

APPENDIX I

LABORATORY TESTING

Undisturbed and bulk samples of the landslide debris and bedrock were obtained from the borings and transported to the laboratory for testing and analysis. The samples were obtained by driving a ring lined barrel sampler conforming to ASTM D-3550 with successive drops of the Kelly bar weight. Experience has shown that sampling causes some disturbance of the sample, however the test results remain within a reasonable range. The samples were retained in brass rings of 2.50 inches outside diameter and 1.00 inches in height. The central portions of the samples were stored in close fitting, waterproof containers for transportation to the laboratory.

Moisture-Density

The dry density of the samples was determined using the procedures outlined in ASTM D-2937. The moisture content of the samples was determined using the procedures outlined in ASTM D-2216. The results are shown on the Log of Borings.

Maximum Density

The maximum dry density and optimum moisture content of the future compacted fill and soil cement were determined by remolding bulk samples of the slide debris using the procedures outlined in ASTM D 1557, a five-layer standard. Remolded samples were prepared at 90% of the maximum density. The remolded samples were tested for shear strength.

Boring	Depth (Feet)	Soil Type	Maximum Density (pcf)	Optimum Moisture %	Expansion Index
2	10-20	Silty Sand with 2% Cement	122.0	15.0	---
3	5-20	Silty Sand	115.5	16.0	76

Expansion Test

To find the expansiveness of the soil, a swell test was performed using the procedures outlined in ASTM D-4829. Based upon the testing, remolded samples of the existing slide debris are moderately expansive.

Shear-Tests

Shear tests were performed on samples of future compacted fill, future soil-cement fill, landslide debris, slide plane, and bedrock using the procedures outlined in ASTM D-3080 and a strain controlled, direct shear machine manufactured by Soil Test, Inc. The rate of deformation to determine the peak shear strength of the bedrock, slide debris, and compacted fill was 0.025 inches per minute. The rate of deformation to determine the residual shear strength by repeat shearing was 0.010 inches per minute. The samples were tested in an artificially saturated condition. Following shear tests, the moisture content of the samples was determined to verify saturation. The results are plotted on the "Shear Test Diagrams".

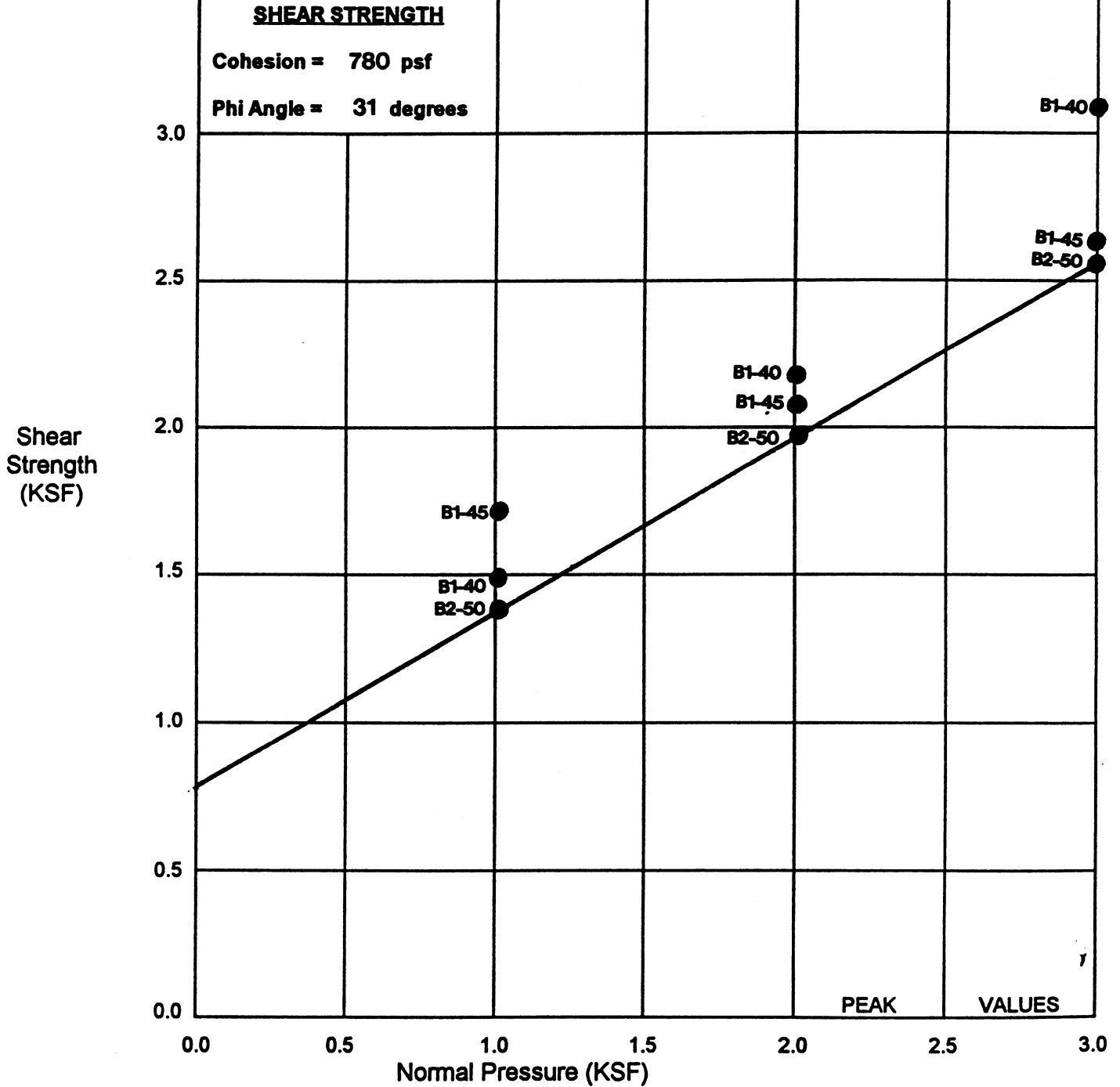
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SHEAR TEST DIAGRAM #1

JB: 17241-I COLER

SAMPLE: BEDROCK



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 14.8

Ave. Dry Density (pcf) = 118.4

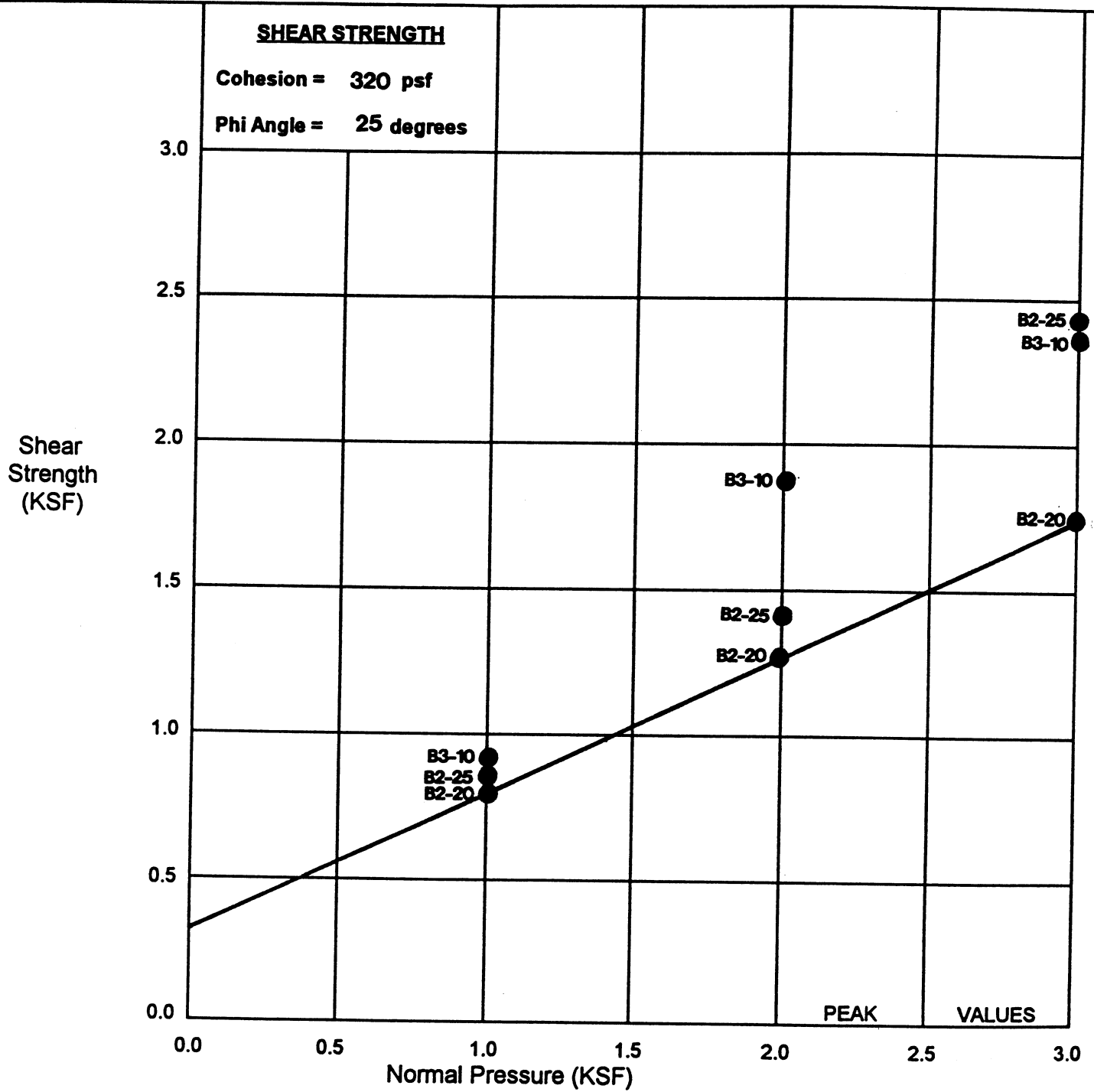
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SHEAR TEST DIAGRAM #2

JB: 17241-I COLER

SAMPLE: SLIDE DEBRIS



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 21.2

Ave. Dry Density (pcf) = 104.6

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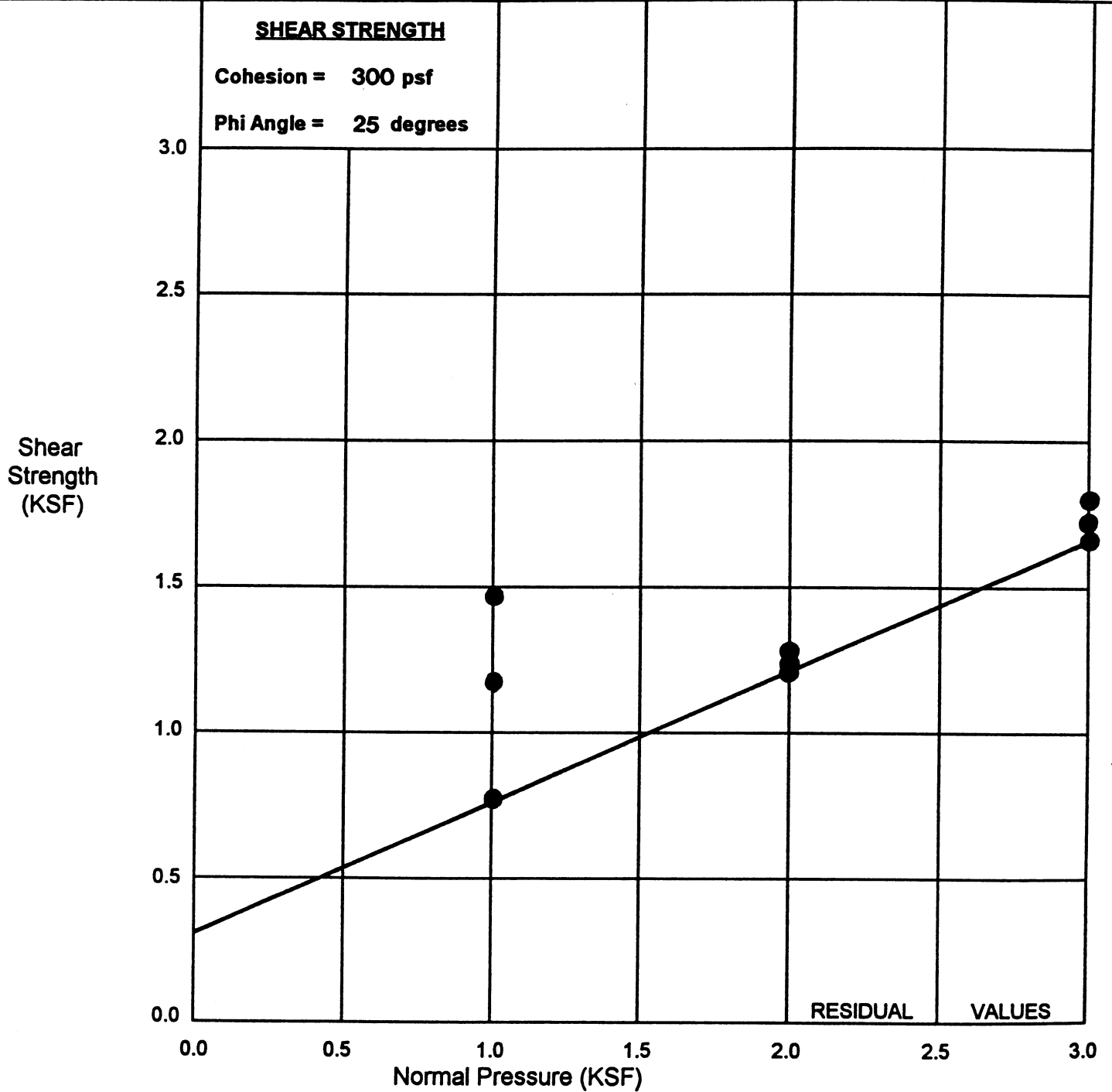
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SHEAR TEST DIAGRAM #3

JB: 17241-I COLER

SAMPLE: SLIDE PLANE B1-30

SAMPLE REPEATEDLY SHEARED PARALLEL TO SLIDE PLANE



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 15.8

Ave. Dry Density (pcf) = 116.4

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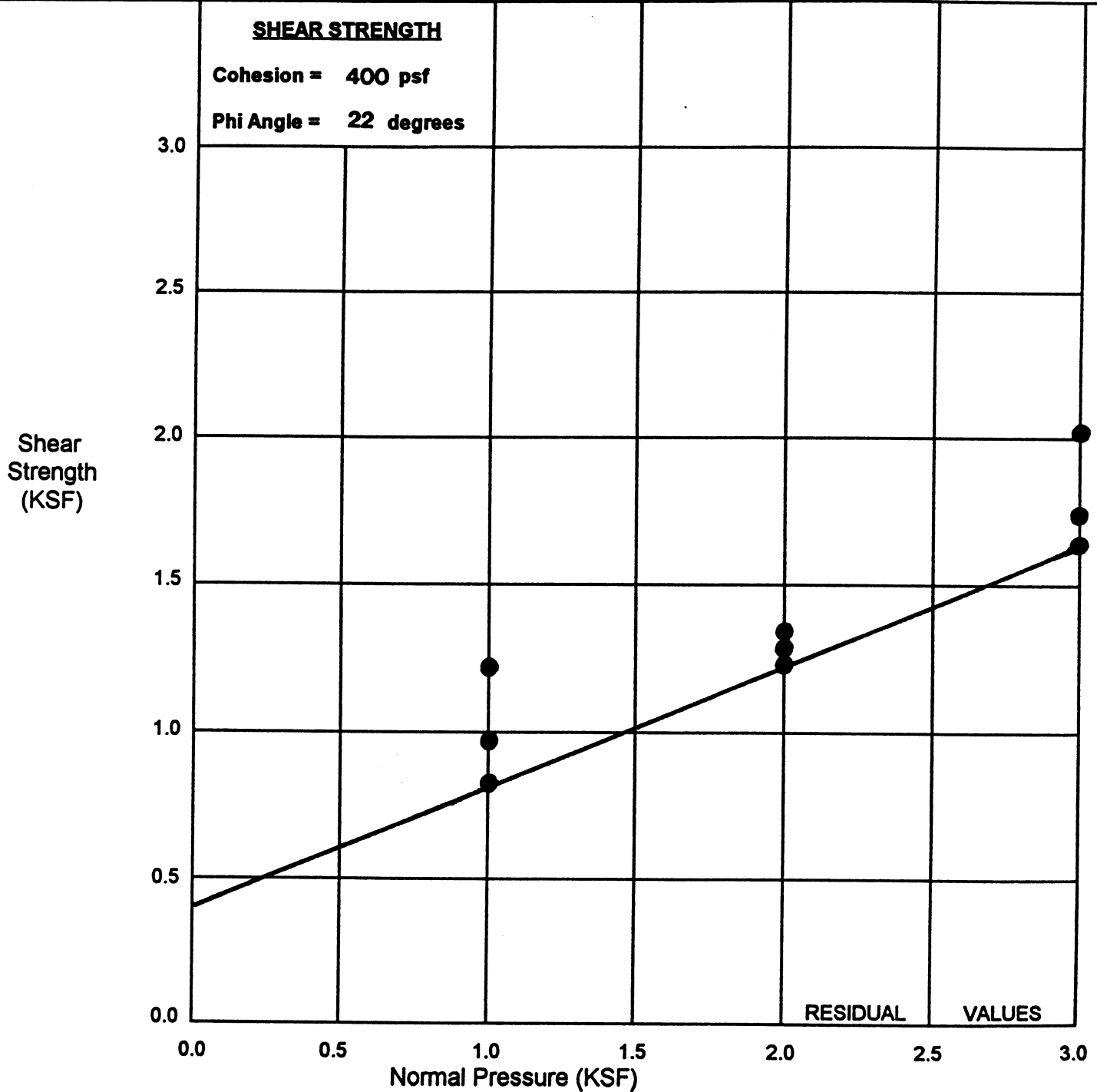
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SHEAR TEST DIAGRAM #4

JB: 17241-I COLER

SAMPLE: SLIDE PLANE B2-40

SAMPLE REPEATEDLY SHEARED PARALLEL TO SLIDE PLANE



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 11.4

Ave. Dry Density (pcf) = 113.4

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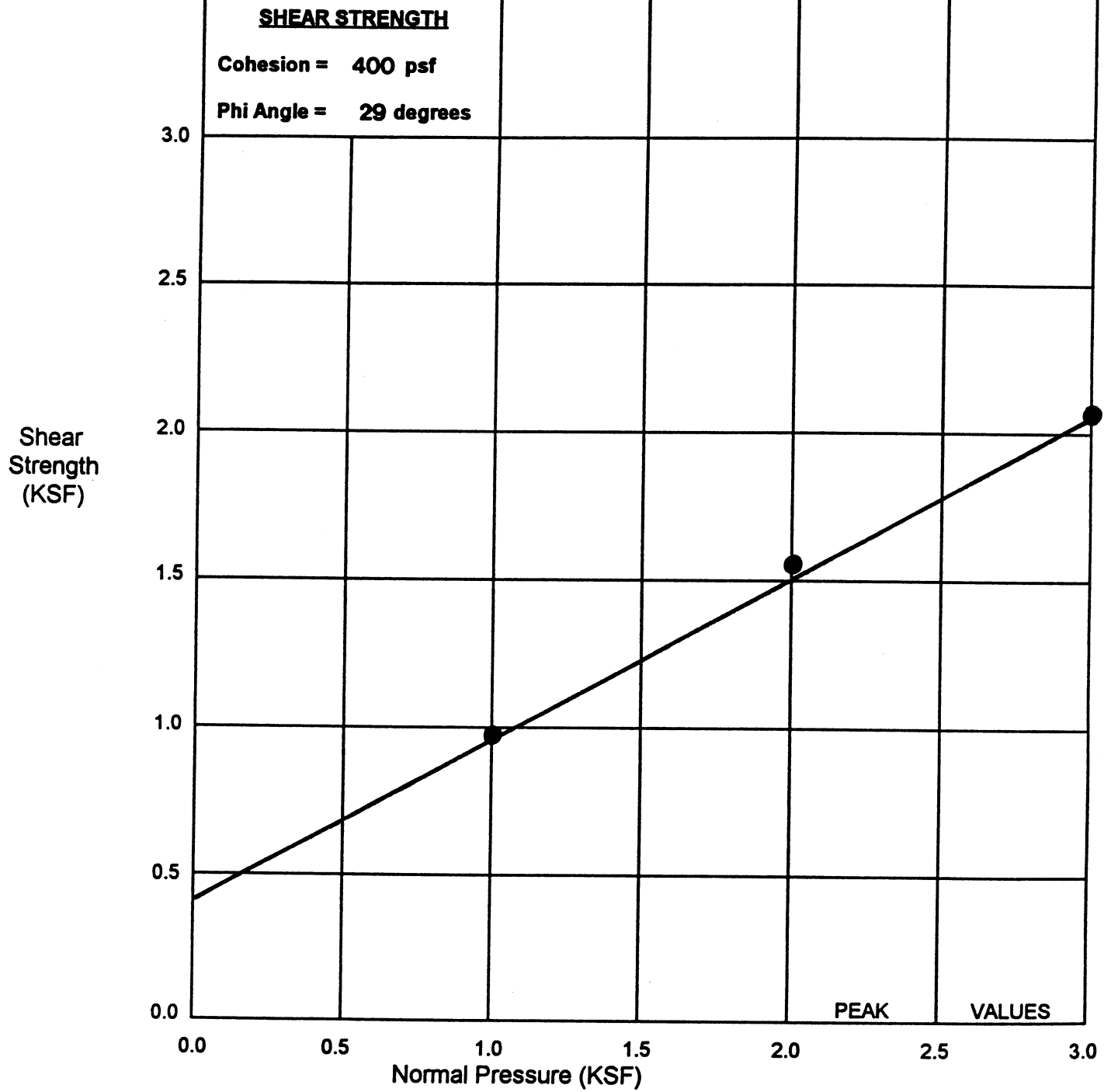
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SHEAR TEST DIAGRAM #5

JB: 17241-I COLER

SAMPLE: FUTURE COMPACTED FILL

NOTE: BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM DRY DENSITY



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 22.5

Ave. Dry Density (pcf) = 104.0

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AGGREGATE & SOIL INVESTIGATION

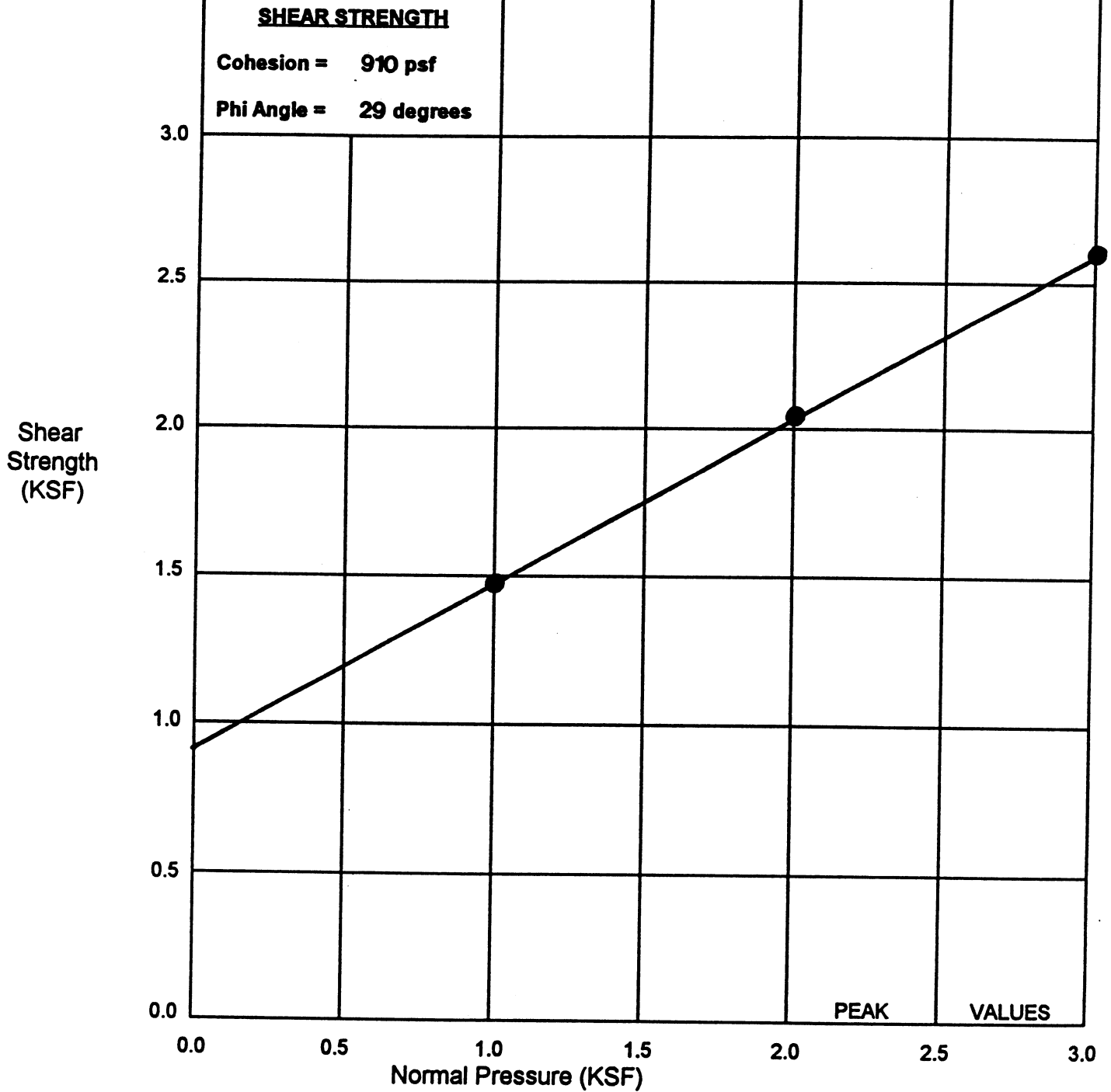
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SHEAR TEST DIAGRAM #6

JB: 17241-I COLER

SAMPLE: SOIL CEMENT

NOTE: BULK SAMPLE REMOLDED TO 92% OF THE MAX. DRY DENSITY WITH 2% PORTLAND CEMENT BY VOLUME



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 18.5

Ave. Dry Density (pcf) = 109.8

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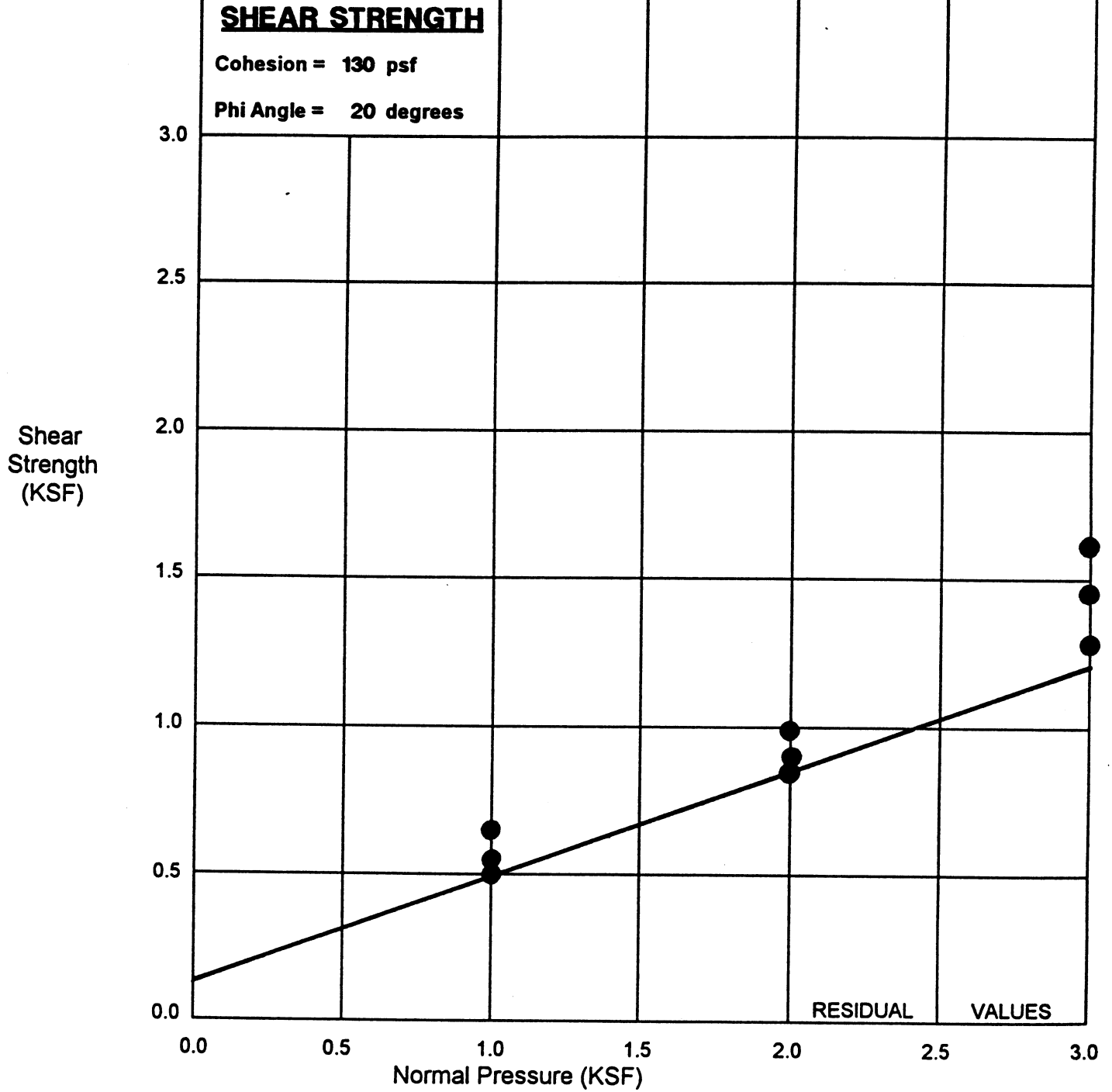
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SHEAR TEST DIAGRAM #7

JB: 17241-I COLER

SAMPLE: SLIDE PLANE B2-40

NOTE: Standard ring sample sheared repeatedly parallel to bedding.



