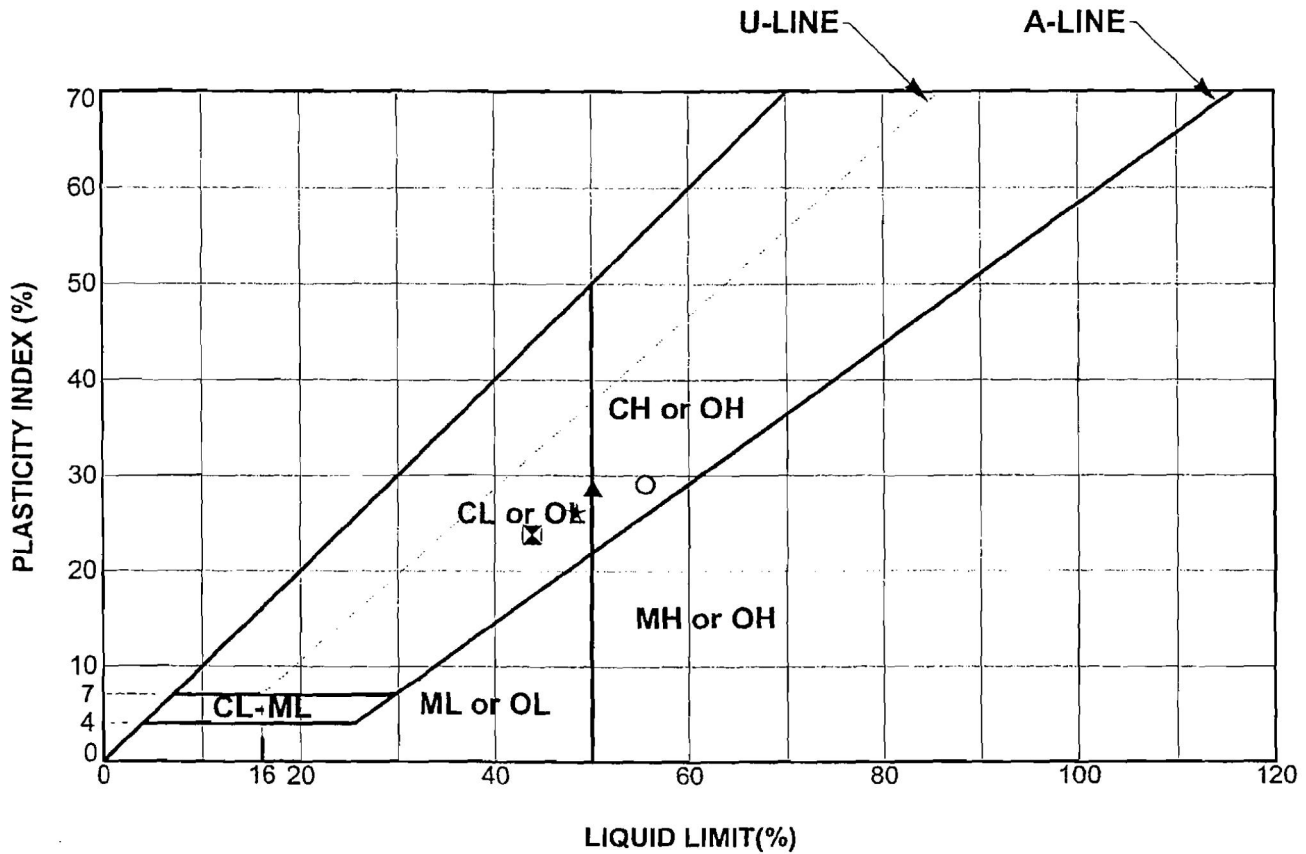
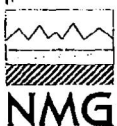


DOCKETED	
Docket Number:	24-OPT-02
Project Title:	Compass Energy Storage Project
TN #:	264557
Document Title:	Geotechnical Evaluation Report (TN #255561-6) References Part 2_8 of 9
Description:	N/A
Filer:	Erin Phillips
Organization:	Dudek
Submitter Role:	Applicant Consultant
Submission Date:	7/2/2025 6:58:42 PM
Docketed Date:	7/2/2025

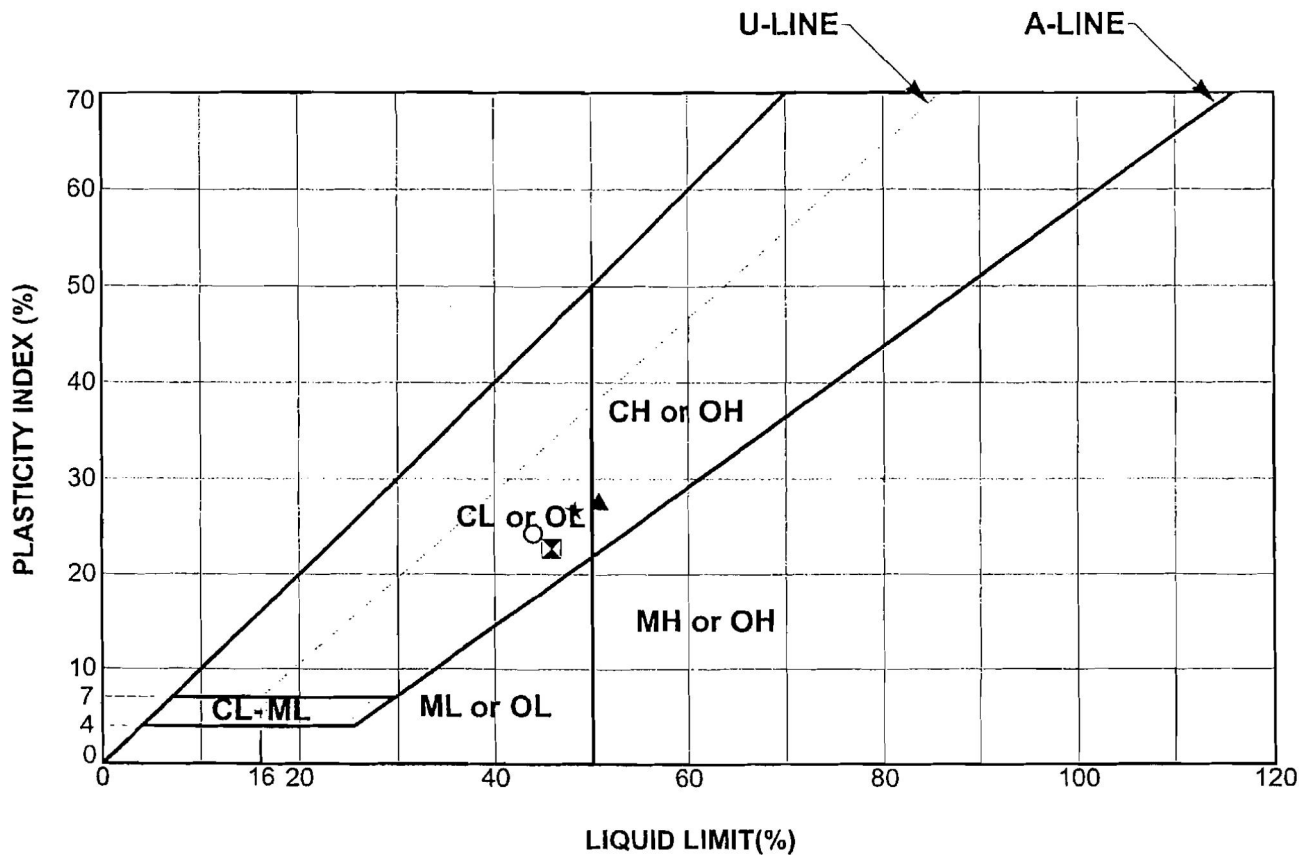


Symbol	Boring Number	Depth (feet)	Sample Number	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	B- 3	71.5	SB-3	98	56	30	CL	CLAY
⊠	H- 1	45.0	D-9	93	44	24	CL	Silty CLAY
▲	H- 1	50.0	D-10	96	50	29	CH	Silty CLAY
★	H- 1	60.0	D-12	92	48	26	CL	CLAY

PLASTICITY CHART
 CUSD/Rancho Capistrano
 San Juan Capistrano
 PROJECT NO. 01012-02



Geotechnical, Inc.



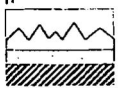
Symbol	Boring Number	Depth (feet)	Sample Number	Passing No. 200 Sieve (%)	LL	PI	USCS	Description
○	H- 2	10.0	D-2	91	44	24	CL	Silty CLAY
⊠	H- 2	15.0	D-3	93	46	23	CL	Silty CLAY
▲	H- 2	40.0	D-8	92	51	28	CH	CLAY
★	H- 2	45.0	D-9	85	48	26	CL	Silty CLAY

PLASTICITY CHART

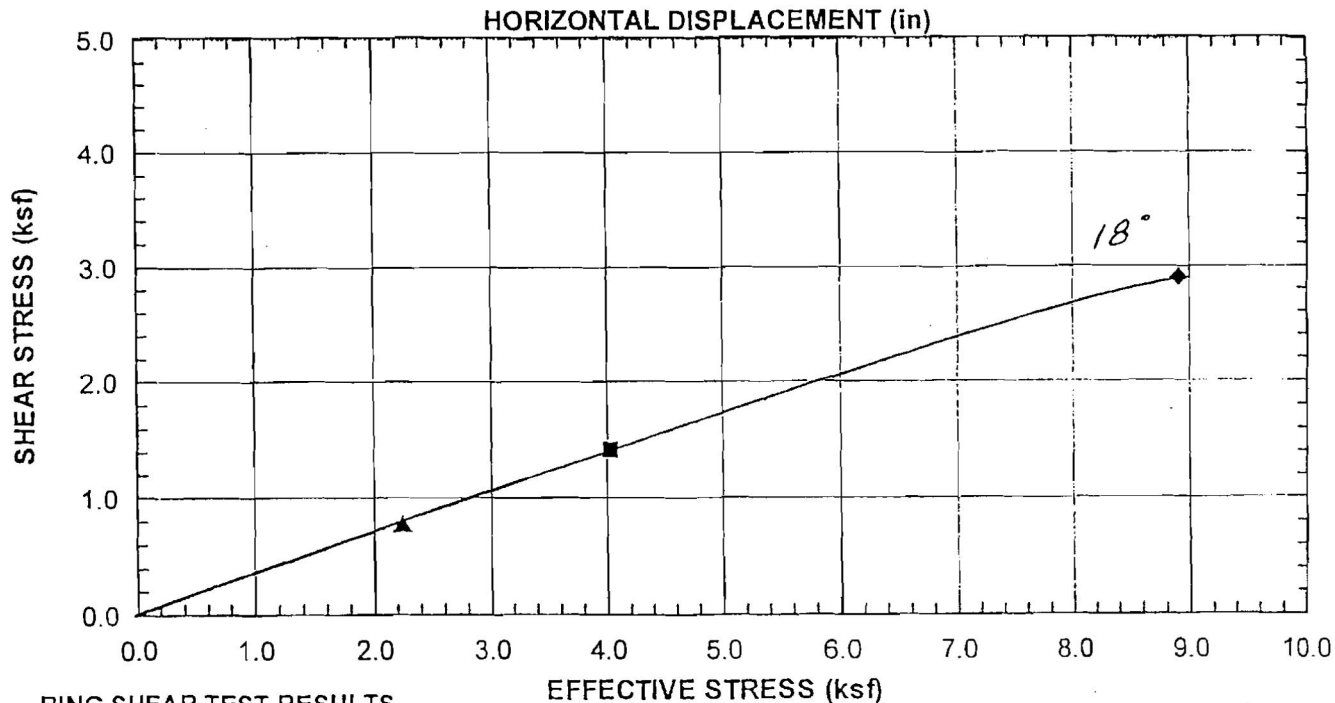
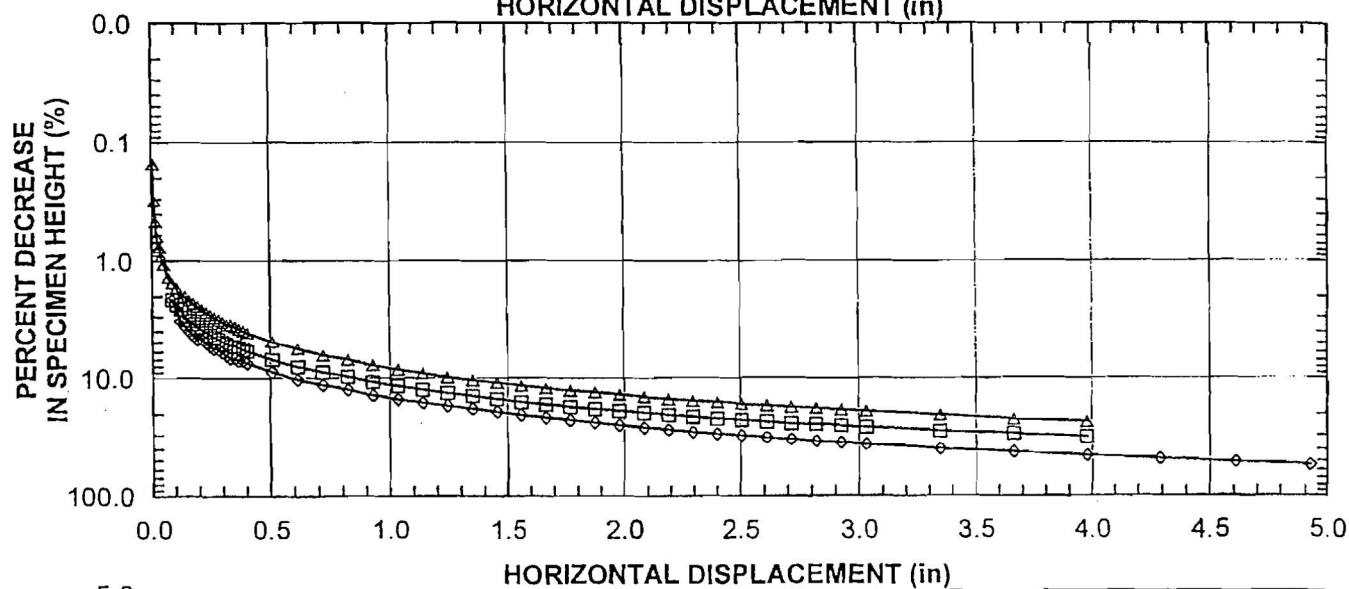
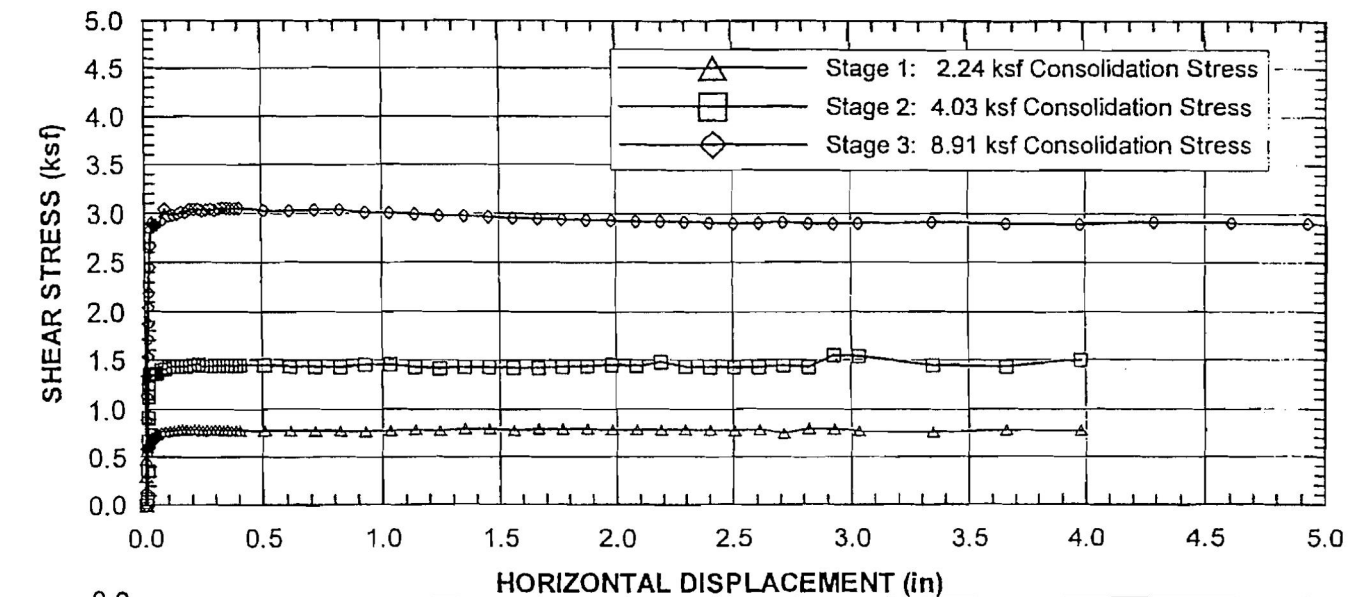
CUSD/Rancho Capistrano

San Juan Capistrano

PROJECT NO. 01012-02



NMG Geotechnical, Inc.



RING SHEAR TEST RESULTS

Project Name.: CUSD / Rancho Capistrano

Project Number: 01012-02

Exploration No.: B-3

Sample Number: SB-3 at 71.5 ft

Liquid Limit (%): 56

Clay Fraction (%):

Test Number: RS20005r

**Ninyo
Lab**

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488-93. Soil classifications are indicated on the logs of the exploratory excavations in Appendix A.

Moisture Content

The moisture content of samples obtained from the exploratory excavations was evaluated in accordance with ASTM D 2216-92. The test results are presented on the logs of the exploratory excavations in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory excavations were evaluated in general accordance with ASTM D 2937-94. The test results are presented on the logs of the exploratory excavations in Appendix A.

Direct Shear Tests

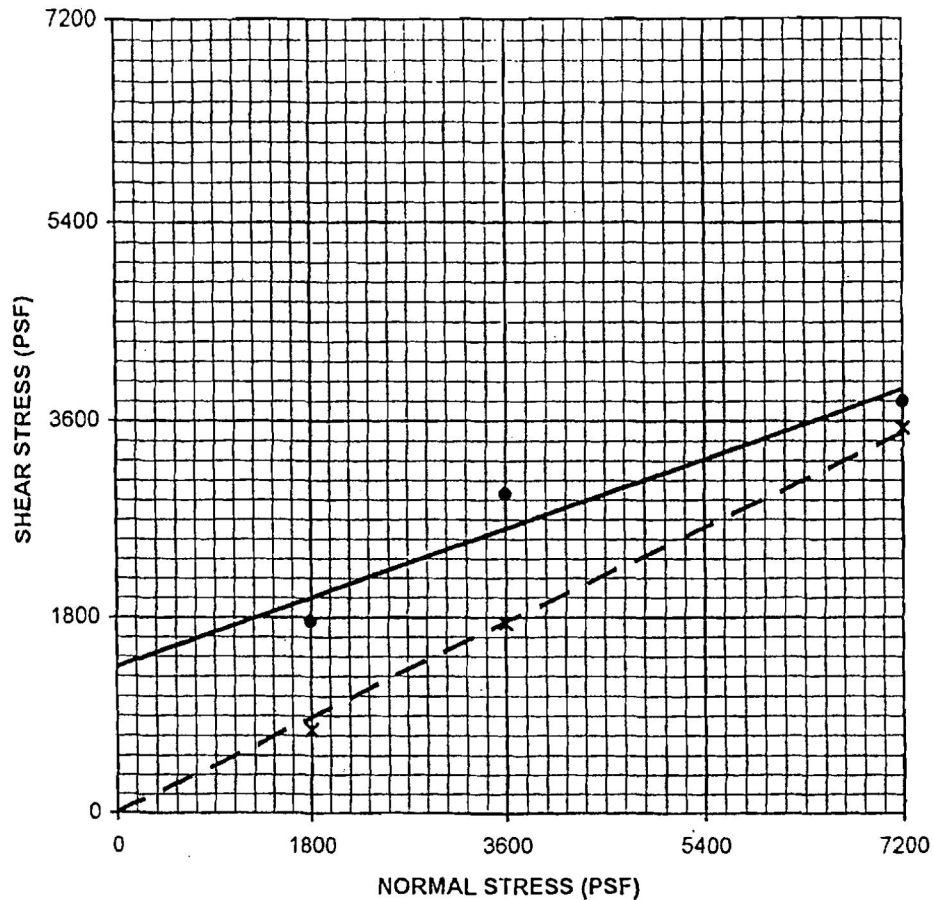
Direct shear tests were performed on undisturbed samples in general accordance with ASTM D 3080-90 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figures B-1 through B-7.

Expansion Index Tests

The expansion index of selected materials was evaluated in general accordance with U.B.C. Standard No. 18-2. Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The results of this test are presented on Figure B-8.

Soil Corrosivity Tests

Soil pH, and minimum resistivity tests were performed on representative samples in general accordance with California Test (CT) 643. The chloride content of selected samples was evaluated in general accordance with CT 422. The sulfate content of selected samples was evaluated in general accordance with CT 417. The test results are presented on Figure B-9.



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle	Soil Type
CLAYSTONE	•	B-1	30.0-31.5	Peak	1350	19	CAPISTRANO FM.
CLAYSTONE	x	B-1	30.0-31.5	Ultimate	0	25	CAPISTRANO FM.

Ninyo & Moore

DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

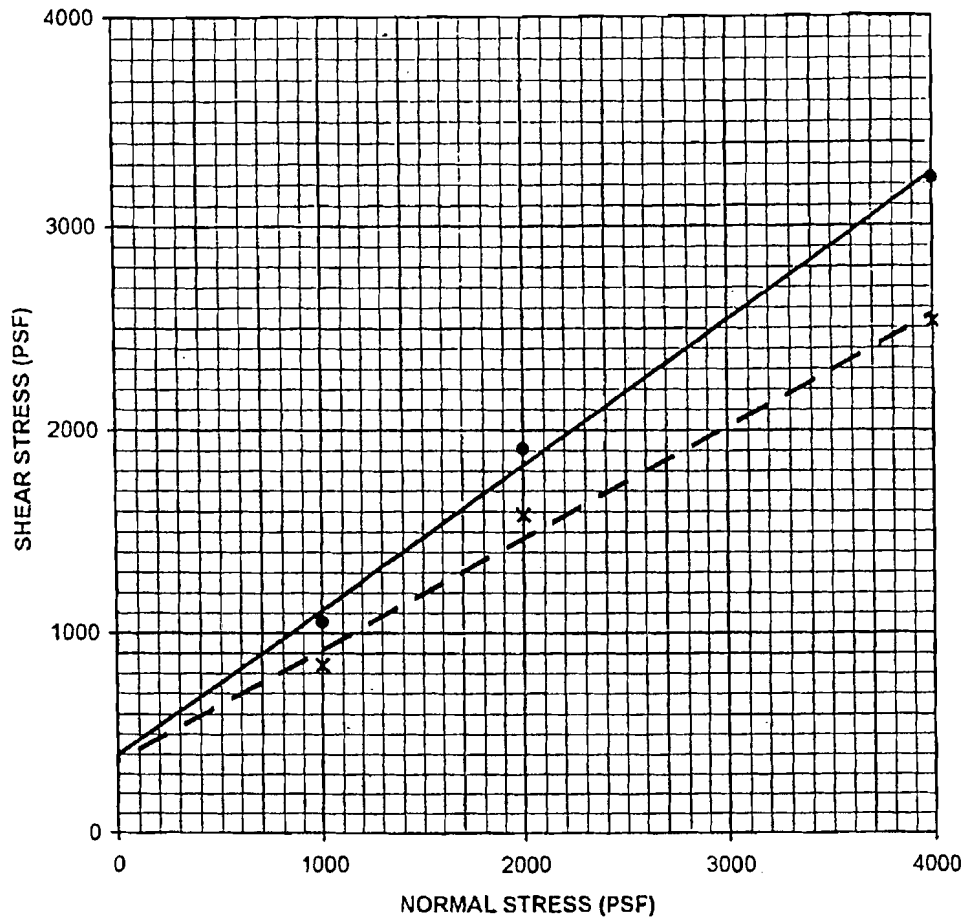
201885-01

DATE

6/00

FIGURE

B-1



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (deg)	Soil Type
Poorly graded SAND	●	B-2	15.0-16.5	Peak	400	35	SP
Poorly graded SAND	x	B-2	15.0-16.5	Ultimate	350	28	SP

Ninyo & Moore

DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

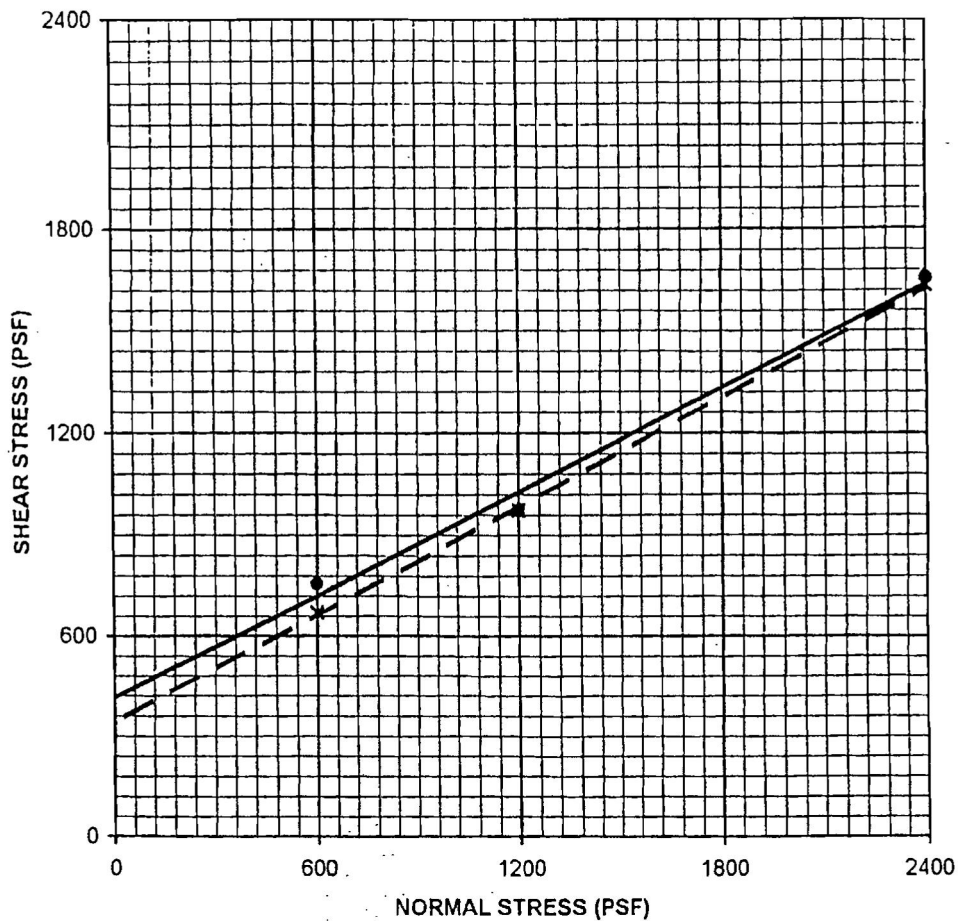
201885-01

DATE

6/00

FIGURE

B-2



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (deg)	Soil Type
Fine Sandy CLAY	•	B-3	10.0-11.5	Peak	400	26	CL
Fine Sandy CLAY	x	B-3	10.0-11.5	Ultimate	350	27	CL

