Empire Laboratories, Inc.
MATERIALS AND FOUNDATION ENGINEERS
214 No. Howes Fort Collins, Colorado 80522
P.O. Box 429 (303) 484-0359

Branch Offices
1242 Bramwood Place
Fort Collins, Colorado 80501
P.O. Box 1135
(303) 776-3921

3151 Nation Way
Cheyenne, Wyoming 82001
P.O. Box 10076
(307) 632-9224

September 24, 1980

Miller Properties, Inc.
2731 Dunbar Avenue
Fort Collins, Colorado 80526

Attention: Mr. Bruce Miller

Re: Proposed Dixon Creek Subdivision
Fort Collins, Colorado
ELI Project No. 4128-80

Gentlemen:

Submitted herein are our recommendations for design and construction of pavements in the proposed Dixon Creek Subdivision, Larimer County, Colorado. Atterberg limits and Hveem stabilometer tests have been performed on representative samples of the on-site materials forming pavement subgrade. The results of these laboratory tests are attached.

As discussed in our geotechnical report submitted August 7, 1980, AASHTO classification of the on-site materials forming pavement subgrade are A-2-4, A-2-6, A-4, and A-6 with group indices 0 to 5. Based upon a group index of 5 and the City of Fort Collins group index design procedure, the following pavement thicknesses are recommended:

Residential Streets

Select Base Course	4"
Asphaltic Concrete	2"
Total Pavement Thickness	6"

Collector Streets

Select Base Course	6"
Asphaltic Concrete	2"
Total Pavement Thickness	8"

Arterial Streets

Select Base Course	8"
Asphaltic Concrete	2"
Total Pavement Thickness	10"

Resistance values determined from the Hveem stabilometer tests vary from 10 to 19 and represent soils having AASHTO classifications A-4 and A-6. As the majority of the soils on the site have classifications of A-2-4, A-2-6, and A-4, a resistance value of 17 has been used in determining minimum pavement thicknesses. The following pavement thicknesses are based upon the new City of Fort Collins design procedure and traffic indices provided by the City of Fort Collins Engineering Department:

Residential Streets

Select Base Course	6"
Asphaltic Concrete	3"
Total Pavement Thickness	9"

Collector Streets

Select Subbase	4"
Select Base Course	6"
Asphaltic Concrete	3"
Total Pavement Thickness	13"

Arterial Streets

Select Subbase	9"
Select Base Course	6"
Asphaltic Concrete	4"
Total Pavement Thickness	19"

Borings 25, 26, and 27 drilled through the existing pavement on Drake Road encountered two (2) inches of asphaltic concrete underlain by approximately twenty (20) inches of base and subbase material. We recommend that a two (2) inch overlay be placed on the existing Drake Road pavement. Prior to placement of the overlay, a tack coat should be applied. The extended width of Drake Road should meet the above thicknesses recommended for arterial streets.

Preparation to pavement subgrade elevation should be accomplished as discussed in our geotechnical report. The base course should also meet the specifications presented in the report.

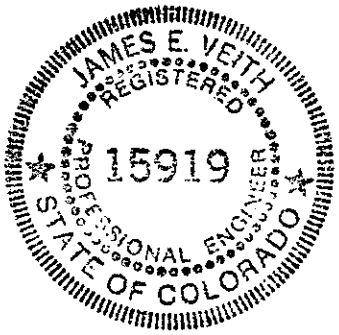
The asphaltic concrete should meet City of Fort Collins specifications or equivalent and be placed in accordance with those specifications. If more than two (2) inches of asphaltic concrete is used, we recommend that it be placed in two (2) lifts of equivalent thickness. The final lift should be placed following completion of all construction in the subdivision.

If you have any questions of if we can be of further assistance, please contact us.

Very truly yours,

EMPIRE LABORATORIES, INC.