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 16.9

Ave. Dry Density (pcf) = 113.4

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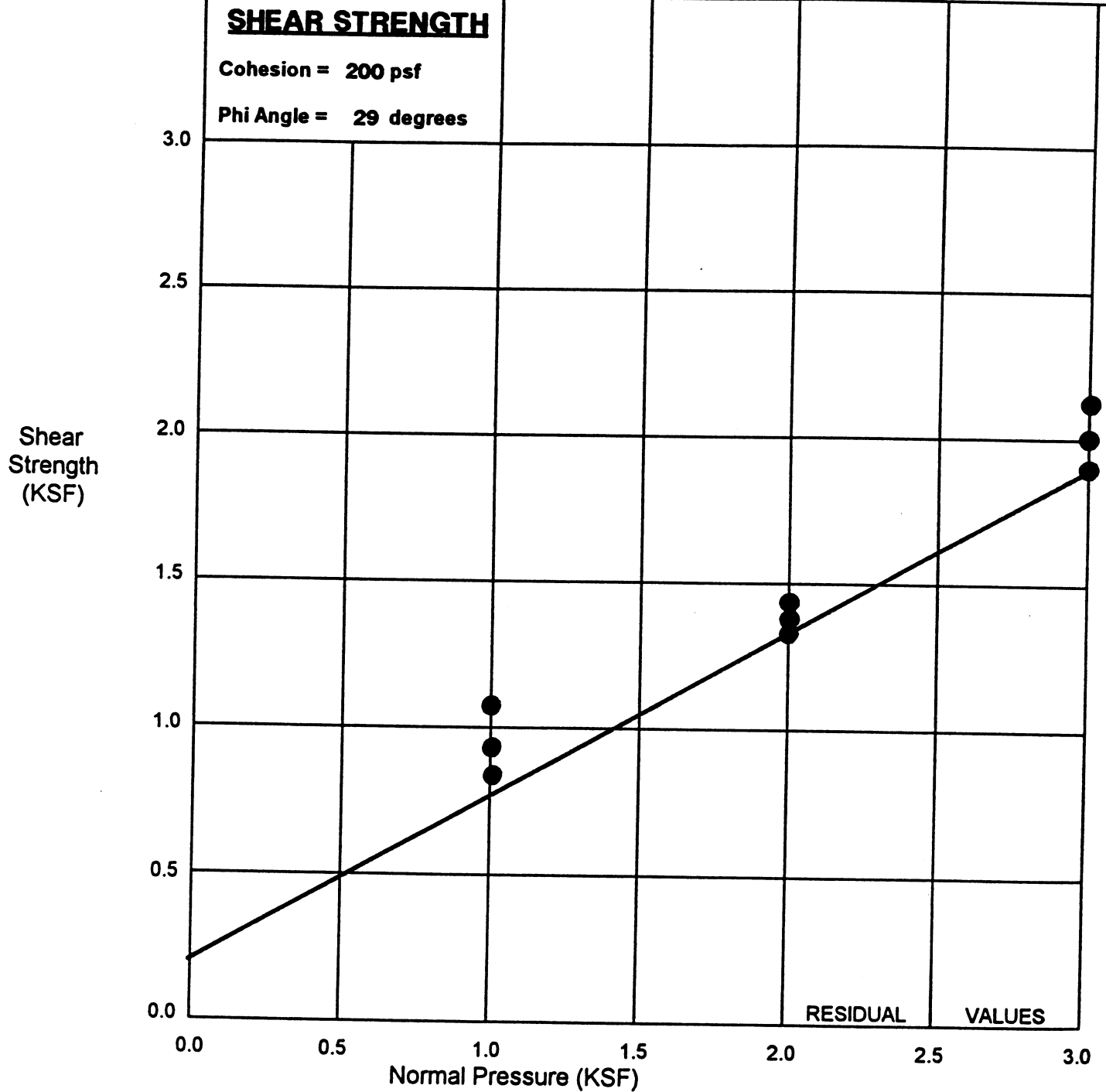
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SHEAR TEST DIAGRAM #8

JB: 17241-I COLER

SAMPLE: SLIDE DEBRIS B2-30

NOTE: Standard ring sample sheared repeatedly parallel to bedding.



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 16.0

Ave. Dry Density (pcf) = 114.9

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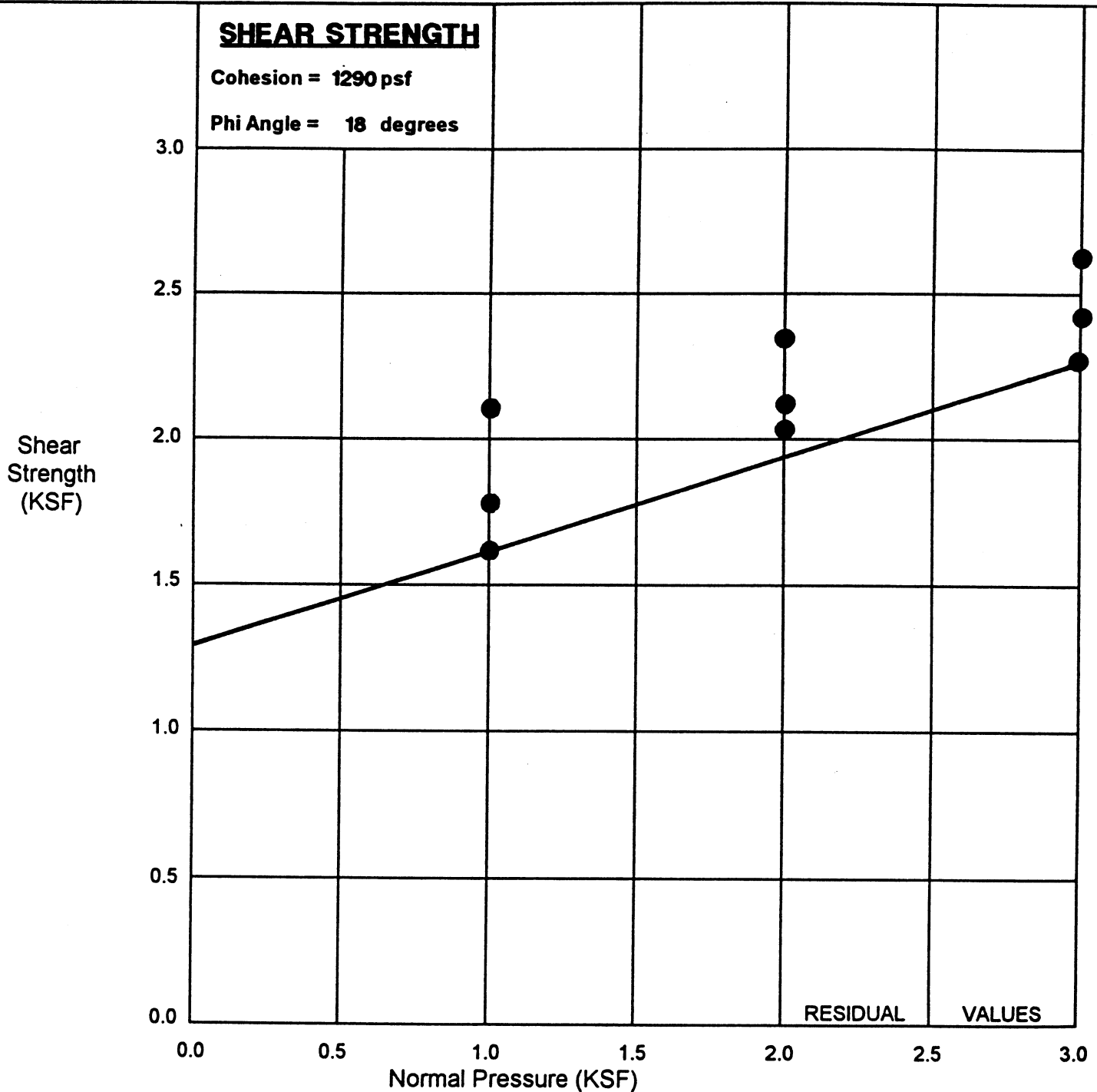
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SHEAR TEST DIAGRAM #9

JB: 17241-I COLER

SAMPLE: SLIDE DEBRIS B3-20

NOTE: Standard ring sample sheared repeatedly parallel to bedding.



○ Direct Shear (Field Moisture)

● Direct Shear (Saturated)

Ave. Moisture Content (%) = 17.1

Ave. Dry Density (pcf) = 106.0

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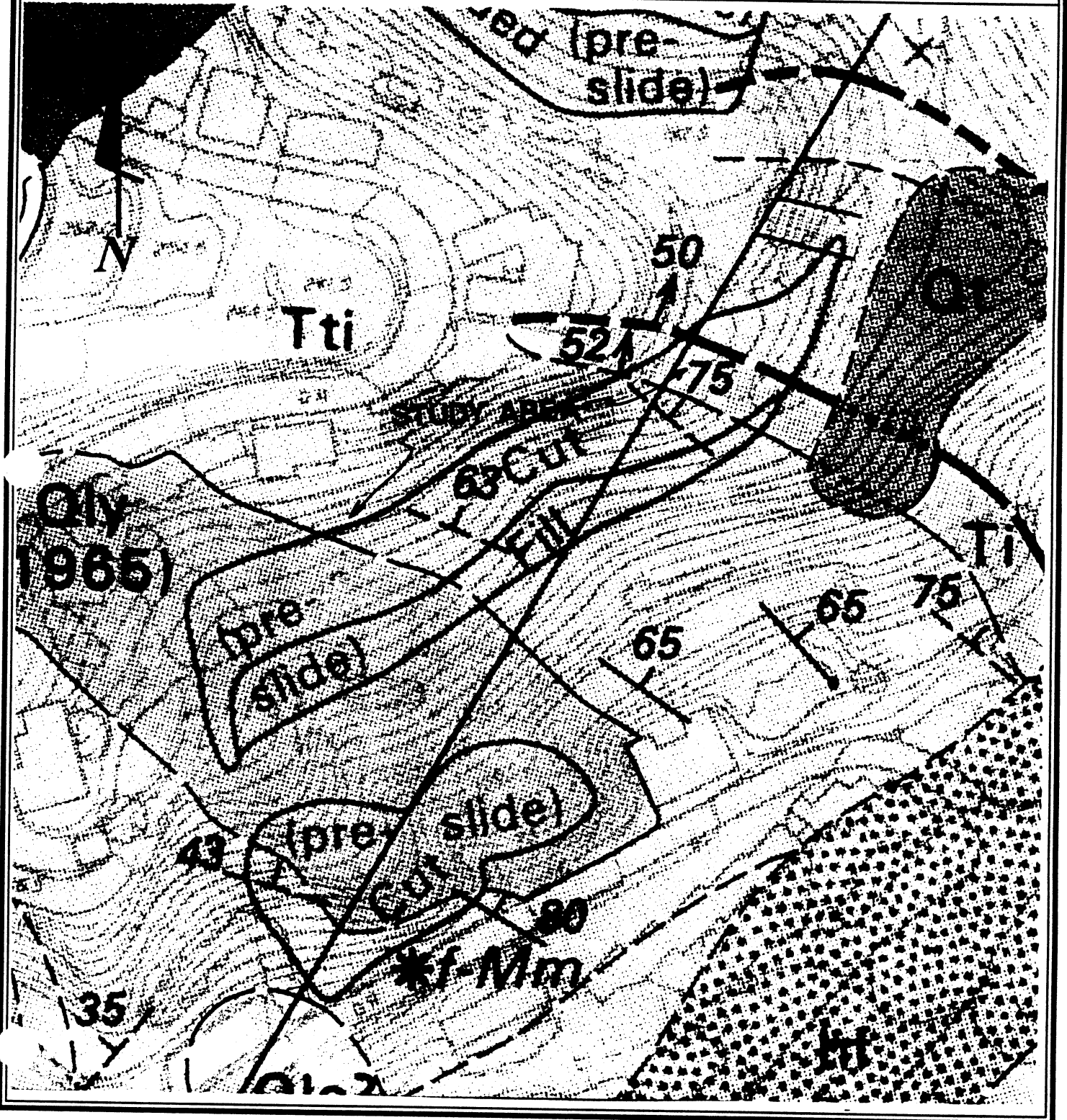
REGIONAL GEOLOGIC MAP

JB 18457-I PALISADES LANDMARK

CONSULTANT: JAI

SCALE: 1" = 100'

REFERENCE: Modified from J. T. McGill, 1989 (*Geologic Map of the Pacific Palisades Area*, CDMG Map I-1828)



LOG OF BORING 1

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JB: 17241-1

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 3/31/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	LANDSLIDE DEBRIS: Silty Sand, grey-brown, moist
				1	
				2	
				3	
				4	
				5	
				6	Sheared Siltstone, mottled gray, tan, and brown, moist
				7	
				8	
				9	
10	8	23.9	103.4	10	Contorted Siltstone and Sandstone, moist, dense, shear plane N25W; 45E
				11	
				12	
				13	
				14	
				15	
15	12	12.5	103.5	15	OLDER SLIDE DEBRIS: No slide plane between recent and older slide Cemented Sandstone, very hard, light brown, water perched on top, slight seep Interbedded Sandstone and Siltstone, moderately hard, thinly bedded, tight bedding, N85W;68N Sandstone, brown, moist, hard to very hard, massive
				16	
				17	
				18	
				19	
				20	
				21	
				22	
				23	
				24	
25	26	12.2	115.5	25	Sandstone, tan, moderately hard, friable, fractured, massive



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LOG OF BORING 1 (Continued)

JB: 17241-1

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 3/31/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				26	
				27	
				28	
				29	
30		15.0	116.4	30	Clay Gouge, blue-grey, plastic, deformed siltstone, contorted, abundant slicks, moderate to heavy seep 31 to 32 feet, bedding plane shear, N35W; 34N base of slide N30E, 15SE
				31	BEDROCK: Interbedded Siltstone and Sandstone, dark grey, moderately hard, tight, slightly weathered; bedding plane shear N55W; 49NE
				32	
				33	
				34	
35		18.9	108.4	35	Siltstone with Sandstone interbeds, dark grey, moderately hard, tight, slightly weathered
				36	
				37	
				38	
				39	
				39	
40	30	11.7	120.1	40	
				41	
				42	
				43	
				44	
45	19	14.0	115.5	45	<i>End at 45 Feet; No Caving, Slight Seep at 17 Feet; Moderate to Heavy Seep at 32 Feet.</i>

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LOG OF BORING 2

JB: 17241-1

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 4/1/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	LANDSLIDE DEBRIS: Silty Sand, grey-brown to tan, slightly moist to moist, medium dense
				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
				9	Silty Sand and Clayey Sand, orange-brown, very moist
10	3	17.3	113.0	10	
				11	
				12	
				13	Silty Sand, light brown to brown, moist, dense, contorted structure
				14	
15	3	26.7	95.3	15	
				16	Siltstone, contorted, blue-grey, moist to very moist, soft
				17	
				18	
				19	
20	4	17.3	105.0	20	N31W; 25SE, shear plane
				21	
				22	
				23	6 inch thick clay gouge, slicks, dark grey to blue-grey, plastic, slight seep N-S; 24E
				24	
25	4	16.6	101.5	25	

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LOG OF BORING 2 (Continued)

JB: 17241-I

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 4/1/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				26	
				27	
				28	Cemented Sandstone, grey
				29	N70W; 17N shear
30	9	15.3	114.9	30	Siltstone with Sandstone interbeds, contorted, light grey and dark grey
				31	
				32	
				33	
				34	
5	27	13.1	117.8	35	Sandstone, very hard, massive
				36	
				37	
				38	
				39	
40	3	11.4	113.4	40	Very sheared and contorted Siltstone, grey, saturated, slicks, joint, N15W; 75W, moderate to heavy seep, slide plane N75E; 14SE
				41	
				41½	BEDROCK: Siltstone with Sandstone interbeds, dark grey, moderate hard to hard, slightly weathered
				42	
				43	
				44	
45	19	13.6	119.1	45	
				46	
				47	Bedding N35W; 83N
				48	
				49	
50	35	13.6	119.5	50	



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LOG OF BORING 2 (Continued)

JB: 17241-I

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 4/1/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				51	
				52	
				53	Cemented Sandstone, coring required
				54	Siltstone and sandstone, dark grey-brown, moderately hard, slightly weathered
55	21	8.7	119.7	55	
				56	
				57	
				57½	Cemented Sandstone, hard, coring
				58	
				59	
60	25	10.5	114.7	60	
				61	
				62	
				63	
				64	
65	31	13.8	112.9	65	<i>End at 65 Feet; Slight Seep at 24 Feet; Moderate to Heavy Seep at 42 Feet; No Caving.</i>

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LOG OF BORING 3

JB: 17241-1

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 4/2/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				0	LANDSLIDE DEBRIS: Silty Sand, orange-brown, grey, tan, slightly dense to dense, slightly moist
				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
				9	
10	11	17.6	107.4	10	Contorted Siltstone, moderately hard, tight, chaotic structure
				11	
				12	
				13	
				14	
15	15	15.5	112.2	15	
				16	
				17	
				18	
				19	
20	11	18.7	108.0	20	Siltstone, moderately hard, very fractured, contorted, occasional roots, very oxidized, Bedding N35E; 73NW
				21	
				22	
				23	
				24	
				24	Silty Clay, blue-grey, saturated, slicks, plastic, slight to moderate seep, slide plane N55E; 25SE
25	14	---	---	25	BEDROCK: Conglomerate, blue-grey to grey, Sandstone and Quartzite clasts, matrix is friable, structureless, slightly weathered, no sample recovery

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LOG OF BORING 3 (Continued)

JB: 17241-1

CLIENT: Coler

GEOLOGIST: JAI

DATE LOGGED: 4/2/97

REPORT DATE: 5/6/97

Sample Depth (feet)	Blows Per Foot	Moisture Content %	Dry Density (pcf)	Depth (feet)	LITHOLOGIC DESCRIPTION
				26	cemented conglomerate, coring required
				27	
				28	
				29	
30	10	16.0	111.1	30	Sandstone with Siltstone interbeds, thinly bedded, N35W; 80N, Bedding
				31	
				32	
				33	
				34	
35	44	12.0	114.9	35	
				36	
				37	
				38	
				39	
				40	
				41	
				42	
				43	<i>End at 43 Feet; Slight to Moderate Seep 24 to 25 Feet; No Caving</i>

Project No: JB 18241-I

Log of Boring 4


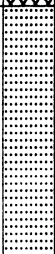



The J. Byer Group, Inc.
 1461 E. Chevy Chase Dr., Suite 200
 Glendale, CA 91206
 (818) 549-9959

Client: PALMER

Location: 17325 Castellammare Drive

By: JAI

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
142	0	Ground Surface								
		FILL: Silty Sand, gray-brown, moist, slightly dense, concrete fragments								
141	1									
140	2									
139	3	SLIDE DEBRIS: Relict Sandstone, mottled tan, buff, gray, slightly moist, soft, friable								
138	4									
137	5						8.9	119.3	64.3	
136	6									
135	7	Siltstone, moderately hard, brittle, chaotic structure, open fractures 1/4 - 1/2 inch								
134	8	Bedding: N20W; 65E								
133	9									
132	10	Sandstone and Siltstone, soft, moist, chaotic and discontinuous structure, tan, brown, gray, very fractured, fractures open 1/4 - 1/2 inch					19.6	103.5	89.8	
131	11									
130	12									
129	13									
128	14									
127	15						14.4	98.8		
126	16									
125	17									
124	18									
123	19									
122	20									

Surface: Graded Road

Drill Method: Hillside Bucket Auger Drill Rig

Drill Date: 3-23-00

Size:

Elevation: 142

Sheet: 1 of 3

Project No: JB 18241-I

Log of Boring 4

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 Glendale, CA 91206
 (818) 549-9959

Client: PALMER

Location: 17325 Castellammare Drive

By: JAI

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
121	21	same	[Symbol]				14.4	110.1	79.1	
120	22		[Symbol]							
119	23	6 Inch thick sheared clay, moist, soft, light gray, plastic	[Symbol]							
118	24	Sandstone, gray-brown, very soft, friable, massive	[Symbol]							
117	25		[Symbol]				18.1	111.4	100.0	
116	26		[Symbol]							
115	27		[Symbol]							
114	28		[Symbol]							
113	29	light seep	[Symbol]							
112	30		[Symbol]				17.5	112.9	100.0	
111	31		[Symbol]							
110	32	crushed and contorted bedrock, caving	[Symbol]							
109	33		[Symbol]							
108	34	slight to moderate seep	[Symbol]							
107	35		[Symbol]				13.7	119.9	100.0	
106	36		[Symbol]							
105	37	intensively sheared, dark gray	[Symbol]							
104	38		[Symbol]							
103	39	blue gray Sandstone and Siltstone, slightly moist, broken N70W; 10N Shear	[Symbol]							
102	40		[Symbol]							

Surface: Graded Road

Drill Method: Hillside Bucket Auger Drill Rig

Drill Date: 3-23-00

Size:

Elevation: 142

Sheet: 2 of 3

Project No: JB 18241-I

Client: PALMER

Location: 17325 Castellammare Drive

Log of Boring 4

By: JAI

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 1461 E. Chevy Chase Dr., Suite 200
 Glendale, CA 91206
 (818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
101	41	same	[Symbol]				16.9	107.2	85.6	
100	42	highly sheared, contorted, slicks, water seeping, Shear N38E; 17SE	[Symbol]							
99	43	N75W; 35N Bedrock between 42 and 48 feet continuous, but intense shearing along bedding planes, active deformation of bedrock, possible step forming in slide plane	[Symbol]							
98	44									
97	45									
96	46									
95	47	Sheared Bedrock, contorted, seeps, dark brown, base of slide, no clay gouge, N55W; 31N Bedding	[Symbol]							
94	48	BEDROCK: Siltstone and Sandstone, moderately hard to hard, well bedded, fissile, blue gray	[Symbol]							
93	49									
92	50						12.1	124.1	100.0	
91	51									
90	52									
89	53									
88	54	cemented Sandstone, blue-gray, hard	[Symbol]							
87	55	End at 55 Feet;	[Symbol]							
86	56									
85	57									
84	58									
83	59									
82	60									

Surface: Graded Road

Drill Method: Hillside Bucket Auger Drill Rig

Drill Date: 3-23-00

Size:

Elevation: 142

Sheet: 3 of 3

Project No: JB 18241-I

Log of Boring 5




















The J. Byer Group, Inc.
 1461 E. Chevy Chase Dr., Suite 200
 Glendale, CA 91206
 (818) 549-9959

Client: PALMER

Location: 17325 Castellammare Drive

By: JAI

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
135	0	Ground Surface								
		SLIDE DEBRIS:								
134	1	Silty Sand and Clayey Sand with Bedrock fragments, medium dense								
133	2									
132	3									
131	4									
130	5						16.8	107.4	85.5	
129	6									
128	7									
127	8									
126	9									
125	10						21.1	101.4	91.4	
124	11									
123	12	Relict Sandstone, gray, buff, and orange, moist, dense								
122	13									
121	14									
120	15						15.1	108.7	79.7	
119	16									
118	17	very moist to saturated								
117	18									
116	19	slight seep								
115	20									

Surface:

Drill Method: Hillside Bucket Auger Drill Rig

Drill Date: 3-25-00

Size:

Elevation: 135

Sheet: 1 of 3

Project No: JB 18241-I

Client: PALMER

Location: 17325 Castellammare Drive

Log of Boring 5

By: JAI

The J. Byer Group, Inc.
 1461 E. Chevy Chase Dr., Suite 200
 Glendale, CA 91206
 (818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
114	21	slight seep	[Symbol]				23.8	100.9		
113	22		[Symbol]							
112	23		[Symbol]							
111	24	crushed and broken bedrock, soft, saturated, caving, base of shallow slide, Shear N30E; 18SE	[Symbol]							
110	25	Siltstone and Sandstone, moderately hard, contorted, open fractures	[Symbol]							
109	26		[Symbol]							
108	27		[Symbol]							
107	28		[Symbol]							
106	29		[Symbol]							
105	30		[Symbol]							
104	31		[Symbol]							
103	32	heavy to moderate seep, caving, hole widens to 48 diameter	[Symbol]							
102	33		[Symbol]							
101	34		[Symbol]							
100	35		[Symbol]							
99	36		[Symbol]							
98	37		[Symbol]							
97	38		[Symbol]							
96	39		[Symbol]							
95	40		[Symbol]							

Surface:

Drill Method: Hillside Bucket Auger Drill Rig

Drill Date: 3-25-00

Size:

Elevation: 135

Sheet: 2 of 3

Project No: JB 18241-I

Client: PALMER

Location: 17325 Castellammare Drive

Log of Boring 5

By: JAI

The J. Byer Group, Inc.
 1461 E. Chevy Chase Dr., Suite 200
 Glendale, CA 91206
 (818) 549-9959

SUBSURFACE PROFILE

Elevation	Depth	Description	Symbol	USCS	Type	Blow Count	Moisture Content (%)	Dry Density (pcf)	% Saturation	Remarks
94	41	Sandstone and Siltstone, dark brown, thinly bedded	[Dotted Pattern]							
93	42		[Dotted Pattern]							
92	43		[Dotted Pattern]							
91	44	SHEARED BEDROCK: Clay, dark gray to black, moist	[Diagonal Lines]							
90	45	Sheared Siltstone and Sandstone, gray, moist	[Dotted Pattern]				14.1	118.1	98.1	
89	46		[Dotted Pattern]							
88	47	BEDROCK: Sandstone, dark gray, hard, massive, cemented, difficult drilling	[Dotted Pattern]							
87	48		[Dotted Pattern]							
86	49		[Dotted Pattern]							
85	50		[Dotted Pattern]				11.4	126.2	100.0	
84	51		[Dotted Pattern]							
83	52		[Dotted Pattern]							
82	53		[Dotted Pattern]							
81	54		[Dotted Pattern]							
80	55	End at 55 Feet; Water at 35 Feet.	[Dotted Pattern]							
79	56		[Dotted Pattern]							
78	57		[Dotted Pattern]							
77	58		[Dotted Pattern]							
76	59		[Dotted Pattern]							
75	60		[Dotted Pattern]							

Surface:

Drill Method: Hillside Bucket Auger Drill Rig

Drill Date: 3-25-00

Size:

Elevation: 135

Sheet: 3 of 3

B 70131-8-0618.0001 DATE 12/31/1998 F.T. AR DR. O.E. JJB CHKD JJB

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOW COUNT* (blows/ft.)	SAMPLE LOC.
150	5			2	ML
				<1	
145	10			1	SM
				<1	
140	15			2	
135	20			2	
130	25			5	
125	30			4	
120	35			20 for 10"	

BORING B-1

DATE DRILLED: November 24, 1998
 EQUIPMENT USED: 24" - Diameter Bucket
 ELEVATION: 155 Ft. (Mean Sea Level)

ARTIFICIAL FILL
 CLAYEY SILT - some fine Sand, few Gravel, some wood and steel fragments, slightly moist, firm, brown

Some wood fragments, some Cobbles (to 8-inches) brown
 Encountered 3-inch P.V.C. pipe

COLLUVIUM
 SILTY SAND - some bedrock fragments, reddish brown
 Sandstone fragment (7-inch thick)

Reddish brown to yellowish gray and black

Some Cobbles (to 6 inches), some angular bedrock fragments (to 12 inches)
 Seepage encountered on top of sandstone bed

LANDSLIDE DEBRIS
 SANDSTONE - massive, fine to medium-grained, highly weathered, very hard, yellowish brown
 Contact (top of sandstone bed): N70E, 32SE

CLAYEY SILTSTONE - highly weathered, moist, soft, light brown and yellow
 Moist, moderately firm, light brown

Moderately bedded, sheared, dark gray

Moist, moderately firm, dark bluish gray, unoxidized

* Number of blows required to drive the Crandall sampler 12 inches for depths of:
 0 to 25' using a 1600 pound kelly bar falling 12 inches;
 Below 25' using a 765 pound kelly bar falling 12 inches.

Some slickensides, sheared
 Well bedded layer

SANDSTONE - fine to medium-grained, damp, hard, gray
 Slightly cemented

END OF BORING AT 38'.

NOTE: Water seepage encountered at depths of 13' and 29'.
 Caving at 13' and below. Boring backfilled and tamped. Downhole logged by SFK.

LOG OF BORING


LAW/CRANDALL 

FIGURE A-1.1

JJB

JOB 70131-8-0618.0001 DATE 12/31/1998 F.T. AR DF. B O.E. JJB CHKD

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOW COUNT* (blows/ft.)	SAMPLE LOC.
160	5			2	ML
				< 1	ML
155	10			3	
150	15			8	
145	20			10	
140	25			15 for 10"	
135	30			25	
130	35				
125					

BORING B-2

DATE DRILLED: November 25, 1998
EQUIPMENT USED: 24" - Diameter Bucket
ELEVATION: 163 Ft. (Mean Sea Level)

5" Asphalt Paving
ARTIFICIAL FILL:
 CLAYEY SILT - medium brown, firm, moist, some 1/4 to 3-inch brick fragments in upper foot, root hairs and roots to 1/8-inch in diameter

TERRACE DEPOSITS
 CLAYEY to fine SANDY SILT - mottled light yellow to medium brown, soft to firm, very moist, mineralized rootlets, some pin-hole porosity

BEDROCK - Interbedded light gray to light yellow brown sandstone and light to medium gray siltstone and shale, moist, thinly to thickly bedded, friable, slightly cemented sandstone with intermittent 3 to 6 inch concretions, gypsum crystals within the siltstone
 8 1/2' - Bedding: N25E, 32SE
 10' - Fault: N15W, 75NE

13 1/2' - Carbonate filled joints 1/16 to 1/8-inch, some light red iron staining

15 1/2' - Bedding: N85E, 50NW - intermittent gypsum crystals to 1/4-inch thick along bedding

17' - Bedding: EW, 84N - slickensides along bedding

21 1/2' - Well cemented lenticular concretion 2 to 3-inch thick

22' - Shear: N28W, 62SW - 1/4-inch wide clay seam
Unable to correlate strata across shear

25' - Bedding: N10E, 46SE - 2 to 3-inch gouged clay seam with 1/4-inch thick gypsum along bedding, groundwater seepage along east clay seam contact

32' - Color change to dark blue gray, intermittent well cemented layers from 2 to 6-inch thick

34' - Bedding: N24E, 50SE; 3-inch thick well cemented Sandstone layer

NOTE: Slight groundwater seepage at 25'. No caving. Boring backfilled and tamped. Downhole logged by JJB.

BORING TERMINATED AT 39' DUE TO REFUSAL IN WELL CEMENTED SANDY SILTSTONE.

LOG OF BORING

LAW/CRANDALL



FIGURE A-1.2

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditions at other locations and times.

