APPENDIX B

Leroy Crandall & Associates Reports

REPORT OF
PRELIMINARY SOIL INVESTIGATION
PROPOSED APARTMENT BUILDING
WILSHIRE BOULEVARD AND COMSTOCK AVENUE
LOS ANGELES, CALIFORNIA
FOR
MR. WILLIAM H. CARTER
(OUR JOB NO. A-65278)

LEROY CRANDALL & ASSOCIATES

CONSULTING FOUNDATION ENGINEERS

1619 BEVERLY BOULEVARD · LOS ANGELES 26, CALIFORNIA
MAdison 9-3661

L. LEROY CRANDALL, C. E.
FREDRICK A. BARNES
LEOPOLD HIRSCHFELDT
RUSSELL C. WEBER, C. E.
J. D. KIRKGARD, C. E.
JAMES M. MCWEE, C. E.

August 25, 1965

Welton Becket & Associates
10000 Santa Monica Boulevard
Los Angeles, California 90025

(Our Job No. A-65278)

Attention: Mr. Alan Rosen

Gentlemen:

Report of Preliminary Soil Investigation
Proposed Apartment Building
Wilshire Boulevard and Comstock Avenue
Los Angeles, California
for Mr. William H. Carter

SCOPE

This report presents the results of a preliminary investigation of the soil conditions at the subject site. The locations of the proposed building and our exploration boring are shown on Plate 1, Plot Plan. It is understood that the property is currently being considered as the site of a multi-story apartment building. It is anticipated that the building will be 30 stories high and will be underlain by two or three levels of subterranean parking which will extend beyond the tower in plan. Column loads will probably be on the order of 4,000 to 5,000 kips. The excavation required for the subterranean parking will probably extend roughly 30 feet below the higher portion of the site adjacent to Wilshire Boulevard.

The investigation was authorized to determine the general characteristics of the soils beneath the site, and to provide preliminary information on the type of foundations that may be required for the proposed building. Prior to final design, additional exploration borings, laboratory testing of undisturbed samples, and engineering analyses based thereon should be performed to provide definite foundation design data and subterranean construction procedures.

EXPLORATIONS

The site was explored by drilling one boring to a depth of 101 feet below the existing ground surface. The boring was drilled on the lower portion of the site, as it was believed that the poorest soil conditions would be encountered at that location; the soil conditions beneath the remainder of the site should be better. The boring was drilled to a depth of 49 feet using 18-inch-diameter bucket-type drilling equipment, and then extended to the 101-foot depth using 5-inch-diameter rotary wash-type equipment with drilling mud to prevent caving.

The soils encountered were logged by our field engineer, who obtained undisturbed samples from the boring for laboratory inspection and possible future testing. The log of the boring is presented on Plate 2; the depths at which undisturbed sample were obtained are indicated to the left of the boring log. The soils are classified in accordance with the Unified Soil Classification System described on Plate 3.

Laboratory testing of the undisturbed samples was not warranted for the present preliminary investigation. The undisturbed samples will be retained for 60 days for possible laboratory testing when plans for the development are finalized.

SOIL CONDITIONS

Existing fill soils on the order of six feet in thickness were encountered in the exploration boring. Deeper fill deposits could occur elsewhere on the site, but should be of no consequence to foundations as the required excavation should extend through any shallow fill deposits. The underlying natural soils consist of moderately firm alluvial deposits to a depth of roughly 15 feet. Below the 15-foot depth , the soils are firm. Below a depth of about 60 feet, the soils are firm to very firm.

Water was encountered in the boring at a depth of 40 feet below the existing ground surface. Water was encountered on the site which we investigated to the north of Wilshire Boulevard at Comstock Avenue at a higher elevation, and water seepage could occur on the present site higher than observed in the boring.

CONCLUSIONS AND RECOMMENDATIONS

Based on the one exploration boring, the soils below the planned excavated level are firm and should offer satisfactory support to the proposed building on spread-type foundations. Drilled piles would be difficult to install due to the water level and the caving nature of the soils below the water level. Driven piles would be very difficult to install due to the firmness of the underlying soils. If driven piling were to be used, pre-drilling of the pile locations would probably be required.

Depending on the magnitude of the loads and spacing of columns, there may not be sufficient area available for isolated spread footings, and continuous strip footings or mat foundations may be required. It may be possible to utilize conventional spread footings beneath exterior columns and continuous or mat foundations beneath interior columns. Spread-type

foundations at the planned level of excavation may be designed to impose a dead plus live load pressure on the order of 6,000 to 8,000 pounds per square foot with a one-third increase for wind or seismic loads.

Although the soils are generally firm, no exceptional difficulties due to the soil conditions are anticipated in excavating the site as planned. Water was encountered at a depth of 40 feet below the lower portion of the site; it may be desirable to limit the planned excavation to about 35 feet to minimize possible water problems. Water seepage may be encountered at higher levels on the higher portion of the site. However, it is not anticipated that subterranean walls need be designed for hydrostatic pressures.

In summary, it is our opinion that this site has satisfactory foundation conditions, and may be economically developed from a foundation standpoint. The above conclusions and recommendations, however, are preliminary and are based only on the one exploration boring. Prior to final design, additional borings, laboratory testing of undisturbed samples, and engineering analyses based thereon will be necessary.

Yours very truly,

LeROY CRANDALL & ASSOCIATES

by LeRoy Crandall
LeRoy Crandall

LC-SC/pc
Attachments (3)
(4 copies submitted)

cc: (1) Stacy & Meadville, Inc.

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

NO. 200 NO. 40 NO. 10 NO. 4 3/4 in. 3 in. (12 in)

U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

Reference:
The Unified Soil Classification System, Corps of Engineers, U. S. Army Technical Memorandum No. 3-357, Vol. I, March, 1953. (Revised April, 1960)

LEROY CRANDALL & ASSOCIATES

REPORT OF PRELIMINARY FOUNDATION INVESTIGATION
PROPOSED APARTMENT DEVELOPMENT
WILSHIRE BOULEVARD AND COMSTOCK AVENUE
LOS ANGELES, CALIFORNIA
FOR THE
WESTERN HABITAT CORP.
AND THE
WESTLEAR COMPANY
(OUR JOB NO. A-72242)

November 7, 1972

Western Habitat Corp.
1800 Century Park East, Suite 1120
Los Angeles, California 90067

Attention: Mr. William Carter
President

Westlear Company
Union Bank Square
South Tower, Suite 1000
Orange, California 92669

(Our Job No. A-72242)

Attention: Mr. Owen Powell

Gentlemen:

Our "Report of Preliminary Foundation Investigation, Proposed Apartment Development, Wilshire Boulevard and Comstock Avenue, Los Angeles, California, for the Western Habitat Corp. and the Westlear Company" is herewith submitted. The investigation was authorized to provide preliminary information for use in planning prior to site purchase.