Ninyo & Moore

DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

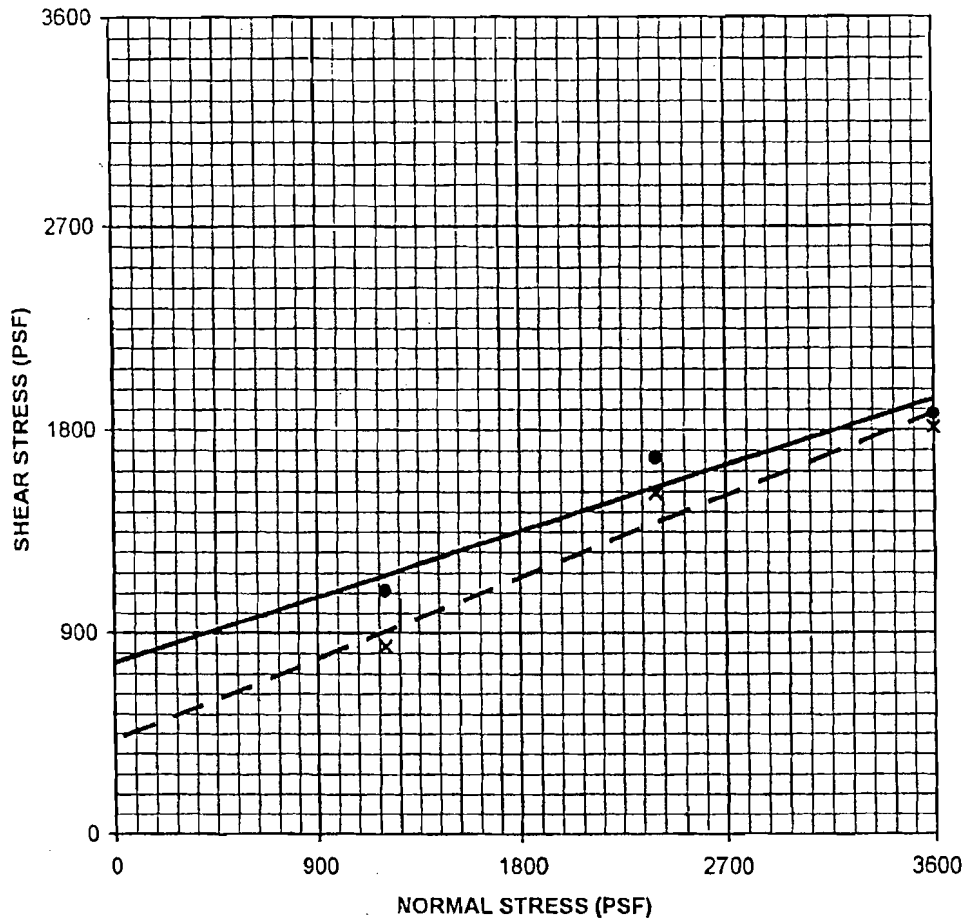
201885-01

DATE

6/00

FIGURE

B-3



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (deg)	Soil Type
CLAY	•	B-3	20.0-21.5	Peak	770	18	CL
CLAY	x	B-3	20.0-21.5	Ultimate	420	22	CL

Ningo & Moore

DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

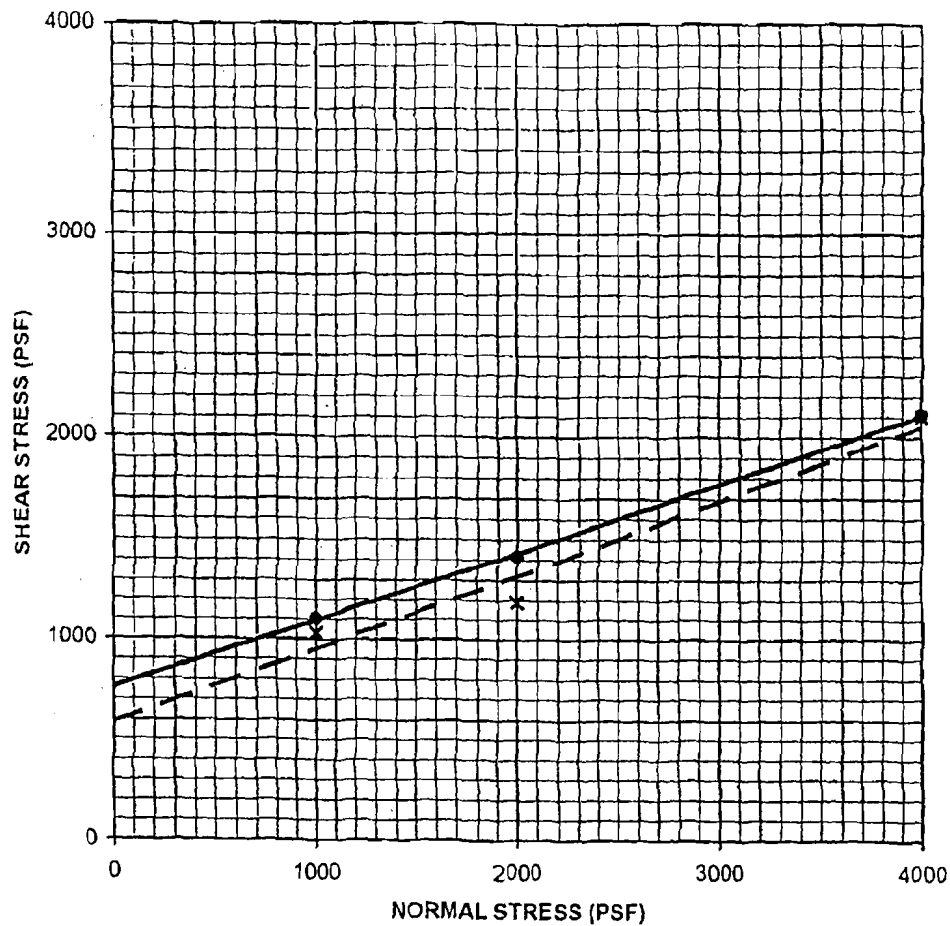
201885-01

DATE

6/00

FIGURE

B-4



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (deg)	Soil Type
CLAY	•	B-4	15.0-16.5	Peak	750	18	CL
CLAY	x	B-4	15.0-16.5	Ultimate	600	19	CL

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DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

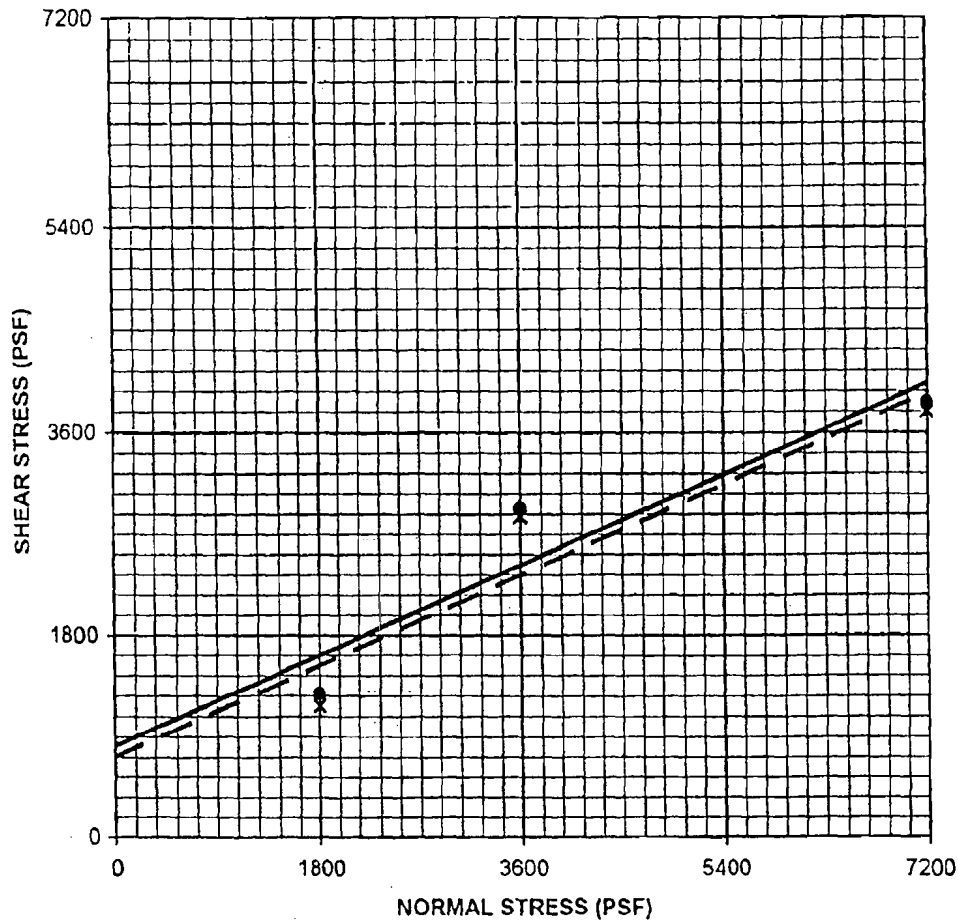
201885-01

DATE

6/00

FIGURE

B-5



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (deg)	Soil Type
Silty CLAY	●	B-4	25.0-26.5	Peak	800	24	CL
Silty CLAY	x	B-4	25.0-26.5	Ultimate	700	24	CL

Ninyo & Moore

DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

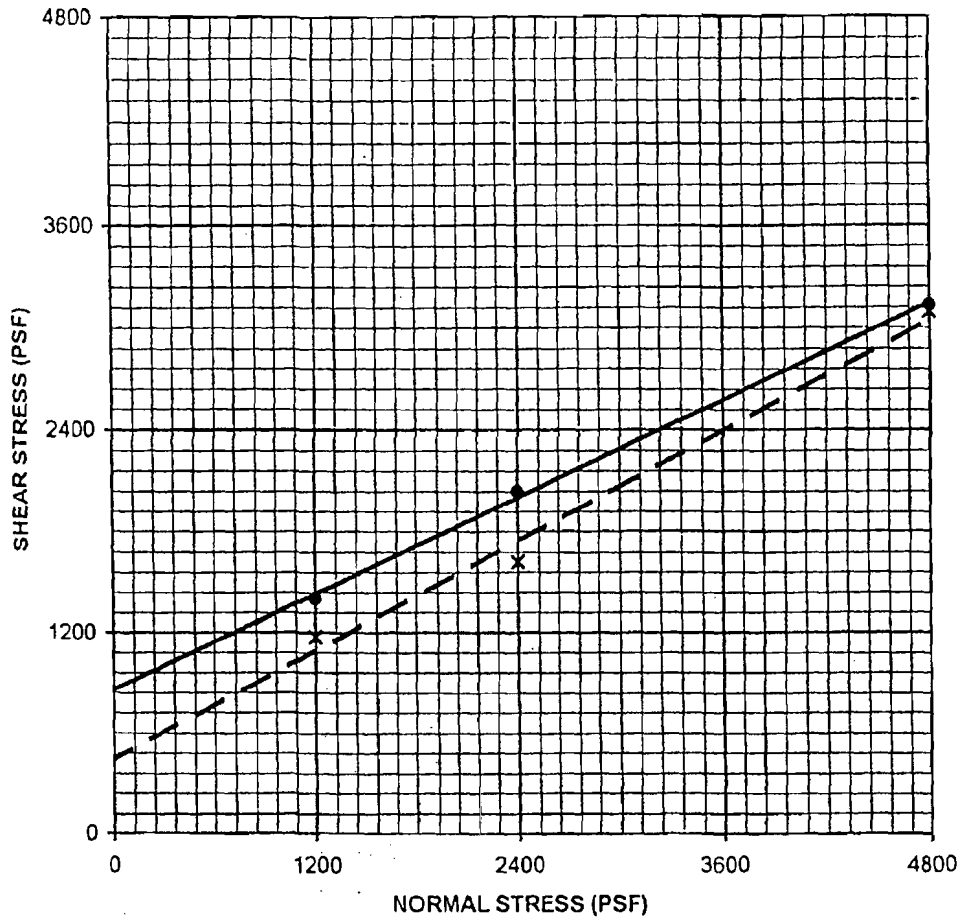
201885-01

DATE

6/00

FIGURE

B-6



Description	Symbol	Boring Number	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (deg)	Soil Type
Clayey SAND	•	B-5	20.0-21.5	Peak	850	24	SC
Clayey SAND	x	B-5	20.0-21.5	Ultimate	450	28	SC

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DIRECT SHEAR TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

201885-01

DATE

6/00

FIGURE

B-7

EXPANSION INDEX TEST RESULTS

SAMPLE LOCATION	SAMPLE DEPTH (FT)	INITIAL MOISTURE (%)	COMPACTED DRY DENSITY (PCF)	FINAL MOISTURE (%)	VOLUMETRIC SWELL (IN)	EXPANSION INDEX	EXPANSION POTENTIAL
B-2	39.0-42.0	17.0	86.7	40.0	0.1013	101	High
B-3	12.0-15.0	8.6	112.9	18.4	0.0366	37	Low

PERFORMED IN GENERAL ACCORDANCE WITH UBC STANDARD 18-2

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EXPANSION INDEX TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

201885-01

DATE

6/00

FIGURE

B-8

CORROSIVITY TEST RESULTS

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH *	RESISTIVITY * (ohm-cm)	WATER-SOLUBLE SULFATE CONTENT IN SOIL ** (ppm)	CHLORIDE CONTENT *** (ppm)
B-2	39.0-42.0	7.0	365	1,860	110
B-3	23.0-26.0	8.0	630	130	95

* PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643

** PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417

*** PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

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CORROSIVITY TEST RESULTS

OSO CREEK CHANNEL
OCTA METROLINK MILE POST 195
SAN JUAN CAPISTRANO, CALIFORNIA

PROJECT NO.

201885-01

DATE

6/00

FIGURE

B-9

**EJN
Lab**

LABORATORY TESTING PROCEDURES

Moisture/Density

The field density of the soils were determined by split barrel sampling. The sampler was equipped with 2 1/2 inch brass liner rings and was driven with a 140 pound weight. The weight was dropped in a free fall 30 inches and the number of blow counts (N) is recorded for 16 inches of penetration. Where cohesive soils contained sufficient moisture, the sampler was pushed into the soils by hydrolics.

Settlement

The settlement characteristics of the in situ soil are determined by performing standard consolidation tests on undisturbed specimens. The samples are tested in the original sample liner ring and the increment loads for consolidation are applied for periods of 24 hours by means of a single counter-balanced lever system. The pressure settlement curves are shown on the attached plates.

Shear Strength

The shear strength of the soil is determined by performing direct shear tests and unconfined compression tests.

The direct shear tests are performed on both undisturbed specimens and on samples remolded to 90 percent of ASTM: D-1575-70. The samples are either tested at in situ moisture or are saturated to simulate the worst field condition and sheared at a constant rate of 0.1 inches per minute. The relationship between normal stress and shear stress is shown on the attached Direct Shear Summary.

The unconfined shear strength of selected undisturbed specimens is determined in accordance with ASTM: D-2162-66T. These tests are performed at the existing moisture content. The results of these tests are shown on the Boring Logs.

Expansion

The expansive potential was determined in accordance with the American Society of Civil Engineers Expansive Index Test.

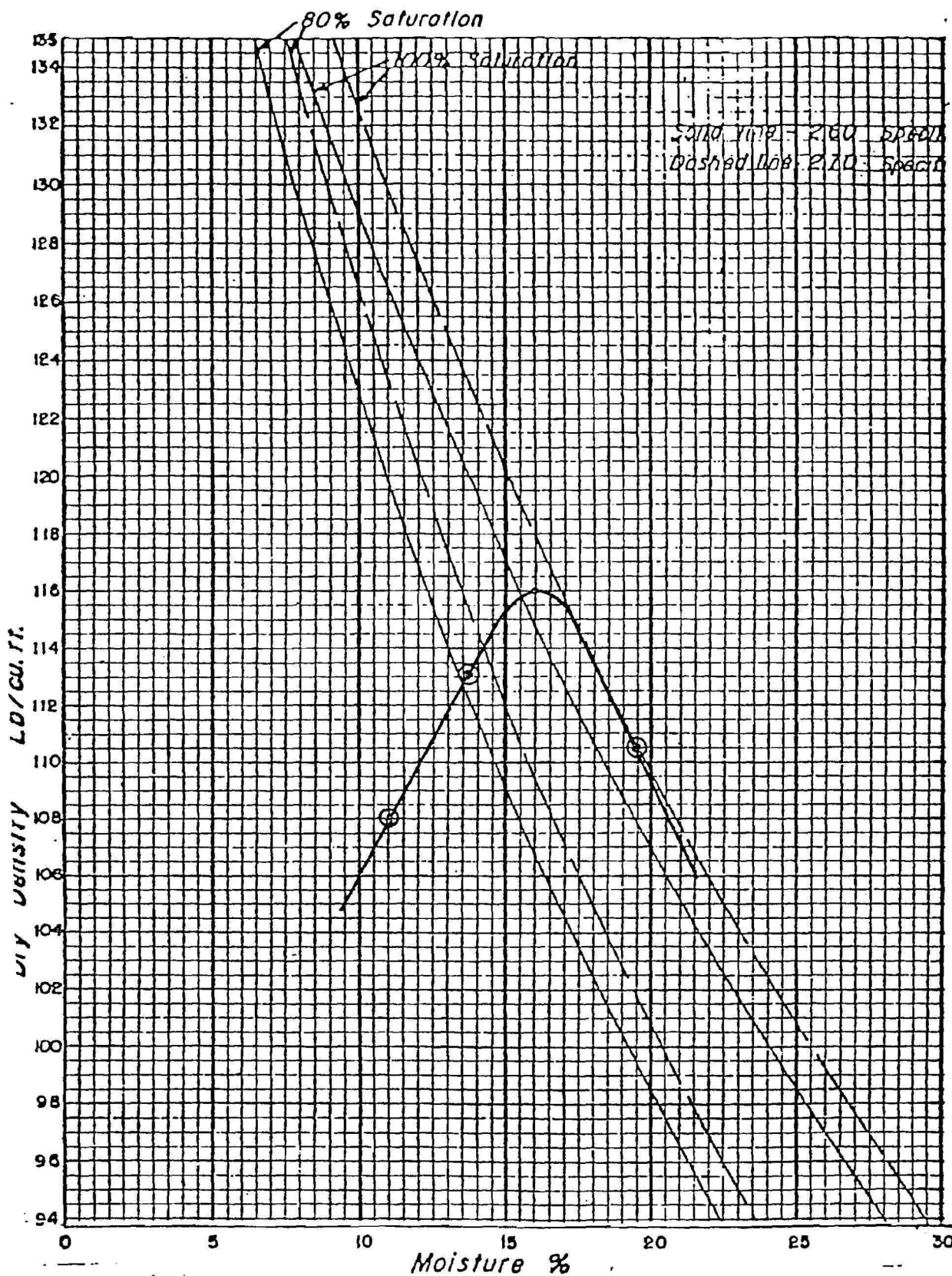
Samples are remolded at 49% to 51% saturation using a specified gravity of 2.7. A total load of 12.23 pounds is applied to the sample and allowed to consolidate for 10 minutes. The sample is then saturated with distilled water and allowed to swell for a minimum of 24 hours.

Sand Equivalent

The sand equivalent of granular soils and fine aggregates is determined in accordance with ASTM: D-2449-74. Three representative samples of the soils are tested and final sand equivalent is computed as the average of the three individual sand equivalents.

Soluble Sulfate Content

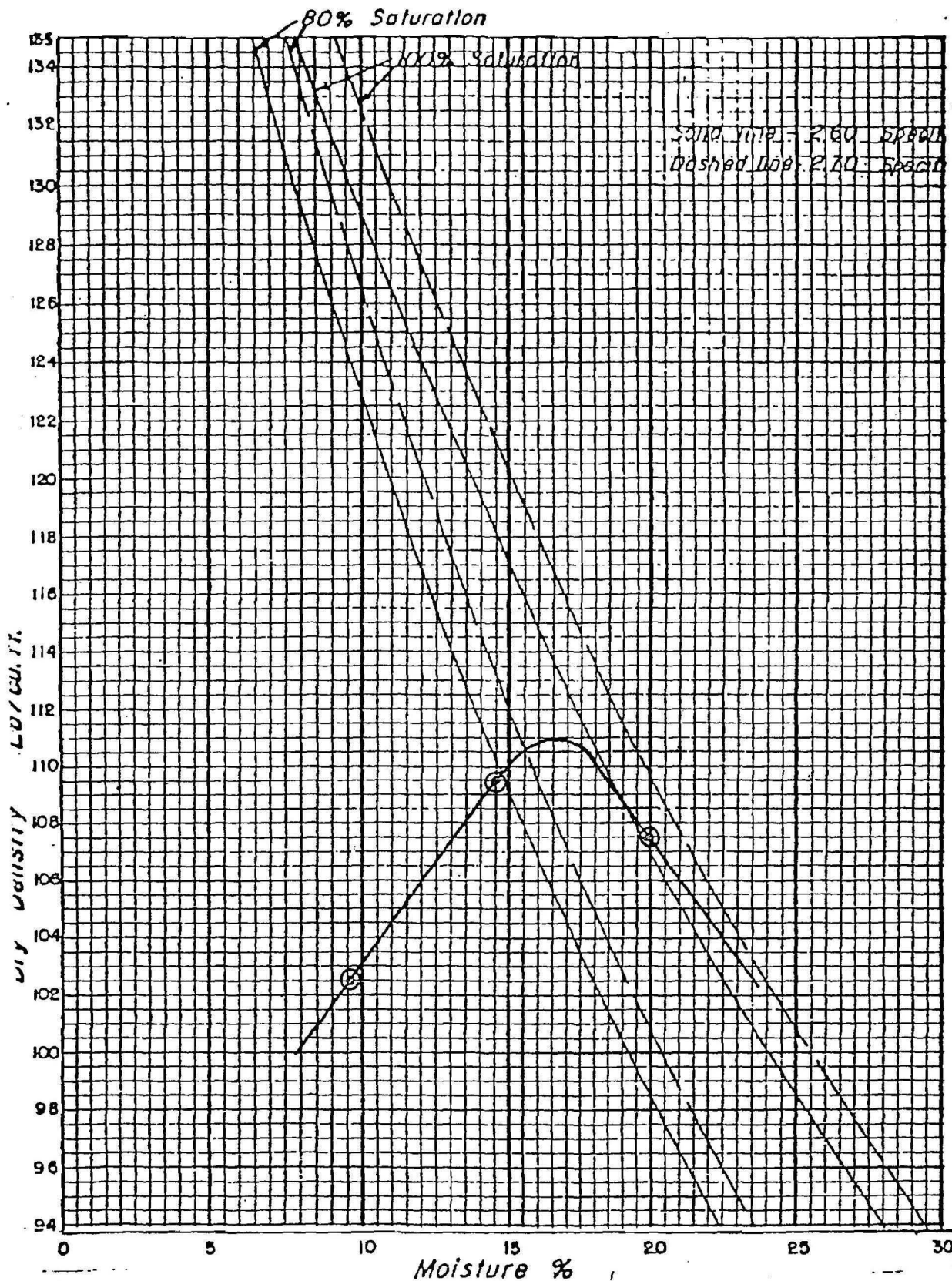
The concentration of soluble sulfates in the soils is determined by measuring the optical density of a barium sulfate precipitate. The precipitate results from a reaction of barium chloride with water extractions from the soil samples. The measured optical density is correlated with a calibration curve obtained from readings on precipitates of known sulfate concentrations.



JOB NO. B2-100-1 BORING NO. AND DEPTH B-1 @ 1' SAMPLE DESCRIPTION SOIL TYPE I

MAXIMUM DENSITY 116.0 OPTIMUM MOISTURE 16.0%

E.J.N. & ASSOCIATES INC.

