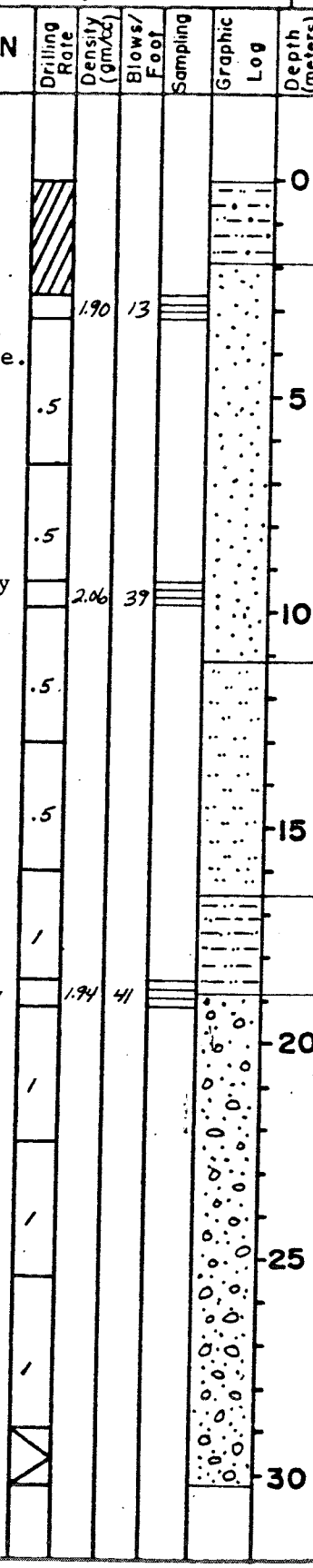


COMMENTS:

LOGGED BY: T. Fumal

FIG. 33

ALTITUDE: 145'	LOCATION: Lat. 37°17'48" Long. 121°51'05"	HOLE No. 54
DATE: 1/12/76	QUADRANGLE: 7½' SAN JOSE EAST, CALIF.	SITE: SANTA CLARA COUNTY FAIRGROUNDS
		GEOLOGIC MAP UNIT: Qyfo HOLOCENE FLUVIAL DEPOSITS



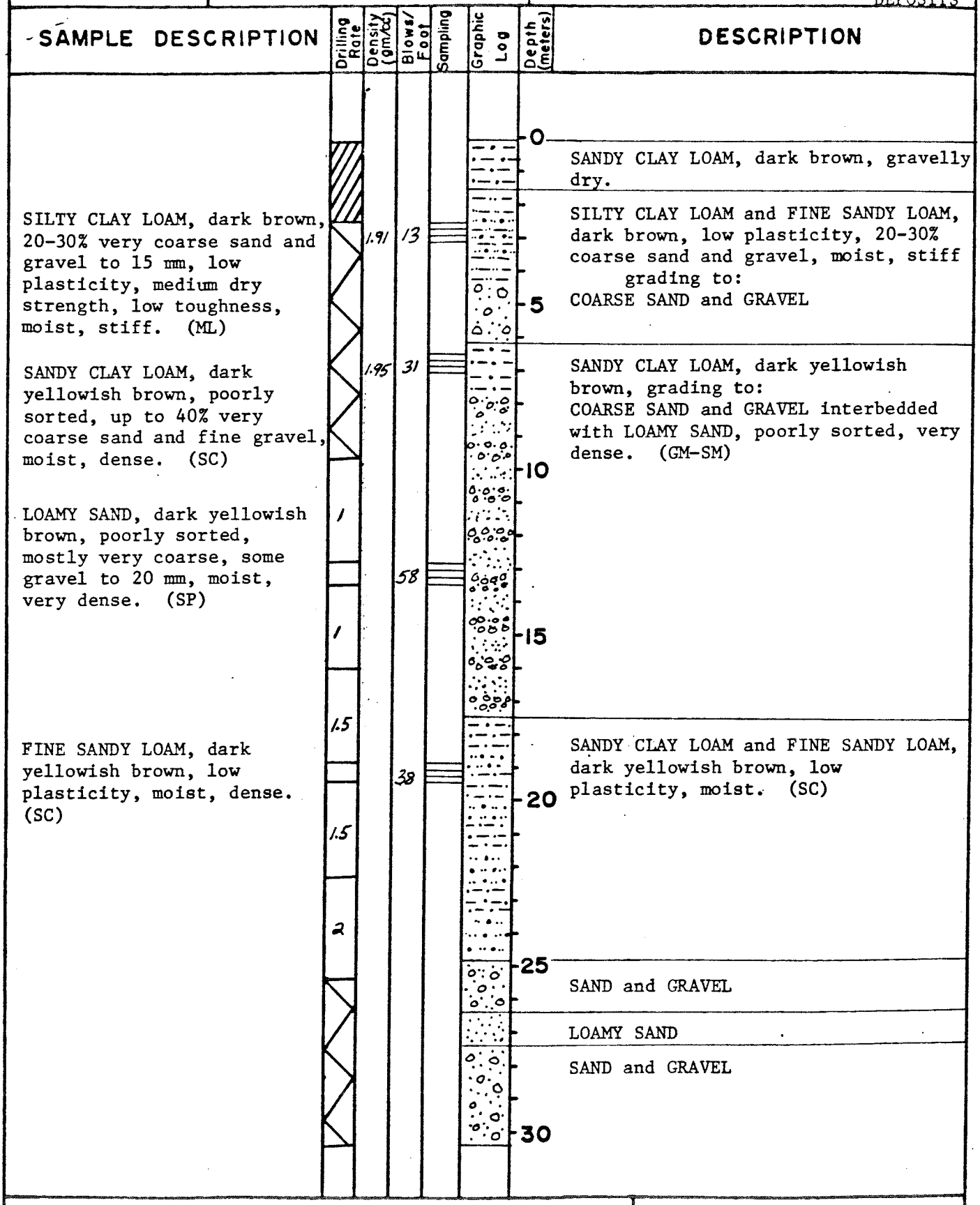
SAMPLE DESCRIPTION	DESCRIPTION
	LOAM, dark brown, dry. (CL)
VERY FINE SAND, dark yellowish brown, very well sorted, moist, medium dense. (SP)	SAND, dark yellowish brown to dark brown, very well sorted, very fine to fine grained, medium dense to dense, moist. (SP)
FINE SAND, dark brown, very well sorted, moist, dense. (SP)	SILT LOAM, dark brown. (ML)
SILTY CLAY LOAM, dark grayish brown and dark gray with strong brown mottles. (CL)	SILTY CLAY, mottled gray and grayish brown. (CL)
grading to: SANDY LOAM, dark grayish brown, poorly sorted, some gravel to 20 mm. (SM)	SAND and FINE GRAVEL, dark grayish brown, most is <5 mm, 25% is up to 15 mm, mostly sandstone and shale, some red chert. (GW)

COMMENTS:

LOGGED BY: T. Fumal

FIG. 34

ALTITUDE: 195'	LOCATION: Lat. 37°21'25" Long. 122°04'12"	HOLE No. 55
DATE: 12/16/75	QUADRANGLE: 7½' CUPERTINO, CALIF.	SITE: OAK AVENUE SCHOOL
		GEOLOGIC MAP UNIT: Qyf HOLOCENE ALLUVIAL FAN DEPOSITS

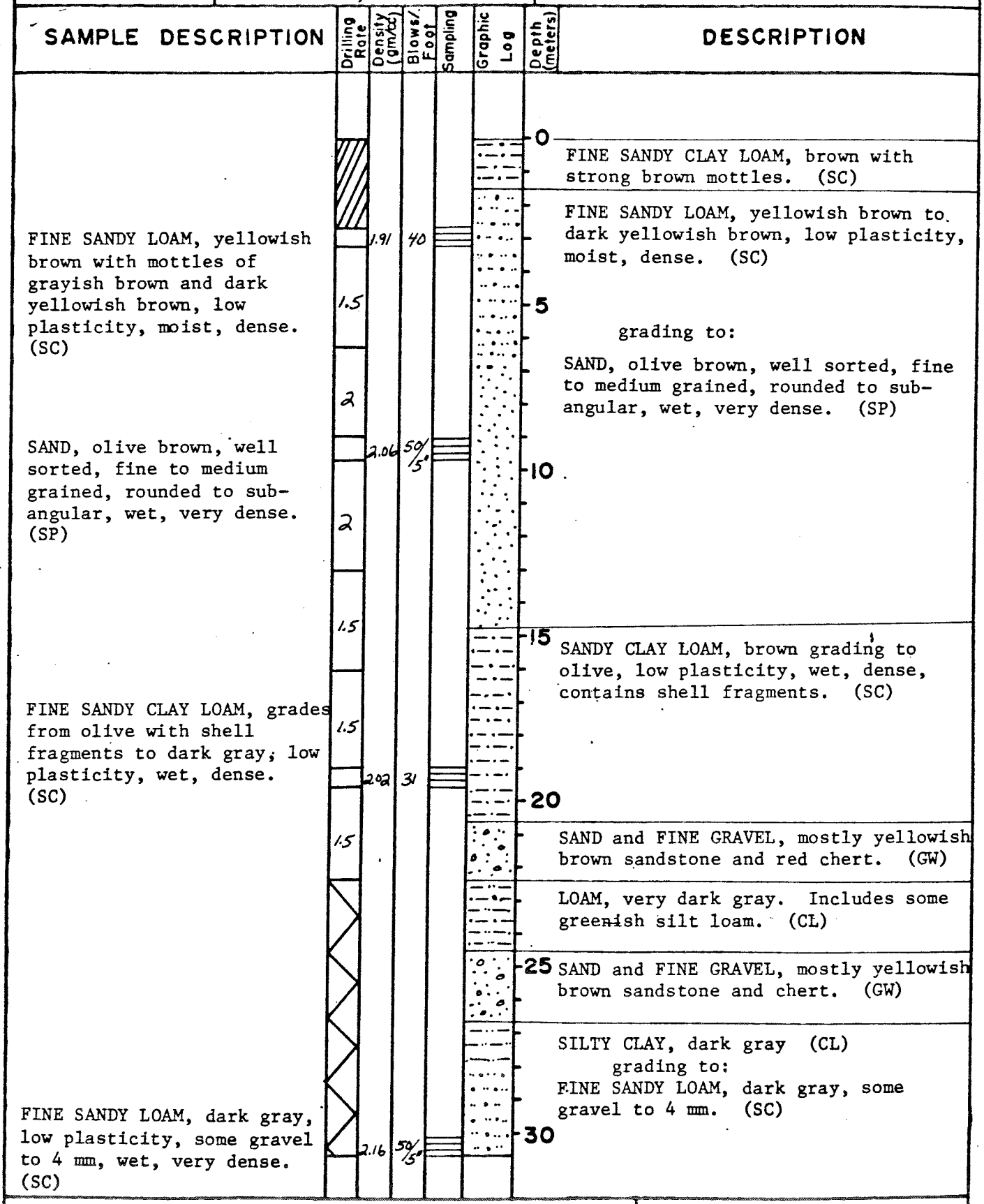


COMMENTS:

LOGGED BY: T. Fumal

FIG. 35

ALTITUDE: 27'	LOCATION: Lat. 37°48'31" Long. 122°16'43"	HOLE No. 56
DATE: 1/8/76	QUADRANGLE: 7½' OAKLAND WEST, CALIF.	SITE: MERRITT SAND
		GEOLOGIC MAP UNIT: Qm MERRITT SAND



COMMENTS:

LOGGED BY: T. Fumal

FIG. 36

ALTITUDE: 920'	LOCATION: Lat. 37°47'15" Long. 122°09'50" QUADRANGLE: 7½' OAKLAND EAST, CALIF.	HOLE No. 57 SITE: MERRITT COLLEGE GEOLOGIC MAP UNIT: LEONA RHYOLITE
DATE: 1/9/76		

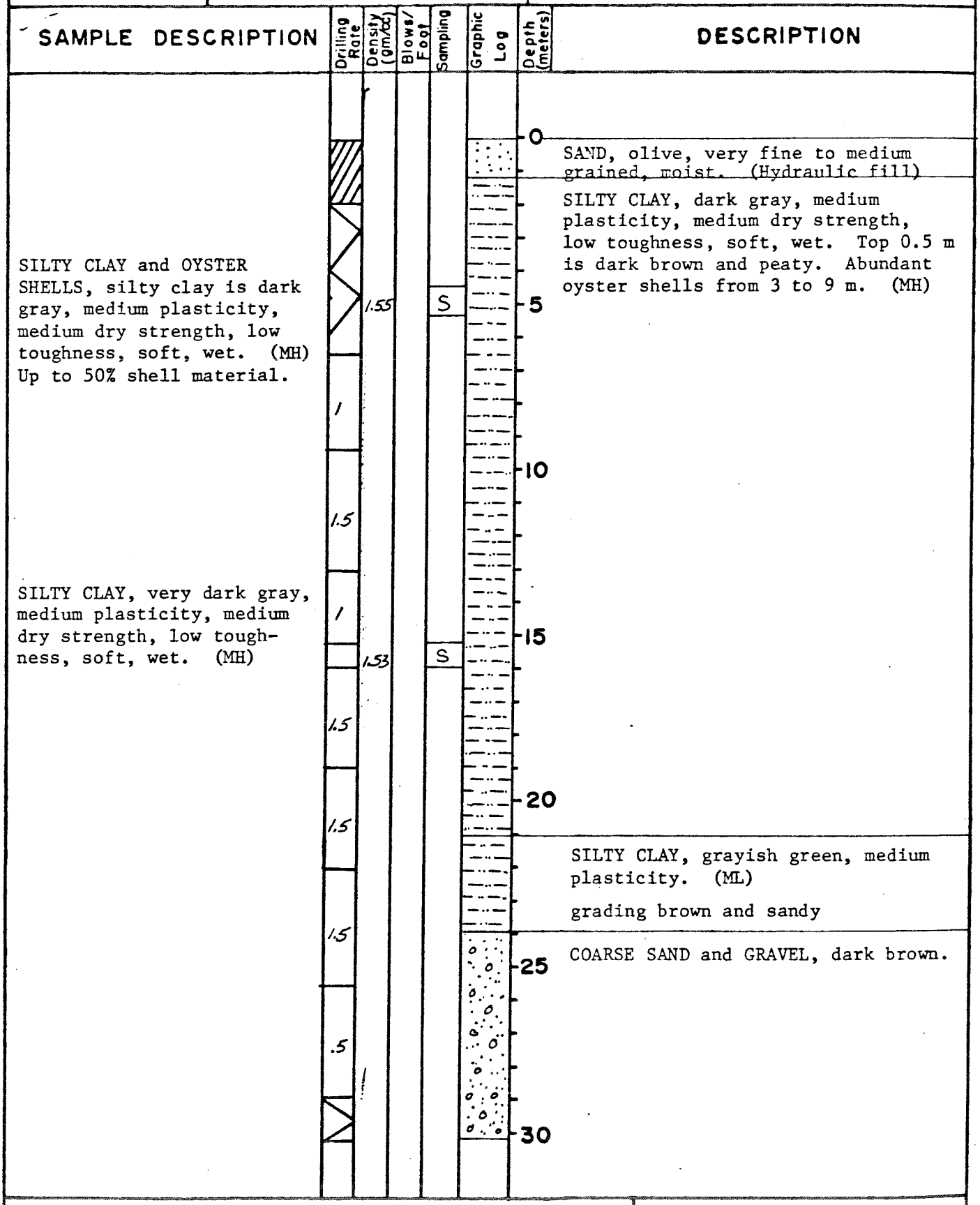
SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
RHYOLITE, moderately weathered, yellowish brown and dark yellowish brown with dark reddish brown stains, hard, very close to close fracture, some fragments to 40 mm, mostly <10 mm.	2	2.06		P		0	RHYOLITE, slightly to moderately weathered, yellowish brown and dark yellowish brown with dark reddish brown stains, hard, close to very close fracture. Includes thin breccia zones which are soft and clayey.
	2.5					5	
	2.5					10	
	1.5					15	
	1.5						
	2					20	RHYOLITE, slightly weathered, yellowish brown and dark yellowish brown, hard, mostly close to moderate fracture.
	2.5					25	
	2.5						
						30	

COMMENTS:

LOGGED BY: T. Fumal

FIG. 37

ALTITUDE: 2' DATE: 12/11/75	LOCATION: Lat. 37°34'04" Long. 122°15'27" QUADRANGLE: 7½' SAN MATEO, CALIF.	HOLE No. 58 SITE: AUDUBON SCHOOL GEOLOGIC MAP UNIT: Qaf ARTIFICIAL FILL



COMMENTS:	LOGGED BY: T. Fumal

FIG. 38

ALTITUDE: 12'	LOCATION:	HOLE No. 59
	Lat. 37°46'35"	SITE: CARMICHAEL SCHOOL
DATE: 1/7/76	Long. 122°24'15"	GEOLOGIC MAP UNIT: Qaf
	QUADRANGLE: 7½' SAN FRANCISCO NORTH, CALIF.	ARTIFICIAL FILL

SAMPLE DESCRIPTION	Drilling Rate	Density (gm/cc)	Blows/Foot	Sampling	Graphic Log	Depth (meters)	DESCRIPTION
						0	SAND, dark brown, very well sorted, fine grained, loose, dry. (SP)
SAND, dark olive gray, well sorted, fine grained, quick, wet, medium dense. Contains roots and other plant fragments. (SP)		2.02	27				Peat
SAND, dark olive gray, well sorted, fine grained, quick, wet, very dense. (SP)		2.12	50/13"			5	SAND, dark olive gray, well sorted, fine grained, quick, wet. (SP)
							Peat
						10	SANDY CLAY LOAM, very dark gray, wet, strong odor. (SC)
							SANDY LOAM, strong brown to yellowish brown (SC)
							grading to:
						15	LOAMY SAND, dark yellowish brown, fine grained. (SM)
LOAMY FINE SAND, olive, quick, wet, rounded to subangular, dense. (SM)		2.12	36				grading to:
	1.5						SAND, olive brown, well sorted, fine grained. (SP)
						20	
	1.5						SILTY CLAY, green. (CL)
							light olive brown
	1.5						SAND, strong brown to yellowish brown, well sorted, fine grained, rounded to subangular. (SP)
						25	
	1						olive brown
							olive gray
SAND, olive gray, well sorted, fine grained, rounded to subangular, wet, quick, very dense. (SP)		2.04	50/15"			30	

COMMENTS:

LOGGED BY: T. Fumal

FIG. 39

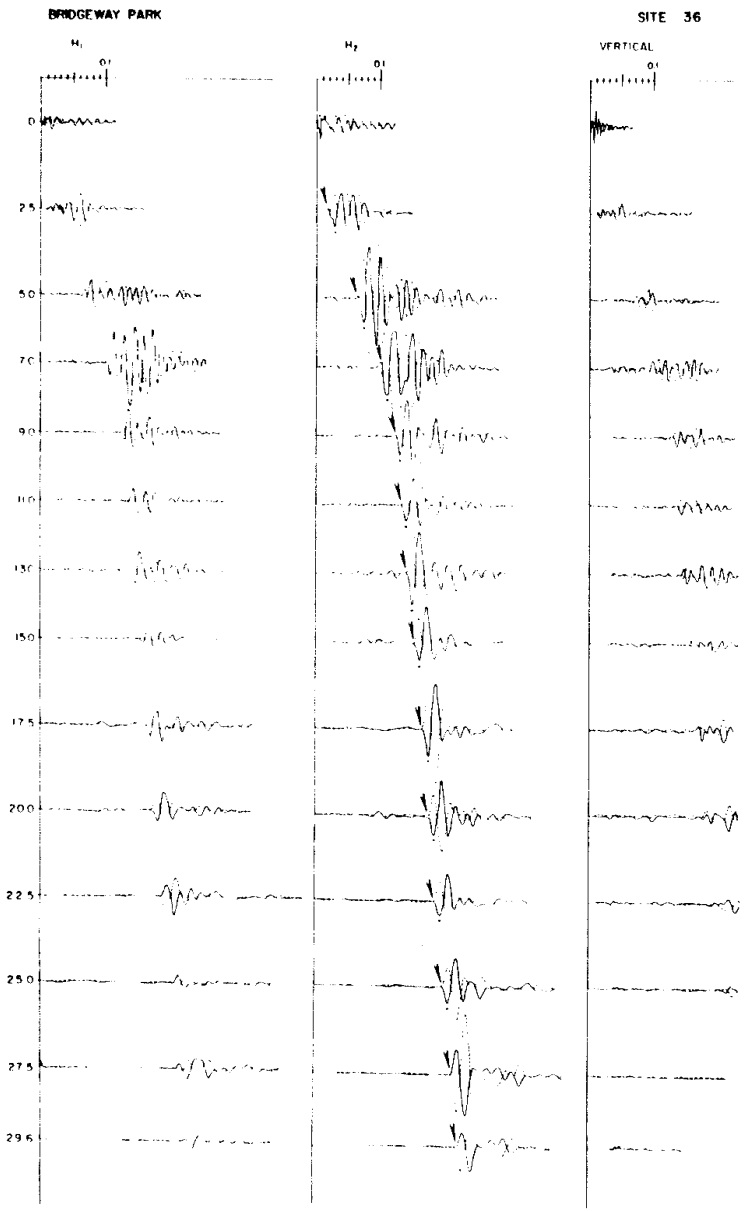

BRIDGEWAY PARK
SITE 36
H1
H2
VERTICAL
0.1
0
25
50
70
90
110
130
150
175
200
225
250
275
296

FIG. 40

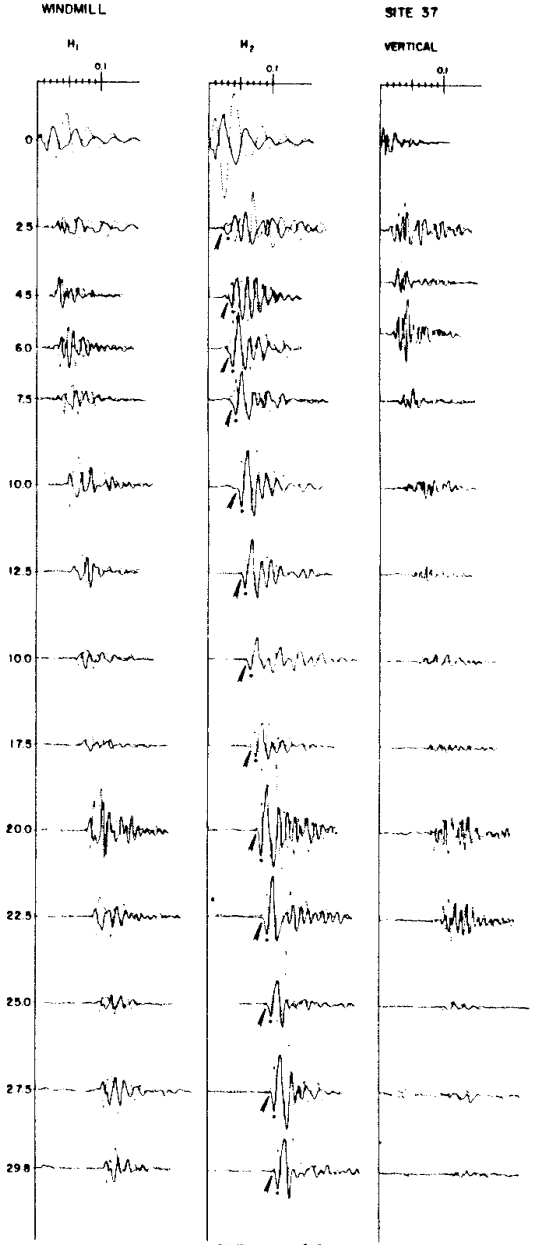

WINDMILL
SITE 37
H1
H2
VERTICAL
0.1
0
25
45
60
75
100
125
100
175
200
225
250
275
298

FIG. 41

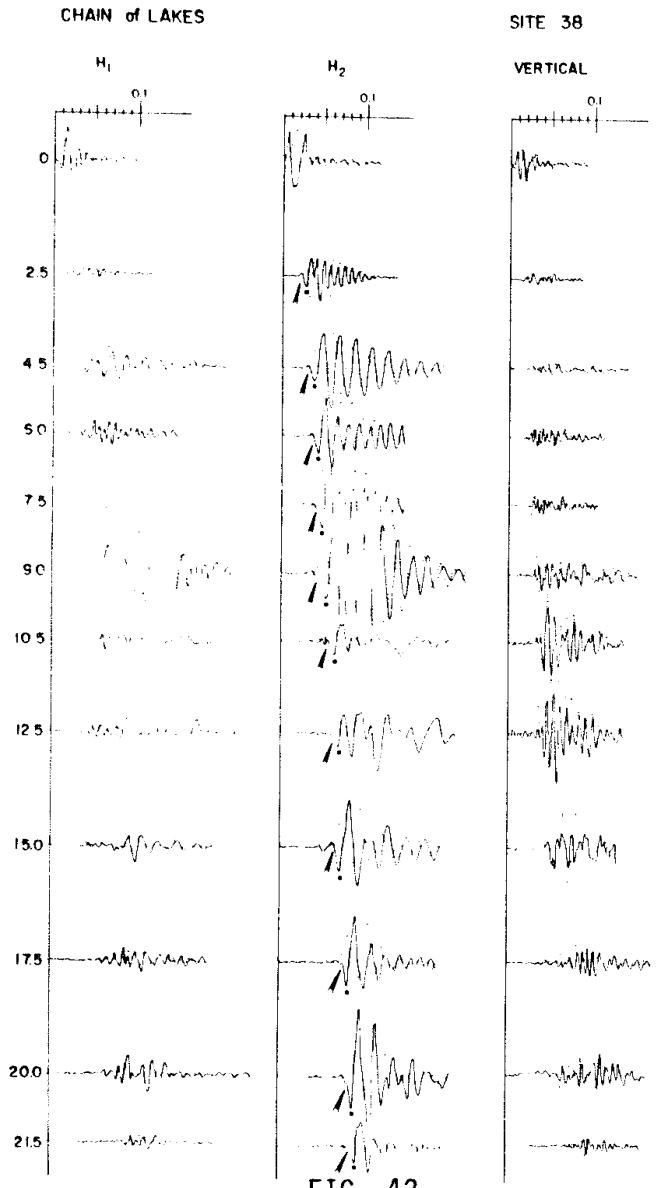

CHAIN of LAKES
SITE 38
H1
H2
VERTICAL
0.1
0
2.5
4.5
5.0
7.5
9.0
10.5
12.5
15.0
17.5
20.0
21.5

FIG. 42

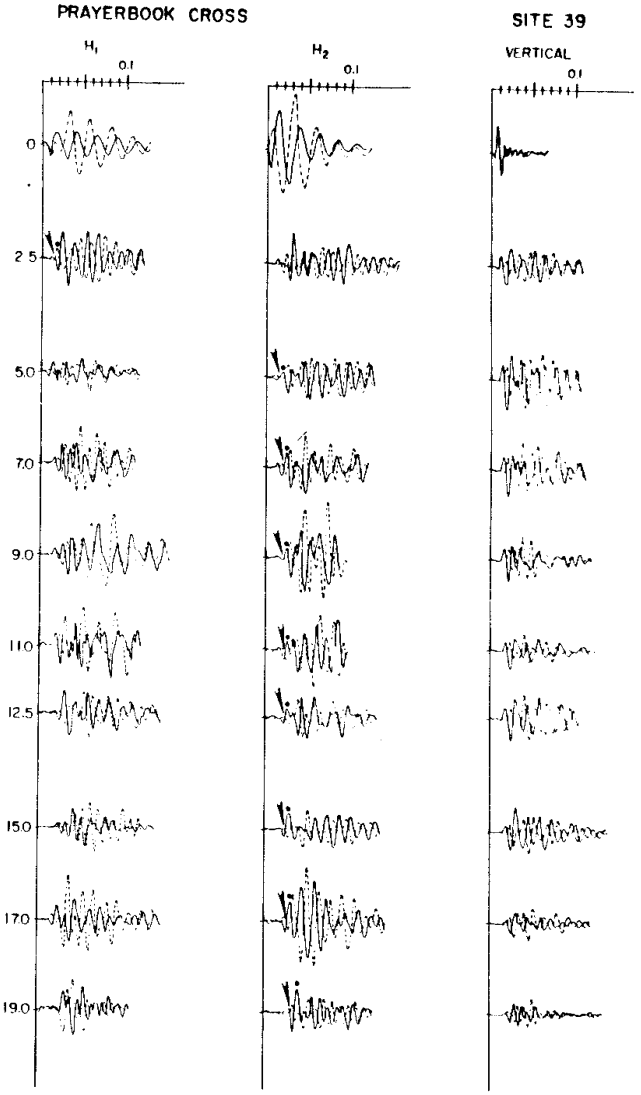

PRAYERBOOK CROSS
SITE 39
H1
H2
VERTICAL
0.1
0
2.5
5.0
7.0
9.0
11.0
12.5
15.0
17.0
19.0

FIG. 43

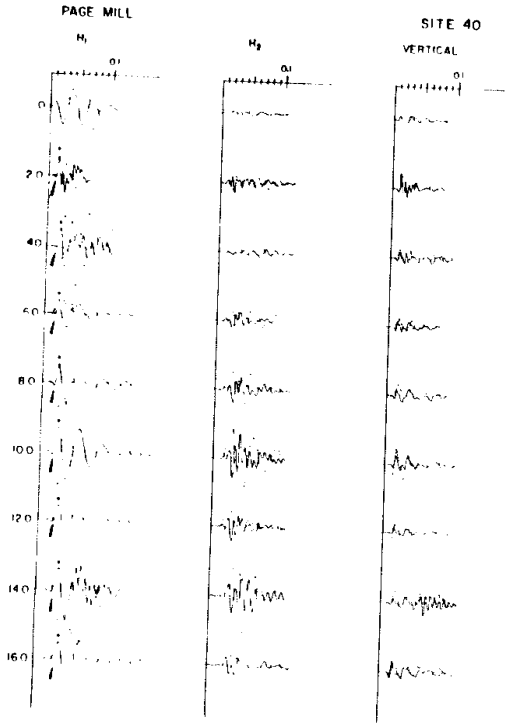

PAGE MILL
SITE 40
VERTICAL
0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0