The scope of the investigation was planned in collaboration with Messrs. N. W. Marsh and Paul Johnson of Charles Luckman Associates and with Mr. Carl Johnson of Johnson & Nielsen Associates, Consulting Structural Engineers. We were advised of the features of the proposed development by Johnson & Nielsen Associates, and the results of our investigation were discussed with them.

Based on present plans, the proposed building will have three to four subterranean parking levels. As a result of the planned excavation, firm soils should be exposed at final grade, and the proposed building may be supported on spread footings established in the firm natural soils. There will not be

space for sloped embankments around the perimeter of the excavation, and shoring will be required. Water was encountered above the planned level of excavation, and dewatering will be necessary during construction. Also, drainage provisions will be necessary to prevent possible hydrostatic pressures on the lower walls and floors.

Preliminary recommendations are presented in the report. More comprehensive explorations and tests, and engineering analyses based thereon, must be made before final design information can be developed.

Respectfully submitted,

LeROY CRANDALL AND ASSOCIATES

by LeRoy Crandall

LeRoy Crandall
President

JK-PM/pa
(2 copies submitted
to each addressee)

cc: (2) Charles Luckman Associates
Attn: Mr. Paul Johnson
(1) Johnson & Nielsen Associates

REPORT OF PRELIMINARY FOUNDATION INVESTIGATION

PROPOSED APARTMENT DEVELOPMENT

WILSHIRE BOULEVARD AND COMSTOCK AVENUE

LOS ANGELES, CALIFORNIA

FOR THE

WESTERN HABITAT CORP.

AND THE

WESTLEAR COMPANY

SCOPE

This report presents the results of a preliminary investigation of the soil conditions at the subject site. The locations of the proposed building and our exploration borings are shown on Plate 1, Plot Plan.

This investigation (Phase I) was authorized to determine the general soil and groundwater conditions at the site and to provide data for use in preliminary planning. The Phase II investigation, which will be performed if the site is purchased and when the preliminary plans for the project have been developed, will consist of the drilling of additional borings and the performance of comprehensive laboratory tests and engineering analyses. A geologic-seismic evaluation of the site may also be included. The Phase II report will contain recommendations for foundation and basement wall design, design criteria for excavating and shoring, and design data for drainage systems and for floor slab support.

The results of the field explorations and laboratory tests, which form the basis of the preliminary recommendations presented herein, are presented in the attached Appendix.

Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable foundation engineers practicing in this or similar localities. This warranty is in lieu of all other warranties either express or implied. This report has been prepared for the Western Habitat Corp. and the Westlear Company to be used in the preliminary design of the proposed building. The report is not intended as a bidding document, and any contractor reviewing this report must draw his own conclusions regarding required construction procedures.

STRUCTURAL CONSIDERATIONS

Based on present plans, the proposed development will consist of a 22-story tower constructed over 3 to 4 subterranean parking levels. The parking levels will extend beyond the tower in plan and will encompass nearly the entire site. The building will be of steel frame construction above grade and of reinforced concrete below grade. Column loads will range from 1,800 to 2,800 kips in the tower; column loads in the garage beyond the tower will be on the order of 400 kips.

The lower floor elevation has not been established at this time. On the basis of 3 to 4 subterranean levels, it is anticipated that excavation some 35 to 40 feet deep will be required.

SITE CONDITIONS

The site of the proposed development is currently occupied by an existing two-story apartment building with appurtenant garages and paved and planted areas. The removal of the existing foundations, underground utilities, and trees will result in disturbance of the upper soils. However, the disturbed soils should be removed automatically by the planned excavation. There are existing

buildings on the adjacent property to the east. Elevations of the existing grade at selected locations are shown on Plate 1.

SOIL CONDITIONS

Existing fill soils were not encountered in the two exploration borings. Local fill deposits could occur on the site due to the prior construction; however, any existing fill should be removed by the planned excavation.

The natural soils, to a depth of approximately 70 feet below the existing grade, consist primarily of silt, and clay with lesser deposits of silty sand and sand containing variable amounts of gravel. Below the 70-foot depth, the soils consist of sand and gravel with some cobbles. The upper natural soils are moderately firm at present moisture content but would become weaker and more compressible when wet. The soils become firmer with increase in depth.

Water was measured at a depth of 26 feet in Boring 1 and at a depth of 23 feet in Boring 2, corresponding to approximately Elevation 301.

GEOLOGIC AND SEISMIC CONSIDERATIONS

A geologic-seismic evaluation of the site should be considered for the Phase II comprehensive investigation. In the interim, the following general information is presented.

The site is underlain by recent alluvial deposits underlain by deposits of Pleistocene age. Based on a review of the geologic data in our office, there are no known faults passing through or immediately adjacent to the site. However, the Inglewood Fault is located about 1¼ miles to the east of the site. The Overland Avenue Fault and the Charnock Fault are located about 1¼ miles and 2 miles to the southeast of the site, respectively.

The site must at some time be expected to experience strong ground motion due to an earthquake, as must practically all sites in the Los Angeles area. Based on the available data, the site appears as safe, with respect to geologic and seismic hazards, as other sites within the general area. The proposed construction appears feasible, provided the building is designed and constructed for the earthquake potential of the area.

PRELIMINARY RECOMMENDATIONS

Based on the preliminary borings, the soils at the anticipated depth of excavation are firm, and the proposed building may be suported on spread footings established in the firm natural soils. For preliminary estimating, it may be assumed that spread footings established in the firm natural soils may be designed to impose a pressure of 8,000 pounds per square foot. Depending on the spacing between columns, combined footings may be required in the tower area. The maximum ultimate settlement of the proposed building (2,800-kip column load), supported on spread footings, would be less than 1½ inches. Provisions will probably be required to accommodate differential settlement between the tower and non-tower portions of the building.

