

SOILS



This Document Contains:

**Geotechnical Reviews
Mitigation Recommendation Report
Soils Reports**

SOIL COMPACTION TESTS
FINAL REPORT
TRACT no. 3981
EAST AVENIDA SAN JUAN & AVENIDA SALVADOR
SAN CLEMENT, ORANGE COUNTY, CALIFORNIA

GRADING PERMIT NO. 75

FOR

MIDWAY HARBOR, INC.
% JACK ADAMS
299 ROBIN HOOD LANE
COSTA MESA, CALIFORNIA

February 27, 1964
File No. 63 - 503

H. V. LAWMASTER & CO., INC.

P.O. BOX 246
7940 MAIN STREET

STANTON, CALIFORNIA

AREA CODE 714
TEL. 828-8040

February 27, 1964

Midway Harbor Inc.
% Jack Adams
299 Robin Hood Lane
Costa Mesa, California

File No. 63 - 503

Project: Tract No. 3981
Ave. San Juan
San Clemente, California

Subject: Soil Compaction Tests - Final Report

The following report contains the results of density tests No. 1 thru 579 taken on the subject project on Dec. 19, 1963 thru Feb. 17, 1964. Refer to the attached plot plan, Plate "A" for location of the tests.

Preparation of Areas to Receive Fill

Prior to development, the subject site was an undeveloped parcel of land. Before placing any fill, the entire area was cleared of all organic or deleterious material under the direction of a representative of this office. The areas to receive fill were scarified to a depth of 8 to 10 inches, inspected by a representative of this office, and recompactd to provide a bonding between the natural soils and the imposed fill material.

The natural ground is classified as (1) a sandy clay; (2) siltstone and shale; and (3) sandstone and shale and is considered adequate to support the imposed fills under normal conditions.

In areas of natural slopes, benches have been provided in the areas filled by cutting into firm natural soil as the fill was placed to form an interlocking effect between the fill material and the natural slopes.

At the base of all fill slopes, keys were cut into the natural soil to depths and widths adequate to provide a firm base for the fill.

Placement of Fill

The material utilized as fill is classified as material cut from the site. The fill material certified by this report was placed in 4 to 6 inch lifts, watered to the moisture content shown in the test results, and compacted to the relative compaction shown by means of sheepsfoot rollers and by wheel rolling.

Areas falling below the specified relative compaction of 95% were called to the contractor's attention. These areas were reworked and recompactd until the proper compaction was obtained.

Tests were taken at a frequency sufficient to insure complete control of the compaction operations and provide a representative cross-section of the compaction obtained.

Inspection on this project has been continuous throughout the grading operations.

Progress of Job

Fill was placed and compacted in the following areas during the period of this report, Lots 1 thru 6 and 17 thru 38 inclusive.

The following areas were brought to finished grade during the period of this report, and are certified as complete. Lots 1 thru 50, inclusive.

Excessive soil from cuts was placed and compacted offsite under the supervision of this office, and is certified by our report under File No. 63 - 503 - A.

Engineering Recommendations

Engineering evaluation of the material utilized as fill is predicated on the results of the field density tests and on the recommendations contained in the Preliminary Foundation Soils Investigation Report issued by this office on Oct. 2, 1963 under File No. 63 - 358. When considered in conjunction with one another, the site materials are subject to the following recommendations:

A safe bearing value of 1500 pounds per square foot may be used for the compacted fill or for natural soil below conventional footings embedded at least twelve (12) inches below finished grade for one story structures and eighteen inches below finished grade for two story structures.

A lot by lot inspection of the as graded lots has been done by this office to determine the presence of any expansive bearing soils at foundation or slab elevations.

In accordance with the recommendations of the Preliminary Foundation Soils Report a lot by lot inspection was made at the conclusion of grading to check for expansive and slab elevations, and where reinforcement of footings and slabs will be required per the attached detail sheets.

Lots No. 3 thru 9; 13 thru 26; 28 thru 31; 35; 37; 38; 40 thru 42; and 44 thru 50, inclusive will require the recommended reinforcement.

Lots 1; 2; 10 thru 12; 27; 32 thru 34; 36; 39; and 43 have non-expansive materials and the reinforcement of footings and slabs will not be required.

Footings resting partially on fill and partially on natural soil should be reinforced as shown on the attached detail sheet.

It should be noted that no tests were taken in the cut lots since the cuts expose bedded sandstones and shales which are adequate for the recommended bearing value in their natural state of compaction.

Compaction Standard.

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 cu. ft. mold, with the representative soil sample composed of material passing a #4 sieve.

Soil Classification.

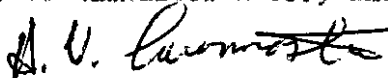
<u>Soil Classification.</u>	<u>Maximum Density, PCF</u>	<u>Optimum Moisture</u>
Yellow Brown Silty Very Fine to Fine Sand	114.0	17.0
Brown Clayey Silty Sand	113.5	17.0
Light Brown Silty Very Fine Sand	106.0	19.0
Dark Brown Silty Clay w/Shell Fragments	107.0	20.0
Brown Clayey, Silty Sand	113.5	14.5
Dark Brown Sandy Clay (Topsoil)	120.0	13.0

Field Density Tests

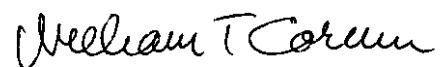
Results of the field density tests taken during this inspection are attached hereto.