James E. Veith, P.E.
Geotechnical Engineer



Reviewed by:

Chester C. Smith, P.E.
President

clc

cc: M & I, Inc. - Lloyd McLaughlin

SUMMARY OF TEST RESULTS

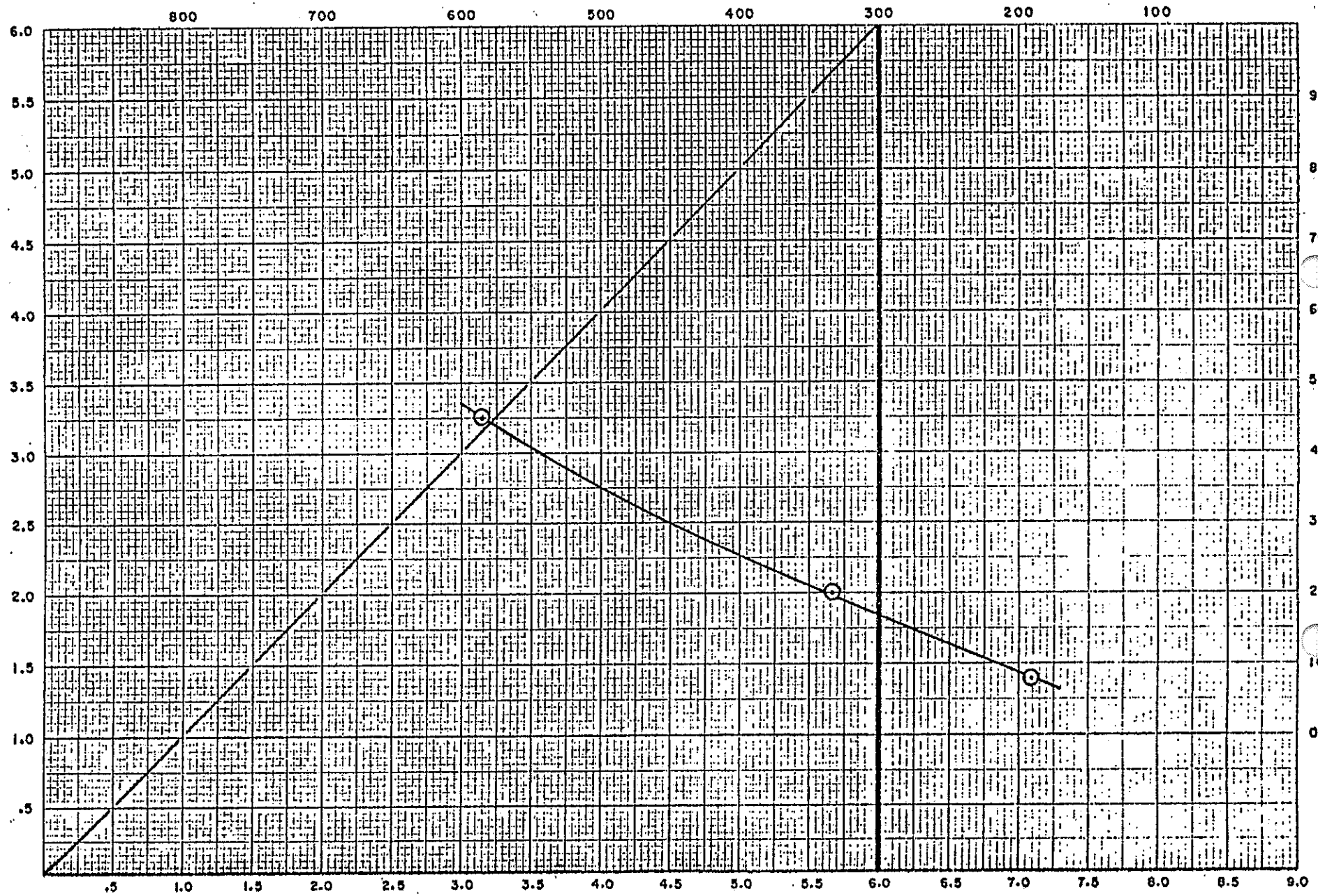
Atterberg Summary

Boring No.	19	23	27
Depth (Ft.)	0.5-3.0'	1.0-3.0'	2.0-3.0'
Liquid Limit	24.6	34.6	30.7
Plastic Limit	16.5	24.1	17.3
Plasticity Index	8.1	10.5	13.4
% Passing 200	37.0	51.1	43.4
Group Index	0.0	3.0	0.0