FIG. 44

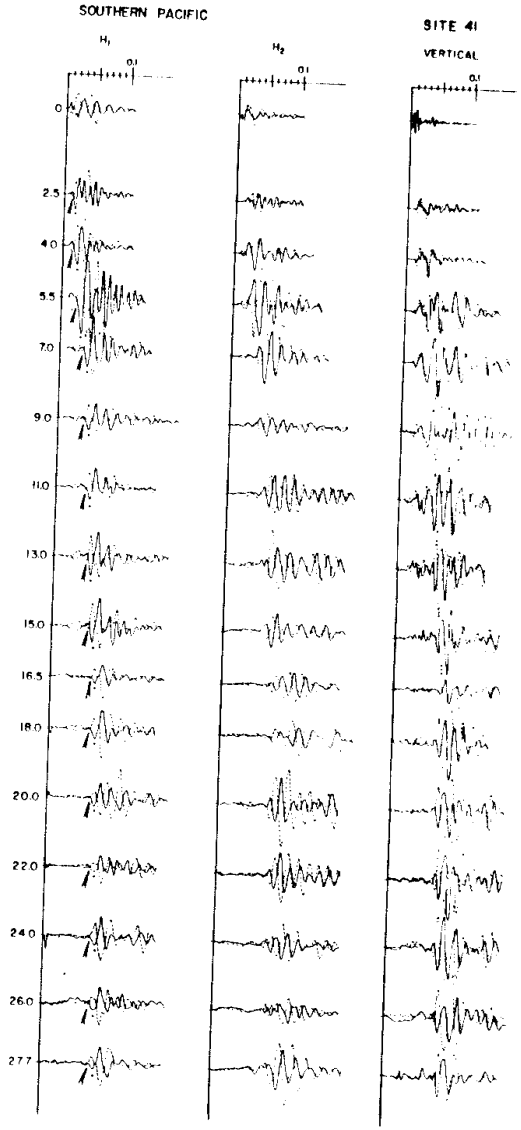

SOUTHERN PACIFIC
SITE 41
VERTICAL
0
2.5
4.0
5.5
7.0
9.0
11.0
13.0
15.0
16.5
18.0
20.0
22.0
24.0
26.0
27.7

FIG. 45

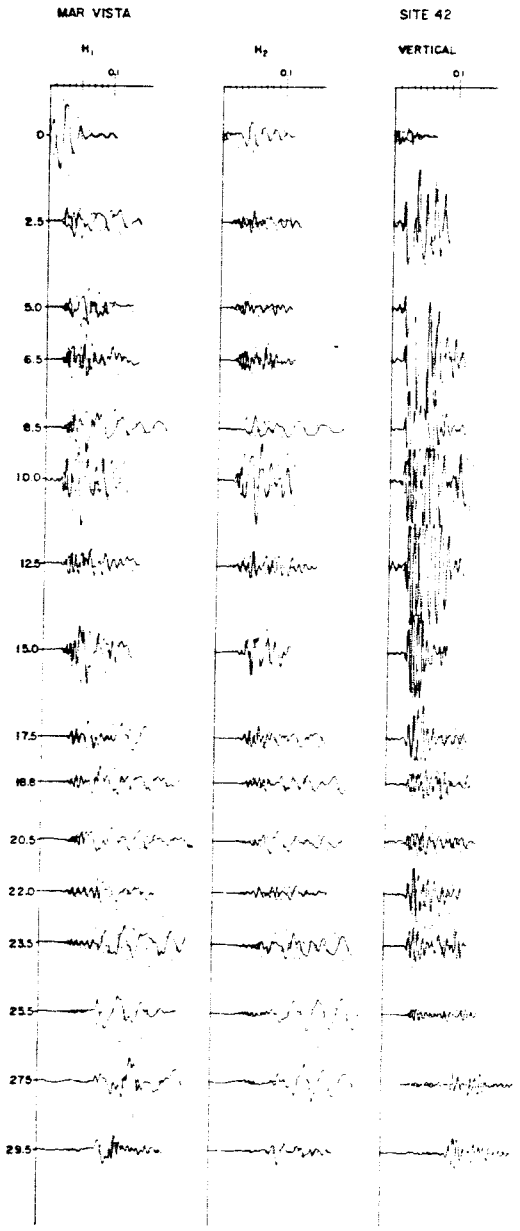

MAR VISTA
SITE 42
H1
H2
VERTICAL
0.1
0
2.5
5.0
6.5
8.5
10.0
12.5
15.0
17.5
18.8
20.5
22.0
23.5
25.5
27.5
29.5

FIG. 46

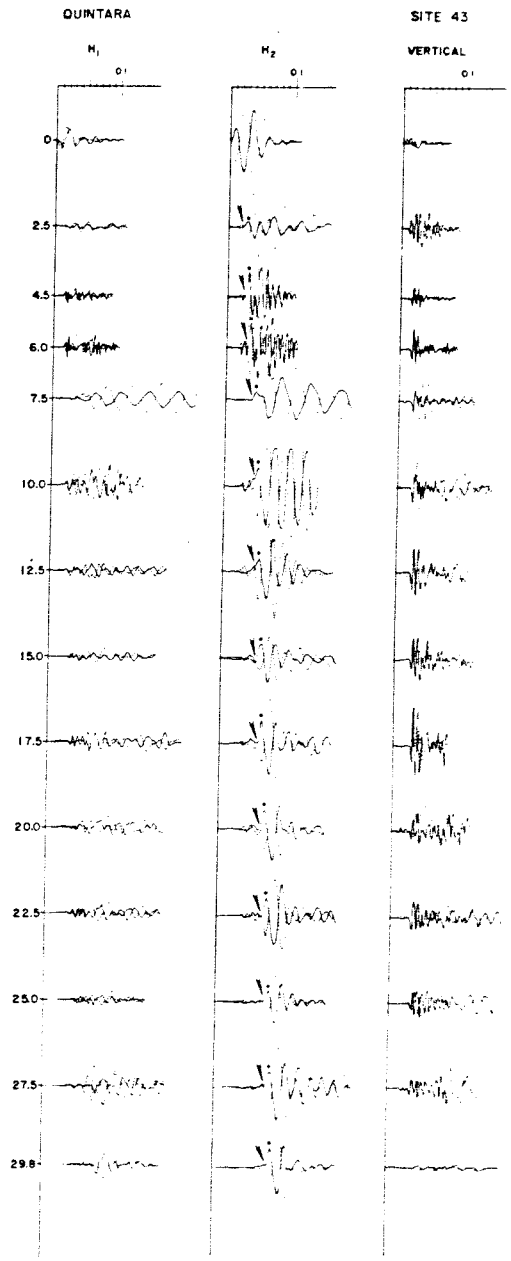

QUINTARA
SITE 43
H1
H2
VERTICAL
0.1
0
2.5
4.5
6.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
25.0
27.5
29.8