Respectfully Submitted

H. V. Lawmaster & Co., Inc.

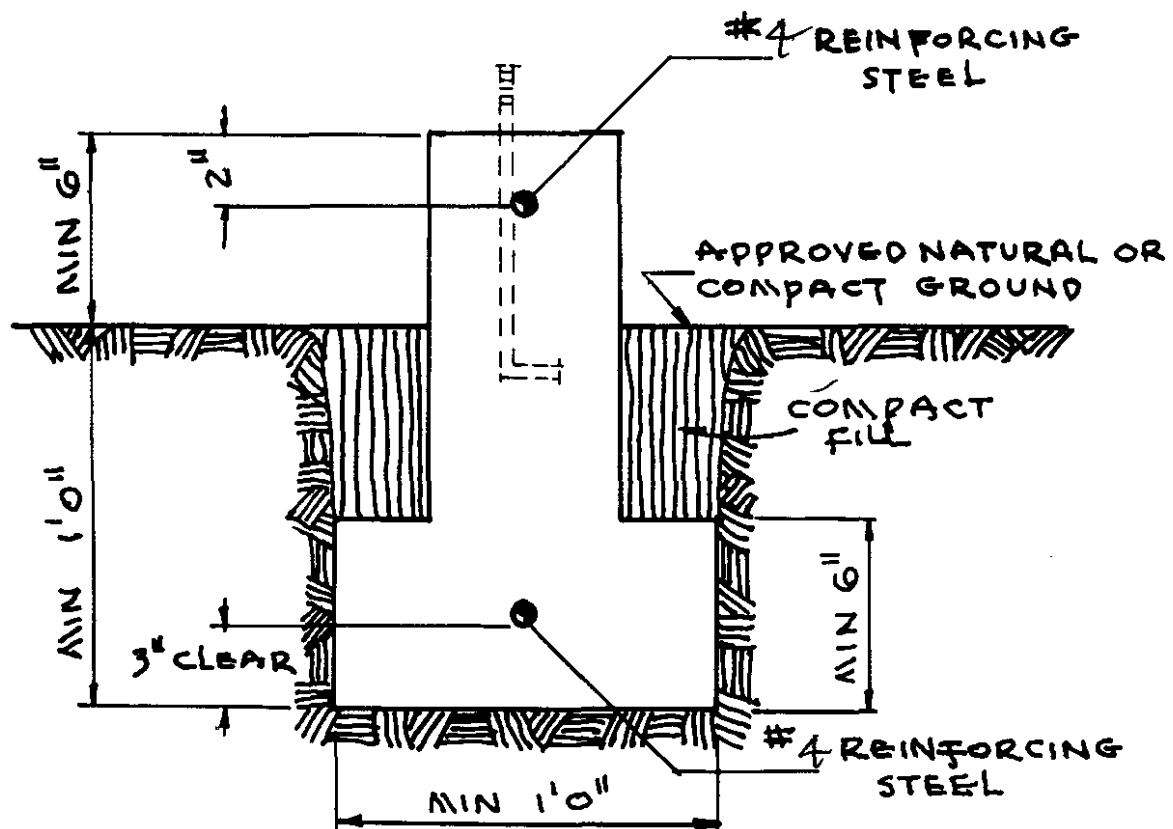


H. V. Lawmaster



H. V. LAWMASTER & CO., INC.
William T. Corum
R.C.E. No. 6207

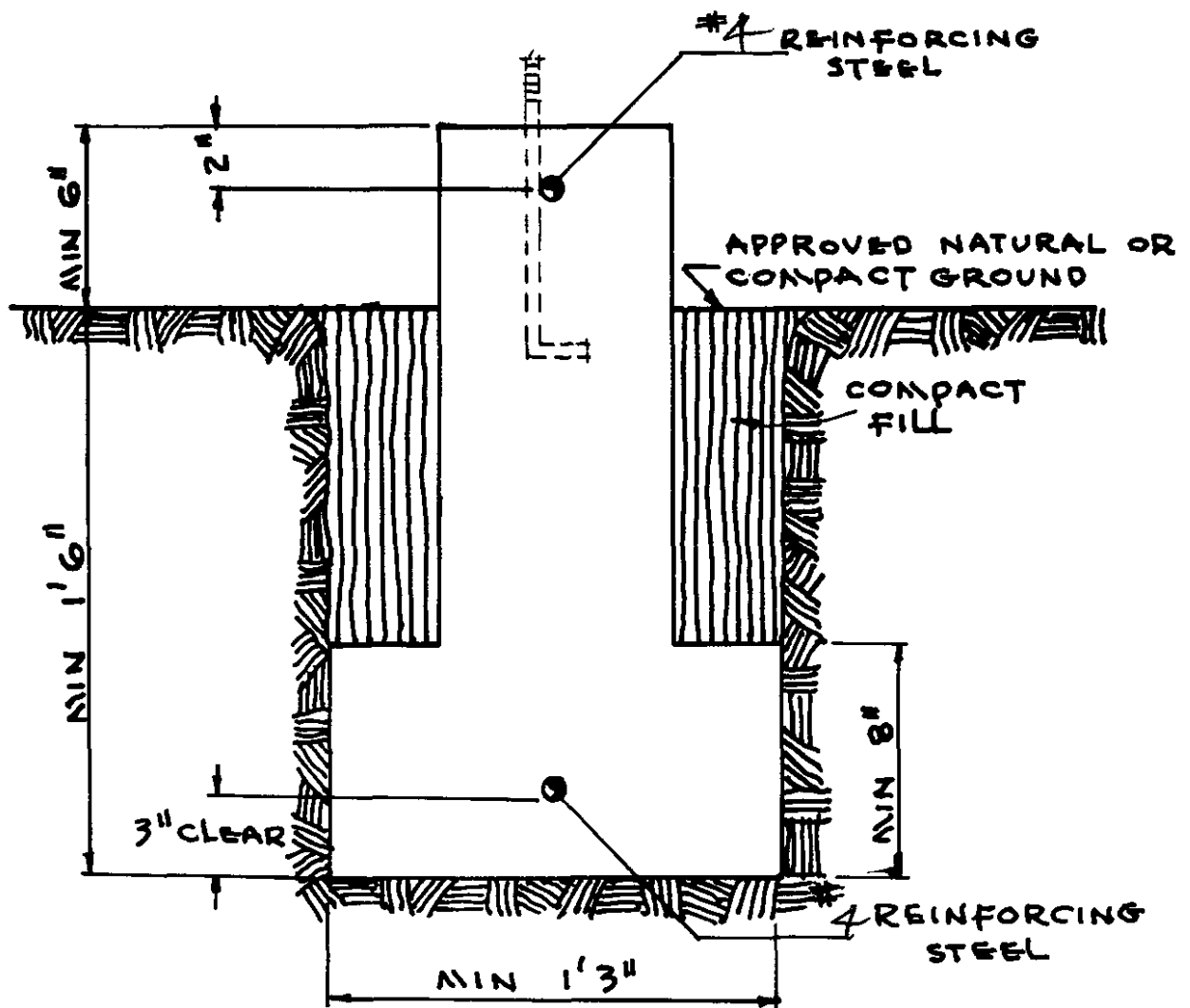
REINFORCEMENT REQUIRED 1 STORY FOUNDATION (TYPICAL)



REINFORCEMENT REQUIRED

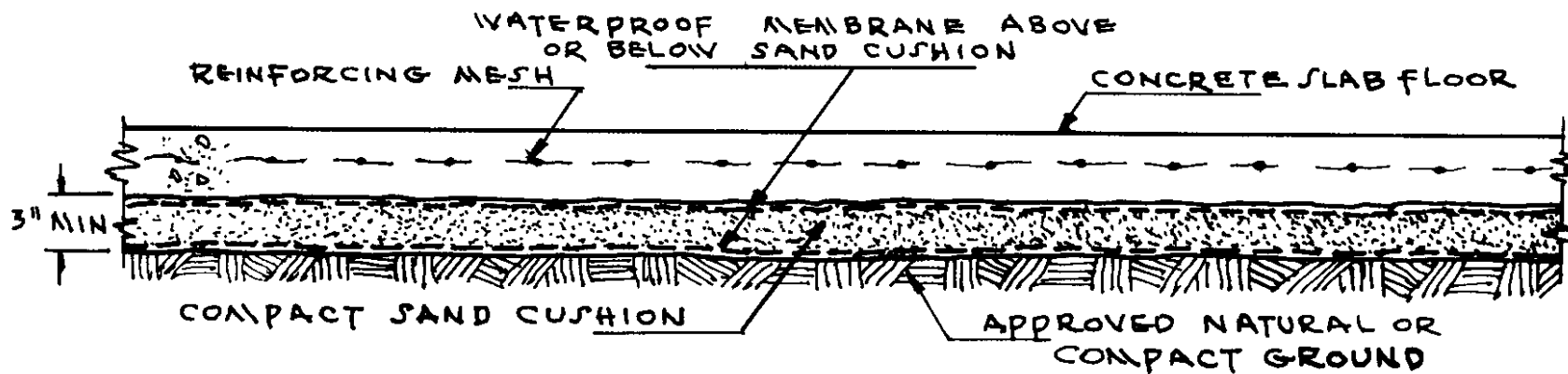
2 STORY FOUNDATION

(TYPICAL)



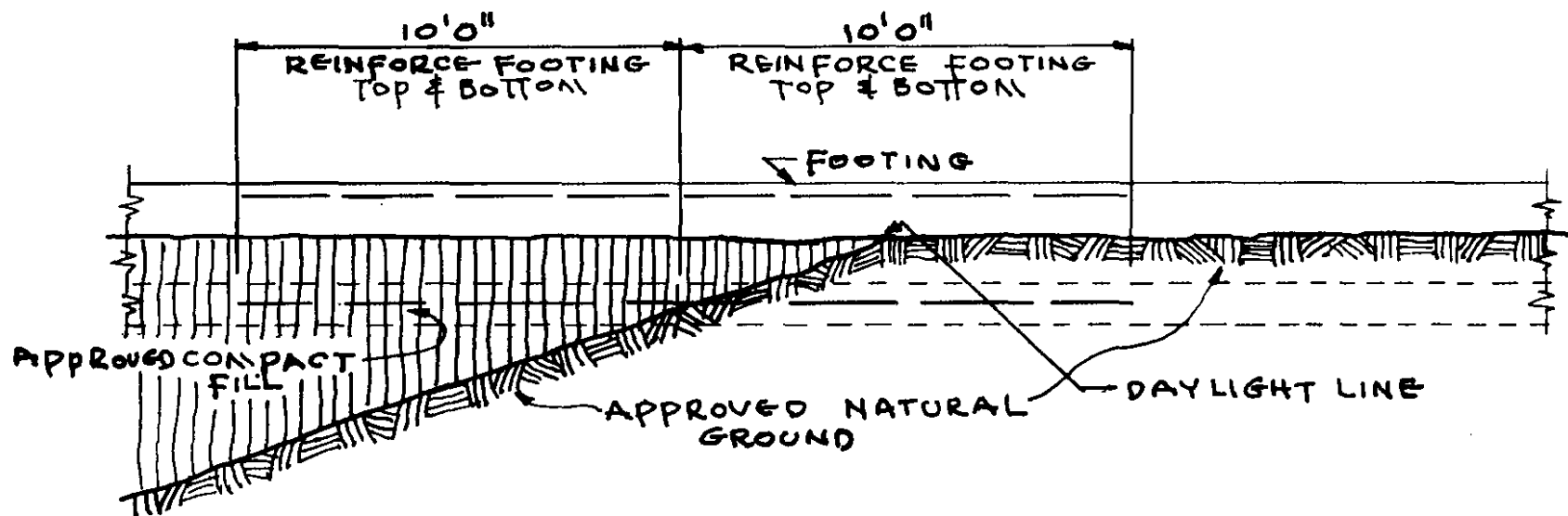
REINFORCEMENT & DAMPROOFING REQUIRED FOR FLOOR SLAB

(TYPICAL)



FOOTING REINFORCEMENT REQUIRED

(TYPICAL)



Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTNESS</u>
12/30/ 63	1	20	104.2	16.3	89.7	16"	4'	84.7*
	2	"	111.2	15.0	95.9	28"	4'	90.3
	3	"	119.2	20.3	99.1	Retest # 1		92.7
	4	21	104.6	18.7	88.4	12"	5'	83.2*
	5	20	112.0	17.7	95.5	30"	4'	90.1
	6	"	104.4	11.1	94.1	52"	Nat.	87.9
	7	"	112.2	12.2	100.0	40"	Nat.	93.5
	8	19	109.8	16.9	94.0	12"	4'	88.6*
	9	21	115.6	16.3	99.3	Retest # 4		92.7
	10	19	120.4	11.9	107.9	Retest # 8		95.0
	11	20	111.4	11.7	100.0	20"	5'	86.8*
	12	"	118.6	24.0	95.6	Retest # 11		90.1
	13	23	110.6	14.4	96.9	10"	1'	90.7
	14	22	108.4	11.1	96.9	12"	1.5'	91.1
	15	24	105.8	15.6	97.5	16"	Nat.	86.2
	16	22	108.4	21.1	92.4	28"	"	84.4*
	17	24	117.8	20.3	89.6	6"	1'	91.5
	18	21	120.4	19.8	97.8	10"	3'	94.0
	19	20	118.2	19.6	100.6	10"	6'	92.5
	20	22	109.6	19.1	99.0	Retest # 16		86.9
	21	20	115.8	20.6	96.1	10"	4'	90.7
	22	19	110.5	17.5	100.9	10"	7.5'	94.1
	23	23	111.2	15.3	95.7	8"	2'	90.1
	24	23	112.6	15.4	99.3	10"	6'	92.6
	25	22	113.0	14.3	99.2	10"	5'	92.6
	26	21	125.6	18.3	106.9	12"	6'	99.8
	27	20	119.8	19.2	100.0	24"	8'	95.5
	28	20	112.6	12.4	100.0	36"	9'	93.5
	29	19	123.4	18.3	104.1	"	10'	97.4
	30	19	121.4	19.0	102.0	"	8'	95.4
	31	22	117.0	17.0	100.0	12"	8'	93.5
	32	23	112.6	15.5	99.1	30"	10'	92.6
	33	24	114.2	15.4	99.1	48"	12'	92.6
12/31								

Field Density Tests

Date	Test No.	Location	Wet Density PCF	% Field Moisture	Dry Density PCF	Depth of Test	Depth of Fill	RELATIVE COMPACTION
12/31/63	34	24	113.0	17.8	96.0	24"	12'	90.6
	35	25	109.0	16.4	93.7	12"	8'	88.4*
	36	25	124.2	11.1	112.0	24"	Retest # 35	98.7
	37	21	125.8	16.5	103.0	12"	10'	95.0
	38	22	120.4	17.5	102.4	12"	14'	90.3
	39	23	123.2	18.9	103.9	10"	10'	91.4
	40	18	111.2	15.7	96.4	12"	8'	90.0
	41	19	112.4	17.1	95.9	12"	12'	90.5
	42	20	127.0	13.9	111.6	30"	14'	98.2
1/2/64	43	21	125.8	18.1	106.1	12"	12'	93.5
	44	21	119.4	11.1	107.4	12"	4'	94.9
	45	21	119.2	19.8	100.0	"	11'	93.5
	46	22	122.8	19.5	102.2	"	16'	95.6
	47	22	120.6	22.0	99.0	"	16'	95.6
	48	23	116.4	16.4	100.0	40"	18'	93.5
	49	24	116.2	18.2	98.3	26"	19'	91.9
	50	24	110.4	22.0	90.6	10"	14'	85.4*
	51	25	123.0	18.9	103.8	24"	10'	91.5
	52	24	121.2	19.3	101.7	8"	19'	95.0
	53	24	120.4	18.6	101.8	10"	Retest # 50	95.0
	54	26	121.4	18.1	102.9	8"	2'	90.6
	55	27	117.8	12.2	104.9	4"	Nat.	92.4
	56	28	121.0	11.1	108.9	4"	Nat.	95.9
	57	26	116.6	19.0	97.7	8"	4'	91.2
	58	28	107.0	11.1	96.5	10"	4'	90.0
	59	28	119.6	15.6	103.2	8"	3'	91.2
	60	26	117.6	14.3	102.9	18"	5'	90.5
	61	31	118.0	14.1	103.1	8"	2'	90.7
1/3	62	31	126.6	17.1	108.0	8"	4'	95.2
	63	30	120.4	20.1	100.1	10"	2'	93.8
	64	29	120.6	15.7	104.2	"	5'	91.9
	65	27	125.8	17.0	107.2	"	7'	94.5
	66	26	120.6	23.4	97.7	"	6'	91.2
	67	25	126.2	15.5	109.2	12"	19'	96.2
	68	24	124.8	17.7	106.1	8"	20'	93.6

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density pcf</u>	<u>% Field Moisture</u>	<u>Dry Density pcf</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/5	69	23	122.4	19.1	102.9	10"	22'	90.6
	70	22	118.6	19.1	99.4	10"	15'	92.9
	71	22	124.8	18.3	105.2	8"	10'	92.8
	72	23	125.2	17.9	106.2	10"	24'	93.7
	73	24	119.6	17.9	101.2	10"	23'	94.7
	74	25	116.2	16.3	100.0	"	11'	93.5
	75	26	115.2	17.5	98.0	"	6'	91.6
1/6	76	28	125.0	15.2	103.5	18"	10'	95.5
	77	30	121.0	17.5	103.0	8"	5'	90.7
	78	29	106.8	17.3	90.7	10"	8'	84.7*
	79	23	103.4	17.0	92.7	24"	13'	86.5*
	80	26	114.6	13.0	96.1	23"	7'	90.6
	81	25	121.0	21.8	99.5	10"	12'	93.5
	82	24	123.0	22.0	100.9	8"	16'	94.1
	83	23	119.4	10.9	99.7	12"	26'	93.4
	84	22	122.4	17.6	100.1	10"	24'	91.9
	85	22	116.4	17.9	99.0	10"	10'	92.6
	86	31	112.2	15.0	97.8	16'	7'	91.4
	87	31	116.4	15.2	101.0	16"	4'	94.2
	88	"	110.8	15.1	100.2	12"	9'	93.9
	89	"	122.6	18.9	103.1	6"	9'	96.5
	90	30	116.6	23.6	96.9	10"	7'	90.4
	91	29	119.8	13.0	100.0	Retest # 78		91.5
	92	23	116.0	17.9	98.5	Retest # 79		92.0
	93	27	113.8	10.2	96.1	18"	16'	90.6
	94	27	120.6	15.5	104.4	40"	18'	92.1
	95	27	123.2	12.2	108.1	10"	17'	95.6
	96	25	122.6	17.5	104.4	12"	5'	92.1
	97	24	132.0	20.6	109.4	12"	26'	96.2
1/7	98-A	31	120.2	15.6	105.7	10"	11'	96.5
	99-A	31	122.4	25.3	99.3	10"	12'	92.8
	99	30	122.0	19.6	102.8	12"	11'	96.0
	99	23	114.6	19.8	95.9	10"	18'	90.5
	100	28	113.8	21.2	96.7	12"	21'	90.0
	101	27	123.4	23.0	100.1	30"	22'	93.7
	102	26	113.4	11.7	100.7	10"	18'	93.5

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density</u> <u>pcf</u>	<u>% Field</u> <u>Moisture</u>	<u>Dry Density</u> <u>pcf</u>	<u>Depth</u> <u>of Test</u>	<u>Depth</u> <u>of Fill</u>	<u>RELATIVE</u> <u>COMPACTION</u>
1/7	103	24	127.3	18.3	107.4	10"	24'	94.7
	104	23	113.2	16.5	97.2	12"	27'	90.9
	105	22	110.4	18.1	100.2	10"	12'	93.8
	106	21	121.4	19.1	101.9	10"	14'	95.1
	107	24	122.6	15.8	106.0	10"	32'	93.5
	108	25	126.8	15.7	111.5	12"	32'	98.2
	109	22	126.4	22.4	103.1	10"	30'	91.0
	110	22	125.2	23.8	102.1	12"	30'	90.2
	111	21	121.4	15.3	105.1	10"	14'	92.9
	112	17	116.6	12.3	103.5	28"	Net.	91.1
	113	17	120.6	11.1	108.2	26"	4'	95.5
1/8	114	18	122.6	17.9	104.0	14"	4'	91.7
	115	18	113.6	13.0	100.2	24"	10'	88.6
	116	19	123.0	15.0	107.1	6"	18'	94.5
	117	20	124.3	16.3	107.1	10"	19'	94.5
	118	20	117.6	16.3	100.5	10"	20'	93.9
	119	21	129.0	22.4	106.2	12"	19'	98.4
	120	21	127.6	15.2	110.5	12"	12'	97.5
	121	26	118.2	15.9	102.1	10"	25'	90.1
	122	26/25	115.0	15.8	103.0	12"	20'	90.9
	123	25	110.6	13.0	96.1	10"	30'	90.7
	124	25	122.4	16.0	105.2	12"	"	92.9
	125	24	119.0	14.4	104.0	"	33'	91.7
	126	23	120.6	17.0	102.6	10"	34'	90.5
	127	22	126.0	15.1	109.2	12"	35'	96.2
	128	22	120.3	20.0	100.5	"	34'	94.0
	129	21	123.0	14.7	107.2	"	29'	94.5
	130	20	122.8	18.3	103.8	10"	15'	91.5
	131	30	124.6	14.3	109.9	28"	20'	96.0
	132	30	130.3	15.9	104.1	16"	17'	90.2
	133	29	121.6	14.5	105.9	12"	16'	91.5
	134	23	124.2	13.0	110.1	10"	21'	95.5
	135	"	119.0	14.8	103.8	10"	24'	90.0
	136	27	117.8	14.2	103.0	12"	26'	91.4