Water was measured in the borings above the planned basement level. Accordingly, dewatering will be required during construction. The dewatering could be accomplished by a well point system or a system of wells. Also, a permanent subdrain system will be necessary beneath the lower floors to prevent the development of hydrostatic pressures beneath the floors and against the lower portions of the basement walls. Such a system would consist of a layer of filter gravel drained by a system of perforated drain lines leading to sumps equipped with automatic pumping units.

If the site is properly dewatered, no significant difficulties due to the soil conditions are anticipated in excavating at the site. Conventional earth-moving equipment may be used. Because of the proximity of the planned excavation to the property lines, shoring will be required. Soldier piles with tied-back earth anchors or internal bracing could be used.

As previously mentioned, this report is of a preliminary nature and is intended to provide you with general information. Additional explorations and more comprehensive laboratory tests and engineering analyses should be performed to provide definite recommendations.

-oOo-

A Plot Plan and Appendix are attached and complete this report.

APPENDIX

EXPLORATIONS

The site was explored by drilling two borings to depths of 98½ and 100 feet below the existing grade. The borings were drilled using 5-inch-diameter rotary wash-type drilling equipment with drilling mud to prevent caving.

The soils encountered were logged by our field engineer, and undisturbed samples were obtained for laboratory inspection and testing. The logs of the borings are presented on Plates A-1 through A-6; the depths at which undisturbed samples were obtained are indicated to the left of the boring logs. The number of blows required to drive the sampler twelve inches, and the driving weight and stroke, are also indicated on the logs. The soils are classified in accordance with the Unified Soil Classification System described on Plate B.

LABORATORY TESTS

The field moisture content and dry density of the soils encountered were determined by performing tests on the undisturbed samples. The results of the tests are shown to the left of the boring logs.

Direct shear tests were performed on selected undisturbed samples to determine the strength of the soils. The samples were tested at field and increased moisture contents and at various surcharge pressures. The yield-point values determined from the direct shear tests are presented on Plate C, Direct Shear Test Data.

Confined consolidation tests were performed on five undisturbed samples to determine the compressibility of the soils. The samples were tested

at field moisture content. To simulate the effect of the planned excavation, the samples were loaded, unloaded, and subsquently reloaded. The results of the consolidation tests are presented on Plates D-1 through D-3, Consolidation Test Data.

-oOo-

BORING 1

DATE DRILLED: October 20, 1972

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION 327**

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS*	SAMPLE	Classification	Description
	0					ML	SANDY SILT - few gravel, greyish-brown
325		6.8	97	14	■		
	5						Some Clay
320		24.7	99	7	■		
	10	23.3	96	4	■		
315						SM	SILTY SAND - fine, few gravel, greyish-brown
		12.6	106	9	■		
	15						
310						SP	SAND - fine, about 40% gravel, greyish-brown
		5.6	125	38	■		
	20						
305						ML	SANDY SILT - brown
		27.8	91	12	■		WATER LEVEL (10-23-72)
	25						Layers of Silty Sand, fine, brown
300		23.0	103	9	■		
	30	22.2	102	12	■		
295							
						CL	SILTY CLAY - some Sand, light brown
	35	14.5	118	34	■		Layer of Sand - fine, brown

Soils classified in accordance with the Unified Soil Classification System.

*Number of blows required to drive LC&A sampler 12". Driving Weight = 300 lbs. Stroke = one foot.

**Elevations refer to City of Los Angeles datum.

(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LEROY CRANDALL AND ASSOCIATES

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

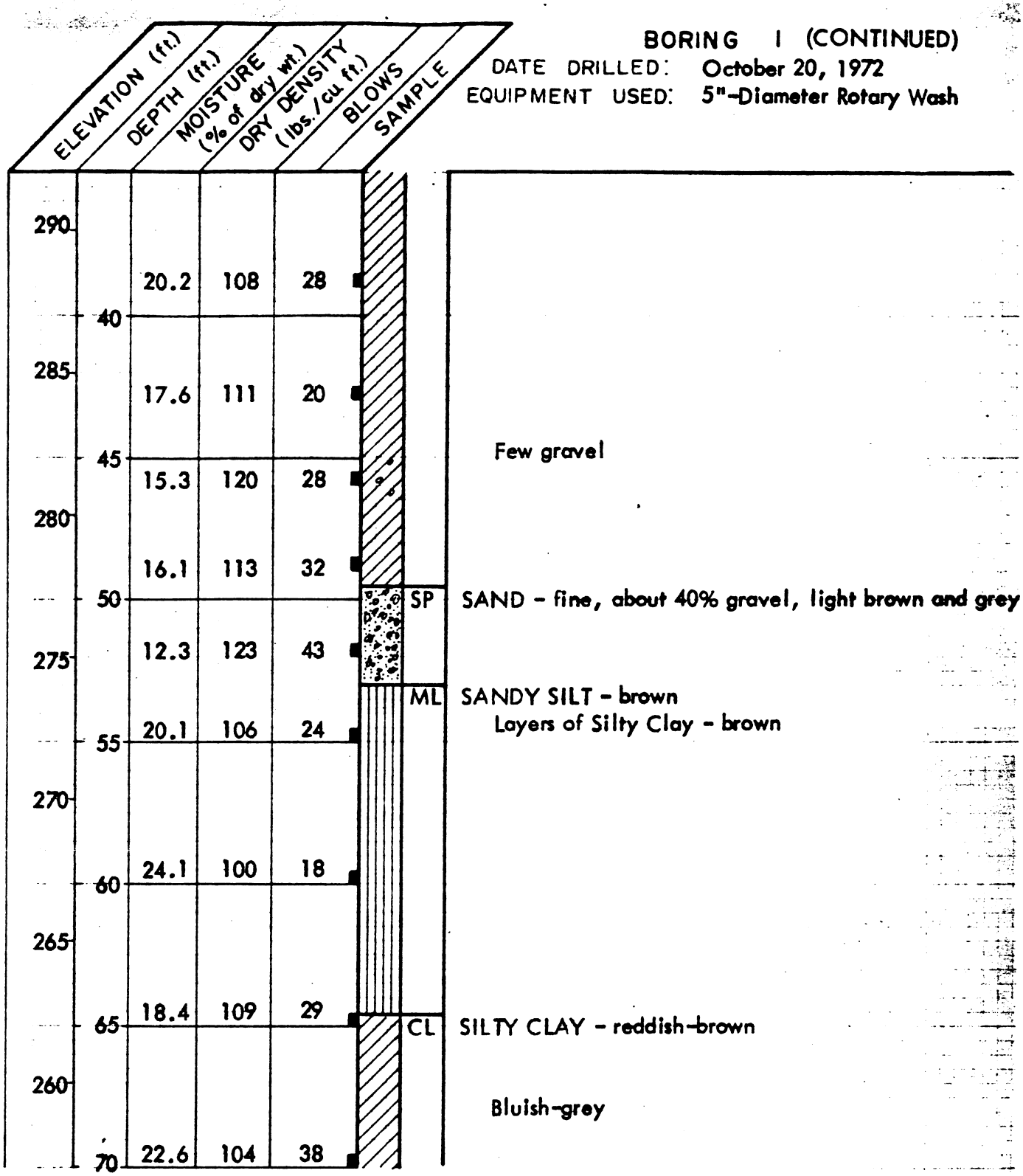
JOB A-72242 DATE 10-26-72 JM O.E. MF mu CHKD.