FIG. 47

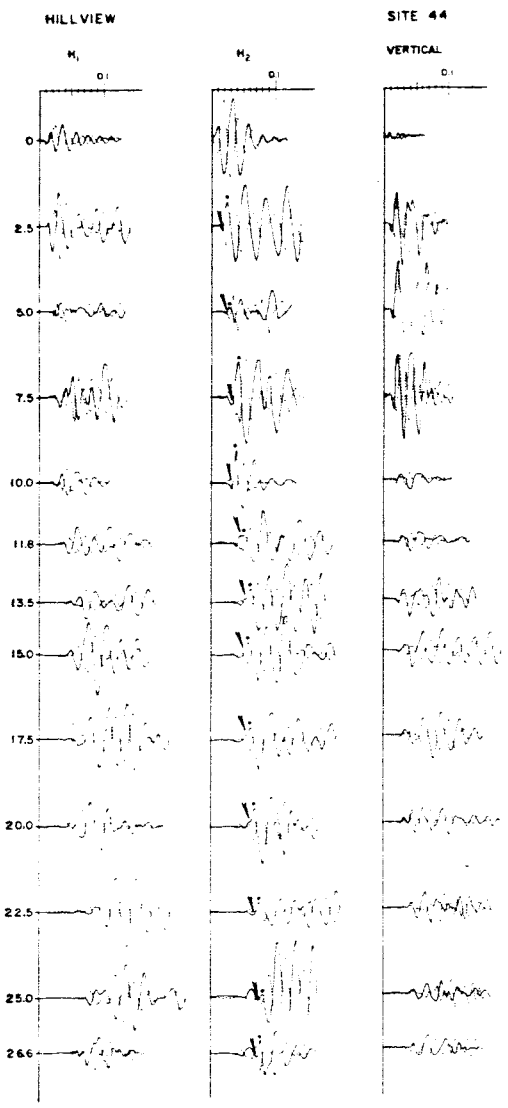

HILLVIEW
SITE 44
VERTICAL
H1
H2
0.1
0
2.5
5.0
7.5
10.0
11.8
13.5
15.0
17.5
20.0
22.5
25.0
26.6

FIG. 48

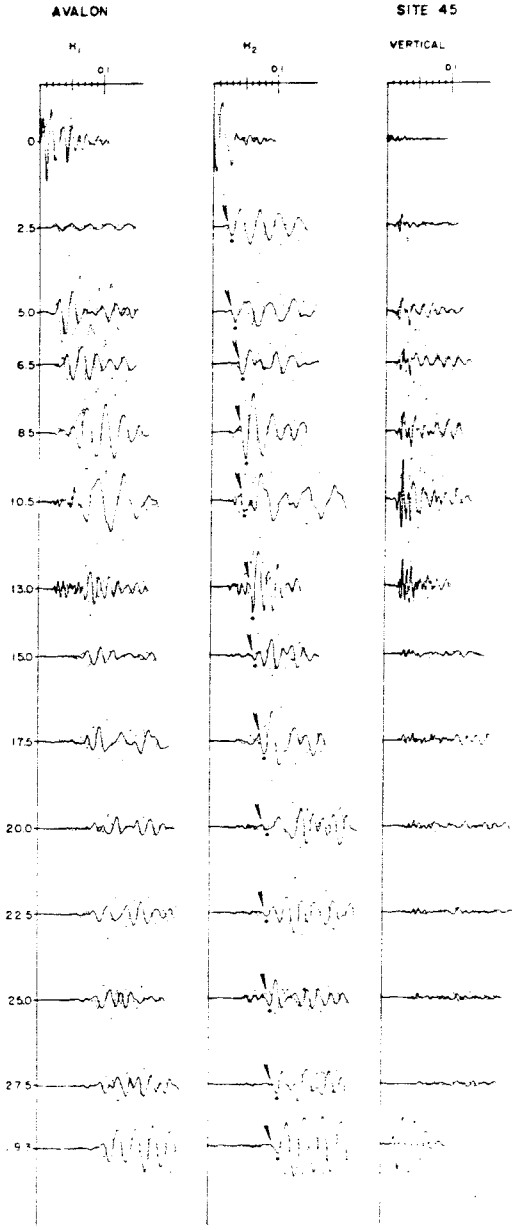

AVALON
SITE 45
VERTICAL
H1
H2
0.1
0
2.5
5.0
6.5
8.5
10.5
13.0
15.0
17.5
20.0
22.5
25.0
27.5

FIG. 49

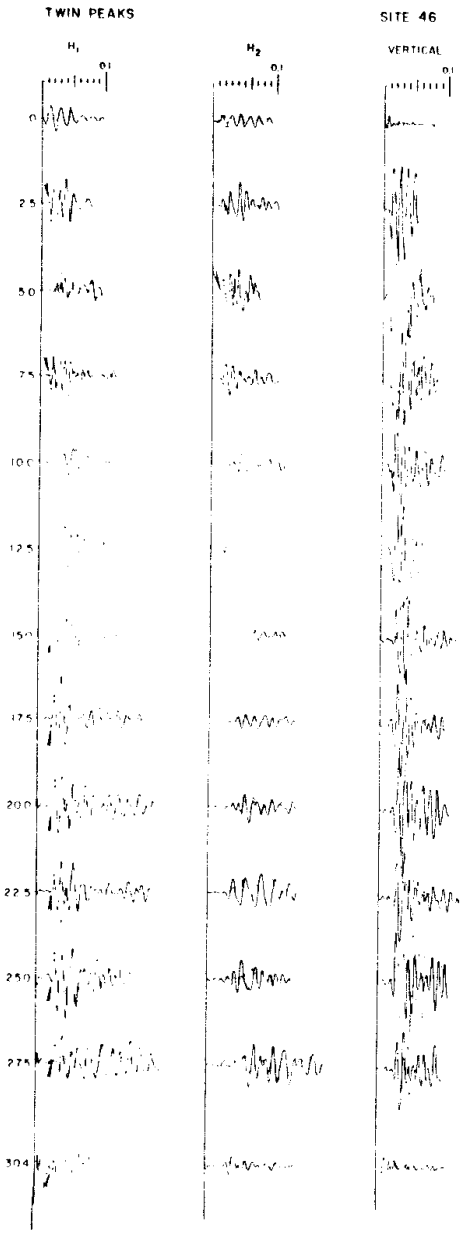

TWIN PEAKS
SITE 46
H1
H2
VERTICAL
0.1
0
25
50
75
100
125
150
175
200
225
250
275
304

FIG. 50

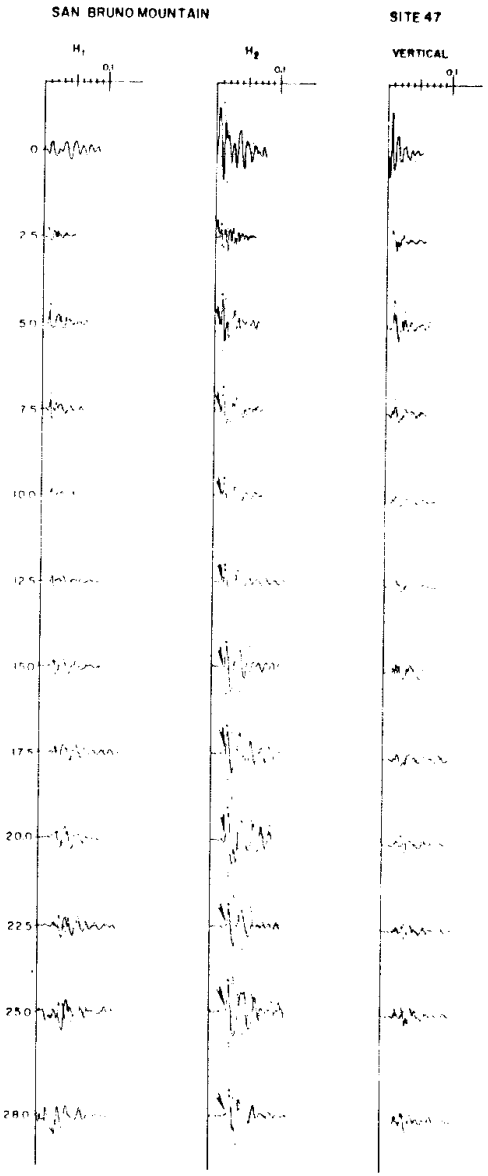

SAN BRUNO MOUNTAIN
SITE 47
H1
H2
VERTICAL
0.1
0
25
50
75
100
125
150
175
200
225
250
280

FIG. 51

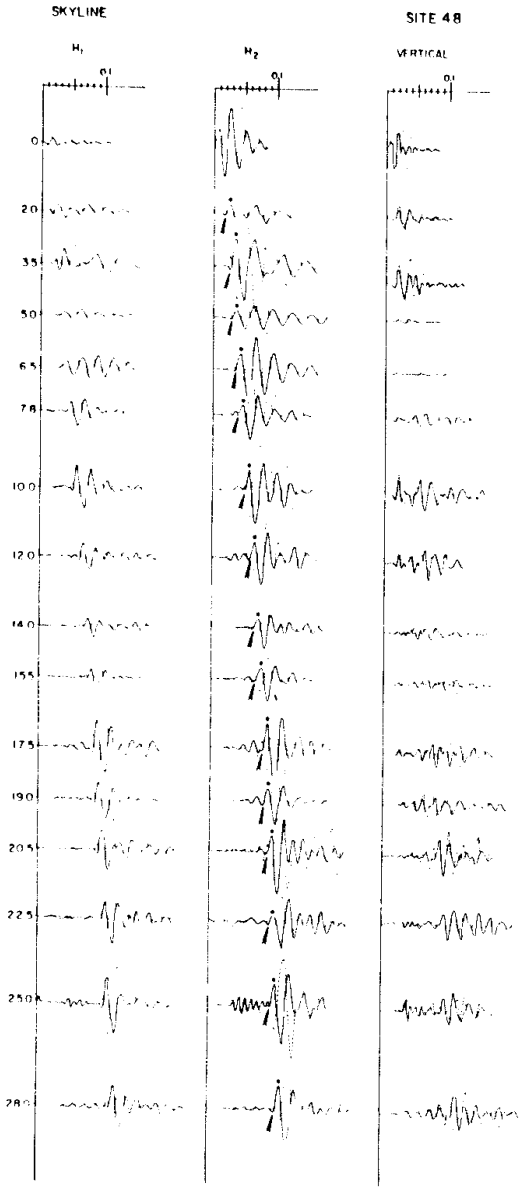

SKYLINE
SITE 48
H1
H2
VERTICAL
0'
0
20
35
50
65
78
100
120
140
155
175
190
205
225
250
280

FIG. 52

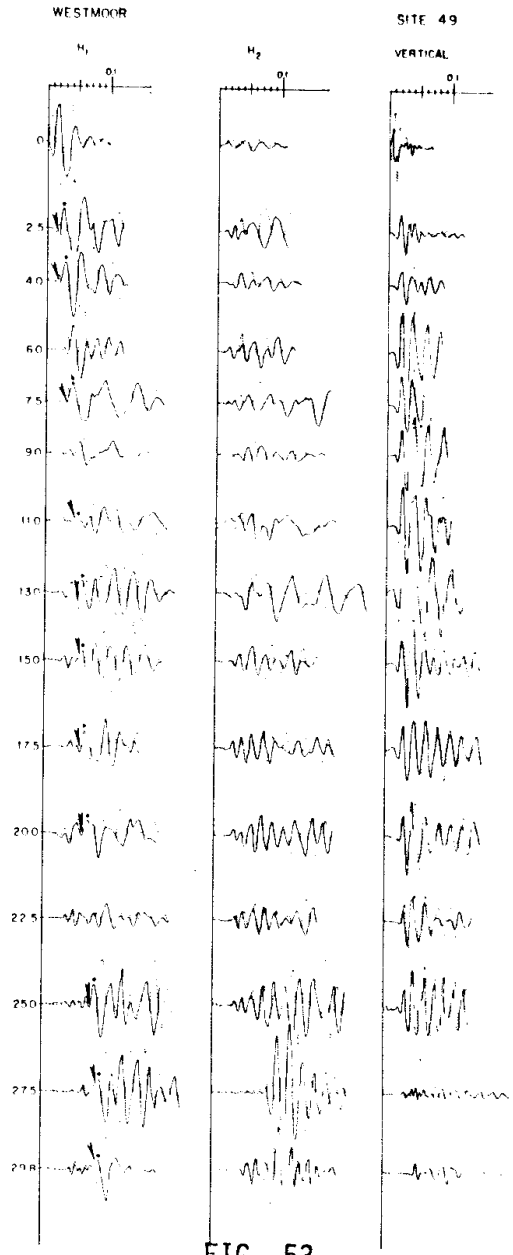

WESTMOOR
SITE 49
H1
H2
VERTICAL
0'
0
25
40
60
75
90
110
130
150
175
200
225
250
275
298

FIG. 53

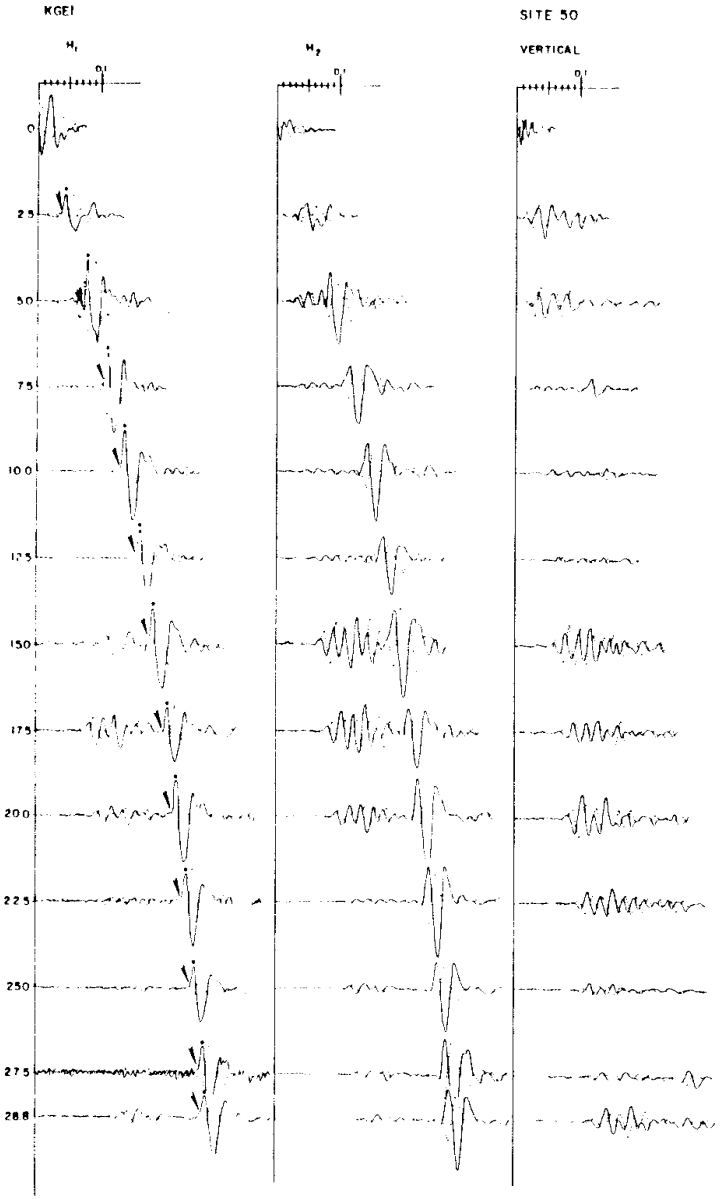

KGEI
H1
H2
SITE 50
VERTICAL
0
25
50
75
100
125
150
175
200
225
250
275
288

FIG. 54

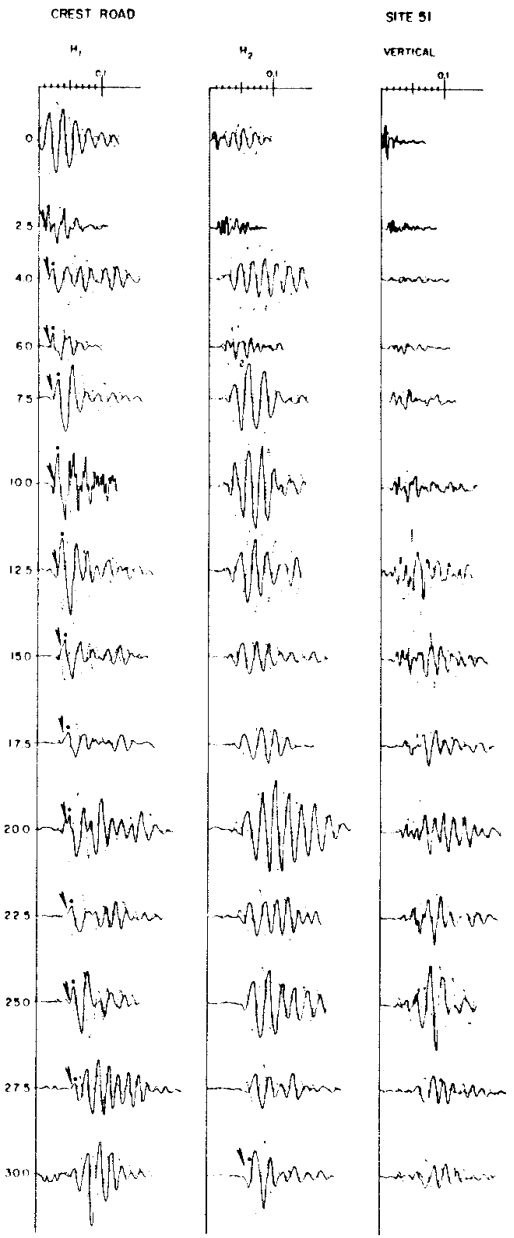

CREST ROAD
H1
H2
SITE 51
VERTICAL
0
25
40
60
75
100
125
150
175
200
225
250
275
300

FIG. 55

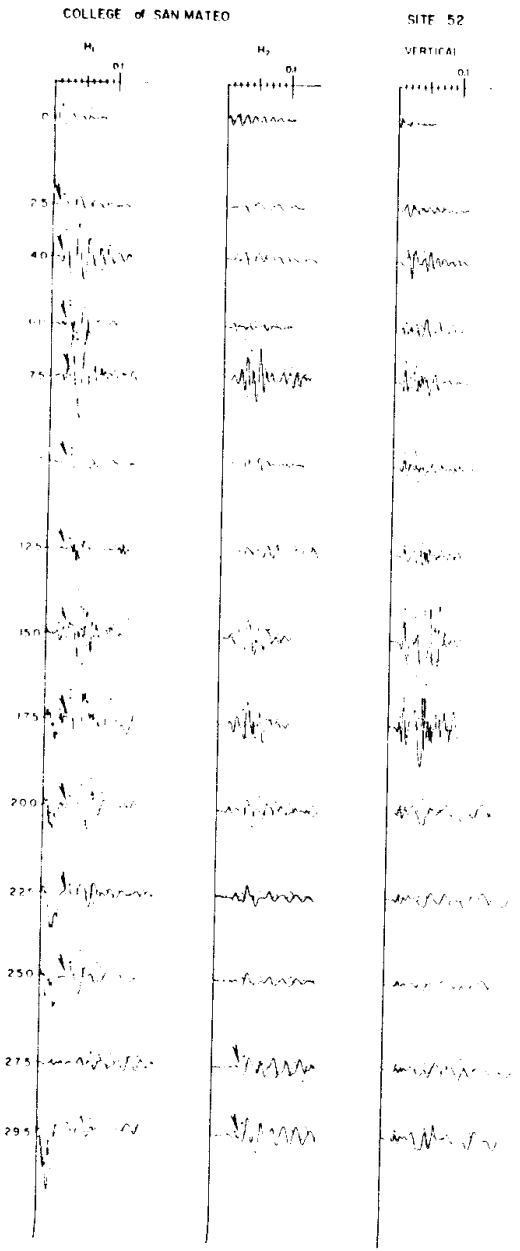

COLLEGE of SAN MATEO
SITE 52
VERTICAL
H1
H2
0.1
0
25
40
75
125
150
175
200
225
250
275
295

FIG. 5C

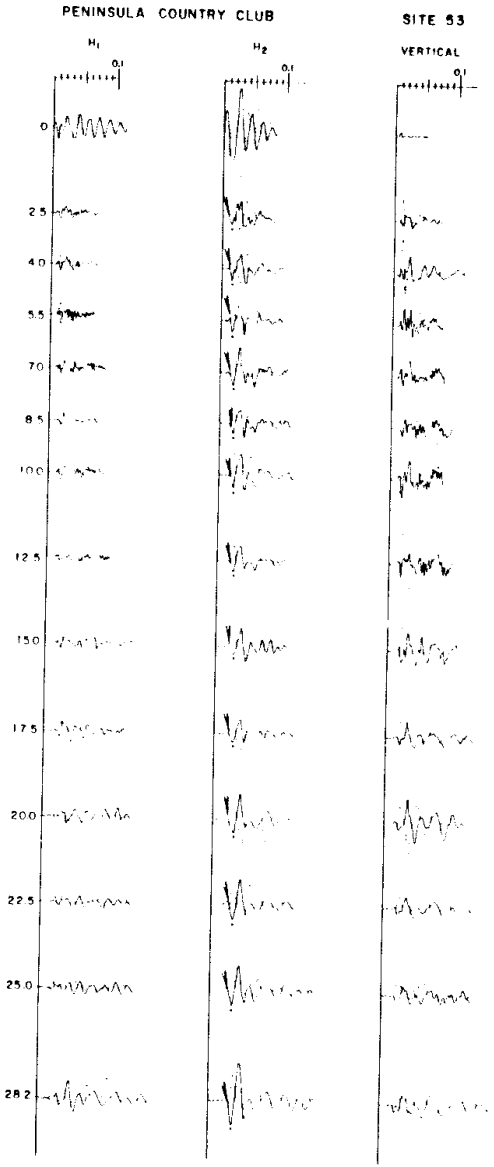

PENINSULA COUNTRY CLUB
SITE 53
VERTICAL
H1
H2
0.1
0
25
40
55
70
85
100
125
150
175
200
225
250
282

FIG. 5/

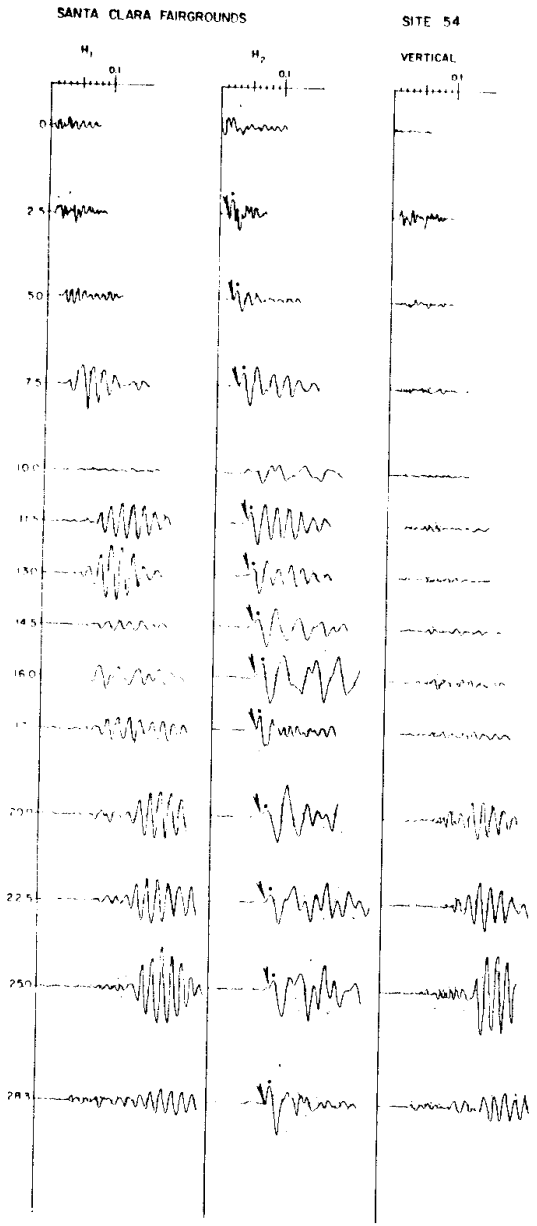

SANTA CLARA FAIRGROUNDS
SITE 54
VERTICAL
0.1
0
2.5
5.0
7.5
10.0
12.5
13.0
14.5
16.0
17
20.0
22.5
25.0
28.3

FIG. 58

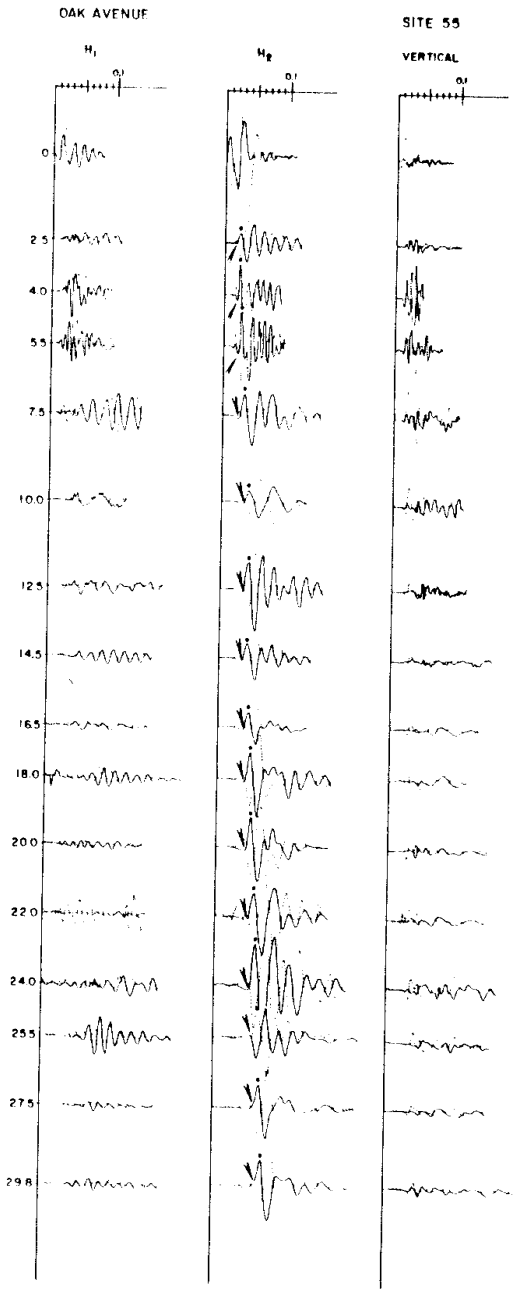

OAK AVENUE
SITE 55
VERTICAL
0.1
0
2.5
4.0
5.5
7.5
10.0
12.5
14.5
16.5
18.0
20.0
22.0
24.0
25.5
27.5
29.8

FIG. 59

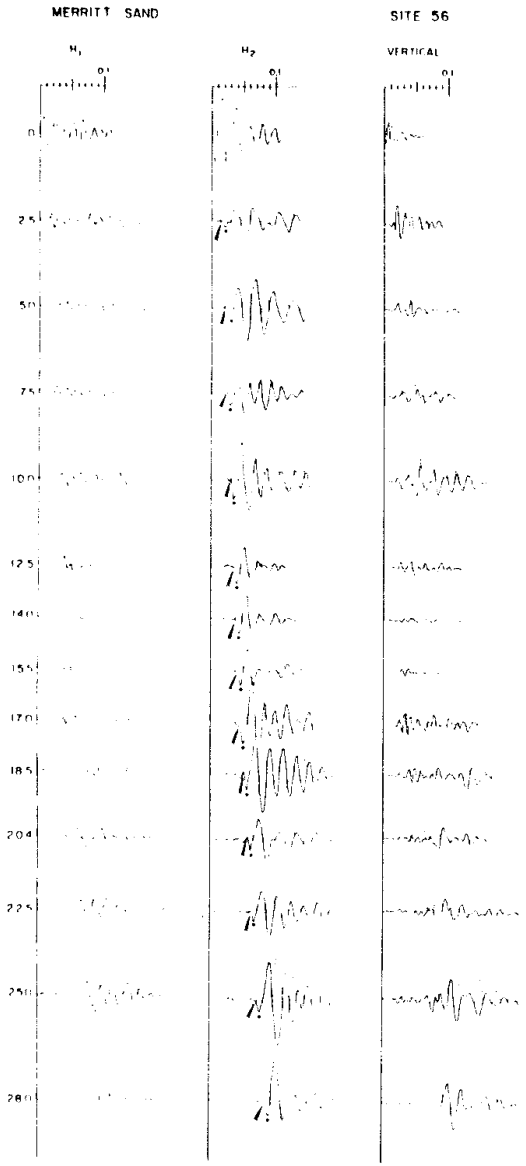

MERRITT SAND
SITE 56
H1
H2
VERTICAL
0
25
50
75
100
125
140
155
170
185
204
225
250
280

FIG. 60

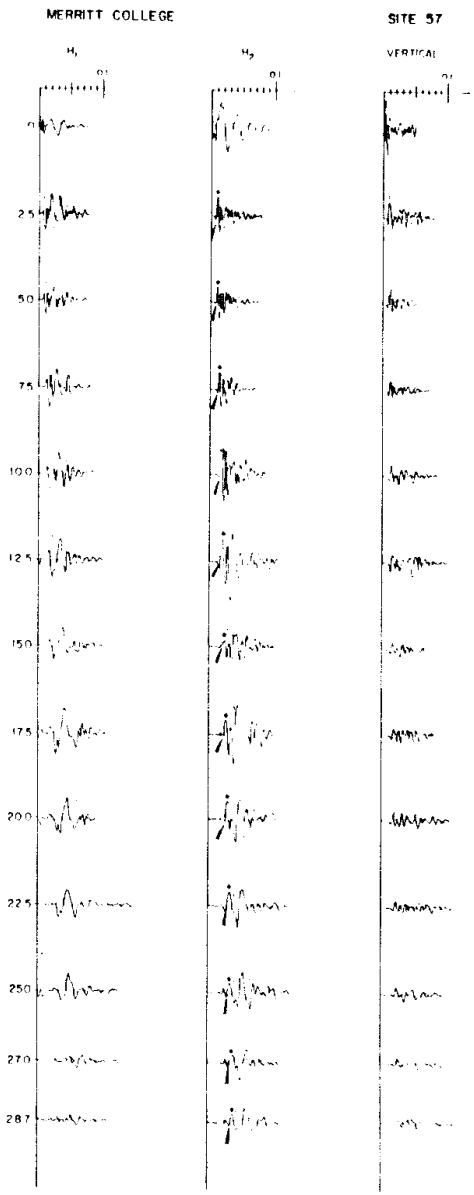

MERRITT COLLEGE
SITE 57
H1
H2
VERTICAL
0
25
50
75
100
125
150
175
200
225
250
270
287

FIG. 61

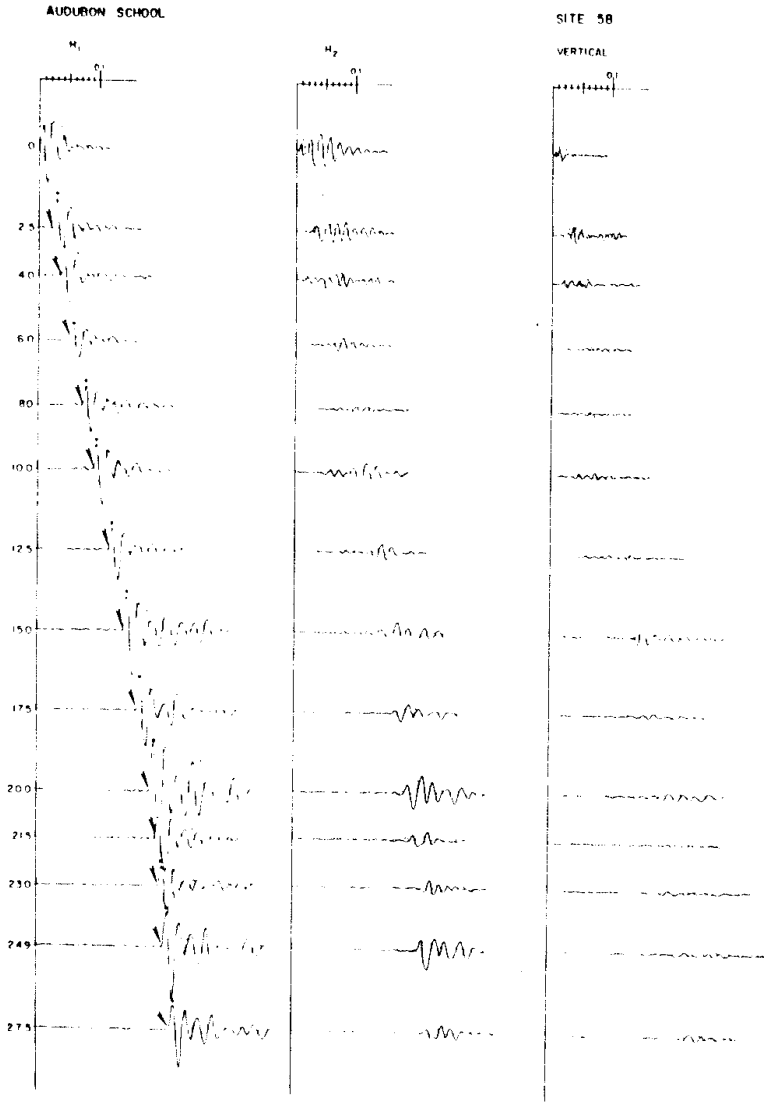

AUDUBON SCHOOL
SITE 58
VERTICAL

FIG. 62

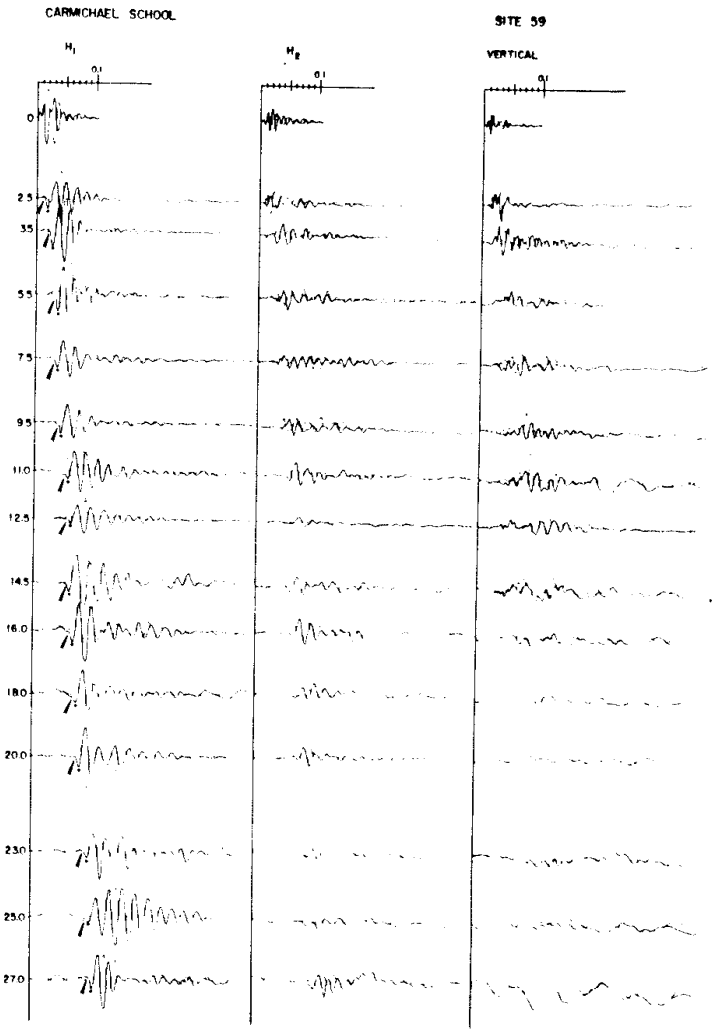

CARMICHAEL SCHOOL
SITE 59
VERTICAL

FIG. 63

TABLE 1

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 36 BRIDGEWAY PARK DATE LOGGED 3-26-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.018	0.014	177
5.0	0.002	0.064	0.059	84
7.0	0.002	0.101	0.097	72
9.0	0.002	0.125	0.122	73
11.0	0.002	0.134	0.132	83
13.0	0.002	0.143	0.141	91
15.0	0.002	0.154	0.153	98
17.5	0.002	0.168	0.167	104
20.0	0.002	0.178	0.177	112
22.5	0.001	0.187	0.186	120
25.0	0.002	0.201	0.200	124
27.5	0.002	0.216	0.216	127
29.6	0.002	0.227	0.227	130

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	0.029	0.023	0.008	0.005	488
5.0	0.073	0.068	0.010	0.009	583
7.0	0.110	0.106	0.015	0.014	507
9.0	0.132	0.129	0.021	0.020	451
11.0	0.142	0.140	0.025	0.024	456
13.0	0.151	0.149	0.026	0.025	513
15.0	0.163	0.162	0.027	0.026	566
17.5	0.177	0.176	0.029	0.029	612
20.0	0.186	0.185	0.030	0.030	674
22.5	0.196	0.195	0.032	0.032	709
25.0	0.210	0.209	0.033	0.033	763
27.5	0.225	0.224	0.035	0.035	790
29.6	0.236	0.236	0.037	0.037	804

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 37 WINDMILL DATE LOGGED 3-29-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.022	0.017	146
4.5	0.002	0.033	0.030	149
6.0	0.002	0.034	0.032	186
7.5	0.002	0.038	0.037	205
10.0	0.002	0.047	0.046	217
12.5	0.002	0.054	0.053	235
15.0	0.002	0.062	0.061	244
17.5	0.003	0.070	0.069	252
20.0	0.002	0.079	0.078	254
22.5	0.003	0.089	0.088	254
25.0	0.002	0.094	0.094	267
27.5	0.002	0.099	0.099	278
29.8	0.002	0.105	0.105	284

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	0.029	0.023	0.015	0.010	260
4.5	0.038	0.035	0.016	0.013	338
6.0	0.039	0.037	0.017	0.015	394
7.5	0.043	0.041	0.018	0.017	448
10.0	0.052	0.051	0.019	0.018	549
12.5	0.059	0.058	0.021	0.020	612
15.0	0.067	0.066	0.021	0.021	728
17.5	0.076	0.075	0.024	0.024	739
20.0	0.085	0.084	0.025	0.025	808
22.5	0.095	0.094	0.026	0.026	873
25.0	0.100	0.100	0.028	0.028	899
27.5	0.105	0.105	0.029	0.029	953
29.8	0.111	0.111	0.031	0.031	966

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 38 CHAIN OF LAKES DATE LOGGED 3-30-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.020	0.016	158
4.5	0.002	0.032	0.029	153
6.0	0.003	0.038	0.036	165
7.5	0.003	0.042	0.041	184
9.0	0.003	0.047	0.046	195
10.5	0.003	0.058	0.057	183
12.5	0.003	0.065	0.064	194
15.0	0.003	0.066	0.066	228
17.5	0.003	0.076	0.076	231
20.0	0.003	0.083	0.083	241
21.5	0.003	0.087	0.087	247

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	0.027	0.021	0.019	0.012	205
4.5	0.038	0.035	0.021	0.017	257
6.0	0.043	0.041	0.024	0.021	279
7.5	0.048	0.047	0.027	0.025	299
9.0	0.053	0.052	0.028	0.027	338
10.5	0.063	0.062	0.030	0.029	364
12.5	0.069	0.068	0.031	0.030	414
15.0	0.071	0.071	0.034	0.033	449
17.5	0.081	0.081	0.040	0.039	443
20.0	0.087	0.087	0.042	0.042	481
21.5	0.091	0.091	0.043	0.043	504

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 39 PRAYERBOOK CROSS DATE LOGGED 3-31-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.008

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.008	0.016	0.012	200
5.0	0.008	0.017	0.016	316
7.0	0.008	0.020	0.019	364
11.0	0.008	0.022	0.022	508
12.5	0.008	0.024	0.024	527
15.0	0.008	0.026	0.026	582
17.0	0.008	0.028	0.028	611
19.0	0.008	0.030	0.030	636

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	0.010	0.006	390
5.0	0.021	0.019	0.010	0.009	583
7.0	0.024	0.023	0.012	0.011	634
11.0	0.026	0.026	0.015	0.014	760
12.5	0.030	0.030	0.016	0.016	803
15.0	0.030	0.030	0.017	0.017	899
17.0	0.032	0.032	0.017	0.017	1020
19.0	0.033	0.033	0.018	0.018	1070

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO.40 PAGE MILL DATE LOGGED 4-1-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.0	0.005	0.010	0.007	279
4.0	0.005	0.016	0.014	277
6.0	0.005	0.017	0.016	369
8.0	0.004	0.020	0.020	409
10.0	0.005	0.023	0.023	440
12.0	0.005	0.027	0.027	448
14.0	0.005	0.030	0.030	469
16.0	0.005	0.033	0.033	486

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.0	0.015	0.011	0.010	0.006	360
4.0	0.020	0.018	0.012	0.010	416
6.0	0.021	0.020	0.012	0.011	559
8.0	0.024	0.023	0.013	0.012	657
10.0	0.028	0.028	0.014	0.013	745
12.0	0.031	0.031	0.015	0.015	824
14.0	0.034	0.034	0.016	0.016	894
16.0	0.037	0.037	0.017	0.017	957

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 41 SOUTHERN PACIFIC DATE LOGGED 4-1-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	228
4.0	0.002	0.020	0.018	223
5.5	0.002	0.028	0.026	209
7.0	0.002	0.040	0.038	182
9.0	0.002	0.043	0.042	214
11.0	0.002	0.049	0.048	228
13.0	0.002	0.054	0.053	243
15.0	0.002	0.060	0.059	252
16.5	0.002	0.064	0.064	259
18.0	0.002	0.066	0.066	274
20.0	0.002	0.069	0.069	291
22.0	0.002	0.071	0.071	311
24.0	0.002	0.074	0.074	325
26.0	0.002	0.076	0.076	343
27.7	0.002	0.079	0.079	351

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	0.009	0.006	433
4.0	0.023	0.021	0.010	0.008	499
5.5	0.034	0.032	0.012	0.011	522
7.0	0.045	0.043	0.012	0.011	634
9.0	0.048	0.047	0.013	0.012	729
11.0	0.054	0.053	0.014	0.014	814
13.0	0.060	0.059	0.015	0.015	889
15.0	0.065	0.064	0.016	0.016	956
16.5	0.070	0.069	0.017	0.017	986
18.0	0.072	0.072	0.017	0.017	1070
20.0	0.075	0.075	0.018	0.018	1120
22.0	0.078	0.078	0.019	0.019	1170
24.0	0.082	0.082	0.020	0.020	1210
26.0	0.083	0.083	0.021	0.021	1250
27.7	0.085	0.085	0.022	0.022	1270

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 43 QUINTARA DATE LOGGED 4-8-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.019	0.015	168
4.5	0.004	0.026	0.024	189
6.0	0.004	0.032	0.030	197
7.5	0.004	0.039	0.038	199
10.0	0.004	0.046	0.045	221
12.5	0.004	0.050	0.049	253
15.0	0.004	0.054	0.054	280
17.5	0.004	0.059	0.059	298
20.0	0.004	0.064	0.064	314
22.5	0.004	0.069	0.069	327
25.0	0.004	0.074	0.074	338
27.5	0.004	0.079	0.079	349
29.8	0.004	0.082	0.082	364

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	0.028	0.022	0.017	0.011	229
4.5	0.033	0.030	0.019	0.016	284
6.0	0.037	0.035	0.021	0.019	319
7.5	0.046	0.044	0.024	0.022	336
10.0	0.051	0.050	0.025	0.024	417
12.5	0.056	0.055	0.027	0.026	476
15.0	0.061	0.060	0.029	0.028	527
17.5	0.064	0.064	0.030	0.030	591
20.0	0.071	0.071	0.032	0.032	631
22.5	0.076	0.076	0.034	0.034	667
25.0	0.081	0.081	0.036	0.036	699
27.5	0.086	0.086	0.038	0.038	727
29.8	0.088	0.088	0.040	0.040	748

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 44 HILLVIEW DATE LOGGED 4-12-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.016	0.012	200
5.0	0.004	0.022	0.020	244
7.5	0.004	0.028	0.027	277
10.0	0.004	0.036	0.035	283
11.8	0.004	0.040	0.039	299
13.5	0.004	0.046	0.046	296
15.0	0.004	0.049	0.049	308
17.5	0.004	0.054	0.054	326
20.0	0.004	0.059	0.059	340
22.5	0.004	0.065	0.065	347
25.0	0.004	0.071	0.071	353
26.6	0.004	0.074	0.074	360

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	0.022	0.017	0.015	0.010	260
5.0	0.027	0.025	0.016	0.014	364
7.5	0.037	0.036	0.018	0.017	448
10.0	0.044	0.043	0.023	0.022	453
11.8	0.047	0.046	0.025	0.024	487
13.5	0.053	0.052	0.027	0.026	512
15.0	0.056	0.056	0.027	0.026	566
17.5	0.061	0.061	0.029	0.029	612
20.0	0.066	0.066	0.030	0.030	674
22.5	0.072	0.072	0.033	0.033	687
25.0	0.078	0.078	0.035	0.035	719
26.6	0.083	0.083	0.037	0.037	723