ELEVATION (ft.)	DEPTH (ft.)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOW COUNT* (blows/ft.)	SAMPLE LOC.
135				5	ML-CL
	5			7	ML
130					
	10			17	
125					
	15			25 for 10"	
120					
	20			20	
115					

BORING B-3

DATE DRILLED: November 25 1998
 EQUIPMENT USED: 24" - Diameter Bucket
 ELEVATION: 136 Ft. (Mean Sea Level)

ARTIFICIAL FILL
 CLAYEY SILT to SILTY CLAY - mottled light yellow brown to dark brown, moist, firm, abundant roots in upper foot to maximum 1/4-inch diameter

TERRACE DEPOSITS
 CLAYEY SILT - with Sand, medium brown, moist, firm, some intermittent gravel to 2-inch maximum diameter
 Dark reddish brown, moist, firm to stiff, massive, some minor root hairs, some intermittent gravel to a maximum 2-inch diameter
 6' - Cobbles and Boulders in 2-foot thick layer up to 18-inch diameter, loose sandy matrix, raveling and belling of hole in this zone from 2 to 3 feet, clasts predominately of granitic and metamorphic composition

BEDROCK - Weathered Basalt; mottled light yellow brown, light reddish brown and dark gray, massive, friable, randomly oriented carbonate veins
 9' - Shear: N52E, 85NW

Becoming harder and less weathered

BORING TERMINATED AT 22' DUE TO REFUSAL IN HARD BASALT.

NOTE: Groundwater not encountered. Raveling from 6 to 8 feet. Boring backfilled and tamped. Downhole logged by JJB.

LOG OF BORING

FIGURE A-1.3

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

DATE DRILLED: September 10 & 11, 1980
 EQUIPMENT USED: 12"-Diameter Auger

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE	STD. PEN. TEST	MOISTURE (% of dry wt)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-lbs/ft.)	SAMPLE LOC.
155	5						
150	10						
145	15						
140	20	21.5	104		12		
135	25						
		14.9	110		53		
130	30						

ELEVATION 160*

FILL - CLAYEY SILT - some Sand, few siltstone fragments, brown

SILTSTONE - Clayey, weathered, fractured, bedded, thin beds of sandstone, streaks of gypsum, mottled brown

Beds of sandstone
 Cemented beds of sandstone

Reddish-brown

Thin Clay layer (POSSIBLE PLANE OF FAILURE)
 Bark grey to black

Thin Clay layer (POSSIBLE PLANE OF FAILURE)
 SANDSTONE - fine grained, fractured, dark grey and brown
 Cemented, light bluish-grey

NOTE: Water not encountered. No caving.

*Elevations refer to datum of reference drawing; see Plate 1.

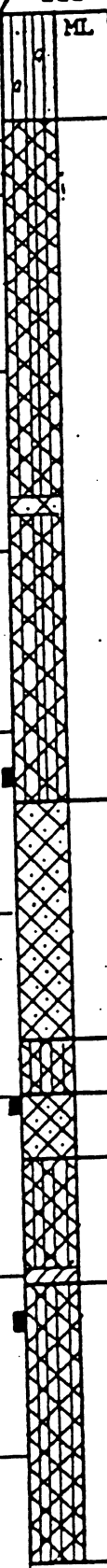
LOG OF BORING

DATE DRILLED: Sep. 16, 1980
 EQUIPMENT USED: 12"-Diameter Auger

ELEVATION 158

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

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE	STD. PEN. TEST	MOISTURE (% of dry wt.)	DRY DENSITY (lb./cu. ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC.
155	5						
150	10						
145	15						
140	20						
135	25	15.5	109	7			
130	30	11.9	109	33			
125	35	25.6	96	32			
120	40						
115	45						



FILL - SANDY & CLAYEY SILT - pieces of brick, few roots, brown

SILTSTONE - Clayey, weathered, fractured, bedded, thin beds of sandstone, streaks of gypsum, brown and grey

Bed of Silty Sandstone

NOTE: Water seepage encountered at a depth of 36'. About 6' of water at bottom of boring at completion of drilling. Possible caving at 30' to 32'.

SANDSTONE - fine grained, fractured, light yellowish - brown
 Beds of siltstone

Thin cemented beds

Dark brown and grey

SILTSTONE - fractured, bedded, beds of shale and sandstone, dark grey

SANDSTONE - fine grained, fractured, beds of siltstone (dipping at 80°), streaks of gypsum, grey

SILTSTONE - Clayey, fractured, bedded, dark brownish-grey

Layer of Clay (PROBABLE FAILURE PLANE)

SILTSTONE - fractured, bedded, beds of shale, greenish-brown

Sandy

DATE DRILLED: September 15, 1980
 EQUIPMENT USED: 12"-Diameter Auger

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

ELEVATION (ft.)	DEPTH (ft.)	"N" VALUE	STD. PEN TEST MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-kips/ft.)	SAMPLE LOC.	
150							FILL - SANDY AND CLAYEY SILT - some Silty Sand, pieces of wood, dark brown
145	5						Thin layers of Sand
140	10		24.4	99	11		SILTSTONE - Clayey, weathered, fractured, bedded, thin beds of sandstone, streaks of gypsum, brown
135	15						Light grey and brown
130	20		20.8	102	18		Bedding dipping at 40°
25							Thin cemented sandstone bed

(CONTINUED)

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

BORING 3 (CONTINUED)

DATE DRILLED: September 15, 1980

EQUIPMENT USED: 12"-Diameter Auger

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

ELEVATION (ft)	DEPTH (ft)	"N" VALUE	STD. PEN. TEST MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	DRIVE ENERGY (ft.-lbs./ft.)	SAMPLE LOC.
125						
	30		24.2	104	12	
120						
	35					
115						
	40		13.5	114	20	
110						
	45					
105			14.4	100	6	
50						

SANDSTONE - fine grained, fractured, thin beds of shale, light brown
 Clay layer (PROBABLE PLANE OF FAILURE)
 SILTSTONE - Clayey, fractured, bedded, brownish-grey

Dark grey to black

Bedding dipping at 45°

SANDSTONE - fine grained, fractured, grey to light grey
 SILTSTONE - Clayey, fractured, bedded, thin beds of sandstone, dark grey to black

NOTE: Water not encountered. No caving.

LOG OF BORING

LeROY CRANDALL AND ASSOCIATES

Project Name: 11- JASSOLI Site: STATE REVENUE DRIVE Date: 22 NOVEMBER 1981 Log by: R. CURTIS / P. REEVE Scale: 1" = 2' R.O.D. or 2
 Project Number: 7922-6 Date: 1983

EXPLORATORY BORING NO. B-1

SAMPLE NO.	SAMPLE DEPTH	DIP	MOIST %	DENSITY	S	C	RCHS	DEPTH	MIC	ATTACHES	UNIT	DESCRIPTION	DRILLING CONDITIONS	
													ft/min	Feet/min
101	5'		101	112.6			1/2	5			Q1s (sf)	FINE SANDY, CLAYEY SILT - MEDIUM RED BROWN, MODERATELY MOIST, FIRM. SUBROUND TO SUBANGULAR CRYSTALLINE PEBBLES TO 1/2 INCH MAXIMUM DIAMETER. 0-3 GRAPES TO 3/4 INCH ORANGE BROWN. ABUNDANT 1/4" PEBBLES TO 1/2 INCH MAXIMUM DIAMETER. INCREASING CLAY CONTENT		
104	10'		104	109.7			1/2	10			Q1s (Qs)	SUBMILT SILTY FINE SAND - DARK ORANGE BROWN, SUBMILTLY MOIST, MODERATELY DENSE, ROUNDED PEBBLES AND SUBANGULAR DEBRIS FRAGMENTS TO 2 INCHES MAXIMUM DIAMETER. KATOVENA TO 4 INCHES MAXIMUM DIAMETER.		
								15			Q1s (Qs)	CLAYEY SILTY FINE SAND - ORANGE BROWN, MOIST, MODERATELY DENSE TO DENSE. ABUNDANT ROUNDED PEBBLES TO 1 1/2 INCHES MAXIMUM DIAMETER. Q13 1/2" INCREASE IN SILT AND FINE TO MEDIUM SAND, DECREASING IN PEBBLES		
								20			Q1s (Em)	INTERBEDDED SILTSTONE AND SANDSTONE - OLIVE GRAY (LTP) TO PALE ORANGE REDDISH, MOIST, MODERATELY DENSE, WIDELY JOINTED, TIGHTLY JOINTED. IRON OXIDE STAINING ON JOINT SURFACES. CAUCHE INFILTRATION OF JOINTS. SCATTERED KATOVENTS.		
25'	25'		227				1/2	25			Q24	Q24' MOIST TO VERY MOIST; SCATTERED G. ABOURITE DEBRIS		
26'	26'		202				1/2	26			Q25'-26'	Q25'-26': RUPTURE SURFACE		

Project Name: **JANSON**
 Well Name: **1571 REEFIELD DRILL**
 Date: **23 NOVEMBER 1968**
 Log by: **J. CURTIS / P. REEL**
 Well No.: **2**

EXPLORATORY BC

SAMPLE NO.	DEPTH	LR	MOIST %	DEPTH	f	c	RCMS	SAMPLE DEPTH	GRAVIMETRIC LOSS	ATTIBUTES	UNIT	DESCRIPTION
30	102		120.1				3/4	30		D20' N40W 36S E3.	D16 (FMT)	D26' PLASTIC CLAY - BLUE GRAY. SOFT. MOIST TO VERY MOIST. SCATTERED CARBON DEPOSIT.
										D20' N75E 72N T N 31W 19S T 41E 7M T	BEDROCK PARTIAL FORMATION	INTERBEDDED SILTSTONE AND SANDSTONE. BLUE GRAY TO FALE BLUE GRAY (S1) MODERATELY TO MOST MODERATELY DENSE. HIGHLY JOINTED. MODERATELY TO HIGHLY OPEN JOINTS. THINLY INTERBEDDED.
										D21' E-W 81N T		D22' OPEN JOINTS WITH EVAPORITE DEPOSITS INFILLING JOINTS
										D25' N40W 20N B		D24' THINLY JOINTED, MODERATELY DENSE TO DENSE
										D25' N45W 49S T		
										D30' N40W 20N B		D31' 18 INCH THICK SANDSTONE BED. DENSE
										D38' N72W 35N B		
										D45' N40W 43N B		
										D45' N81W 48N B		
50	148		104.6				19/30	50		D46' N70W 30N B		D49' ANNE & BOUNDWAREE SEEP WITHIN SANDSTONE BED

END OF LOGGING

EXPLORATORY BORING NO. B-2

Project Name: **L. HASSON**
 Project Number: **7392-6**
 Site: **11111 GAVILAN DRIVE**
 Location: **1181**
 Date: **21 NOVEMBER 1982**
 Log by: **R. GARCIA**

Elevation: **21.688**
 Depth: **1** ft **0** in **3**

STAMP NO.	STAMP DEPTH	DP.	WGT %	CRSNTY	f	c	h ft	h in	GRAVIM LOG	ATTACHED	UNIT	DESCRIPTION	DRILLING EQUIPMENT REMARKS
											Q1s (a1)	CLAYEY, SILTY, FINE SAND - DARK BROWN. DRY TO SLIGHTLY MOIST. FIRM DUE TO DRYNESS. SOME ROOTS ABUNDANT. PRESENT OF CONCRETES. GRAIN SIZE. END WELL.	
	4'	60	100	111.0			1/2				Q1s (Q3w)	CLAYEY, SILTY, VERY FINE SAND - DARK BROWN. MOIST. LOOSE TO MODERATELY DENSE AT 3 FEET. SCATTERED ROUND PEBBLES TO 2 1/2 INCHES MAXIMUM DIAMETER.	
	5'		11	1071			1/2				Q1s (Ew1)	MEDIUM TO COARSE GRAINED SAND WITH ABUNDANT PEBBLES TO 2 1/2 INCHES IN MAXIMUM DIAMETER. SLIGHTLY MOIST. DENSE. INTERBEDDED SILTSTONE AND FINE GRAINED SANDSTONE - THINLY INTERBEDDED TO LAMINATED. PALE YELLOW BROWN (S1), OLIVE BROWN (S1) TO LOCALLY GRANULIFEROUS (STAINED) MODERATELY DENSE, SCATTERED OPEN JOINTS. SLIGHTLY MOIST TO MOIST, WEATHERED.	
	10'		41.5	850			2/3				Q1s (Q3w)		
	15'		37	1150			1/2				Q1s (Ew1)		
	20'		180	1064			1/2				Q1s (Q3w)		
	25'		6.5	1212							Q1s (Q3w)		

Q1s - MEDIUM TO COARSE GRAINED SANDSTONE, OLIVE BROWN MOIST.

Project Name: J. Hession Date: 17-11-1958 Location: REVISED QUAY Sheet: 2 of 3
 Project Number: 7932-B Date: 17-11-1958 Location: REVISED QUAY Sheet: 2 of 3
 Log No: 1181 Log No: 1181 Log No: 1181

EXPLORATORY BORING NO. B-2

DEPTH	DIAMETER	LOG	REMARKS
0'	10.8	1087	
5'	10.8	1087	
10'	10.8	1087	
15'	10.8	1087	
20'	10.8	1087	
25'	10.8	1087	
30'	10.8	1087	
35'	10.8	1087	
40'	10.8	1087	
45'	10.8	1087	
50'	10.8	1087	

CR. (EM2)

031' SCATTERED UNWEATHERED BLUE-GRAY SILTSTONE AND PILE BLUE SANDSTONE

037' GYPSUM FRAGMENTS IN SOFT CLAY GAUZE MATERIAL, MINOR SEEP BELOW CLAY GAUZE.
038' GAUZE LANE

040' BLUE GRAY CLAY WITH SLICKENSIDES

041' FAINT STRATIIONS ON RUPTURE SURFACE. RUPTURE SURFACE CONTAINS 2-3 INCHES OF CLAYEY SILT. BLUE GRAY, WET, PLASTIC TEXTURE.
043' FAINT FACIATED SILTSTONE AND SANDSTONE

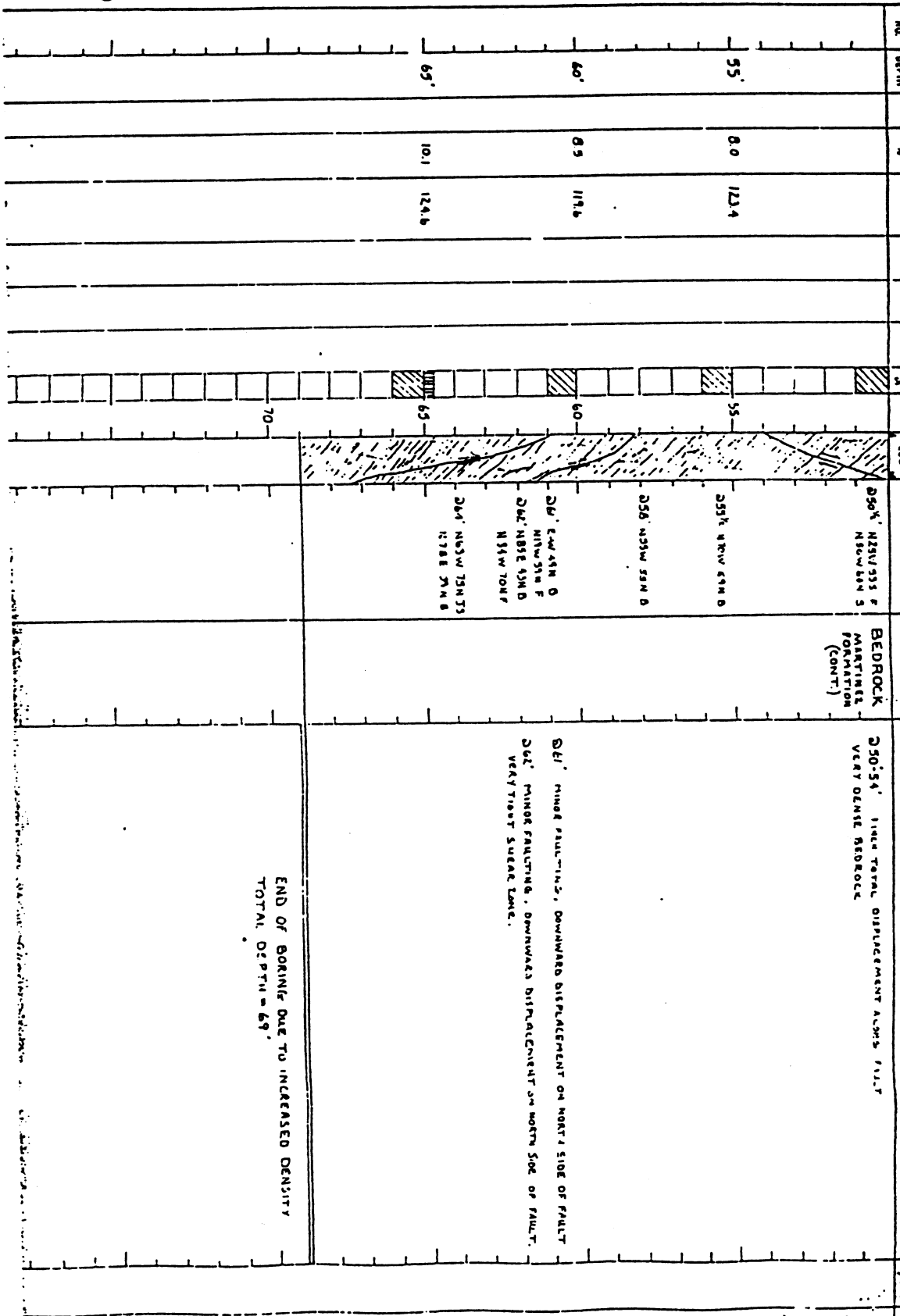
BEDROCK
MAINTAIN
FORMATION

048' MINOR SEEPAGE FROM 4 INCH THICK SANDSTONE BED.

5/8" REMARKS

Field Name: J. J. NASSON ... 7153-6 ... Exploratory Boring No. B-2

Date: JUNE 24, 1948 ... Leg. by: R. CARTER



END OF BORING DUE TO INCREASED DENSITY
TOTAL DEPTH = 69'

0-1' MINOR FAULTING, DOWNWARD DISPLACEMENT ON RIGHT SIDE OF FAULT.
6-10' MINOR FAULTING, DOWNWARD DISPLACEMENT ON NORTH SIDE OF FAULT.
VERY THIN SUGAR LAME.

DRAINING CONDITIONS RETURNED

EXPLORATORY BORING NO. B-3

Sample No.	Depth (ft)	Moist %	Density	Notes	Remarks	Unit	Description	Drilling Conditions
	0					Q1s (Gf)	CLAYEY SILTY FINE SAND - ORANGE BROWN. MODERATELY MOIST. MODERATELY DENSE, SUBANGULAR TO SUBROUND PEBBLES TO 1 INCH MAXIMUM DIAMETER. ROOT HAIRS THROUGHOUT. STRATIFIED BEDDING FRAGMENT'S	
	5					Q1s (Gf)	SLIGHTLY CLAYEY, SILTY, FINE TO MEDIUM GRAINED SAND - ORANGE BROWN. MODERATELY MOIST, LOOSE TO MODERATELY DENSE. ABUNDANT SUBROUND PEBBLES AND COBBLES TO 8 INCHES MAXIMUM DIAMETER. SANDHOLE ROOTS UP TO 1/8 INCH, APPROXIMATE 4 INCHES IN DIAMETER	
	10					Q1s (Gf)	INTERBEDDED SILTYSTONE AND SANDSTONE - SANDSTONE - SLIGHTLY SILTY, FINE GRAINED, PALE YELLOW BROWN. MODERATELY MOIST TO MOIST - SLIGHTLY TO MODERATELY DENSE. FRIABLE. MODERATELY CEMENTED. MODERATELY JOINTED. IRON OXIDE STAINING ON JOINT SURFACES. SCATTERED ROOTLET'S SILTYSTONE - PALE ORANGE BROWN, MOIST, THINLY BEDDED.	
	15					Q1s (Gf)	Q14 SANDSTONE BECOMES COARSE GRAINED	
	20					Q1s (Gf)	Q15 SCATTERED CARBON DEPOSIT	
	25					Q1s (Gf)	Q16 HIGHLY FRACTURED SANDSTONE AND SILTYSTONE, PALE ORANGE BROWN, MOIST.	
	25					Q1s (Gf)	Q17 SILTYSTONE - FINE GRAINED, PALE YELLOW BROWN, MODERATELY MOIST. MODERATELY DENSE. MODERATELY JOINTED, TIGHTLY JOINTED	
	25					Q1s (Gf)	Q17 1 INCH THICK CLAYEY SILT BED	
	25					Q1s (Gf)	Q17 1/2' HIGHLY DEFORMED SILTYSTONE AND SANDSTONE, ABUNDANT POLISHED SURFACES. EVAPORITE DEPOSITS WITHIN OPEN JOINTS	
	25					Q1s (Gf)	Q15 RUPTURE SURFACE, APPROXIMATELY 3-4 INCHES THICK. PLASTIC CLAY. DUNE GRAY, VERY MOIST	

Well Name: J. HARBIN Site: 17114 KAYLID. DIST. Date: 25 SEPTEMBER 1964 Location: 125° 34' W, 66° 00' N
 Well Number: 7982-6 Elevation: 118.52 Logged By: R. SCOTTIS / JTC Sheet: 2 of 3

EXPLORATORY BORING NO. B-3

DEPTH (FT)	MOIST %	DENSITY	γ	C	ECMS	DEPTH (FEET)	LOGGING CODE	UNIT	DESCRIPTION	Drilling Conditions
0						0-10	226' N20E 125 KS	GRS (EML)	226' SILTY CLAY - BLUE GRAY, VERY MOIST, SOFT, SCATTERED EVAPORITE DEPOSITS, MAXIMUM THICKNESS OF BED APPROXIMATELY 6 INCHES	
10						10-27	227' N80W 80N S	BEDROCK MAJOR FORMATION	227' MINOR FAULT, TRUNCATED BY RUPTURE SURFACE INTERBEDDED SANDSTONE AND SILTSTONE - YELLOW BROWN, MODERATELY DENSE, THINLY INTERBEDDED, HIGHLY JOINTED TIGHTLY JOINTED	
20						228' N10E 27N S				
30	12.7	119.3				30-40	229' N10W 41N S		INTERBEDDED SANDSTONE AND SILTSTONE - DARK OLIVE GRAY (S&T) PALE OLIVE GRAY (SS), VERY MOIST, MODERATELY DENSE, VERY THINLY INTERBEDDED, HIGHLY JOINTED, TIGHTLY JOINTED.	
40	19.9	107.0				40-41	230' N57W 40N S	240' VERY DENSE SANDSTONE BEDS APPROXIMATELY 2-4 INCHES THICK		
50	17.6	109.3				50-55	231' N80W 55N S	243' BECOMES DENSE TO VERY DENSE		
60						60-64	232' N58W 48N S			
70						70-75	233' N80W 55N S			
80						80-85	234' N55W 61N S			
90						90-95				
100						100-105				
110						110-115				
120						120-125				
130						130-135				
140						140-145				
150						150-155				
160						160-165				
170						170-175				
180						180-185				
190						190-195				
200						200-205				
210						210-215				
220						220-225				
230						230-235				
240						240-245				
250						250-255				
260						260-265				
270						270-275				
280						280-285				
290						290-295				
300						300-305				
310						310-315				
320						320-325				
330						330-335				
340						340-345				
350						350-355				
360						360-365				
370						370-375				
380						380-385				
390						390-395				
400						400-405				
410						410-415				
420						420-425				
430						430-435				
440						440-445				
450						450-455				
460						460-465				
470						470-475				
480						480-485				
490						490-495				
500						500-505				

250' SANDSTONE BED APPROXIMATELY 4 FEET THICK WITH MINOR GROUNDWATER SEEPAGE.

Drilling Conditions
REMARKS

EXPLORATORY BORING O.B.3

Well No. **J-11333-6**
 Project Number: **7792-6**
 State: **NEW JERSEY**
 Locality: **100.51**
 Date: **22 NOVEMBER 1960**
 Logged By: **R. CROTTEN / J. REZEL**

STANDARD SAMPLE NO.	DEPTH	DI.	MOIST %	DENSITY	C	ELCVS	DEPTH	DEPTH	ATTITUDES	UNIT	DESCRIPTION	DRILLING CONDITIONS	REMARKS
	55'		46.0	121.2			60'	55'	251' N19W 40N F	DEERCK MANDINEL FORMATION (CONT) D51' MINOR FAULT D54' INTERBEDDED SILTSTONE AND SANDSTONE - PALE BLUE GRAY (SS) TO OLIVE GRAY (SLT). MOIST TO MODERATELY MOIST, MODERATELY DENSE TO DENSE. MODERATELY JOINTED, TIGHTLY JOINTED; IRON OXIDE STAINING ON JOINT SURFACES; SCATTERED EVAPORITE DEPOSITS. THINLY INTERBEDDED D59' THINLY BEDDED TO LAMINATED			
							65'	60'	256' N40W 53N S				
							70'	65'	265' N49W 59N S				
	65'						70'	65'	265' N49W 59N S				
172b SECTION BEGINS T.O. = 70'													

EXPLORATORY BORING NO. B-1

Project Name: J. W. BERRY Site: ATATA REVELLO DRIVE Date: 23 NOVEMBER 1988
Project Number: 7852-6 Elevation: 202.81 Layer: 3 Depth: 24' Rod: 1 W: 2
Drilling Company: _____

Sample No.	Sample Depth (FT)	ED	Moist %	DENSITY	F	C	BLOWS	DEPTH GRAPHIC LOG	ATTITUDES	UNIT	DESCRIPTION	%sa	REMARKS
								0 5 10 15 20 25		Q15 (af)	CLAYEY SILTY FINE SAND - YELLOW BROWN, MODERATELY MOIST, MODERATELY DENSE, SCATTERED SUBROUND TO SUBANGULAR CRYSTALLINE PEBBLES TO 1/4 INCHES IN DIAMETER, SCATTERED SILTY SILT AND SANDSTONE FRAGMENTS TO 3/4" MAXIMUM DIAMETER.		
							2 1/2			Q15 (Q ₁₅)	CLAYEY SILTY, FINE TO COARSE SAND - ORANGE BROWN, MODERATELY MOIST, MODERATELY DENSE, SOME PEBBLES AND BEDROCK FRAGMENTS TO 3 INCHES MAXIMUM DIAMETER.		
							10			Q15 (Q ₁₅)	Q15' ABUNDANT COBBLES TO 4 INCHES MAXIMUM DIAMETER. CLAYEY, SILTY, VERY FINE SAND - RED BROWN, MOIST, MODERATELY DENSE, SCATTERED PEBBLES UP TO 1 INCH MAXIMUM DIAMETER, SCATTERED ROOTS TO 7/8 INCH MAXIMUM DIAMETER. SLIGHTLY SILTY, FINE TO MEDIUM SAND, BROWN, MODERATELY MOIST, MODERATELY DENSE, ABUNDANT PEBBLES SURROUND TO SUBANGULAR, SCATTERED ROOTLETS.		
							21			Q15 (Lent)	Q15' ABUNDANT COBBLES TO 6-10 INCHES MAXIMUM DIAMETER, LOOSE, SLIGHTLY MOIST. SANDSTONE - FINE GRAINED, PALE YELLOW BROWN, MODERATELY MOIST, MODERATELY DENSE, PRISMIC, MODERATELY JOINTED, TIGHTLY JOINTED IRON OXIDE STAINING ALONG JOINT SURFACES.		

WELL NO. 1352-6
 DATE 2 NOVEMBER 1959
 LOCATION 1352-6

EXPLORATORY BORING O.B-4

DEPTH	DIAMETER	MOISTURE %	DENSITY	REMARKS	LOG	UNIT	DESCRIPTION
0	12.1	118.4				Oils (Lm)	026' INTERBEDDED SILTSTONE AND SANDSTONE - PALE ORANGE BROWN AND OLIVE GRAY, MOIST, MODERATELY DENSE TO SUBSTANTIALLY DENSE, SCATTERED CARBON DEPOSITS.
30	12.1	118.4					024' POLISHED SURFACES ON SILT BEDS. 024' SILTY CLAY APPROXIMATELY 2-3 INCHES THICK, OLIVE GRAY, PLASTIC RUPTURE SURFACE. 021' PLASTIC CLAY, 2-3 INCHES THICK, POLISHED BEDDING SURFACE, FAINT SLICKENSIDES.
35	12.1	118.4				BEDROCK	INTERBEDDED SILTSTONE AND SANDSTONE - PALE GRAY (SILT) DARK OLIVE BROWN (S.S.), VERY MOIST, MODERATELY DENSE, MODERATELY JOINTED. THINLY JOINTED, ABUNDANT EVAPORITE DEPOSITS. 029' SANDSTONE - LIGHT GRAY, MODERATELY MOIST, MODERATELY DENSE TO DENSE, FINE-GRAINED, MODERATELY JOINTED, VERY THINLY JOINTED. SOME JOINTS INFILLED WITH EVAPORITES.
40	12.1	118.4					020' INTERBEDDED SILTSTONE AND SANDSTONE - THINLY BEDDED.
45	12.1	118.4					041' MODERATE GROUNDWATER SEEP.
50	12.1	118.4					043' DENSE TO VERY DENSE. 040' MINOR GROUNDWATER SEEP, 1CM JUDGE STRAINING ON JOINT SURFACES.