JOB A-72242 DATE 10-22-22 BY U.M O.E. MF CHKD. [illegible]

BORING 1 (CONTINUED)

DATE DRILLED: October 20, 1972

EQUIPMENT USED: 5"-Diameter Rotary Wash



(CONTINUED ON FOLLOWING PLATE)

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

LOG OF BORING

LEROY CRANDALL AND ASSOCIATES

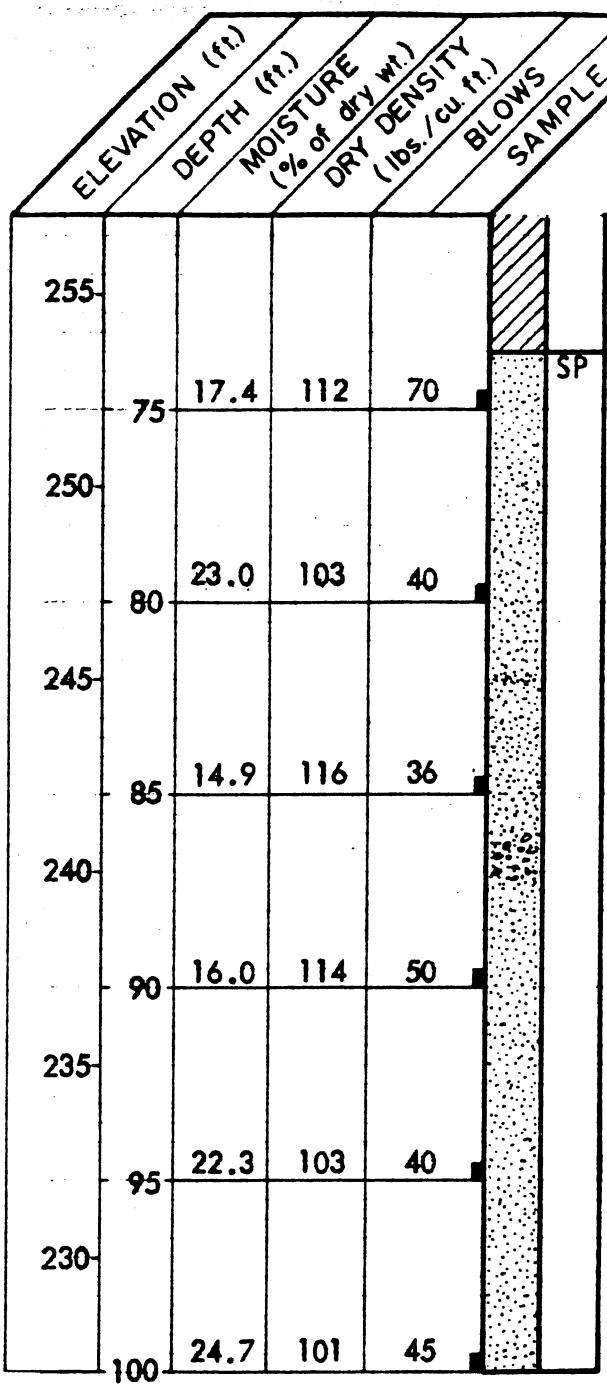
PLATE A-2

JOB A-12242 DATE 10-27-72 BY VM O.E. MF CHKD. MF

BORING 1 (CONTINUED)

DATE DRILLED: October 20, 1972

EQUIPMENT USED: 5"-Diameter Rotary Wash



SAND - fine, grey

Cemented layers

Layer containing large amount of gravel

NOTE: Drilling mud used in drilling process. Mud removed after drilling completed; water level measured at a depth of 26' 2 days after removing mud.

