


FOUNDATION SOILS INVESTIGATION  
TRACT NO. 3901  
AVENIDA SAN JUAN & AVENIDA SALVADOR  
SAN CLEMENTE, CALIFORNIA

FOR

L.D. LAMB



ENGINEER  
HUNTINGTON ENGINEERING CORP.  
7355 SLATER AVENUE  
HUNTINGTON BEACH, CALIFORNIA

OCTOBER 2, 1963  
FILE NO. 63 - 390

- SOILS ENGINEERING
- FOUNDATION INVESTIGATIONS

# H. V. LAWMASTER & CO.

TESTING & INSPECTION ENGINEERS

- ENGINEERING GEOLOGY
- ASPHALT ENGINEERING

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October 2, 1963

L.D. Lamb

Dear Sir:

File No. 63 - 358

Attached herewith is our report of the Foundation Soils Investigation conducted on Tract No. 3981, located on Avenida San Juan at Avenida Salvadore ( Proposed ) in the City of San Clemente, Orange County, California.

This investigation was planned and carried out in accordance with plans and information submitted to this office by Huntington Engineering Corp. of Huntington Beach and in accordance with sound engineering practice.

Evaluation of the site conditions has been made with regard to the structural aspects of the proposed structures and modifications of topography by grading.

Respectfully Submitted,

H. V. Lawmaster & Co., Inc.

H. V. Lawmaster

William T. Corum

William T. Corum

R.C.E. No. 6207

FOUNDATION SOILS INVESTIGATION  
TRACT NO. 3984  
AVENIDA SAN JUAN & AVENIDA SALVADORE  
SAN CLEMENTE, CALIFORNIA

SCOPE

The purpose of this investigation was to determine the subsurface soil conditions and provide engineering recommendations for safe and economical foundation systems for the proposed structures.

STRUCTURAL CONDITIONS

It is understood that the structures to be placed on the site will be one story, frame and stucco, dwellings with slab floors on grade.

No detailed loading information is available to this office, however, for the purposes of analysis, it is assumed that maximum loads on exterior footings will be on the order of 800 pounds per foot.

SITE CONDITIONS

At the time of this investigation, the subject site was an idle parcel of land covered with a sparse to medium growth of native vegetation. There are no existing structures on the site nor any evidence of other cultural improvements.

Topographically, the site lies mainly on the west flank of a north-south trending ridge which plunges south, and the maximum differences in elevation is from a high of El. 670 feet at the extreme north end to a low of El. 500 feet in the southwest portion of the site. The slopes appear to be on the order of 25% to 30% on the west side of the ridge and 5% to 25% on the east side. Present drainage is sheet flow along the existing slopes with no well defined drainage channels.

No fill material was observed on the surface or in the test borings during this investigation.

Natural soils encountered in the test borings consist primarily of sandy clays, clayey sands, silty sands, and sands throughout the depths explored. The materials at depth are more properly identified as soft interbedded chabas and sandstones. These materials are in a fair to good state of compaction with uniform moisture and density conditions.

No ground water was encountered in the test borings to the depths explored, on the date of drilling.

## RECOMMENDATIONS

The following recommendations are based on observations made in the field; on the results of laboratory tests on samples of the materials encountered and on overall evaluation of the site conditions.

### Grading

Field conditions indicate that extensive grading will be required to develop the site and will consist of cut and fill operations involving site materials. All such grading should be done in accordance with the following recommendations.

Prior to grading, the entire site should be cleared of all organic or other deleterious materials which should be removed from the site.

All level areas to receive fill should be scarified 6 to 8 inches and recompact to provide a bond between the natural soil and the imposed fills.

Fills should be composed of site materials placed in 4 to 6 inch layers, watered to approximate optimum moisture and compacted to a minimum relative compaction of 90%, as determined by Test Method AASHTO T99-57 modified to provide a 10 pound hammer having a free fall of 18 inches and applying 25 blows on each of three equal layers of soil in a 1/30 cubic foot mold.