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACT</u>
1/8	137	27	114.8	14.6	100.1	10"	30"	93.8
	138	26	114.6	15.5	99.2	12"	29"	91.9
	139	26	110.6	13.2	93.4	10"	28"	87.2*
	140	21	120.6	18.1	102.0	18"	25"	95.4
	141	20	124.0	15.0	107.9	10"	22"	93.4
1/9	142	29	109.2	12.2	97.4	12"	21"	91.8
	143	28	107.4	11.6	96.5	10"	31"	84.9*
	144	27	108.0	20.8	89.8	10"	32"	84.6*
	145	26	114.2	15.9	100.2	Retest # 139		94.6
	146	26	115.4	17.0	98.8	12"	35"	92.3
	147	21	112.2	16.8	96.4	10"	20"	90.0
	148	21	120.8	16.4	103.5	12"	21"	91.2
	149	20	118.2	15.3	102.5	10"	23"	90.5
	150	20	114.2	14.1	100.1	12"	25"	93.7
	151	19	114.0	15.9	98.5	18"	26"	92.1
	152	19	110.6	15.7	95.5	12"	28"	90.1
	153	18	119.6	16.3	102.8	18"	7"	96.9
	154	32	123.2	14.8	107.5	16"	22"	93.0
	155	30	123.6	13.9	108.6	12"	23"	94.0
	156	29	109.2	11.1	98.4	"	23"	91.9
	157	28	112.6	13.4	99.4	Retest # 143		92.9
	158	27	120.8	15.0	105.0	Retest # 144		91.0
	159	26	119.4	17.8	101.5	10"	32"	94.9
	160	18	119.6	20.2	99.5	26"	10"	92.9
	161	18	118.8	17.1	100.2	10"	10"	93.9
	162	19	109.4	15.2	95.5	10"	28"	90.1
	163	19	109.3	11.0	98.8	12"	30"	85.5*
	164	20	110.8	11.1	98.8	12"	31"	85.5*
	165	20	116.4	18.4	98.4	28"	29"	91.9
	166	21	111.4	18.5	95.4	12"	28"	90.0
	167	21	120.8	19.1	101.1	24"	26"	94.5
	168	21	120.2	18.7	101.2	10"	26"	94.7
	169	23	116.6	15.2	101.1	12"	38"	94.5
	170	22	119.8	15.5	103.4	24"	18"	91.3

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/9	171	24	119.6	17.5	101.9	10"	36'	90.0
1/10	172	19	109.4	14.2	95.9	12"	29'	90.4
	173	19	119.6	15.8	104.8	18"	34'	92.1
	174	20	126.6	18.4	106.9	12"	33'	94.1
	175	20	124.6	22.0	102.0	10"	29'	90.0
	176	21	120.8	15.0	104.9	10"	20'	92.5
	177	22	114.4	17.5	97.5	10"	22'	91.1
	178	22	121.4	14.7	106.0	12"	36'	93.4
	179	23	127.8	15.6	110.5	12"	39'	97.4
	180	24	128.2	20.5	106.5	10"	40'	99.7
	181	24	122.6	15.2	106.2	12"	40'	93.9
	182	24	114.0	19.2	95.7	12"	41'	90.4
	183	25	128.8	18.7	103.2	"	40'	95.5
	184	26	126.2	20.3	105.0	"	35'	92.7
	185	27	118.0	14.1	105.1	"	"	91.1
	186	29	111.8	11.1	100.2	18"	36'	88.5*
	187	28	117.8	16.6	100.9	10"	37'	95.0
	188	28	103.0	14.4	94.4	24"	38'	88.1*
	189	27	109.2	12.2	97.4	12"	36'	90.9
	190	26	111.8	14.3	97.6	"	37'	91.1
	191	26	105.2	11.8	94.4	10"	36'	88.1*
	192	25	111.0	14.3	97.2	12"	34'	91.9
	193	24	114.6	13.5	100.9	12"	39'	87.1*
	194	23	115.3	18.3	97.9	12"	40'	92.2
	195	23	116.4	16.0	100.2	24"	44'	94.6
	196	22	119.8	16.2	102.9	18"	44'	90.5
	197	22	109.2	15.6	94.8	14"	42'	83.5*
	198	21	110.8	16.3	95.1	12"	40'	83.9*
	199	21	110.2	13.4	97.2	18"	24'	91.6
	200	20	116.6	15.2	101.0	18"	36'	95.0
	201	19	109.8	11.7	98.4	24"	38'	92.7
1/13	202	31	122.4	17.1	104.5	18"	25'	92.1
	203	31	121.0	20.2	100.7	18"	26'	94.1
	204	29	120.6	13.6	106.1	12"	37'	92.0
	205	27	109.8	12.0	97.9	Retest # 186		91.4

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density pcf</u>	<u>% Field Moisture</u>	<u>Dry Density pcf</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/15	205	28	120.0	12.9	107.1	Retest # 188		92.7
	207	25	120.4	19.2	101.0	Retest 191		94.5
	208	24	118.6	18.2	100.1	Retest # 193		93.8
	209	22	123.2	17.7	109.1	Retest # 197		96.1
	210	23	129.0	16.7	110.8	12" 45'		97.6
	211	24	115.6	15.3	100.1	Retest # 198		93.8
	212	21	121.8	15.6	105.2	18" 27'		92.9
	213	20	118.8	15.8	102.5	12" 32'		90.4
	214	19	119.2	15.6	103.1	18" 40'		91.0
	215	19	118.4	13.4	104.2	12" 38'		90.3
	216	28	123.2	18.2	103.2	18" 36'		93.5
	217	27	124.6	14.3	103.9	18" 36'		94.2
	218	26	117.4	13.6	103.6	34" 35'		91.4
	219	25	115.4	14.3	100.9	12" 48'		95.0
	220	24	118.4	11.6	106.1	30" 48'		92.0
	221	22	117.8	11.1	105.9	10" 46'		91.7
	222	21	113.8	11.8	101.9	12" 45'		90.0
	223	20	130.6	20.4	103.2	18" 41'		95.5
	224	19	117.8	14.8	102.8	26" 43'		90.5
	225	19	123.6	20.0	107.1	12" 42'		94.6
	226	31	124.2	12.6	110.2	12" 27'		95.7
	227	30	115.6	14.3	101.9	14" 28'		90.0
	228	28	117.8	17.2	100.2	12" 39'		93.8
	229	26	122.2	17.5	104.1	12" 33'		92.0
	230	24	117.0	16.0	100.9	18" 50'		94.1
	231	22	124.8	16.8	105.8	12" 41'		94.0
	232	6	120.6	14.9	105.0	16" Nat.		92.5
	233	5	117.8	15.2	101.0	" "		89.0
	234	5	116.3	16.3	100.0	" "		87.0
	235	4	122.3	17.8	104.1	" "		91.9
1/20	236	31	109.4	14.2	96.0	12" 30'		90.5
	237	30	116.6	17.2	99.4	48" 33.5'		92.9
	238	28	114.0	13.2	92.4	54" 39'		92.9
	239	28	110.8	13.0	98.0	36" 39'		91.4
	240	28	121.8	15.3	105.2	12" 40'		92.9
	241	27	118.4	19.2	99.3	48" 40'		92.9

Field Density Tests

Date	Test No.	Location	Wet Density pcf	% Field Moisture	Dry Density pcf	Depth of Test	Depth of Fill	RELAT COMPA
1/20	242	27	107.8	12.5	95.7	24"	40'	90.2
	243	25	118.2	16.4	101.5	60"	40'	94.7
	244	"	114.8	15.3	99.5	36"	39'	93.0
	245	"	122.4	16.4	105.1	12"	39'	92.8
	246	24	112.0	16.4	96.2	60"	54'	90.6
	247	"	106.6	13.6	95.7	36"	"	90.2
	248	"	124.6	17.1	106.2	12"	"	93.7
	249	22	114.2	14.6	99.8	60"	56'	93.1
	250	"	115.0	13.6	101.1	36"	"	94.4
	251	"	114.6	13.6	101.0	12"	42'	94.4
	252	21	107.4	13.9	95.5	54"	55'	90.0
	253	"	109.6	14.6	95.7	36"	"	90.3
	254	"	113.6	11.4	102.0	12"	"	90.0
	255	4	123.4	17.0	110.0	60"	7'	97.1
1/23	256	"	118.0	16.3	100.4	36"	"	93.9
	257	"	112.6	17.6	95.7	10"	"	90.3
	258	5	115.4	11.1	104.0	60"	"	90.0
	259	"	118.0	19.0	99.4	36"	"	93.7
	260	"	124.6	16.2	107.1	10"	"	94.4
	261	"	118.4	16.5	101.7	60"	8'	94.9
	262	"	117.0	17.2	99.7	36"	8'	94.0
	263	"	121.4	15.8	105.0	12"	8'	91.0
	264	"	124.4	16.2	107.1	60"	"	94.4
	265	6	126.2	17.5	107.5	36"	"	94.9
	266	6	122.3	17.9	104.1	12"	"	91.8
	267	21	116.8	18.9	98.4	60"	40'	91.9
	268	20	116.0	16.5	99.6	36"	"	93.1
	269	20	114.2	16.2	98.3	12"	"	91.9
	270	19	121.2	17.5	103.1	60"	50'	90.9
	271	"	121.0	19.2	103.8	36"	"	91.4
	272	"	110.4	16.3	101.9	12"	"	90.0
	273	"	119.2	16.0	102.9	60"	51'	90.6
	274	"	112.4	15.9	97.3	36"	"	90.8
	275	19	126.2	18.0	107.1	12"	47'	94.2
	276	4	118.2	20.9	98.0	24"	10'	91.6
	277	"	118.6	19.1	99.4	18"	11'	92.7