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 45 AVALON DATE LOGGED 4-13-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.023	0.018	139
5.0	0.002	0.030	0.028	179
6.5	0.002	0.036	0.034	188
8.5	0.002	0.043	0.042	203
10.5	0.002	0.051	0.050	209
13.0	0.002	0.062	0.061	212
15.0	0.002	0.067	0.066	225
17.5	0.002	0.072	0.072	244
20.0	0.002	0.078	0.078	257
22.5	0.002	0.085	0.085	265
25.0	0.002	0.091	0.091	275
27.5	0.002	0.098	0.098	281
29.3	0.002	0.101	0.101	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	0.017	0.011	229
5.0	0.036	0.033	0.019	0.016	306
6.5	0.041	0.039	0.021	0.019	340
8.5	0.054	0.053	0.021	0.020	429
10.5	0.056	0.055	0.022	0.021	496
13.0	0.067	0.066	0.024	0.023	555
15.0	0.071	0.070	0.026	0.025	588
17.5	0.077	0.077	0.028	0.028	634
20.0	0.083	0.083	0.029	0.029	697
22.5	0.090	0.090	0.046	0.046	493
25.0	0.096	0.096	0.048	0.048	524
27.5	0.107	0.107	0.049	0.049	564
29.3	0.110	0.110	0.050	0.050	589

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 46 TWIN PEAKS DATE LOGGED 4-19-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.002

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	COPR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.002	0.010	0.008	320
5.0	0.002	0.013	0.012	414
7.5	0.002	0.016	0.015	485
10.0	0.002	0.017	0.017	599
12.5	0.002	0.019	0.019	666
15.0	0.002	0.020	0.020	756
17.5	0.002	0.022	0.022	800
20.0	0.002	0.023	0.023	873
22.5	0.002	0.024	0.024	941
25.0	0.002	0.026	0.026	964
27.5	0.002	0.028	0.028	984
30.4	0.002	0.029	0.029	1050

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	0.008	0.005	488
5.0	0.016	0.015	0.008	0.007	728
7.5	0.020	0.019	0.011	0.010	734
10.0	0.020	0.020	0.013	0.012	803
12.5	0.021	0.021	0.015	0.015	856
15.0	0.024	0.024	0.016	0.016	956
17.5	0.026	0.026	0.018	0.018	986
20.0	0.027	0.027	0.019	0.019	1060
22.5	0.028	0.028	0.019	0.019	1190
25.0	0.030	0.030	0.020	0.020	1260
27.5	0.032	0.032	0.020	0.020	1380
30.4	0.033	0.033	0.020	0.020	1530

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 47 SAN BRUNO MTN DATE LOGGED 4-20-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.007	0.005	463
5.0	0.004	0.010	0.009	543
7.5	0.004	0.011	0.011	711
10.0	0.004	0.014	0.014	733
12.5	0.004	0.018	0.018	706
15.0	0.004	0.020	0.020	760
17.5	0.004	0.023	0.023	768
20.0	0.004	0.025	0.025	806
22.5	0.004	0.027	0.027	839
25.0	0.004	0.029	0.029	867
28.0	0.005	0.031	0.031	908

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	0.010	0.008	0.008	0.005	488
5.0	0.013	0.012	0.009	0.008	647
7.5	0.014	0.013	0.011	0.010	734
10.0	0.017	0.017	0.013	0.012	803
12.5	0.021	0.021	0.014	0.014	918
15.0	0.024	0.024	0.016	0.016	956
17.5	0.026	0.026	0.018	0.018	986
20.0	0.029	0.029	0.019	0.019	1060
22.5	0.031	0.031	0.020	0.020	1130
25.0	0.033	0.033	0.021	0.021	1200
28.0	0.035	0.035	0.021	0.021	1340

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 48 SKYLINE DATE LOGGED 4-21-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.005

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.0	0.005	0.017	0.012	166
3.5	0.005	0.025	0.022	161
5.0	0.005	0.030	0.028	179
6.5	0.005	0.037	0.035	183
7.8	0.005	0.041	0.040	196
10.0	0.005	0.051	0.050	199
12.0	0.005	0.061	0.060	199
14.0	0.005	0.067	0.066	211
15.5	0.005	0.072	0.071	217
17.5	0.005	0.082	0.081	214
19.0	0.005	0.086	0.086	222
20.5	0.005	0.091	0.091	226
22.5	0.005	0.094	0.094	240
25.0	0.005	0.099	0.099	253
28.0	0.005	0.106	0.106	264

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.0	0.025	0.018	0.013	0.007	277
3.5	0.033	0.029	0.013	0.010	354
5.0	0.036	0.033	0.015	0.013	388
6.5	0.043	0.041	0.016	0.015	447
7.8	0.047	0.046	0.017	0.016	491
10.0	0.057	0.056	0.018	0.017	580
12.0	0.067	0.066	0.020	0.019	618
14.0	0.073	0.072	0.021	0.021	681
15.5	0.078	0.077	0.022	0.022	717
17.5	0.089	0.088	0.024	0.024	739
19.0	0.092	0.091	0.025	0.025	769
20.5	0.097	0.097	0.026	0.026	796
22.5	0.100	0.100	0.028	0.028	810
25.0	0.105	0.105	0.030	0.030	839
28.0	0.112	0.112	0.036	0.036	782

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 49 WESTMOOR DATE LOGGED 4-22-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.003

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.0	0.003	0.018	0.013	157
4.0	0.003	0.021	0.019	212
6.0	0.003	0.028	0.027	225
7.5	0.003	0.034	0.033	228
9.0	0.003	0.039	0.038	236
11.0	0.003	0.046	0.045	243
13.0	0.003	0.053	0.052	248
15.0	0.003	0.056	0.056	270
17.5	0.003	0.058	0.058	303
20.0	0.003	0.063	0.063	319
25.0	0.003	0.078	0.078	321
27.5	0.003	0.086	0.086	320

DEPTH (M)	FIRST S PEAK (S)	CORR S PEAK (S)	P TIME (S)	CORR P TIME (S)	AVE VEL P WAVE (M/S)
2.0	0.026	0.018	0.014	0.008	257
4.0	0.029	0.026	0.014	0.011	357
6.0	0.034	0.032	0.014	0.013	479
7.5	0.041	0.040	0.015	0.014	538
9.0	0.044	0.043	0.016	0.015	592
11.0	0.051	0.050	0.018	0.017	633
13.0	0.059	0.058	0.020	0.019	667
15.0	0.062	0.061	0.021	0.021	728
17.5	0.064	0.064	0.023	0.023	771
20.0	0.071	0.071	0.025	0.025	808
25.0	0.084	0.084	0.030	0.030	839
27.5	0.092	0.092	0.032	0.032	864

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 50 KGEI DATE LOGGED 4-23-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.037	0.029	86
5.0	0.003	0.074	0.069	72
7.5	0.003	0.104	0.100	74
10.0	0.003	0.131	0.128	77
12.5	0.003	0.156	0.154	81
15.0	0.003	0.177	0.175	85
17.5	0.003	0.199	0.198	88
20.0	0.003	0.212	0.211	94
22.5	0.003	0.227	0.226	99
25.0	0.003	0.242	0.241	103
27.5	0.003	0.253	0.252	108
28.8	0.003	0.258	0.257	111

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	0.046	0.036	0.011	0.007	355
5.0	0.079	0.073	0.015	0.013	388
7.5	0.111	0.107	0.020	0.019	403
10.0	0.138	0.135	0.022	0.021	474
12.5	0.163	0.161	0.025	0.024	514
15.0	0.185	0.183	0.027	0.026	566
17.5	0.206	0.205	0.031	0.031	572
20.0	0.219	0.218	0.034	0.034	594
22.5	0.234	0.233	0.036	0.036	630
25.0	0.249	0.248	0.037	0.037	680
27.5	0.260	0.259	0.039	0.039	709
28.8	0.265	0.264	0.040	0.040	723

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 51 CREST ROAD DATE LOGGED 4-26-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	246
4.0	0.002	0.017	0.015	263
6.0	0.002	0.019	0.018	332
7.5	0.002	0.022	0.021	352
10.0	0.002	0.027	0.026	377
12.5	0.002	0.033	0.033	383
15.0	0.002	0.038	0.038	398
17.5	0.002	0.043	0.043	409
20.0	0.002	0.047	0.047	427
22.5	0.002	0.049	0.049	460
25.0	0.002	0.052	0.052	482
27.5	0.002	0.055	0.055	501
30.0	0.002	0.059	0.059	509

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	0.011	0.007	355
4.0	0.023	0.021	0.011	0.009	454
6.0	0.024	0.023	0.012	0.011	559
7.5	0.031	0.030	0.013	0.012	621
10.0	0.032	0.031	0.015	0.014	696
12.5	0.038	0.038	0.017	0.017	756
15.0	0.043	0.043	0.019	0.019	805
17.5	0.048	0.048	0.020	0.020	887
20.0	0.051	0.051	0.021	0.021	963
22.5	0.054	0.054	0.022	0.022	1030
25.0	0.057	0.057	0.023	0.023	1090
27.5	0.060	0.060	0.024	0.024	1150
30.0	0.064	0.064	0.025	0.025	1210

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 52 COLLEGE OF SAN MATEO DATE LOGGED 4-27-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.007

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.007	0.010	0.008	308
4.0	0.007	0.016	0.015	272
6.0	0.006	0.023	0.022	270
7.5	0.006	0.027	0.026	283
10.0	0.007	0.030	0.030	335
12.5	0.007	0.032	0.032	390
15.0	0.007	0.035	0.035	427
17.5	0.007	0.036	0.036	484
20.0	0.006	0.037	0.037	537
22.5	0.007	0.040	0.040	559
25.0	0.007	0.043	0.043	578
27.5	0.006	0.045	0.045	607
29.5	0.006	0.047	0.047	623

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	0.011	0.007	355
4.0	0.021	0.019	0.012	0.010	416
6.0	0.027	0.026	0.015	0.013	447
7.5	0.031	0.030	0.015	0.014	538
10.0	0.034	0.034	0.016	0.015	652
12.5	0.036	0.036	0.017	0.017	756
15.0	0.040	0.040	0.018	0.018	849
17.5	0.041	0.041	0.018	0.018	986
20.0	0.041	0.041	0.019	0.019	1060
22.5	0.044	0.044	0.020	0.020	1130
25.0	0.047	0.047	0.020	0.020	1260
27.5	0.050	0.050	0.021	0.021	1320
29.5	0.051	0.051	0.022	0.022	1350

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 53 PENINSULA COUNTRY CLUB DATE LOGGED 4-28-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.010	0.008	320
4.0	0.004	0.011	0.010	406
5.5	0.004	0.013	0.012	450
7.0	0.004	0.015	0.014	485
8.5	0.004	0.016	0.016	545
10.0	0.004	0.018	0.018	566
12.5	0.004	0.020	0.020	632
15.0	0.004	0.022	0.022	687
17.5	0.004	0.024	0.024	733
20.0	0.004	0.026	0.026	773
22.5	0.004	0.028	0.028	806
25.0	0.004	0.030	0.030	835
28.2	0.004	0.032	0.032	883

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	0.010	0.006	390
4.0	0.015	0.013	0.009	0.007	555
5.5	0.017	0.016	0.010	0.009	626
7.0	0.019	0.018	0.011	0.010	692
8.5	0.021	0.020	0.011	0.010	819
10.0	0.022	0.022	0.011	0.011	949
12.5	0.024	0.024	0.013	0.013	988
15.0	0.026	0.026	0.014	0.014	1090
17.5	0.028	0.028	0.014	0.014	1270
20.0	0.031	0.031	0.015	0.015	1350
22.5	0.032	0.032	0.015	0.015	1510
25.0	0.034	0.034	0.016	0.016	1570
28.2	0.036	0.036	0.017	0.017	1670

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 54 SANTA CLARA FAIRGROUNDS DATE LOGGED 4-29-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	266
5.0	0.003	0.023	0.021	234
7.5	0.003	0.034	0.033	228
10.0	0.003	0.043	0.042	237
11.5	0.003	0.049	0.048	238
13.0	0.003	0.054	0.053	243
14.5	0.003	0.062	0.061	236
16.0	0.003	0.070	0.069	230
17.5	0.003	0.070	0.070	251
20.0	0.003	0.079	0.079	254
22.5	0.003	0.090	0.090	250
25.0	0.003	0.099	0.099	253
28.3	0.003	0.094	0.094	301

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	0.011	0.007	355
5.0	0.029	0.027	0.014	0.012	416
7.5	0.040	0.039	0.018	0.017	448
10.0	0.049	0.048	0.021	0.020	497
11.5	0.055	0.054	0.024	0.023	495
13.0	0.061	0.060	0.027	0.026	494
14.5	0.068	0.067	0.029	0.028	510
16.0	0.076	0.075	0.032	0.031	508
17.5	0.075	0.075	0.036	0.035	493
20.0	0.085	0.085	0.037	0.037	546
22.5	0.096	0.096	0.039	0.039	582
25.0	0.105	0.105	0.040	0.040	629
28.3	0.100	0.100	0.049	0.049	580

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 55 OAK AVENUE DATE LOGGED 4-30-7€
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.018	0.014	177
4.0	0.004	0.019	0.017	235
5.5	0.004	0.021	0.020	278
7.5	0.004	0.025	0.024	310
10.0	0.004	0.032	0.031	318
12.5	0.004	0.034	0.034	372
14.5	0.004	0.037	0.037	395
16.5	0.004	0.040	0.040	415
18.0	0.004	0.042	0.042	431
20.0	0.004	0.046	0.046	436
22.0	0.004	0.051	0.051	433
24.0	0.004	0.054	0.054	445
25.5	0.004	0.060	0.060	426
27.5	0.004	0.063	0.063	437
29.8	0.004	0.067	0.067	445

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	C.010	260
4.0	0.025	0.022	0.016	0.013	312
5.5	0.027	0.025	0.017	0.015	368
7.5	0.035	0.034	0.019	0.018	425
10.0	0.042	0.041	0.021	0.020	497
12.5	0.044	0.043	0.022	0.021	584
14.5	0.046	0.046	0.024	0.024	616
16.5	0.049	0.049	0.027	0.027	621
18.0	0.052	0.052	0.028	0.028	651
20.0	0.055	0.055	0.029	0.029	697
22.0	0.061	0.061	0.032	0.032	693
24.0	0.064	0.064	0.034	0.034	711
25.5	0.069	0.069	0.036	0.036	713
27.5	0.072	0.072	0.038	0.038	727
29.8	0.076	0.076	0.041	0.041	730

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 56 MERRITT SAND DATE LOGGED 5-3-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.001

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.001	0.013	0.010	247
5.0	0.001	0.023	0.021	234
7.5	0.001	0.025	0.024	311
10.0	0.001	0.031	0.030	329
12.5	0.001	0.037	0.036	342
14.0	0.001	0.039	0.039	363
15.5	0.002	0.043	0.043	364
17.0	0.001	0.047	0.047	364
18.5	0.001	0.053	0.053	351
20.4	0.001	0.059	0.059	347
22.5	0.001	0.065	0.065	347
25.0	0.001	0.073	0.073	343
28.0	0.001	0.088	0.088	319

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	0.011	0.007	355
5.0	0.030	0.028	0.012	0.010	485
7.5	0.029	0.028	0.013	0.012	621
10.0	0.036	0.035	0.015	0.014	696
12.5	0.042	0.041	0.017	0.017	756
14.0	0.044	0.043	0.018	0.018	795
15.5	0.048	0.048	0.019	0.019	830
17.0	0.052	0.052	0.020	0.020	863
18.5	0.057	0.057	0.021	0.021	892
20.4	0.064	0.064	0.021	0.021	981
22.5	0.070	0.070	0.022	0.022	1030
25.0	0.078	0.078	0.024	0.024	1050
28.0	0.093	0.093	0.026	0.026	1080

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 57 MERRITT COLLEGE DATE LOGGED 5-4-76
PLANK DIST= 2.0 PLATE DIST= 3.0 AVE ORIGIN CORR= 0.001

DEPTH (M)	ORIGIN CORR (S)	FIRST S ARRIVAL (S)	CORR S TIME (S)	AVE VEL S WAVE (M/S)
2.5	0.001	0.005	0.004	640
5.0	0.001	0.009	0.008	598
7.5	0.001	0.012	0.012	646
10.0	0.001	0.015	0.015	679
12.5	0.001	0.018	0.018	703
15.0	0.001	0.022	0.022	687
17.5	0.001	0.025	0.025	704
20.0	0.001	0.027	0.027	744
22.5	0.001	0.030	0.030	752
25.0	0.001	0.033	0.033	759
27.0	0.001	0.035	0.035	773
28.7	0.001	0.037	0.037	777

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	0.010	0.008	0.006	0.004	650
5.0	0.012	0.011	0.007	0.006	832
7.5	0.016	0.015	0.009	0.008	897
10.0	0.019	0.019	0.011	0.011	949
12.5	0.022	0.022	0.013	0.013	988
15.0	0.026	0.026	0.014	0.014	1090
17.5	0.029	0.029	0.015	0.015	1180
20.0	0.031	0.031	0.017	0.017	1190
22.5	0.033	0.033	0.018	0.018	1260
25.0	0.037	0.037	0.019	0.019	1330
27.0	0.039	0.039	0.021	0.021	1290
28.7	0.041	0.041	0.022	0.022	1310

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 58 AUDUBON SCHOOL DATE LOGGED 5-5-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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	0.022	0.017	145
4.0	0.004	0.037	0.033	120
6.0	0.004	0.052	0.049	121
8.0	0.004	0.073	0.071	112
10.0	0.004	0.093	0.091	109
12.5	0.004	0.118	0.117	107
15.0	0.004	0.143	0.142	105
17.5	0.004	0.167	0.166	105
20.0	0.004	0.188	0.187	106
21.5	0.004	0.198	0.197	109
23.0	0.003	0.203	0.202	113
24.9	0.004	0.211	0.210	118
27.5	0.004	0.222	0.221	124

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	0.031	0.024	0.009	0.006	433
4.0	0.044	0.039	0.011	0.009	454
6.0	0.059	0.056	0.012	0.011	559
8.0	0.080	0.078	0.014	0.013	610
10.0	0.099	0.097	0.016	0.015	652
12.5	0.125	0.124	0.018	0.018	714
15.0	0.150	0.149	0.020	0.020	764
17.5	0.174	0.173	0.022	0.022	807
20.0	0.195	0.194	0.024	0.024	842
21.5	0.205	0.204	0.025	0.025	868
23.0	0.210	0.209	0.026	0.026	892
24.9	0.218	0.217	0.027	0.027	928
27.5	0.229	0.228	0.029	0.029	953

TRAVEL-TIMES AND AVERAGE VELOCITIES

SITE NO. 59 CARMICHAEL SCHOOL DATE LOGGED 5-6-76
PLANK DIST= 2.0 PLATE DIST= 3.0 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
3.5	0.003	0.021	0.018	190
5.5	0.002	0.027	0.026	215
7.5	0.002	0.033	0.032	233
9.5	0.003	0.040	0.039	241
11.0	0.002	0.052	0.051	214
12.5	0.002	0.055	0.055	229
14.5	0.003	0.058	0.058	251
16.0	0.004	0.064	0.064	251
18.0	0.003	0.070	0.070	257
20.0	0.003	0.077	0.077	260
23.0	0.003	0.089	0.089	258
25.0	0.003	0.093	0.093	269
27.0	0.003	0.097	0.097	278

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	0.008	325
3.5	0.027	0.024	0.012	0.009	384
5.5	0.032	0.030	0.013	0.011	481
7.5	0.036	0.035	0.014	0.013	576
9.5	0.043	0.042	0.017	0.016	586
11.0	0.055	0.054	0.017	0.016	670
12.5	0.059	0.058	0.018	0.018	714
14.5	0.062	0.062	0.019	0.019	779
16.0	0.069	0.069	0.020	0.020	813
18.0	0.074	0.074	0.022	0.022	829
20.0	0.082	0.082	0.024	0.024	842
23.0	0.095	0.095	0.026	0.026	892
25.0	0.099	0.099	0.028	0.028	899
27.0	0.103	0.103	0.035	0.035	776

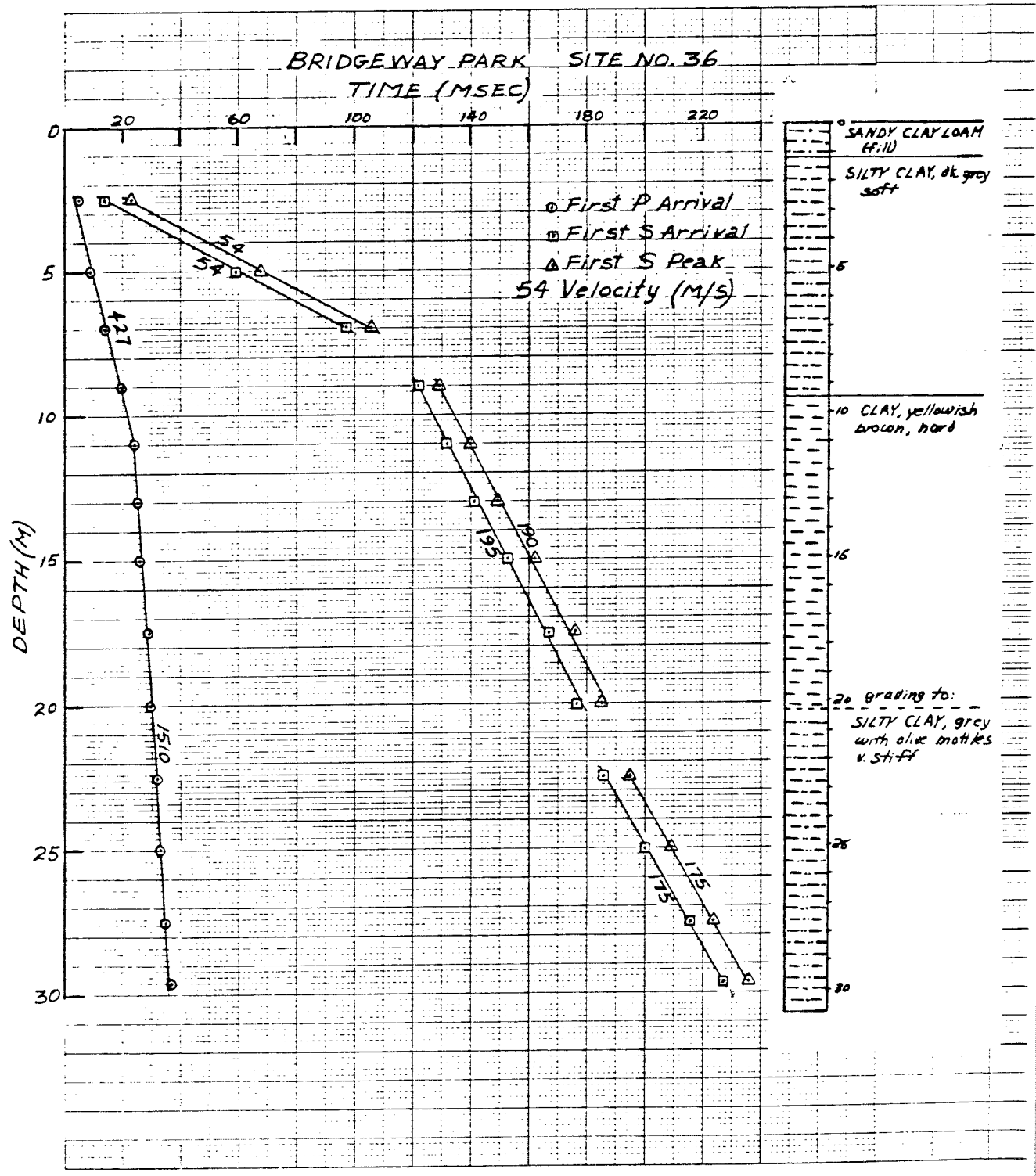

BRIDGEWAY PARK SITE NO. 36
TIME (MSEC)
20
60
100
140
180
220
DEPTH (M)
0
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
54 Velocity (M/S)
54
54
427
195
190
1510
175
175
SANDY CLAY LOAM (FILL)
SILTY CLAY, dk grey soft
6
CLAY, yellowish brown, hard
10
16
20 grading to:
SILTY CLAY, grey with olive mottles v. stiff
26
30

FIG. 64

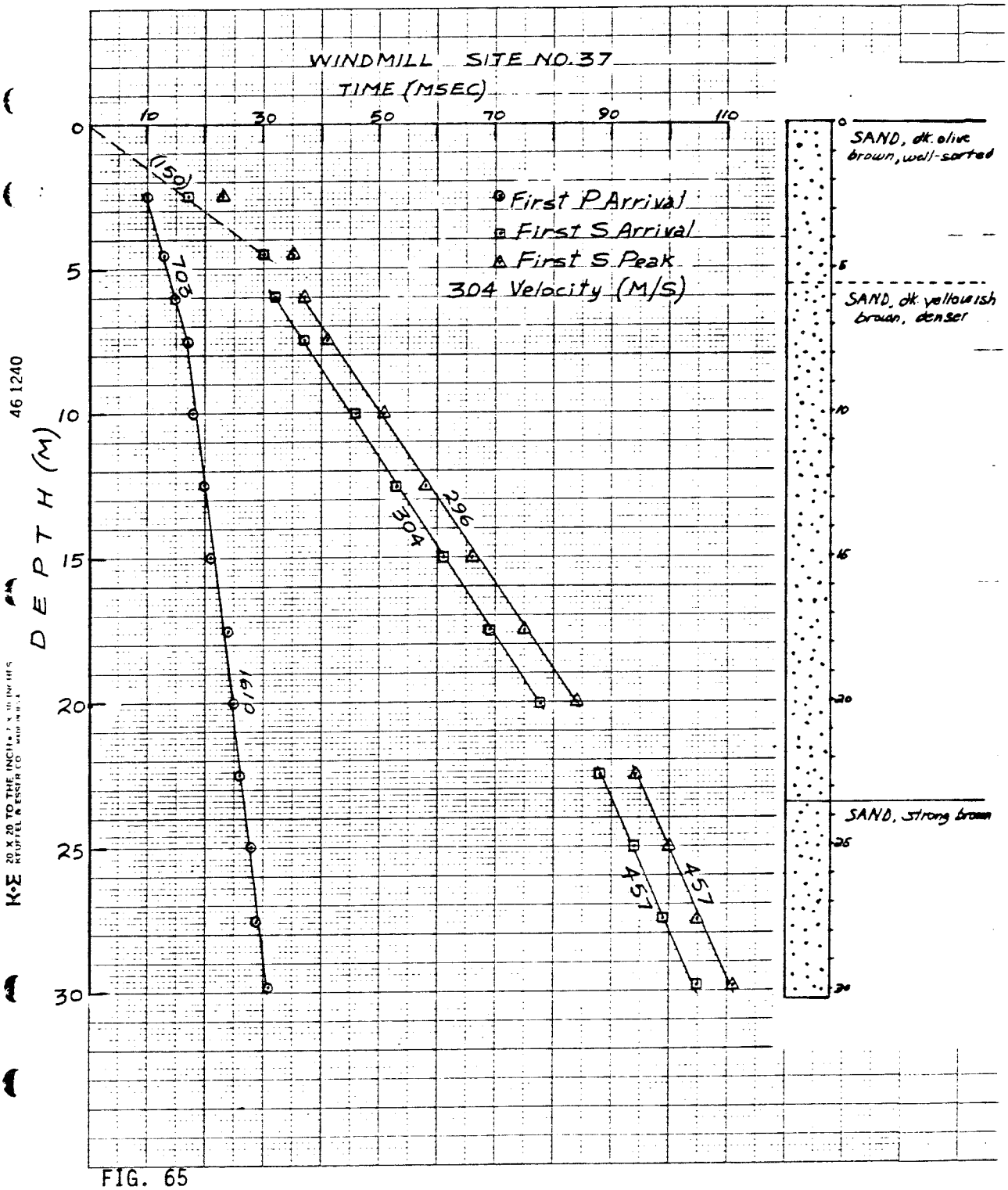

WINDMILL SITE NO. 37
TIME (MSEC)
10
30
50
70
90
110
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
304 Velocity (M/S)
(150)
703
1610
304
296
457
457
SAND, dk. olive brown, well-sorted
SAND, dk yellowish brown, denser
SAND, strong brown
46 1240
K·E 20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