Side-hill fills should be provided with a key into the natural, at least four feet deep and fifteen (15) feet wide.

Where fills are placed against natural slopes exceeding a slope ratio of 5:1, continuous benching will be required, to consist of benches cut into firm natural material as the fill is placed to provide an interlocking effect between the fill and the natural slopes.

All cut and fill slopes developed during grading should not exceed a slope ratio of 1½:1 and should be provided with drainage benches for every 25 feet in vertical height.

All clearing should be inspected by the Soils Engineer and all grading should be continuously supervised by the Soils Engineer, and certified at the conclusion of grading operations.

### Foundations

Continuous footings may be utilized to support the proposed structures under the following conditions.

All footings should be embedded a minimum of twelve (12) inches below finished grade, for one story structures.

Footings should rest on natural soil having a minimum relative compaction of 85% or on compacted fill.

A safe bearing value of 1500 pounds per square foot may be used for the natural soil or compacted fill below footings placed as recommended.

#### Slab Floors

Slab floors may be placed directly on natural soil or on compacted fill without any special base or reinforcement requirements, subject to individual inspection of as-graded lots by the Soils Engineer to determine whether expansive materials have been exposed in cuts or utilized in fills.

A safe bearing value of 1000 pounds per square foot may be used for the supporting soils below slab floors.

#### Soil Characteristics

Settlements - Uniform settlements under the recommended loads are not expected to exceed one-fourth inch. Differential settlement under the foregoing recommendations should be minor.

Expansion - Expansion tests were performed in conjunction with the Consolidation Tests, under a static load of 1000 PSF. These tests show that clay zones in the materials are expansive and if occurring at footing or slab elevation, will require reinforcement of footings and slabs, as well as a sand base below slabs.

#### Special Considerations

The clay zones within the materials encountered display a variable expansive tendency. Since utilizing these materials as fill will result in mixtures of unknown percentages of sand and clay, it is recommended that additional expansion tests be performed on representative samples of the fill mixture to determine the expansive tendency.

It is further recommended that the as-graded lots be individually inspected by the Soils Engineer to determine the presence of expansive materials at footing or slab elevations, which would require reinforcement and other special treatment.

## APPENDIX

Plate A - - - - - Plot Plan

Plate B thru F - - - - - Test Boring Logs

Plate G thru I - - - - - Consolidation Tests

The following appendix contains the substantiating data for the engineering recommendations of this report.

### Exploration

On September 8 and 9, 1963, five test borings were drilled on the subject site at the locations shown on the attached plot plan. The borings were 20 inches in diameter and were drilled to depths of 20 to 30 feet by means of a rotary bucket type drill rig.

### Sampling

A representative of this office directed the exploration and determined the location of both disturbed and undisturbed samples of the materials encountered.

All samples were sealed when taken to prevent loss of moisture while in transit to the laboratory.

### Testing

All samples were visually classified and a testing program was established to provide data for the engineering recommendations. Tests performed include: (1) Field Moisture and Field Density Determinations; (2) Maximum Density Optimum Moisture Relationships; (3) Consolidation Tests; and (4) Direct Shear Tests.

## TEST RESULTS

### Field Moisture/Density

Determinations of field moisture and field density conditions in subsurface soils are incorporated in the test boring logs attached hereto.

### Maximum Density - Optimum Moisture

Compaction Standard - AASHTO T99-57, Modified.