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

LOG OF BORING

LEROY CRANDALL AND ASSOCIATES

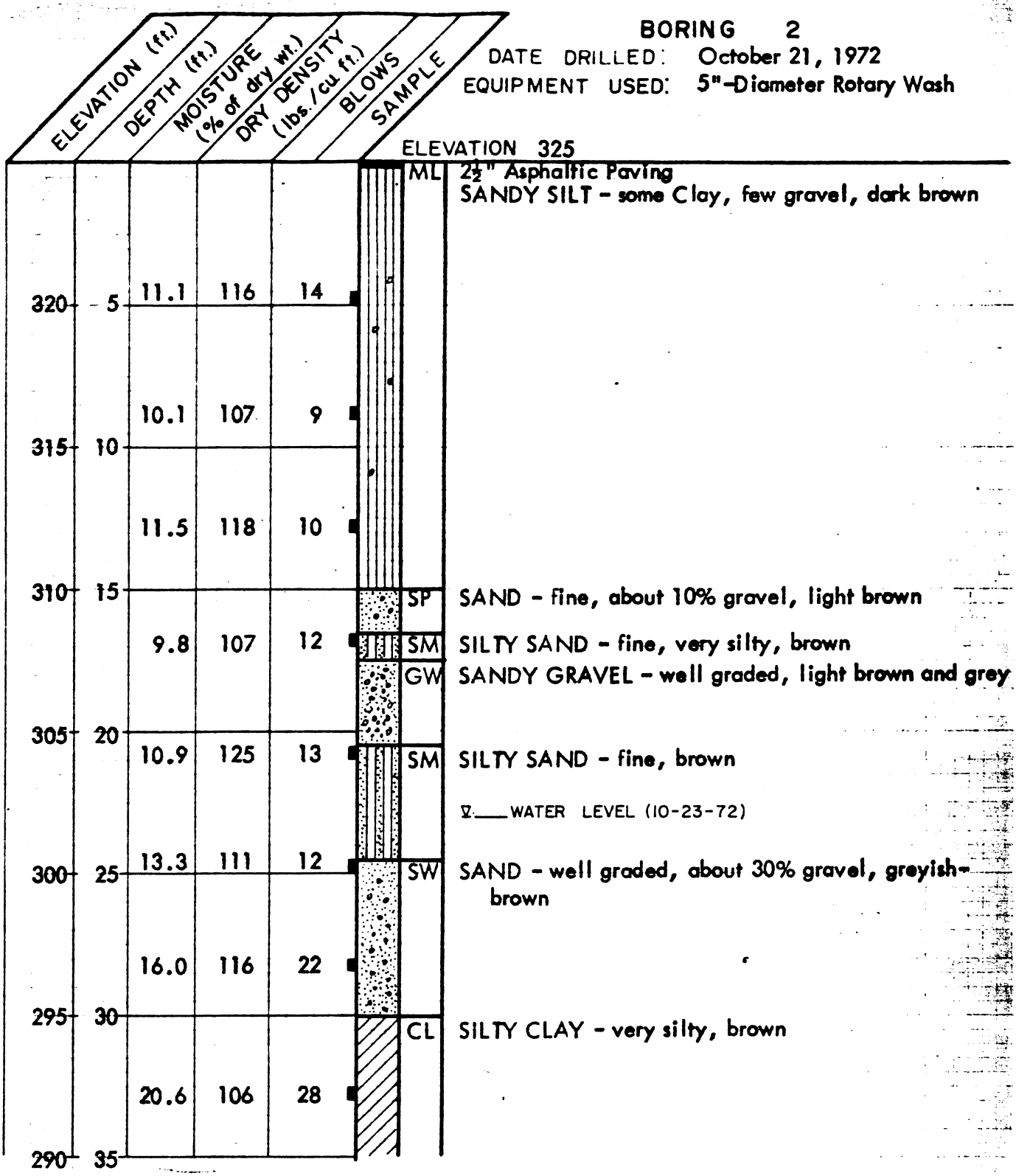
PLATE A-3

JOB A-72292 DATE 10-22-72 BY VM O.E. MF CHKD. [illegible]

BORING 2

DATE DRILLED: October 21, 1972

EQUIPMENT USED: 5"-Diameter Rotary Wash



(CONTINUED ON FOLLOWING PLATE)

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

LOG OF BORING

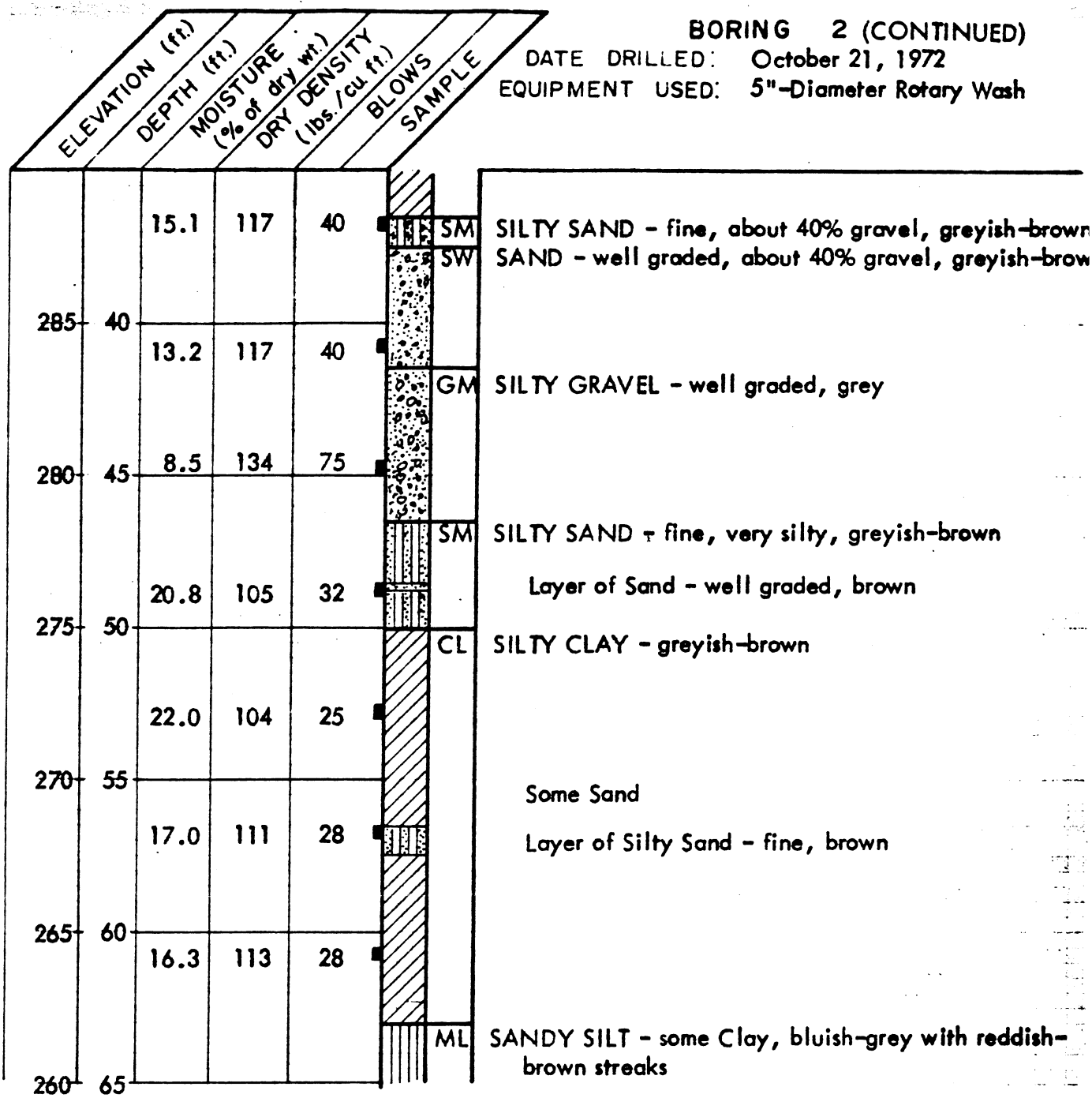
LEROY CRANDALL AND ASSOCIATES

PLATE A-4

JOB A-72242 DATE 10-27-72 BY V.H O.E. MF CHKD. see p1

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

BORING 2 (CONTINUED)
DATE DRILLED: October 21, 1972
EQUIPMENT USED: 5"-Diameter Rotary Wash