END OF BORING
 TD - 51'

DATE NOVEMBER 1959
 LOCATION 1352-6

BORING LOG							No. LS1		
DATE			20 April 99		DRILLING EQUIPMENT			8" Hollow Stem Auger	
REFERENCE			17411 Posetano Road - NE Corner of Driveway Area						
DRIVING WEIGHT			140 lb. / 30" Drop						
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 Inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
					<u>Fill/Colluvium</u> Sandy silt to silty sand	Light Brown	Soft	Moist	
					<u>Landslide Debris (Derived from Bedrock)</u>				
5	1		14 22		<u>Siltstone</u> and fine grained <u>sandstone</u> , moderately weathered	Light Orange-Gray-Brown	Stiff	Moist	
10	2		12 18		Silty <u>sandstone</u> , fine grained, to sandy <u>siltstone</u> , massive	Light Brown			
15	3		39 42		<u>Sandstone</u> , fine to medium grained, silty				
20	4		20 29		<u>Siltstone</u> , slightly sandy, contorted, and medium grained sandstone	Mottled Medium Brown & Orange-Brown			
PROJECT NAME					NORTON (Sadow) - Posetano Road				
PROJECT NO.					5016-96		Logged by MR		
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BORING LOG							No. LS1		
DATE		20 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger			
REFERENCE		17411 Posetano Road - NE Corner of Driveway Area							
DRIVING WEIGHT		140 lb. / 30" Drop							
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 Inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
	5		28 38		<p><u>Landslide Debris (Derived from Bedrock)</u> - continued</p> <p>Silty sandstone, fine to coarse grained, moderately cemented but friable, massive</p>	Light Gray-Beige	Medium Dense	Slightly Moist	
30	6		28 50 5"		<p>Sandstone, fine grained, contorted, with thin siltstone interbeds, bedding dips 65°</p>	Light Brown			
35	7		26 35		<p>Siltstone interbed at about 35½', few inches thick, softer but not moist, sheared surfaces, silty sandstone, fine to coarse grained, massive</p> <p style="text-align: center;"><u>Changes to less oxidized between 36-40'</u></p> <p style="text-align: center;">? ? ?</p>	Medium Brown			
40	8		13 27		<p>Siltstone, thin alternating colored beds, micro-fault through sample (bedding offset with shears along joint surface), some fine sandstone interbeds, siltstone is locally sheared - deformed around hard sandstone nodule, bedding dip about 30°</p>	Light to Dark Gray & Brown -Gray	Medium Dense	Slightly Moist	
45	9		10 18		<p>- Sampler wet</p> <p>- Locally soft and locally hard (brittle) siltstone, fractured, wet along fractures in upper part of sample</p> <p><u>Bedrock (Topanga Formation)</u></p> <p>Thinly laminated dark brown siltstone and light gray fine grained sandstone, bedding dips 40°</p>	Light to Dark Gray & Brown -Gray	Medium Dense	Slightly Moist to Moist	
PROJECT NAME						NORTON (Sadow) - Posetano Road			
PROJECT NO.						5016-96		Logged by	MR
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BORING LOG							No. LS1					
DATE			20 April 99				DRILLING EQUIPMENT			8" Hollow Stem Auger		
REFERENCE							17411 Posetano Road - NE Corner of Driveway Area					
DRIVING WEIGHT							140 lb. / 30" Drop					
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 Inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION						
						COLOR	CONSISTENCY	MOISTURE				
		10	10 16		<u>Bedrock (Topanga Formation)</u> - continued <u>Sandstone</u> , fine grained, (dense to hard) interbedded with <u>siltstone</u> , (stiff to medium dense), siltstone locally sheared around harder sandstone, contorted	Medium Dark Brown- Gray	Medium Dense	Slightly Moist to Moist				
55		11	19 25		<u>Siltstone and sandstone</u> , thin alternating color laminae, some shears along bedding, bedding dips 65°	Light to Dark Brown- Gray						
60		12	15 25		<u>Siltstone</u> to very fine grained <u>sandstone</u> , thin alternating colored laminae, some shearing of siltstone around harder sand beds, bedding dips 78°							
65		13	15 28		Contorted and broken <u>siltstone</u> , with thin laminae of very fine grained sandstone							
70		14	30 50/ 5"		Interbedded <u>siltstone</u> and <u>sandstone</u> , fine to medium grained, less moisture, broken, with harder sandstone chunks in sample	Light to Dark Brown and Gray		Slightly Moist				
					Becomes Dense							
PROJECT NAME							NORTON (Sadow) - Posetano Road					
PROJECT NO.							5016-96			Logged by MR		
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BORING LOG						No. LS1			
DATE		20 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger			
REFERENCE		17411 Posetano Road - NE Corner of Driveway Area							
DRIVING WEIGHT		140 lb. / 30" Drop							
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
	15		60/ 6"		<u>Bedrock (Topanga Formation)</u> - continued <u>Sandstone</u> , fine grained, silty, massive, moderately well cemented, with siltstone inclusions	Light Gray-Brn & Dark Brn	Dense	Slightly Moist	
80	16		25 50/ 4"		Interbedded <u>siltstone</u> and very fine grained <u>sandstone</u> , thinly bedded, moderately well indurated, approximate 40° dip	Light to Medium Gray			
85	17		42 50/ 4"		Interbedded <u>siltstone</u> and <u>sandstone</u> , bedding deformed, brecciated appearance	Light to Dark Gray & Brown- Gray			
90	18		60/ 5"		Interbedded <u>siltstone</u> and <u>sandstone</u> , alternating light gray to dark brown-gray, well indurated, approximate 70° dip				
95	19		60 -		<u>Siltstone</u> , few thin sandstone interbeds, approximate 70-80° dip	Dark Gray- Brown			
					End of Boring = 100' 2.75" diameter plastic Inclinator casing installed, cemen/bentonite grout backfill Perched groundwater at about 45'				
PROJECT NAME						NORTON (Sadow) - Posetano Road			
PROJECT NO.						5016-96		Logged by	MR
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BORING LOG							No. LS2	
DATE		21 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger		
REFERENCE		17411 Posetano Road - SW Corner of Driveway/Parking Area						
DRIVING WEIGHT		140 lb. / 30" Drop						
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION		
						COLOR	CONSISTENCY	MOISTURE
5	1	8	18		<u>Fill/Colluvium</u> Silt, slightly clayey, some siltstone fragments	Light Brown & Orange-Brown	Stiff	Moist
10	2	11	21		<u>Bedrock (Topanga Formation)</u> Siltstone, thin bedded, few thin sandstone interbeds, moderately weathered, dip of bedding approximately 50-70°	Medium Brown w/ Orange & Gray	Stiff	Moist
15	3	17	28		Interbedded siltstone and fine grained sandstone, approximate 40-50° dip	Medium Brown & Beige		
20	4	17	39		Interbedded siltstone and fine grained sandstone, Approximate 20-30° dip			
PROJECT NAME						NORTON (Sadow) - Posetano Road		
PROJECT NO.						5016-96		
LOCKWOOD-SINGH & ASSOCIATES						Logged by MR		
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BORING LOG							No. LS2		
DATE		21 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger			
REFERENCE		17411 Posetano Road - SW Corner of Driveway/Parking Area							
DRIVING WEIGHT		140 lb. / 30" Drop							
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
		5	17 41		<u>Bedrock (Topanga Formation)</u> - continued Interbedded <u>siltstone</u> and fine grained <u>sandstone</u> , thinly bedded siltstone, dips approximately 50°	Medium Orange- Brown & Gray	Medium Dense	Moist	
30		6	60/ 6"		<u>Sandstone</u> , fine to coarse grained, massive, silty, friable		Dense	Slightly Moist	
35		7	43 50/ 5"		Interbedded fine grained <u>sandstone</u> and thinly bedded <u>siltstone</u> , near vertical dip, moderately weathered	Light to Medium Brown			
40		8	45 50/ 3"		<u>Sandstone</u> , massive, fine to coarse grained, silty, slightly cemented, friable	Light Brown			
45		9	73/ 6"		<u>Sandstone</u> , fine to very coarse grained, silty, massive				
PROJECT NAME		NORTON (Sadov) - Posetano Road							
PROJECT NO.		5016-96					Logged by MR		
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BORING LOG							No. LS2		
DATE		21 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger			
REFERENCE							17411 Posetano Road - SW Corner of Driveway/Parking Area		
DRIVING WEIGHT							140 lb. / 30" Drop		
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
		10	40 45		<u>Bedrock (Topanga Formation)</u> - continued <u>Siltstone</u> , thin sandstone interbeds, alternating light and dark colors, approximately 20-30° dip,	Light to Dark Brown-Gray	Dense	Slightly Moist	
55		11	43 50 3"		<u>Sandstone</u> , massive, fine to coarse grained, more dense, moderately well indurated	Medium Gray Medium Orange Brown			
60		12	65 6"						
65		12	84 92 4"		- Sampler slightly wet <u>Sandstone</u> , massive, fine to coarse grained				
70		13	45 6"		Interbedded <u>siltstone</u> and fine grained <u>sandstone</u> , less oxidized, thinly bedded, moderately well indurated, approximately 40-50° dip				
PROJECT NAME							NORTON (Sadow) - Posetano Road		
PROJECT NO.							5016-96		
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BORING LOG					No. LS2			
DATE		DRILLING EQUIPMENT						
REFERENCE		DRIVING WEIGHT						
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION		
						COLOR	CONSISTENCY	MOISTURE
		NR	42 50/ 2"		<p>Bedrock (Topanga Formation) - continued Interbedded <u>siltstone</u> and fine grained <u>sandstone</u>, thinly bedded, alternating light and dark gray colored beds, moderately well indurated, approximately 60° dip</p>	Light Gray to Dark Brown Gray	Dense	Slightly Moist
80		14	60/ 5"		<p>- Encountered cobbles at about 82-83'</p> <p>- Encountered cobbles at 85-87'</p>			
90		15	75/ 3"					
95		16	65/ 6"		<p>Interbedded <u>siltstone</u> and <u>sandstone</u>. - Hard cemented sandstone in sample tip</p>			
<p>End of Boring = 100' 2.75" diameter plastic Inclinator casing installed, cement/bentonite grout backfill Possible seepage at 65'</p>								
PROJECT NAME					NORTON (Sadow) - Posetano Road			
PROJECT NO.					5016-96	Logged by MR		
LOCKWOOD-SINGH & ASSOCIATES					PLATE			4 of 4

BORING LOG						No. LS3			
DATE		DRILLING EQUIPMENT							
22 April 99		8" Hollow Stem Auger							
REFERENCE						17480 Revello Drive - East Side of Property - Lower Garden Terrace			
DRIVING WEIGHT						140 lb. / 30" Drop			
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
5	1		30 35		<u>Landslide Debris (Derived from Fill/Colluvium ?)</u> Silt, clayey, siltstone fragments	Mottled Medium Brown	Stiff	Moist	
					Contact in sample at 5½'				
	10	2		9 14		<u>Landslide Debris (Derived from Bedrock)</u> Sandstone, fine to medium grained, well cemented and indurated, massive	Beige to Light Orange- Brown	Hard	Slightly Moist
						Sandstone and siltstone, weathered, no apparent bedding, some powdered gypsum			
15	3		11 15		Siltstone, some fine sandstone interbeds, weathered, jumbled/discordant bedding	Mottled Light Orange- Brown	Stiff	Moist	
20	4		7 10		Siltstone, very weathered, no bedding, subangular to subrounded sandstone fragments	Mottled Light Brown with Orange	Firm		
PROJECT NAME						NORTON (Sadow) - Posetano Road			
PROJECT NO.						5016-96			
LOCKWOOD-SINGH & ASSOCIATES						Logged by MR			
						PLATE			
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BORING LOG						No. LS3		
DATE		22 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger		
REFERENCE		17480 Revello Drive - East Side of Property - Lower Garden Terrace						
DRIVING WEIGHT		140 lb. / 30" Drop						
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION		
						COLOR	CONSISTENCY	MOISTURE
		5	21 30		<u>Landslide Debris (Derived from Bedrock)</u> - continued <u>Siltstone</u> , weathered, no bedding, jumbled/discordant appearance, few sandstone stringers and fragments, few disseminated gypsum crystals, thin gypsum vein	Mottled Dark Brown w/ Orange	Stiff	Moist
					----- ? ----- ? ----- ? -----			
30		6	15 21		<u>Bedrock (Topanga Formation)</u> <u>Siltstone</u> , fine <u>sandstone</u> interbeds, fractured, moderately weathered, approximately 20-25° dip	Light Gray to Dark Brown	Medium Dense	Moist
35		7	21 38		Sheared surfaces along siltstone bedding planes, approximate 20-30° dip	Mottled Light Orange-Brown	Stiff	
40		8	34 50/ 3"		Interbedded <u>siltstone</u> and fine grained <u>sandstone</u> , moderately well cemented, less weathered than above, approximately 40° dip		Dense	Slightly Moist
45		9	50/ 5"		<u>Sandstone</u> , fine to medium grained, silty, massive, weakly cemented, friable	Light Gray		
PROJECT NAME						NORTON (Sadow) - Posetano Road		
PROJECT NO.						5016-96		
						Logged by MR		
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BORING LOG							No. LS3		
DATE 22 April 99			DRILLING EQUIPMENT 8" Hollow Stem Auger						
REFERENCE 17480 Revello Drive - East Side of Property - Lower Garden Terrace									
DRIVING WEIGHT 140 lb. / 30" Drop									
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 Inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
		10	34 50/ 4"		<u>Bedrock (Topanga Formation)</u> - continued <u>Siltstone</u> and fine grained <u>sandstone</u> , dip approximately 45°, sheared surfaces along siltstone bedding	Light to Dark Gray	Dense	Slightly Moist	
55		11	60/ 6"		<u>Sandstone</u> , fine to medium grained, massive, moderately cemented	Light Gray			
60		12	60/ 6"		<u>Sandstone</u> , very fine to fine grained, thin siltstone interbeds, some sheared siltstone in sample, dip approximately 50-60°	Light to Medium Gray			
65		13	50/ 6"		<u>Siltstone</u> , moderately well cemented, brittle	Dark Brown-Gray	Hard		
70		14	50/ 5"		<u>Sandstone</u> , fine to medium grained, massive, lightly cemented, friable	Light to Medium Gray	Dense		
PROJECT NAME NORTON (Sadow) - Posetano Road							Logged by MR		
PROJECT NO. 5016-96							PLATE		
LOCKWOOD-SINGH & ASSOCIATES							3 of 4		

BORING LOG						No. LS3			
DATE		22 April 99		DRILLING EQUIPMENT		8" Hollow Stem Auger			
REFERENCE		17480 Revello Drive - East Side of Property - Lower Garden Terrace							
DRIVING WEIGHT		140 lb. / 30" Drop							
Depth - feet	Drive Samples	Drive Sample No.	Blows per 6 inches	Bag Sample	VISUAL DESCRIPTION	VISUAL CLASSIFICATION			
						COLOR	CONSISTENCY	MOISTURE	
		15	50/ 4"		<p><u>Bedrock (Topanga Formation)</u> - continued</p> <p><u>Sandstone</u>, fine to medium grained, massive, lightly cemented</p>	Medium Gray	Dense	Slightly Moist	
80		16	50/ 2"		<p>Few inches of siltstone in sample, intensely sheared on top of hard bed (probable conglomerate)</p> <p>Encountered cobbles at 81', Refusal at 81'</p>				
85					<p>End of Boring = 81'</p> <p>2.75" diameter plastic inclinometer casing installed, cement/bentonite grout backfill</p>				
PROJECT NAME						NORTON (Sadow) - Posetano Road			
PROJECT NO.						5016-96		Logged by	MR
LOCKWOOD-SINGH & ASSOCIATES						PLATE			
						4 of 4			

DRAFT COPY

PS-3-cont'd.		30.0-45.0	<u>SHALE</u> : Dark brown, soft, plastic with thin lenses of light blue sandstone; friable, medium-grained, fairly dry.
PS-4	5-27-65	0.0-25.0	<u>SANDSTONE</u> ; Silty, tan to yellow-brown, soft, overly damp, friable, fine to medium-grained. Interbeds of siltstone and shale (1/4" to 1/2"), well bedded, moist at 15 ft. Water in hole next day.
		25.0-30.0	<u>SHALE and SILTSTONE</u> : Blue-gray, interbedded, soft, damp.
		30.0-44.0	<u>SANDSTONE</u> : Tan to yellowbrown, poorly, silty, damp, wet at 38.0 ft. Water running in at bottom.
PS-5	5-15-65	0.0- 9.0	<u>FILL</u> : Compacted, exceedingly moist.
		9.0-44.0	<u>SHALE</u> : Clayey, light brown, very moist to wet, with interbedded fine to medium-grained sandstone. Very hard and dense coarse-grained sandstone at 37.5 ft. to 38.2 ft. and at 40.0 to 40.8 ft. Ten inch thick soft clay zone at 36.5 ft.
		44.0-62.0	<u>SANDSTONE</u> : Light bluish-gray, fine-grained, hard, interbedded with dark bluish-gray, clay shale.
WP-1	5-15-65	0.0- 1.0	<u>FILL</u> : Moist.
		1.0-21.0	<u>SANDSTONE and SHALE</u> : Light brown, wet silty and clayey shale interbedded with fine to coarse-grained sandstone. Water flowing into hole at 15 feet from coarse-grained sandstone. Hole caved.

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Work Order 3418-LLOGS OF BORINGS*

<u>Boring No.</u>	<u>Date Drilled</u>	<u>Depth (ft.)</u>	<u>Classification</u>
PS-1	5-27-65	0.0- 6.0	<u>SANDSTONE</u> : Clayey, silty, light brown, moist, tight.
		6.0- 8.5 6.0- 8.5	<u>CONGLOMERATE</u> : Sandy with pebbles and cobbles, poorly consolidated.
		8.5-28.0	<u>SANDSTONE</u> : Medium-grained, fairly well indurated, tan, massive. Water seepage at 16 ft. Attitude on shale bed, N65W; N62, slickensides at 25 ft., possible fault contact.
		28.0-42.0	<u>SANDSTONE</u> : Blue-gray, fairly well indurated, massive, damp, seepage at 35 ft. Some interbedded blue-black clayey shale, plastic, slickensided. Attitude of N48W; N66. Shale; blue-gray, moist, some carbonaceous matter at 38 ft. Attitude of N50W; N71, possible fault.
PS-2	5-27-65	0.0- 5.5	<u>SANDSTONE</u> : Tan, medium-grained, friable, damp, massive, silty.
		5.5-43.0	<u>SANDSTONE, SILTSTONE and SHALE</u> : Light gray to black, interbedded, well bedded, soft; shales frequently plastic. Bedding attitude at 10.0 ft. N60E; vertical.
PS-3	5-27-65	0.0-30.0	<u>SANDSTONE</u> : Yellow-brown to dark brown, fine-grained, soft; interbeds of siltstone and shale (1/4" to 1/2"), some folding; seepage at 27 ft.

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WP-2	5-15-65	0.0-21.0	<u>SANDSTONE and SHALE</u> : Light to dark brown, fine to coarse-grained sandstone interbedded with silty to clayey shales, very moist to wet. Water flowing from sandstone at 19.3 feet. Direction of flow of water from uphill direction.
		21.0-24.0	<u>SHALE</u> : Dark gray, clayey, interbedded with light brown clay shales and occasional light brown, coarse-grained sandstone.
		24.0-35.0	<u>SANDSTONE</u> : Light brown, medium to coarse-grained, loosely consolidated with interbedded light brown shale from 19 to 32 feet. Water coming into the hole from the sandstone at 32 feet.
		35.0-37.0	<u>SHALE</u> : Dark gray, clayey, interbedded with light brown clay shales and occasional light brown, coarse-grained sandstone.
		37.0-39.0	<u>SHALE</u> : Dark gray, clayey, with interbeds of fine to coarse-grained, light gray sandstone, wet.
		39.0-41.0	<u>SANDSTONE</u> : Gray to light bluish-gray, medium-grained, hard and dense with occasional interbeds of gray clay shale, dry.
IB	6-16-65	0.0-26.0	<u>SANDSTONE, SILTSTONE, SHALE</u> : Interbedded, light to greenish-brown, fairly well indurated and damp; slickensiding and gouge along clayey shale beds; soft and plastic locally. Gypsum, seepage (10 to 19 ft.) along clayey shale layers with additional seepage between 21 and 24 ft.

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13-cont'd.

26.0-44.0

SILTSTONE and SHALE: Light to dark gray, fairly well bedded, soft; some slickensiding along dark gray shale beds; slightly damp, gypsum crystals.

Bedding attitudes: at 11.0 ft. N55W; 65N
at 19.0 ft. N45W; 63N

2B

6-16-65

0.0- 9.0

TERRACE: Coarse-grained, tan to medium brown sand, fair induration, damp.

9.0-15.0

TERRACE: Gravels, sandy, poor to fair induration, limey clasts to 1 inch in diameter.

15.0-34.0

SANDSTONE and SHALE: Interbedded, fairly well bedded; clayey shales are smooth, slickensided; very wet seepage from 15 to 34 ft. with gouge zones and gypsum seams.

34.0-38.0

SILTSTONE and SHALE: Interbedded, light to dark gray, well bedded, drier than preceding material.

3B

6-16-65

0.0- 7.0

FILL: Silty clay, dark brown to mottled, slightly damp, dense.

7.0-10.0

TERRACE: Gravel in a clayey sand matrix, medium to coarse-grained, damp, fairly loose.

10.0-12.0

TERRACE: Sand, medium brown, well sorted, loose, damp.

12.0-15.0

TERRACE: Limestone boulders, clayey silt matrix, unable to penetrate; water seepage at bottom of hole.

4B	6-17-65	0.0- 6.5	<u>TERRACE</u> : Gravels in a clayey sand matrix, medium to coarse-grained, damp, fairly loose; clasts composed of granitics, limestone, occasional basalt.
		6.5-20.0	<u>SILTSTONE and SHALE</u> : Light tan to dark gray, fairly well bedded, soft, damp; some clasts of limestone to 3 inches. Unable to penetrate large boulder.
5B	6-17-65	0.0- 6.0	<u>FILL</u> : Clayey sand, tan to mottled, fairly tight, fairly dry.
		6.0-14.0	<u>SOIL</u> : Adobe, black, sticky, moist, tight, seepage at 11.0 ft.
		14.0-37.0	<u>SILTSTONE</u> : Tan to yellow-brown, clayey, damp, indistinct bedding; plastic and tight with major seepage at 28 feet.
		37.0-42.0	<u>SILTSTONE and SHALE</u> : Light gray to dark gray, bedded, fairly dry.
6B	6-18-65	0.0-19.0	<u>SANDSTONE</u> : Silty, light tan, dry, medium-grained, some limestone clasts, fractured; clay seams throughout, fairly well indurated; fault contact at base, N5E; 45S.
		19.0-38.0	<u>SILTSTONE and SHALE</u> : Light brown to dark brown; soft and highly sheared with polished pebbles, gouge, slickensides; fairly well bedded, damp, minor seep at 34 ft., limestone nodules from 36 to 38 ft.
		38.0-44.0	<u>SILTSTONE</u> : Blue-gray, soft, moist. Bedding attitudes: at 25.0 ft. N45W; 52N
7B	6-18-65	0.0- 4.5	<u>FILL</u> : Clayey silt, grayish-brown to yellow-brown sand; some pebbles, slightly moist, fairly tight.

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73-cont'd.		4.5- 9.0	<u>ADOBE</u> : Black, moist, tight, plastic.
		9.0-29.0	<u>SANDSTONE and SILTSTONE</u> : Clayey, yellow-brown, damp, soft, heavy seepage at 19 ft.
		29.0-42.0	<u>SANDSTONE and SILTSTONE</u> : Blue-gray, poorly bedded, soft, clayey, fairly dry.
83	6-21-65	0.0- 5.0	<u>FILL</u> : Silty clayey sand, yellow-brown, some pebbles, damp, soft.
		5.0- 8.5	<u>ADOBE</u> : Dark black, moist, sticky, tight.
		8.5-34.0	<u>SILTSTONE</u> : Clayey, tan to yellow-brown, fairly well bedded, soft, damp; interbedded sandstone, medium-grained beach sand (14 to 17 ft.). Pebbly zone at 18.5 ft. and 24.0-25.0 ft., hard sandstone layers; siltstone and shale from 31 ft. to 33 ft., seepage at 33 ft. to 34 ft.
		34.0-42.0	<u>SILTSTONE and SHALE</u> : Blue-gray, soft, contorted bedding.
			Bedding attitude: at 23.0 ft. N85E; 66N
93	6-21-65	0.0- 6.0	<u>SOIL</u> : Adobe, sandy, dark brown to black, stiff, fairly dry.
		6.0-30.6	<u>SANDSTONE and SILTSTONE</u> : Tan to light brown, moist, gypsum seams, fairly well bedded, soft, some shale beds, seepage at 23.0 ft.
		30.6-43.5	<u>SANDSTONE and SILTSTONE</u> : Blue-gray, dry, fairly well bedded, some hard sandstone layers.
103	6-30-65	0.0- 5.0	<u>FILL</u> : Silty sand, mottled, clayey, some cobbles, damp, fairly tight.

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10B-cont'd.		5.0-12.0	<u>ADOB</u> : Dark brown to black, moist, tight.
		12.0-32.0	<u>SILTSTONE and SHALE</u> : Tan to gray-brown, clayey, damp, fairly well bedded, cobbles from 12.0 to 13.5 ft.; sandstone (26 to 32 ft.), light brown, moist, some gypsum crystals, massive, medium-grained, fairly well indurated; water seepage at 29.0 ft.
			Bedding attitude: at 20.0 ft. N68W; 64N
11B	7-1-65	0.0-15.0	<u>SILTSTONE and SHALE</u> : Light brown to tan, clayey, interbedded, damp, fairly well bedded, soft; some slickensides and gypsum crystals, seep at 14 ft.
		15.0-43.0	<u>SILTSTONE and SHALE</u> : Gray to blue-gray, fairly well bedded, soft, fairly dry.
12B	7-1-65	0.0-10.0	<u>FILL</u> : Sandy silt, reddish to dark brown, damp, fairly tight, some pebbles and cobbles.
		10.0-13.0	<u>ADOB</u> : Dark brown, tight, dry.
		13.0-35.0	<u>CONGLOMERATE</u> : Yellow-brown, clayey silt matrix, tight, damp; clasts well rounded, mostly pebbles and cobbles.
		35.0-44.0	<u>SHALE</u> : Red-brown, yellow, gray, blue; soft, damp, fairly well bedded, some pebbles, abundant gypsum crystals.
13B	7-2-65	0.0- 1.5	<u>FILL</u> : Sandy clay, red-brown, mottled, some pebbles and granules, damp, tight.
		1.5-17.0	<u>SILTSTONE</u> : Clayey, grayish-brown, fairly well bedded, soft, damp, gypsum crystals.

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13B-cont'd.		17.0-42.0	<u>SILTSTONE and SHALE</u> : Blue-gray, interbedded, soft, contorted bedding, dry.
14B	7-2-65	0.0- 3.0	<u>FILL</u> : Clayey sand, medium brown, damp, fairly tight.
		3.0- 5.0	<u>SOIL</u> : Clayey silt, medium brown, slightly moist, tight.
		5.0-38.0	<u>SILTSTONE</u> : Tan, clayey, damp, some interbedded sandstone, fairly well bedded. Sandstone, medium-grained, damp, hard sandstone concretions.
15B	7-6-65	0.0- 7.0	<u>TERRACE</u> : Gravels, reddish-brown, pebbles and cobbles, silty sand matrix, dry, loose.
		7.0-42.0	<u>CONGLOMERATE</u> : Yellow-brown, clayey silt matrix, 20% clasts, well rounded, damp, fairly tight.
16B	7-6-65	0.0- 6.0	<u>FILL</u> : Dark brown sandy silt, boulders, concrete fragments, fairly loose, damp.
		6.0-34.0	<u>TERRACE</u> : Gravel in a sandy clay matrix, yellow-brown to white, pebbles and occasional boulders, well rounded.
		34.0-44.0	<u>SHALE and SILTSTONE</u> : Blue-gray, moist, sticky, soft, occasional pebbles, poorly bedded.
17	7-7-65	0.0-32.0	<u>SILTSTONE, SHALE and SANDSTONE</u> : Tan to gray-brown, interbedded, damp, some contorted bedding and gypsum crystals. Water seepage at 27.5 ft., poorly consolidated sandstone from 27.5 to 29.0 ft.

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1T-cont'd.		32.0-65.0	<p><u>SILTSTONE and SANDSTONE:</u> Interbedded, blue-gray, friable, arkosic, fairly soft. Bottom of slide gouge at <u>55 ft.</u> 7-22-65 6 ft. of water in hole.</p>
2T	7-8-65	0.0-27.0	<p><u>SHALE, SILTSTONE:</u> Tan to yellow-brown, some clayey sandstone stringers, soft, contorted bedding, damp.</p>
		27.0-65.0	<p><u>SHALE, SILTSTONE:</u> Blue-gray, locally slickensided along shale layers, soft, water seepage at 41.5 ft. Seepage at 57 ft. Slide gouge between 25.0 and <u>41.5 ft.</u></p>
3T	7-16-65	0.0- 5.0	<p><u>ADOBE:</u> Dark brown to black, moist, sticky, sandy.</p>
		5.0-32.0	<p><u>SANDSTONE:</u> Silty, yellow-brown, damp, poorly bedded; grades to sandstone which is friable, soft, fine-grained and damp.</p>
		32.0-44.0	<p><u>SANDSTONE:</u> Clayey, silty, fine-grained, yellow-brown to gray-brown, damp, poorly bedded, minor seepage at 38 ft.</p>
		44.0-53.0	<p><u>CLAY:</u> Dark brown to black, moist, pebbles and fragments of sandstone, shale and granitics; mottled and brecciated <u>44</u> to <u>53</u> ft. Slide gouge between 32.0 and <u>53.0 ft.</u></p>
		53.0-65.0	<p><u>SANDSTONE:</u> Light gray to bluish-gray, fine to medium-grained, clayey, some thin (1/2") siltstone interbeds, poorly bedded.</p>
4T	7-16-65	0.0- 9.0	<p><u>ADOBE:</u> Dark brown, damp, sandy.</p>
		9.0-26.0	<p><u>SANDSTONE and SILTSTONE:</u> Yellow-brown to tan, interbedded, damp, poorly bedded, soft.</p>

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4T-cont'd.	26.0-34.0	<u>SILTSTONE and SHALE</u> : Blue-gray, locally sandy, poorly bedded.
	34.0-49.0	<u>CLAY BRECCIA</u> : Red-brown to dark brown, sandy, mottled, seepage at 45 ft., damp. Slide gouge between 34 and <u>49 ft.</u>
	49.0-65.0	<u>SANDSTONE and SHALE</u> : Blue-gray, medium-grained, friable, fairly hard, shale is soft, well bedded, locally slickensided. 7-22-65 2.5 ft. of water in hole, bottom at 50.5 ft., hole caved.
5T	7-19-65 0.0-45.0	<u>SANDSTONE and SHALE</u> : Interbedded, yellow-brown to tan, damp, poorly bedded, clayey, soft. Some thin lenses of clay, blue-gray and soft between 34.0 and 40.0 ft. Minor seepage at 43.0 ft.; slide gouge between 37.0 and <u>44.0 ft.</u>
	45.0-54.0	<u>SANDSTONE</u> : Blue-gray, clean, medium-grained, damp. 7-22-65 Water from 44 ft. to 49 ft.
6T	7-19-65 0.0- 5.0	<u>FILL</u> : Silty sand, fairly dry, loose, trashy (concrete, wood, pipe, etc.). This fill due to demolition of apartment.
	5.0-22.0	<u>CLAY</u> : Sandy, medium brown, damp, fairly tight, conglomerate, pebbles and cobbles 7.0-22.0 ft., moist, seepage at 20-22 ft.
	22.0-45.0	<u>SANDSTONE</u> : Clayey, yellow-brown, soft, damp, interbedded shale, soft, gypsum crystals. Slickensided from 42-45 ft.
	45.0-65.0	<u>SHALE and SILTSTONE</u> : Blue-gray, soft, contorted bedding, slickensides on thin blue clay layers, damp, thin contorted sandstone beds. Hard sandstone bed from 54-56 ft. Slide gouge from 42-65 ft.