<u>Soil Classification</u>	<u>Maximum Density, PCF</u>	<u>Optimum Moisture, %</u>
Dark Brown Sandy Clay ( TH - 5 @ 0-2' )	120.0	12.5

### Consolidation Tests

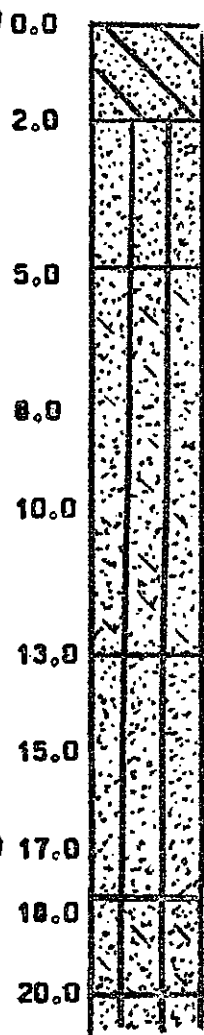
The results of the Consolidation Tests are presented graphically as Plates G thru I of this report.

# Direct Shear Tests

<u>Sample</u>	<u><math>\phi</math> Angle</u>	<u>Cohesion PSF</u>	<u>Dry Density P.C.F.</u>	<u>Computed * Bearing Value, PSF</u>
TH - 1 @ 2.0'	29°	1200	106.2	5,150
TH - 1 @ 5.0'	28°	400	101.0	2,700
TH - 1 @ 10.0'	28°	220	112.3	1,450
TH - 1 @ 20.0'	30°	100	116.0	1,250
TH - 5 @ 2.0'	30°	1000	110.9	4,650
TH - 5 @ 5.0'	39°	80	99.6	1,500
TH - 5 @ 10.0'	38°	100	111.7	1,600
TH - 5 @ 15.0'	37°	390	110.0	3,300
TH - 5 @ 20.0'	35°	210	114.3	2,000

\* Computed by Terzaghi's formula for Bearing Capacity. - S.F. = 3.0

TH - 1



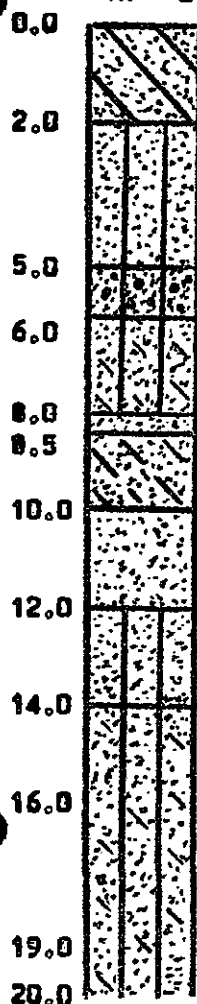
Scale 1" = 4'

<u>TEST BORING LOG</u>		Dry Density
<u>Soil Classification</u>	<u>% Moisture</u>	<u>P.C.F.</u>
Dark Brown Sandy Clay	17.0	
Brown Silty Very Fine to Fine Sand	14.3	106.2
Brown Silty Very Fine to Fine Sand Trace of Clay.	21.2	101.0
Brown Silty Very Fine to Fine Sand Trace of Clay.	22.0	
Brown Silty Very Fine to Fine Sand Trace of Clay.	14.9	112.3
Brown Silty Very Fine Sand	12.4	
Brown Silty Very Fine Sand	10.5	
Brown Silty Very Fine Sand	9.9	
Brown Silty Very Fine Sand Trace of Clay	20.5	
Brown Silty Very Fine to Fine Sand	10.5	116.8



# TEST BORING LOG

TH - 2



<u>Soil Classification</u>	<u>% Moisture</u>
Dark Brown Sandy Clay	7.5
Light Brown Silty Very Fine Sand	8.1
Brown Silty Very Fine to Medium Sand & Gravel	17.5
Brown Silty Very Fine to Fine Sand Trace of Clay	16.3
Raddish Brown Very Fine to Fine Sand	9.9
Brown Clayey Very Fine to Fine Sand	17.7
Brown Fine to Medium Sand	5.3
Brown Silty Very Fine to Fine Sand	10.5
Brown Silty Very Fine to Fine Sand Trace of Clay.	23.4
Brown Silty Very Fine to Fine Sand Trace of Clay.	22.0
Brown Silty Very Fine to Fine Sand Trace of Clay.	17.0