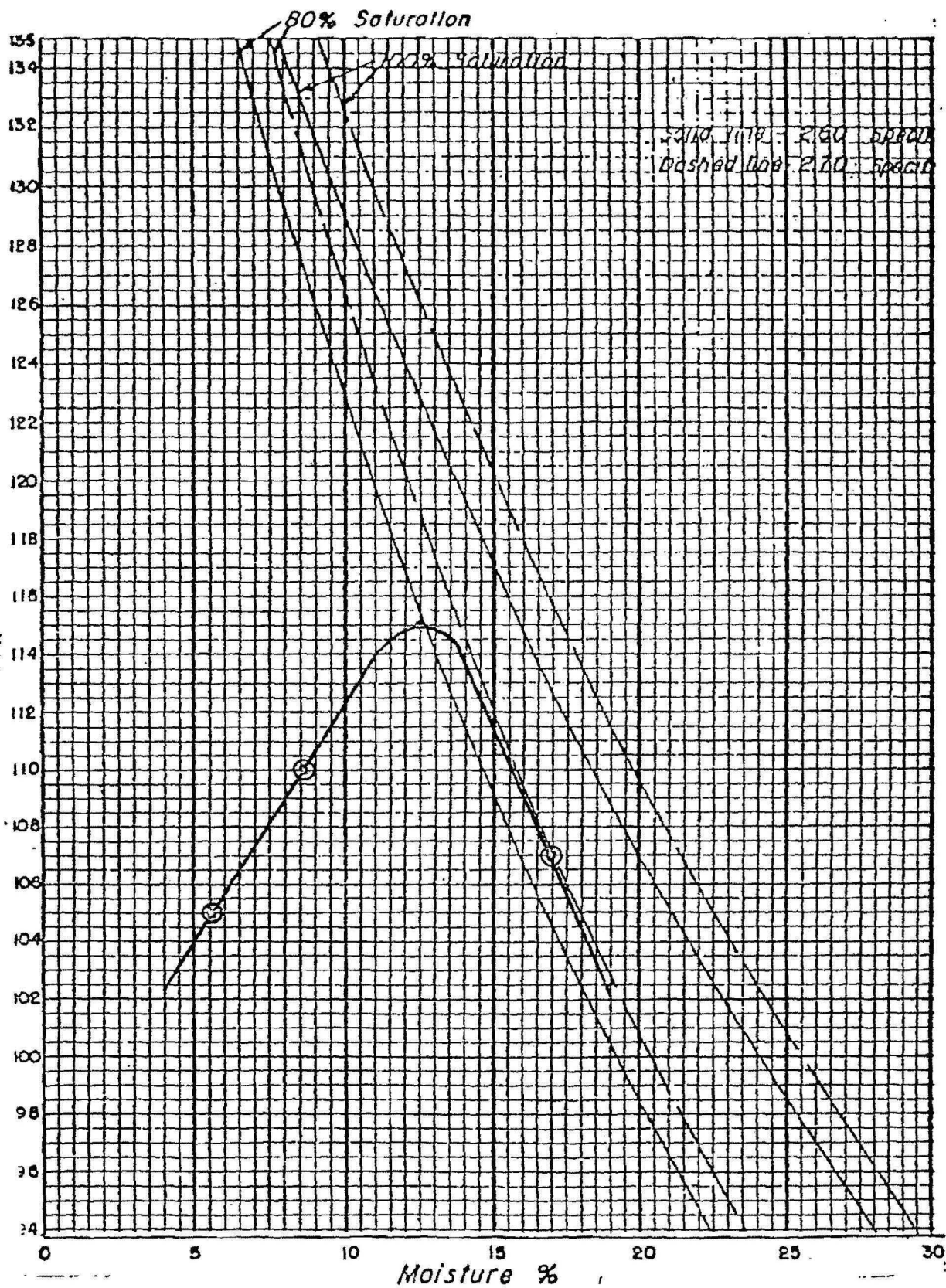


MAXIMUM DENSITY 111.0 OPTIMUM MOISTURE 17.0%

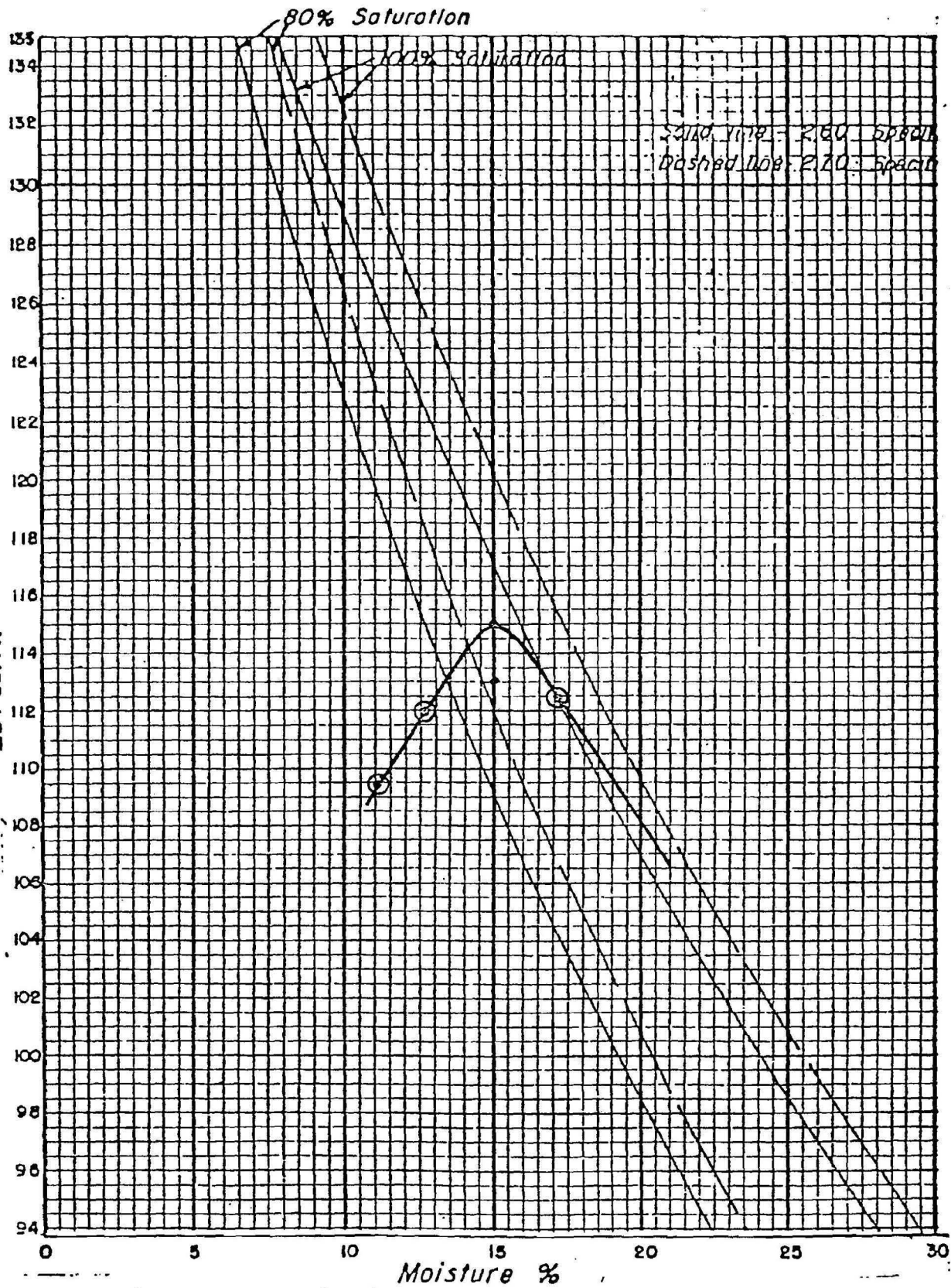
JOB NO. B2-100-1 BORING NO. AND DEPTH B-2 @ 10' SAMPLE DESCRIPTION

SOIL TYPE II

E.J.N. & ASSOCIATES INC.

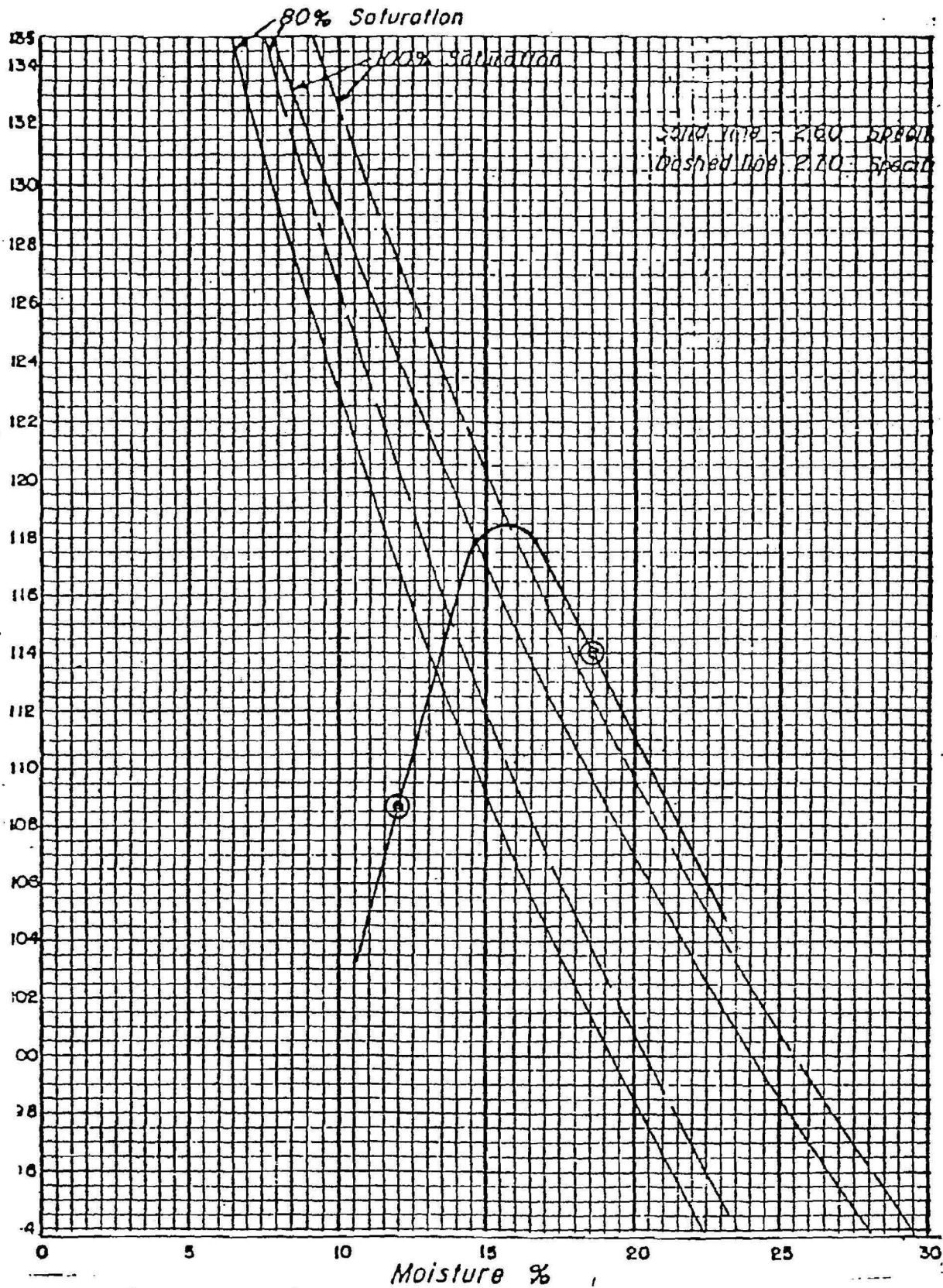


E.J.N. & ASSOCIATES INC.



JOB NO. 82-100-1 BORING NO. AND DEPTH B-5 C 6' SAMPLE DESCRIPTION II SOIL TYPE 15.02

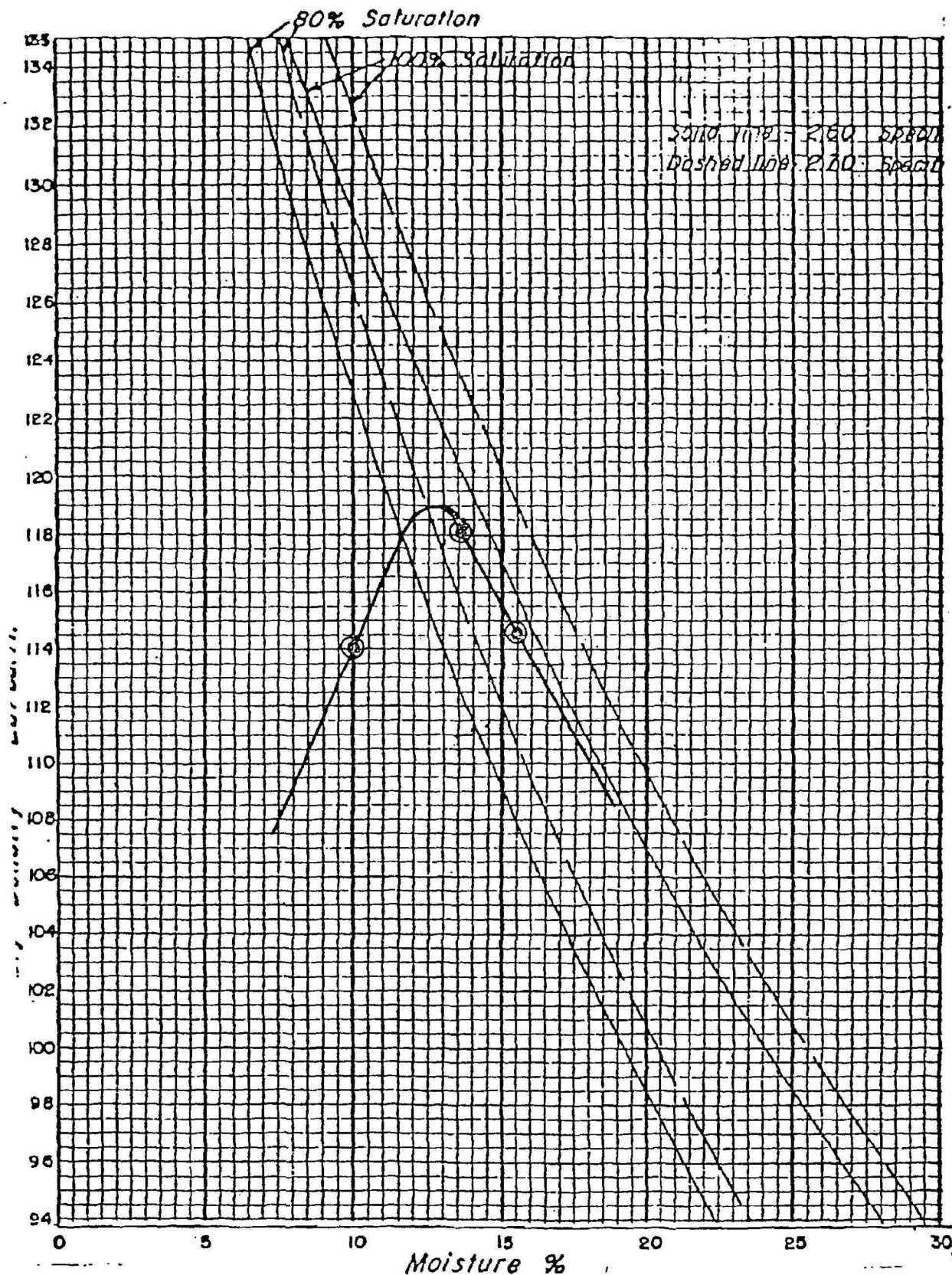
E.J.N. & ASSOCIATES INC.



MAXIMUM DENSITY 118.5 OPTIMUM MOISTURE 15.5%

JOB NO. B2-100-1 BORING NO. AND DEPTH B-6 @ 1' SAMPLE DESCRIPTION SOIL TYPE IV

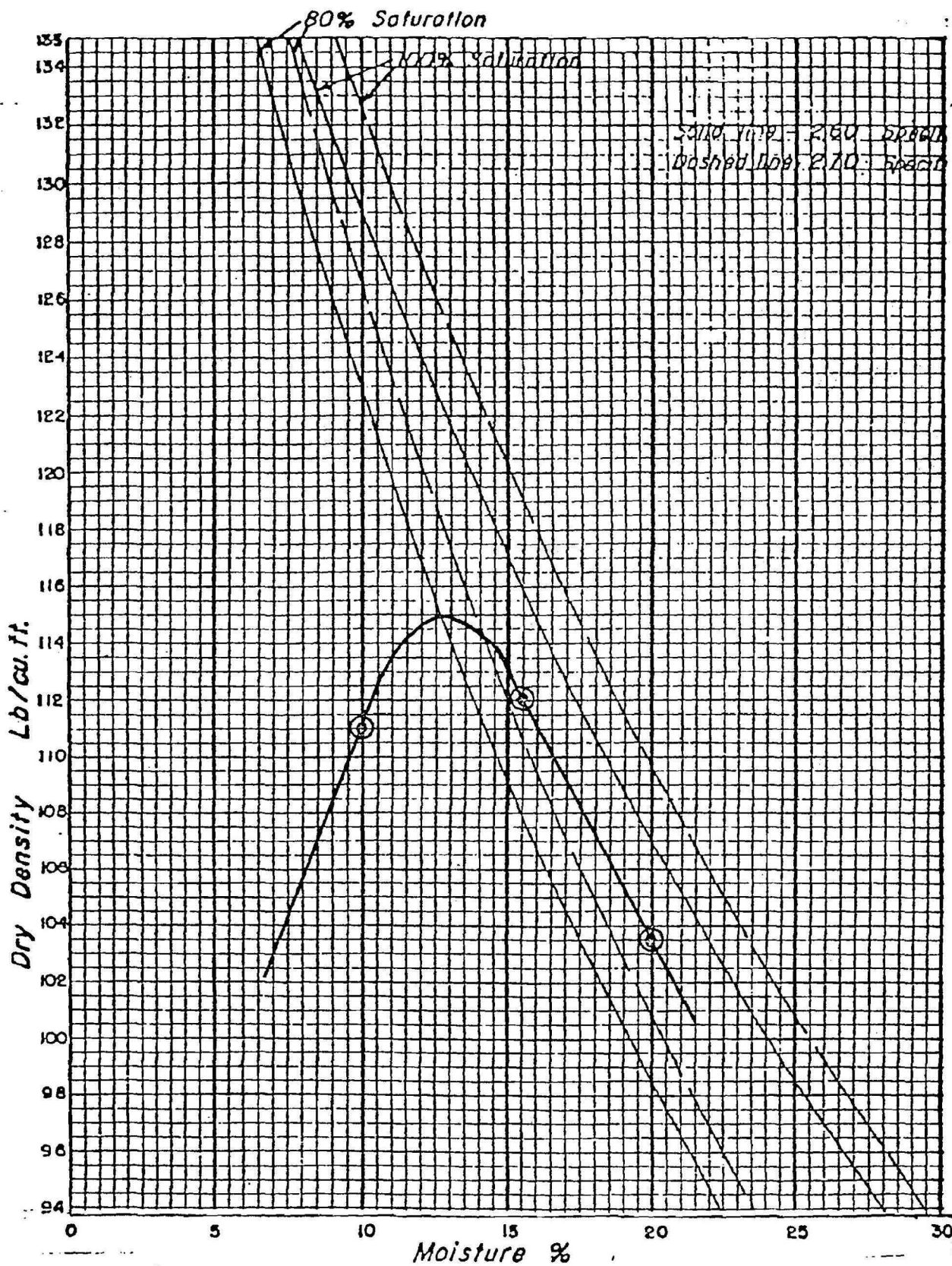
E.J.N. & ASSOCIATES INC.



JOB NO. B2-100-1 BORING NO. AND DEPTH B-6 @ 6' SAMPLE DESCRIPTION VI SOIL TYPE CLAY

MAXIMUM DENSITY 119.0 OPTIMUM MOISTURE 12.5%

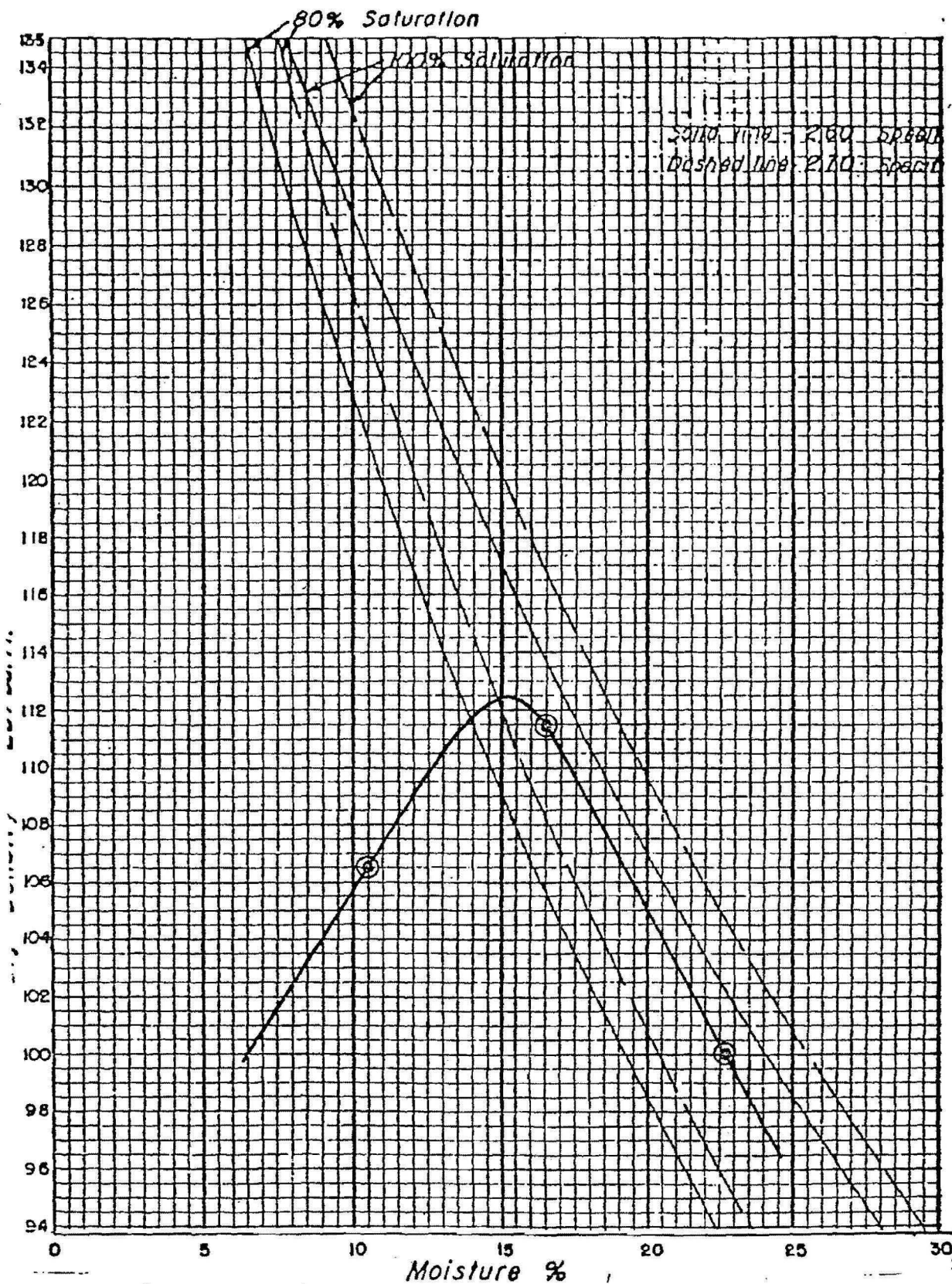
E.J.N. & ASSOCIATES INC.



JOB NO. 82-100-1 BORING NO. AND DEPTH B-6 @ 12.5' SAMPLE DESCRIPTION Soil Type VII

MAXIMUM DENSITY 115.0 OPTIMUM MOISTURE 12.5%

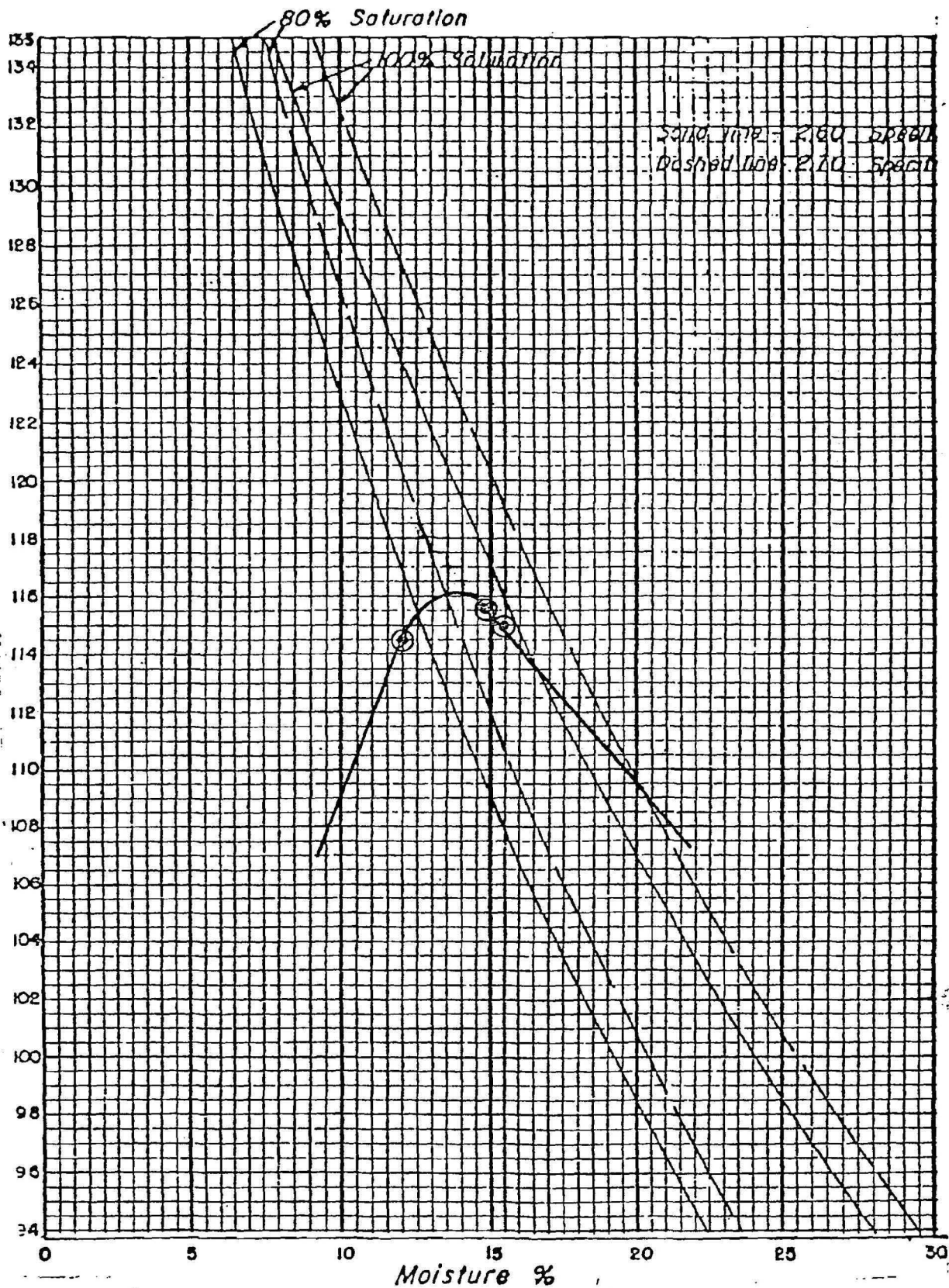
E.J.N. & ASSOCIATES INC.