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7T	7-20-65	0.0- 5.0	<u>FILL</u> : Silty sand, fairly dry, loose, debris (concrete, wood, asphalt). This fill due to demolition of apartment.
		5.0-34.0	<u>SANDSTONE</u> : Yellow-brown, clayey, soft, gypsum crystals, damp, some slickensiding and gouge from 33-34 ft.
		34.0-53.0	<u>SHALE</u> and <u>SILTSTONE</u> : Blue-gray, soft, thinly bedded, contorted, slickensiding and thin (1-3") layers of gouge along bedding planes. Bottom of slide gouge at <u>53.0 ft.</u>
		53.0-65.0	<u>SANDSTONE</u> : Blue-gray, clayey, fairly hard, damp. 7-22-65 Water in bottom of hole from 62.5 to 63.5 ft.
8T	7-21-65	0.0- 6.0	<u>FILL</u> : Sandy silt, fairly dry, loose, concrete fragments.
		6.0-18.0	<u>SANDSTONE</u> : Yellow-brown, clayey, dry, some interbedded soft shale.
		18.0-32.0	<u>SANDSTONE</u> and <u>SHALE</u> : Interbedded, tan to yellow-brown, sheared along bedding, gouge, slickensides, abundant gypsum crystals, fairly dry. Sandstone concretions at 20 ft. Slide gouge from 18 to 30 ft.
		32.0-59.0	<u>SILTSTONE</u> : Olive-brown, massive, hard, local hard sandstone concretions.

*Note: The surface elevations of Boring No's. PS-1 through PS-5, WP-1, WP-2, 1B through 16B and BS-1 through BS-5 are as indicated by the topography on the plot plan.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK JB 18457-I CALCULATION SHEET #1

REAME (ROTATIONAL EQUILIBRIUM ANALYSIS OF MULTILAYERED EMBANKMENT), Windows 95 THIS 1999 VERSION OF REAME IS LICENSED BY CIVIL ENGINEERING SOFTWARE CENTER TO The J. Byer Group, Inc.

TITLE BACK-CALCULATE SHEAR STRENGTH ALONG BASE OF SLIDE SHOWN IN SECTION A-A. ASSUME NO GROUNDWATER. ALSO, INCLUDE RESISTING FORCE DUE TO BULKHEAD ALONG CASTELLAMMARE

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 640 Y COORD.= 0

J. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 212
 2 X COORD.= 65 Y COORD.= 212

NO. OF POINTS ON BOUNDARY LINE 3 = 16
 1 X COORD.= 0 Y COORD.= 219
 2 X COORD.= 80 Y COORD.= 219
 3 X COORD.= 120 Y COORD.= 207
 4 X COORD.= 160 Y COORD.= 202
 5 X COORD.= 200 Y COORD.= 188
 6 X COORD.= 240 Y COORD.= 176
 7 X COORD.= 280 Y COORD.= 170
 8 X COORD.= 320 Y COORD.= 160
 9 X COORD.= 360 Y COORD.= 151
 10 X COORD.= 400 Y COORD.= 139
 11 X COORD.= 440 Y COORD.= 125
 12 X COORD.= 480 Y COORD.= 100
 13 X COORD.= 520 Y COORD.= 82
 14 X COORD.= 560 Y COORD.= 63
 15 X COORD.= 560 Y COORD.= 53
 16 X COORD.= 640 Y COORD.= 53

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-0.300	-0.125	-0.350	-0.300	-0.150
	-0.250	-0.225	-0.300	-0.350	-0.625	-0.450
	-0.475	99999.000	0.000			

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-1

CALCULATION SHEET #2

UNIT WEIGHT OF WATER (GW) = 62.4

<u>EARTH MATERIAL</u>	<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>
BASE OF SLIDE	1	0	17	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 1

SOFT SOIL NUMBER (SSN)= 0

SLICES WILL BE SUBDIVIDED

<u>FORCE NO.</u>	<u>MAGNITUDE</u>	<u>X COORD.</u>	<u>Y COORD.</u>	<u>ANGLE</u>	<u>TYPE</u>	<u>INTERACTION</u>
	<u>(MFO)</u>	<u>(XFO)</u>	<u>(YFO)</u>	<u>(AFO)</u>	<u>(ANC)</u>	<u>(SAI)</u>
1	4000.00	570.000	56.300	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 4 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE DUE TO THE CITY BULKHEAD, WHICH IS DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 80 PCF.

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 7

1	X COORD.= 65	Y COORD.= 212
2	X COORD.= 225	Y COORD.= 129
3	X COORD.= 240	Y COORD.= 124
4	X COORD.= 263	Y COORD.= 119
5	X COORD.= 320	Y COORD.= 105
6	X COORD.= 440	Y COORD.= 83
7	X COORD.= 560	Y COORD.= 53

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #3

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	INTERSLICE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
1	1	28.494	-0.519	6.765E+03	4.721E+03	-1.478E+03	.80E+04	.12E+05	2.927
2	1	22.355	-0.519	1.237E+04	1.335E+04	-4.180E+03	.15E+05	.23E+05	4.143
3	1	17.645	-0.519	1.224E+04	2.190E+04	-6.855E+03	.15E+05	.22E+05	5.444
4	1	33.205	-0.519	3.208E+04	4.428E+04	-1.386E+04	.38E+05	.59E+05	7.789
5	1	6.795	-0.519	8.283E+03	5.006E+04	-1.567E+04	.98E+04	.15E+05	8.205
6	1	40.000	-0.519	5.482E+04	8.832E+04	-2.764E+04	.65E+05	.10E+06	11.089
7	1	4.054	-0.519	6.053E+03	9.254E+04	-2.897E+04	.72E+04	.11E+05	11.396
8	1	20.946	-0.519	3.311E+04	1.156E+05	-3.620E+04	.39E+05	.60E+05	12.992
9	1	15.000	-0.333	2.569E+04	1.192E+05	-3.732E+04	.29E+05	.31E+05	12.896
10	1	14.904	-0.217	2.683E+04	1.127E+05	-3.526E+04	.29E+05	.21E+05	12.179
11	1	8.096	-0.217	1.479E+04	1.090E+05	-3.412E+04	.16E+05	.11E+05	11.795
12	1	17.000	-0.246	3.137E+04	1.043E+05	-3.265E+04	.34E+05	.28E+05	11.150
13	1	25.753	-0.246	4.818E+04	9.710E+04	-3.039E+04	.52E+05	.42E+05	10.170
14	1	14.247	-0.246	2.661E+04	9.311E+04	-2.914E+04	.29E+05	.23E+05	9.621
15	1	36.602	-0.183	6.898E+04	6.809E+04	-2.131E+04	.74E+05	.45E+05	7.524
16	1	3.398	-0.183	6.305E+03	6.580E+04	-2.060E+04	.67E+04	.41E+04	7.336
17	1	40.000	-0.183	7.089E+04	4.009E+04	-1.255E+04	.76E+05	.46E+05	5.174
18	1	7.452	-0.183	1.244E+04	3.558E+04	-1.114E+04	.13E+05	.81E+04	4.800
19	1	32.548	-0.183	5.057E+04	1.723E+04	-5.394E+03	.54E+05	.33E+05	3.426
20	1	18.301	-0.250	2.392E+04	1.400E+04	-4.382E+03	.26E+05	.21E+05	2.924
21	1	21.699	-0.250	2.285E+04	1.091E+04	-3.416E+03	.25E+05	.20E+05	2.182
22	1	29.151	-0.250	2.380E+04	7.701E+03	-2.410E+03	.26E+05	.21E+05	0.862
23	1	10.849	-0.250	7.386E+03	6.703E+03	-2.098E+03	.80E+04	.66E+04	0.252
24	1	40.000	-0.250	2.001E+04	1.270E+02	0.000E+00	.22E+05	.14E+05	0.000
		SUM					.72E+06	.68E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.303 AND FACTOR OF SAFETY IS 1.053

CONCLUSIONS: THE SHEAR STRENGTH ALONG THE BASE OF THE SLIDE WAS VARIED UNTIL THE SAFETY FACTOR WAS NEAR 1.0. AN EXTERNAL FORCE WAS USED TO MODEL THE RESISTING FORCE DUE TO THE CITY BULKHEAD ALONG THE STREET.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #4

TITLE BACK-CALCULATE SHEAR STRENGTH ALONG BASE OF SLIDE SHOWN IN SECTION B-B. ASSUME NO GROUNDWATER. ALSO, INCLUDE RESISTING FORCE DUE TO BULKHEAD ALONG CASTELLAMMARE

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 600 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 215
 2 X COORD.= 85 Y COORD.= 215

NO. OF POINTS ON BOUNDARY LINE 3 = 18
 1 X COORD.= 0 Y COORD.= 250
 2 X COORD.= 43 Y COORD.= 250
 3 X COORD.= 80 Y COORD.= 228
 4 X COORD.= 110 Y COORD.= 213
 5 X COORD.= 128 Y COORD.= 213
 6 X COORD.= 160 Y COORD.= 198
 7 X COORD.= 200 Y COORD.= 188
 8 X COORD.= 240 Y COORD.= 181
 9 X COORD.= 280 Y COORD.= 174
 10 X COORD.= 320 Y COORD.= 167
 11 X COORD.= 360 Y COORD.= 153
 12 X COORD.= 400 Y COORD.= 138
 13 X COORD.= 440 Y COORD.= 120
 14 X COORD.= 480 Y COORD.= 113
 15 X COORD.= 520 Y COORD.= 96
 16 X COORD.= 560 Y COORD.= 82
 17 X COORD.= 570 Y COORD.= 74
 18 X COORD.= 600 Y COORD.= 52

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-0.595	-0.500	0.000	-0.469	-0.250
	-0.175	-0.175	-0.175	-0.350	-0.375	-0.450
	-0.175	-0.425	-0.350	-0.800	-0.733	

UNIT WEIGHT OF WATER (GW) = 62.4

<u>EARTH MATERIAL</u>	<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>
BASE OF SLIDE	1	0	16	120
TENSION CRACK ZONE	2	0	0	62.4

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-1

CALCULATION SHEET #5

NO SEEPAGE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 0

SOFT SOIL NUMBER (SSN)= 0

SLICES WILL BE SUBDIVIDED

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 9

1	X COORD.= 85	Y COORD.= 215
2	X COORD.= 87	Y COORD.= 210
3	X COORD.= 98	Y COORD.= 198
4	X COORD.= 160	Y COORD.= 160
5	X COORD.= 200	Y COORD.= 143
6	X COORD.= 440	Y COORD.= 78
7	X COORD.= 480	Y COORD.= 73
8	X COORD.= 520	Y COORD.= 72
9	X COORD.= 560	Y COORD.= 73

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
3	1	11.000	-1.091	5.589E+03	1.941E+04	-5.608E+03	.86E+04	.19E+05	14.098
4	1	12.000	-0.613	7.969E+03	2.773E+04	-8.010E+03	.97E+04	.18E+05	13.171
5	1	18.000	-0.613	1.537E+04	4.376E+04	-1.264E+04	.19E+05	.34E+05	13.101
6	1	0.863	-0.613	8.841E+02	4.468E+04	-1.291E+04	.11E+04	.20E+04	13.107
7	1	31.137	-0.613	3.411E+04	8.027E+04	-2.319E+04	.42E+05	.76E+05	15.136
8	1	17.988	-0.425	2.205E+04	9.126E+04	-2.637E+04	.25E+05	.35E+05	15.605
9	1	22.012	-0.425	2.937E+04	1.059E+05	-3.060E+04	.33E+05	.47E+05	16.225
10	1	27.113	-0.271	4.008E+04	1.052E+05	-3.040E+04	.43E+05	.41E+05	15.824
11	1	12.887	-0.271	1.984E+04	1.049E+05	-3.030E+04	.21E+05	.20E+05	15.634
12	1	36.238	-0.271	5.851E+04	1.039E+05	-3.002E+04	.63E+05	.60E+05	15.106
13	1	3.762	-0.271	6.305E+03	1.038E+05	-2.999E+04	.68E+04	.64E+04	15.052
14	1	40.000	-0.271	6.972E+04	1.026E+05	-2.965E+04	.75E+05	.71E+05	14.477
15	1	5.363	-0.271	9.639E+03	1.025E+05	-2.960E+04	.10E+05	.98E+04	14.400
16	1	34.637	-0.271	6.050E+04	1.014E+05	-2.930E+04	.65E+05	.62E+05	13.899
17	1	14.488	-0.271	2.432E+04	1.010E+05	-2.918E+04	.26E+05	.25E+05	13.685
18	1	25.512	-0.271	4.113E+04	1.003E+05	-2.898E+04	.44E+05	.42E+05	13.304
19	1	23.614	-0.271	3.548E+04	9.972E+04	-2.881E+04	.38E+05	.36E+05	12.944
20	1	16.386	-0.271	2.274E+04	9.934E+04	-2.870E+04	.25E+05	.23E+05	12.689
21	1	32.739	-0.125	4.536E+04	7.474E+04	-2.159E+04	.48E+05	.21E+05	10.596
22	1	7.261	-0.125	9.815E+03	6.942E+04	-2.006E+04	.10E+05	.46E+04	10.169
23	1	40.000	-0.025	4.532E+04	2.823E+04	-8.154E+03	.47E+05	.41E+04	6.716
24	1	1.864	0.025	1.609E+03	2.647E+04	-7.647E+03	.17E+04	-.14E+03	6.555
25	1	38.136	0.025	2.249E+04	1.955E+03	-5.647E+02	.23E+05	-.20E+04	1.585
26	1	10.000	0.025	1.780E+03	1.451E+01	-4.193E+00	.19E+04	-.16E+03	0.121
27	1	0.989	0.025	1.352E+01	-1.511E-02	0.000E+00	.14E+02	-.12E+01	0.000
		SUM					.69E+06	.66E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.281 AND FACTOR OF SAFETY IS 1.040

ONCLUSIONS: THE SHEAR STRENGTH ALONG THE BASE OF THE SLIDE WAS VARIED UNTIL THE SAFETY FACTOR WAS NEAR 1.0.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #6

**TITLE BACK-CALCULATE SHEAR STRENGTH ALONG BASE OF SLIDE SHOWN IN
SECTION C-C. ASSUME NO GROUNDWATER. ALSO, INCLUDE RESISTING
FORCE DUE TO BULKHEAD ALONG CASTELLAMMARE**

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 2
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.= 0 Y COORD.= 0
2 X COORD.= 720 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
1 X COORD.= 0 Y COORD.= 209
2 X COORD.= 122 Y COORD.= 209

NO. OF POINTS ON BOUNDARY LINE 3 = 19
1 X COORD.= 0 Y COORD.= 209
2 X COORD.= 120 Y COORD.= 219
3 X COORD.= 160 Y COORD.= 211
4 X COORD.= 200 Y COORD.= 203
5 X COORD.= 240 Y COORD.= 192
6 X COORD.= 280 Y COORD.= 179
7 X COORD.= 320 Y COORD.= 170
8 X COORD.= 360 Y COORD.= 156
9 X COORD.= 400 Y COORD.= 153
10 X COORD.= 440 Y COORD.= 146
11 X COORD.= 480 Y COORD.= 133
12 X COORD.= 520 Y COORD.= 116
13 X COORD.= 560 Y COORD.= 98
14 X COORD.= 600 Y COORD.= 83
15 X COORD.= 623 Y COORD.= 75
16 X COORD.= 640 Y COORD.= 69
17 X COORD.= 645 Y COORD.= 64
18 X COORD.= 645 Y COORD.= 49
19 X COORD.= 720 Y COORD.= 49

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.083	-0.200	-0.200	-0.275	-0.325	-0.225
	-0.350	-0.075	-0.175	-0.325	-0.425	-0.450
	-0.375	-0.348	-0.353	-1.000	99999.000	0.000

UNIT WEIGHT OF WATER (GW) = 62.4

SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
ASE OF SLIDE	1	0	16
TENSION CRACK ZONE	2	0	62.4

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #7

NO SEEPAGE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 1

SOFT SOIL NUMBER (SSN)= 0

SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	9000.00	655.000	54.000	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 9 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE DUE TO THE CITY BULKHEAD, WHICH IS DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 80 PCF.

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 9

1	X COORD.= 122	Y COORD.= 209
2	X COORD.= 125	Y COORD.= 200
3	X COORD.= 131	Y COORD.= 193
4	X COORD.= 140	Y COORD.= 187
5	X COORD.= 160	Y COORD.= 179
6	X COORD.= 320	Y COORD.= 133
7	X COORD.= 480	Y COORD.= 85
8	X COORD.= 527	Y COORD.= 77
9	X COORD.= 623	Y COORD.= 75

O. OF POINTS ON SLIP SURFACE (NPSS) 2 = 9

1	X COORD.= 122	Y COORD.= 209
2	X COORD.= 125	Y COORD.= 200
3	X COORD.= 131	Y COORD.= 193
4	X COORD.= 140	Y COORD.= 187
5	X COORD.= 160	Y COORD.= 179
6	X COORD.= 320	Y COORD.= 133
7	X COORD.= 480	Y COORD.= 85
8	X COORD.= 527	Y COORD.= 77
9	X COORD.= 645	Y COORD.= 49

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.079

SLIP SURFACE NO. 2

FOR SLIP SURFACE NO. 2 FACTOR OF SAFETY IS 1.021

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #8

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	5.000	-3.000	2.187E+03	7.184E+03	-2.062E+03	.71E+04	.14E+05	7.974
3	1	6.000	-1.167	4.105E+03	1.561E+04	-4.481E+03	.64E+04	.15E+05	7.521
4	1	9.000	-0.667	7.274E+03	2.393E+04	-6.869E+03	.89E+04	.17E+05	7.728
5	1	20.000	-0.400	1.899E+04	3.141E+04	-9.017E+03	.21E+05	.28E+05	7.872
6	1	11.332	-0.287	1.193E+04	3.168E+04	-9.095E+03	.13E+05	.13E+05	7.806
7	1	28.668	-0.287	3.180E+04	3.241E+04	-9.303E+03	.34E+05	.34E+05	7.636
8	1	23.962	-0.287	2.767E+04	3.304E+04	-9.484E+03	.29E+05	.29E+05	7.494
9	1	16.038	-0.287	1.865E+04	3.346E+04	-9.606E+03	.20E+05	.20E+05	7.401
10	1	36.592	-0.287	4.185E+04	3.442E+04	-9.881E+03	.44E+05	.45E+05	7.202
11	1	3.408	-0.287	3.815E+03	3.451E+04	-9.906E+03	.41E+04	.41E+04	7.184
12	1	40.000	-0.287	4.631E+04	3.556E+04	-1.021E+04	.49E+05	.49E+05	6.977
13	1	9.222	-0.300	1.095E+04	3.628E+04	-1.041E+04	.12E+05	.12E+05	6.955
14	1	30.778	-0.300	3.554E+04	3.860E+04	-1.108E+04	.38E+05	.39E+05	6.914
15	1	21.851	-0.300	2.643E+04	4.033E+04	-1.158E+04	.28E+05	.29E+05	6.889
16	1	18.149	-0.300	2.459E+04	4.194E+04	-1.204E+04	.26E+05	.27E+05	6.850
17	1	34.481	-0.300	5.138E+04	4.530E+04	-1.300E+04	.55E+05	.57E+05	6.763
18	1	5.519	-0.300	8.670E+03	4.586E+04	-1.317E+04	.92E+04	.96E+04	6.749
19	1	40.000	-0.300	6.263E+04	4.996E+04	-1.434E+04	.67E+05	.69E+05	6.681
20	1	7.111	-0.170	1.127E+04	4.558E+04	-1.308E+04	.12E+05	.71E+04	6.450
21	1	32.889	-0.170	4.647E+04	2.754E+04	-7.905E+03	.48E+05	.29E+05	5.562
22	1	7.000	-0.170	8.674E+03	2.417E+04	-6.938E+03	.90E+04	.54E+04	5.460
23	1	12.741	-0.237	1.444E+04	2.199E+04	-6.313E+03	.15E+05	.13E+05	5.332
24	1	20.259	-0.237	2.063E+04	1.888E+04	-5.419E+03	.22E+05	.18E+05	5.113
25	1	32.370	-0.237	2.829E+04	1.461E+04	-4.194E+03	.30E+05	.25E+05	4.751
26	1	7.630	-0.237	5.978E+03	1.371E+04	-3.935E+03	.63E+04	.52E+04	4.669
27	1	23.000	-0.237	1.666E+04	1.119E+04	-3.213E+03	.17E+05	.15E+05	4.437
28	1	17.000	-0.237	1.106E+04	9.526E+03	-2.734E+03	.12E+05	.97E+04	4.289
29	1	5.000	-0.237	3.485E+03	-1.953E-03	0.000E+00	.37E+04	-.59E+04	0.000
SUM							.65E+06	.63E+06	

FOR SLIP SURFACE NO. 2 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.280 AND FACTOR OF SAFETY IS 1.021

CONCLUSIONS: THE SHEAR STRENGTH ALONG THE BASE OF THE SLIDE WAS VARIED UNTIL THE SAFETY FACTOR WAS NEAR 1.0. AN EXTERNAL FORCE WAS USED TO MODEL THE RESISTING FORCE DUE TO THE BULKHEAD.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #9

TITLE BACK-CALCULATE SHEAR STRENGTH ALONG BASE OF THE SHALLOW SECONDARY SLIDE SHOWN IN SECTION G-G. ASSUME NO GROUNDWATER. ALSO, INCLUDE RESISTING FORCE DUE TO BULKHEAD ALONG CASTELLAMMARE

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000
 NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 300 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 142
 2 X COORD.= 20 Y COORD.= 142

NO. OF POINTS ON BOUNDARY LINE 3 = 15
 1 X COORD.= 0 Y COORD.= 156
 2 X COORD.= 10 Y COORD.= 156
 3 X COORD.= 18 Y COORD.= 148
 4 X COORD.= 40 Y COORD.= 137
 5 X COORD.= 80 Y COORD.= 123
 6 X COORD.= 120 Y COORD.= 113
 7 X COORD.= 138 Y COORD.= 102
 8 X COORD.= 160 Y COORD.= 96
 9 X COORD.= 175 Y COORD.= 90
 10 X COORD.= 200 Y COORD.= 85
 11 X COORD.= 221 Y COORD.= 78
 12 X COORD.= 240 Y COORD.= 68
 13 X COORD.= 243 Y COORD.= 65
 14 X COORD.= 243 Y COORD.= 50
 15 X COORD.= 300 Y COORD.= 50

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-1.000	-0.500	-0.350	-0.250	-0.611
	-0.273	-0.400	-0.200	-0.333	-0.526	-1.000
99999.000	0.000					

UNIT WEIGHT OF WATER (GW) = 62.4

<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>
BASE OF SLIDE	1	0	19
TENSION CRACK ZONE	2	0	0
			120
			62.4

NO SEEPAGE
 NO. OF SLICES (NSLI) = 10
 NO. OF ADD. CIRCLES (NAC) = 3
 ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
 NUMBER OF FORCES (NFO) = 1
 SOFT SOIL NUMBER (SSN) = 0

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #10

SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	9000.00	255.000	55.000	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 9 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE DUE TO THE CITY BULKHEAD, WHICH IS DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 80 PCF.

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 8

1	X COORD.= 20	Y COORD.= 142
2	X COORD.= 22	Y COORD.= 137
3	X COORD.= 29	Y COORD.= 131
4	X COORD.= 39	Y COORD.= 125
5	X COORD.= 51	Y COORD.= 116
6	X COORD.= 86	Y COORD.= 101
7	X COORD.= 190	Y COORD.= 72
8	X COORD.= 243	Y COORD.= 50

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 0.967

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
3	1	7.000	-0.857	2.325E+03	5.606E+03	-2.137E+03	.30E+04	.55E+04	8.713
4	1	10.000	-0.600	4.575E+03	8.296E+03	-3.163E+03	.52E+04	.80E+04	7.718
5	1	1.000	-0.750	4.756E+02	8.718E+03	-3.324E+03	.58E+03	.10E+04	7.704
6	1	11.000	-0.750	6.195E+03	1.421E+04	-5.416E+03	.75E+04	.13E+05	7.997
7	1	11.467	-0.429	7.946E+03	1.570E+04	-5.984E+03	.84E+04	.10E+05	7.750
8	1	17.533	-0.429	1.294E+04	1.812E+04	-6.909E+03	.14E+05	.17E+05	7.480
9	1	5.033	-0.429	3.939E+03	1.886E+04	-7.191E+03	.41E+04	.50E+04	7.419
10	1	0.967	-0.429	7.770E+02	1.901E+04	-7.246E+03	.82E+03	.99E+03	7.407
11	1	21.600	-0.279	1.863E+04	1.512E+04	-5.764E+03	.19E+05	.15E+05	6.806
12	1	12.400	-0.279	1.095E+04	1.284E+04	-4.893E+03	.11E+05	.91E+04	6.629
13	1	10.167	-0.279	8.340E+03	1.110E+04	-4.230E+03	.84E+04	.69E+04	6.541
14	1	7.833	-0.279	5.455E+03	9.957E+03	-3.796E+03	.55E+04	.45E+04	6.437
15	1	14.733	-0.279	9.493E+03	7.976E+03	-3.041E+03	.95E+04	.79E+04	6.333
16	1	7.267	-0.279	4.702E+03	6.995E+03	-2.667E+03	.47E+04	.39E+04	6.422
17	1	15.000	-0.279	9.155E+03	5.085E+03	-1.939E+03	.92E+04	.76E+04	7.003
18	1	0.300	-0.279	1.719E+02	5.049E+03	-1.925E+03	.17E+03	.14E+03	7.021
19	1	14.700	-0.279	8.786E+03	3.216E+03	-1.226E+03	.88E+04	.73E+04	9.081
20	1	7.867	-0.415	4.926E+03	3.972E+03	-1.514E+03	.52E+04	.61E+04	7.591
21	1	2.133	-0.415	1.427E+03	4.191E+03	-1.598E+03	.15E+04	.18E+04	7.264
22	1	20.433	-0.415	1.452E+04	6.420E+03	-2.448E+03	.15E+05	.18E+05	5.307
23	1	0.567	-0.415	4.220E+02	6.485E+03	-2.472E+03	.44E+03	.52E+03	5.273
24	1	19.000	-0.415	1.337E+04	8.538E+03	-3.255E+03	.14E+05	.17E+05	4.564
25	1	3.000	-0.415	3.012E+03	0.000E+00	0.000E+00	.32E+04	-.53E+04	0.000
		SUM					.16E+06	.16E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000

BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.364 AND FACTOR OF SAFETY IS 0.967

CONCLUSIONS:

THE SHEAR STRENGTH ALONG THE BASE OF THE SLIDE WAS VARIED UNTIL THE SAFETY FACTOR WAS NEAR 1.0. AN EXTERNAL FORCE WAS USED TO MODEL THE RESISTING FORCE DUE TO THE BULKHEAD.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #11

TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY LINE - SECTION A-A.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 640 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 212
 2 X COORD.= 65 Y COORD.= 212

NO. OF POINTS ON BOUNDARY LINE 3 = 10
 1 X COORD.= 0 Y COORD.= 219
 2 X COORD.= 80 Y COORD.= 219
 3 X COORD.= 120 Y COORD.= 207
 4 X COORD.= 160 Y COORD.= 202
 5 X COORD.= 200 Y COORD.= 188
 6 X COORD.= 240 Y COORD.= 176
 7 X COORD.= 280 Y COORD.= 170
 8 X COORD.= 288 Y COORD.= 170
 9 X COORD.= 288 Y COORD.= 112
 10 X COORD.= 640 Y COORD.= 112

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-0.300	-0.125	-0.350	-0.300	-0.150
	0.000	99999.000	0.000			

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIALS	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	0	16	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 1

SOFT SOIL NUMBER (SSN)= 0

SLICES WILL BE SUBDIVIDED

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #12

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	170000.00	300.000	131.300	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 170 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 4
 1 X COORD.= 65 Y COORD.= 212
 2 X COORD.= 225 Y COORD.= 129
 3 X COORD.= 240 Y COORD.= 124
 4 X COORD.= 288 Y COORD.= 112

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.269

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	INTERSLICE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	4.845	-0.519	1.452E+03	6.366E+03	-1.492E+03	.21E+04	.33E+04	8.575
3	1	18.805	-0.519	8.159E+03	1.575E+04	-3.690E+03	.12E+05	.19E+05	7.217
4	1	21.195	-0.519	1.159E+04	2.906E+04	-6.810E+03	.17E+05	.26E+05	8.550
5	1	2.454	-0.519	1.519E+03	3.081E+04	-7.220E+03	.22E+04	.35E+04	8.743
6	1	23.649	-0.519	1.777E+04	5.123E+04	-1.201E+04	.25E+05	.40E+05	10.636
7	1	13.896	-0.519	1.309E+04	6.628E+04	-1.553E+04	.19E+05	.30E+05	11.720
8	1	9.753	-0.519	1.008E+04	7.787E+04	-1.825E+04	.14E+05	.23E+05	12.540
9	1	23.649	-0.519	2.616E+04	1.079E+05	-2.529E+04	.37E+05	.60E+05	14.828
10	1	6.598	-0.519	7.731E+03	1.168E+05	-2.737E+04	.11E+05	.18E+05	15.502
11	1	17.052	-0.519	2.104E+04	1.410E+05	-3.304E+04	.30E+05	.48E+05	17.270
12	1	7.948	-0.519	1.037E+04	1.529E+05	-3.584E+04	.15E+05	.24E+05	18.093
13	1	15.000	-0.333	2.017E+04	1.620E+05	-3.796E+04	.27E+05	.30E+05	18.517
14	1	0.701	-0.250	9.604E+02	1.621E+05	-3.799E+04	.13E+04	.11E+04	18.516
15	1	23.649	-0.250	3.315E+04	1.655E+05	-3.879E+04	.43E+05	.38E+05	18.492
16	1	15.649	-0.250	2.275E+04	1.679E+05	-3.933E+04	.30E+05	.26E+05	18.471
17	1	8.000	-0.250	2.074E+04	-1.563E-02	0.000E+00	.27E+05	-.15E+06	0.000
SUM							.31E+06	.25E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.230 AND FACTOR OF SAFETY IS 1.269

CONCLUSIONS: THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION A SHOULD BE DESIGNED TO RESIST A FORCE OF 170 KIPS, APPLIED AT 1/3 THE RETAINED HEIGHT.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-1

CALCULATION SHEET #13

**TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY
 LINE - SECTION B-B.**

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 600 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 215
 2 X COORD.= 85 Y COORD.= 215