FIG. 65

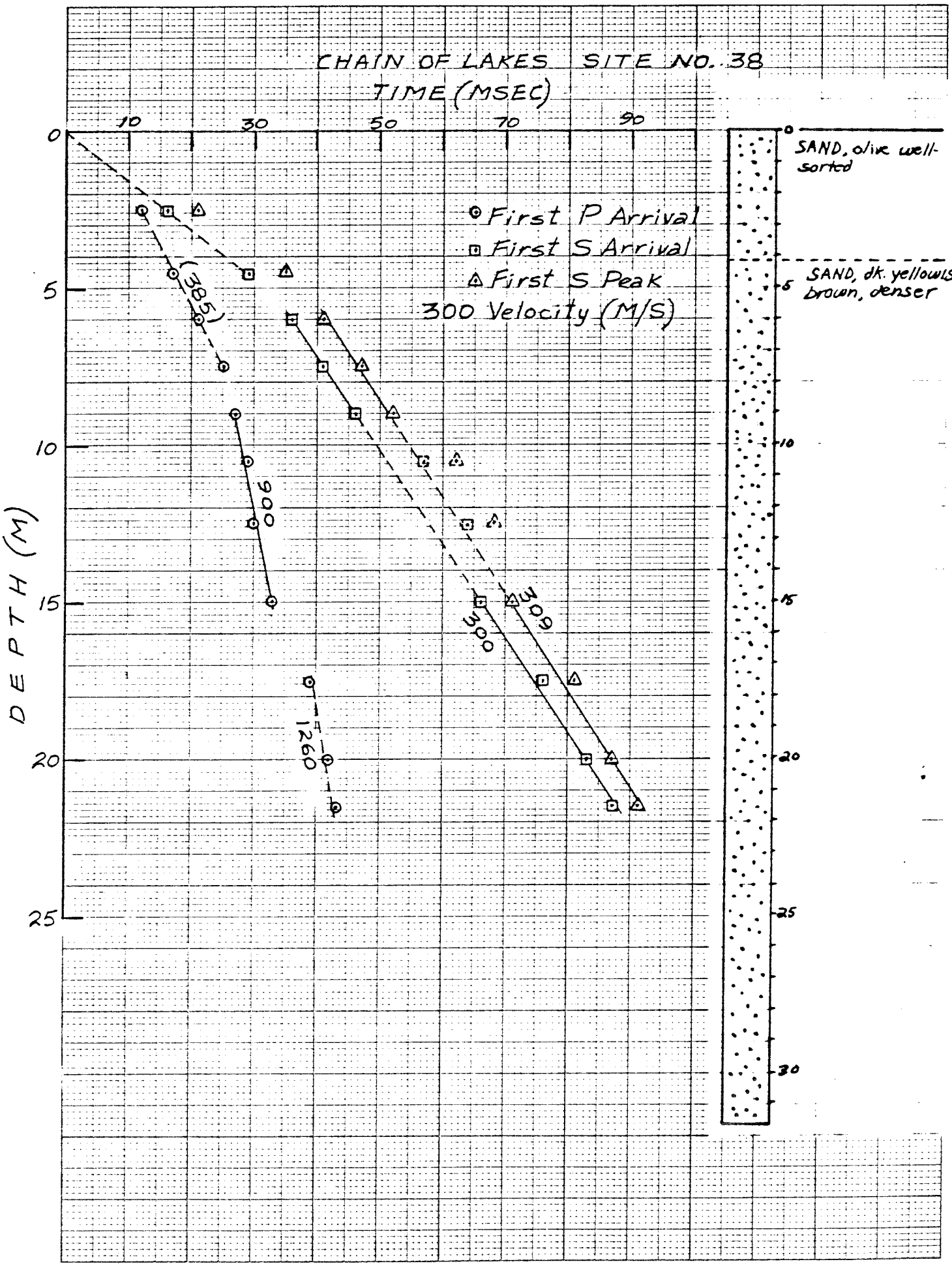

CHAIN OF LAKES SITE NO. 38
TIME (MSEC)
10
30
50
70
90
0
5
10
15
20
25
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
300 Velocity (M/S)
385
900
1260
300
309
SAND, olive well-sorted
SAND, dk. yellowish brown, denser
0
5
10
15
20
25
30

FIG. 66

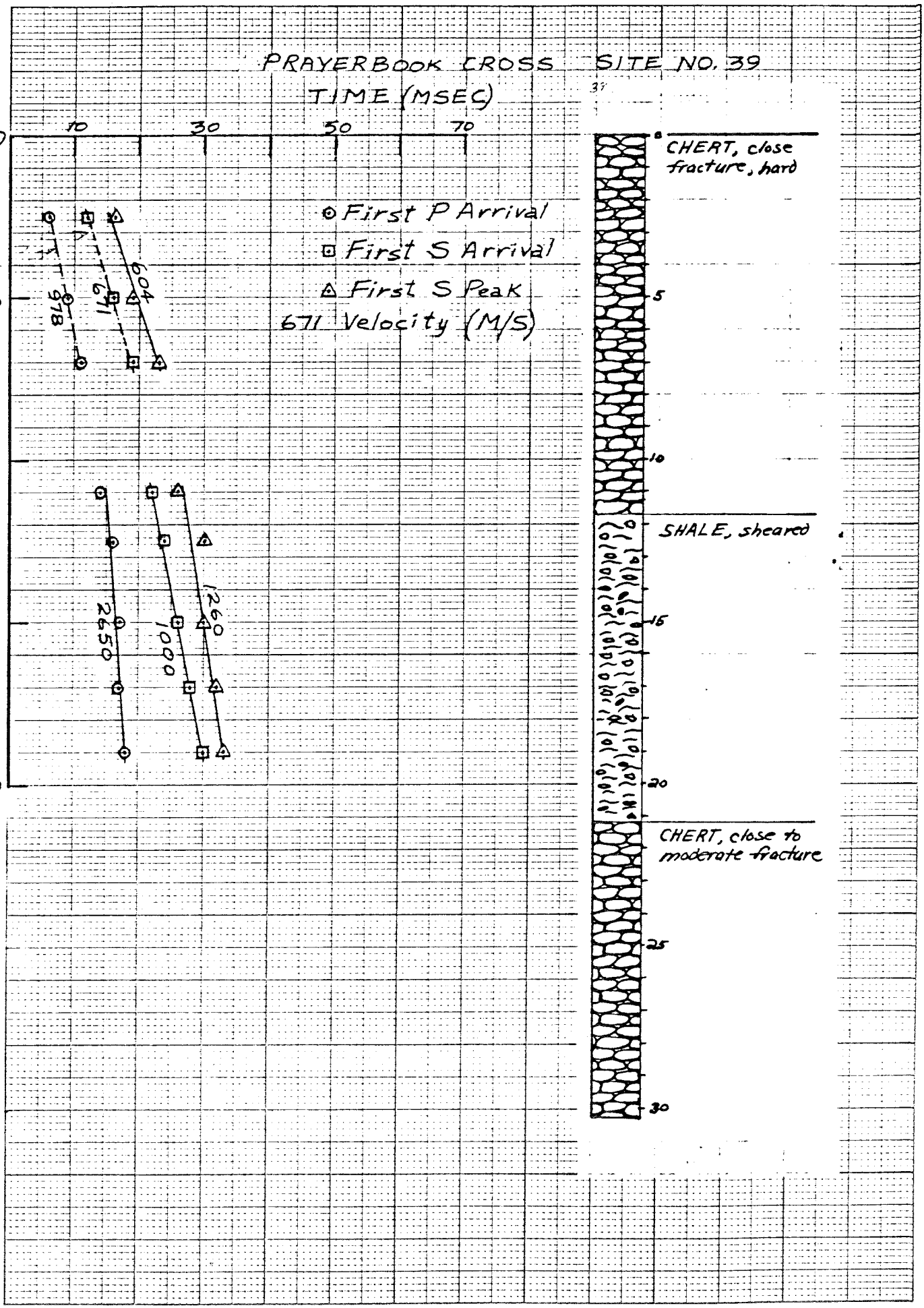

PRAYERBOOK CROSS SITE NO. 39
TIME (MSEC)
10
30
50
70
0
5
10
15
20
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
671 Velocity (M/S)
978
671
604
2650
1000
1260
CHERT, close fracture, hard
SHALE, sheared
CHERT, close to moderate fracture
5
10
15
20
25
30

FIG. 67

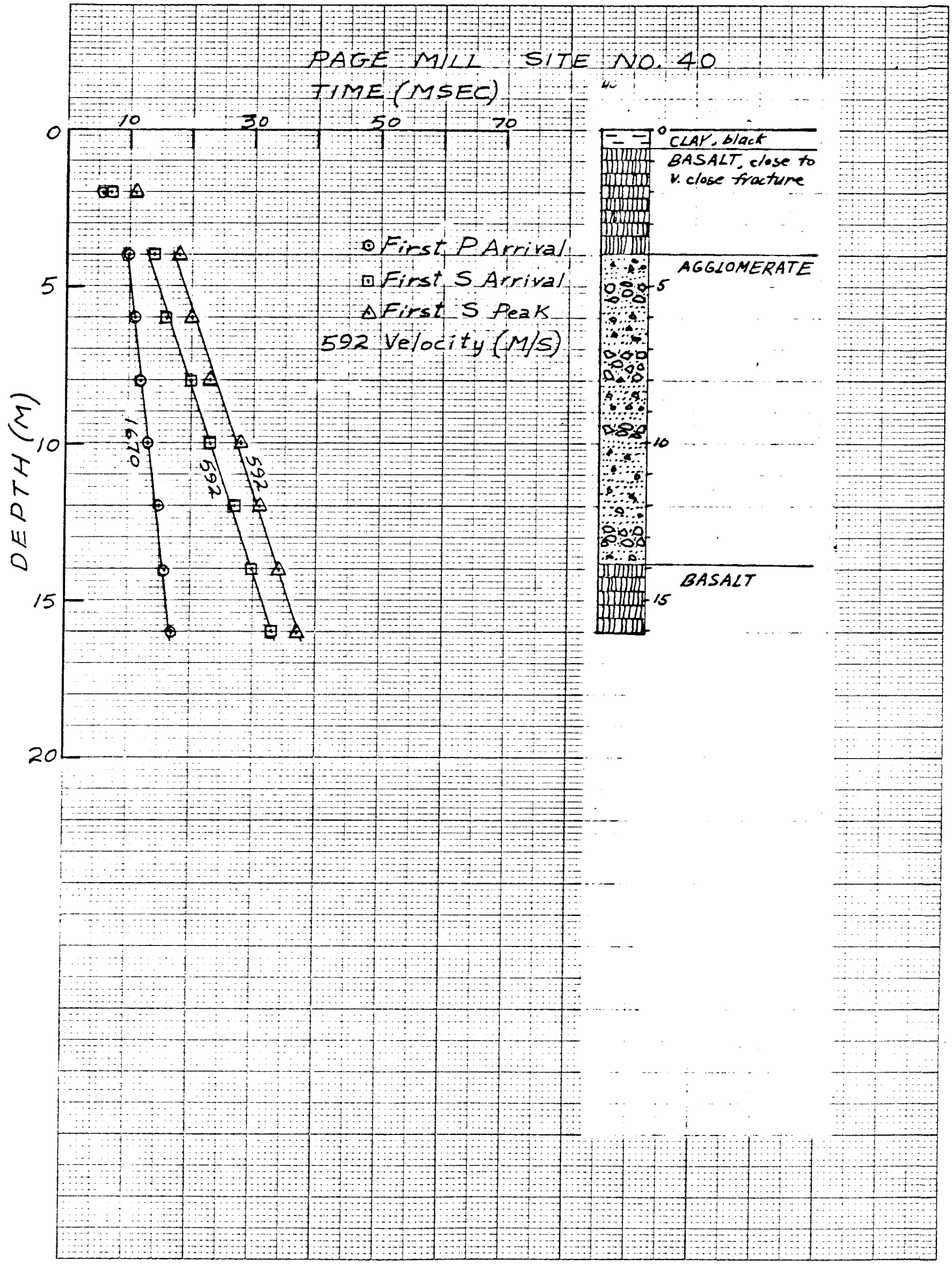

PAGE MILL SITE NO. 40
TIME (MSEC)
10
30
50
70
0
5
10
15
20
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
592 Velocity (M/S)
1670
592
592
0
CLAY, black
BASALT, close to
V. close fracture
AGGLOMERATE
5
10
BASALT
15

FIG. 68

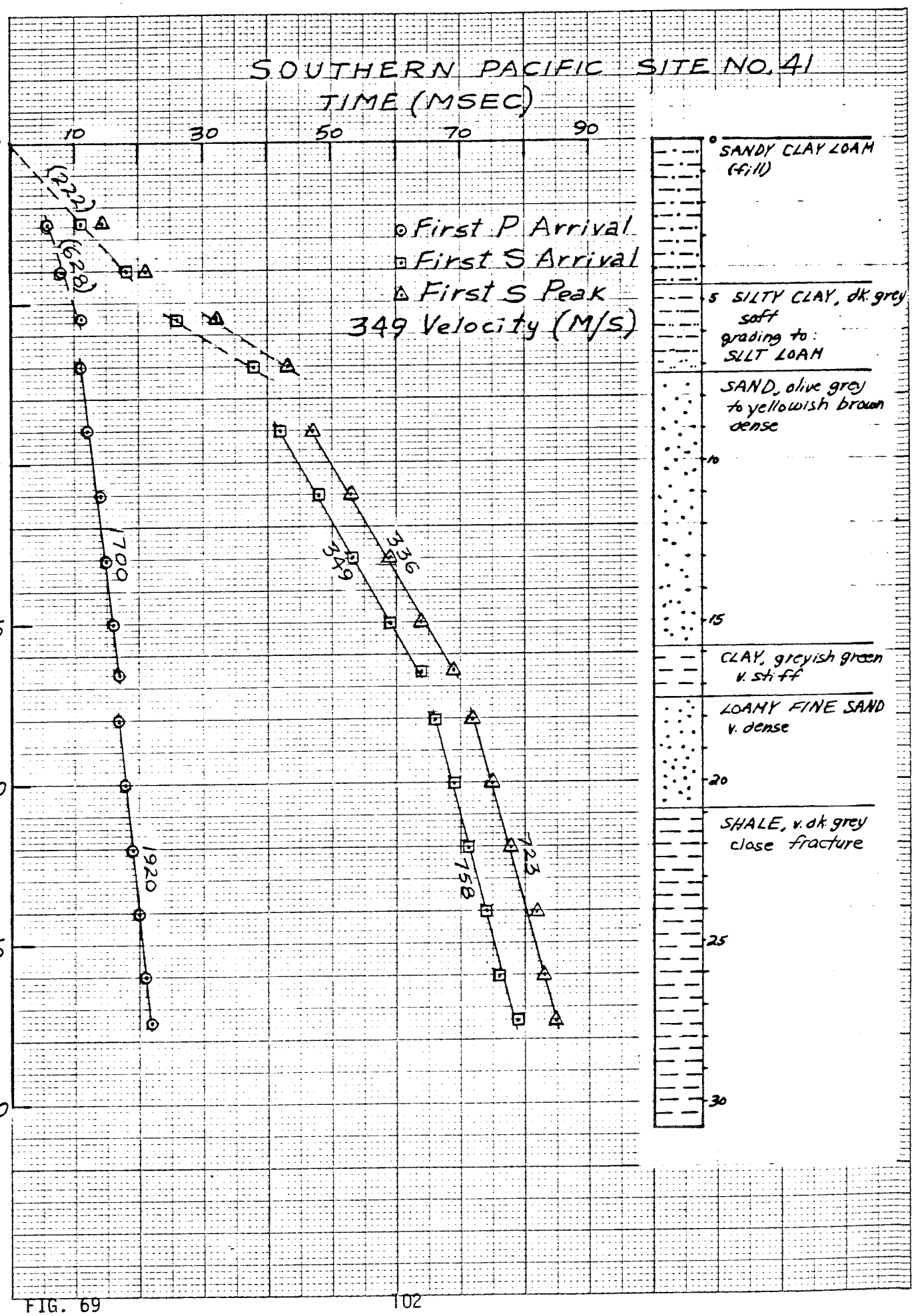

SOUTHERN PACIFIC SITE NO. 41
TIME (MSEC)
10
30
50
70
90
DEPTH (M)
0
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
349 Velocity (M/S)
(722)
(629)
1700
1920
336
349
758
723
SANDY CLAY LOAM (fill)
SILTY CLAY, dk. grey soft grading to: SILT LOAM
SAND, olive grey to yellowish brown dense
CLAY, greyish green v. stiff
LOAMY FINE SAND v. dense
SHALE, v. dk. grey close fracture

FIG. 69

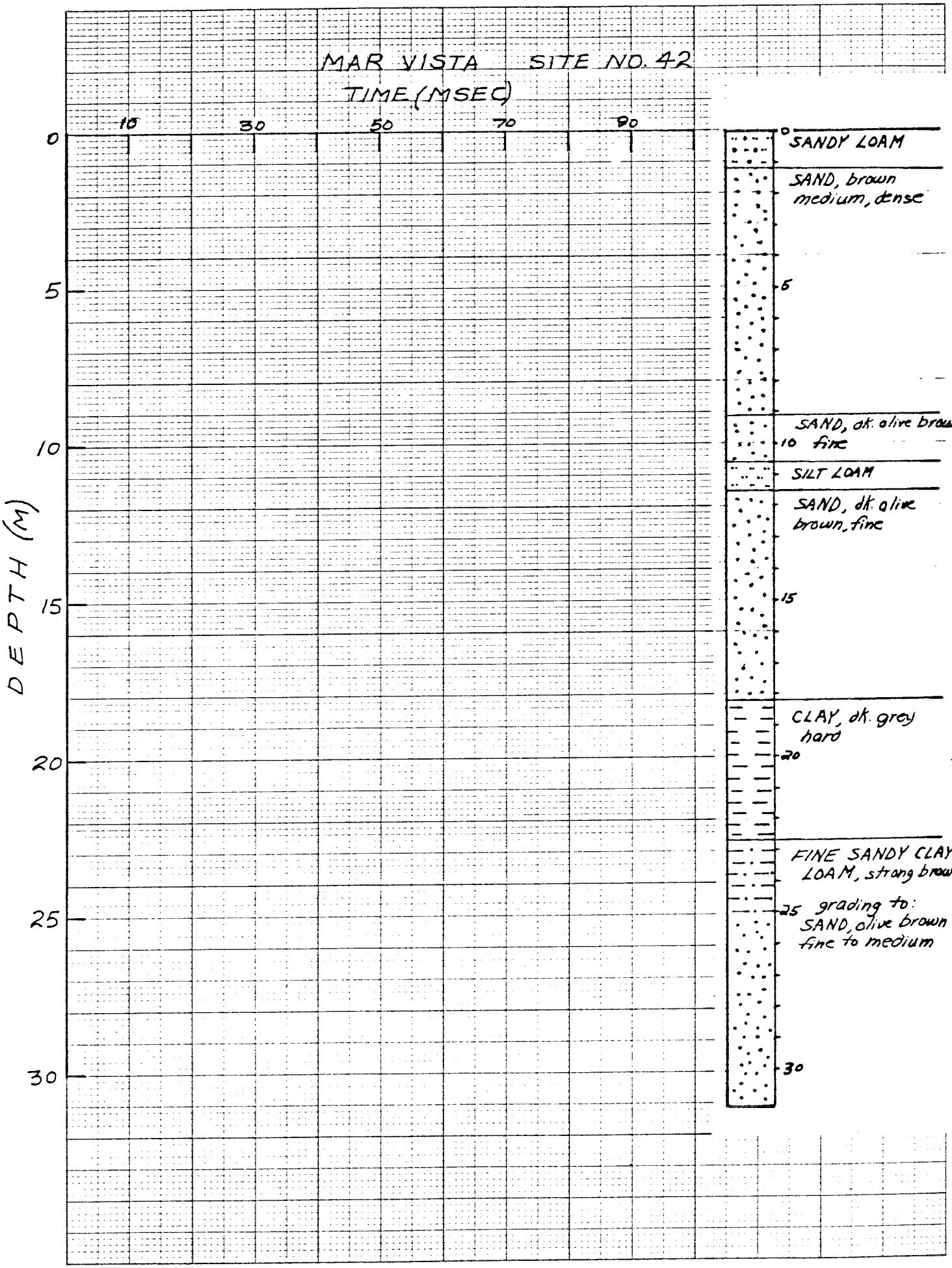
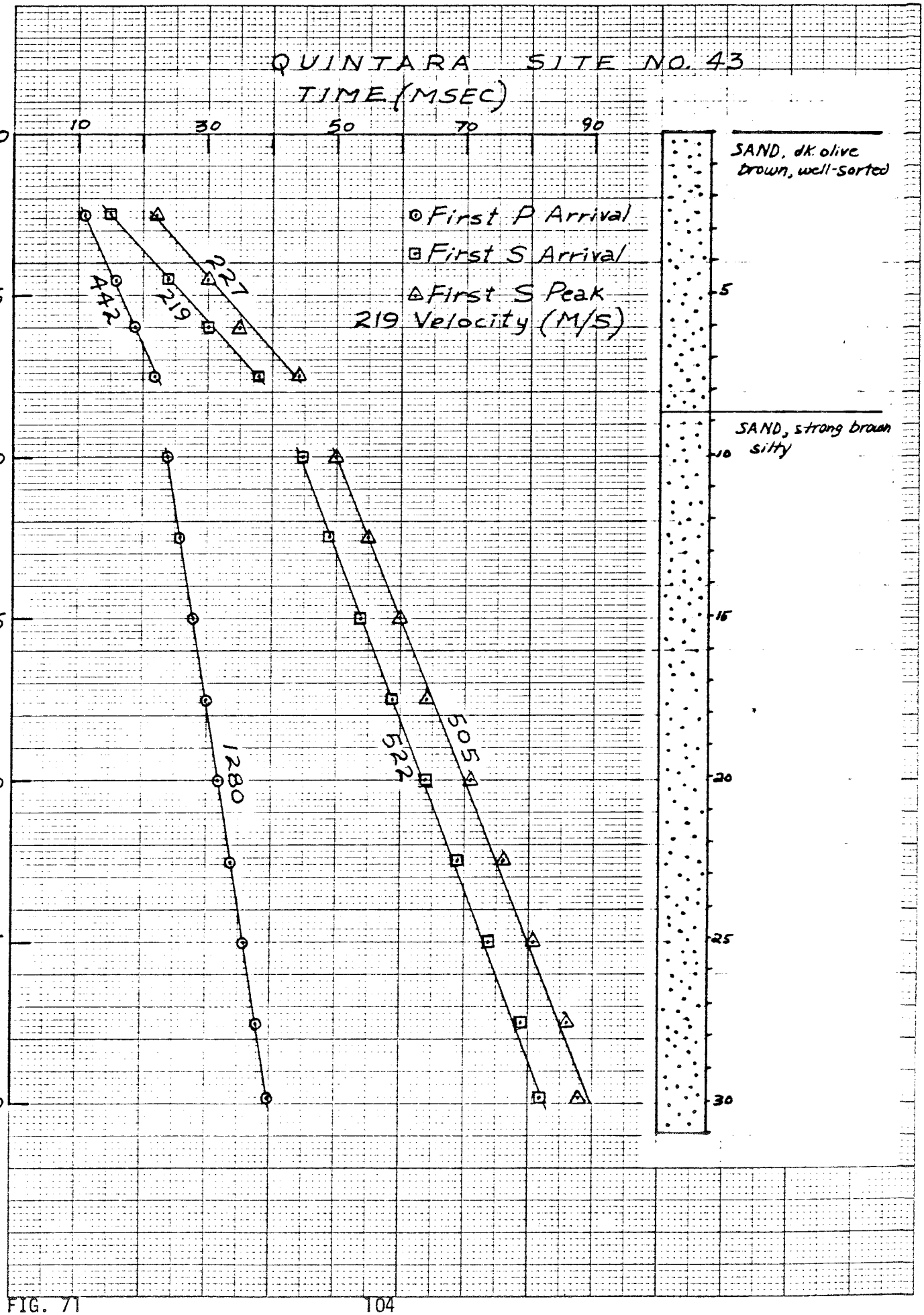

MAR VISTA SITE NO. 42
TIME (MSEC)
10
30
50
70
90
0
5
10
15
20
25
30
DEPTH (M)
0
SANDY LOAM
SAND, brown medium, dense
5
SAND, dk. olive brown fine
10
SILT LOAM
SAND, dk. olive brown, fine
15
CLAY, dk. grey hard
20
FINE SANDY CLAY LOAM, strong brown
25 grading to: SAND, olive brown fine to medium
30

FIG. 70



46 1240

K&E 20 X 20 TO THE INCH • 10 X 10 IN CM
KEUFFEL & ESSER CO MADE IN U.S.A.