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/23	278	5	116.4	18.9	92.3	24"	12'	91.8
	279	"	125.6	20.6	105.0	12"	"	98.2
	280	6	126.4	19.0	106.2	12"	11'	99.4
	281	"	122.0	16.1	105.0	30"	16'	92.5
	282	"	122.8	16.7	105.1	12"	"	92.7
	283	5	127.4	14.7	111.1	18"	15'	96.4
	284	"	116.6	19.1	98.1	12"	"	91.6
	285	"	121.8	16.5	104.2	12"	14'	92.1
	286	"	129.2	14.7	113.0	12"	"	97.7
	287	4	122.8	12.0	109.5	10"	12'	94.7
	288	18	119.6	15.4	103.5	12"	38'	91.4
	289	19	120.0	17.7	102.8	30"	49'	90.6
	290	19	116.6	12.6	103.7	12"	"	90.0
	291	20	118.4	17.9	100.2	30"	54'	93.9
	292	20	123.0	17.0	107.2	12"	"	94.5
	293	21	123.8	17.5	105.2	"	42'	93.0
	294	21	110.4	11.4	103.1	"	57'	91.9
	295	23	112.8	15.2	96.9	12"	46'	91.5
	296	24	123.6	20.2	102.9	18"	59'	95.8
	297	25	112.0	22.5	96.5	12"	36'	91.0
	298	26	127.2	18.3	107.5	"	42'	94.7
	299	27	110.0	15.5	95.9	"	"	90.4
	300	28	120.6	17.8	106.1	"	29'	92.0
1/24	301	18	123.8	21.5	101.0	"	40'	94.4
	302	19	113.6	17.5	98.2	"	51'	92.7
	303	20	113.0	10.5	107.1	18"	58'	92.9
	304	21	112.6	20.5	93.5	12"	57'	88.2
	305	"	106.2	12.5	105.1	"	"	91.1
	306	22	121.6	20.5	100.9	18"	43'	94.0
	307	25	118.0	13.6	104.0	12"	47'	90.1
	308	25	116.8	17.4	98.4	18"	38'	93.6
	308	24	127.8	15.9	109.2	10"	59'	94.6
	310	27	116.2	16.4	99.9	12"	43'	94.1
	311	28	112.2	16.0	97.0	12"	31'	91.5
	312	31	109.8	12.5	97.5	"	35'	91.2
	313	21	120.2	17.6	102.5	"	57'	90.4
	314	21	118.2	15.6	103.4	"	53'	90.5
	315	16	123.6	16.0	106.1	"	58'	92.1

Field Density Test

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/24	316	4	120.4	17.4	102.6	30"	15'	90.5
	317	5	115.6	15.8	99.9	12"	15'	93.2
	318	5	121.6	16.8	104.1	18"	18'	91.8
	319	6	116.8	12.5	103.8	12"	18'	91.5
	320	6	123.6	16.3	106.8	18"	19'	94.1
	321	6	112.8	16.4	96.7	12"	21'	91.1
	322	6	110.6	14.7	96.5	"	20'	91.0
	323	5	121.6	21.2	100.2	"	"	93.8
	324	5	120.2	19.1	101.0	"	17'	94.5
	325	4	114.4	16.0	98.5	"	"	92.9
1/27	326	27/28	124.4	20.5	103.1	"	45'	96.4
	327	26	116.4	19.2	97.7	"	40'	91.2
	328	24	116.6	15.5	100.9	"	59'	94.2
	329	23	118.4	19.0	99.5	14"	48'	92.9
	330	22	114.4	17.4	97.5	16"	44'	91.3
	331	21	120.8	15.8	104.2	12"	"	92.0
	332	20	112.0	16.2	96.6	"	60'	91.2
	333	"	118.0	21.2	97.4	14"	"	91.1
	334	19	119.4	18.3	101.0	18"	62'	94.5
	335	17/18	127.6	17.0	109.0	18"	11'	96.0
	336	22	116.4	21.4	96.0	12"	59'	90.5
	337	21	127.0	18.2	107.1	18"	61'	94.2
	338	20	125.2	19.8	104.8	12"	62'	92.4
	339	19	123.8	18.3	108.1	"	60'	93.6
	340	6	108.8	13.9	95.7	40"	26'	90.1
	341	"	116.8	17.5	99.4	18"	26'	93.8
	342	"	112.0	17.0	95.7	54"	27'	90.1
	343	"	118.4	18.0	100.4	36"	"	94.0
	344	"	120.6	19.3	101.0	12"	"	94.2
	345	5	113.2	17.0	97.0	26"	24'	90.7
	346	4	114.2	16.8	98.0	12"	18'	91.6
	347	28	120.6	18.3	101.9	18"	47'	96.0
	348	29	116.2	14.8	101.2	"	48'	94.6
	349	27	124.8	16.3	107.1	"	51'	94.6
	350	22	118.4	17.8	100.6	12"	45'	94.0

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density pcf</u>	<u>% Field Moisture</u>	<u>Dry Density pcf</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/27	351	24	119.2	19.1	100.1	12"	63'	94.8
	352	25	116.8	16.0	100.5	"	62'	94.1
	353	25	116.0	17.7	98.7	"	61'	92.1
	354	23	124.0	19.2	103.8	"	64'	91.4
	355	22	120.6	18.0	102.0	"	62'	90.0
1/28	356	6	118.0	19.2	99.1	12"	29'	92.6
	357	6	126.2	18.3	106.8	14"	28'	94.1
	358	5	118.8	17.9	100.8	12"	"	94.2
	359	5	120.8	25.0	96.8	14"	20'	90.2
	360	4	112.6	17.2	96.0	12"	"	90.5
	361	21	118.4	20.7	98.4	"	62'	91.8
	362	20	122.8	19.2	102.8	18"	63'	96.0
	363	19	118.2	17.5	100.5	12"	66'	93.9
	364	19	114.8	18.2	96.9	"	63'	90.4
	365	22	124.6	22.0	102.0	"	64'	95.4
	366	"	114.0	16.2	98.0	"	46'	91.4
	367	23	115.2	17.5	98.1	18"	50'	91.7
	368	24	116.8	19.2	97.8	12"	68'	91.4
	369	25	120.6	15.3	103.8	"	64'	91.3
	370	26	120.0	20.5	99.6	"	55'	93.1
	371	27	125.2	17.4	107.4	36"	"	94.7
	372	"	115.6	19.2	96.8	12"	"	91.2
	373	28	116.6	18.8	97.3	"	47'	91.7
	374	30	124.5	21.8	102.1	"	37'	96.2
	375	31	123.0	22.2	101.0	18"	33'	95.3
	376	19	116.6	17.2	99.4	12"	65'	93.0
	377	20	118.8	15.3	102.9	"	66'	90.6
	378	"	120.8	13.1	101.9	18"	67'	95.1
	379	21	114.3	15.1	99.5	12"	66'	93.0
	380	22	114.4	16.8	100.0	"	48'	93.6
	381	25	116.4	13.0	93.8	"	50'	92.3
	382	24	123.0	17.6	104.5	18"	71'	98.8
	383	26	122.2	18.1	103.2	13"	58'	91.2
	384	26	122.0	18.6	102.8	12"	57'	90.3
	385	27	121.2	16.6	104.0	"	"	91.6

Field Density Test

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density Pcf</u>	<u>% Field Moisture</u>	<u>Dry Density Pcf</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/29	386	18	110.8	13.3	97.5	12"	40'	92.1
	387	19	110.0	12.4	97.9	18"	69'	92.2
	388	20	116.6	13.9	102.5	12"	67'	90.4
	389	21	115.6	13.5	98.5	"	65'	92.0
	390	22	110.0	13.3	96.9	"	50'	90.5
	391	23	109.8	13.6	96.6	"	52'	90.3
	392	24	124.2	14.3	109.0	"	70'	94.3
	393	25	120.8	15.9	104.1	30"	68'	90.3
	394	25	126.6	21.4	104.1	12"	"	90.3
	395	26/27	123.6	16.7	105.0	"	60'	91.9
	396	28	129.4	18.1	109.5	18"	50'	96.5
	397	29	116.6	15.2	101.0	14"	"	94.3
	398	30	120.4	13.7	106.0	18"	41'	91.8
	399	31	112.4	13.6	99.1	12"	40'	92.6
	400	18	112.8	17.4	95.9	"	42'	90.4
	401	19	118.4	21.2	97.7	36"	69'	92.2
	402	"	116.2	19.2	97.6	18"	70'	92.1
	403	20	108.8	18.2	92.0	12"	69'	86.7*
	404	"	112.8	15.9	97.4	Retest # 403		91.9
	405	21	116.2	16.4	99.9	12"	67'	93.2
	406	22	111.6	15.9	96.5	18"	52'	91.1
	407	23	113.4	16.1	97.8	18"	55'	92.2
	408	"	116.8	15.2	101.0	30"	"	95.2
	409	24	115.6	19.4	96.6	12"	72'	91.2
	410	"	125.6	18.0	106.4	23"	"	94.0
	411	25	119.8	15.2	103.0	10"	71'	91.3
1/30	412	6	116.8	17.5	99.4	30"	32'	93.7
	413	"	120.6	18.8	101.5	12"	"	95.9
	414	"	126.8	17.5	107.6	30"	"	94.9
	415	5	116.2	15.2	100.9	12"	"	95.1
	416	"	118.0	14.6	103.1	40"	33'	90.9
	417	"	119.2	15.4	103.2	18"	"	91.0
	418	4	122.0	15.0	106.0	30"	31'	91.0
	419	"	123.4	17.2	105.1	12"	"	92.6
	420	25	132.8	20.7	110.5	"	73'	97.4