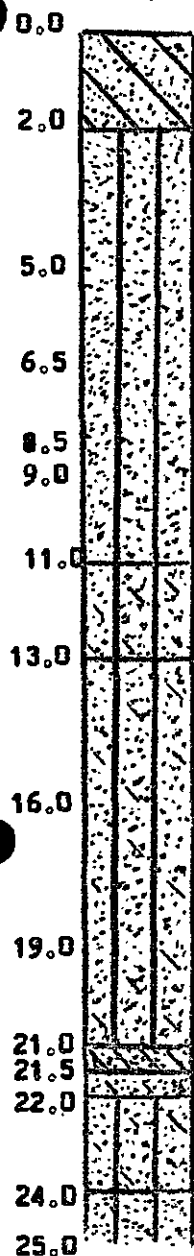
TEST BORING LOG

TH - 3

	<u>Soil Classification</u>	<u>% Moisture</u>
0.0	Brown Silty Very Fine to Medium Sand	4.7
1.0	Dark Brown Sandy Clay	13.6
3.0	Brown Clayey Very Fine to Fine Sand	15.6
6.0	Brown Silty Very Fine to Medium Sand	11.1
8.0	Brown Silty Very Fine to Medium Sand	10.5
10.0	Brown Silty Very Fine Sand	19.3
13.0	Brown Silty Very Fine Sand	14.3
16.0	Brown Silty Very Fine Sand Trace of Clay	22.0
18.5	Brown Silty Very Fine to Fine Sand	9.9
19.5	Brown Silty Very Fine to Fine Sand	9.3
22.0	Brown Very Fine to Medium Sand	7.5
25.0	Brown Clayey Very Fine to Fine Sand	20.5