FIG. 71

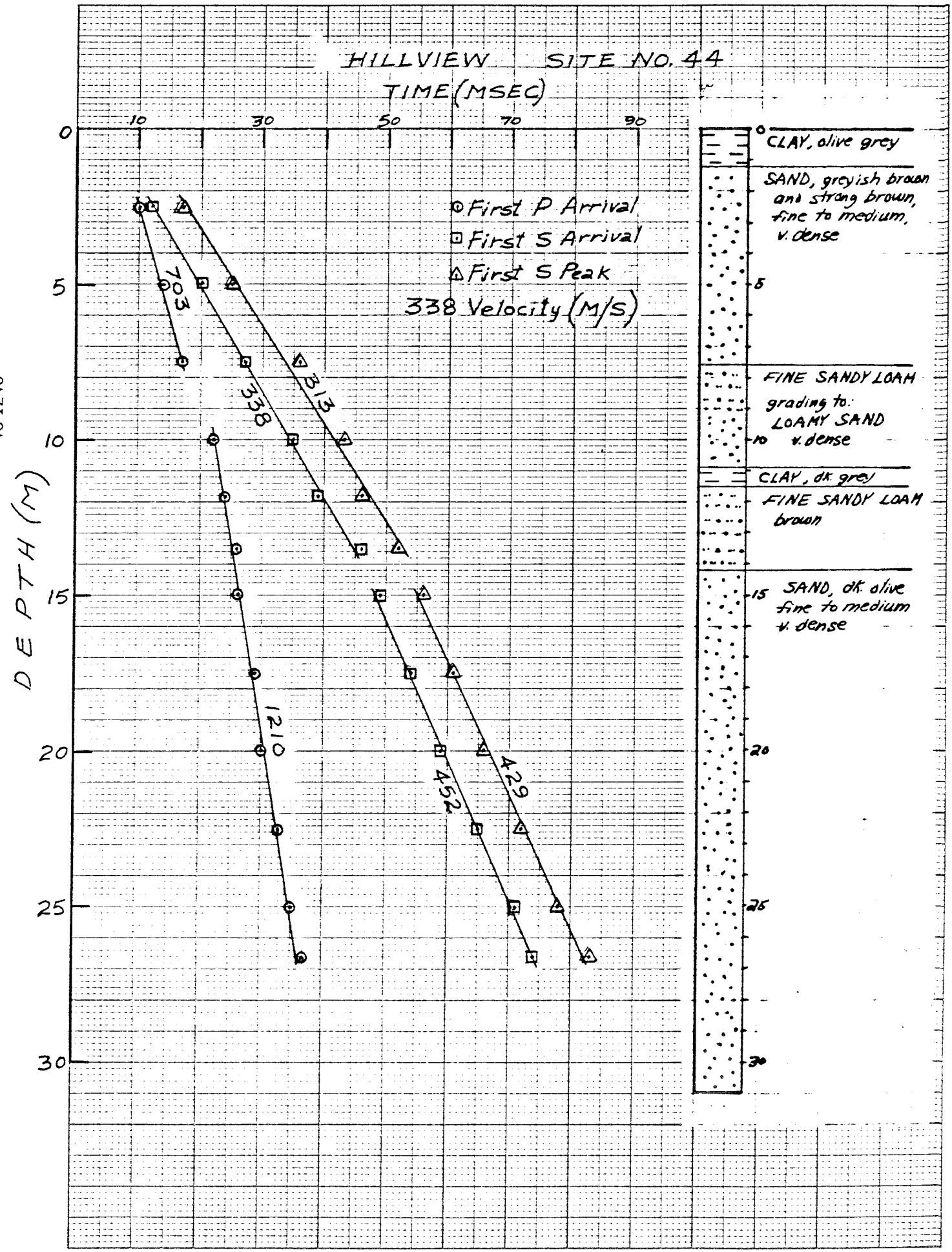

HILLVIEW SITE NO. 44
TIME (MSEC)
10
30
50
70
90
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
338 Velocity (M/S)
703
338
313
1210
452
429
CLAY, olive grey
SAND, greyish brown and strong brown, fine to medium, v. dense
FINE SANDY LOAM grading to: LOAMY SAND v. dense
CLAY, dk. grey
FINE SANDY LOAM brown
SAND, dk. olive fine to medium v. dense

FIG. 72

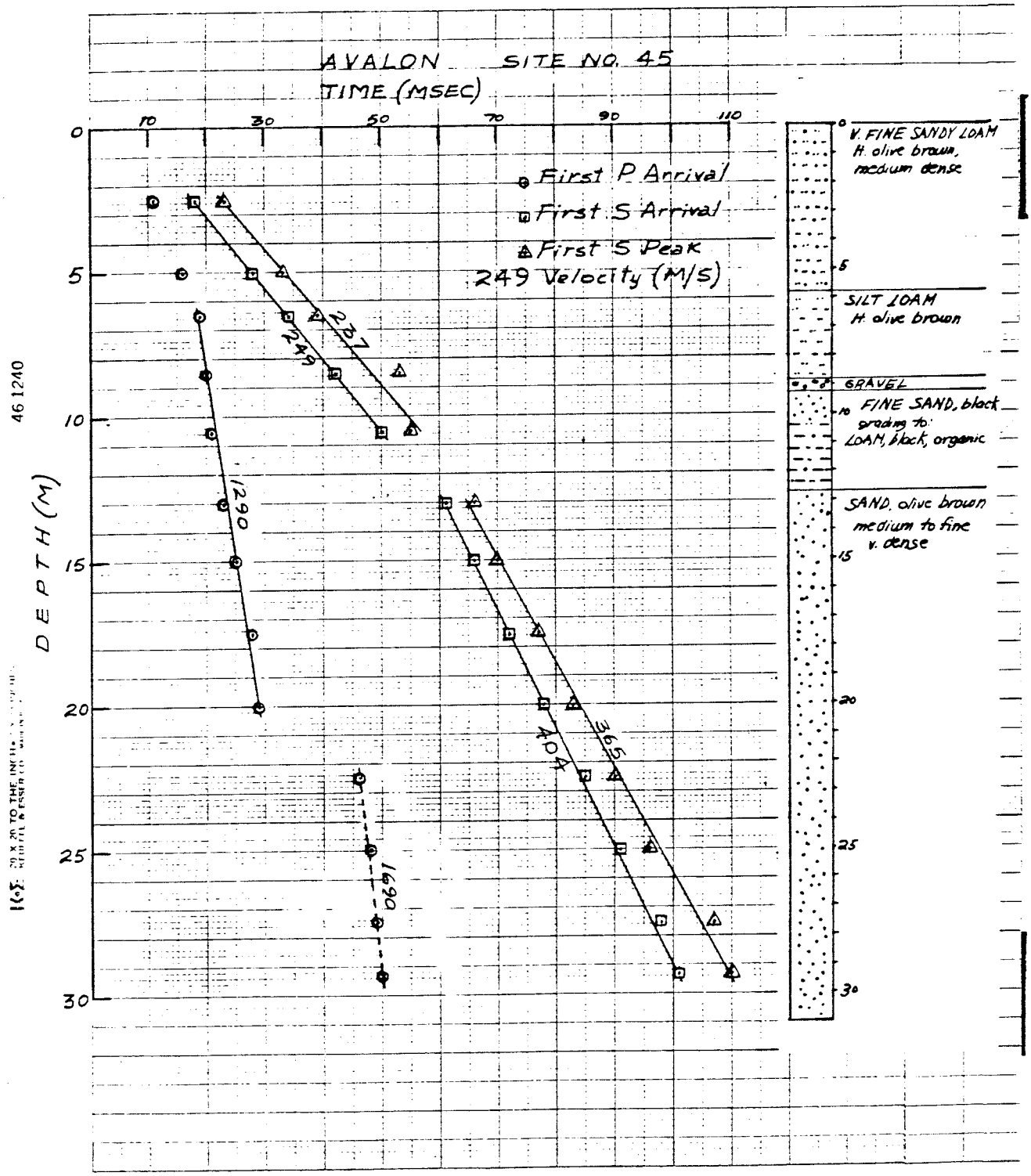

AVALON SITE NO. 45
TIME (MSEC)
10
30
50
70
90
110
First P Arrival
First S Arrival
First S Peak
249 Velocity (M/S)
237
249
1290
1690
365
404
DEPTH (M)
0
5
10
15
20
25
30
V. FINE SANDY LOAM
H. olive brown,
medium dense
SILT LOAM
H. olive brown
GRAVEL
FINE SAND, black
grading to
LOAM, black, organic
SAND, olive brown
medium to fine
v. dense
46 1240

FIG. 73

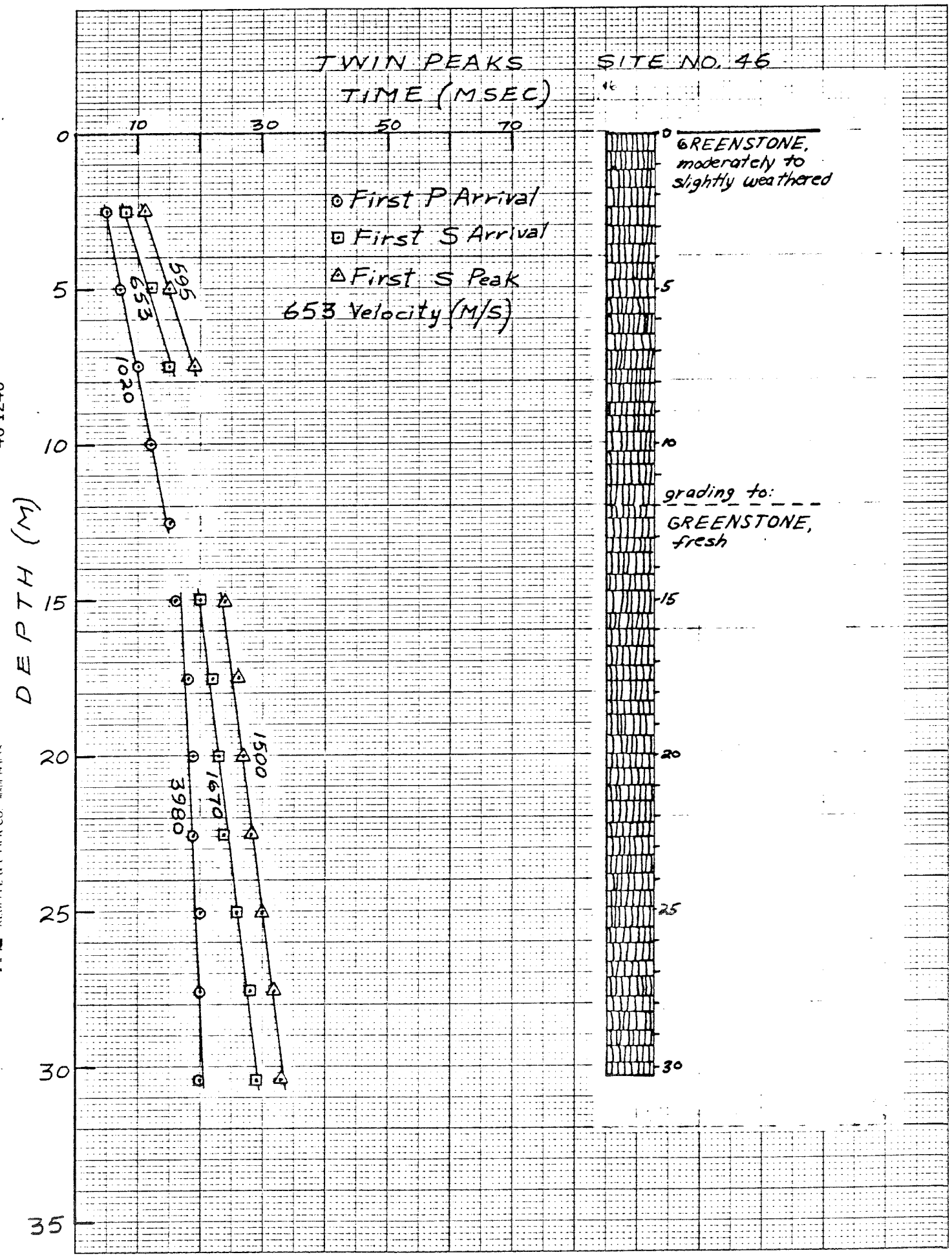

TWIN PEAKS SITE NO. 46
TIME (MSEC)
10
30
50
70
0
5
10
15
20
25
30
35
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
653 Velocity (M/S)
595
653
1020
3980
1670
1500
GREENSTONE, moderately to slightly weathered
grading to:
GREENSTONE, fresh
46 1240
20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.
K•E

FIG. 74

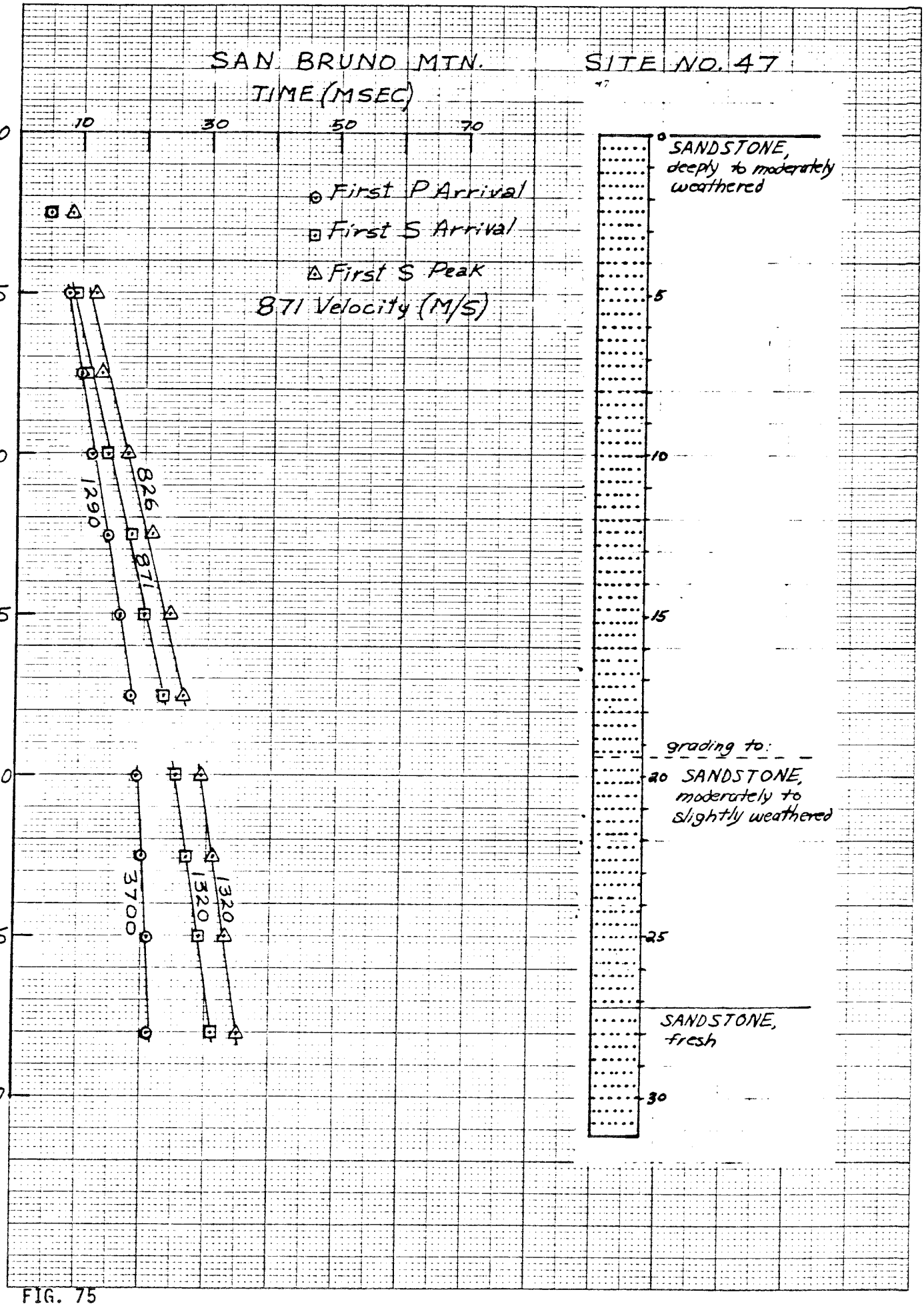

SAN BRUNO MTN.
SITE NO. 47
TIME (MSEC)
10
30
50
70
First P Arrival
First S Arrival
First S Peak
871 Velocity (M/S)
DEPTH (M)
0
5
10
15
20
25
30
826
1290
871
3700
1320
1320
SANDSTONE, deeply to moderately weathered
grading to:
SANDSTONE, moderately to slightly weathered
SANDSTONE, fresh

FIG. 75

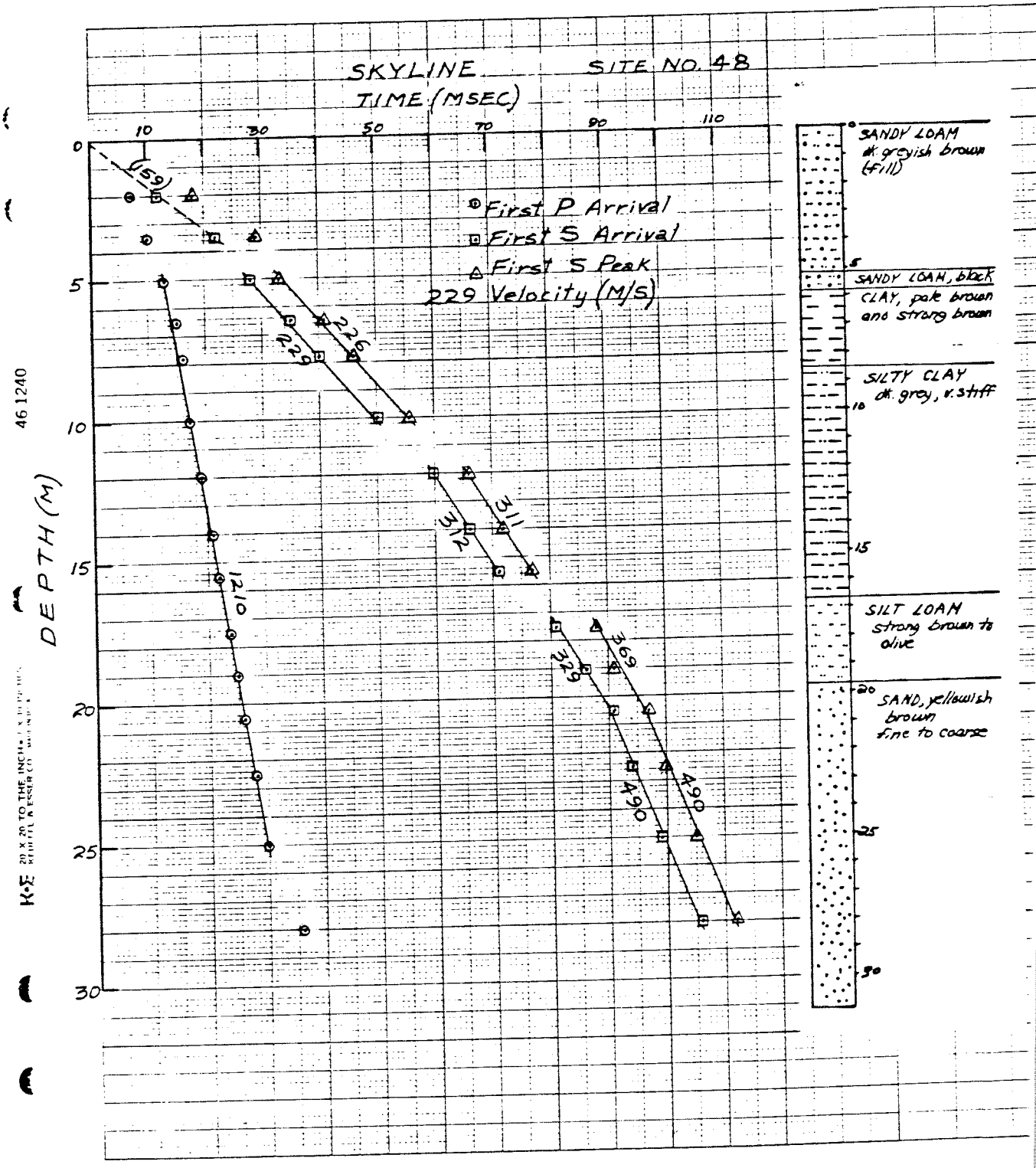

SKYLINE
SITE NO. 48
TIME (MSEC)
10
30
50
70
90
110
DEPTH (M)
0
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
229 Velocity (M/S)
159
229
226
311
312
1210
329
369
490
490
SANDY LOAM
dk. greyish brown
(Fill)
SANDY LOAM, black
CLAY, pale brown
and strong brown
SILTY CLAY
dk. grey, v. stiff
SILT LOAM
strong brown to
olive
SAND, yellowish
brown
fine to coarse
5
10
15
20
25
30
46 1240
K·E

FIG. 76

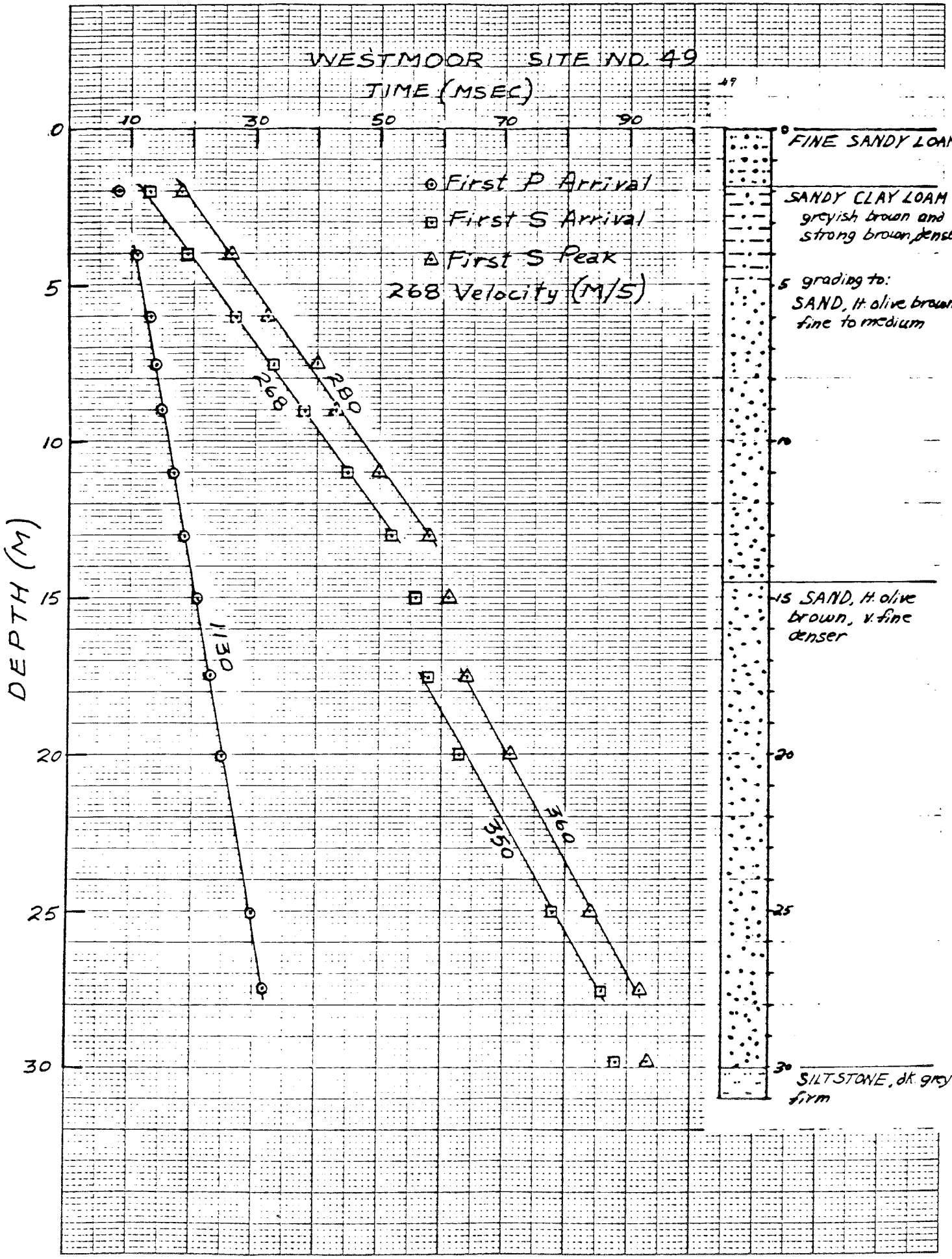

WESTMOOR SITE NO. 49
TIME (MSEC)
10
30
50
70
90
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
268 Velocity (M/S)
280
268
130
360
350
FINE SANDY LOAM
SANDY CLAY LOAM
greyish brown and
strong brown, dense
5 grading to:
SAND, lt. olive brown
fine to medium
15 SAND, lt. olive
brown, v. fine
denser
SILTSTONE, dk. grey
firm

FIG. 77

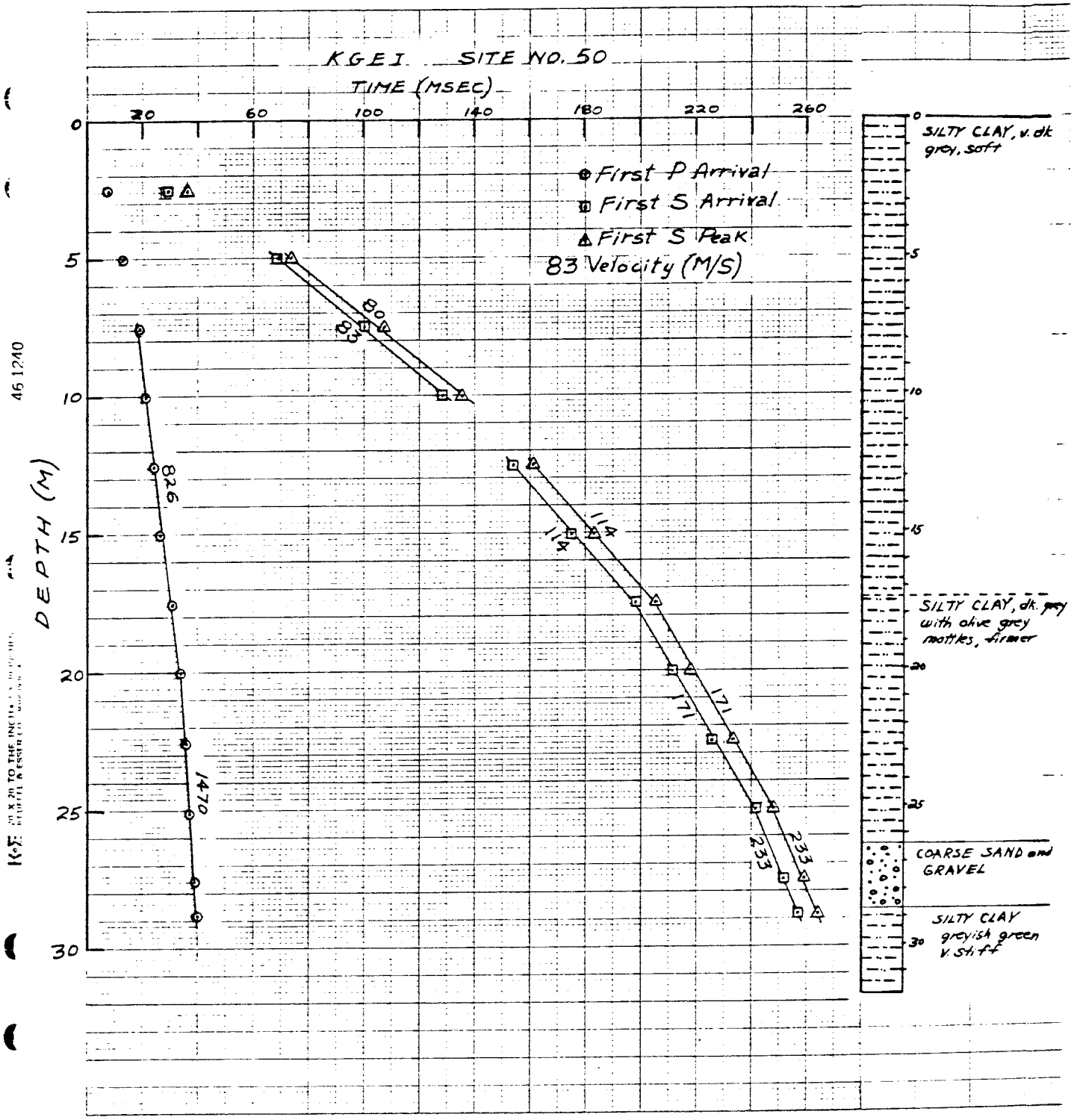

KGEI SITE NO. 50
TIME (MSEC)
20
60
100
140
180
220
260
First P Arrival
First S Arrival
First S Peak
83 Velocity (M/S)
DEPTH (M)
0
5
10
15
20
25
30
826
1470
80
83
114
114
171
171
233
233
SILTY CLAY, v. dk grey, soft
SILTY CLAY, dk. grey with olive grey mottles, firmer
COARSE SAND and GRAVEL
SILTY CLAY greyish green V. Stiff