(CONTINUED ON FOLLOWING PLATE)

LOG OF BORING

LEROY CRANDALL AND ASSOCIATES

JOB A-72242 DATE 10-27-72 O.E. MF CHKD.

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

BORING 2 (CONTINUED)

DATE DRILLED: October 21, 1972

EQUIPMENT USED: 5"-Diameter Rotary Wash

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu.ft.)	BLOWS	Description
	65–70	19.1	107	35	
255	70	18.9	108	40	SP — SAND - fine, bluish-grey
250	75	19.5	109	58	
245	80	22.8	104	55	Layers containing large amount of gravel
240	85	23.6	101	50	Large cobble
235	90	22.1	103	55	GW — SANDY GRAVEL - well graded, about 20% cobbles, grey
230	95				(LARGE COBBLE. BORING TERMINATED DUE TO DIFFICULTY IN DRILLING.)
225	100				

NOTE: Drilling mud used in drilling process. Mud removed after drilling completed; water level measured at a depth of 23' 2 days after removing mud.

LOG OF BORING

LEROY CRANDALL AND ASSOCIATES

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
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	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
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PARTICLE SIZE LIMITS

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	FINE	MEDIUM	COARSE	FINE	COARSE		

NO. 200 NO. 40 NO. 10 NO. 4 3/4 in. 3 in. (12 in.)

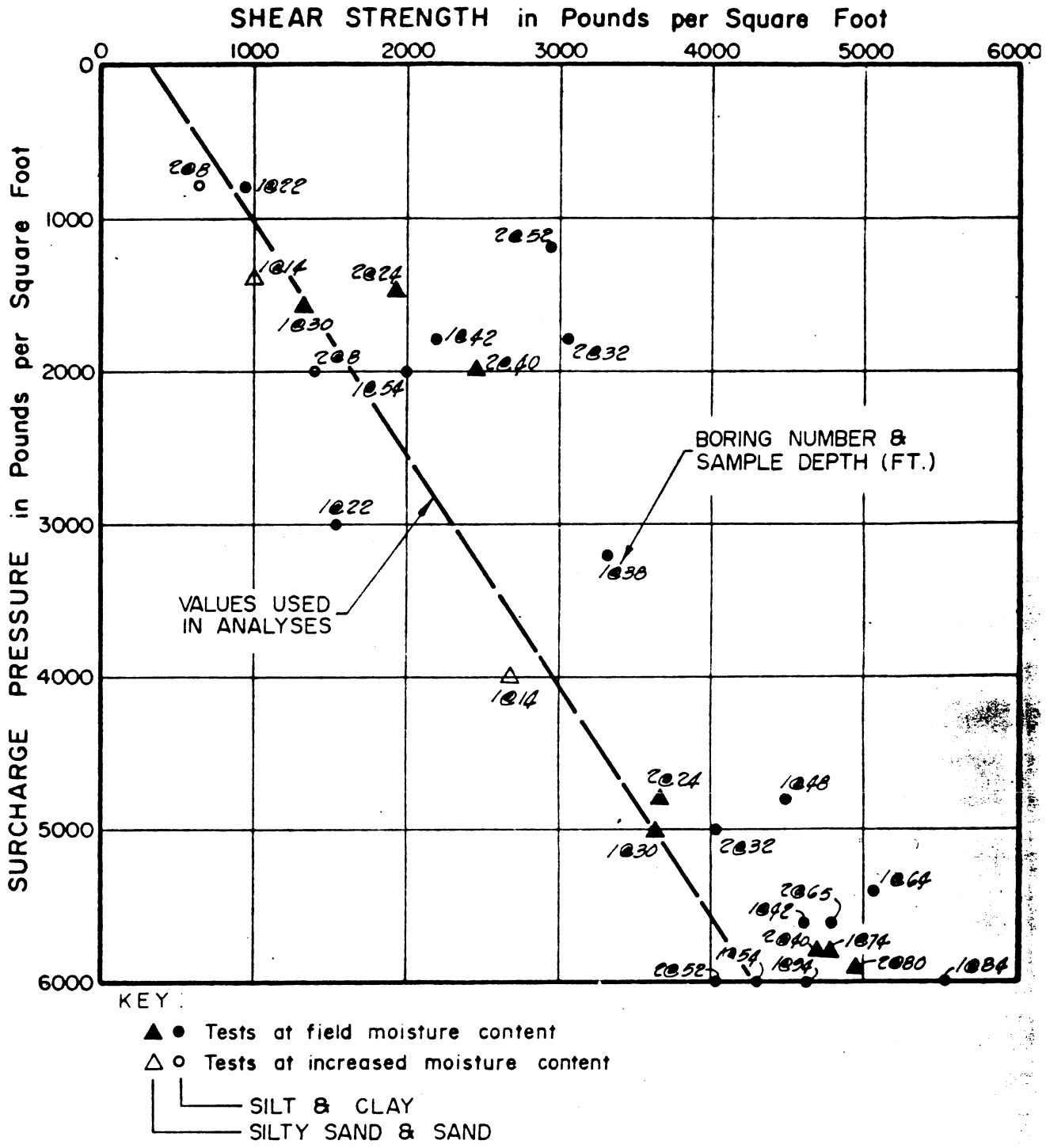
U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

Reference :
The Unified Soil Classification System, Corps of Engineers, U. S. Army Technical Memorandum No. 3-357, Vol. I, March, 1953. (Revised April, 1960)