# TEST BORING LOG

TH - 4

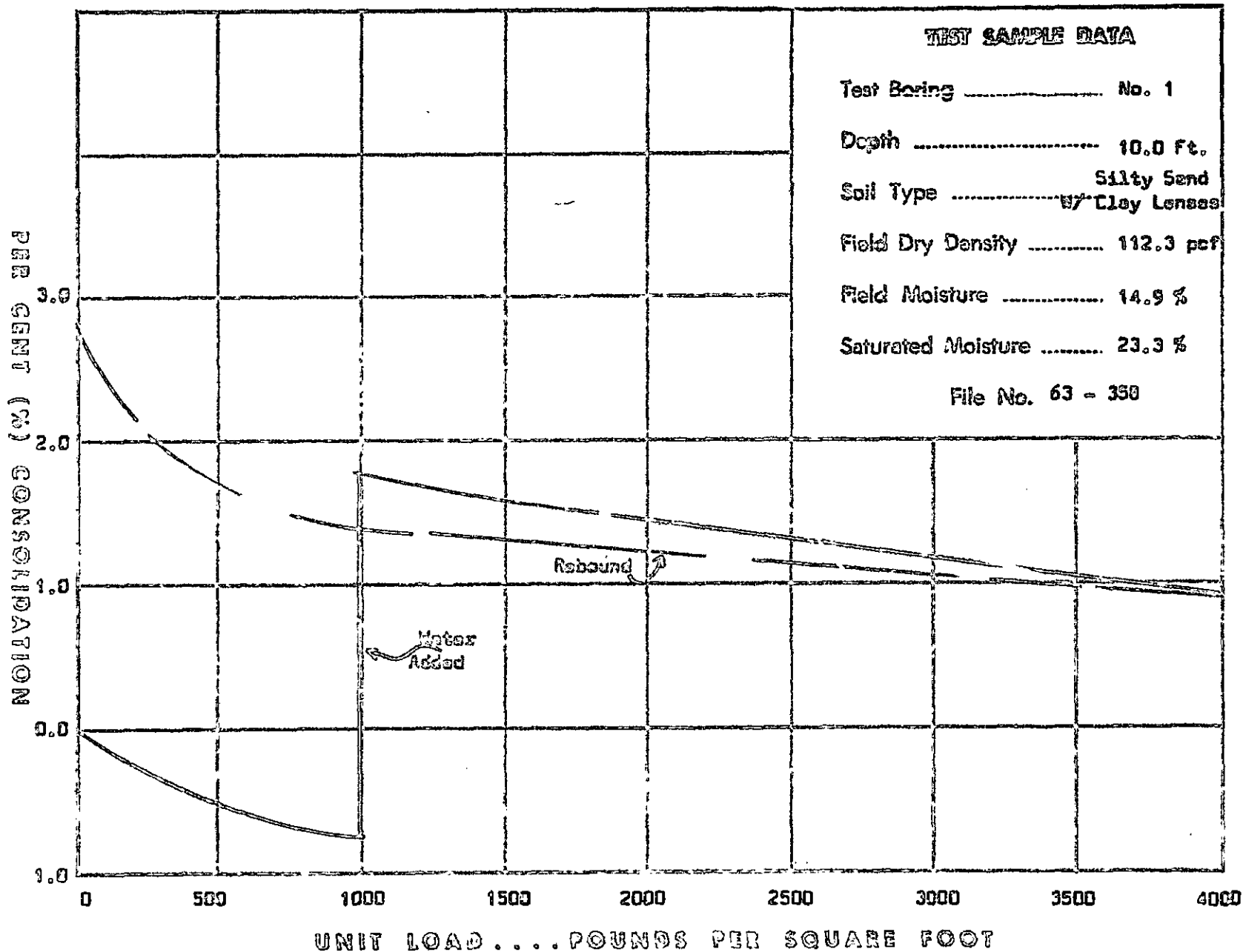


<u>Soil Classification</u>	<u>% Moisture</u>
Dark Brown Sandy Clay	14.3
Brown Silty Very Fine to Fine Sand	9.9
Brown Silty Very Fine to Fine Sand	13.6
Brown Silty Very Fine to Fine Sand	14.9
Brown Silty Very Fine to Fine Sand	15.6
Brown Silty Very Fine to Fine Sand	11.7
Brown Silty Very Fine Sand Trace of Clay	16.3
Brown Silty Very Fine to Fine Sand Trace of Clay.	13.0
Brown Silty Very Fine to Fine Sand Trace of Clay	17.0
Brown Silty Very Fine to Fine Sand Trace of Clay	15.6
Brown Sandy Clay	19.1
Brown Clayey Very Fine to Fine Sand	22.7
Brown Silty Very Fine Sand Trace of Clay	16.3
Brown Silty Very Fine to Fine Sand	12.4