JOB NO. B2-100-1 BORING NO. AND DEPTH B-7 @ 13' SAMPLE DESCRIPTION VIII SOIL TYPE VIII

MAXIMUM DENSITY 112.5 OPTIMUM MOISTURE 15.0%

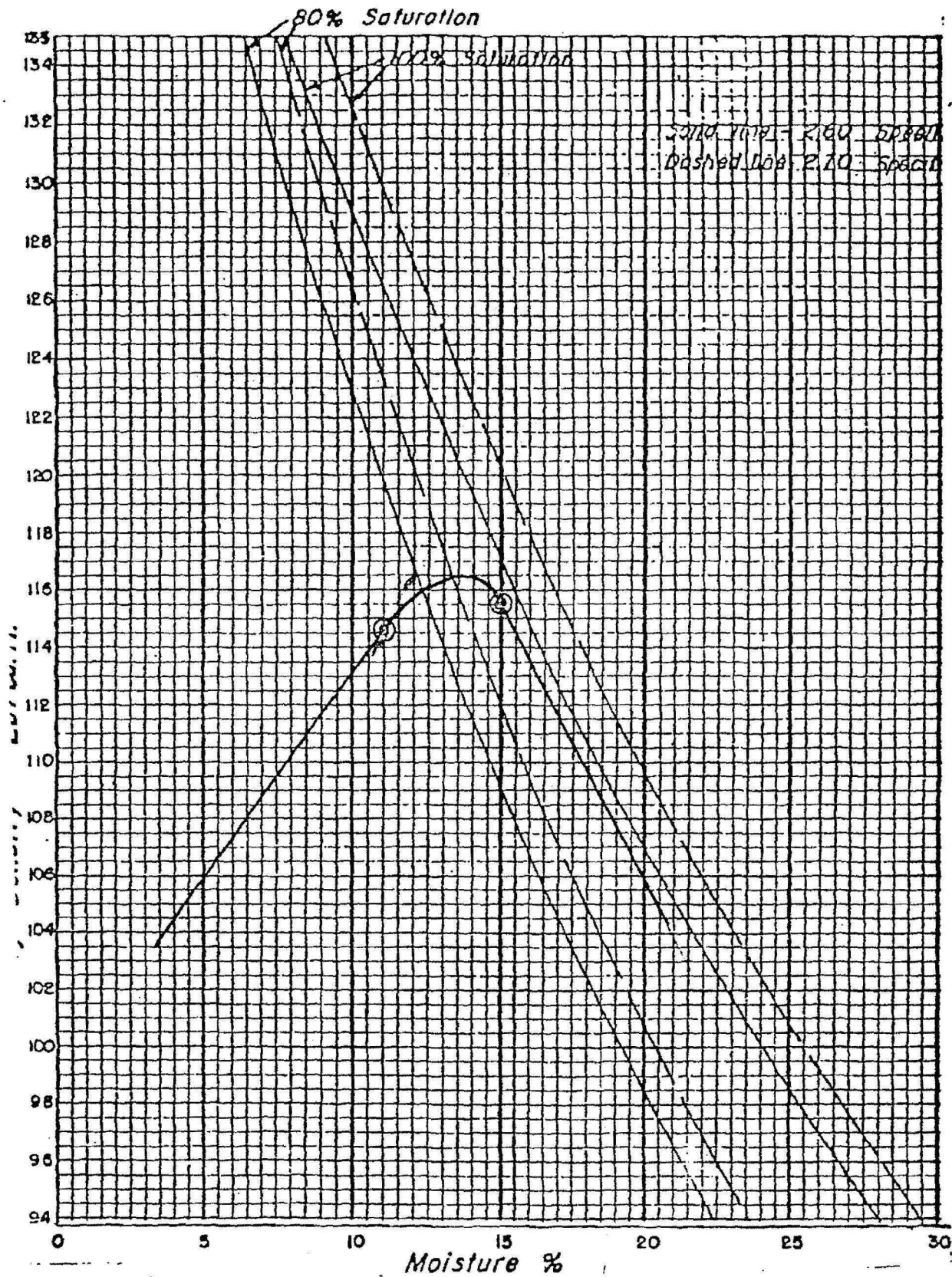
E.J.N. & ASSOCIATES INC.



JOB NO. B2-100-1 BORING NO. AND DEPTH B-10 @ 1' SAMPLE DESCRIPTION IX

MAXIMUM DENSITY 116.0 OPTIMUM MOISTURE 13.5% SOIL TYPE

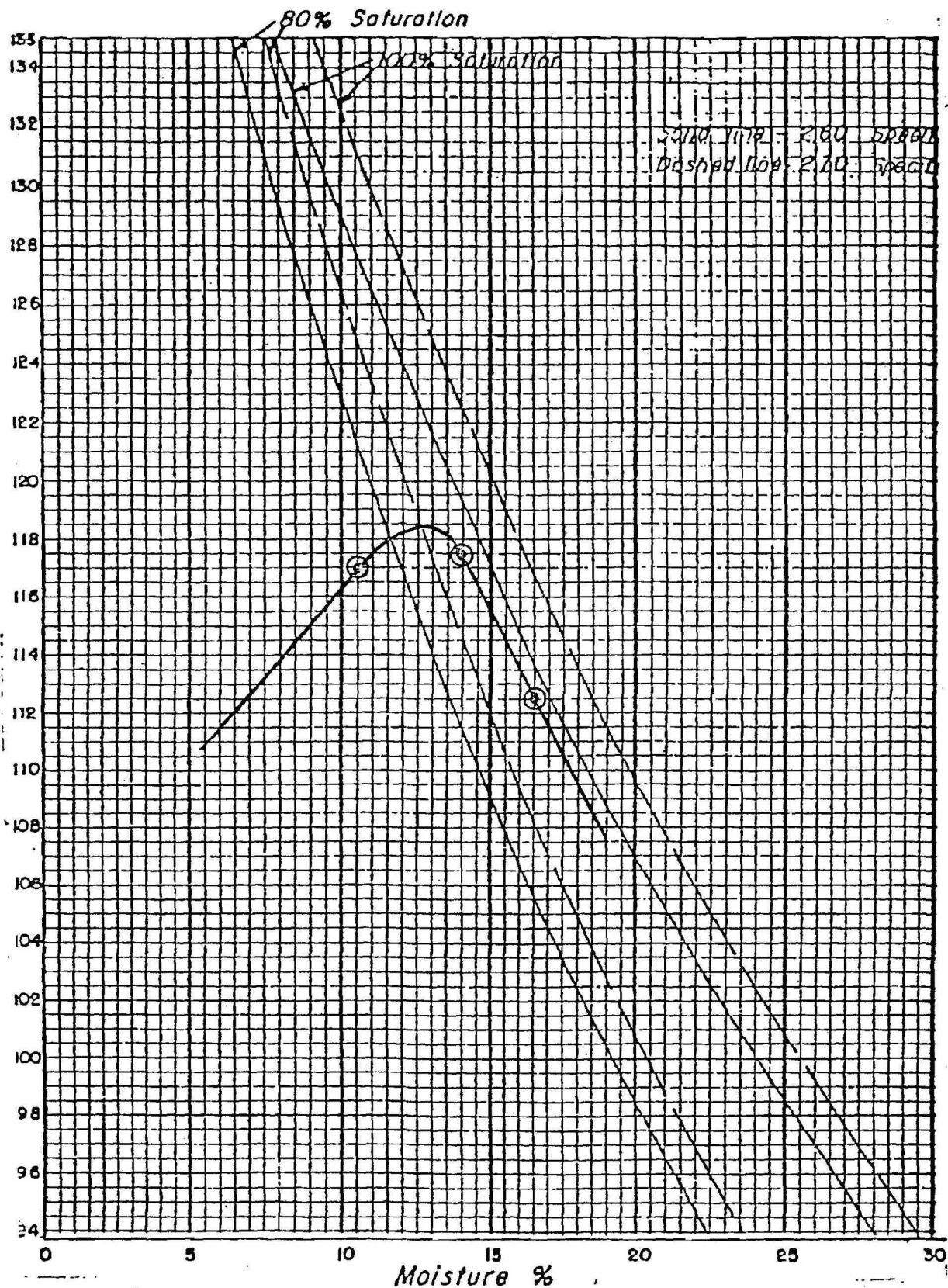
E.J.N. & ASSOCIATES INC.



JOB NO. B2-100-1 BORING NO. AND DEPTH B-10 @ 3.5' SAMPLE DESCRIPTION X SOIL TYPE X

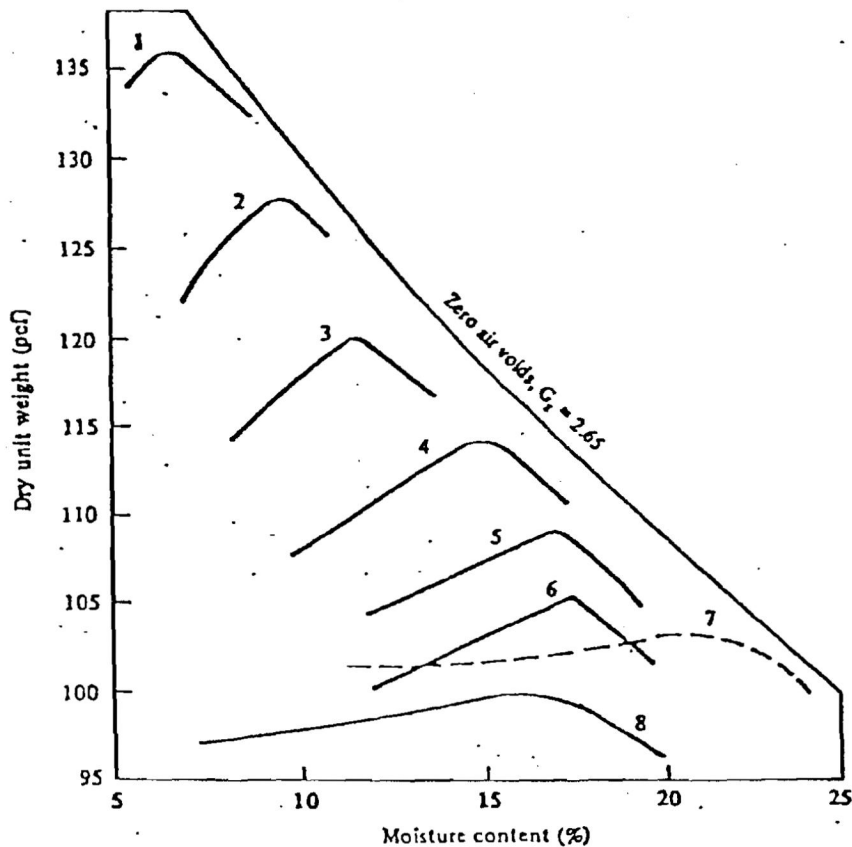
MAXIMUM DENSITY 116.5 OPTIMUM MOISTURE 13.5%

E.J.N. & ASSOCIATES INC.



JOB NO. 82-100-1 BORING NO. AND DEPTH B-10 @ 5.5' SAMPLE DESCRIPTION SOIL TYPE XI

E.J.N. & ASSOCIATES INC.



Moisture content vs. dry unit weight relationships for eight soils according to A.A.S.H.O. T99.

Soil Texture and Plasticity Data

No.	Description	Sand	Silt	Clay	LL	PI
1	Well-graded loamy sand	88	10	2	16	NP
2	Well-graded sandy loam	78	15	13	16	NP
3	Medium-graded sandy loam	73	9	18	22	4
4	Lean sandy silty clay	32	33	35	28	9
5	Lean silty clay	5	64	31	36	15
6	Loessial silt	5	85	10	26	2
7	Heavy clay	6	22	72	67	40
8	Poorly graded sand	94	-6-			NP

E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

Rancho Capistrano
San Juan Capistrano

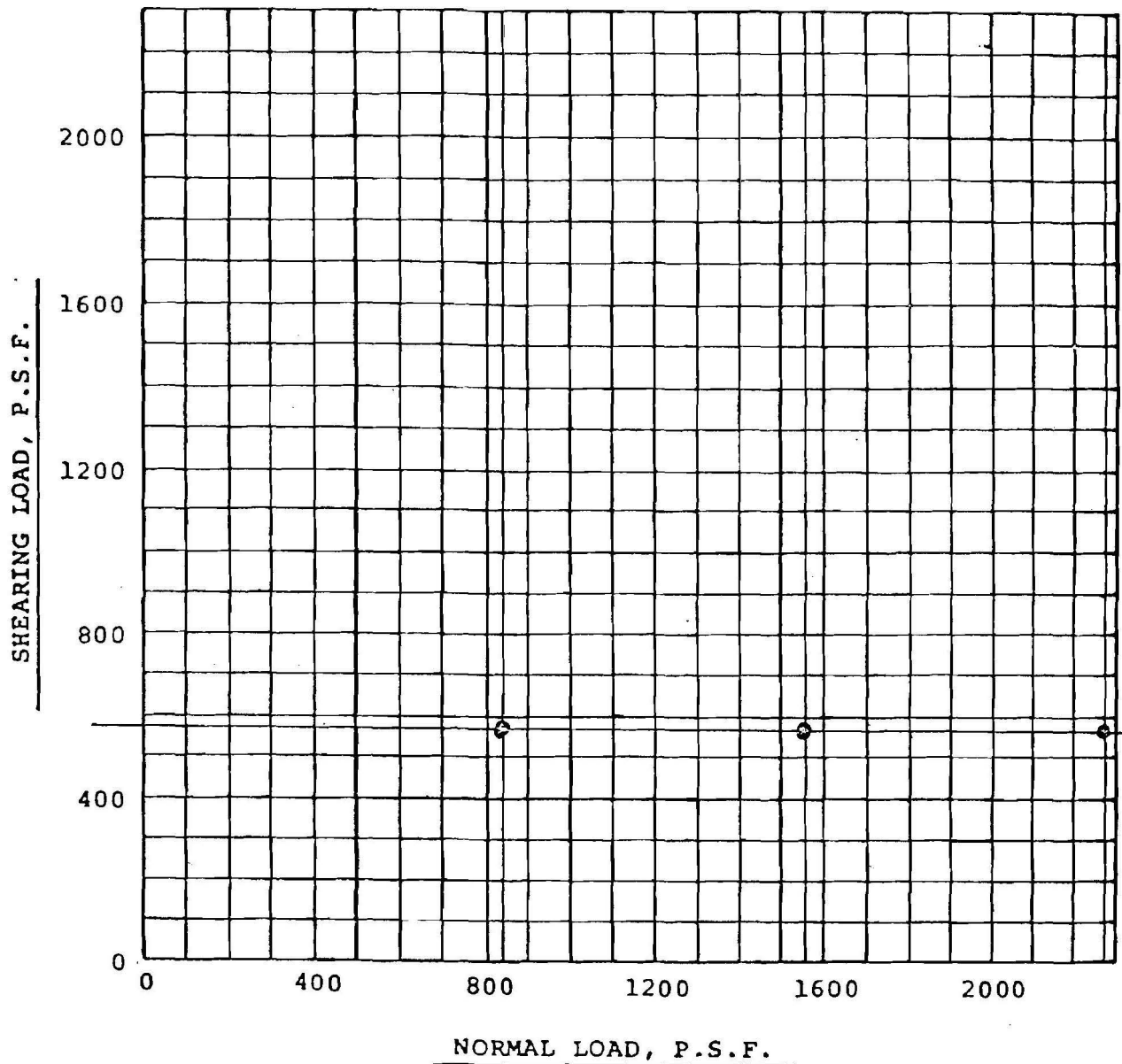
Job No:

Date:

82-100

Nov. 3, 1982

DIRECT SHEAR SUMMARY



JOB NUMBER 82-100-1

BORING NUMBER B-10

DEPTH 3.5'

MOISTURE SATURATED

UNDISTURBED —•—

REMOLED —○—@

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

PLATE I
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

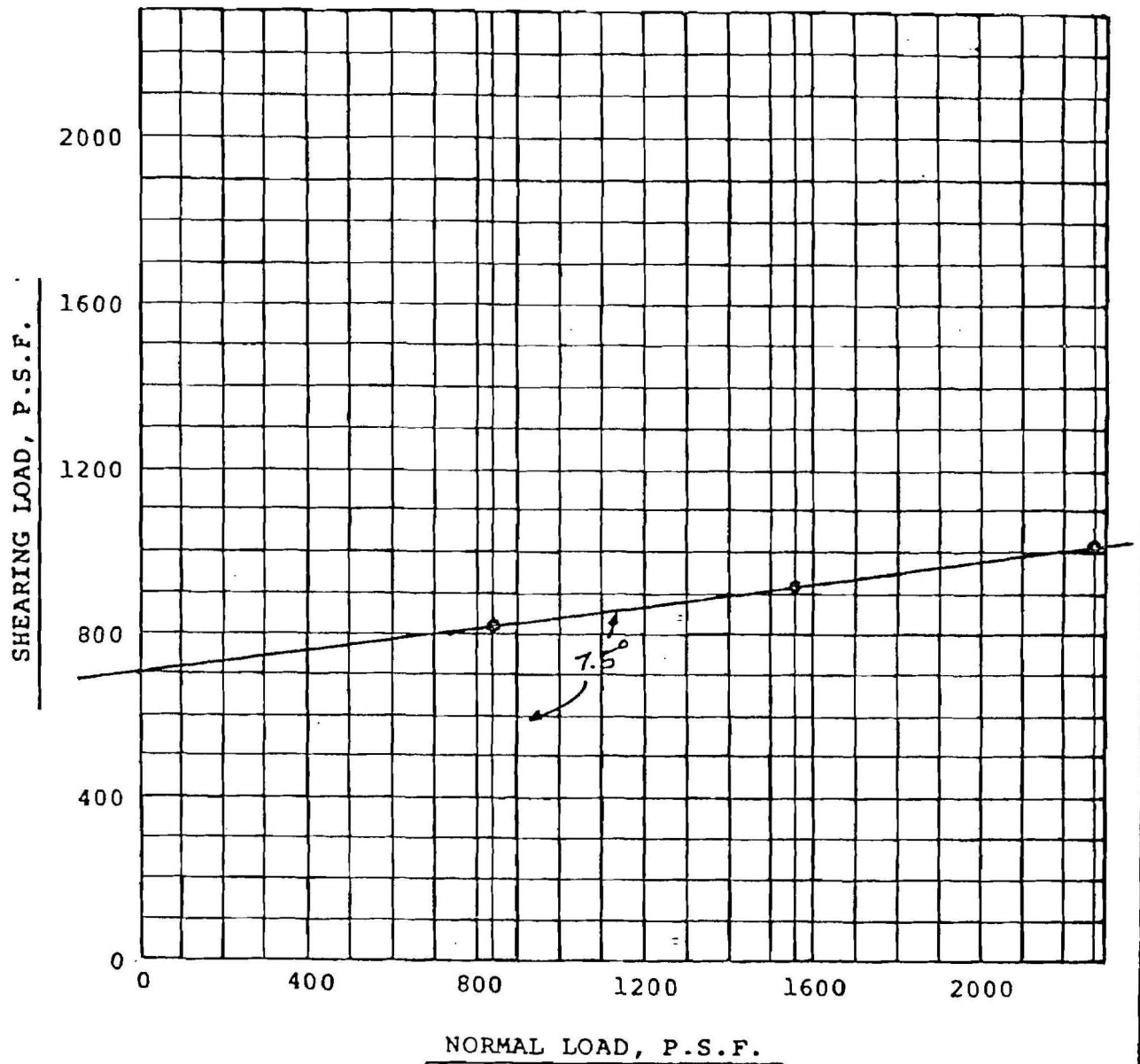
Job No.:

Date:

82-100-1

Nov. 03, 1982

DIRECT SHEAR SUMMARY



JOB NUMBER 82-100-1

BORING NUMBER B-6

DEPTH 1.0'

MOISTURE SATURATED

UNDISTURBED —●—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado-Anaheim, Ca.

PLATE II
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

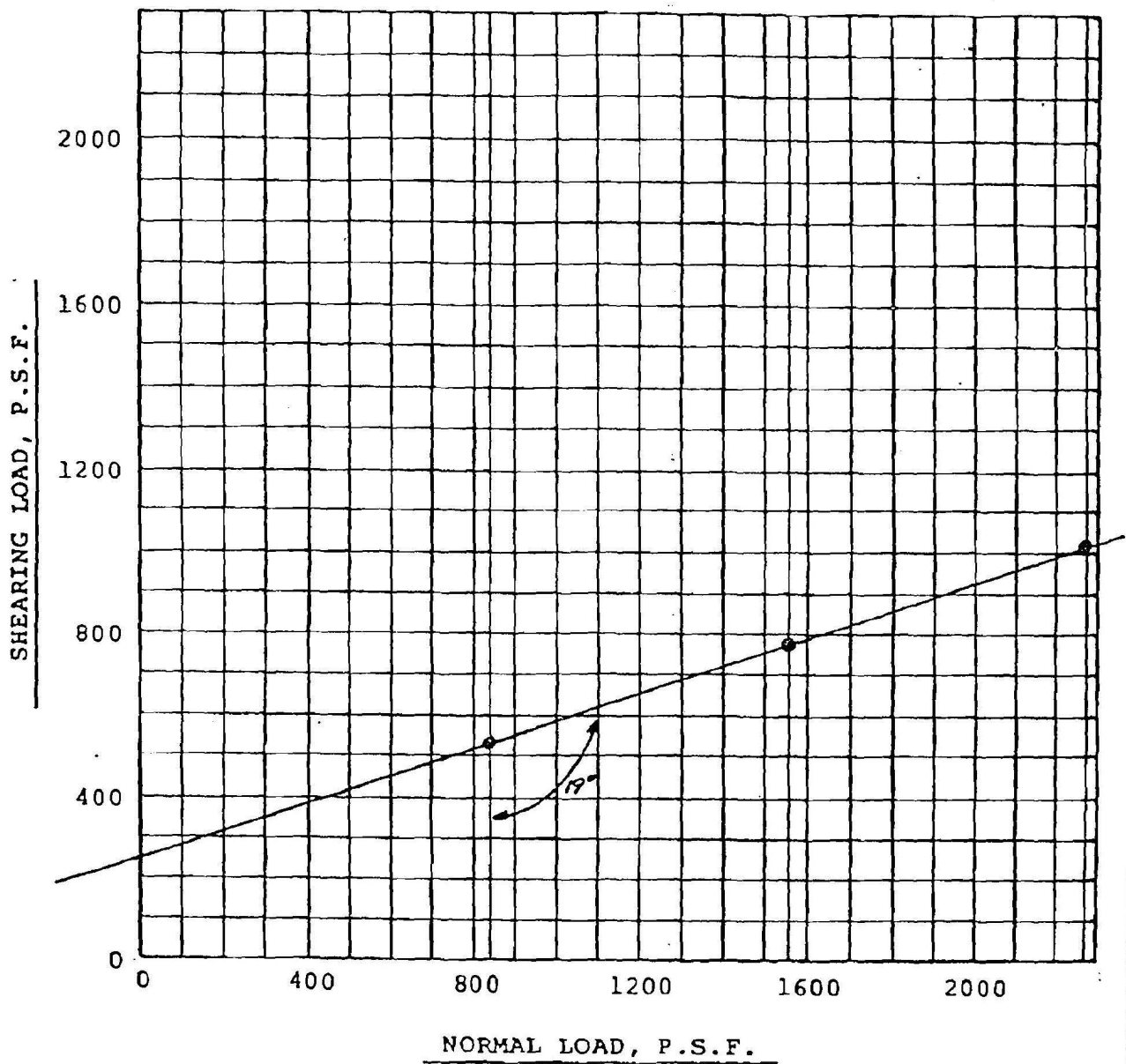
Job No.:

Date:

82-100-1

Nov. 03, 1982

DIRECT SHEAR SUMMARY



JOB NUMBER 82-100-1

BORING NUMBER B-7

DEPTH 13.0'