NO. OF POINTS ON BOUNDARY LINE 3 = 11
 1 X COORD.= 0 Y COORD.= 250
 2 X COORD.= 43 Y COORD.= 250
 3 X COORD.= 80 Y COORD.= 228
 4 X COORD.= 110 Y COORD.= 213
 5 X COORD.= 128 Y COORD.= 213
 6 X COORD.= 160 Y COORD.= 198
 7 X COORD.= 200 Y COORD.= 188
 8 X COORD.= 240 Y COORD.= 181
 9 X COORD.= 254 Y COORD.= 180
 10 X COORD.= 254 Y COORD.= 128
 11 X COORD.= 600 Y COORD.= 128

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-0.595	-0.500	0.000	-0.469	-0.250
	-0.175	-0.071	99999.000	0.000		

UNIT WEIGHT OF WATER (GW) = 62.4

<u>EARTH MATERIAL</u>	<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>
BASE OF SLIDE	1	0	16	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE
 NO. OF SLICES (NSLI) = 10
 NO. OF ADD. CIRCLES (NAC) = 3
 ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
 NUMBER OF FORCES (NFO)= 1
 SOFT SOIL NUMBER (SSN)= 0
 LICES WILL BE SUBDIVIDED

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #14

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	145000.00	275.000	145.330	0.00	0	0

NOTE: AN EXTERNAL FORCE OF 145 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 6

1	X COORD.= 85	Y COORD.= 215
2	X COORD.= 87	Y COORD.= 210
3	X COORD.= 98	Y COORD.= 198
4	X COORD.= 160	Y COORD.= 160
5	X COORD.= 200	Y COORD.= 143
6	X COORD.= 254	Y COORD.= 128

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.282

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
3	1	10.164	-1.091	4.315E+03	1.955E+04	-5.130E+03	.82E+04	.18E+05	13.447
4	1	0.836	-1.091	4.684E+02	2.078E+04	-5.452E+03	.89E+03	.19E+04	13.325
5	1	12.000	-0.613	6.609E+03	3.058E+04	-8.025E+03	.99E+04	.18E+05	12.580
6	1	4.590	-0.613	2.771E+03	3.469E+04	-9.104E+03	.42E+04	.74E+04	12.601
7	1	13.410	-0.613	9.974E+03	4.949E+04	-1.299E+04	.15E+05	.26E+05	12.825
8	1	4.016	-0.613	3.436E+03	5.459E+04	-1.433E+04	.52E+04	.91E+04	12.968
9	1	17.426	-0.613	1.559E+04	7.772E+04	-2.040E+04	.23E+05	.41E+05	14.300
10	1	10.557	-0.613	9.988E+03	9.254E+04	-2.429E+04	.15E+05	.27E+05	15.410
11	1	6.869	-0.425	6.737E+03	9.812E+04	-2.575E+04	.94E+04	.13E+05	15.616
12	1	17.426	-0.425	1.803E+04	1.131E+05	-2.967E+04	.25E+05	.35E+05	16.192
13	1	15.705	-0.425	1.741E+04	1.275E+05	-3.345E+04	.24E+05	.33E+05	16.763
14	1	1.721	-0.278	2.009E+03	1.279E+05	-3.358E+04	.27E+04	.26E+04	16.727
15	1	17.426	-0.278	2.078E+04	1.328E+05	-3.485E+04	.28E+05	.26E+05	16.373
16	1	17.426	-0.278	2.159E+04	1.378E+05	-3.617E+04	.29E+05	.27E+05	16.031
17	1	3.426	-0.278	4.340E+03	1.388E+05	-3.643E+04	.58E+04	.55E+04	15.966
18	1	14.000	-0.278	2.653E+04	0.000E+00	0.000E+00	.35E+05	-.11E+06	0.000
		SUM					.24E+06	.19E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000

BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.257 AND FACTOR OF SAFETY IS 1.282

CONCLUSIONS:

THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION B SHOULD BE DESIGNED TO RESIST A FORCE OF 145 KIPS, APPLIED AT 1/3 THE RETAINED HEIGHT.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #15

TITLE CALCULATE THE LOAD ON SHORING PILES ALONG THE UPSLOPE PROPERTY LINE - SECTION C-C.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 720 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 209
 2 X COORD.= 122 Y COORD.= 209

NO. OF POINTS ON BOUNDARY LINE 3 = 9
 1 X COORD.= 0 Y COORD.= 209
 2 X COORD.= 120 Y COORD.= 219
 3 X COORD.= 160 Y COORD.= 211
 4 X COORD.= 200 Y COORD.= 203
 5 X COORD.= 240 Y COORD.= 192
 6 X COORD.= 280 Y COORD.= 179
 7 X COORD.= 295 Y COORD.= 175
 8 X COORD.= 295 Y COORD.= 140
 9 X COORD.= 720 Y COORD.= 140

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.083	-0.200	-0.200	-0.275	-0.325	-0.267
	99999.000	0.000				

UNIT WEIGHT OF WATER (GW) = 62.4

<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>	
BASE OF SLIDE	1	0	16	120
TENSION CRACK ZONE	2	0	0	62.4

NO SEEPAGE

NO. OF SLICES (NSLI) = 10
 NO. OF ADD. CIRCLES (NAC) = 3
 ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)
 NUMBER OF FORCES (NFO)= 1
 SOFT SOIL NUMBER (SSN)= 0
 SLICES WILL BE SUBDIVIDED

<u>FORCE NO.</u>	<u>MAGNITUDE</u>	<u>X COORD.</u>	<u>Y COORD.</u>	<u>ANGLE</u>	<u>TYPE</u>	<u>INTERACTION</u>
	<u>(MFO)</u>	<u>(XFO)</u>	<u>(YFO)</u>	<u>(AFO)</u>	<u>(ANC)</u>	<u>(SAI)</u>
1	145000.00	325.000	151.670	0.00	0	0

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #16

NOTE: AN EXTERNAL FORCE OF 145 KIPS WAS APPLIED TO SIMULATE THE RESISTING FORCE REQUIRED BY THE SOLDIER PILE

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 6

1	X COORD.= 122	Y COORD.= 209
2	X COORD.= 125	Y COORD.= 200
3	X COORD.= 131	Y COORD.= 193
4	X COORD.= 140	Y COORD.= 187
5	X COORD.= 160	Y COORD.= 179
6	X COORD.= 295	Y COORD.= 140

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 2.338

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	INTERSLICE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	5.000	-3.000	1.277E+03	9.966E+03	-2.095E+03	.94E+04	.14E+05	7.833
3	1	6.000	-1.167	2.081E+03	2.150E+04	-4.519E+03	.75E+04	.15E+05	7.830
4	1	5.332	-0.667	1.975E+03	2.879E+04	-6.051E+03	.55E+04	.97E+04	7.972
5	1	3.668	-0.667	1.472E+03	3.422E+04	-7.193E+03	.41E+04	.72E+04	8.246
6	1	13.962	-0.400	5.875E+03	4.656E+04	-9.786E+03	.15E+05	.19E+05	8.357
7	1	6.038	-0.400	2.713E+03	5.226E+04	-1.098E+04	.68E+04	.86E+04	8.527
8	1	11.592	-0.289	5.394E+03	5.928E+04	-1.246E+04	.13E+05	.13E+05	8.372
9	1	17.630	-0.289	8.532E+03	7.039E+04	-1.480E+04	.21E+05	.20E+05	8.323
10	1	10.778	-0.289	5.411E+03	7.744E+04	-1.628E+04	.13E+05	.13E+05	8.373
11	1	6.851	-0.289	3.491E+03	8.198E+04	-1.723E+04	.85E+04	.82E+04	8.431
12	1	17.630	-0.289	9.026E+03	9.374E+04	-1.970E+04	.22E+05	.21E+05	8.669
13	1	15.519	-0.289	7.997E+03	1.042E+05	-2.189E+04	.19E+05	.19E+05	8.958
14	1	2.111	-0.289	1.090E+03	1.056E+05	-2.219E+04	.27E+04	.26E+04	9.002
15	1	17.630	-0.289	9.012E+03	1.173E+05	-2.466E+04	.22E+05	.21E+05	9.414
16	1	17.630	-0.289	8.851E+03	1.288E+05	-2.708E+04	.22E+05	.21E+05	9.893
17	1	2.630	-0.289	1.307E+03	1.305E+05	-2.744E+04	.32E+04	.31E+04	9.968
18	1	15.000	-0.289	1.111E+04	0.000E+00	0.000E+00	.27E+05	-.12E+06	0.000
		SUM					.22E+06	.95E+05	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.207 AND FACTOR OF SAFETY IS 2.338

CONCLUSIONS: THE EXTERNAL FORCE USED TO MODEL THE SOLDIER PILE WAS INCREASED UNTIL THE SAFETY FACTOR WAS AT LEAST 1.25. SOLDIER PILES NEAR SECTION C SHOULD BE DESIGNED TO RESIST A FORCE OF 145 KIPS, APPLIED AT 1/3 THE RETAINED HEIGHT.

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #17

TITLE **CALCULATE THE SAFETY FACTOR OF THE REPAIR BASED UPON SECTION A. ASSUME THAT THE SLIDE DEBRIS IS REPLACED WITH COMPACTED FILL AND SOLDIER PILES ALONG THE UPHILL AND DOWNHILL PROPERTY LINES. THE UPHILL PILES ARE DESIGNED FOR EQUIVALENT FLUID PRESSURE = 30 PCF, WHILE THE EQUIVALENT FLUID PRESSURE FOR THE DOWNHILL PILES IS 65 PCF. ALSO, ASSUME WORST CASE GROUNDWATER CONDITIONS SHOWN IN SECTION A.**

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
TWO-DIMENSIONAL ANALYSIS (THREED = 0)
CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000
NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 2
1 X COORD.= 0 Y COORD.= 0
2 X COORD.= 640 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 4
1 X COORD.= 288 Y COORD.= 170
2 X COORD.= 288 Y COORD.= 110
3 X COORD.= 387 Y COORD.= 92
4 X COORD.= 387 Y COORD.= 142

NO. OF POINTS ON BOUNDARY LINE 3 = 2
1 X COORD.= 0 Y COORD.= 212
2 X COORD.= 65 Y COORD.= 212

NO. OF POINTS ON BOUNDARY LINE 4 = 12
1 X COORD.= 0 Y COORD.= 219
2 X COORD.= 80 Y COORD.= 219
3 X COORD.= 120 Y COORD.= 207
4 X COORD.= 160 Y COORD.= 202
5 X COORD.= 200 Y COORD.= 188
6 X COORD.= 240 Y COORD.= 176
7 X COORD.= 280 Y COORD.= 170
8 X COORD.= 320 Y COORD.= 160
9 X COORD.= 360 Y COORD.= 151
10 X COORD.= 387 Y COORD.= 142
11 X COORD.= 387 Y COORD.= 94
12 X COORD.= 640 Y COORD.= 94

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	99999.000	-0.182	99999.000			
3	0.000					
4	0.000	-0.300	-0.125	-0.350	-0.300	-0.150
	-0.250	-0.225	-0.333	99999.000	0.000	

UNIT WEIGHT OF WATER (GW) = 62.4

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #18

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	0	16	120
COMPACTED FILL	2	400	29	130
TENSION CRACK ZONE	3	0	0	62.4

USE PHREATIC SURFACE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 2

SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 6

1	X COORD.= 0	Y COORD.= 200
2	X COORD.= 120	Y COORD.= 200
3	X COORD.= 254	Y COORD.= 145
4	X COORD.= 288	Y COORD.= 112
5	X COORD.= 387	Y COORD.= 94
6	X COORD.= 640	Y COORD.= 40

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	74880.00	400.000	110.000	0.00	0	0
2	50460.00	160.000	131.330	0.00	1	0

NOTE: EXTERNAL FORCES WERE USED TO MODEL THE SOLDIER PILES. FORCE #1 IS THE RESULTANT FROM THE LOWER SOLDIER PILES DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 65 PCF. FORCE #2 IS THE RESULTANT FROM THE UPPER SOLDIER PILES DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 30 PCF.

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 6

1	X COORD.= 65	Y COORD.= 212
2	X COORD.= 225	Y COORD.= 129
3	X COORD.= 240	Y COORD.= 124
4	X COORD.= 263	Y COORD.= 119
5	X COORD.= 320	Y COORD.= 105
6	X COORD.= 387	Y COORD.= 94

SLIP SURFACE NO. 1

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #19

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.633

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
1	1	28.494	-0.519	4.192E+03	7.271E+03	-2.152E+03	.77E+04	.12E+05	3.170
2	1	5.055	-0.519	1.543E+03	9.947E+03	-2.944E+03	.28E+04	.44E+04	3.290
3	1	33.549	-0.519	1.021E+04	3.538E+04	-1.047E+04	.19E+05	.37E+05	5.706
4	1	1.395	-0.519	3.799E+02	3.677E+04	-1.088E+04	.70E+03	.18E+04	5.795
5	1	32.154	-0.519	1.210E+04	7.677E+04	-2.272E+04	.22E+05	.54E+05	8.066
6	1	7.846	-0.519	3.979E+03	8.886E+04	-2.630E+04	.73E+04	.17E+05	8.595
7	1	25.704	-0.519	1.438E+04	1.323E+05	-3.917E+04	.26E+05	.60E+05	10.552
8	1	14.296	-0.519	8.588E+03	1.585E+05	-4.692E+04	.16E+05	.36E+05	11.726
9	1	19.253	-0.519	1.242E+04	1.964E+05	-5.813E+04	.23E+05	.52E+05	13.334
10	1	5.747	-0.519	6.404E+03	1.622E+05	-4.800E+04	.12E+05	-.27E+05	17.300
11	1	15.000	-0.333	1.090E+04	1.800E+05	-5.327E+04	.19E+05	.29E+05	16.117
12	1	12.802	-0.217	1.007E+04	1.868E+05	-5.528E+04	.17E+05	.17E+05	14.541
13	1	10.198	-0.217	8.694E+03	1.917E+05	-5.674E+04	.15E+05	.14E+05	13.372
14	1	17.000	-0.246	1.670E+04	2.011E+05	-5.951E+04	.28E+05	.27E+05	11.909
15	1	6.352	-0.246	6.957E+03	2.040E+05	-6.038E+04	.12E+05	.10E+05	11.417
16	2	33.648	-0.246	8.833E+04	1.744E+05	-5.161E+04	.15E+06	.61E+05	11.509
17	2	33.451	-0.164	8.847E+04	1.256E+05	-3.718E+04	.15E+06	.41E+05	10.699
18	2	6.549	-0.164	1.702E+04	1.162E+05	-3.440E+04	.28E+05	.78E+04	10.665
19	2	27.000	-0.164	7.495E+04	-7.813E-03	0.000E+00	.12E+06	-.40E+05	0.000
SUM							.67E+06	.41E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.288 AND FACTOR OF SAFETY IS 1.633

CONCLUSIONS: **THE CALCULATED SAFETY FACTOR AFTER THE REPAIR IS GREATER THAN 1.5.**

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #20

TITLE CALCULATE THE SAFETY FACTOR OF THE REPAIR BASED UPON SECTION B. ASSUME THAT THE SLIDE DEBRIS IS REPLACED WITH COMPACTED FILL AND SOLDIER PILES ALONG THE UPHILL AND DOWNHILL PROPERTY LINES. THE UPHILL PILES ARE DESIGNED FOR EQUIVALENT FLUID PRESSURE = 30 PCF, WHILE THE EQUIVALENT FLUID PRESSURE FOR THE DOWNHILL PILES IS 65 PCF. ALSO, ASSUME WORST CASE GROUNDWATER CONDITIONS SHOWN IN SECTION B.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 2

1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 600 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 5

1 X COORD.= 254 Y COORD.= 180
 2 X COORD.= 254 Y COORD.= 127
 3 X COORD.= 440 Y COORD.= 77
 4 X COORD.= 449 Y COORD.= 74
 5 X COORD.= 449 Y COORD.= 116

NO. OF POINTS ON BOUNDARY LINE 3 = 2

1 X COORD.= 0 Y COORD.= 215
 2 X COORD.= 85 Y COORD.= 215

NO. OF POINTS ON BOUNDARY LINE 4 = 16

1 X COORD.= 0 Y COORD.= 250
 2 X COORD.= 43 Y COORD.= 250
 3 X COORD.= 80 Y COORD.= 228
 4 X COORD.= 110 Y COORD.= 213
 5 X COORD.= 128 Y COORD.= 213
 6 X COORD.= 160 Y COORD.= 198
 7 X COORD.= 200 Y COORD.= 188
 8 X COORD.= 240 Y COORD.= 181
 9 X COORD.= 280 Y COORD.= 174
 10 X COORD.= 320 Y COORD.= 167
 11 X COORD.= 360 Y COORD.= 153
 12 X COORD.= 400 Y COORD.= 138
 13 X COORD.= 440 Y COORD.= 120
 14 X COORD.= 449 Y COORD.= 118
 15 X COORD.= 449 Y COORD.= 75
 16 X COORD.= 600 Y COORD.= 75

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	99999.000	-0.269	-0.333	99999.000		
3	0.000					
4	0.000	-0.595	-0.500	0.000	-0.469	-0.250
	-0.175	-0.175	-0.175	-0.350	-0.375	-0.450
	-0.222	99999.000	0.000			

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #21

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BASE OF SLIDE	1	0	16	120
COMPACTED FILL	2	400	29	130
TENSION CRACK ZONE	3	0	0	62.4

USE PHREATIC SURFACE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 2

SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.= 0	Y COORD.= 200
2	X COORD.= 110	Y COORD.= 200
3	X COORD.= 209	Y COORD.= 173
4	X COORD.= 254	Y COORD.= 128
5	X COORD.= 449	Y COORD.= 75
6	X COORD.= 480	Y COORD.= 72
7	X COORD.= 720	Y COORD.= 10

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

SLICES WILL BE SUBDIVIDED

FORCE NO.	MAGNITUDE (MFO)	X COORD. (XFO)	Y COORD. (YFO)	ANGLE (AFO)	TYPE (ANC)	INTERACTION (SAI)
1	54632.50	500.000	89.330	0.00	0	0
2	40560.00	100.000	145.330	0.00	1	0

NOTE: EXTERNAL FORCES WERE USED TO MODEL THE SOLDIER PILES. FORCE #1 IS THE RESULTANT FROM THE LOWER SOLDIER PILES DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 65 PCF. FORCE #2 IS THE RESULTANT FROM THE UPPER SOLDIER PILES DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 30 PCF.

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 7

1	X COORD.= 85	Y COORD.= 215
2	X COORD.= 87	Y COORD.= 210
3	X COORD.= 98	Y COORD.= 198
4	X COORD.= 160	Y COORD.= 160
5	X COORD.= 200	Y COORD.= 143
6	X COORD.= 440	Y COORD.= 78
7	X COORD.= 449	Y COORD.= 75

SLIP SURFACE NO. 1

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #22

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.635

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE FORCE NORMAL	INTERSLICE FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
3	1	11.000	-1.091	3.658E+03	2.114E+04	-6.641E+03	.89E+04	.18E+05	13.168
4	1	12.000	-0.613	4.320E+03	3.294E+04	-1.034E+04	.83E+04	.17E+05	11.394
5	1	6.664	-0.613	2.364E+03	4.064E+04	-1.276E+04	.45E+04	.10E+05	11.035
6	1	11.336	-0.613	4.835E+03	5.680E+04	-1.784E+04	.93E+04	.22E+05	10.799
7	1	25.590	-0.613	1.164E+04	1.010E+05	-3.171E+04	.22E+05	.58E+05	12.044
8	1	6.410	-0.613	2.779E+03	1.131E+05	-3.551E+04	.53E+04	.15E+05	12.566
9	1	30.516	-0.425	1.438E+04	1.551E+05	-4.872E+04	.26E+05	.58E+05	12.078
10	1	9.484	-0.425	6.896E+03	1.316E+05	-4.132E+04	.12E+05	-.16E+05	15.286
11	1	27.443	-0.271	1.664E+04	1.538E+05	-4.829E+04	.28E+05	.39E+05	11.972
12	1	12.557	-0.271	1.019E+04	1.622E+05	-5.093E+04	.17E+05	.19E+05	10.819
13	1	24.369	-0.271	2.439E+04	1.754E+05	-5.508E+04	.41E+05	.38E+05	8.984
14	2	15.631	-0.271	3.864E+04	1.648E+05	-5.176E+04	.65E+05	.29E+05	8.857
15	2	21.295	-0.271	5.425E+04	1.501E+05	-4.715E+04	.92E+05	.42E+05	8.752
16	2	18.705	-0.271	4.918E+04	1.369E+05	-4.300E+04	.83E+05	.38E+05	8.743
17	2	18.221	-0.271	4.804E+04	1.240E+05	-3.895E+04	.81E+05	.37E+05	8.817
18	2	21.779	-0.271	5.595E+04	1.089E+05	-3.420E+04	.95E+05	.43E+05	9.028
19	2	15.148	-0.271	3.785E+04	9.859E+04	-3.096E+04	.64E+05	.29E+05	9.279
20	2	24.852	-0.271	5.989E+04	8.210E+04	-2.578E+04	.10E+06	.46E+05	9.952
21	2	12.074	-0.271	2.787E+04	7.433E+04	-2.334E+04	.47E+05	.21E+05	10.440
22	2	27.926	-0.271	6.019E+04	5.718E+04	-1.796E+04	.10E+06	.45E+05	12.173
23	2	9.000	-0.333	2.382E+04	-1.172E-02	0.000E+00	.41E+05	-.32E+05	0.000
		SUM					.96E+06	.58E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000

BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.304 AND FACTOR OF SAFETY IS 1.635

CONCLUSIONS: THE CALCULATED SAFETY FACTOR AFTER THE REPAIR IS GREATER THAN 1.5.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-1

CALCULATION SHEET #23

TITLE CALCULATE THE SAFETY FACTOR OF THE REPAIR BASED UPON SECTION C. ASSUME THAT THE SLIDE DEBRIS IS REPLACED WITH COMPACTED FILL AND SOLDIER PILES ALONG THE UPHILL AND DOWNHILL PROPERTY LINES. THE UPHILL PILES ARE DESIGNED FOR EQUIVALENT FLUID PRESSURE = 30 PCF, WHILE THE EQUIVALENT FLUID PRESSURE FOR THE DOWNHILL PILES IS 65 PCF. ALSO, ASSUME WORST CASE GROUNDWATER CONDITIONS SHOWN IN SECTION C.

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000
 NO. OF BOUNDARY LINES (NBL) = 4

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 720 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 4
 1 X COORD.= 295 Y COORD.= 175
 2 X COORD.= 295 Y COORD.= 139
 3 X COORD.= 469 Y COORD.= 87
 4 X COORD.= 469 Y COORD.= 135

NO. OF POINTS ON BOUNDARY LINE 3 = 2
 1 X COORD.= 0 Y COORD.= 209
 2 X COORD.= 122 Y COORD.= 209

NO. OF POINTS ON BOUNDARY LINE 4 = 13
 1 X COORD.= 0 Y COORD.= 209
 2 X COORD.= 120 Y COORD.= 219
 3 X COORD.= 160 Y COORD.= 211
 4 X COORD.= 200 Y COORD.= 203
 5 X COORD.= 240 Y COORD.= 192
 6 X COORD.= 280 Y COORD.= 179
 7 X COORD.= 320 Y COORD.= 170
 8 X COORD.= 360 Y COORD.= 156
 9 X COORD.= 400 Y COORD.= 153
 10 X COORD.= 440 Y COORD.= 146
 11 X COORD.= 469 Y COORD.= 135
 12 X COORD.= 469 Y COORD.= 88
 13 X COORD.= 720 Y COORD.= 88

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	99999.000	-0.299	99999.000			
3	0.000					
4	0.083	-0.200	-0.200	-0.275	-0.325	-0.225
	-0.350	-0.075	-0.175	-0.379	99999.000	0.000

UNIT WEIGHT OF WATER (GW) = 62.4

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #24

<u>EARTH MATERIAL</u>	<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>
BASE OF SLIDE	1	0	16	120
COMPACTED FILL	2	400	29	130
TENSION CRACK ZONE	3	0	0	62.4

USE PHREATIC SURFACE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO) = 2

SOFT SOIL NUMBER (SSN) = 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.= 0	Y COORD.= 200
2	X COORD.= 191	Y COORD.= 200
3	X COORD.= 252	Y COORD.= 183
4	X COORD.= 295	Y COORD.= 140
5	X COORD.= 469	Y COORD.= 88
6	X COORD.= 533	Y COORD.= 55
7	X COORD.= 720	Y COORD.= 10

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

SLICES WILL BE SUBDIVIDED

<u>FORCE NO.</u>	<u>MAGNITUDE</u> (MFO)	<u>X COORD.</u> (XFO)	<u>Y COORD.</u> (YFO)	<u>ANGLE</u> (AFO)	<u>TYPE</u> (ANC)	<u>INTERACTION</u> (SAI)
1	71792.50	475.000	103.670	0.00	0	0
2	18375.00	100.000	151.670	0.00	1	0

NOTE: EXTERNAL FORCES WERE USED TO MODEL THE SOLDIER PILES. FORCE #1 IS THE RESULTANT FROM THE LOWER SOLDIER PILES DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 65 PCF. FORCE #2 IS THE RESULTANT FROM THE UPPER SOLDIER PILES DESIGNED FOR EQUIVALENT FLUID PRESSURE OF 30 PCF.

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 7

1	X COORD.= 122	Y COORD.= 209
2	X COORD.= 125	Y COORD.= 200
3	X COORD.= 131	Y COORD.= 193
4	X COORD.= 140	Y COORD.= 187
5	X COORD.= 160	Y COORD.= 179
6	X COORD.= 320	Y COORD.= 133
7	X COORD.= 469	Y COORD.= 88

SLIP SURFACE NO. 1

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #25

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.733

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	5.000	-3.000	1.480E+03	8.512E+03	-2.367E+03	.81E+04	.13E+05	7.810
3	1	6.000	-1.167	2.300E+03	1.910E+04	-5.311E+03	.61E+04	.14E+05	7.332
4	1	9.000	-0.667	3.391E+03	3.140E+04	-8.730E+03	.71E+04	.16E+05	7.270
5	1	13.732	-0.400	5.261E+03	4.372E+04	-1.216E+04	.98E+04	.18E+05	6.653
6	1	6.268	-0.400	2.364E+03	4.993E+04	-1.388E+04	.44E+04	.87E+04	6.540
7	1	28.762	-0.287	1.052E+04	7.035E+04	-1.956E+04	.19E+05	.31E+05	4.861
8	1	11.238	-0.287	3.905E+03	7.916E+04	-2.201E+04	.70E+04	.13E+05	4.415
9	1	23.792	-0.287	8.519E+03	9.805E+04	-2.726E+04	.15E+05	.28E+05	3.757
10	1	16.208	-0.287	5.850E+03	1.110E+05	-3.086E+04	.11E+05	.19E+05	3.455
11	1	18.822	-0.287	7.485E+03	1.082E+05	-3.008E+04	.13E+05	.50E+04	3.990
12	1	21.178	-0.287	1.002E+04	1.222E+05	-3.397E+04	.18E+05	.24E+05	3.713
13	1	13.851	-0.287	8.415E+03	1.295E+05	-3.601E+04	.15E+05	.16E+05	3.622
14	2	26.149	-0.287	4.405E+04	1.198E+05	-3.331E+04	.79E+05	.36E+05	4.159
15	2	8.881	-0.302	1.512E+04	1.171E+05	-3.255E+04	.27E+05	.13E+05	4.467
16	2	31.119	-0.302	5.180E+04	1.075E+05	-2.990E+04	.94E+05	.45E+05	5.625
17	2	3.911	-0.302	6.463E+03	1.063E+05	-2.957E+04	.12E+05	.56E+04	5.781
18	2	35.030	-0.302	6.405E+04	9.529E+04	-2.649E+04	.12E+06	.56E+05	7.320
19	2	1.059	-0.302	2.110E+03	9.495E+04	-2.640E+04	.38E+04	.19E+04	7.371
20	2	33.970	-0.302	7.073E+04	8.378E+04	-2.329E+04	.13E+06	.63E+05	9.204
21	2	6.030	-0.302	1.316E+04	8.176E+04	-2.273E+04	.24E+05	.12E+05	9.574
22	2	29.000	-0.302	6.857E+04	0.000E+00	0.000E+00	.12E+06	-.10E+05	0.000
		SUM					.74E+06	.43E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.271 AND FACTOR OF SAFETY IS 1.733

CONCLUSIONS: THE CALCULATED SAFETY FACTOR AFTER THE REPAIR IS GREATER THAN 1.5.