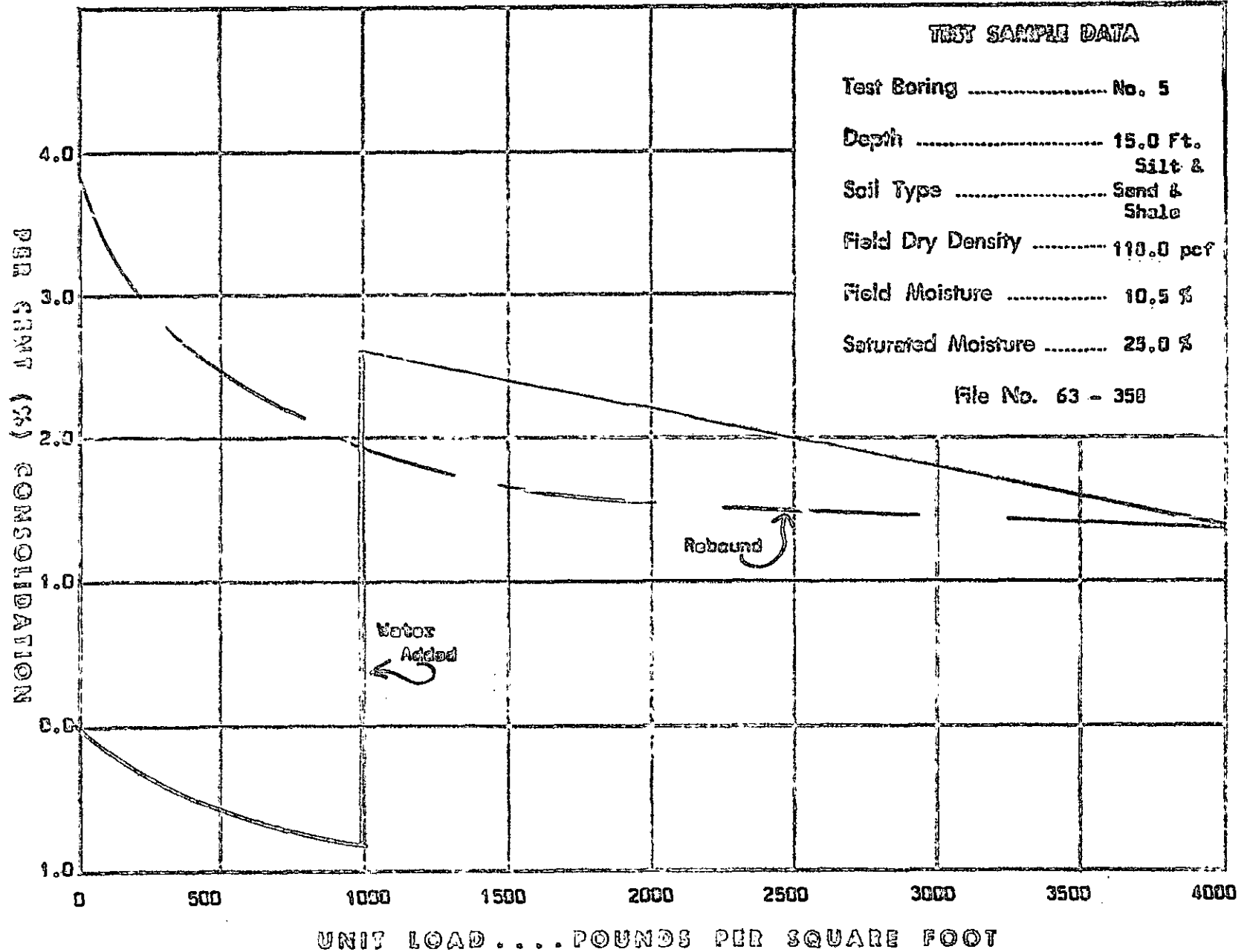
# TEST BORING LOG

Depth Feet	TH - 5	Soil Classification	% Moisture	Dry Density
				P.C.F.
0.0		Dark Brown Sandy Clay	15.6	
2.0		Reddish Brown Sandy Clay	19.1	110.9
4.0		Reddish Brown Clayey Very Fine to Fine Sand	15.6	99.6
6.0		Reddish Brown Silty Very Fine to Fine Sand	11.1	
8.5		Brown Clayey Very Fine to Fine Sand	15.6	
10.0				111.7
11.0		Brown Silty Fine Sand	9.9	
14.0		Brown Silty Clayey Very Fine Sand	22.0	
15.0		Reddish Brown Silty Very Fine to Fine Sand	10.5	110.0
18.0		Brown Silty Very Fine to Fine Sand	9.9	
20.0		Brown Silty Very Fine to Medium Sand	5.0	114.3
21.0		Brown Silty Very Fine to Medium Sand	9.3	
24.0		Brown Silty Very Fine to Medium Sand	11.1	
26.0		Brown Silty Very Fine to Medium Sand	11.1	
28.0		Brown Silty Very Fine to Medium Sand	13.6	
29.0		Reddish Brown Very Fine to Medium Sand	9.9	116.0
30.0				