MOISTURE SATURATED

UNDISTURBED —●—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

PLATE III
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

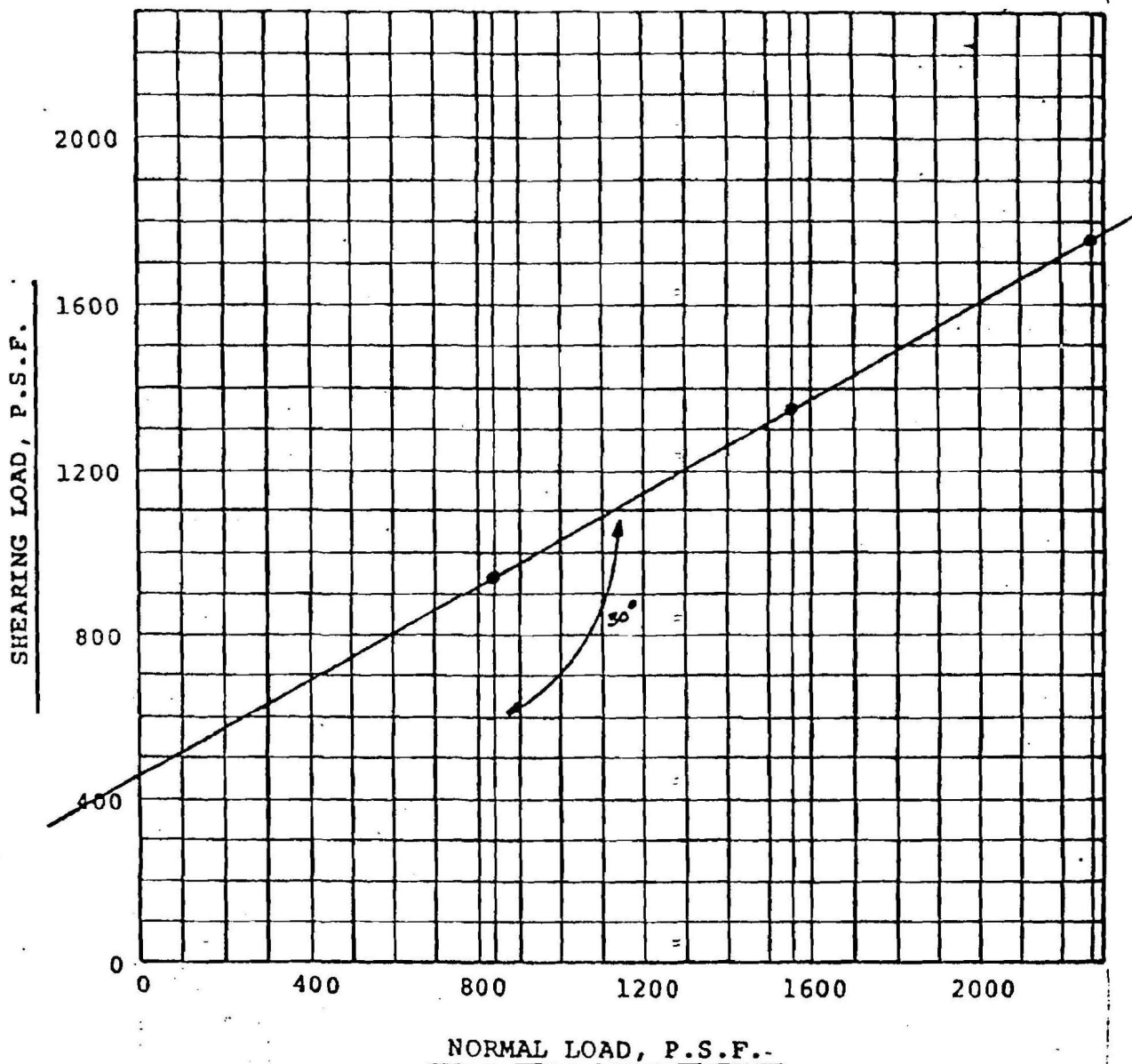
Job No.:

Date:

82-100-1

Nov. 03, 1982

DIRECT SHEAR SUMMARY



JOB NUMBER 82-100-1

BORING NUMBER B-1

DEPTH 1.0'

MOISTURE SATURATED

UNDISTURBED —●—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

PLATE IV
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

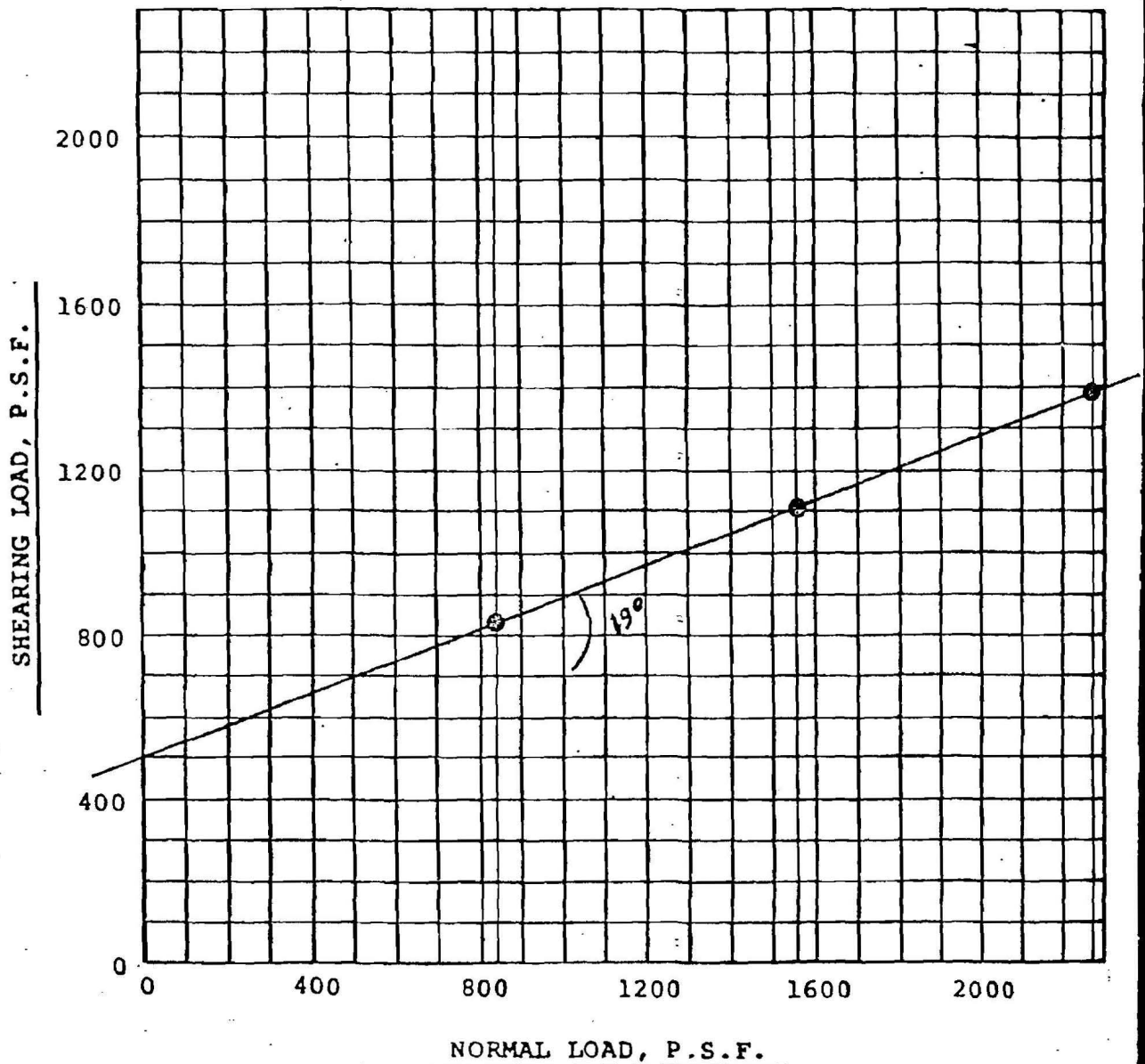
Job No.:

Date:

82-100-1

Nov. 03, 1982

D I R E C T S H E A R S U M M A R Y



JOB NUMBER 82-100-1

BORING NUMBER B-6

DEPTH 12.5'

MOISTURE SATURATED

UNDISTURBED —●—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado-Anaheim, Ca.

PLATE V
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

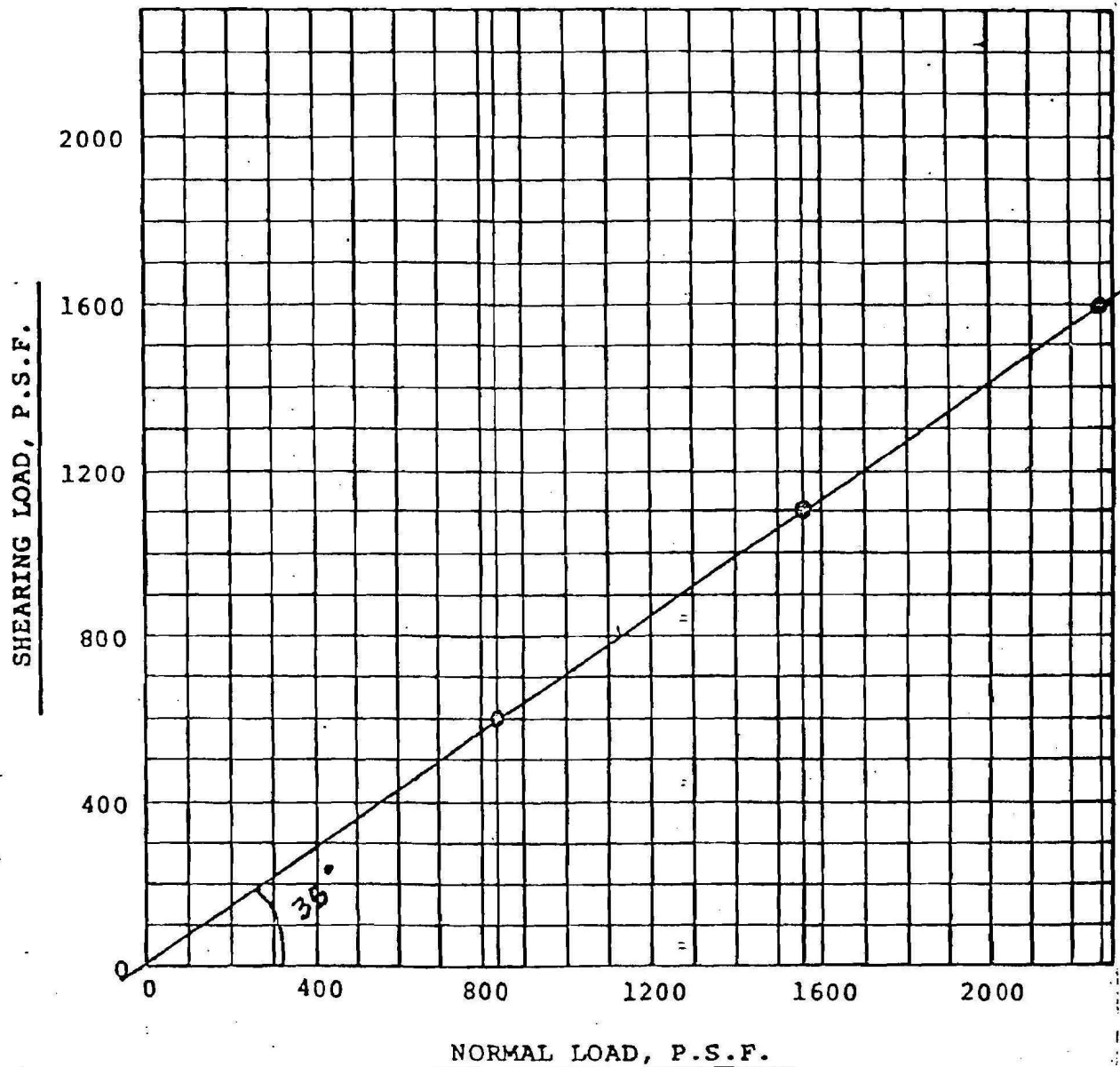
Job No.:

Date:

82-100-1

Nov. 03, 1982

D I R E C T S H E A R S U M M A R Y



JOB NUMBER 82-100-1

BORING NUMBER B-5

DEPTH 6.0'

MOISTURE SATURATED

UNDISTURBED —•—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado-Anahelm, Ca.

PLATE VI
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

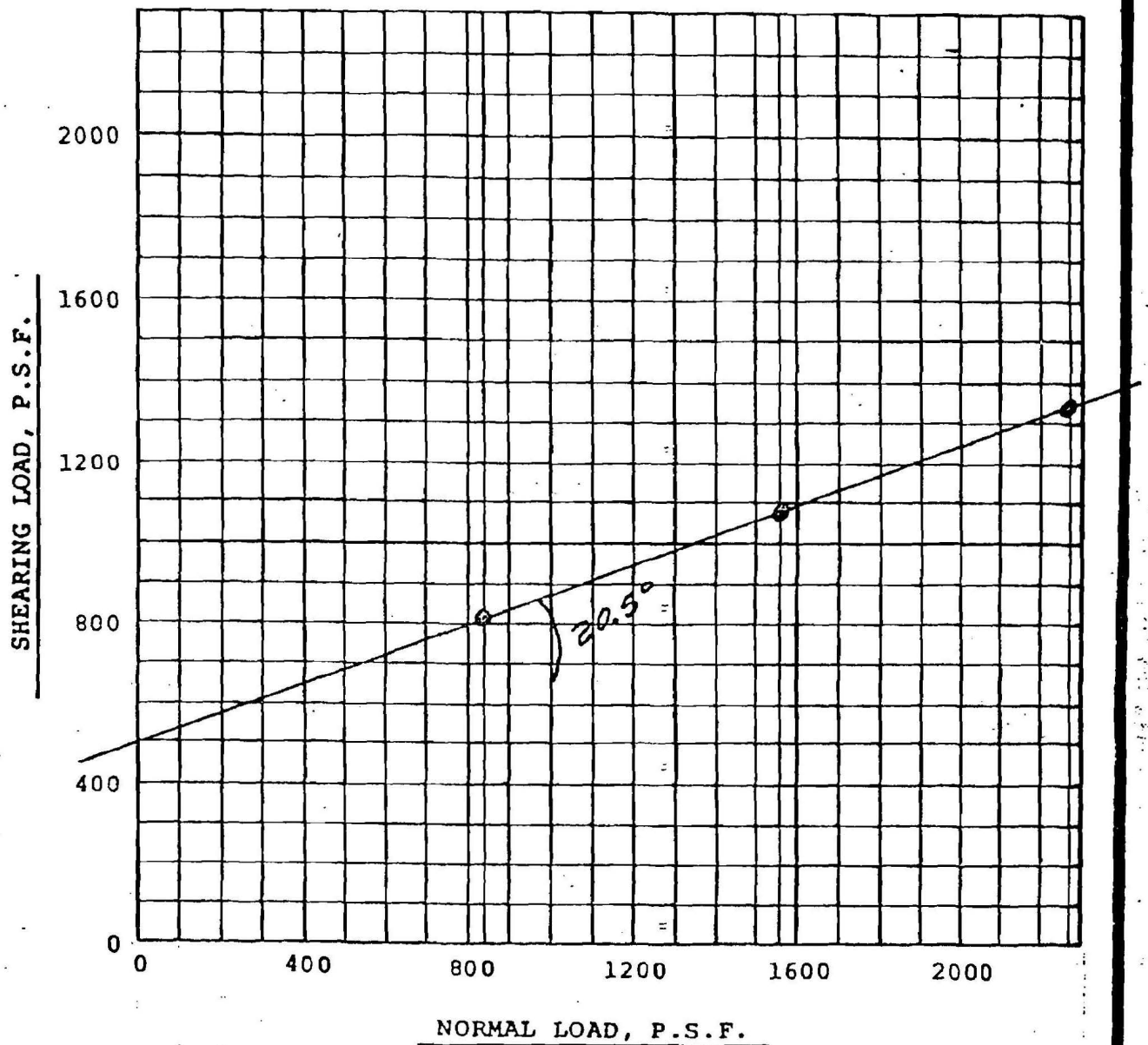
Job No.:

Date:

82-100-1

Nov. 03, 1982

DIRECT SHEAR SUMMARY



JOB NUMBER 82-100-1

BORING NUMBER B-2

DEPTH 17'

MOISTURE SATURATED

UNDISTURBED —•—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
15552 Coronado-Anaheim, Ca.

PLATE VII
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

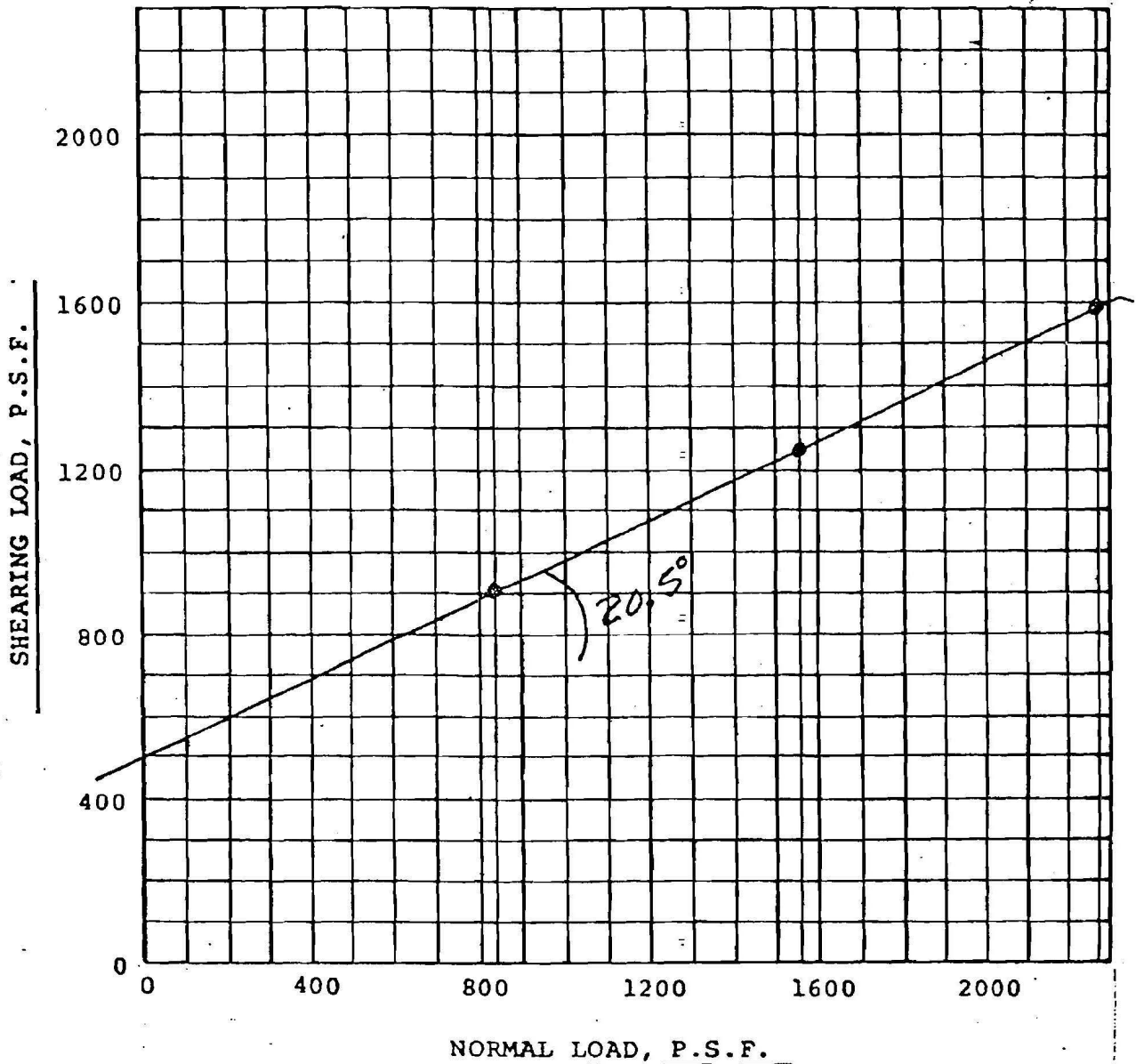
Job No.:

Date:

82-100-1

Nov. 03, 1982

D I R E C T S H E A R S U M M A R Y



JOB NUMBER 82-100-1

BORING NUMBER B-10

DEPTH 5.5'

MOISTURE SATURATED

UNDISTURBED —●—

REMOLDED —○—

90% MAXIMUM DENSITY

E.J.N. and Associates
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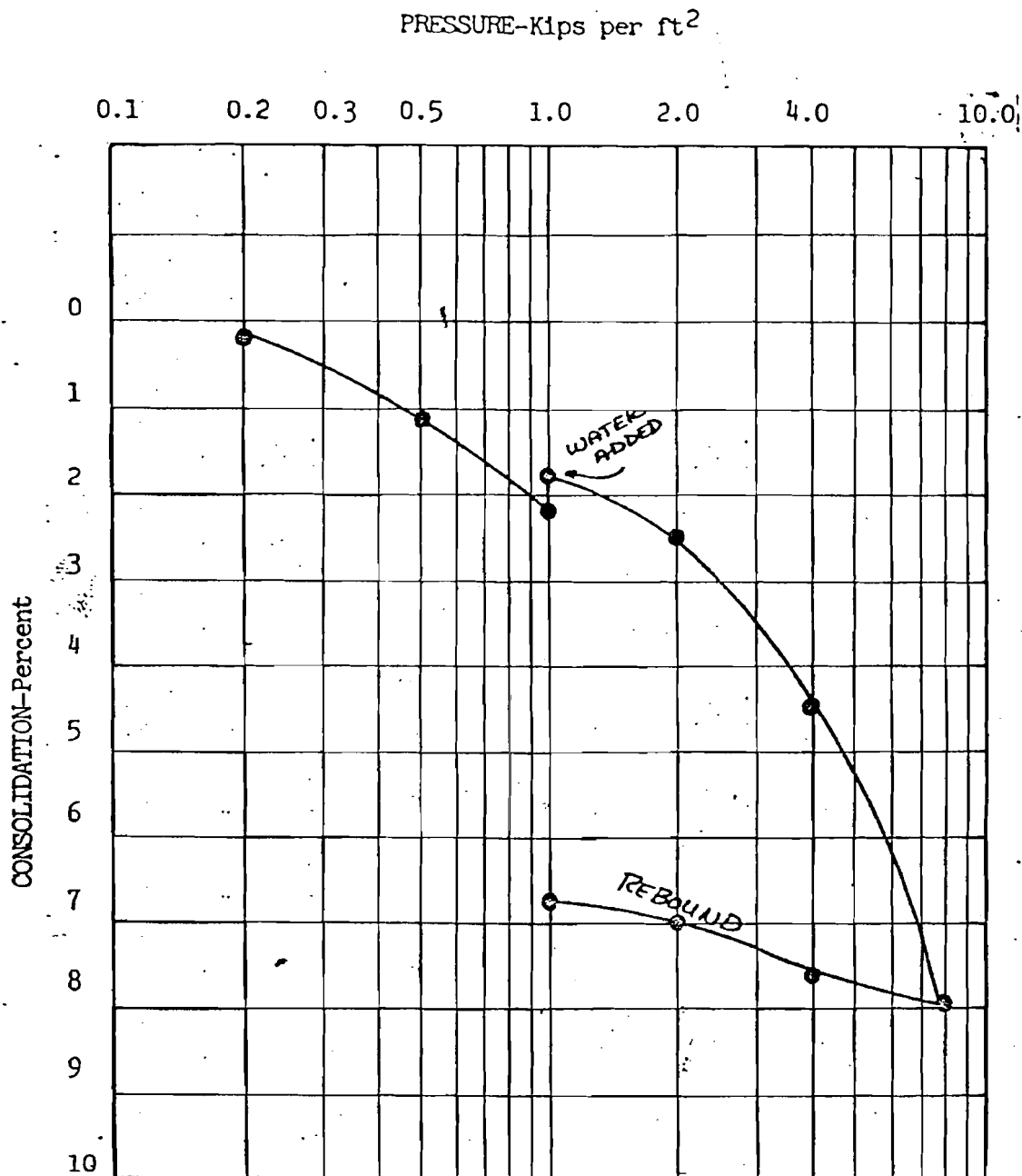
PLATE VIII
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

Job No.:

Date:

82-100-1

Nov. 03, 1982



E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

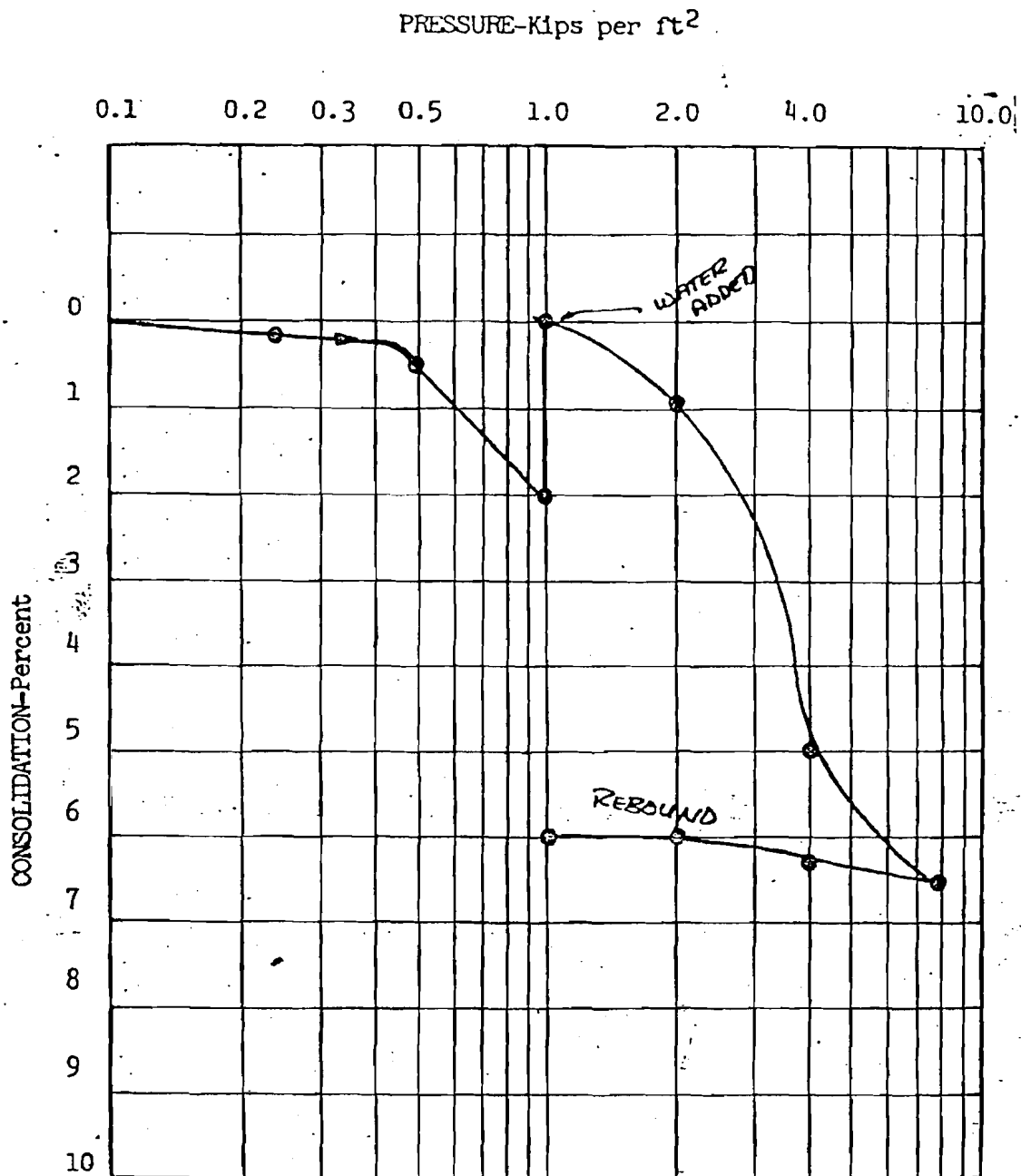
PLATE I
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano
California

Job No.:

Date :

82-100-1

11-3-82



E.J.N. and Associates
15552 Coronado-Anaheim, Ca.