LEROY CRANDALL & ASSOCIATES

JOB 4-78242 DATE 11-2-72 DR L.L. O.E. MF CHKD. RCL

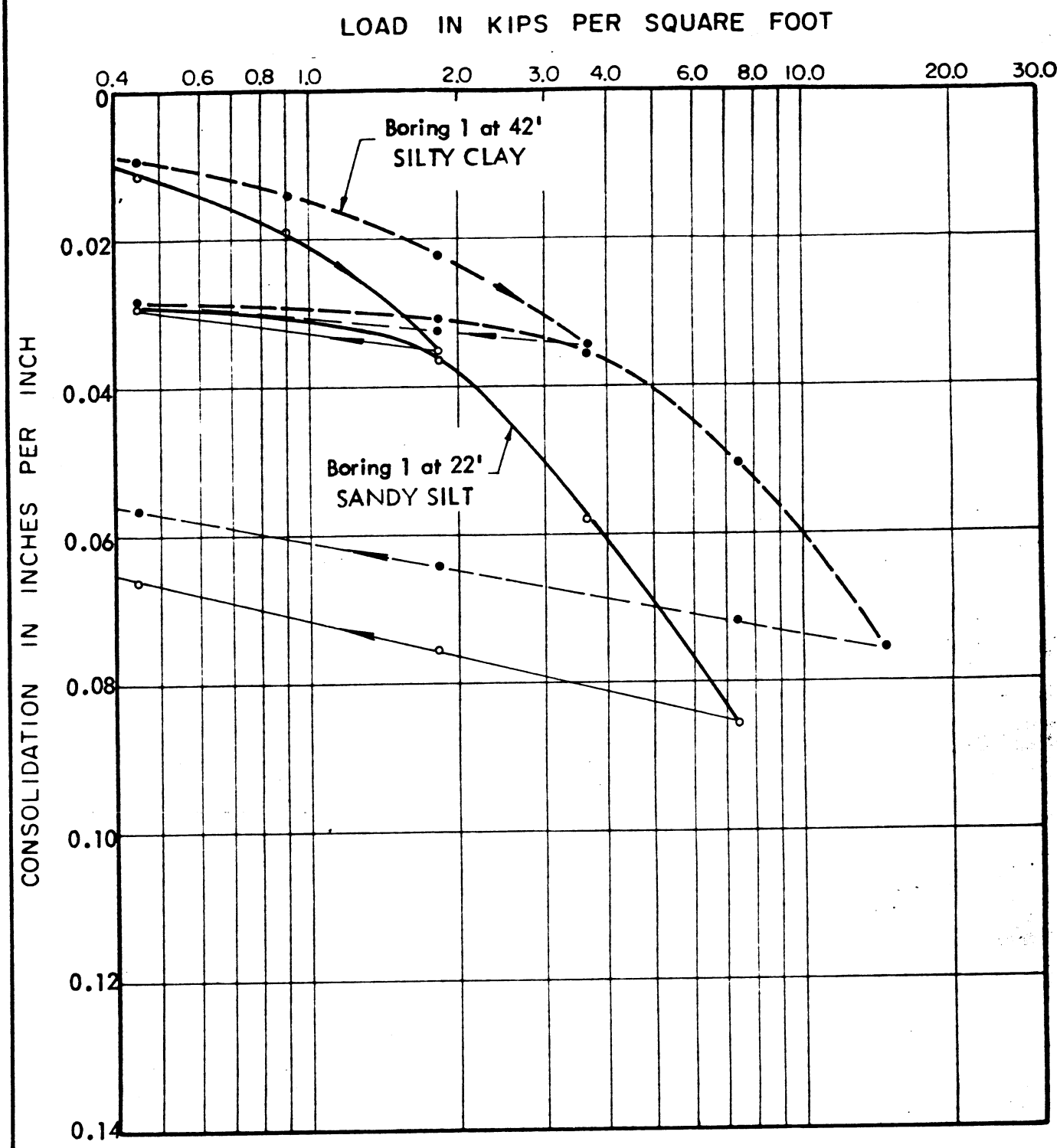


DIRECT SHEAR TEST DATA

LEROY CRANDALL & ASSOCIATES

PLATE C

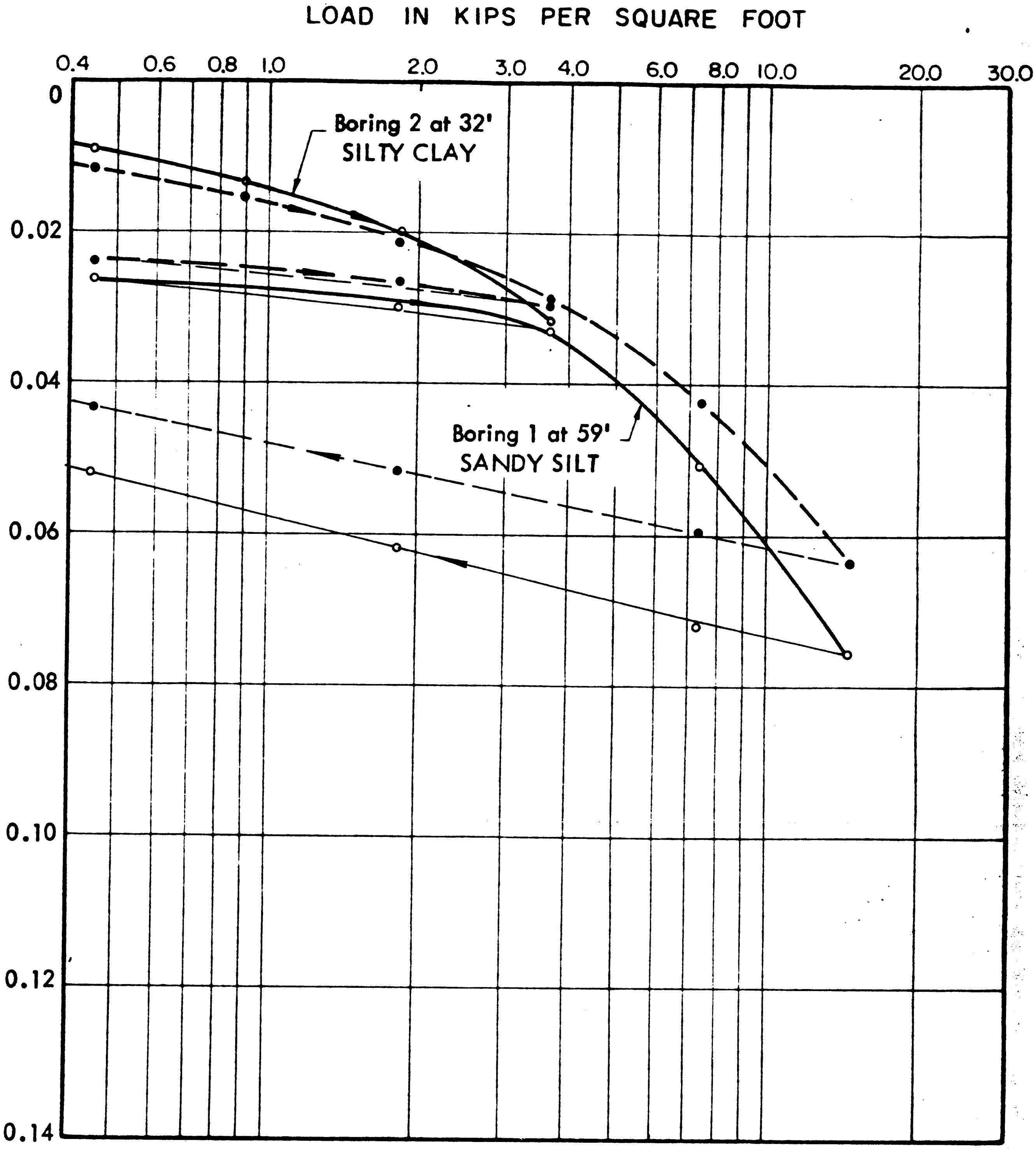
JOB A-72242 DATE 11-1-72 DR. V.M. O.E. MF CHKD. RC



NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LEROY CRANDALL & ASSOCIATES



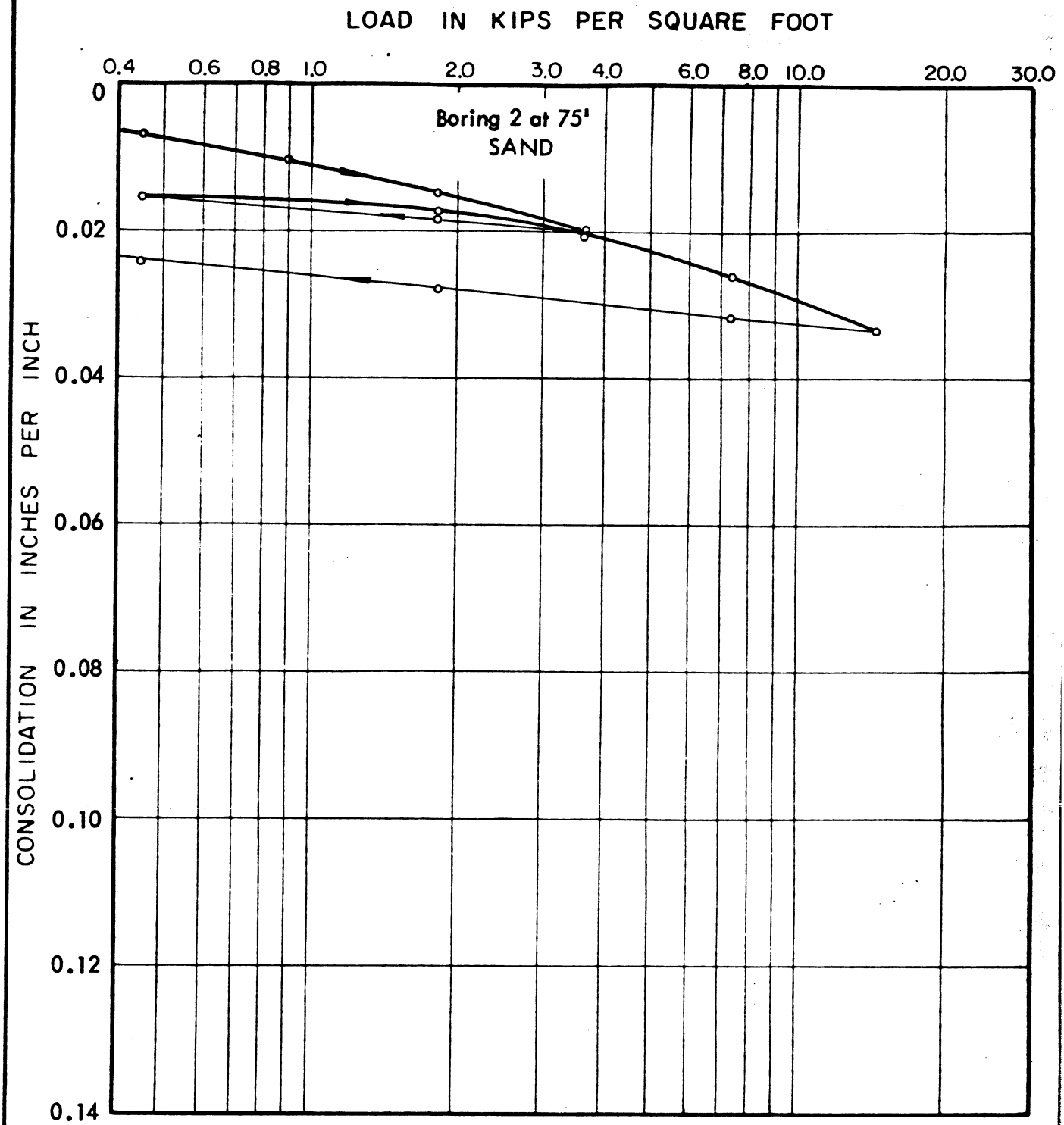
NOTE: Samples tested at field moisture content.

CONSOLIDATION TEST DATA

LEROY CRANDALL & ASSOCIATES

JOB A-72242 DATE 10-31-72 DR. V.14 O.E. JWF CHKD. [illegible]

JOB A-12494 DATE 11-1-12 DR. V.M O.E. MK CHKD. ACC



NOTE: Sample tested at field moisture content.

CONSOLIDATION TEST DATA

LEROY CRANDALL & ASSOCIATES