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/30	421	26	130.6	17.7	111.0	18"	63'	97.7
	422	27	118.2	20.8	97.9	30"	64'	91.4
	423	"	127.0	17.9	107.9	12"	"	95.0
	424	28	114.4	19.1	96.0	30"	54'	90.6
	425	"	116.8	13.4	102.5	12"	"	90.4
	426	29	115.4	17.4	96.6	"	"	91.2
	427	"	116.2	22.2	95.2	30"	"	90.0
	428	30	118.4	18.5	100.1	"	45'	94.6
	429	"	119.6	17.5	101.6	12"	"	95.0
	430	31	115.4	16.5	99.2	"	43'	92.6
	431	6	123.0	23.4	99.6	18"	37'	92.9
	432	"	119.4	22.8	97.5	40"	38'	91.1
	433	5	115.0	15.0	100.0	18"	36'	93.4
	434	5	117.2	11.8	105.0	24"	37'	91.0
	435	4	116.6	16.7	100.0	12"	"	94.4
	436	"	120.0	16.2	103.1	"	25'	91.1
	437	1	117.8	14.8	102.5	40"	Nat.	90.4
	438	"	115.2	21.5	95.1	18"	"	90.0
	439	2	114.8	16.0	99.0	22"	"	92.4
	440	"	122.4	25.0	98.1	18"	"	91.7
	441	"	114.6	16.1	98.5	12"	"	92.0
	442	"	115.8	13.6	102.0	52"	Nat.	90.0
	443	"	129.2	20.2	107.4	28"	"	94.7
	444	32	119.2	11.1	106.2	28"	"	92.1
	445	"	118.0	14.4	103.0	12"	"	90.7
	446	34	116.8	11.9	104.1	40"	"	90.7
1/31	447	"	127.6	12.4	113.2	18"	3'	98.0
	448	35	117.0	14.4	102.1	28"	Nat.	90.0
	449	"	114.6	17.1	97.7	12"	"	91.3
	450	37	120.8	15.6	104.2	40"	Nat.	90.3
	451	"	116.6	11.0	105.1	28"	"	90.9
	452	"	126.0	20.8	104.2	18"	4'	97.5
	453	36	120.6	18.6	101.8	40"	Nat.	95.0
	454	"	117.6	20.5	97.6	12"	"	91.3
	455	33	118.4	13.9	104.1	28"	"	90.2
	456	"	115.4	16.3	99.3	12"	2'	92.7

Field Density Test

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
1/31	457	2	120.2	18.9	101.1	29"	6"	94.6
	458	"	116.8	19.6	97.6	12"	"	91.2
	459	"	115.8	17.3	98.5	18"	7"	92.1
	460	1	125.6	17.8	106.8	12"	4"	94.0
	461	2	120.4	20.0	100.2	30"	11"	94.6
	462	"	128.4	21.8	105.5	12"	"	98.7
2/3	463	1	118.2	18.7	99.8	"	3"	93.2
	464	2	119.2	18.9	100.2	"	13"	93.6
	465	"	118.4	16.1	101.9	14"	12"	90.0
	466	"	121.0	17.9	102.9	12"	8"	90.8
	467	"	116.2	14.9	101.2	"	8"	95.7
	468	1	122.0	15.7	105.4	14"	7"	91.2
	469	2	123.8	15.3	94.2	12"	15"	89.0
	470	"	127.0	13.6	94.3	"	15"	89.0
	471	"	116.0	22.2	95.0	"	10"	89.7
	472	1	110.6	18.7	93.5	"	"	91.9
	473	"	106.2	15.1	92.2	"	9"	87.0
	474	2	118.2	22.0	96.1	Retest # 469		90.7
	475	"	110.8	22.5	95.2	Retest # 470		90.7
	476	"	116.0	18.3	99.2	Retest # 471		93.6
	477	1	120.6	17.4	102.6	Retest # 473		90.3
	478	33	110.2	16.2	101.7	12"	5"	96.0
	479	35	122.2	18.7	103.1	"	4"	97.4
	480	36	119.2	16.7	102.1	"	5"	90.1
	481	2	122.2	22.7	99.8	18"	18"	94.2
	482	"	122.0	20.6	101.1	12"	17"	94.6
	483	1	112.0	22.8	96.3	10"	12"	90.7
	484	"	120.6	22.5	99.9	13"	13"	93.2
	485	2	120.6	15.6	104.2	"	12"	92.0
	486	33	116.0	13.0	103.1	12"	7"	91.0
	487	34	116.0	18.3	98.0	14"	6"	92.5
	488	35	114.2	16.6	98.3	12"	7"	91.7
	489	36	113.2	16.2	97.4	14"	4"	91.9
	490	37	124.8	15.3	103.0	12"	5"	93.5
	491	37	124.2	15.9	107.2	"	4"	93.0

Field Density Test

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
2/3	492	2	126.0	18.6	106.1	18"	21'	93.6
	493	"	118.6	16.8	101.6	12"	20'	95.9
	494	1	116.2	16.3	100.0	12"	15'	94.3
2/4	495	34	118.8	15.4	102.9	18"	10'	90.6
	496	33	116.0	14.9	101.0	24"	11'	95.4
	497	"	111.8	12.0	99.9	14"	10'	94.1
	498	32	124.2	20.6	103.1	12"	9'	96.4
	499	35	109.4	12.5	97.5	14"	7'	92.1
	500	1	119.4	15.0	103.9	12"	17'	91.6
	501	"	126.6	11.1	113.8	"	17'	98.5
	502	2	115.4	13.8	101.5	14"	17'	95.8
	503	2	114.4	17.0	97.9	40"	25'	92.3
	504	"	120.8	18.5	101.9	14"	"	95.9
	505	3	122.8	18.9	103.2	40"	Nat.	97.5
	506	"	117.6	16.7	100.9	24"	3'	94.4
	507	"	110.6	15.5	95.7	12"	"	90.2
	508	33	124.2	17.9	105.5	36"	14'	93.0
	509	"	116.4	15.9	100.8	12"	"	94.3
	510	32	120.4	16.8	103.2	18"	11.5'	91.2
	511	34	119.6	14.2	104.2	"	12.5'	91.8
	512	35	122.4	14.0	107.1	"	10'	92.9
	513	36	121.4	14.3	106.1	12"	9'	91.9
	514	37	119.4	16.0	103.0	10"	7'	90.7
	515	1	111.0	16.7	95.3	36"	21'	90.0
	516	"	122.0	18.0	103.2	12"	21'	97.5
	517	2	118.0	16.5	101.0	"	25'	94.4
	518	"	116.6	19.2	97.7	40"	29'	91.4
	519	"	122.6	16.6	105.2	12"	"	92.9
	520	"	118.6	19.9	99.0	18"	30'	92.6
	521	3	121.8	17.8	103.6	36"	7'	91.4
	522	3	122.6	18.1	103.7	12"	"	91.4
2/5	523	2	119.2	16.4	102.5	36"	34'	90.4
	524	2	116.0	18.7	97.9	12"	"	92.1
	525	3	120.8	16.2	103.8	36"	14'	91.5
	526	3	116.8	17.2	99.5	12"	"	93.7

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u>
2/5	527	3	118.4	17.8	100.6	36"	11'	94.7
	528	"	122.6	18.9	103.1	12"	"	97.1
	529	2	111.8	13.0	98.9	"	32'	93.1
	530	"	116.2	16.2	100.0	40"	38'	94.2
	531	"	120.2	18.5	101.8	24"	"	96.0
	532	"	116.8	14.3	102.0	12"	"	90.0
	533	3	122.2	15.5	105.9	"	16'	91.5
	534	2	122.6	17.7	104.1	"	34'	91.9
	535	"	122.2	18.9	102.9	"	40'	90.7
	536	3	121.4	16.0	104.8	36"	20'	92.3
	537	"	115.8	14.6	100.9	12"	"	94.1
2/17	538	39	114.6	22.7	93.6	4"	Mat.	87.5**
	539	40	121.6	21.4	100.0	6"	"	93.5
	540	41	110.8	18.1	93.8	6"	"	87.7**
	541	42	123.8	23.0	100.2	4"	"	93.9
	542	43	122.6	19.1	102.9	8"	"	90.7
	543	44	126.2	20.8	104.4	6"	"	92.2
	544	45	117.6	17.5	92.0	4"	"	85.9**
	545	31	123.6	17.5	105.1	30"	47'	92.8
2/18	546	"	125.4	21.4	103.2	12"	47'	96.6
	547	30	120.0	17.8	102.0	30"	48'	95.4
	548	30	113.2	16.4	97.4	12"	49'	91.0
	549	29	115.4	16.0	100.2	32"	58'	94.5
	550	29	115.6	15.2	100.1	12"	58'	94.4
	551	28	117.4	16.3	100.9	36"	59'	95.2
	552	28	122.2	22.4	99.6	16"	59'	93.1