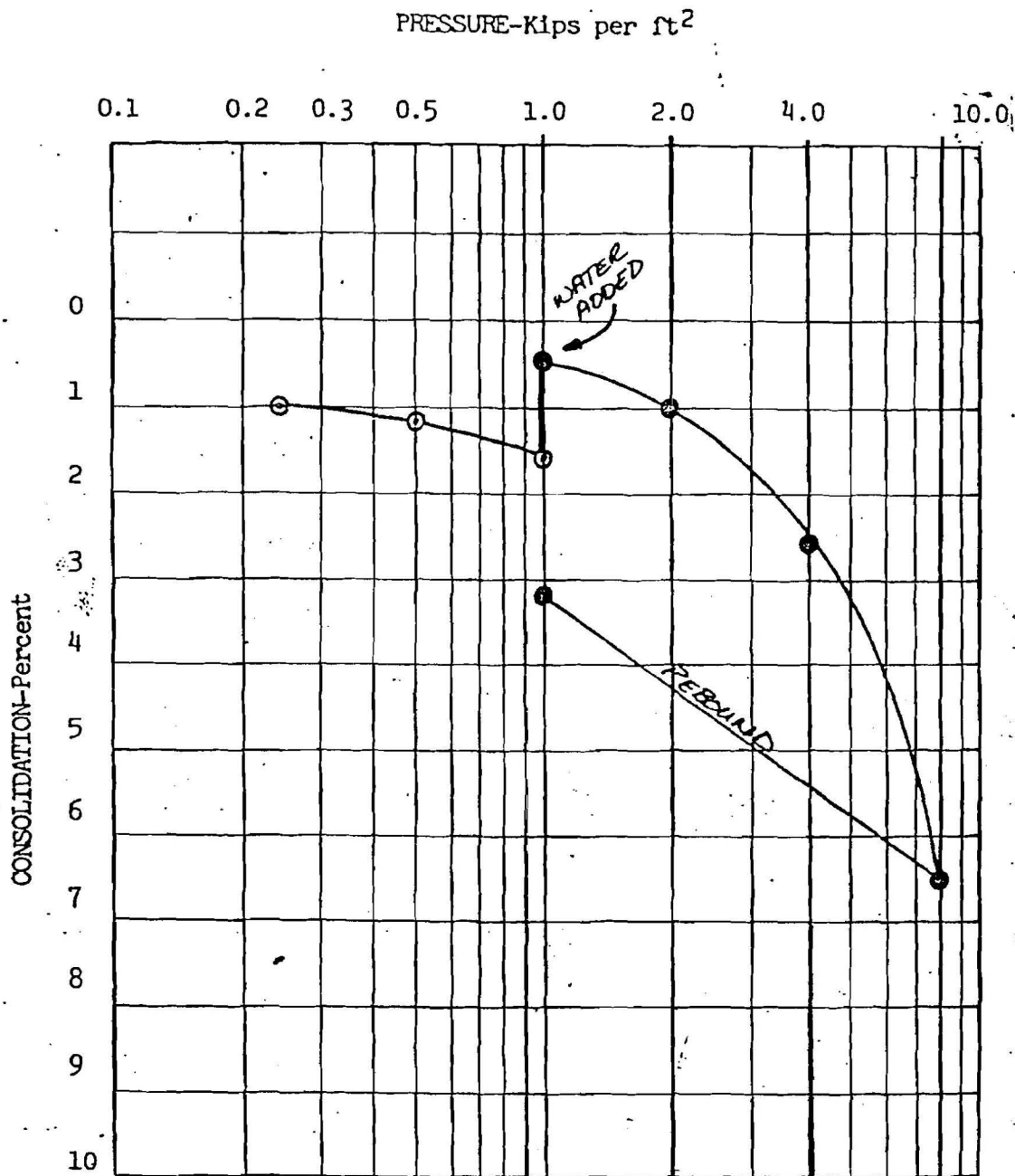
PLATE III
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano

Job No.:

Date :

82-100-2

11-3-82



E.J.N. and Associates
15552 Coronado-Anaheim, Ca.

PLATE IV
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano

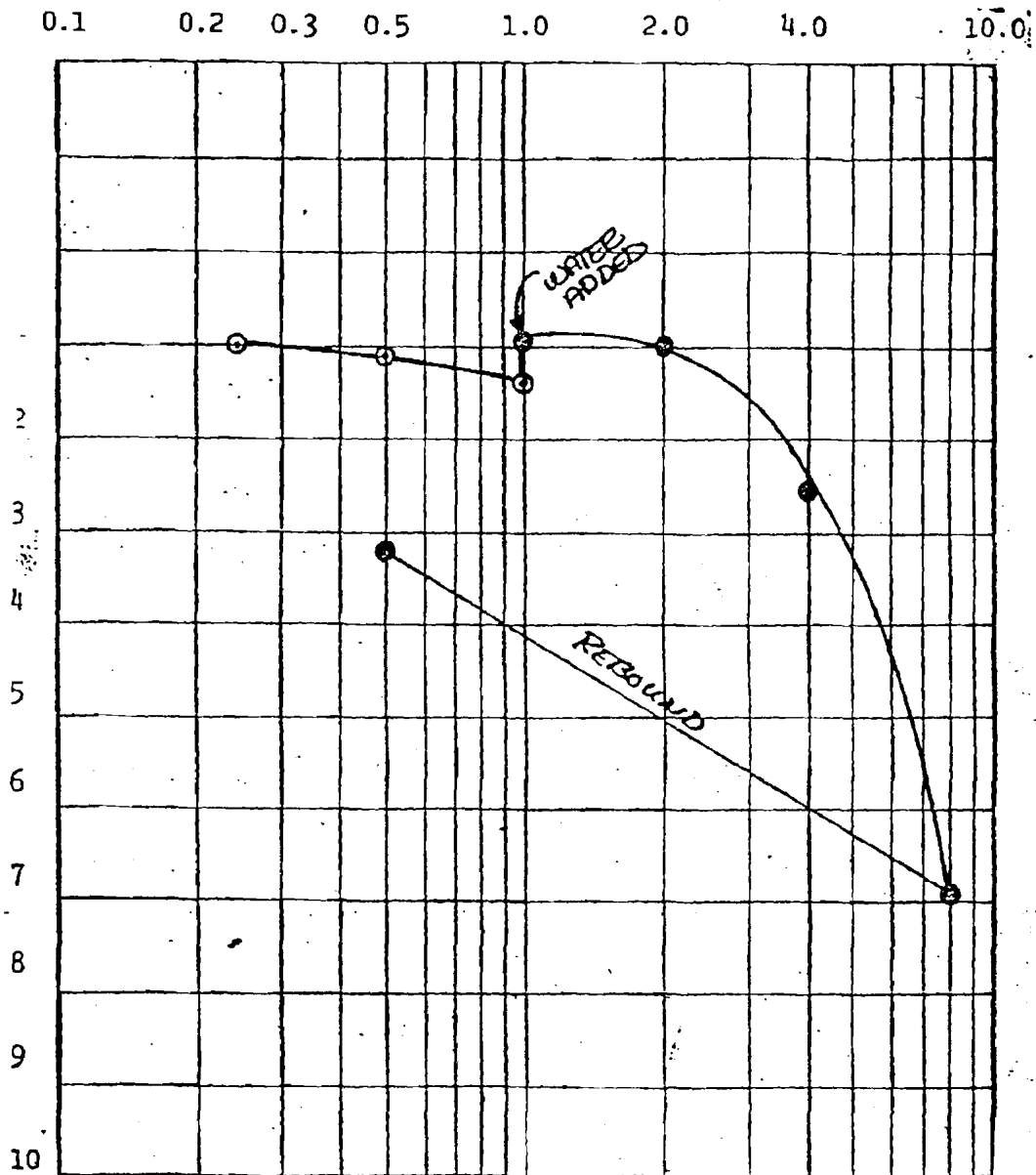
Job No.

82-100-1

Date

11-3-82

PRESSURE-Kips per ft²



E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

PLATE V
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano

Job NO.:

Date :

82-100-1

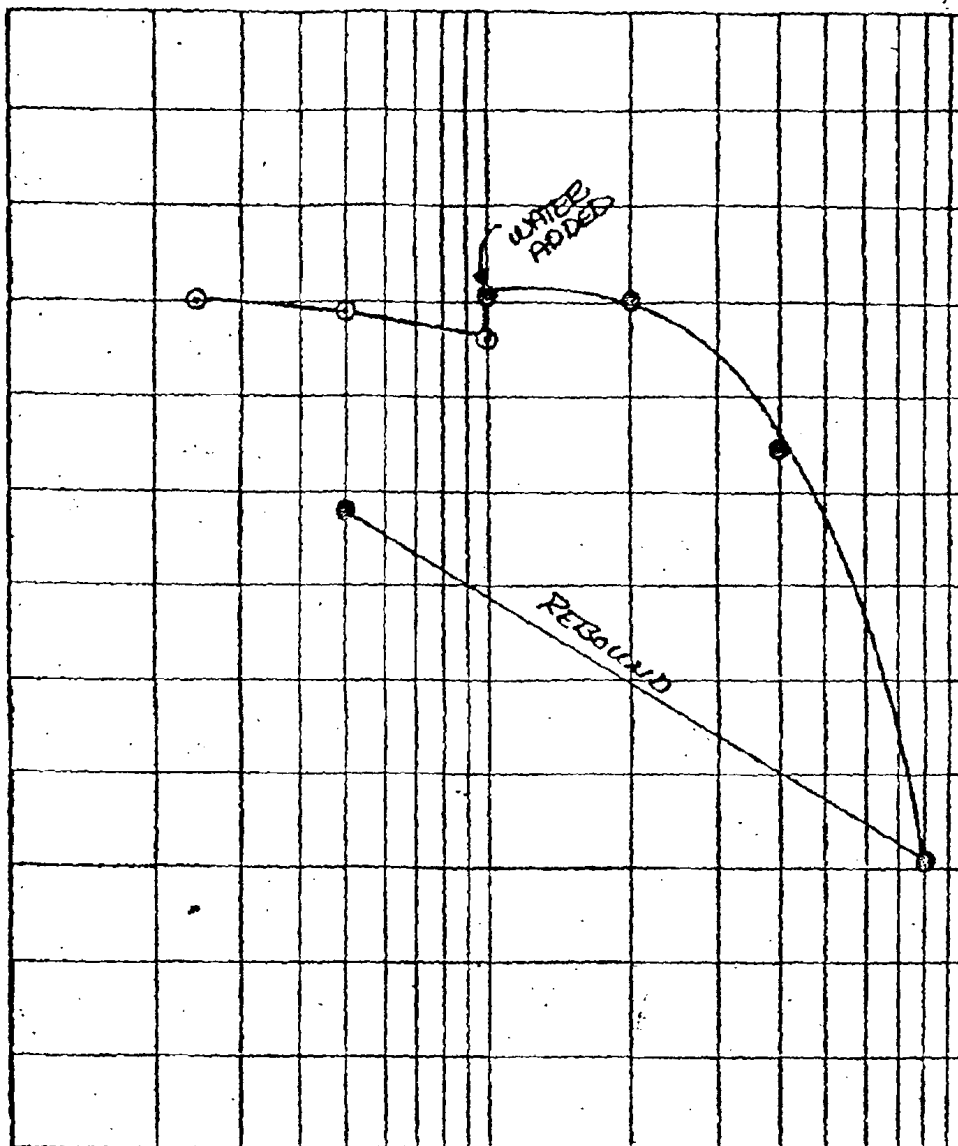
11-3-82

PRESSURE-Kips per ft²

0.1 0.2 0.3 0.5 1.0 2.0 4.0 10.0

CONSOLIDATION-Percent

0
1
2
3
4
5
6
7
8
9
10



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15552 Coronado-Anaheim, Ca.

PLATE V
Crystal Cathedral
Rancho Capistrano
San Juan Capistrano

Job NO.:

Date :

82-100-1

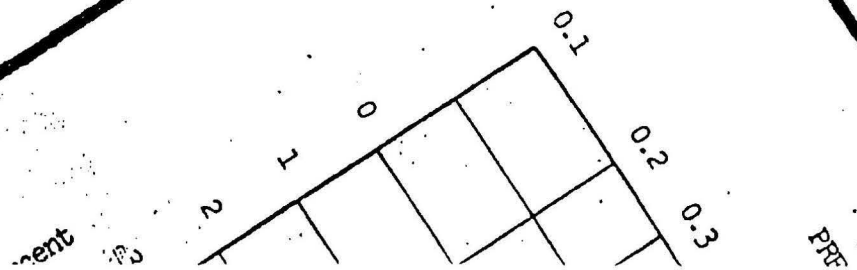
11-3-82

E.J.N. & ASSOCIATES INC.

SAMPLE ☐ SURCHARGE	A ☐ P.S.F.			B ☐ P.S.F.			C ☐ P.S.F.		
MOISTURE CONTENT AND DRY DENSITY DETERMINATION	BEGIN TEST	AIR DRY	END TEST	BEGIN TEST	AIR DRY	END TEST	BEGIN TEST	AIR DRY	END TEST
CAN NUMBER (NO)									
CAN WT. + WET SOIL (GM)									
CAN WT. + DRY SOIL (GM)									
CAN WEIGHT (GM)									
WATER WEIGHT (GM)									
DRY SOIL WT. (GM)									
MOISTURE CONTENT (%)	8.61	28.61							
SOIL + RING WT. (GM)	605.8	680.0							
RING WEIGHT (GM)	203.0	203.0							
NET WET SOIL WT. (GM)	402.8	477.0							
WET DENSITY (PCF)	121.65	141.92							
MOISTURE CONTENT (%)	8.61	28.61							
DRY DENSITY (PCF)	112.0	110.36							
INITIAL READING DATE	4-23								
INITIAL READING TIME (M)									
FINAL READING DATE		4-24							
FINAL READING TIME (M)									
SOAKING TIME (HRS)		24							
INITIAL DIAL READING	0.0								
FINAL DIAL READING									
DIAL READING DIFFERENCE									
EXPANSION (%) / INDEX									
MAX. ALLOWABLE									

NOTION

70-1.



CAN WT. + WET SOIL	(GM)								
CAN WT. + DRY SOIL	(GM)								
CAN WEIGHT	(GM)								
WATER WEIGHT	(GM)								
DRY SOIL WT.	(GM)								
MOISTURE CONTENT (%)		7.5%	25.2%						
SOIL + RING WT.	(GM)	591.0	655.3						
RING WEIGHT	(GM)	203.0	205.0						
NET WET SOIL WT.	(GM)	388.0	452.0						
WET DENSITY (PCF)		117.17	119.28						
MOISTURE CONTENT (%)		7.5%	25.2%						
DRY DENSITY (PCF)		108.99	95.7						
INITIAL READING DATE		4-22							
INITIAL READING TIME (M)		3 P.M.							
FINAL READING DATE			4-23						
FINAL READING TIME (M)			3 P.M.						
SOAKING TIME (HRS)			24 HR.						
INITIAL DIAL READING		000.0							
FINAL DIAL READING			140 DIV.						
DIAL READING DIFFERENCE			140 DIV.						
EXPANSION (%) / INDEX		_____ %	_____ %			_____ %	_____ %	_____ %	_____ %

MAX. ALLOWABLE SWELL: _____ E.I. = 140 HIGH EXPANSION

Sample Description:

OK. BRM 5-4-56 5606 CRYSTAL CATHEDRAL 82-100-1 4-23-82

LL = Liquid Limit Test

Sample Number 342

Type of Test	LL	LL	LL
Container Number	75	95	
Number of Blows	12	17	
Wt. Sample + Tare Wet	68.0	68.4	
Wt. Sample + Tare Dry	53.5	54.0	
Wt. of Water	14.5	14.4	
Tare	14.0	13.5	
Wt. of Dry Soil	39.5	40.5	
Water Content	36.7%	35.5%	

PL = Plastic Limit Test

Type of Test	PL	PL
Container Number	115	90
Number of Blows		
Wt. Sample + Tare Wet	18.8	19.7
Wt. Sample + Tare Dry	17.9	18.7
Wt. of Water	.9	1.0
Tare	14.0	14.5
Wt. of Dry Soil	3.9	4.2
Water Content	23.0%	23.8%

RESULTS

Liquid Limit = 34.0

Plastic Limit = 23.4

Plasticity Index = 10.6

Flow Index =

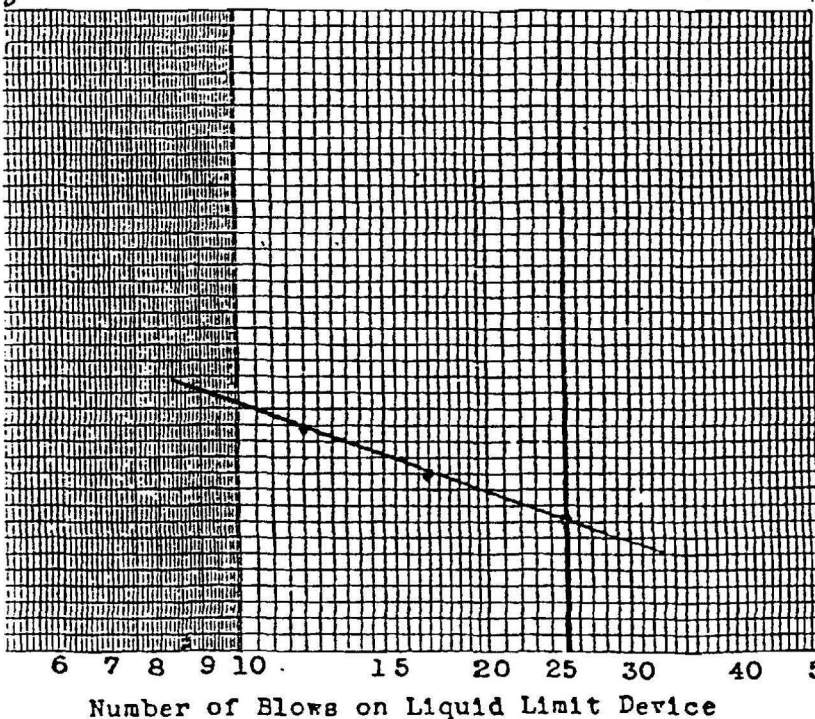
Toughness Index =

Remarks: B10@3 1/2 - 4

CL - SILTY CLAY

LOW PLASTICITY

FLOW CURVE



LIQUID AND PLASTIC LIMIT
DETERMINATIONS
DATA AND COMPUTATION SHEET

E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

Rancho Capistrano
San Juan Capistrano

Job No: Date

82-100 Nov. 3, 1982

LL = Liquid Limit Test

Sample Number 343

Type of Test	LL	LL	LL
Container Number	120	45	
Number of Blows	17	50	
Wt. Sample + Tare Wet	53.5	69.0	
Wt. Sample + Tare Dry	41.0	54.06	
Wt. of Water	12.5	15.0	
Tare	14.2	14.5	
Wt. of Dry Soil	26.8	39.5	
Water Content	46.6%	37.9%	

PL = Plastic Limit Test

Type of Test		PL	PL
Container Number		40	70
Number of Blows			
Wt. Sample + Tare Wet		19.4	20.5
Wt. Sample + Tare Dry		18.3	19.2
Wt. of Water		1.1	1.3
Tare		14.5	14.4
Wt. of Dry Soil		3.8	4.8
Water Content		28.9%	27.0%

RESULTS

Liquid Limit = 43.5%

Plastic Limit = 28%

Plasticity Index = 15.5%

Flow Index =

Toughness Index =

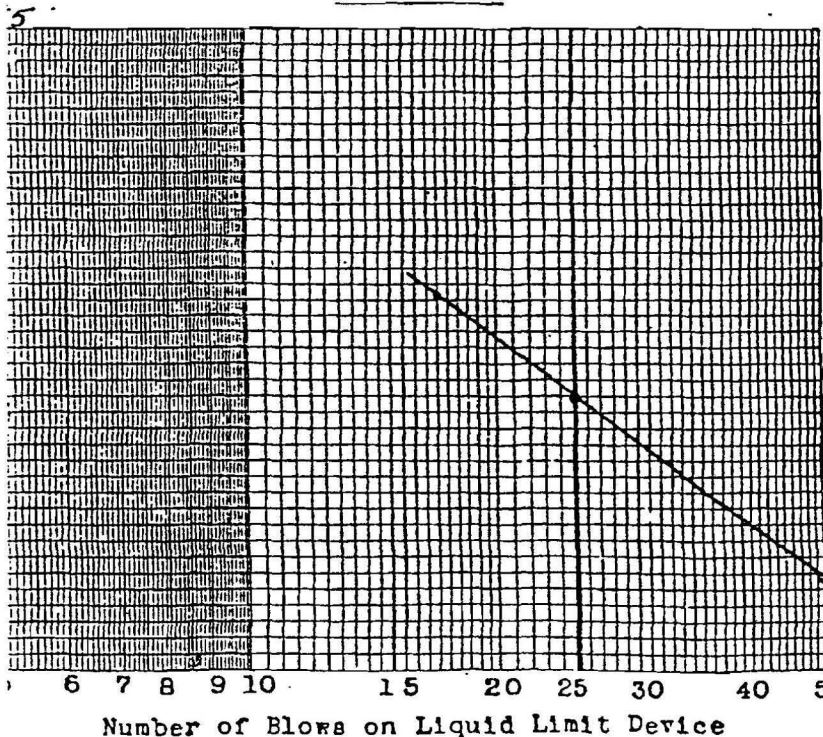
Remarks: B-6 @ 1'

CL TO CH

SILTY CLAY TO CLAY

HIGH PLASTICITY

FLOW CURVE



LIQUID AND PLASTIC LIMIT
DETERMINATIONS
DATA AND COMPUTATION SHEET

E.J.N. and Associates
15552 Coronado - Anaheim, Ca.

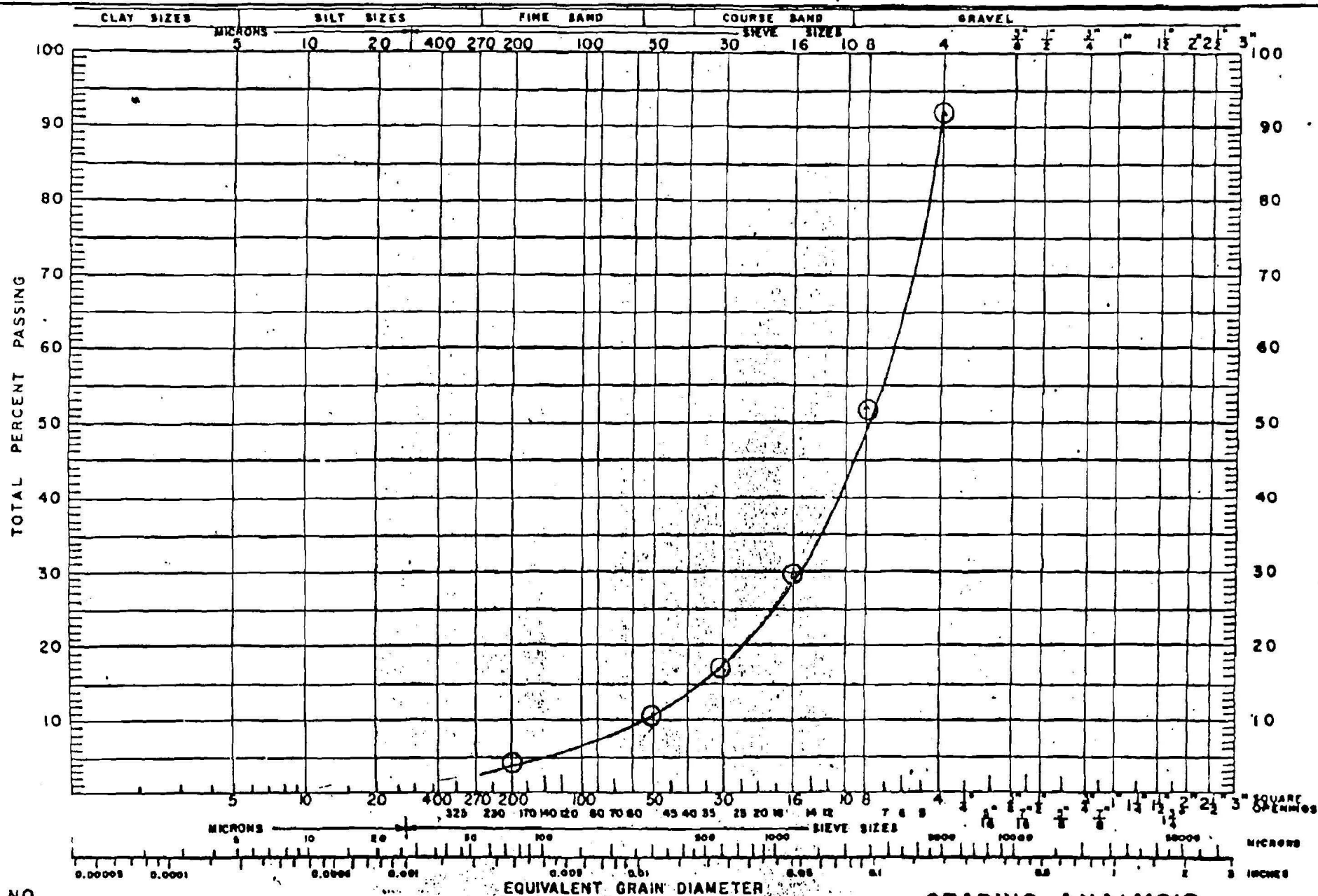
Rancho Capistrano
San Juan Capistrano

Job No:

Date

82-100

Nov. 3, 1982



NO. _____

DATE 11-8-6

BY D. Henderson

LOCATION Rancho Capistrano San Juan Capistrano

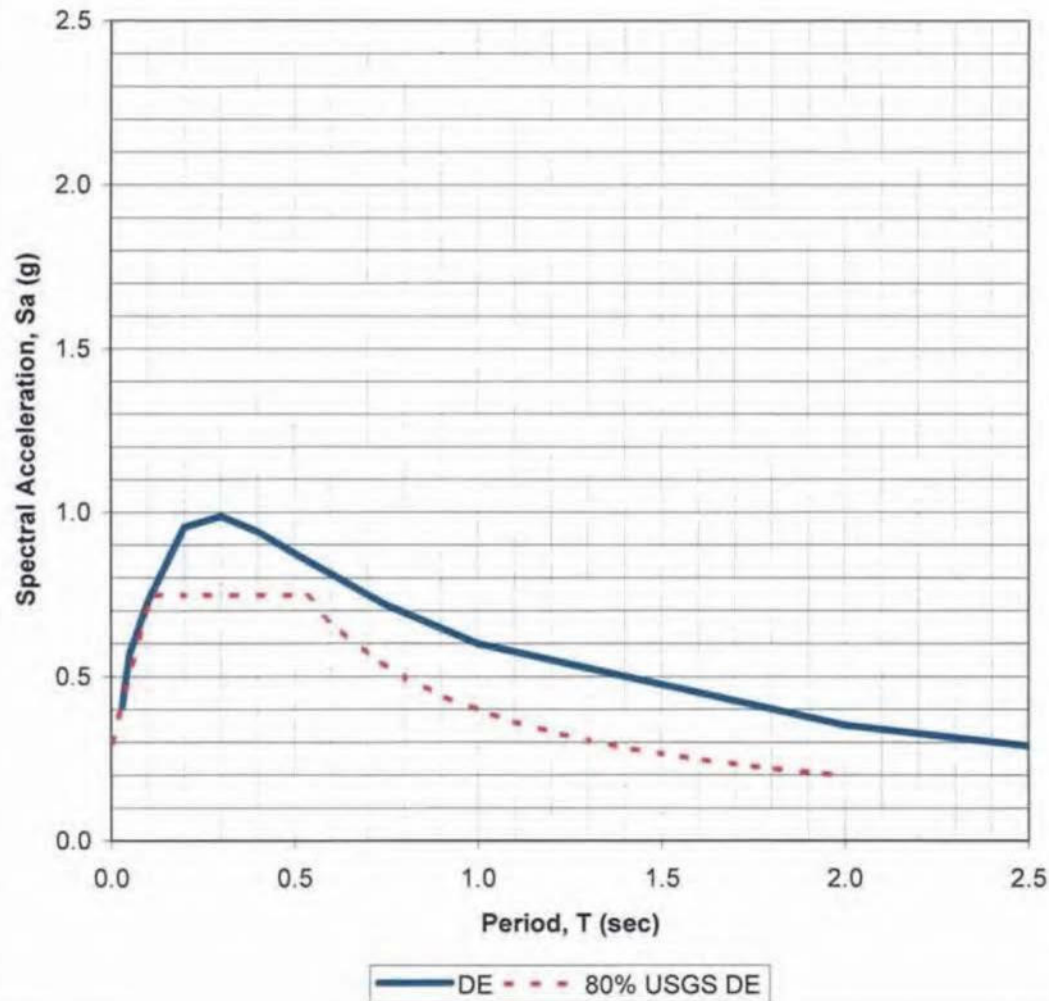
GRADING ANALYSIS

PROJECT NO 82-100-1

APPENDIX D

DESIGN RESPONSE SPECTRUM

Project: The Orchards at Capistrano
 Project Number: 012383-001
 Location: San Juan Capistrano, California



DESIGN
RESPONSE
SPECTRUM

PERIOD T (s)	DE CURVE Sa (g)
0.03	0.409
0.05	0.569
0.1	0.728
0.2	0.955
0.3	0.989
0.4	0.942
0.5	0.875
0.75	0.719
1.0	0.601
2.0	0.353
3.0	0.227
4.0	0.162

80% USGS SEISMIC
HAZARD CURVE

PERIOD T (s)	USGS DE CURVE Sa (g)	80% USGS DE CURVE Sa (g)
0	0.374	0.299
0.107	0.935	0.748
0.2	0.935	0.748
0.533	0.935	0.748
0.6	0.831	0.665
0.7	0.712	0.570
0.8	0.623	0.499
0.9	0.554	0.443
1	0.499	0.399
1.1	0.453	0.363
1.2	0.415	0.332
1.3	0.383	0.307
1.4	0.356	0.285
1.5	0.332	0.266
1.6	0.311	0.249
1.7	0.293	0.235
1.8	0.277	0.221
1.9	0.263	0.210
2	0.249	0.199

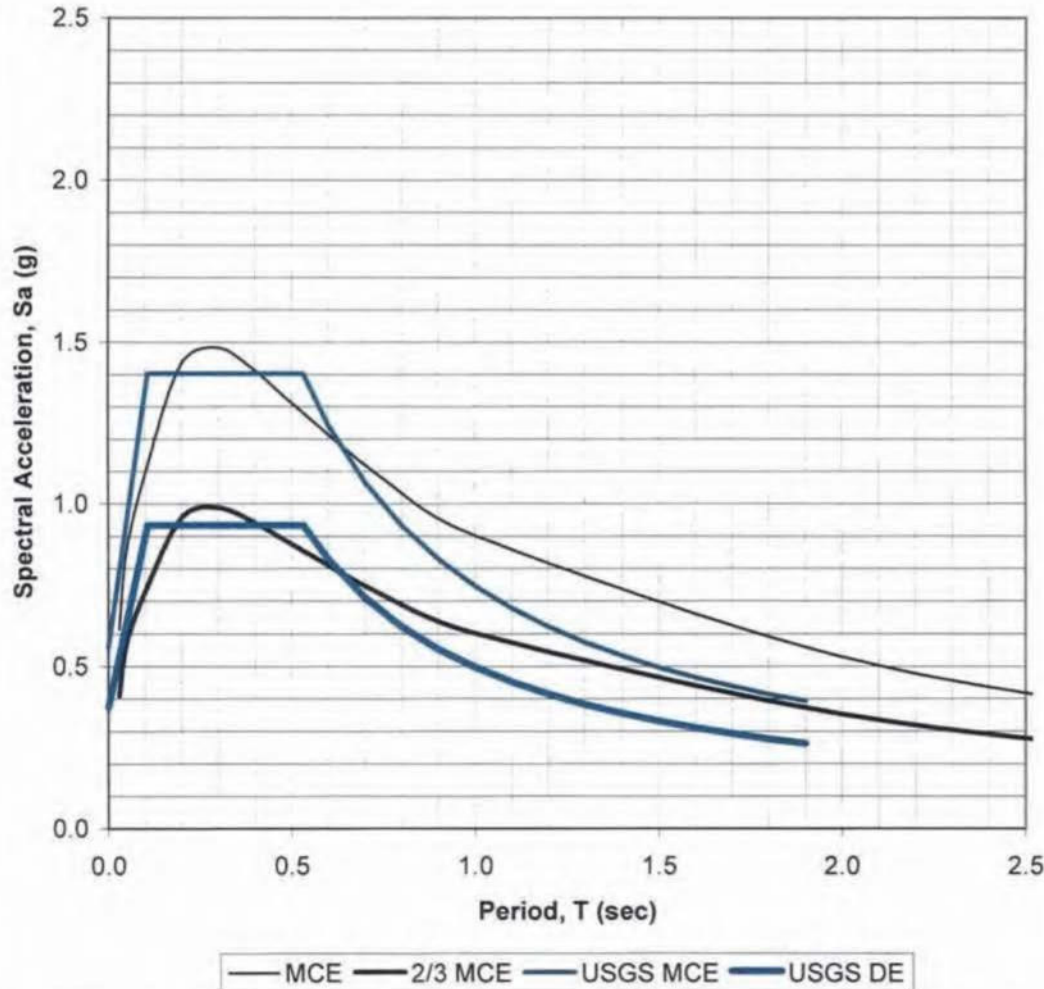
BOLD ORDINATES FROM 80% OF USGS CURVE



Figure D1

SITE MODIFIED MCE AND 2/3 SITE MODIFIED MCE RESPONSE SPECTRUM

Project: The Orchards at Capistrano
 Project Number: 012383-001
 Location: San Juan Capistrano, California



SITE MODIFIED MCE AND
 2/3 SITE MODIFIED MCE
 RESPONSE SPECTRA

USGS
 SEISMIC HAZARD
 CURVE

PERIOD T (s)	SITE MOD. MCE CURVE Sa (g)	2/3 SITE MOD. MCE CURVE Sa (g)	PERIOD T (s)	SITE MOD. USGS MCE CURVE Sa (g)	USGS DESIGN CURVE Sa (g)
0.03	0.613	0.409	0	0.561	0.374
0.05	0.853	0.569	0.107	1.403	0.935
0.1	1.092	0.728	0.2	1.403	0.935
0.2	1.433	0.955	0.533	1.403	0.935
0.3	1.483	0.989	0.6	1.246	0.831
0.4	1.413	0.942	0.7	1.068	0.712
0.5	1.313	0.875	0.8	0.935	0.623
0.75	1.078	0.719	0.9	0.831	0.554
1.0	0.902	0.601	1	0.748	0.499
2.0	0.529	0.353	1.1	0.680	0.453
3.0	0.341	0.227	1.2	0.623	0.415
4.0	0.243	0.162	1.3	0.575	0.383
			1.4	0.534	0.356
			1.5	0.498	0.332
			1.6	0.467	0.311
			1.7	0.440	0.293
			1.8	0.415	0.277
			1.9	0.394	0.263
			2	0.374	0.249

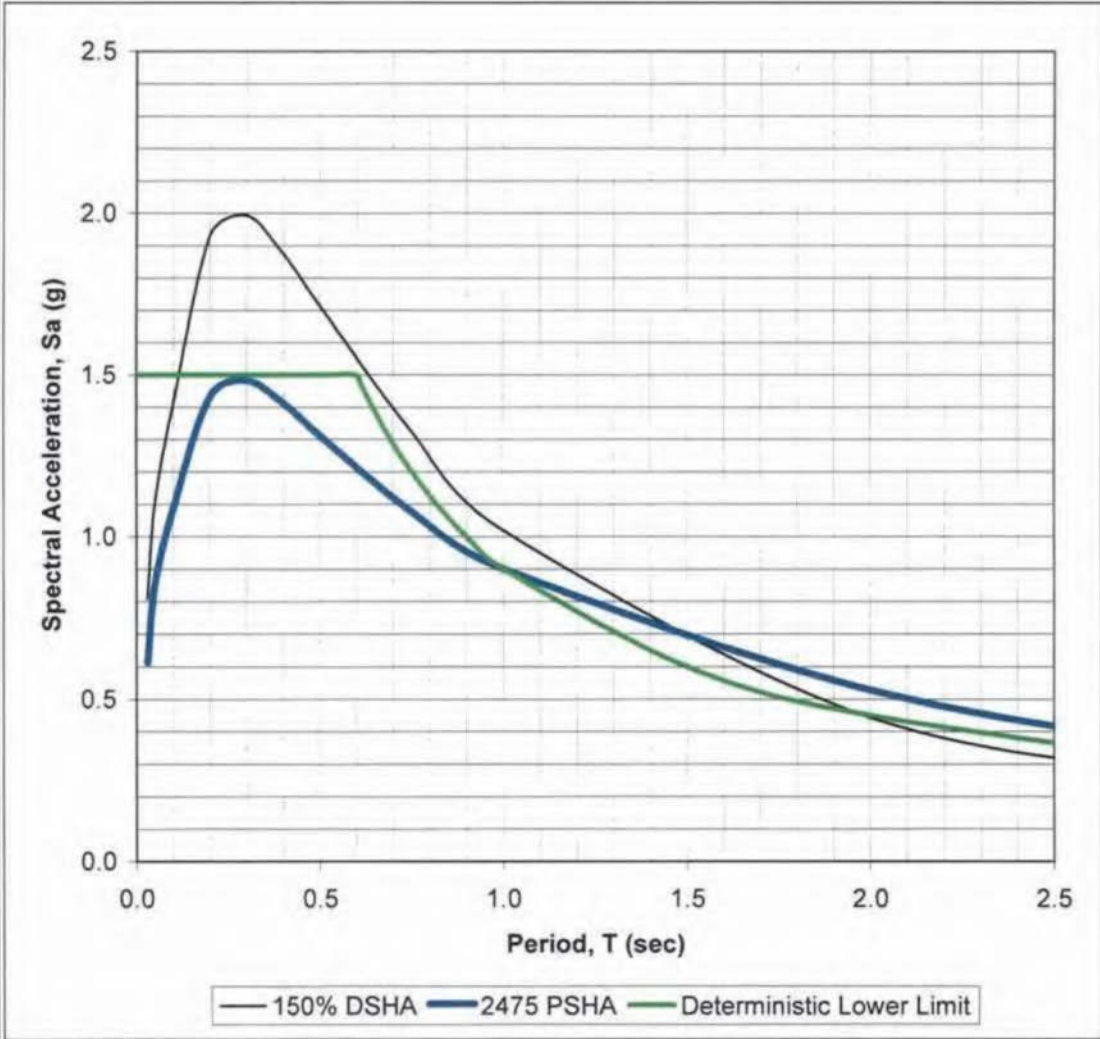
BOLD ORDINATES DETERMINISTIC LOWER LIMIT CURVE



Figure D2

DETERMINISTIC AND PROBABILISTIC SEISMIC HAZARD ANALYSIS SUMMARY

Project: The Orchards at Capistrano
Project Number: 012383-001
Location: San Juan Capistrano, California

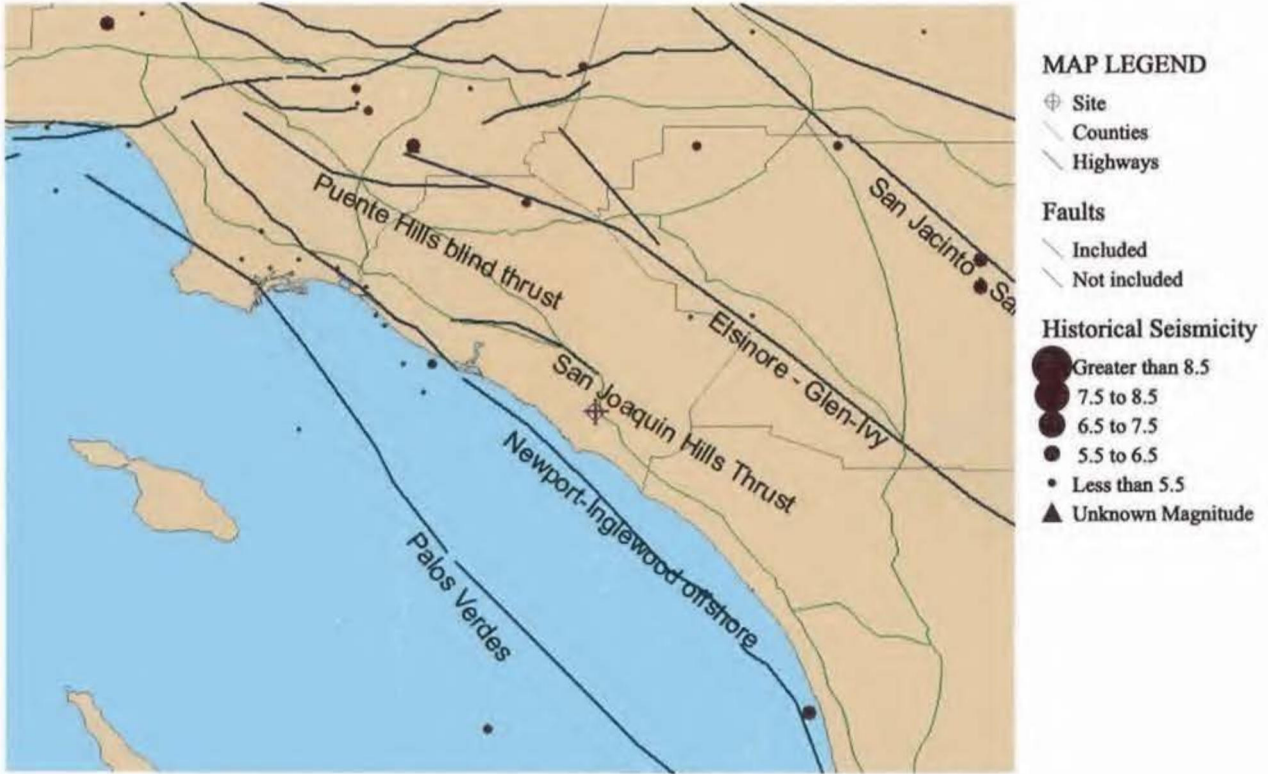


SITE FACTORS
 $F_a = 1$
 $F_v = 1.503$

DETERMINISTIC SEISMIC HAZARD ANALYSIS		DETERMINISTIC LOWER LIMIT		PROBABILISTIC SEISMIC HAZARD ANALYSIS	
PERIOD T (s)	150% DSHA CURVE Sa (g)	PERIOD T (s)	DLL CURVE Sa (g)	PERIOD T (s)	2475 YR PSHA CURVE Sa (g)
0.03	0.809	0.00	1.500	0.03	0.613
0.05	1.101	0.1	1.500	0.05	0.853
0.1	1.414	0.2	1.500	0.1	1.092
0.2	1.932	0.3	1.500	0.2	1.433
0.3	1.994	0.4	1.500	0.3	1.483
0.4	1.874	0.5	1.500	0.4	1.413
0.5	1.713	0.6	1.500	0.5	1.313
0.75	1.326	0.618	1.460	0.75	1.078
1.0	1.020	0.7	1.288	1.0	0.902
2.0	0.444	0.8	1.127	2.0	0.529
3.0	0.257	0.9	1.002	3.0	0.341
4.0	0.169	1.0	0.902	4.0	0.243
		1.5	0.601		
		2.0	0.451		
		3.0	0.301		
		4.0	0.225		



Figure D3



Probabilistic Spectra results for EZ-FRISK 7.32 Build 001

ANNUAL FREQUENCY OF EXCEEDANCE: 4.041e-004

RETURN PERIOD: 2474.9

PROBABILITY OF EXCEEDENCE: 2.0% IN 50.0 YEARS

Column 1: Spectral Period

Column 2: Acceleration (g) for: Mean

Column 3: Acceleration (g) for: Abra.-Silva (1997) Deep Soil

Column 4: Acceleration (g) for: Boore-Joyner-Fumal (1997)

Column 5: Acceleration (g) for: Sadigh (1997) Soil

1	2	3	4	5
PGA	6.126e-001	5.566e-001	7.024e-001	5.561e-001
5.e-002	8.533e-001	7.112e-001	9.746e-001	8.477e-001
0.1	1.092e+000	1.042e+000	1.108e+000	1.120e+000
0.2	1.433e+000	1.350e+000	1.522e+000	1.416e+000
0.3	1.483e+000	1.350e+000	1.676e+000	1.399e+000
0.4	1.413e+000	1.273e+000	1.638e+000	1.300e+000
0.5	1.313e+000	1.209e+000	1.525e+000	1.179e+000
0.75	1.078e+000	1.039e+000	1.202e+000	9.777e-001
1.	9.021e-001	8.899e-001	9.831e-001	8.227e-001
2.	5.288e-001	5.485e-001	5.525e-001	4.723e-001
3.	3.407e-001	3.331e-001	3.774e-001	3.034e-001
4.	2.425e-001	2.186e-001	2.890e-001	2.055e-001

Deterministic Spectra Results using EZ-FRISK 7.32 Build 001

Source: San Joaquin Hills Thrust

Region: California USGS02

Closest Distance: 6.22 km

Amplitude Units: Acceleration (g)

Magnitude: 6.60 Mw

Fractile: Mean

Column 1: Spectral Period

Column 2: Acceleration (g) for: Weighted Mean of Attenuation Equations

Column 3: Acceleration (g) for: Abra.-Silva (1997) Deep Soil

Column 4: Acceleration (g) for: Boore-Joyner-Fumal (1997)

Column 5: Acceleration (g) for: Sadigh (1997) Soil

1	2	3	4	5
PGA	5.393e-001	5.028e-001	6.031e-001	5.120e-001
5.e-002	7.337e-001	5.838e-001	8.593e-001	7.581e-001
0.1	9.424e-001	8.217e-001	1.001e+000	1.004e+000
0.2	1.288e+000	1.162e+000	1.415e+000	1.286e+000
0.3	1.329e+000	1.123e+000	1.586e+000	1.278e+000
0.4	1.249e+000	1.023e+000	1.564e+000	1.161e+000
0.5	1.142e+000	9.356e-001	1.449e+000	1.041e+000
0.75	8.837e-001	7.484e-001	1.070e+000	8.327e-001
1.	6.803e-001	5.949e-001	7.829e-001	6.632e-001
2.	2.958e-001	2.695e-001	3.044e-001	3.136e-001
3.	1.715e-001	1.370e-001	2.030e-001	1.746e-001
4.	1.124e-001	7.949e-002	1.522e-001	1.054e-001

```
*****
*****          EZ-FRISK          *****
***** SEISMIC HAZARD ANALYSIS DEFINITION *****
*****      RISK ENGINEERING, INC.      *****
*****      BOULDER, CO  USA          *****
*****
```

PROGRAM VERSION
EZ-FRISK 7.32 Build 001

ANALYSIS TITLE:
The Orchards

ANALYSIS TYPE:
Single Site Analysis

SITE COORDINATES
Latitude 33.5314
Longitude -117.679

HAZARD DEAGGREGATION
Status: OFF

SOIL AMPLIFICATION
Method: Do not use soil amplification

ATTENUATION EQUATION SITE PARAMETERS
Vs30 (m/s): 200

AMPLITUDES - Acceleration (g)
0.0001
0.001
0.01
0.02
0.05
0.07
0.1
0.2
0.3
0.4
0.5
0.7
1
2
3

PERIODS (s)
PGA
5.e-002
0.1
0.2
0.3
0.4
0.5
0.75
1.
2.
3.
4.

DETERMINISTIC FRACTILES
Mean

PLOTTING PARAMETERS
Period at which to plot PGA: 0.030303

CALCULATIONAL PARAMETERS

Fault Seismic Sources -

Maximum inclusion distance : 10000 km
Down dip integration increment : 5 km
Horizontal integration increment : 5 km
Number rupture length per earthquake : 4
Include near-source directivity : YES
Method : Somerville et al. (1997) + Abrahamson (2000)
Component : Average Factor
Hypocenter integration increment : 5 km

Subduction Interface Seismic Sources -

Maximum inclusion distance : 10000 km
Down dip integration increment : 5 km
Horizontal integration increment : 20 km
Number rupture length per earthquake : 1

Area Seismic Sources -

Maximum inclusion distance : 1000 km
Vertical integration increment : 3 km
Number of rupture azimuths : 3
Minimum epicentral distance step : 0.5 km
Maximum epicentral distance step : 10 km

Gridded Seismic Sources -

Maximum inclusion distance : 200 km
Default number of rupture azimuths : 10
Maximum distance for default azimuths : 20 km
Minimum distance for one azimuth : 70

All Seismic Sources -

Magnitude integration step : 0.1 M
Apply magnitude scaling : NO

ATTENUATION EQUATIONS

Name: Abra.-Silva (1997) Deep Soil
Database: C:\Program Files\EZ-FRISK 7.32\Files\standard.bin-attendb
Base: Abrahamson-Silva 1997
Truncation Type: No Truncation
Truncation Value: 0
Magnitude Scale: Moment Magnitude
Distance Type: Distance To Rupture

Name: Boore-Joyner-Fumal (1997)
Database: C:\Program Files\EZ-FRISK 7.32\Files\standard.bin-attendb
Base: Boore-Joyner-Fumal 1997
Truncation Type: No Truncation
Truncation Value: 0
Magnitude Scale: Moment Magnitude
Distance Type: Horizontal Distance To Rupture

Name: Sadigh (1997) Soil
Database: C:\Program Files\EZ-FRISK 7.32\Files\standard.bin-attendb
Base: Sadigh 1997 Soil
Truncation Type: No Truncation
Truncation Value: 0
Magnitude Scale: Moment Magnitude
Distance Type: Distance To Rupture

Prob. Seismic Hazard Deaggregation The_Orchards 117.679° W, 33.531 N.