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #26

**TITLE CALCULATE THE SAFETY FACTOR OF THE REPAIR BASED UPON SECTION A.
 ASSUME A PLANAR FAILURE IN THE BEDROCK, JUST BELOW THE SLIDE
 PLANE. USE RESIDUAL BEDROCK STRENGTHS. ALSO, ASSUME WORST CASE
 GROUNDWATER CONDITIONS SHOWN IN SECTION A.**

TITLE -BACK-CALCULATE SECTION A
 NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 640 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 212
 2 X COORD.= 65 Y COORD.= 212

NO. OF POINTS ON BOUNDARY LINE 3 = 16
 1 X COORD.= 0 Y COORD.= 219
 2 X COORD.= 80 Y COORD.= 219
 3 X COORD.= 120 Y COORD.= 207
 4 X COORD.= 160 Y COORD.= 202
 5 X COORD.= 200 Y COORD.= 188
 6 X COORD.= 240 Y COORD.= 176
 7 X COORD.= 280 Y COORD.= 170
 8 X COORD.= 320 Y COORD.= 160
 9 X COORD.= 360 Y COORD.= 151
 10 X COORD.= 400 Y COORD.= 139
 11 X COORD.= 440 Y COORD.= 125
 12 X COORD.= 480 Y COORD.= 100
 13 X COORD.= 520 Y COORD.= 82
 14 X COORD.= 560 Y COORD.= 63
 15 X COORD.= 560 Y COORD.= 53
 16 X COORD.= 640 Y COORD.= 53

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-0.300	-0.125	-0.350	-0.300	-0.150
	-0.250	-0.225	-0.300	-0.350	-0.625	-0.450
	-0.475	99999.000	0.000			

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIALS	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
RESIDUAL BEDROCK STRENGTH	1	400	22	120
EXTENSION CRACK ZONE	2	0	0	62.4

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #27

USE PHREATIC SURFACE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO)= 1

SOFT SOIL NUMBER (SSN)= 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.= 0	Y COORD.= 200
2	X COORD.= 150	Y COORD.= 200
3	X COORD.= 254	Y COORD.= 145
4	X COORD.= 288	Y COORD.= 112
5	X COORD.= 387	Y COORD.= 94
6	X COORD.= 560	Y COORD.= 52
7	X COORD.= 660	Y COORD.= 30

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

SLICES WILL BE SUBDIVIDED

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 7

1	X COORD.= 65	Y COORD.= 212
2	X COORD.= 225	Y COORD.= 129
3	X COORD.= 240	Y COORD.= 124
4	X COORD.= 263	Y COORD.= 119
5	X COORD.= 320	Y COORD.= 105
6	X COORD.= 440	Y COORD.= 83
7	X COORD.= 560	Y COORD.= 53

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.517

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #28

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
1	1	28.494	-0.519	1.430E+04	-2.609E+03	7.586E+02	.24E+05	.14E+05	3.243
2	1	22.355	-0.519	1.713E+04	1.456E+03	-4.233E+02	.29E+05	.23E+05	-7.828
3	1	17.645	-0.519	1.256E+04	9.781E+03	-2.844E+03	.21E+05	.22E+05	1.142
4	1	33.205	-0.519	2.420E+04	4.010E+04	-1.166E+04	.41E+05	.58E+05	4.980
5	1	6.795	-0.519	5.710E+03	4.846E+04	-1.409E+04	.98E+04	.15E+05	5.535
6	1	40.000	-0.519	3.939E+04	1.022E+05	-2.972E+04	.67E+05	.98E+05	9.336
7	1	4.054	-0.519	4.468E+03	1.080E+05	-3.141E+04	.76E+04	.11E+05	9.731
8	1	20.946	-0.519	2.483E+04	1.395E+05	-4.056E+04	.42E+05	.59E+05	11.768
9	1	15.000	-0.333	1.996E+04	1.486E+05	-4.321E+04	.32E+05	.30E+05	11.659
10	1	14.904	-0.217	2.189E+04	1.467E+05	-4.267E+04	.34E+05	.21E+05	10.702
11	1	8.096	-0.217	1.290E+04	1.449E+05	-4.213E+04	.20E+05	.11E+05	10.236
12	1	17.000	-0.246	3.012E+04	1.414E+05	-4.111E+04	.47E+05	.27E+05	9.708
13	1	25.753	-0.246	5.118E+04	1.312E+05	-3.816E+04	.80E+05	.43E+05	9.242
14	1	14.247	-0.246	2.810E+04	1.258E+05	-3.658E+04	.44E+05	.23E+05	8.979
15	1	36.602	-0.183	7.229E+04	9.748E+04	-2.835E+04	.11E+06	.45E+05	7.069
16	1	3.398	-0.183	6.618E+03	9.488E+04	-2.759E+04	.10E+05	.41E+04	6.891
17	1	40.000	-0.183	7.484E+04	6.525E+04	-1.898E+04	.12E+06	.46E+05	4.731
18	1	7.452	-0.183	1.337E+04	5.982E+04	-1.740E+04	.21E+05	.82E+04	4.321
19	1	32.548	-0.183	5.513E+04	3.701E+04	-1.076E+04	.85E+05	.33E+05	2.396
20	1	18.301	-0.250	2.693E+04	3.087E+04	-8.977E+03	.42E+05	.22E+05	2.045
21	1	21.699	-0.250	2.688E+04	2.389E+04	-6.948E+03	.42E+05	.21E+05	1.621
2	1	29.151	-0.250	2.979E+04	1.490E+04	-4.333E+03	.47E+05	.22E+05	1.039
23	1	10.849	-0.250	9.742E+03	1.163E+04	-3.382E+03	.15E+05	.68E+04	0.822
24	1	40.000	-0.250	2.898E+04	5.859E-03	0.000E+00	.45E+05	.18E+05	0.000
		SUM					.10E+07	.68E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.283 AND FACTOR OF SAFETY IS 1.517

CONCLUSIONS: THE CALCULATED SAFETY FACTOR AFTER THE REPAIR IS GREATER THAN 1.5.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-1

CALCULATION SHEET #29

**TITLE CALCULATE THE SAFETY FACTOR OF THE REPAIR BASED UPON SECTION B.
 ASSUME A PLANAR FAILURE IN THE BEDROCK, JUST BELOW THE SLIDE
 PLANE. USE RESIDUAL BEDROCK STRENGTHS. ALSO, ASSUME WORST CASE
 GROUNDWATER CONDITIONS SHOWN IN SECTION B.**

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 1
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000
 NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 600 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 215
 2 X COORD.= 85 Y COORD.= 215

NO. OF POINTS ON BOUNDARY LINE 3 = 18
 1 X COORD.= 0 Y COORD.= 250
 2 X COORD.= 43 Y COORD.= 250
 3 X COORD.= 80 Y COORD.= 228
 4 X COORD.= 110 Y COORD.= 213
 5 X COORD.= 128 Y COORD.= 213
 6 X COORD.= 160 Y COORD.= 198
 7 X COORD.= 200 Y COORD.= 188
 8 X COORD.= 240 Y COORD.= 181
 9 X COORD.= 280 Y COORD.= 174
 10 X COORD.= 320 Y COORD.= 167
 11 X COORD.= 360 Y COORD.= 153
 12 X COORD.= 400 Y COORD.= 138
 13 X COORD.= 440 Y COORD.= 120
 14 X COORD.= 480 Y COORD.= 113
 15 X COORD.= 520 Y COORD.= 96
 16 X COORD.= 560 Y COORD.= 82
 17 X COORD.= 570 Y COORD.= 74
 18 X COORD.= 600 Y COORD.= 52

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.000	-0.595	-0.500	0.000	-0.469	-0.250
	-0.175	-0.175	-0.175	-0.350	-0.375	-0.450
	-0.175	-0.425	-0.350	-0.800	-0.733	

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIALS	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
RESIDUAL BEDROCK STRENGTH	1	400	22	120
CONSPICUOUS CRACK ZONE	2	0	0	62.4

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #30

USE PHREATIC SURFACE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO) = 0

SOFT SOIL NUMBER (SSN) = 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.= 0	Y COORD.= 200
2	X COORD.= 110	Y COORD.= 200
3	X COORD.= 254	Y COORD.= 128
4	X COORD.= 449	Y COORD.= 75
5	X COORD.= 480	Y COORD.= 72
6	X COORD.= 600	Y COORD.= 48
7	X COORD.= 720	Y COORD.= 10

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0

SLICES WILL BE SUBDIVIDED

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 9

1	X COORD.= 85	Y COORD.= 215
2	X COORD.= 87	Y COORD.= 210
3	X COORD.= 98	Y COORD.= 198
4	X COORD.= 160	Y COORD.= 160
5	X COORD.= 200	Y COORD.= 143
6	X COORD.= 440	Y COORD.= 78
7	X COORD.= 480	Y COORD.= 73
8	X COORD.= 520	Y COORD.= 72
9	X COORD.= 560	Y COORD.= 73

SLIP SURFACE NO. 1

FOR SLIP SURFACE NO. 1 FACTOR OF SAFETY IS 1.727

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #31

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	FORCE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
3	1	11.000	-1.091	8.182E+03	1.661E+04	-4.661E+03	.21E+05	.20E+05	15.780
4	1	12.000	-0.613	8.819E+03	2.411E+04	-6.766E+03	.18E+05	.18E+05	14.233
5	1	18.000	-0.613	1.481E+04	4.077E+04	-1.144E+04	.30E+05	.34E+05	13.167
6	1	0.863	-0.613	8.219E+02	4.176E+04	-1.172E+04	.17E+04	.20E+04	13.138
7	1	31.137	-0.613	3.065E+04	8.096E+04	-2.272E+04	.62E+05	.75E+05	14.606
8	1	17.988	-0.425	1.926E+04	9.469E+04	-2.658E+04	.36E+05	.35E+05	14.887
9	1	22.012	-0.425	2.612E+04	1.125E+05	-3.158E+04	.49E+05	.46E+05	15.441
10	1	27.113	-0.271	3.688E+04	1.149E+05	-3.226E+04	.66E+05	.41E+05	14.841
11	1	12.887	-0.271	1.909E+04	1.153E+05	-3.237E+04	.34E+05	.20E+05	14.659
12	1	36.238	-0.271	5.837E+04	1.145E+05	-3.213E+04	.10E+06	.60E+05	14.392
13	1	3.762	-0.271	6.255E+03	1.144E+05	-3.211E+04	.11E+05	.64E+04	14.360
14	1	40.000	-0.271	6.878E+04	1.141E+05	-3.203E+04	.12E+06	.71E+05	13.982
15	1	5.363	-0.271	9.470E+03	1.141E+05	-3.203E+04	.17E+05	.98E+04	13.926
16	1	34.637	-0.271	5.967E+04	1.139E+05	-3.197E+04	.11E+06	.62E+05	13.595
17	1	14.488	-0.271	2.413E+04	1.137E+05	-3.191E+04	.43E+05	.25E+05	13.472
18	1	25.512	-0.271	4.104E+04	1.131E+05	-3.174E+04	.73E+05	.42E+05	13.280
19	1	23.614	-0.271	3.578E+04	1.122E+05	-3.149E+04	.64E+05	.36E+05	13.141
20	1	16.386	-0.271	2.324E+04	1.113E+05	-3.124E+04	.42E+05	.23E+05	13.073
21	1	32.739	-0.125	4.613E+04	8.595E+04	-2.412E+04	.80E+05	.21E+05	11.065
22	1	7.261	-0.125	1.002E+04	8.042E+04	-2.257E+04	.17E+05	.46E+04	10.653
23	1	40.000	-0.025	4.781E+04	3.674E+04	-1.031E+04	.83E+05	.41E+04	6.981
24	1	1.864	0.025	1.809E+03	3.479E+04	-9.763E+03	.31E+04	-.15E+03	6.787
25	1	38.136	0.025	2.830E+04	4.421E+03	-1.241E+03	.49E+05	-.21E+04	1.630
26	1	10.000	0.025	3.983E+03	2.611E+02	-7.329E+01	.69E+04	-.18E+03	0.150
27	1	0.989	0.025	2.583E+02	3.040E-02	0.000E+00	.45E+03	-.29E+01	0.000
		SUM					.11E+07	.66E+06	

FOR SLIP SURFACE NO. 1 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.274 AND FACTOR OF SAFETY IS 1.727

CONCLUSIONS: THE CALCULATED SAFETY FACTOR AFTER THE REPAIR IS GREATER THAN 1.5.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #32

**TITLE CALCULATE THE SAFETY FACTOR OF THE REPAIR BASED UPON SECTION C.
 ASSUME A PLANAR FAILURE IN THE BEDROCK, JUST BELOW THE SLIDE
 PLANE. USE RESIDUAL BEDROCK STRENGTHS. ALSO, ASSUME WORST CASE
 GROUNDWATER CONDITIONS SHOWN IN SECTION C.**

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 2
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) =0.000

NO. OF BOUNDARY LINES (NBL) = 3

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD.= 0 Y COORD.= 0
 2 X COORD.= 720 Y COORD.= 0

NO. OF POINTS ON BOUNDARY LINE 2 = 2
 1 X COORD.= 0 Y COORD.= 209
 2 X COORD.= 122 Y COORD.= 209

NO. OF POINTS ON BOUNDARY LINE 3 = 19
 1 X COORD.= 0 Y COORD.= 209
 2 X COORD.= 120 Y COORD.= 219
 3 X COORD.= 160 Y COORD.= 211
 4 X COORD.= 200 Y COORD.= 203
 5 X COORD.= 240 Y COORD.= 192
 6 X COORD.= 280 Y COORD.= 179
 7 X COORD.= 320 Y COORD.= 170
 8 X COORD.= 360 Y COORD.= 156
 9 X COORD.= 400 Y COORD.= 153
 10 X COORD.= 440 Y COORD.= 146
 11 X COORD.= 480 Y COORD.= 133
 12 X COORD.= 520 Y COORD.= 116
 13 X COORD.= 560 Y COORD.= 98
 14 X COORD.= 600 Y COORD.= 83
 15 X COORD.= 623 Y COORD.= 75
 16 X COORD.= 640 Y COORD.= 69
 17 X COORD.= 645 Y COORD.= 64
 18 X COORD.= 645 Y COORD.= 49
 19 X COORD.= 720 Y COORD.= 49

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000					
3	0.083	-0.200	-0.200	-0.275	-0.325	-0.225
	-0.350	-0.075	-0.175	-0.325	-0.425	-0.450
	-0.375	-0.348	-0.353	-1.000	99999.000	0.000

UNIT WEIGHT OF WATER (GW) = 62.4

<u>ARTH MATERIALS</u>	<u>SOIL NO.</u>	<u>COHESION</u>	<u>FRIC. ANGLE</u>	<u>UNIT WEIGHT</u>
RESIDUAL BEDROCK STRENGTH	1	400	22	120
TENSION CRACK ZONE	2	0	0	62.4

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #33

USE PHREATIC SURFACE

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY MODIFIED SPENCER METHOD (MTHD=4)

NUMBER OF FORCES (NFO) = 0

SOFT SOIL NUMBER (SSN) = 0

NO. OF POINTS ON WATER TABLE (NPWT) = 7

1	X COORD.= 0	Y COORD.= 200
2	X COORD.= 191	Y COORD.= 200
3	X COORD.= 252	Y COORD.= 183
4	X COORD.= 295	Y COORD.= 140
5	X COORD.= 469	Y COORD.= 88
6	X COORD.= 527	Y COORD.= 66
7	X COORD.= 720	Y COORD.= 10

NO. OF SOILS WITH DIFFERENT WATER TABLE (NSDW) = 0

NO. OF SOILS WITH DIFFERENT PORE PRESSURE RATIO (NSDP) = 0
SLICES WILL BE SUBDIVIDED

NO. OF POINTS ON SLIP SURFACE (NPSS) 1 = 9

1	X COORD.= 122	Y COORD.= 209
2	X COORD.= 125	Y COORD.= 200
3	X COORD.= 131	Y COORD.= 193
4	X COORD.= 140	Y COORD.= 187
5	X COORD.= 160	Y COORD.= 179
6	X COORD.= 320	Y COORD.= 133
7	X COORD.= 480	Y COORD.= 85
8	X COORD.= 527	Y COORD.= 77
9	X COORD.= 623	Y COORD.= 75

NO. OF POINTS ON SLIP SURFACE (NPSS) 2 = 9

1	X COORD.= 122	Y COORD.= 209
2	X COORD.= 125	Y COORD.= 200
3	X COORD.= 131	Y COORD.= 193
4	X COORD.= 140	Y COORD.= 187
5	X COORD.= 160	Y COORD.= 179
6	X COORD.= 320	Y COORD.= 133
7	X COORD.= 480	Y COORD.= 85
8	X COORD.= 527	Y COORD.= 77
9	X COORD.= 645	Y COORD.= 49

SLIP SURFACE NO. 1 : FACTOR OF SAFETY IS 1.747

SLIP SURFACE NO. 2 : FACTOR OF SAFETY IS 1.626

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #34

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	BOTTOM TANGENT	BOTTOM SHEAR	INTERSLICE NORMAL	INTERSLICE SHEAR	RESISTING FORCE	DRIVING FORCE	THRUST HEIGHT
2	1	5.000	-3.000	4.861E+03	2.654E+03	-7.536E+02	.25E+05	.18E+05	10.016
3	1	6.000	-1.167	5.224E+03	9.814E+03	-2.786E+03	.13E+05	.15E+05	6.073
4	1	9.000	-0.667	7.416E+03	1.800E+04	-5.110E+03	.14E+05	.17E+05	5.970
5	1	20.000	-0.400	1.650E+04	2.790E+04	-7.922E+03	.29E+05	.28E+05	5.756
6	1	11.332	-0.287	9.320E+03	3.068E+04	-8.712E+03	.16E+05	.12E+05	5.271
7	1	28.668	-0.287	2.236E+04	4.049E+04	-1.150E+04	.38E+05	.33E+05	4.078
8	1	23.962	-0.287	1.899E+04	4.947E+04	-1.405E+04	.32E+05	.29E+05	3.410
9	1	16.038	-0.287	1.278E+04	5.554E+04	-1.577E+04	.22E+05	.19E+05	3.087
10	1	36.592	-0.287	3.108E+04	6.686E+04	-1.898E+04	.53E+05	.44E+05	2.676
11	1	3.408	-0.287	3.605E+03	6.715E+04	-1.906E+04	.61E+04	.40E+04	2.675
12	1	40.000	-0.287	5.122E+04	6.348E+04	-1.802E+04	.87E+05	.50E+05	2.966
13	1	9.222	-0.300	1.205E+04	6.314E+04	-1.792E+04	.20E+05	.12E+05	3.129
14	1	30.778	-0.300	3.935E+04	6.180E+04	-1.755E+04	.67E+05	.40E+05	3.688
15	1	21.851	-0.300	2.899E+04	6.107E+04	-1.734E+04	.49E+05	.30E+05	4.080
16	1	18.149	-0.300	2.641E+04	6.092E+04	-1.729E+04	.45E+05	.27E+05	4.378
17	1	34.481	-0.300	5.432E+04	6.145E+04	-1.745E+04	.92E+05	.57E+05	4.882
18	1	5.519	-0.300	9.088E+03	6.162E+04	-1.749E+04	.15E+05	.97E+04	4.956
19	1	40.000	-0.300	6.569E+04	6.277E+04	-1.782E+04	.11E+06	.70E+05	5.492
20	1	7.111	-0.170	1.175E+04	5.792E+04	-1.644E+04	.19E+05	.71E+04	5.107
21	1	32.889	-0.170	4.940E+04	3.704E+04	-1.051E+04	.81E+05	.29E+05	3.182
22	1	7.000	-0.170	9.441E+03	3.292E+04	-9.347E+03	.16E+05	.55E+04	2.732
23	1	12.741	-0.237	1.602E+04	2.923E+04	-8.298E+03	.27E+05	.13E+05	2.442
24	1	20.259	-0.237	2.340E+04	2.344E+04	-6.655E+03	.39E+05	.18E+05	1.978
25	1	32.370	-0.237	3.327E+04	1.437E+04	-4.080E+03	.56E+05	.25E+05	1.228
26	1	7.630	-0.237	7.233E+03	1.226E+04	-3.481E+03	.12E+05	.53E+04	1.051
27	1	23.000	-0.237	2.060E+04	5.953E+03	-1.690E+03	.34E+05	.15E+05	0.515
28	1	17.000	-0.237	1.412E+04	1.339E+03	-3.800E+02	.24E+05	.99E+04	0.117
29	1	5.000	-0.237	3.732E+03	-6.348E-03	0.000E+00	.62E+04	.25E+04	0.000
SUM							.10E+07	.65E+06	

FOR SLIP SURFACE NO. 2 WITH SEISMIC COEFFICIENT 0.000
 BY MODIFIED SPENCER METHOD, DEL ANGLE = 0.277 AND FACTOR OF SAFETY IS 1.626

CONCLUSIONS: THE CALCULATED SAFETY FACTOR AFTER THE REPAIR IS GREATER THAN 1.5.

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #35

TITLE CALCULATE THE SAFETY FACTOR OF THE EXISTING SLOPE SHOWN IN SECTION M

NO. OF STATIC AND SEISMIC CASES (NCASE) = 1
 NO. OF NONCIRCULAR SLIP SURFACES (NSS) = 0
 TWO-DIMENSIONAL ANALYSIS (THREED = 0)
 CASE NO. 1 SEISMIC COEFFICIENT (SEIC) = 0.000

NO. OF BOUNDARY LINES (NBL) = 2

NO. OF POINTS ON BOUNDARY LINE 1 = 2
 1 X COORD. = -500 Y COORD. = 0
 2 X COORD. = 1000 Y COORD. = 0

NO. OF POINTS ON BOUNDARY LINE 2 = 14
 1 X COORD. = -500 Y COORD. = 220
 2 X COORD. = 37 Y COORD. = 220
 3 X COORD. = 60 Y COORD. = 210
 4 X COORD. = 90 Y COORD. = 191
 5 X COORD. = 132 Y COORD. = 172
 6 X COORD. = 181 Y COORD. = 160
 7 X COORD. = 203 Y COORD. = 140
 8 X COORD. = 250 Y COORD. = 119
 9 X COORD. = 288 Y COORD. = 100
 10 X COORD. = 288 Y COORD. = 86
 11 X COORD. = 300 Y COORD. = 79
 12 X COORD. = 330 Y COORD. = 60
 13 X COORD. = 397 Y COORD. = 40
 14 X COORD. = 1000 Y COORD. = 40

LINE NO. AND SLOPE OF EACH SEGMENT ARE:

1	0.000					
2	0.000	-0.435	-0.633	-0.452	-0.245	-0.909
	-0.447	-0.500	99999.000	-0.583	-0.633	-0.299
	0.000					

MIN. DEPTH OF TALLEST SLICE (DMIN) = 0

NO. OF RADIUS CONTROL ZONES (NRCZ) = 1

RADIUS DECREMENT (RDEC) FOR ZONE 1 = 0

NO. OF CIRCLES (NCIR) FOR ZONE 1 = 5

ID NO. FOR FIRST CIRCLE (INFC) FOR ZONE 1 = 1

NO. OF BOTTOM LINES (NOL) FOR ZONE 1 = 1

LINE NO. (LINO) BEG. NO. (NBP) END NO. (NEP)

1	1	2
---	---	---

UNIT WEIGHT OF WATER (GW) = 62.4

EARTH MATERIAL	SOIL NO.	COHESION	FRIC. ANGLE	UNIT WEIGHT
BEDROCK	1	780	31	130

NO SEEPAGE

USE GRID

NO. OF SLICES (NSLI) = 10

NO. OF ADD. CIRCLES (NAC) = 3

ANALYSIS BY SIMPLIFIED BISHOP METHOD (MTHD=2)

THE J. BYER GROUP, INC.

SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-1

CALCULATION SHEET #36

NUMBER OF FORCES (NFO) = 0
SOFT SOIL NUMBER (SSN) = 0

INPUT COORD. OF GRID POINTS 1,2,AND 3

POINT 1 X COORD. = 200 Y COORD. = 520
POINT 2 X COORD. = 200 Y COORD. = 220
POINT 3 X COORD. = 440 Y COORD. = 220

X INCREMENT (XINC) = 10 Y INCREMENT (YINC) = 10
NO. OF DIVISIONS BETWEEN POINTS 1 AND 2 (ND12) = 5
NO. OF DIVISIONS BETWEEN POINTS 2 AND 3 (ND23) = 5
ONLY F. S. AT EACH CENTER WILL BE PRINTED
SLICES WILL BE SUBDIVIDED

LOWEST FACTOR OF SAFETY AT EACH GRID POINT IS TABULATED BELOW

COORDINATE	200.000	248.000	296.000	344.000	392.000	440.000
520.000	2.494	2.154	1.899	1.736	1.692	1.798
460.000	2.359	2.058	1.823	1.702	1.722	1.817
400.000	2.242	1.980	1.770	1.708	1.733	2.058
340.000	2.183	1.939	1.769	1.708	1.760	2.434
280.000	2.259	1.986	1.798	1.686	1.977	2.610
220.000	2.585	2.153	1.786	1.780	2.373	2.269

MINIMUM FACTORS OF SAFETY OCCUR AT THE FOLLOWING 4 CENTERS

FACTOR OF SAFETY = 1.692 AT (392.000,520.000)
FACTOR OF SAFETY = 1.702 AT (344.000,460.000)
FACTOR OF SAFETY = 1.686 AT (344.000,280.000)
FACTOR OF SAFETY = 2.269 AT (440.000,220.000)

AT POINT (344 280) RADIUS 228.322
THE MINIMUM FACTOR OF SAFETY IS 1.686

FACTORS OF SAFETY BASED ON SEARCH

IN THE FOLLOWING TABLE WARNING INDICATES HOW MANY TIMES THE
MAXIMUM RADIUS IS LIMITED BY THE END POINTS OF GROUND LINES

CENTER X COORDINATE	CENTER Y COORDINATE	NO. OF CIRCLE TOTAL	CRITIC. RADIUS	LOWEST F.S.	WARNING
344	280	11	8 228.322	1.686	0
354	280	11	8 230.782	1.699	0
334	280	11	4 220.941	1.684	0
324	280	11	8 223.456	1.707	0
334	290	11	4 230.311	1.688	0
334	270	11	4 211.575	1.684	0
336.5	280	11	4 221.612	1.683	0
339	280	11	4 222.283	1.683	0
336.5	282.5	11	4 223.954	1.683	0
336.5	277.5	11	4 219.270	1.683	0

AT POINT (336.5 280) RADIUS 221.612
THE MINIMUM FACTOR OF SAFETY IS 1.683

THE J. BYER GROUP, INC.
SLOPE STABILITY CALCULATIONS

CLIENT: PALISADES LANDMARK

JB 18457-I

CALCULATION SHEET #37

SUMMARY OF SLICE INFORMATION FOR MOST CRITICAL SLIP SURFACE

SL. NO.	SOIL NO.	SLICE WIDTH	SLICE HEIGHT	WATER HEIGHT	SLICE SINE	TOTAL WEIGHT	EFFEC. WEIGHT	RESIS. MOMENT	DRIVING MOMENT
1	1	19.063	12.687	0.000	-.822	.314E+05	.314E+05	.817E+07	.573E+07
2	1	17.174	31.057	0.000	-.740	.693E+05	.693E+05	.106E+08	.114E+08
3	1	1.889	37.964	0.000	-.697	.932E+04	.932E+04	.135E+07	.144E+07
4	1	19.063	38.001	0.000	-.650	.942E+05	.942E+05	.139E+08	.136E+08
5	1	1.048	36.969	0.000	-.605	.504E+04	.504E+04	.762E+06	.675E+06
6	1	18.014	39.315	0.000	-.562	.921E+05	.921E+05	.139E+08	.115E+08
7	1	19.063	42.335	0.000	-.478	.105E+06	.105E+06	.160E+08	.111E+08
8	1	9.923	43.075	0.000	-.413	.556E+05	.556E+05	.862E+07	.508E+07
9	1	9.140	42.626	0.000	-.370	.506E+05	.506E+05	.797E+07	.415E+07
10	1	19.063	40.641	0.000	-.306	.101E+06	.101E+06	.162E+08	.683E+07
11	1	9.797	37.532	0.000	-.241	.478E+05	.478E+05	.792E+07	.255E+07
12	1	9.266	20.525	0.000	-.198	.247E+05	.247E+05	.486E+07	.108E+07
13	1	2.734	18.150	0.000	-.171	.645E+04	.645E+04	.133E+07	.244E+06
14	1	16.328	13.622	0.000	-.128	.289E+05	.289E+05	.666E+07	.819E+06
15	1	13.672	5.540	0.000	-.060	.985E+04	.985E+04	.368E+07	.131E+06
16	1	5.391	0.775	0.000	-.017	.543E+03	.543E+03	.100E+07	.207E+04
							SUM	.123E+09	.763E+08

AT CENTER (336.500 , 280.000) WITH RADIUS 221.612 AND SEIS. COEFF. 0.00
 FACTOR OF SAFETY BY SIMPLIFIED BISHOP METHOD IS 1.683

CONCLUSIONS:

THE CALCULATED SAFETY FACTOR AFTER THE SLOPE SHOWN IN SECTION M IS GREATER THAN 1.5. SEE SECTION M FOR THE LOCATION OF THE CRITICAL FAILURE CIRCLE.



THE J. BYER GROUP, INC.

A GEOTECHNICAL CONSULTING FIRM

1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
 (818) 549-9959 FAX: (818) 543-3747

SOLDIER PILES

JB: 18457-I CONSULT: JAI
 CLIENT: PALISADES LANDMARK

CALCULATION SHEET # 38

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED SOLDIER PILES. THE RETAINED HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	COMPACTED FILL	RETAINED HEIGHT:	50 feet
SHEAR DIAGRAM:	5	BACKSLOPE ANGLE:	16 degrees
COHESION:	400 psf	SURCHARGE:	0 pounds
PHI ANGLE:	29 degrees	SURCHARGE TYPE:	P Point
DENSITY:	130 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.5	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	5 feet
CD (C/FS):	266.7 psf	FINAL TENSION CRACK:	100 feet
PHID = ATAN(TAN(PHI)/FS) =	20.3 degrees		
HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k _h)			0 %g
VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k _v)			0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	47 degrees
AREA OF TRIAL FAILURE WEDGE	1568.1 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	203858.5 pounds
NUMBER OF TRIAL WEDGES ANALYZED	3936 trials
LENGTH OF FAILURE PLANE	82.1 feet
DEPTH OF TENSION CRACK	6.0 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	56.0 feet
CALCULATED HORIZONTAL THRUST ON SOLDIER PILE	79619.6 pounds
CALCULATED EQUIVALENT FLUID PRESSURE	63.7 pcf
DESIGN EQUIVALENT FLUID PRESSURE	65.0 pcf

CONCLUSIONS:

THE CALCULATION INDICATES THAT SOLDIER PILES ALONG THE PROPERTY LINE, WHICH SUPPORT UP TO 50 FEET OF COMPACTED FILL, MAY BE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 65 POUNDS PER CUBIC FOOT. THE EFP SHOULD BE MULTIPLIED BY THE PILE SPACING.



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A GEOTECHNICAL CONSULTING FIRM

1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206
(818) 549-9959 FAX: (818) 543-3747

RETAINING WALL CALCULATION

JB: 18457-I CONSULT: JAI
CLIENT: PALISADES LANDMARK

CALCULATION SHEET # 39

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED RETAINING WALLS. THE WALL HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	COMPACTED FILL	WALL HEIGHT:	15 feet
SHEAR DIAGRAM:	5	BACKSLOPE ANGLE:	27 degrees
COHESION:	400 psf	SURCHARGE:	0 pounds
PHI ANGLE:	29 degrees	SURCHARGE TYPE:	P Point
DENSITY	130 pcf	INITIAL FAILURE ANGLE:	40 degrees
SAFETY FACTOR:	1.5	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	5 feet
CD (C/FS):	266.7 psf	FINAL TENSION CRACK:	40 feet
PHID = $ATAN(TAN(PHI)/FS)$ =	20.3 degrees		
HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h)			0 %g
VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v)			0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	47 degrees
AREA OF TRIAL FAILURE WEDGE	168.0 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	21834.3 pounds
NUMBER OF TRIAL WEDGES ANALYZED	1116 trials
LENGTH OF FAILURE PLANE	23.5 feet
DEPTH OF TENSION CRACK	6.0 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	16.0 feet
CALCULATED HORIZONTAL THRUST ON WALL	4420.7 pounds
CALCULATED EQUIVALENT FLUID PRESSURE	39.3 pcf
DESIGN EQUIVALENT FLUID PRESSURE	43.0 pcf

CONCLUSIONS:

THE CALCULATION INDICATES THAT PROPOSED RETAINING WALL SUPPORTING COMPACTED FILL MAY BE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 43 POUNDS PER CUBIC FOOT.

THE J. BYER GROUP, INC.