Field Density Tests

<u>Date</u>	<u>Test No.</u>	<u>Location</u>	<u>Wet Density PCF</u>	<u>% Field Moisture</u>	<u>Dry Density PCF</u>	<u>Depth of Test</u>	<u>Depth of Fill</u>	<u>RELATIVE COMPACTION</u> (100)
2/19	553	27	114.4	16.4	98.5	30"	68'	93.0
	554	27	116.2	16.3	100.0	12"	68'	94.3
	555	26	120.2	18.9	101.2	32"	65'	94.5
	556	26	118.0	19.2	99.0	12"	65'	92.5
	557	25	121.2	16.0	104.6	12"	75'	92.1
	558	23	122.8	14.9	107.0	30"	59'	92.6
	559	23	116.4	16.2	100.0	12"	59'	93.5
	560	22	116.2	14.8	101.5	12"	54'	95.0
	561	18	120.6	15.7	104.1	30"	46'	91.4
	562	18	121.0	14.8	103.0	12"	46'	90.8
2/20	563	46	120.0	17.5	102.0	8"	Nat.	88.3 **
	564	47	120.8	14.7	105.2	6"	"	87.8 **
	565	48	115.2	13.6	102.4	8"	"	85.4 **
	566	49	123.0	19.0	103.2	6"	"	89.5 **
	567	50	114.4	17.4	97.5	4"	"	86.0 **
	568	17	112.0	15.2	97.1	4"	"	85.6 **
	569	16	118.8	20.2	98.6	6"	"	86.9 **
	570	15	121.2	20.6	100.7	4"	"	87.1 **
	571	14	122.2	18.3	103.2	6"	"	89.4 **
	572	13	117.4	20.2	99.1	4"	"	85.7 **
2/21	573	12	120.0	20.2	100.1	4"	"	86.8 **
	574	11	115.6	20.8	96.7	6"	"	85.2 **
	575	10	116.0	18.7	97.9	4"	"	86.2 **
	576	9	111.3	19.2	93.7	8"	"	87.5 **
	577	8	118.4	18.2	101.0	6"	"	88.6 **
	578	7	120.2	17.4	102.4	4"	"	85.4 **

* Denotes areas of low compaction which were reworked and recompactd.

** Denotes test taken in the natural where a relative compaction of 85% or better is acceptable.

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

FOR

L.D. LAMB
721 NEPTUNE
ANAHEIM, CALIFORNIA

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

OCTOBER 2, 1963
FILE NO. 63 - 350

- SOILS ENGINEERING
- FOUNDATION INVESTIGATIONS

H. V. LAWMASTER & CO.

TESTING & INSPECTION ENGINEERS

- ENGINEERING GEOLOGY
- ASPHALT ENGINEERING

7940 MAIN STREET

P. O. BOX 246-
STANTON, CALIFORNIA

AREA CODE 714
TEL. 828-8040

October 2, 1963

L.D. Lamb
721 Neptune
Anaheim, California

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.

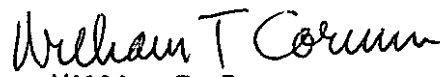
This investigation was planned and carried out in accordance with plans and information submitted to this office by Huntington Engineering Corp. of Huntington Beach and in accordance with sound engineering practice.

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

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 chabon 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

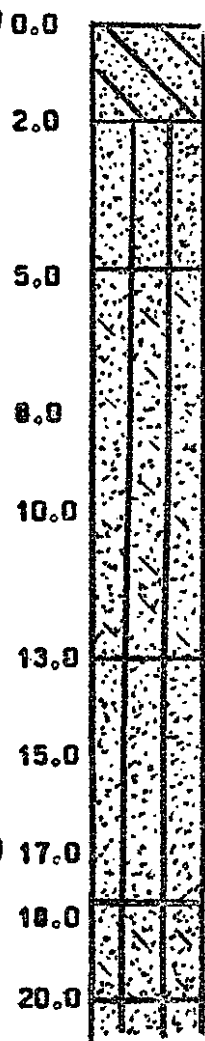
The results of the Consolidation Tests are presented graphically as Plates G thru I of this report.

Direct Shear Tests

<u>Sample</u>	<u>ϕ 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	116.8	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

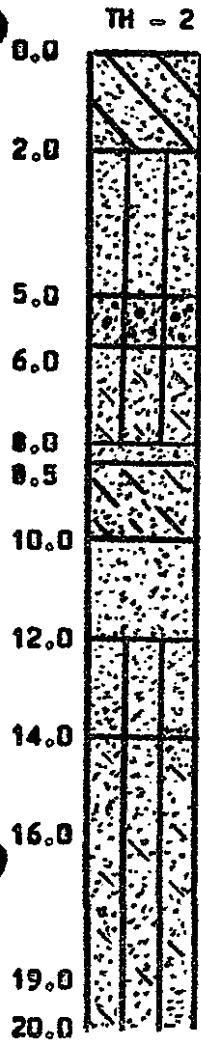
TH - 1



Scale 1" = 4'

TEST BORING LOG		
Soil Classification	% Moisture	Dry Density P.C.F.
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



<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

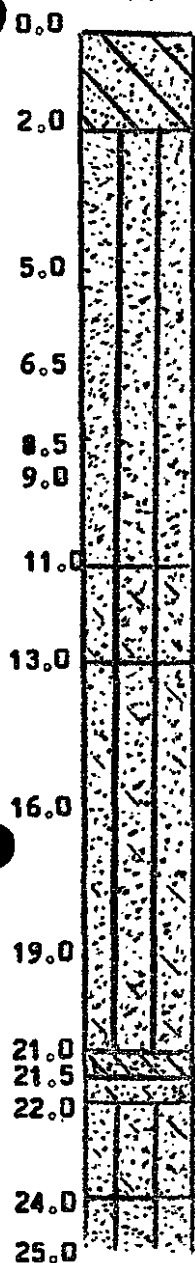
TEST BORING LOG

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	10.3
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	5.8	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