# CONSOLIDATION TEST



# CONSOLIDATION TEST



# CONSOLIDATION TEST

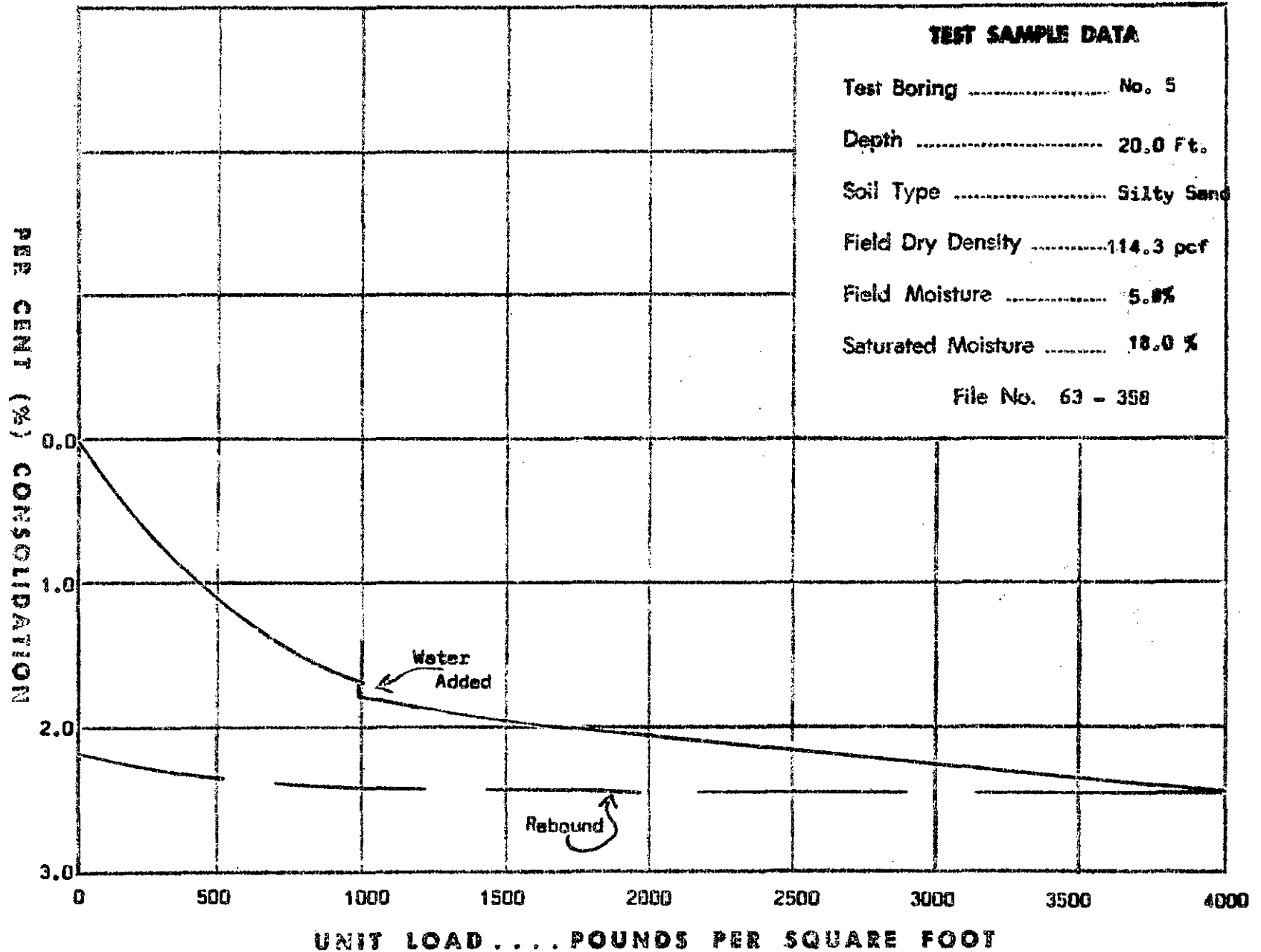


PLATE #10

H. W. LAWMASTER & CO.