A GEOTECHNICAL CONSULTING FIRM

1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206

(818) 549-9959

FAX: (818) 543-3747

SURFICIAL STABILITY

JB: 18457-I CONSULT: JAI
CLIENT: PALISADES LANDMARK

CALCULATION SHEET # 40

CALCULATE THE SURFICIAL STABILITY OF THE EARTH MATERIAL USING THE INFINITE SLOPE ANALYSIS WITH PARALLEL SEEPAGE. THIS METHOD WAS RECOMMENDED BY THE ASCE AND THE BUILDING AND SAFETY ADVISORY COMMITTEE (8/16/78). MODIFIED FROM SKEMPTON & DeLORY, 1957.

CALCULATION PARAMETERS

EARTH MATERIAL: COMPACTED FILL

COHESION: 400 psf

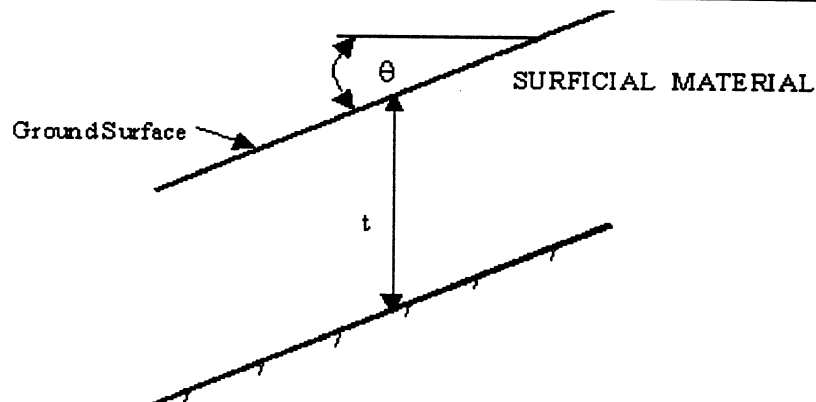
PHI ANGLE: 29 degrees

DENSITY: 130 pcf

SHEAR DIAGRAM: 5

SLOPE ANGLE: 27 degrees

SATURATION DEPTH (t): 3.0 feet



$$FS = \frac{C + (\gamma_{soil} - \gamma_{water}) \cdot t \cdot \cos^2 \theta \tan \Phi}{\gamma_{soil} \cdot t \cdot \cos \Phi \sin \Phi}$$

SAFETY FACTOR = 3.10

CONCLUSIONS:

THE CALCULATION INDICATES THAT UNIFORM SLOPES IN COMPACTED FILL ARE SURFICIALLY STABLE.



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(818) 549-9959

FAX: (818) 543-3747

SOLDIER PILES

JB: 18457-J CONSULT: JAI
 CLIENT: PALISADES LANDMARK

CALCULATION SHEET # 41

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED SOLDIER PILES. THE RETAINED HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONOBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

EARTH MATERIAL:	BEDROCK	RETAINED HEIGHT:	35 feet
SHEAR DIAGRAM:	1	BACKSLOPE ANGLE:	42 degrees
COHESION:	780 psf	SURCHARGE:	0 pounds
PHI ANGLE:	31 degrees	SURCHARGE TYPE:	P Point
DENSITY:	130 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.25	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	0 degrees	INITIAL TENSION CRACK:	5 feet
CD (C/FS):	624.0 psf	FINAL TENSION CRACK:	60 feet
PHID = ATAN(TAN(PHI)/FS) =	25.7 degrees		
HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k _h)			0 %g
VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k _v)			0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	47 degrees
AREA OF TRIAL FAILURE WEDGE	1790.5 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	232760.3 pounds
NUMBER OF TRIAL WEDGES ANALYZED	2296 trials
LENGTH OF FAILURE PLANE	88.0 feet
DEPTH OF TENSION CRACK	24.7 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	60.0 feet
CALCULATED HORIZONTAL THRUST ON SOLDIER PILE	37760.2 pounds
CALCULATED EQUIVALENT FLUID PRESSURE	61.6 pcf
DESIGN EQUIVALENT FLUID PRESSURE	65.0 pcf

CONCLUSIONS:

THE CALCULATION INDICATES THAT SOLDIER PILES ALONG THE UPSLOPE PROPERTY LINE, WHICH SUPPORT UP TO 35 FEET OF BEDROCK, MAY BE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 65 POUNDS PER CUBIC FOOT. THE EFP SHOULD BE MULTIPLIED BY THE PILE SPACING.



THE J. BYER GROUP, INC.

A GEOTECHNICAL CONSULTING FIRM

1461 E. CHEVY CHASE DRIVE, GLENDALE, CA 91206

(818) 549-9959

FAX: (818) 543-3747

SOLDIER PILES

JB: 18457-I CONSULT: JAI
CLIENT: PALISADES LANDMARK

CALCULATION SHEET # 42

CALCULATE THE DESIGN MINIMUM EQUIVALENT FLUID PRESSURE (EFP) FOR PROPOSED SOLDIER PILES. THE RETAINED HEIGHT AND BACKSLOPE AND SURCHARGE CONDITIONS ARE LISTED BELOW. ASSUME THE BACKFILL IS SATURATED WITH NO EXCESS HYDROSTATIC PRESSURE. USE THE MONONBE-OKABE METHOD FOR SEISMIC FORCES.

CALCULATION PARAMETERS

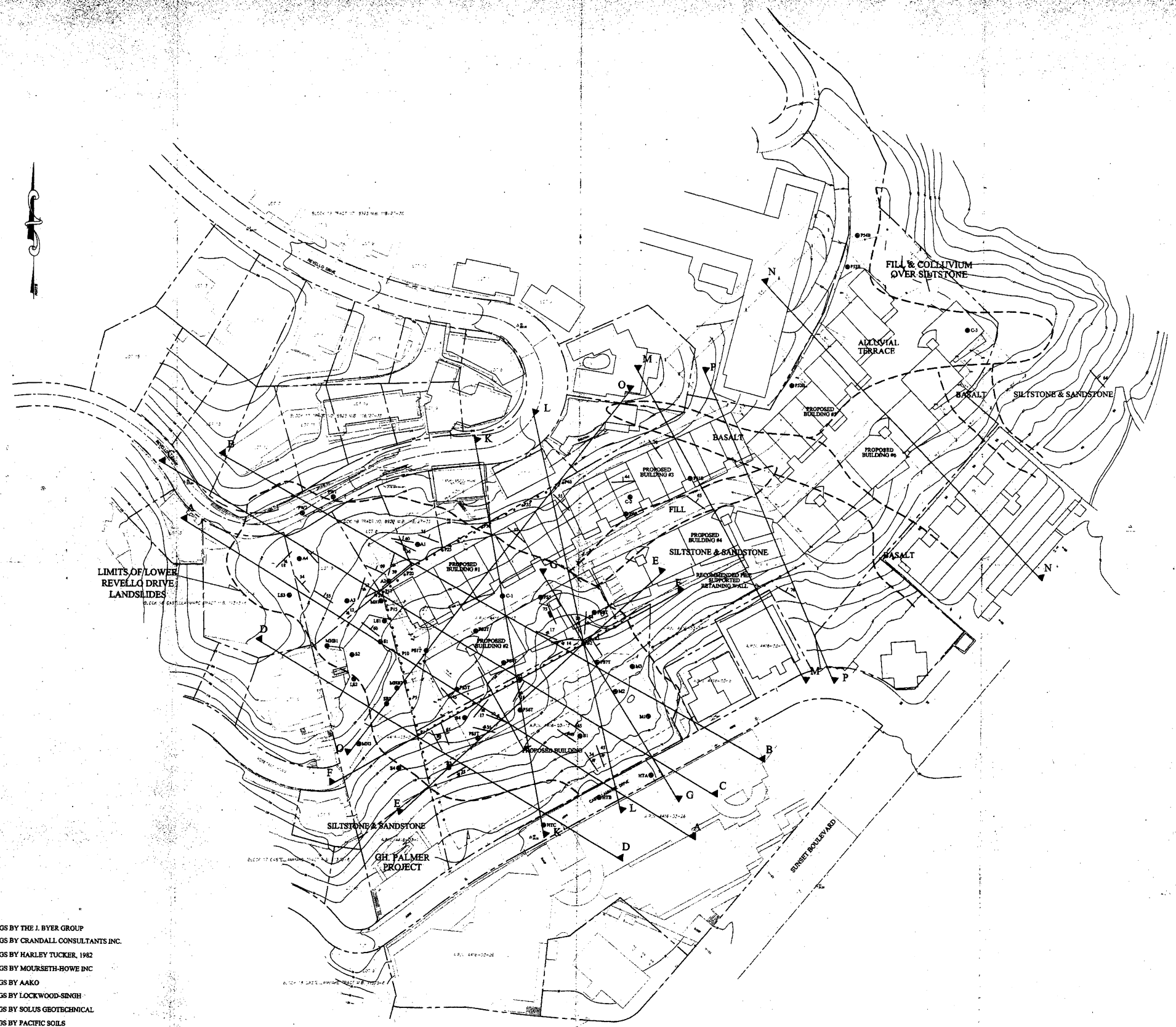
EARTH MATERIAL:	BEDROCK	RETAINED HEIGHT:	35 feet
SHEAR DIAGRAM:	1	BACKSLOPE ANGLE:	27 degrees
COHESION:	780 psf	SURCHARGE:	0 pounds
PHI ANGLE:	31 degrees	SURCHARGE TYPE:	P Point
DENSITY:	130 pcf	INITIAL FAILURE ANGLE:	30 degrees
SAFETY FACTOR:	1.5	FINAL FAILURE ANGLE:	70 degrees
WALL FRICTION:	5 degrees	INITIAL TENSION CRACK:	5 feet
CD (C/FS):	520.0 psf	FINAL TENSION CRACK:	60 feet
PHID = $ATAN(TAN(PHI)/FS)$ =	21.8 degrees		
HORIZONTAL PSEUDO STATIC SEISMIC COEFFICIENT (k_h)			0 %g
VERTICAL PSEUDO STATIC SEISMIC COEFFICIENT (k_v)			0 %g

CALCULATED RESULTS

CRITICAL FAILURE ANGLE	47 degrees
AREA OF TRIAL FAILURE WEDGE	937.0 square feet
TOTAL EXTERNAL SURCHARGE	0.0 pounds
WEIGHT OF TRIAL FAILURE WEDGE	121804.5 pounds
NUMBER OF TRIAL WEDGES ANALYZED	2296 trials
LENGTH OF FAILURE PLANE	57.2 feet
DEPTH OF TENSION CRACK	13.0 feet
HORIZONTAL DISTANCE TO UPSLOPE TENSION CRACK	39.0 feet
CALCULATED HORIZONTAL THRUST ON SOLDIER PILE	25927.4 pounds
CALCULATED EQUIVALENT FLUID PRESSURE	42.3 pcf
DESIGN EQUIVALENT FLUID PRESSURE	43.0 pcf

CONCLUSIONS:

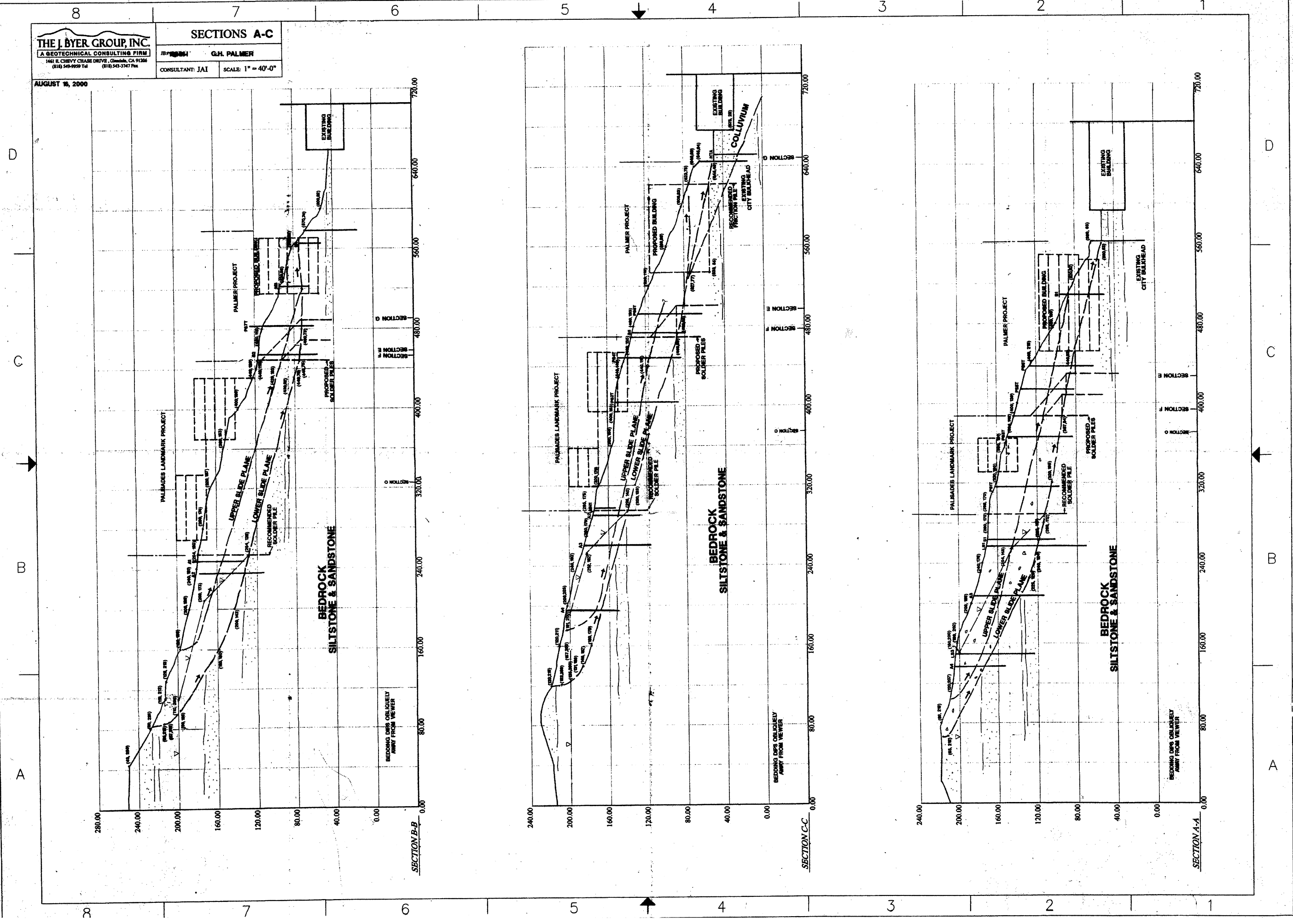
THE CALCULATION INDICATES THAT SOLDIER PILES EAST OF THE SLIDE AND BELOW BUILDING 4, WHICH SUPPORT UP TO 35 FEET OF BEDROCK, MAY BE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 43 POUNDS PER CUBIC FOOT. THE EFP SHOULD BE MULTIPLIED BY THE PILE SPACING.



- LEGEND**
- B5 ● LOCATION AND NUMBER OF BORINGS BY THE J. BYER GROUP
 - C-3 ● LOCATION AND NUMBER OF BORINGS BY CRANDALL CONSULTANTS INC.
 - HTC ● LOCATION AND NUMBER OF BORINGS BY HARLEY TUCKER, 1982
 - MH2 ● LOCATION AND NUMBER OF BORINGS BY MOURSETH-HOWE INC
 - A4 ● LOCATION AND NUMBER OF BORINGS BY AAKO
 - LS3 ● LOCATION AND NUMBER OF BORINGS BY LOCKWOOD-SINGH
 - SB3 ● LOCATION AND NUMBER OF BORINGS BY SOLUS GEOTECHNICAL
 - PSBT ● LOCATION AND NUMBER OF BORINGS BY PACIFIC SOILS
 - M3 ● LOCATION AND NUMBER OF BORINGS BY J.D. MERRILL
 - PW2 ● LOCATION AND NUMBER OF BORINGS BY CITY OF LA. PUBLIC WORKS
 - 30° STRIKE AND DIP OF SHEAR
 - 25° STRIKE AND DIP OF BEDDING
 - 75° STRIKE AND DIP OF JOINT
 - GEOLOGIC CONTACT
 - P38 ● LOCATION AND NUMBER OF RECOMMENDED SOLDIER PILES

AUGUST 18, 2000	
THE J. BYER GROUP, INC. A GEOTECHNICAL CONSULTING FIRM 1461 E. CHERRY CREEK DRIVE, CHANA, CA 91006 (916) 484-9999 Fax (916) 543-7477 Fax	GEOLOGIC MAP #184574 PALISADES LANDMARK, LLC CONSULTANT: JAJ SCALE: 1" = 30'

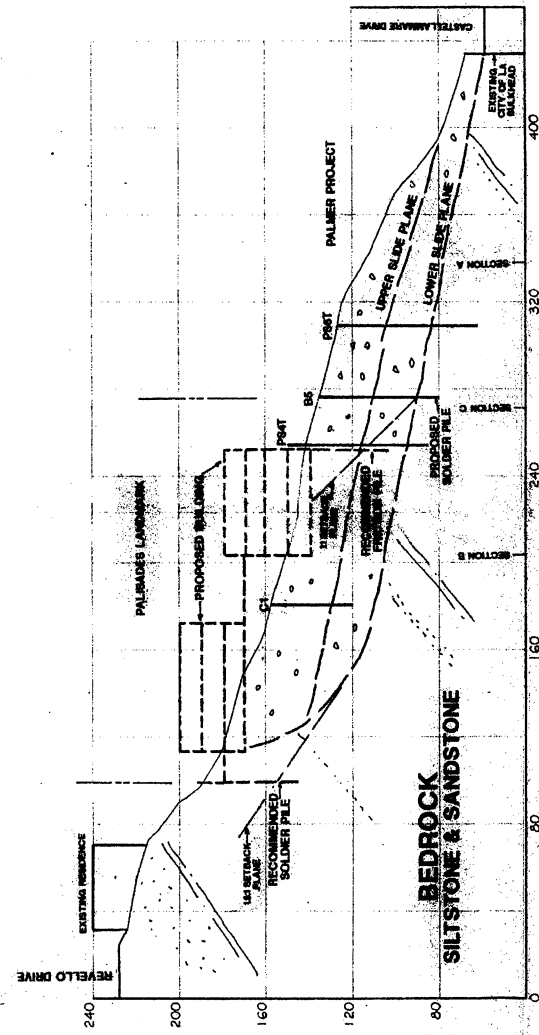
AUGUST 16, 2000



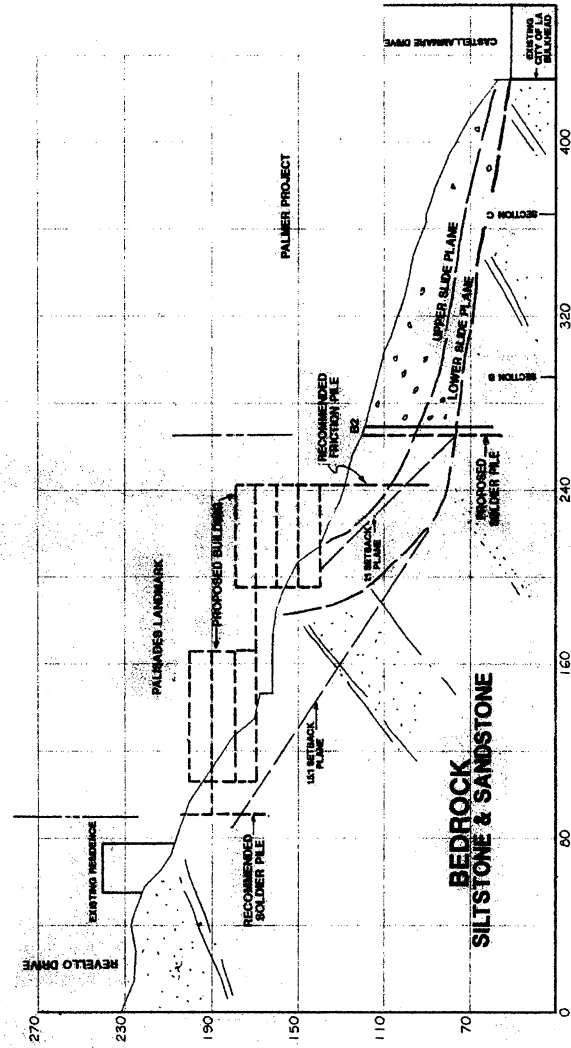
SECTION B-B

SECTION C-C

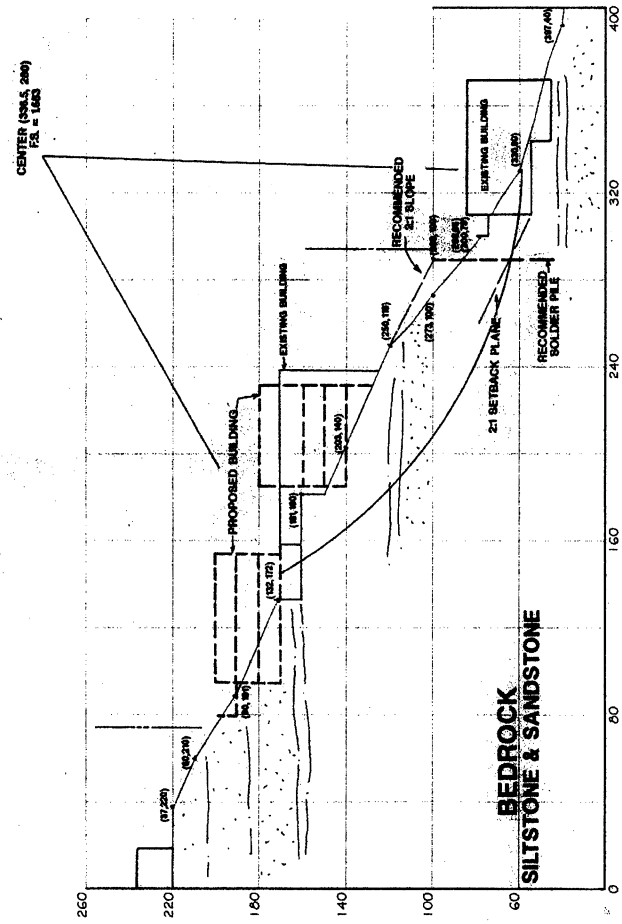
SECTION A-A



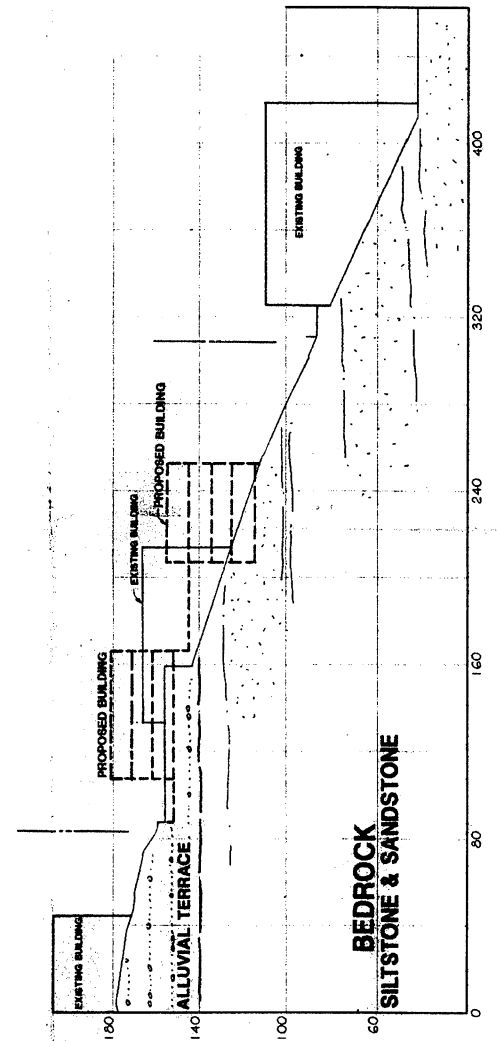
SECTION K



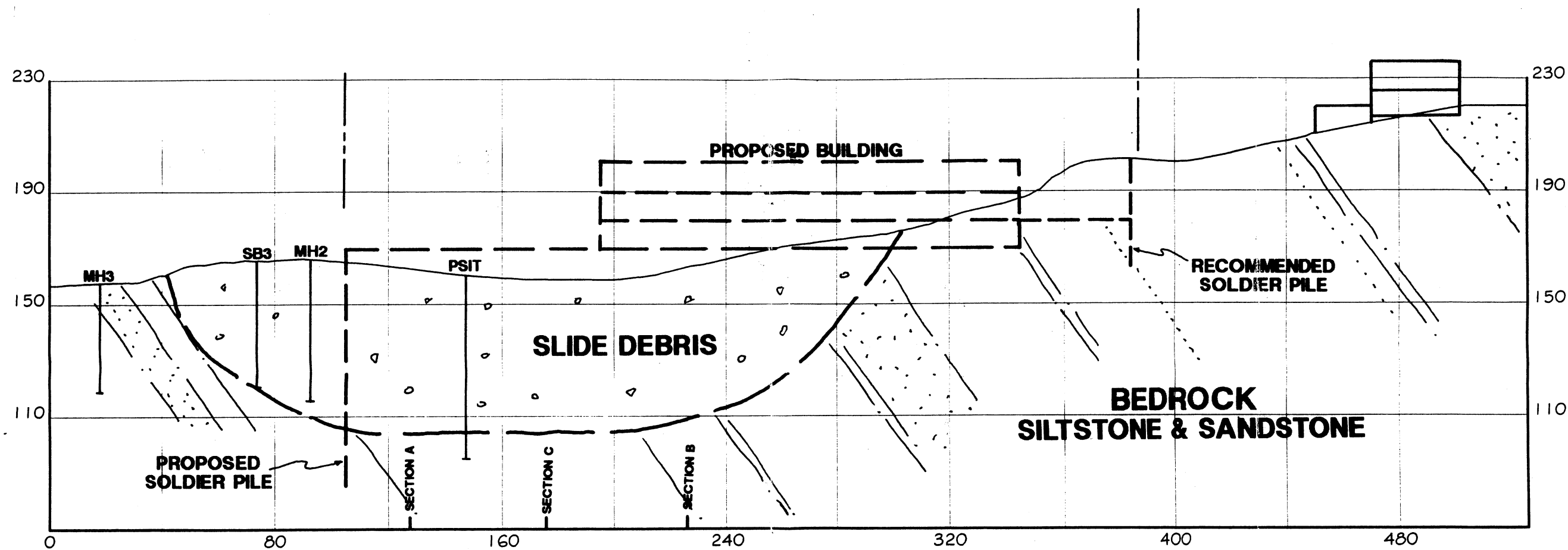
SECTION L



SECTION M



SECTION N



SECTION O

AUGUST 16, 2000
AUGUST 1, 2000

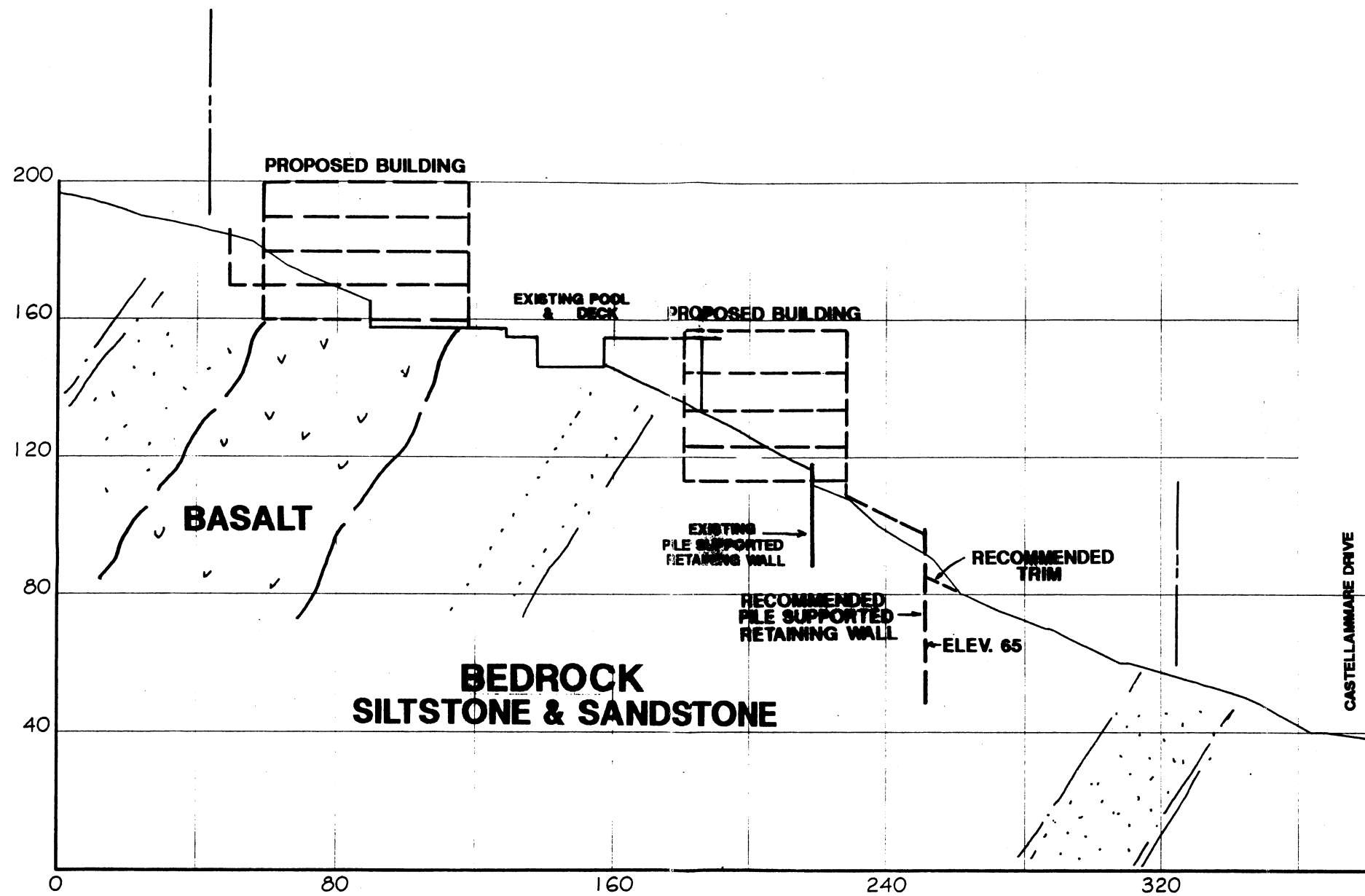
THE J. BYER GROUP, INC.
A GEOTECHNICAL CONSULTING FIRM
1461 E. Chevy Chase Drive Suite 200, Glendale, CA 91206
(818) 549-9959 Tel (818) 543-3747 Fax

SECTION O

JB: 18457-I PALISADES LANDMARK LLC

CONSULTANT: JAI

SCALE: 1" = 40'



SECTION P

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