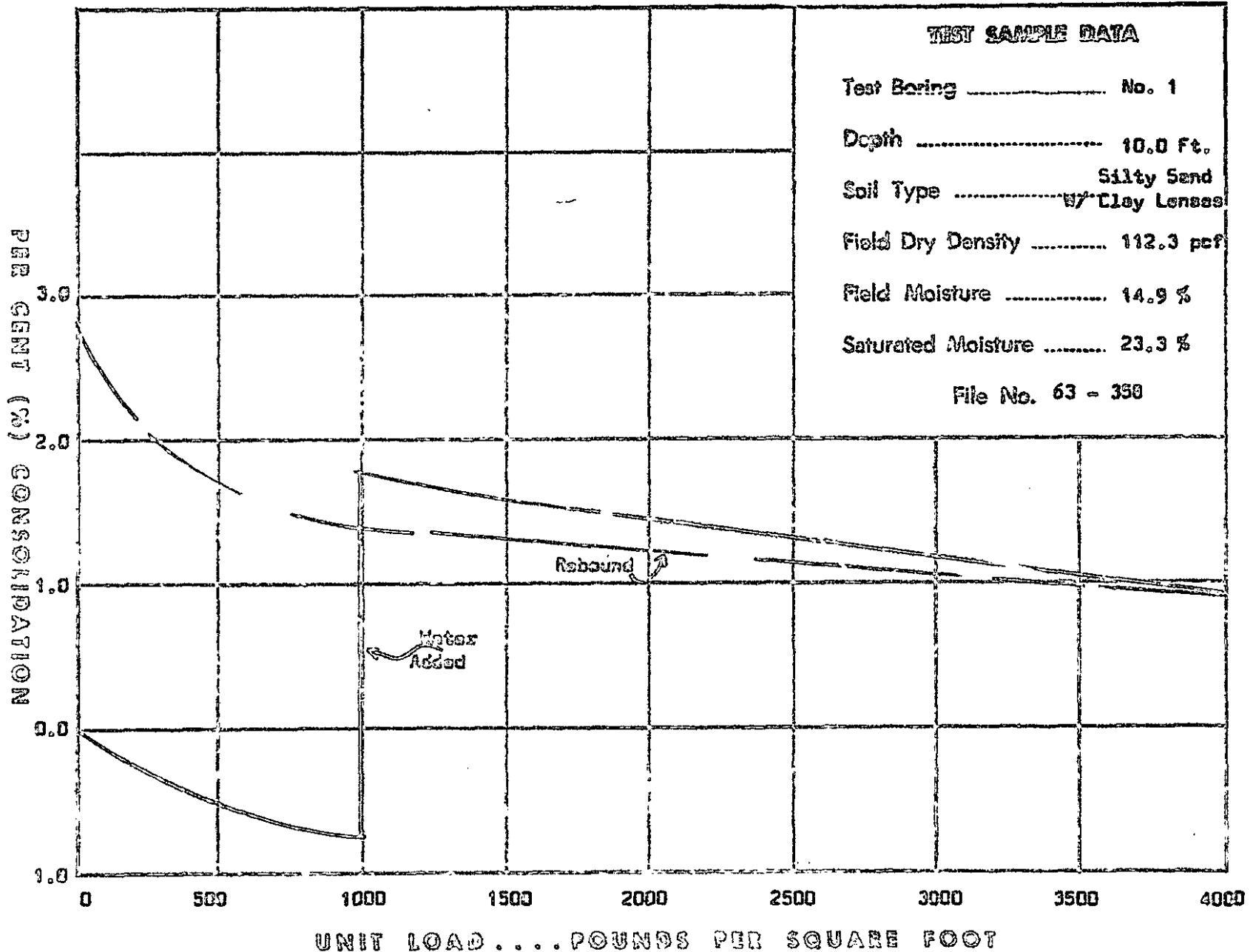
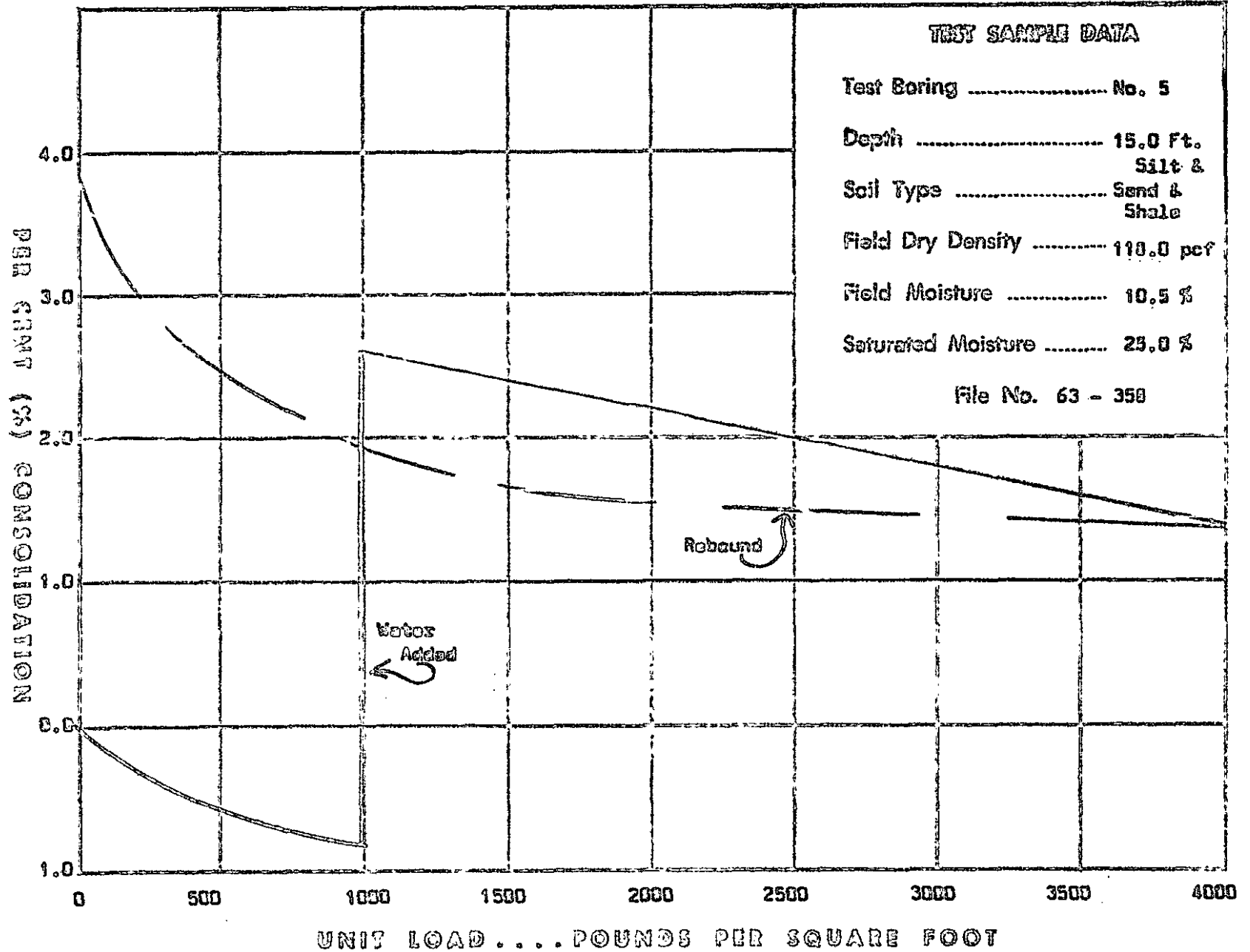


PLATE 100

H. V. LAWMASTER & CO.

CONSOLIDATION TEST



CONSOLIDATION TEST

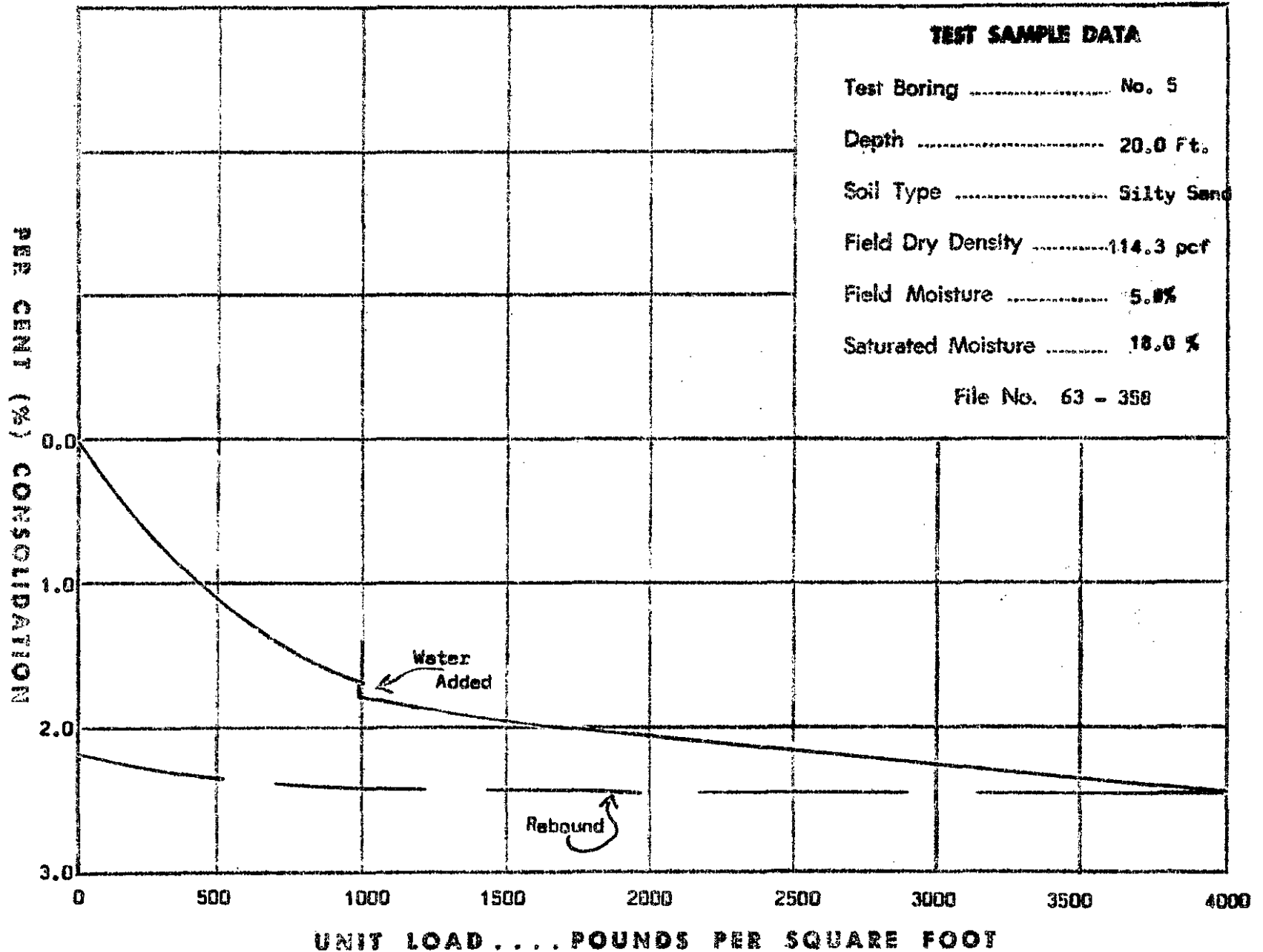


PLATE #10

H. W. LAWMASTER & CO.