FIG. 78

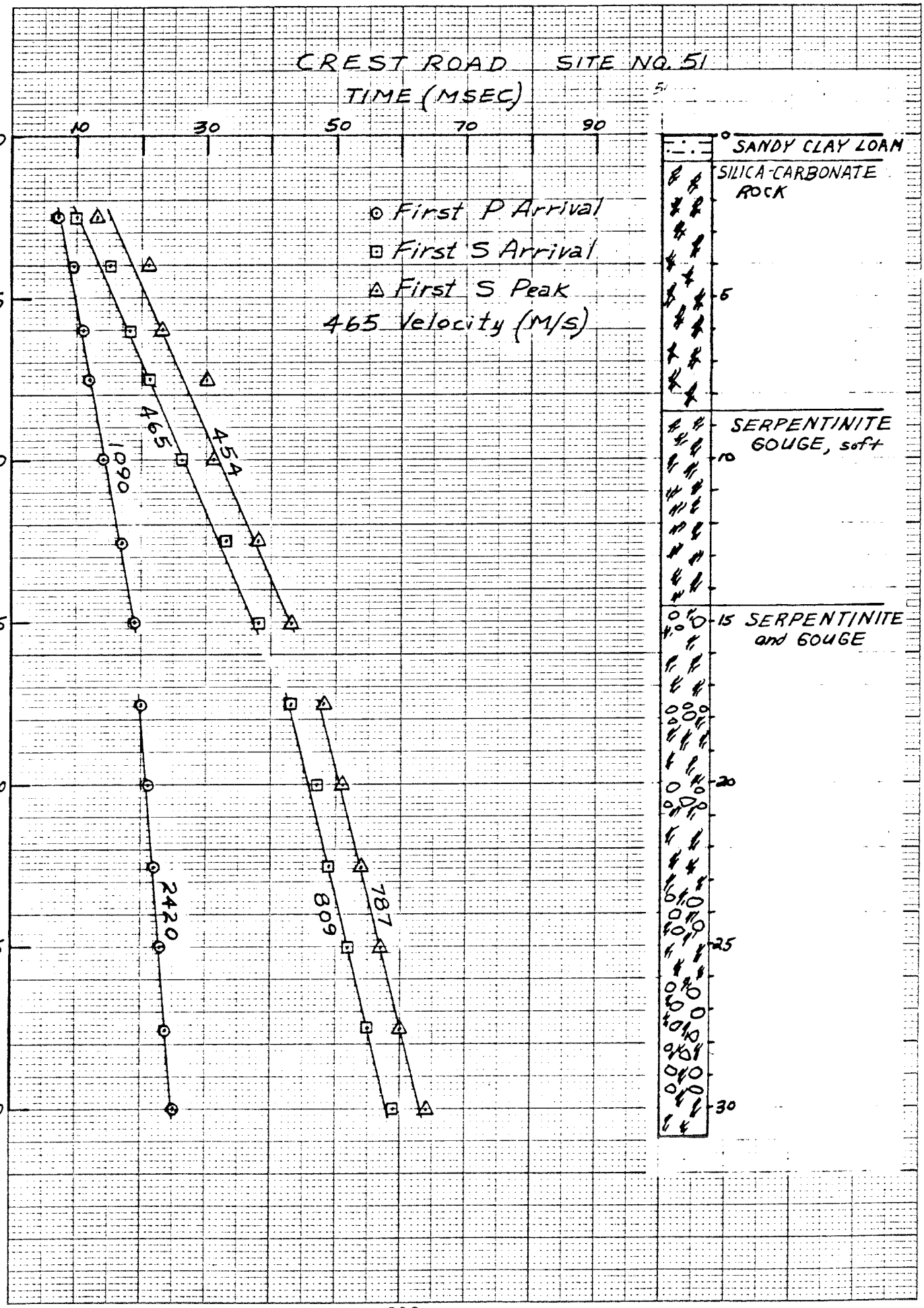

CREST ROAD SITE NO. 51
TIME (MSEC)
10
30
50
70
90
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
465 Velocity (M/s)
1090
465
454
2420
809
787
SANDY CLAY LOAM
SILICA-CARBONATE ROCK
SERPENTINITE GOUGE, soft
SERPENTINITE and GOUGE
0
6
10
15
20
25
30

FIG. 79

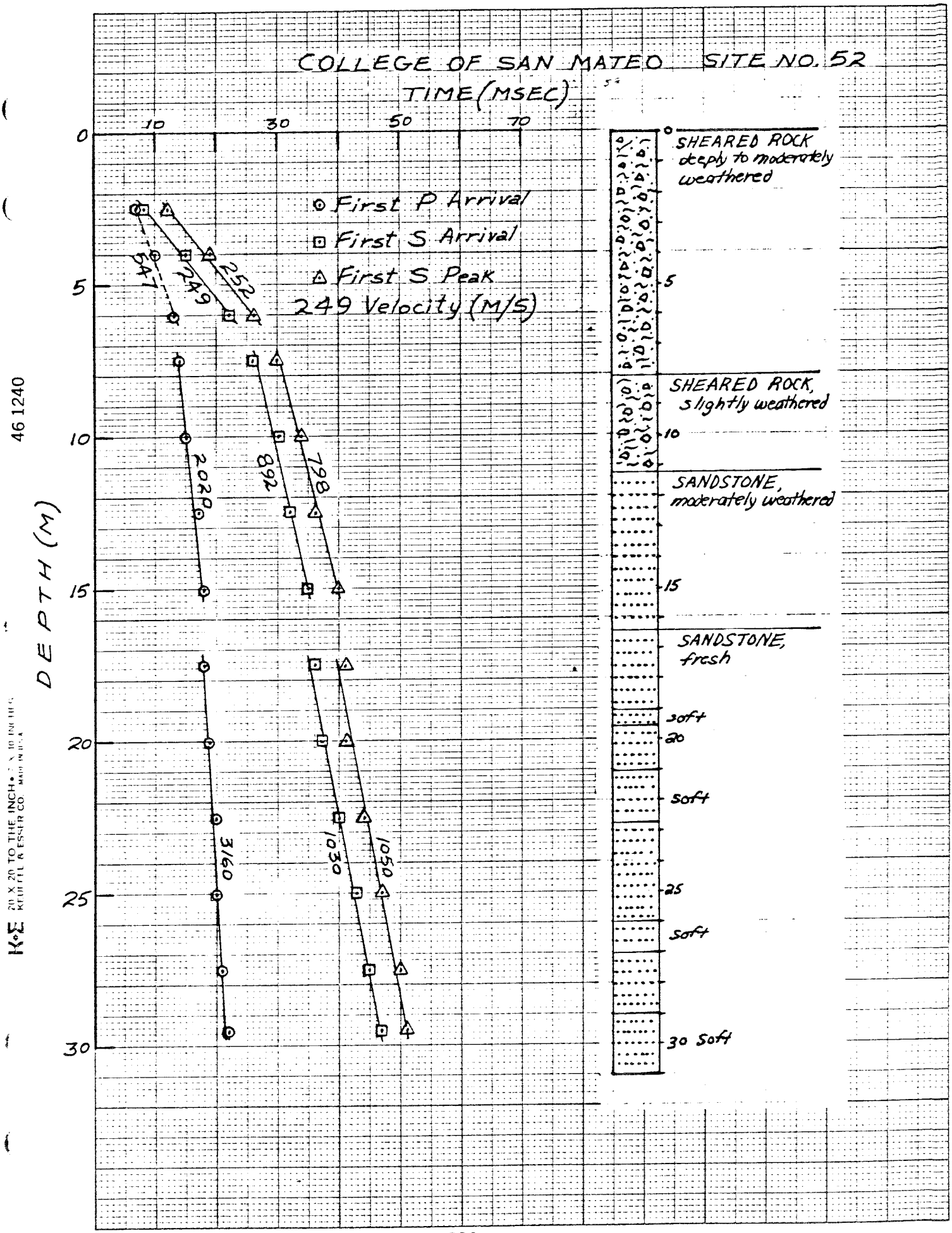

COLLEGE OF SAN MATEO SITE NO. 52
TIME (MSEC)
10
30
50
70
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
249 Velocity (M/S)
247
249
252
2020
892
728
3160
1030
1050
SHEARED ROCK deeply to moderately weathered
SHEARED ROCK, slightly weathered
SANDSTONE, moderately weathered
SANDSTONE, fresh
soft
soft
soft
30 Soft
46 1240
K+E 20 X 20 TO THE INCH
KEUFFEL & ESSER CO. MADE IN U.S.A.

FIG. 80

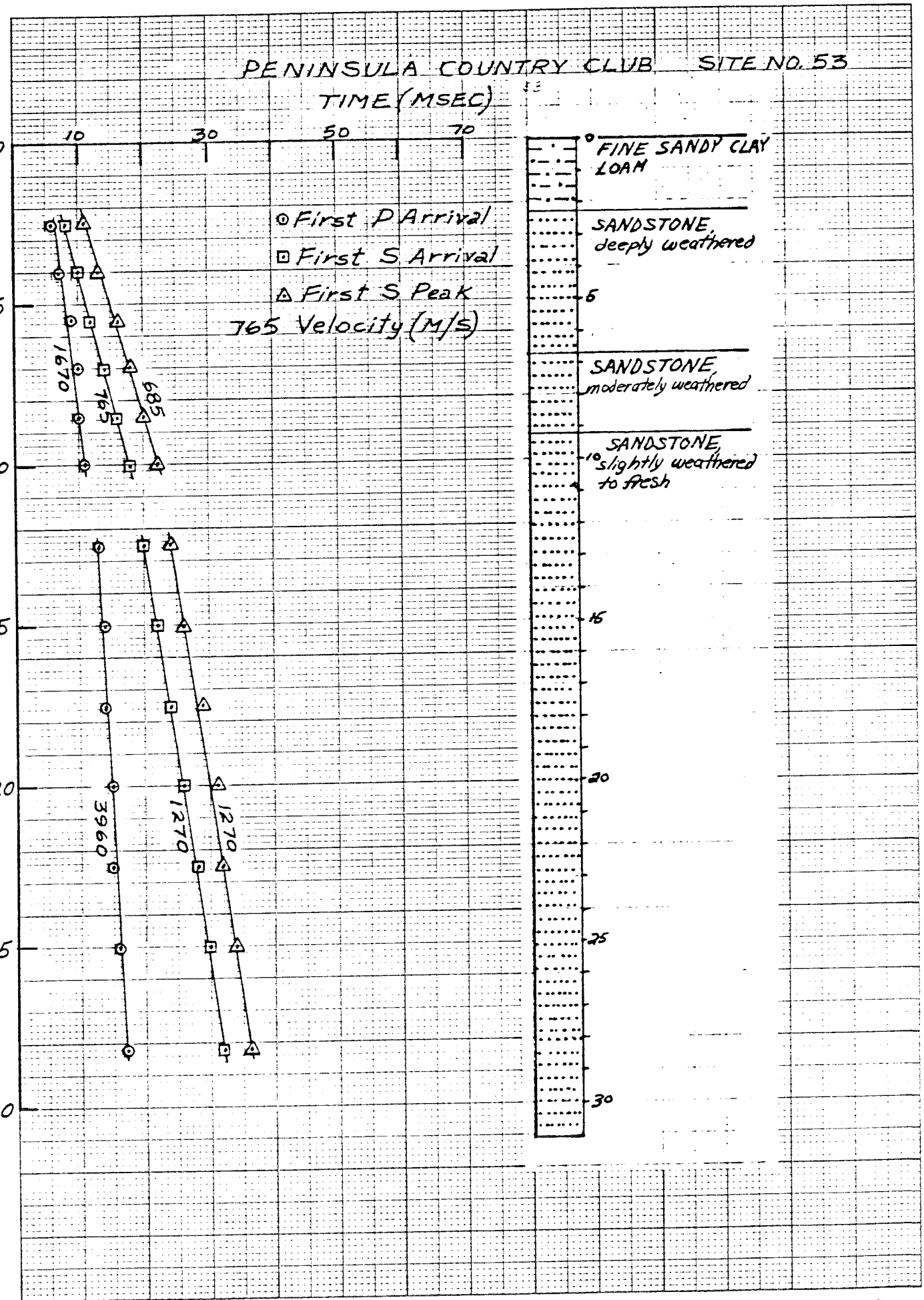

PENINSULA COUNTRY CLUB SITE NO. 53
TIME (MSEC)
10
30
50
70
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
765 Velocity (M/S)
1670
765
685
3990
1270
1270
FINE SANDY CLAY LOAM
SANDSTONE, deeply weathered
SANDSTONE moderately weathered
SANDSTONE, slightly weathered to fresh
5
10
15
20
25
30

FIG. 81

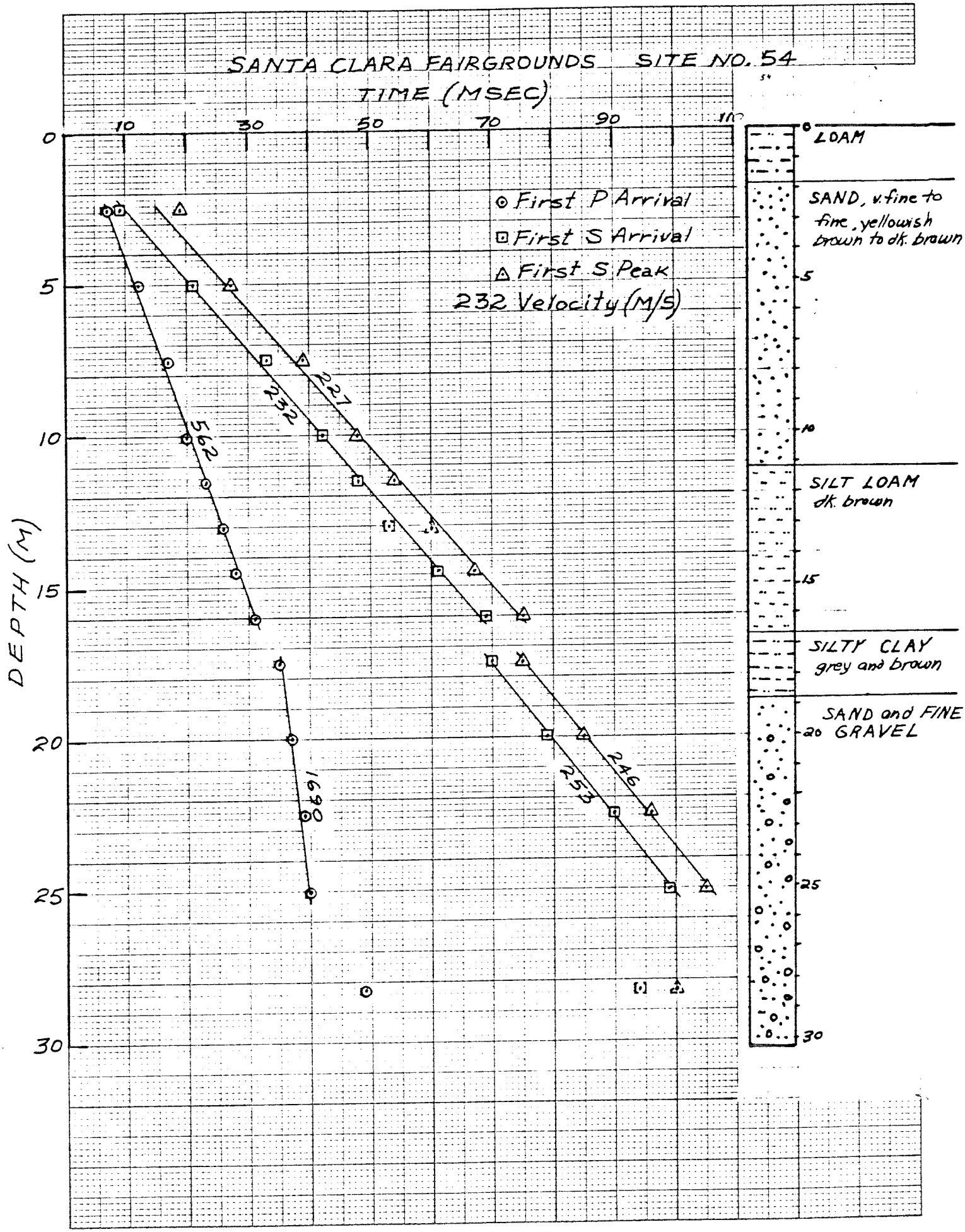

SANTA CLARA FAIRGROUNDS SITE NO. 54
TIME (MSEC)
10
30
50
70
90
110
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
232 Velocity (M/S)
562
232
227
1690
253
246
LOAM
SAND, v. fine to fine, yellowish brown to dk. brown
SILT LOAM dk. brown
SILTY CLAY grey and brown
SAND and FINE GRAVEL
5
10
15
20
25
30

FIG. 82

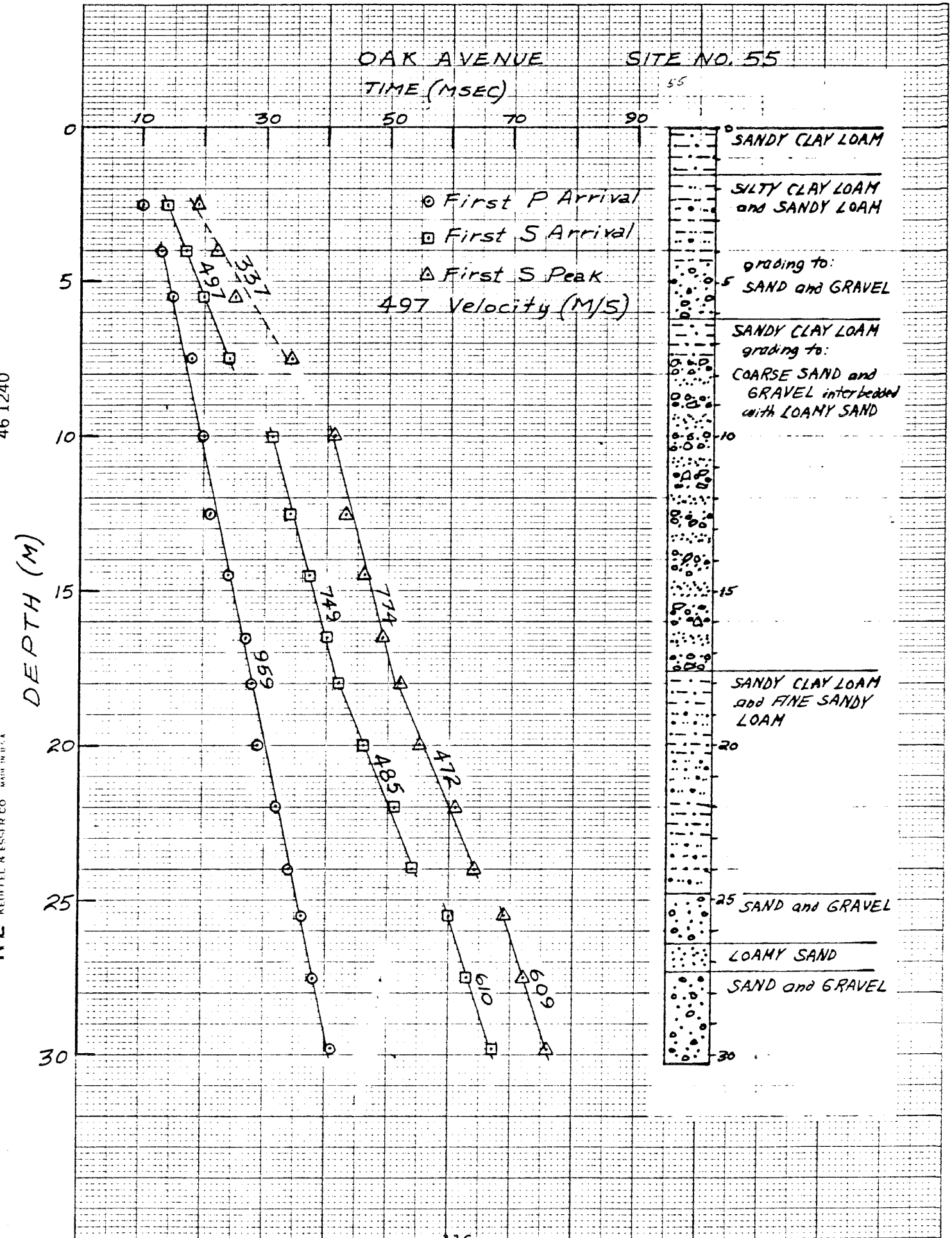

OAK AVENUE SITE NO. 55
TIME (MSEC)
10
30
50
70
90
DEPTH (M)
0
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
497 Velocity (M/S)
337
497
749
774
959
485
472
610
609
SANDY CLAY LOAM
SILTY CLAY LOAM and SANDY LOAM
grading to:
SAND and GRAVEL
SANDY CLAY LOAM grading to:
COARSE SAND and GRAVEL interbedded with LOAMY SAND
SANDY CLAY LOAM and FINE SANDY LOAM
SAND and GRAVEL
LOAMY SAND
SAND and GRAVEL

FIG. 83

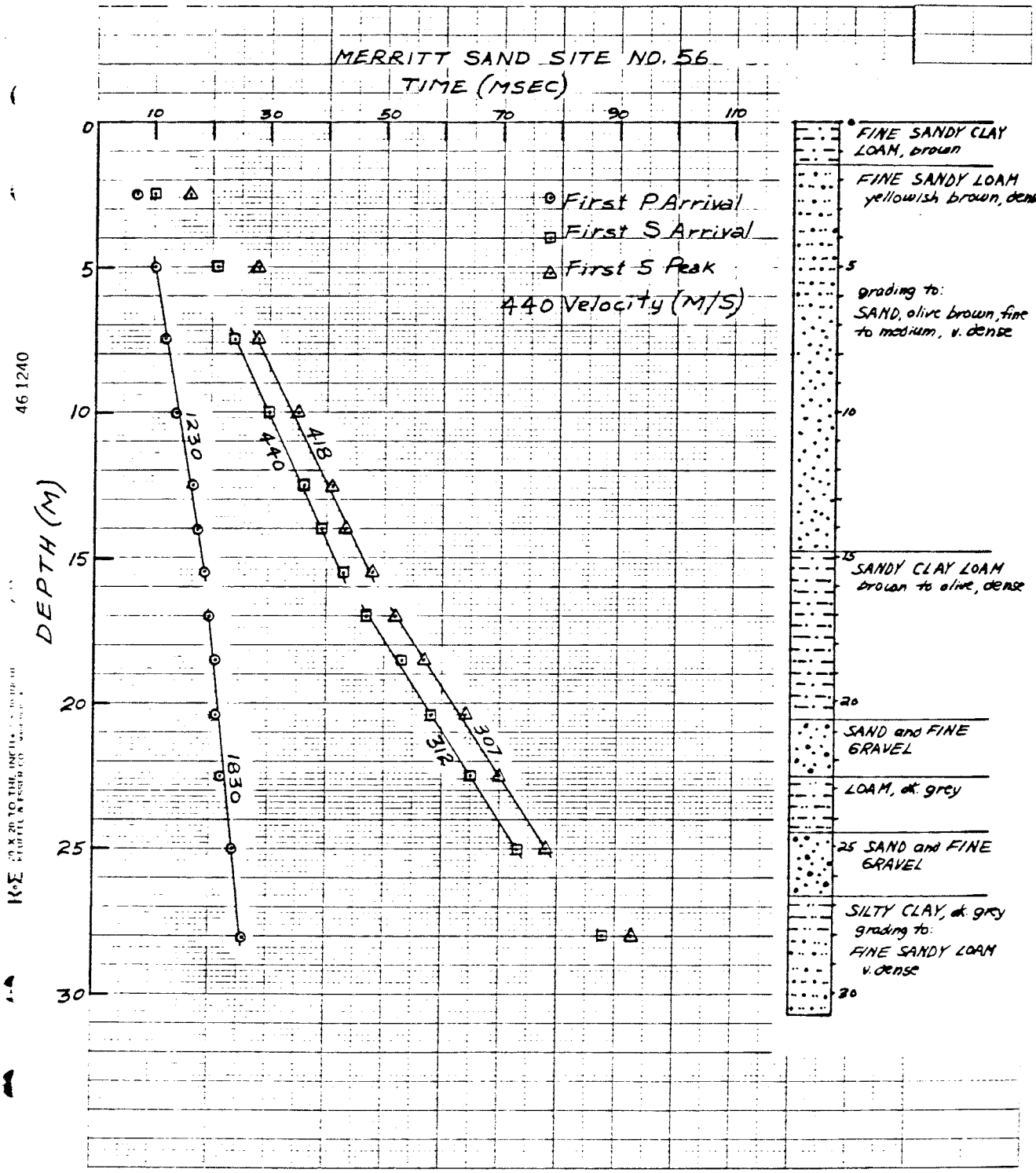

MERRITT SAND SITE NO. 56
TIME (MSEC)
10
30
50
70
90
110
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
440 Velocity (M/S)
1230
440
418
1830
312
307
FINE SANDY CLAY LOAM, brown
FINE SANDY LOAM yellowish brown, dense
grading to:
SAND, olive brown, fine to medium, v. dense
SANDY CLAY LOAM brown to olive, dense
SAND and FINE GRAVEL
LOAM, dk. grey
SAND and FINE GRAVEL
SILTY CLAY, dk. grey
grading to:
FINE SANDY LOAM
v. dense

FIG. 84

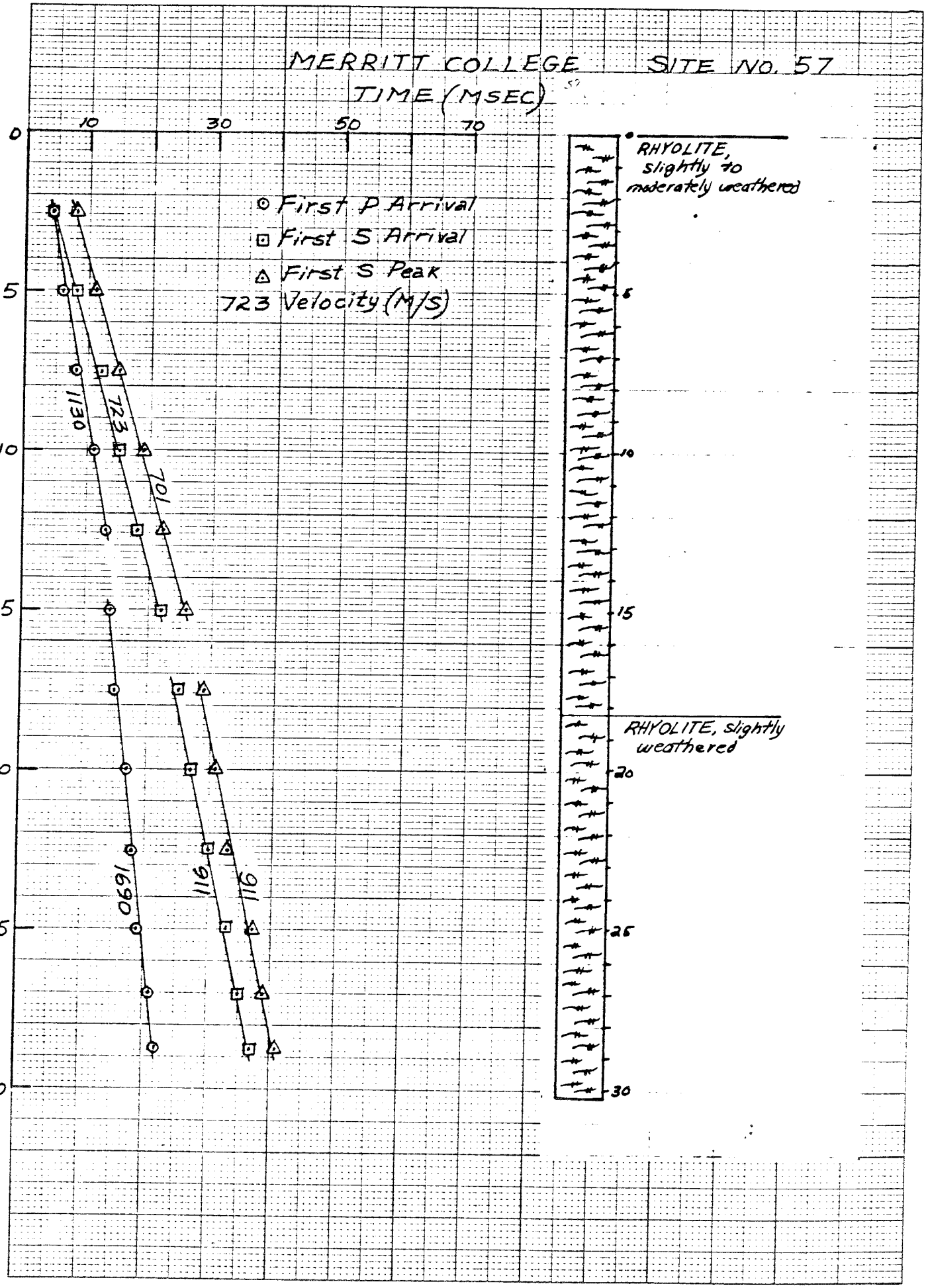

MERRITT COLLEGE SITE NO. 57
TIME (MSEC)
10
30
50
70
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
723 Velocity (M/S)
1130
723
701
1690
911
911
RHYOLITE, slightly to moderately weathered
RHYOLITE, slightly weathered
5
10
15
20
25
30
46 1240
K+E 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO MADE IN U.S.A.