Peak Horiz. Ground Accel. ≥ 0.5742 g

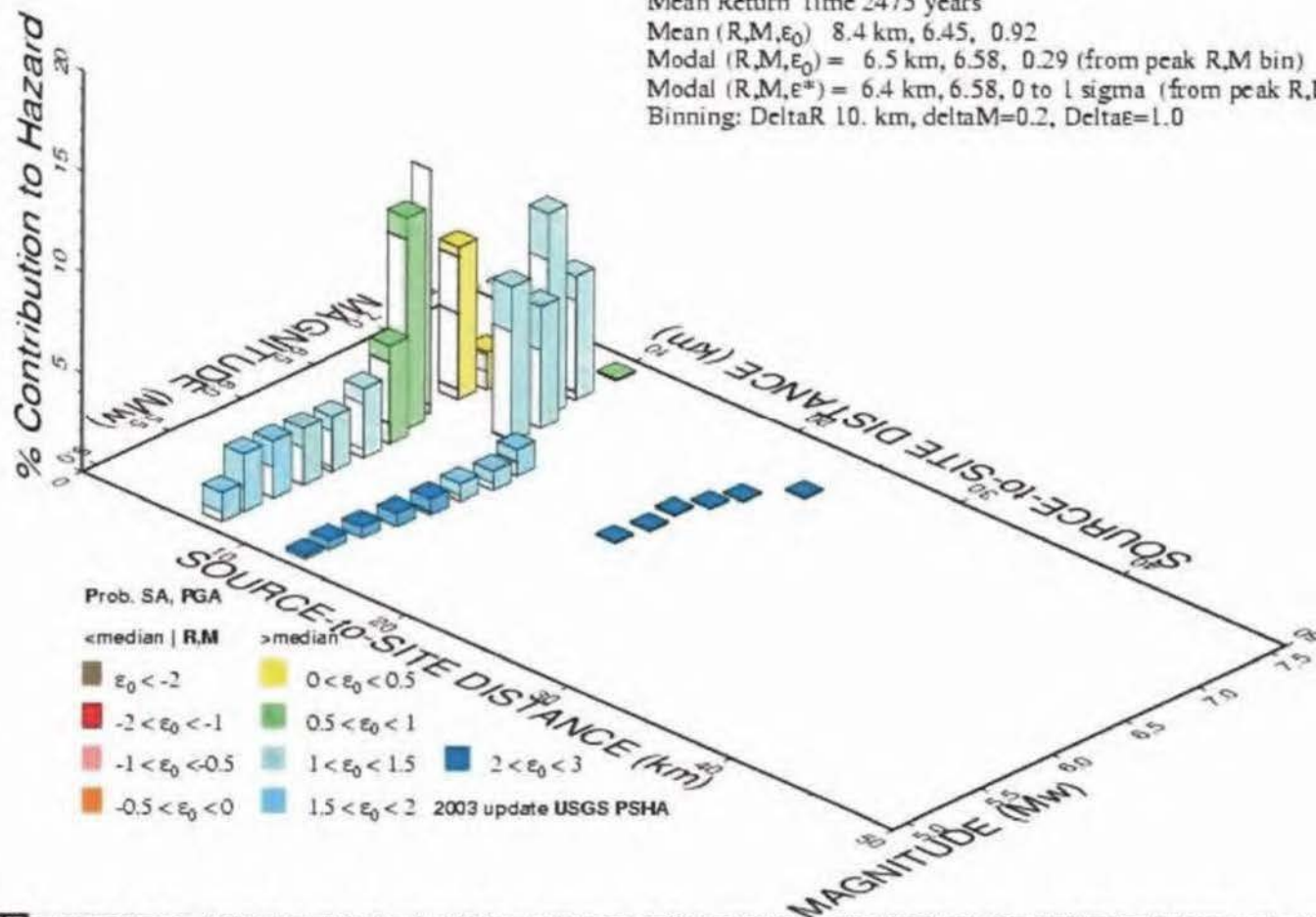
Mean Return Time 2475 years

Mean (R,M, ϵ_0) 8.4 km, 6.45, 0.92

Modal (R,M, ϵ_0) = 6.5 km, 6.58, 0.29 (from peak R,M bin)

Modal (R,M, ϵ^*) = 6.4 km, 6.58, 0 to 1 sigma (from peak R,M, ϵ bin)

Binning: DeltaR 10. km, deltaM=0.2, Delta ϵ =1.0



Conterminous 48 States
 2006 International Building Code
 Latitude = 33.531373
 Longitude = -117.67877
 Spectral Response Accelerations Ss and S1
 Ss and S1 = Mapped Spectral Acceleration Values
 Site Class B - $F_a = 1.0$, $F_v = 1.0$
 Data are based on a 0.01 deg grid spacing
 Period Sa
 (sec) (g)
 0.2 1.403 (Ss, Site Class B)
 1.0 0.497 (S1, Site Class B)

Conterminous 48 States
 2006 International Building Code
 Latitude = 33.531373
 Longitude = -117.67877
 MCE Response Spectrum for Site Class B
 Ss and S1 = Mapped Spectral Acceleration Values
 Site Class B - $F_a = 1.0$, $F_v = 1.0$

Period	Sa	Sd
(sec)	(g)	(inches)
0.000	0.561	0.000
0.071	1.403	0.069
0.200	1.403	0.548
0.355	1.403	1.724
0.400	1.244	1.944
0.500	0.995	2.430
0.600	0.829	2.916
0.700	0.711	3.402
0.800	0.622	3.888
0.900	0.553	4.374
1.000	0.497	4.860
1.100	0.452	5.346
1.200	0.415	5.833
1.300	0.383	6.319
1.400	0.355	6.805
1.500	0.332	7.291
1.600	0.311	7.777
1.700	0.293	8.263
1.800	0.276	8.749
1.900	0.262	9.235
2.000	0.249	9.721

Conterminous 48 States
 2006 International Building Code
 Latitude = 33.531373
 Longitude = -117.67877
 Spectral Response Accelerations SMs and SM1
 $SMs = Fa \times Ss$ and $SM1 = Fv \times S1$
 Site Class D - $Fa = 1.0$, $Fv = 1.503$

Period	Sa
(sec)	(g)
0.2	1.403 (SMs, Site Class D)
1.0	0.748 (SM1, Site Class D)

Conterminous 48 States
 2006 International Building Code
 Latitude = 33.531373
 Longitude = -117.67877
 Site Modified Response Spectrum for Site Class D
 $SMs = FaSs$ and $SM1 = FvS1$
 Site Class D - $Fa = 1.0$, $Fv = 1.503$

Period	Sa	Sd
(sec)	(g)	(inches)
0.000	0.561	0.000
0.107	1.403	0.156
0.200	1.403	0.548
0.533	1.403	3.895
0.600	1.246	4.383
0.700	1.068	5.114
0.800	0.935	5.844
0.900	0.831	6.575
1.000	0.748	7.305
1.100	0.680	8.036
1.200	0.623	8.766
1.300	0.575	9.497
1.400	0.534	10.227
1.500	0.498	10.958
1.600	0.467	11.688
1.700	0.440	12.419
1.800	0.415	13.149
1.900	0.394	13.880
2.000	0.374	14.610

Conterminous 48 States
 2006 International Building Code
 Latitude = 33.531373
 Longitude = -117.67877
 Design Spectral Response Accelerations SDs and SD1
 SDs = $2/3 \times \text{SMs}$ and SD1 = $2/3 \times \text{SM1}$
 Site Class D - $F_a = 1.0$, $F_v = 1.503$

Period (sec)	S_a (g)
0.2	0.935 (SDs, Site Class D)
1.0	0.498 (SD1, Site Class D)

Conterminous 48 States
 2006 International Building Code
 Latitude = 33.531373
 Longitude = -117.67877
 Design Response Spectrum for Site Class D
 SDs = $2/3 \times \text{SMs}$ and SD1 = $2/3 \times \text{SM1}$
 Site Class D - $F_a = 1.0$, $F_v = 1.503$

Period (sec)	S_a (g)	S_d (inches)
0.000	0.374	0.000
0.107	0.935	0.104
0.200	0.935	0.365
0.533	0.935	2.596
0.600	0.831	2.922
0.700	0.712	3.409
0.800	0.623	3.896
0.900	0.554	4.383
1.000	0.498	4.870
1.100	0.453	5.357
1.200	0.415	5.844
1.300	0.383	6.331
1.400	0.356	6.818
1.500	0.332	7.305
1.600	0.312	7.792
1.700	0.293	8.279
1.800	0.277	8.766
1.900	0.262	9.253
2.000	0.249	9.740

APPENDIX E

SECTION A-A'

Title: Continuing Life Rancho San Juan Capistrano

File Name: Section A-A' Upper Slide.gsz

Date: 1/13/2009

Method: Spencer

Factor of Safety: 0.823

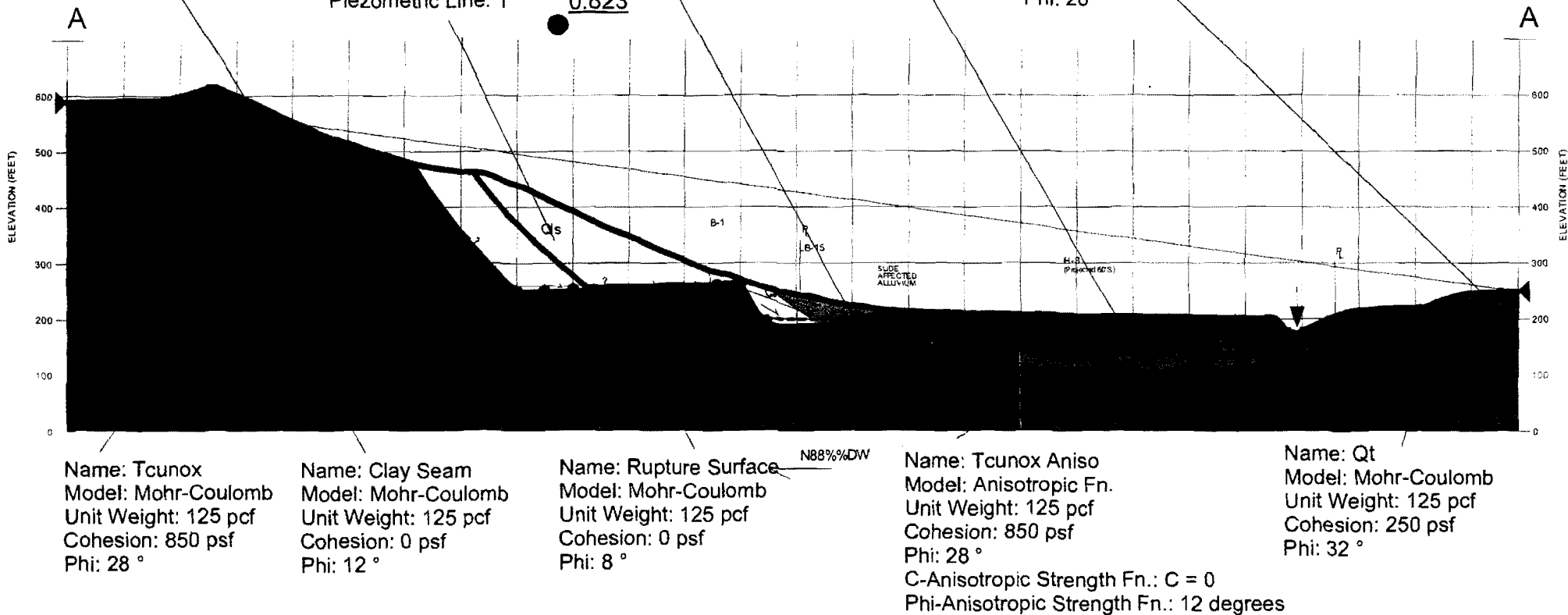
Name: Tcox
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 300 psf
Phi: 23 °

Name: Qls
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 250 psf
Phi: 22 °
Piezometric Line: 1

Name: Qls al
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 150 psf
Phi: 20 °
Piezometric Line: 1

Name: Qal
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 200 psf
Phi: 24 °
Piezometric Line: 1

Name: Afo
Model: Mohr-Coulomb
Unit Weight: 125 pcf
Cohesion: 300 psf
Phi: 26 °



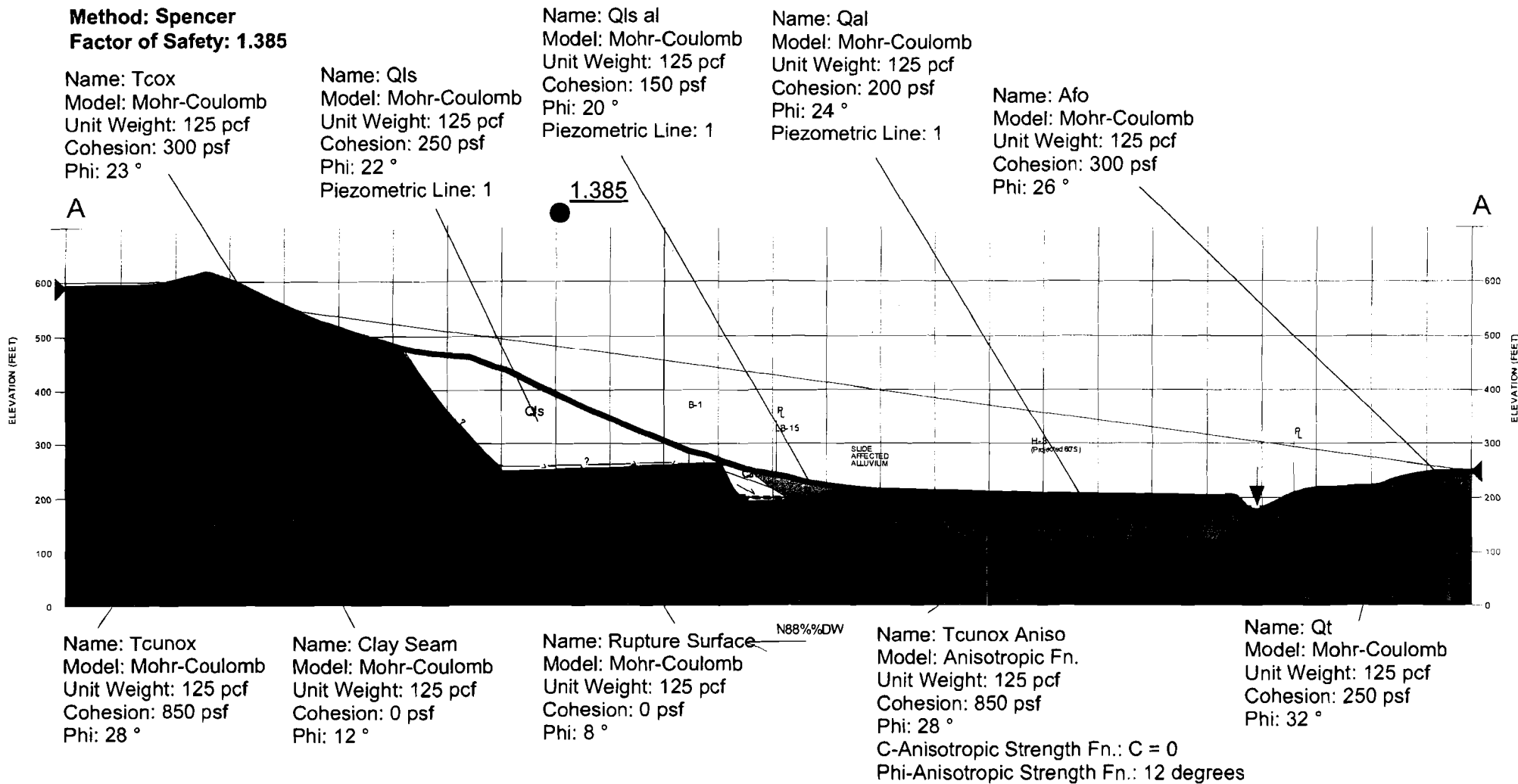
Title: Continuing Life Rancho San Juan Capistrano

File Name: Section A-A' Middle Slide.gsz

Date: 1/14/2009

Method: Spencer

Factor of Safety: 1.385



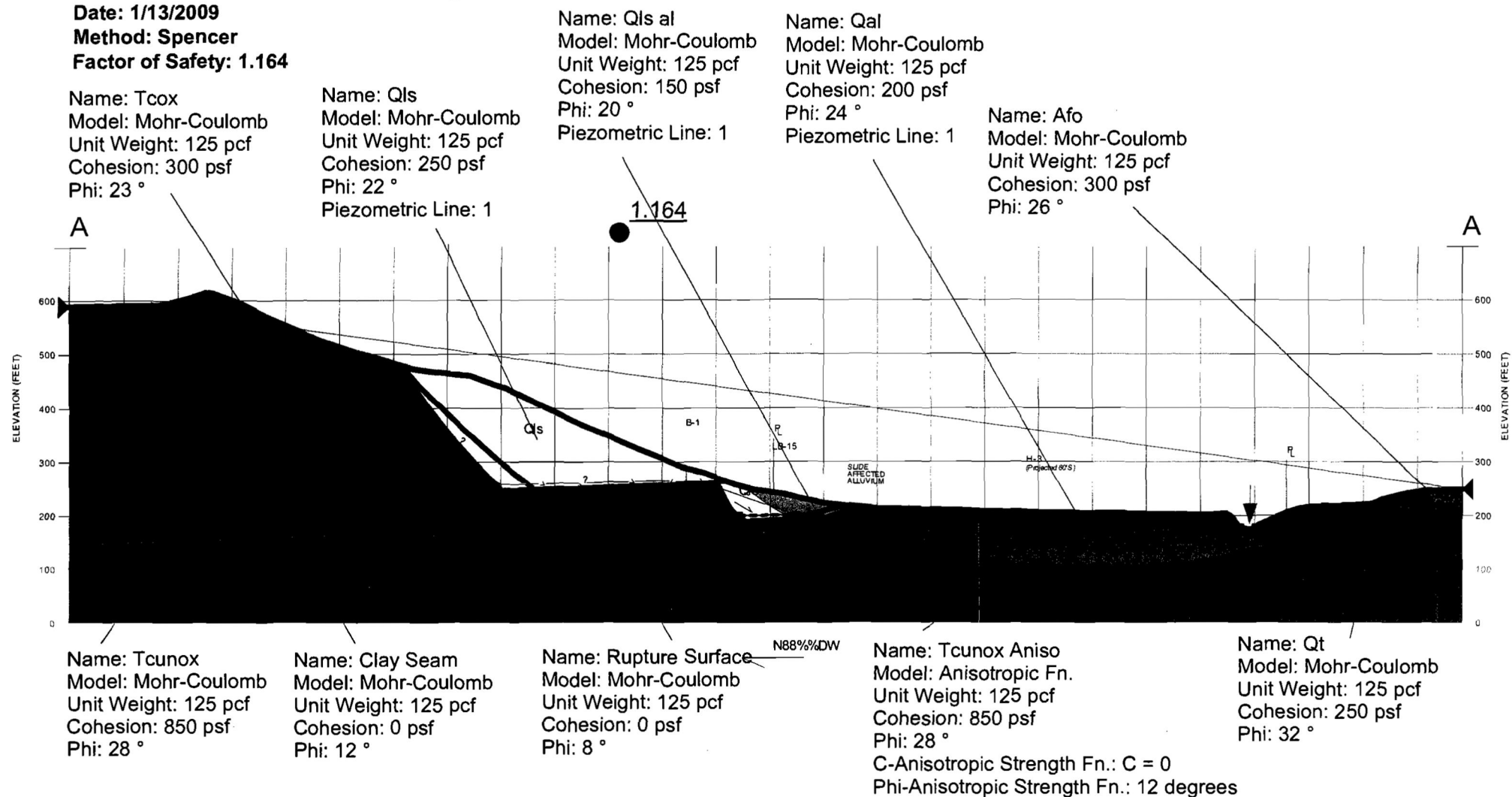
Title: Continuing Life Rancho San Juan Capistrano

File Name: Section A-A' Middle R Peak.gsz

Date: 1/13/2009

Method: Spencer

Factor of Safety: 1.164



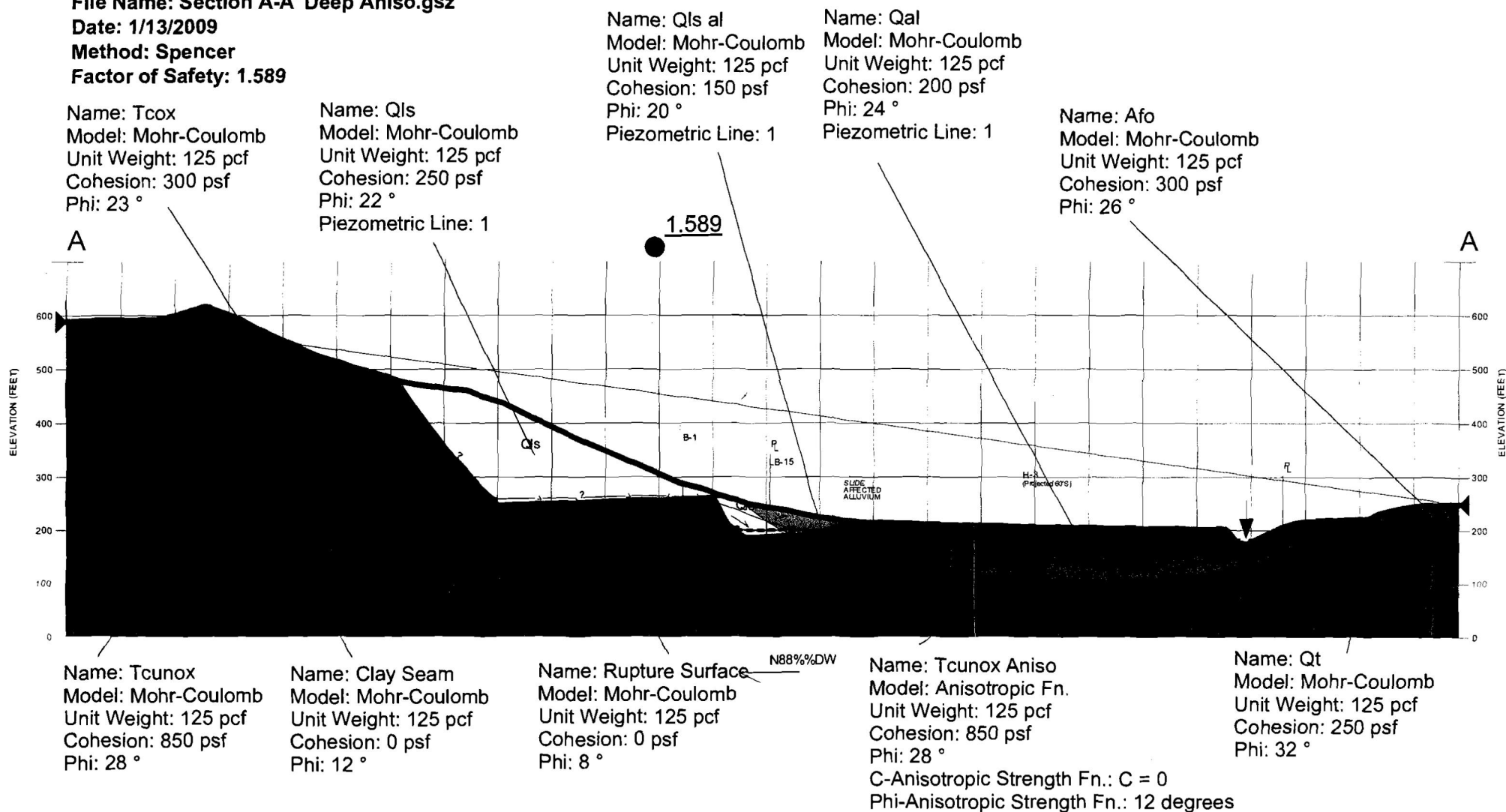
Title: Continuing Life Rancho San Juan Capistrano

File Name: Section A-A' Deep Aniso.gsz

Date: 1/13/2009

Method: Spencer

Factor of Safety: 1.589



SECTION B-B'

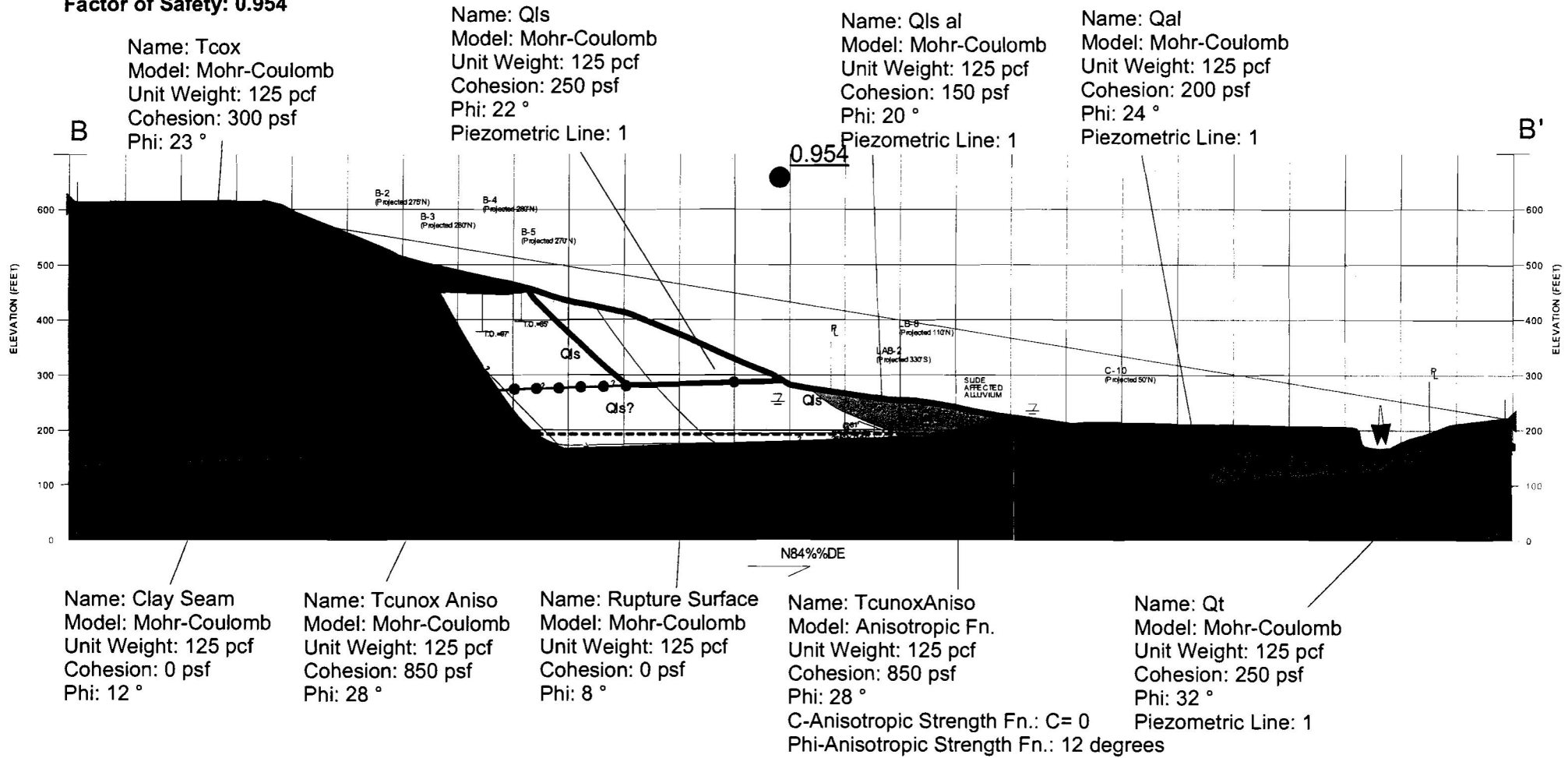
Title: Continuing Life Rancho San Juan Capistrano

File Name: Section B-B' Upper.gsz

Date: 1/14/2009

Method: Spencer

Factor of Safety: 0.954



Title: Continuing Life Rancho San Juan Capistrano

File Name: Section B-B' Middle.gsz

Date: 1/14/2009

Method: Spencer

Factor of Safety: 1.337