FIG. 85

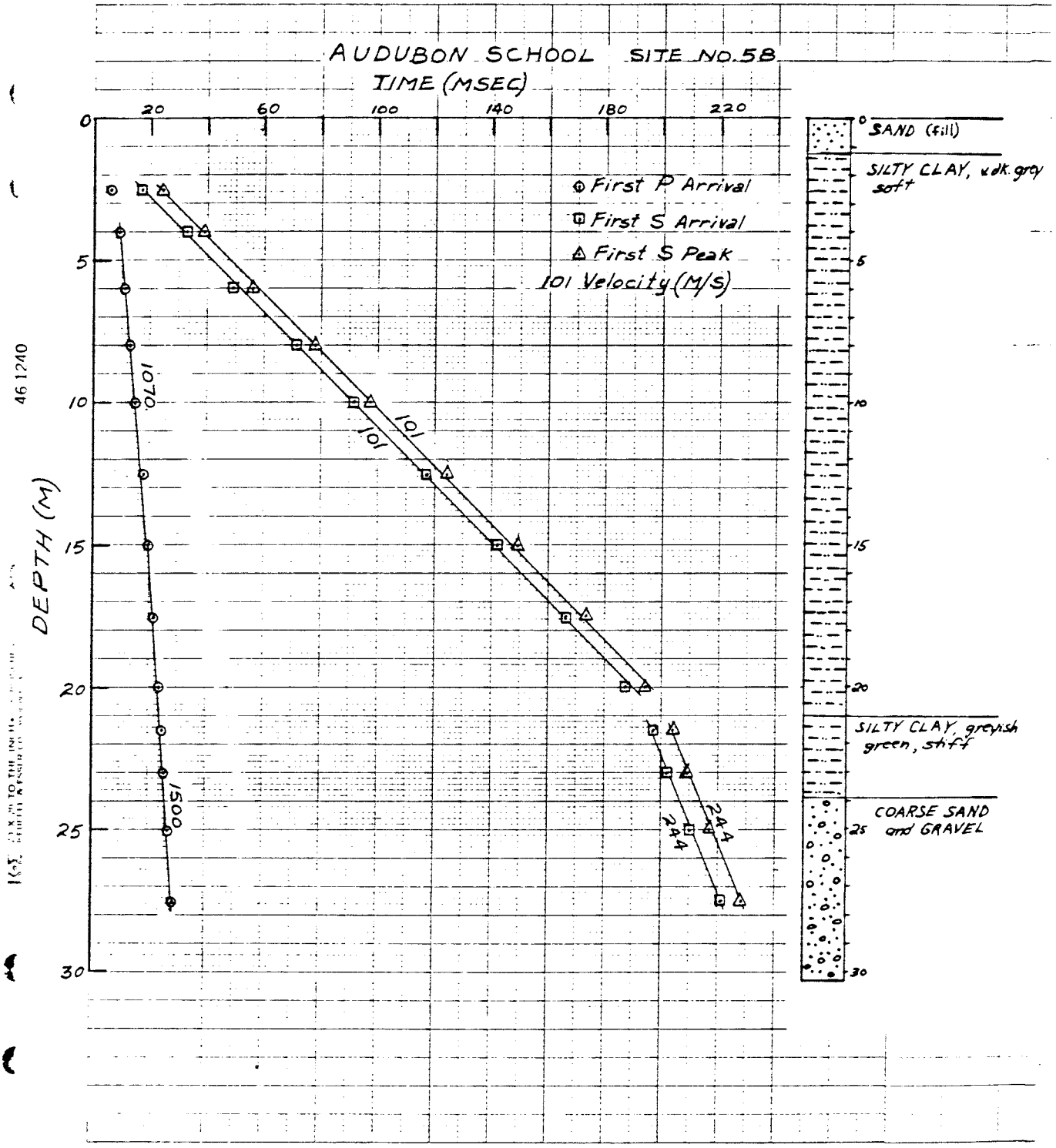

AUDUBON SCHOOL SITE NO.58
TIME (MSEC)
20
60
100
140
180
220
0
5
10
15
20
25
30
DEPTH (M)
First P Arrival
First S Arrival
First S Peak
101 Velocity (M/S)
1070
101
101
1500
244
244
SAND (fill)
SILTY CLAY, wdk. gray soft
SILTY CLAY, greyish green, stiff
COARSE SAND and GRAVEL
46 1240

FIG. 86

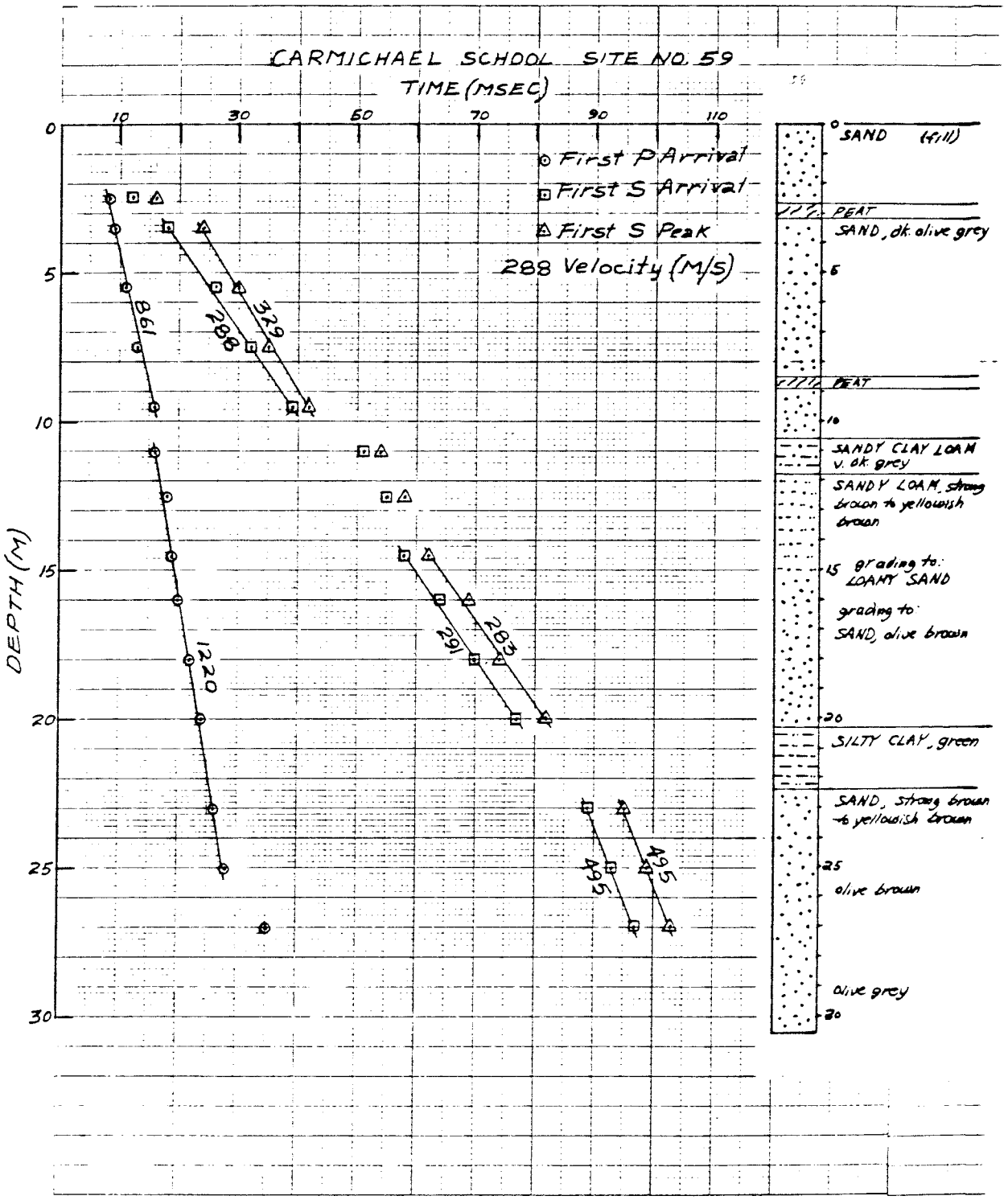

CARMICHAEL SCHOOL SITE NO. 59
TIME (MSEC)
10
30
60
70
90
110
DEPTH (M)
0
5
10
15
20
25
30
First P Arrival
First S Arrival
First S Peak
288 Velocity (M/S)
861
288
329
1220
291
283
495
495
SAND (Fill)
PEAT
SAND, dk olive grey
5
PEAT
10
SANDY CLAY LOAM v. dk grey
SANDY LOAM, strong brown to yellowish brown
15 grading to: LOAMY SAND
grading to: SAND, olive brown
20
SILTY CLAY, green
SAND, strong brown to yellowish brown
25
olive brown
olive grey
30

FIG. 87

TABLE 24

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 36 BRIDGEWAY PARK

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- 7.0	3	-.032	54	(53, 54)	-.024	54	(53, 54)
9.0-20.0	6	0.076	195	(190, 199)	0.082	190	(184, 197)
22.5-29.6	4	0.058	175	(172, 178)	0.067	175	(172, 178)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-11.0	5	-.002	427	(398, 462)
10.0-29.6	9	0.017	1510	(1470,1550)

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
54	2.5- 7.0	427	2.5-11.0	5.0	1.43	42	2560	0.492
195	9.0-20.0	1510	10.0-29.6	12.5	1.99	758	44200	0.491
175	22.5-29.6	1506	10.0-29.6	26.0	2.08	638	46400	0.493

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 37 WINDMILL

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	4	0.010	266	(219, 338)	0.015	274	(230, 340)
6.0-20.0	7	0.012	304	(300, 308)	0.016	296	(292, 300)
22.5-29.8	4	0.039	457	(437, 479)	0.045	457	(437, 479)
10.0-29.8	9	0.016	328	(317, 339)	0.021	321	(310, 333)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	4	0.006	703	(637, 783)
7.5-29.8	10	0.012	1610	(1560,1670)
10.0-29.8	9	0.012	1620	(1550,1690)

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
266	2.5- 7.5	703	2.5- 7.5					0.416
304	6.0-20.0	1610	7.5-29.8					0.481
457	22.5-29.8	1610	7.5-29.8					0.456
328	10.0-29.8	1620	10.0-29.8					0.479

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 38 CHAIN OF LAKES

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
6.0-21.5	7	0.016	300	(296, 305)
10.0-21.5	4	0.018	309	(288, 332)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.022	309	(303, 315)
0.026	327	(300, 358)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
7.5-15.0	3	0.017	900	(883, 918)
10.0-21.5	4	0.014	721	(594, 916)

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
300	6.0-21.5	900	7.5-15.0					0.437
309	10.0-21.5	721	10.0-21.5					0.388

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 39 PRAYERBOOK CROSS

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.0	3	0.009	671	(622, 727)
10.0-19.0	5	0.011	1000	(968,1040)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.011	604	(581, 630)
0.018	1260	(1020,1650)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.0	3	0.004	978	(889,1090)
10.0-19.0	5	0.011	2650	(2310,3090)

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
671	2.5- 7.0	978	2.5- 7.0					0.055
1000	10.0-19.0	2650	10.0-19.0					0.416

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO.40 PAGE MILL

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
6.0-16.0	6	0.006	592	(581, 604)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.010	592	(576, 608)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
4.0-16.0	7	0.007	1670	(1640,1710)

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
592	6.0-16.0	1670	4.0-16.0					0.428

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 41 SOUTHERN PACIFIC

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
9.0-16.5	5	0.016	349	(343, 354)
18.0-27.7	6	0.042	758	(734, 784)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.020	336	(329, 343)
0.047	723	(673, 780)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
7.0-16.5	6	0.007	1700	(1670,1730)
18.0-27.7	6	0.007	1920	(1900,1940)

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
349	9.0-16.5	1700	7.0-16.5	11.2	2.10	2560	57500	0.478
758	18.0-27.7	1920	18.0-27.7	19.0	2.00	11500	58300	0.407

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 43 QUINTARA

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	4	0.003	219	(216, 223)	0.010	227	(209, 250)
10.0-29.8	9	0.025	522	(514, 529)	0.030	505	(491, 519)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	4	0.005	442	(430, 455)
10.0-29.8	9	0.016	1280	(1250,1300)

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
219	2.5- 7.5	442	2.5- 7.5					0.336
522	10.0-29.8	1280	10.0-29.8	20.0	2.11	5750	26800	0.400

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 44 HILLVIEW

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-13.5	6	0.005	338	(331, 344)
15.0-26.6	6	0.015	452	(443, 460)
10.0-26.6	9	0.013	436	(427, 445)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.010	313	(298, 329)
0.020	429	(415, 444)
0.020	428	(419, 437)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.006	703	(644, 773)
10.0-26.6	9	0.014	1210	(1160,1270)

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
338	2.5-13.5	703	2.5- 7.5	9.6	2.03	2320	6940	0.350
452	15.0-26.6	1210	10.0-26.6	26.0	2.08	4250	24900	0.419
436	10.0-26.6	1213	10.0-26.6	26.0	2.08	3960	25300	0.426

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 45 AVALON

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.5	5	0.008	249	(246, 251)
13.0-29.3	8	0.029	404	(398, 411)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.013	237	(215, 264)
0.029	365	(352, 379)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
6.5-20.0	7	0.014	1290	(1230,1360)
22.5-29.3	4	0.033	1690	(1530,1890)

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
249	2.5-10.5	1290	6.5-20.0	3.0	1.99	1240	31500	0.481
404	13.0-29.3	1690	22.5-29.3	25.0	2.05	3360	54200	0.470

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 46 TWIN PEAKS

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 7.5	3	0.004	653	(613, 699)
10.0-30.4	9	0.011	1670	(1620,1720)
10.0-30.4	9	0.011	1670	(1620,1720)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.007	595	(574, 618)
0.013	1500	(1430,1570)
0.013	1500	(1430,1570)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-12.5	5	0.002	1020	(968,1080)
15.0-30.4	7	0.013	3980	(3260,5110)
10.0-30.4	9	0.010	2760	(2410,3230)

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
653	2.5- 7.5	1020	2.5-12.5					0.151
1670	10.0-30.4	3980	15.0-30.4					0.393
1670	10.0-30.4	2760	10.0-30.4					0.211

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 47 SAN BRUNO MTN

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-17.5	7	0.003	871	(837, 908)
20.0-28.0	4	0.010	1320	(1280,1360)
10.0-28.0	8	0.006	1070	(1020,1130)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.005	826	(792, 864)
0.014	1320	(1270,1360)
0.008	1010	(954,1060)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
5.0-17.5	6	0.004	1290	(1240,1350)
20.0-28.0	4	0.014	3700	(2900,5100)
10.0-28.0	8	0.008	1970	(1800,2190)

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
871	2.5-17.5	1290	5.0-17.5	5.5	2.33	17700	15300	0.083
1320	20.0-28.0	3700	20.0-28.0	27.0	2.54	44100	288000	0.427
1070	10.0-28.0	1970	10.0-28.0	27.0	2.54	29300	60000	0.290

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 48 SKYLINE

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)
5.0-10.0	4	0.006	229	(219, 239)	0.012	226	(216, 236)
12.0-15.5	3	0.022	312	(303, 320)	0.027	311	(303, 319)
17.5-20.5	3	0.028	329	(310, 351)	0.041	369	(324, 430)
20.5-28.0	4	0.048	490	(462, 522)	0.054	490	(462, 522)
10.0-28.0	10	0.024	325	(306, 346)	0.030	325	(305, 347)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
5.0-25.0	12	0.009	1210	(1200,1230)
10.0-28.0	10	0.007	1060	(1000,1130)

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
229	5.0-10.0	1210	5.0-25.0	9.6	1.87	984	26200	0.481
312	12.0-15.5	1210	5.0-25.0					0.465
329	17.5-20.5	1210	5.0-25.0					0.460
490	20.5-28.0	1213	5.0-25.0	27.0	2.12	5110	24400	0.402
325	10.0-28.0	1060	10.0-28.0	27.0	2.12	2240	21000	0.448

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 49 WESTMOOR

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-13.0	6	0.004	268	(264, 272)
17.5-27.5	4	0.007	350	(333, 368)
10.0-27.5	7	0.020	430	(401, 463)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.012	280	(271, 290)
0.015	360	(351, 369)
0.025	421	(397, 447)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
4.0-27.5	11	0.007	1130	(1110,1150)
10.0-27.5	7	0.008	1140	(1120,1180)

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
268	2.5-13.0	1130	4.0-27.5	6.0	2.00	1440	23600	0.470
350	17.5-27.5	1129	4.0-27.5	27.0	2.06	2530	22900	0.447
430	10.0-27.5	1140	10.0-27.5	27.0	2.06	3820	21900	0.418

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 50 KGEI

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)
5.0-10.0	3	0.010	83	(80, 86)	0.012	80	(76, 85)
12.5-17.5	3	0.045	114	(113, 115)	0.052	114	(112, 116)
17.5-25.0	4	0.095	171	(167, 175)	0.102	171	(167, 175)
25.0-28.8	3	0.134	233	(226, 241)	0.141	233	(226, 241)
10.0-28.8	9	0.072	149	(141, 157)	0.079	149	(141, 157)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
7.5-20.0	6	0.009	826	(795, 859)
20.0-28.8	5	0.020	1470	(1390,1560)
10.0-28.8	9	0.012	1010	(951,1070)

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
83	5.0-10.0	826	7.5-20.0	6.5	1.52	106	10200	0.495
114	12.5-17.5	826	7.5-20.0	15.5	1.59	208	10600	0.490
171	17.5-25.0	1470	20.0-28.8					0.493
233	25.0-28.8	1472	20.0-28.8	27.0	1.85	1010	38800	0.487
149	10.0-28.8	1010	10.0-28.8	15.5	1.59	353	15600	0.489
149	10.0-28.8	1010	10.0-28.8	27.0	1.85	411	18200	0.489

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 51 CREST ROAD

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-15.0	7	0.005	465	(452, 478)
17.5-30.0	6	0.021	809	(776, 846)
10.0-30.0	9	0.014	649	(614, 689)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.010	454	(419, 495)
0.025	787	(767, 807)
0.019	648	(616, 683)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-15.0	7	0.005	1090	(1070,1110)
17.5-30.0	6	0.013	2420	(2410,2430)
10.0-30.0	9	0.010	2010	(1900,2140)

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
465	2.5-15.0	1090	2.5-15.0	7.0	2.04	4410	18400	0.389
809	17.5-30.0	2420	17.5-30.0					0.437
649	10.0-30.0	2010	10.0-30.0					0.442

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 52 COLLEGE OF SAN MATEO

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- 6.0	3	-.002	249	(239, 260)	0.003	252	(230, 278)
7.5-15.0	4	0.018	892	(846, 942)	0.021	798	(740, 865)
17.5-29.5	6	0.018	1030	(972,1090)	0.023	1050	(955,1160)
10.0-29.5	9	0.021	1140	(1090,1190)	0.025	1130	(1070,1200)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 6.0	3	0.002	547	(531, 565)
7.5-15.0	4	0.010	2020	(1950,2100)
17.5-29.5	6	0.012	3160	(2880,3500)
10.0-29.5	9	0.013	3240	(3070,3420)

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
249	2.5- 6.0	547	2.5- 6.0	3.0	2.19	1360	4750	0.369
892	7.5-15.0	2020	7.5-15.0	9.6	2.36	18800	71300	0.379
1030	17.5-29.5	3160	17.5-29.5	27.0	2.06	21700	176000	0.441
1140	10.0-29.5	3240	10.0-29.5	27.0	2.06	26600	180000	0.430

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 53 PENINSULA COUNTRY CLUB

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	6	0.005	765	(732, 800)	0.008	685	(650, 725)
12.5-28.2	7	0.010	1270	(1250,1300)	0.014	1270	(1210,1330)
10.0-28.2	8	0.010	1260	(1240,1280)	0.014	1250	(1200,1290)

DEPTH INT (M)	NO MEAS	FIRST P ARRIVAL INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-10.0	6	0.005	1670	(1450,1960)
12.5-28.2	7	0.010	3960	(3650,4320)
10.0-28.2	8	0.008	3300	(2970,3710)

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
765	2.5-10.0	1670	2.5-10.0	3.0	2.26	13200	45100	0.386
1270	12.5-28.2	3960	12.5-28.2	27.0	2.67	43200	360000	0.442
1260	10.0-28.2	3300	10.0-28.2	27.0	2.67	42300	234000	0.415

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 54 SANTA CLARA FAIRGROUNDS

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-16.0	8	-.001	232	(227, 237)
17.5-25.0	4	0.000	253	(246, 261)
10.0-25.0	9	0.006	269	(260, 279)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.004	227	(223, 232)
0.004	246	(240, 252)
0.012	271	(261, 281)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-16.0	8	0.003	562	(552, 572)
17.5-25.0	4	0.025	1690	(1550,1870)
10.0-25.0	9	0.009	745	(678, 826)

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
232	2.5-16.0	562	2.5-16.0	6.0	1.98	1070	4830	0.397
253	17.5-25.0	1690	17.5-25.0	18.8	1.94	1250	53900	0.488
269	10.0-25.0	745	10.0-25.0	18.8	1.94	1410	8900	0.425

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 55 OAK AVENUE

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	4	0.009	497	(483, 512)	0.011	337	(299, 386)
10.0-18.0	5	0.018	749	(706, 797)	0.028	774	(706, 856)
18.0-24.0	4	0.005	485	(455, 518)	0.013	472	(429, 525)
25.5-29.8	3	0.018	610	(586, 636)	0.027	609	(585, 636)
10.0-29.8	11	0.010	527	(505, 550)	0.019	534	(512, 559)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
4.0-29.8	14	0.009	959	(941, 978)
10.0-29.8	11	0.009	942	(916, 969)

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
497	2.5- 7.5	959	4.0-29.8	5.0	1.93	4780	11400	0.316
749	10.0-18.0	959	4.0-29.8					-.280
485	18.0-24.0	959	4.0-29.8					0.329
610	25.5-29.8	959	4.0-29.8					0.161
527	10.0-29.8	942	10.0-29.8					0.272

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 56 MERRITT SAND

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
7.5-15.5	5	0.007	440	(422, 458)
17.0-25.0	5	-.007	312	(303, 321)
10.0-28.0	10	-.004	319	(305, 334)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.011	418	(396, 441)
-.004	307	(300, 314)
0.000	318	(304, 334)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
5.0-15.5	6	0.006	1230	(1200,1250)
17.0-28.0	6	0.010	1830	(1650,2040)
10.0-28.0	10	0.009	1680	(1610,1770)

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
440	7.5-15.5	1230	5.0-15.5	9.4	2.06	3990	25600	0.426
312	17.0-25.0	1830	17.0-28.0	25.0	2.09	2040	67100	0.485
319	10.0-28.0	1680	10.0-28.0	25.0	2.09	2130	56400	0.481

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 57 MERRITT COLLEGE

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-15.0	6	0.001	723	(702, 746)
15.0-28.7	7	0.005	911	(894, 928)
10.0-28.7	9	0.004	855	(835, 875)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.004	701	(685, 718)
0.009	911	(876, 948)
0.008	858	(834, 883)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-12.5	5	0.002	1130	(1120,1140)
15.0-28.7	7	0.005	1690	(1610,1780)
10.0-28.7	9	0.005	1720	(1670,1780)

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
723	2.5-15.0	1130	2.5-12.5	3.0	2.06	10800	11900	0.152
911	15.0-28.7	1690	15.0-28.7					0.295
855	10.0-28.7	1720	10.0-28.7					0.336

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 58 AUDUBON SCHOOL

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5-20.0	9	-.007	101	(100, 102)
21.5-27.5	4	0.109	244	(237, 252)
10.0-27.5	9	0.025	131	(123, 141)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
-.001	101	(100, 102)
0.116	244	(237, 252)
0.031	130	(122, 140)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
4.0-20.0	8	0.005	1070	(1040,1100)
20.0-27.5	5	0.010	1500	(1450,1550)
10.0-27.5	9	0.008	1300	(1270,1330)

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
101	2.5-20.0	1070	4.0-20.0	10.0	1.54	159	17400	0.495
244	21.5-27.5	1500	20.0-27.5					0.486
131	10.0-27.5	1300	10.0-27.5	10.0	1.54	266	25700	0.495

INTERVAL VELOCITIES AND ELASTIC MODULI

SITE NO. 59 CARMICHAEL SCHOOL

FIRST S ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
3.5- 9.5	4	0.006	288	(284, 292)
14.5-20.0	4	0.008	291	(282, 302)
23.0-27.0	3	0.042	495	(495, 495)
10.0-27.0	9	0.016	327	(315, 339)

FIRST S PEAK

INCPT (S)	VEL (M/S)	UNC INT (M/S)
0.013	329	(312, 348)
0.011	283	(263, 306)
0.048	495	(495, 495)
0.017	308	(297, 320)

FIRST P ARRIVAL

DEPTH INT (M)	NO MEAS	INCPT (S)	VEL (M/S)	UNC INT (M/S)
2.5- 9.5	5	0.005	861	(811, 917)
11.0-25.0	8	0.007	1220	(1180,1260)
10.0-27.0	9	0.004	990	(897,1110)

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
288	3.5- 9.5	861	2.5- 9.5	5.0	2.07	1720	13100	0.437
291	14.5-20.0	1220	11.0-25.0	16.0	2.12	1810	28900	0.469
495	23.0-27.0	1215	11.0-25.0	25.0	2.04	5010	23500	0.400
327	10.0-27.0	990	10.0-27.0	16.0	2.12	2270	17800	0.439
327	10.0-27.0	990	10.0-27.0	25.0	2.04	2180	17100	0.439