Classification

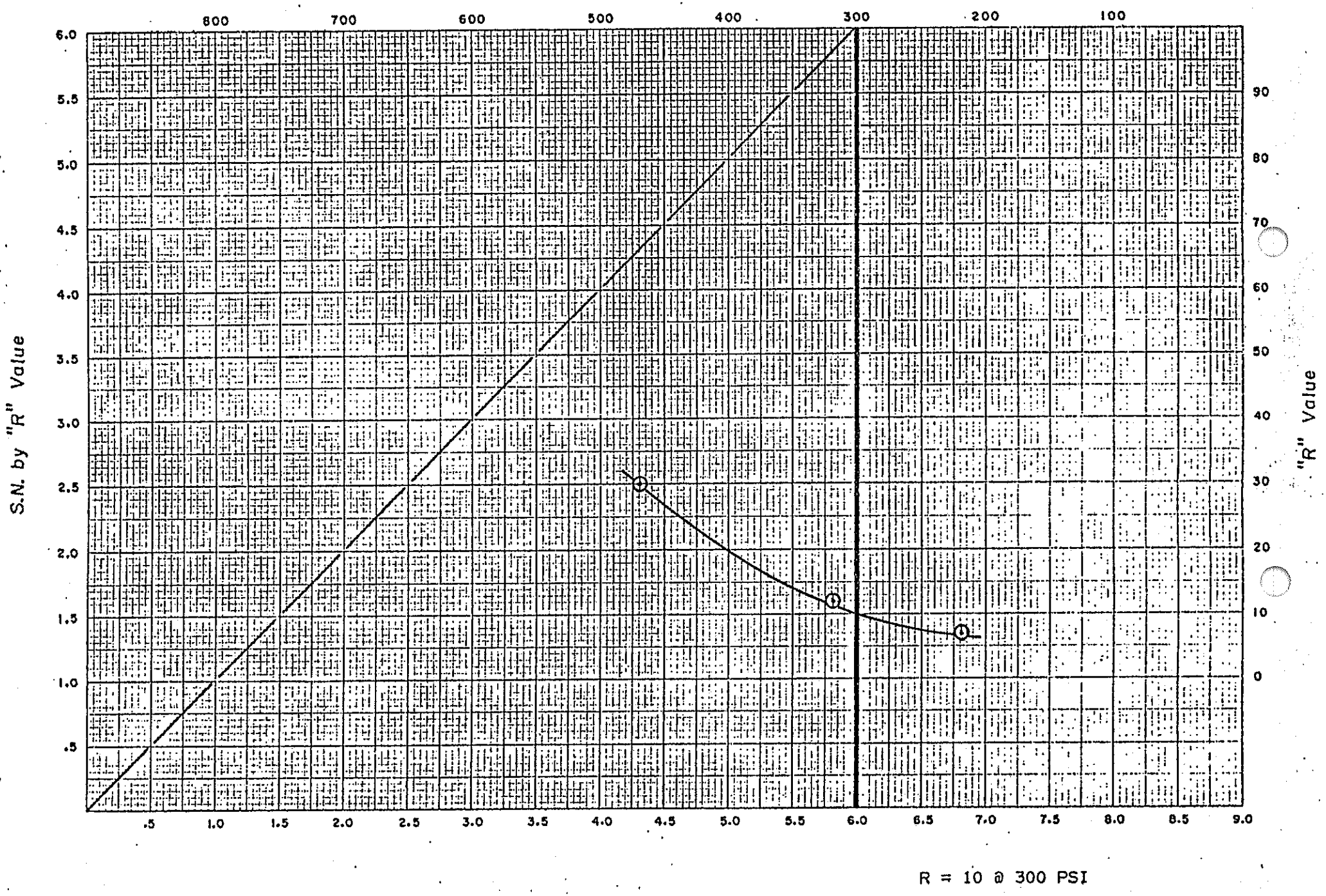
Unified	SC-SM	CL	SC
AASHTO	A-4(0)	A-6(3)	A-6(0)
"R" Value	17	10	19

DIXON CREEK
TH-19 @ 0.5' TO 3.0'



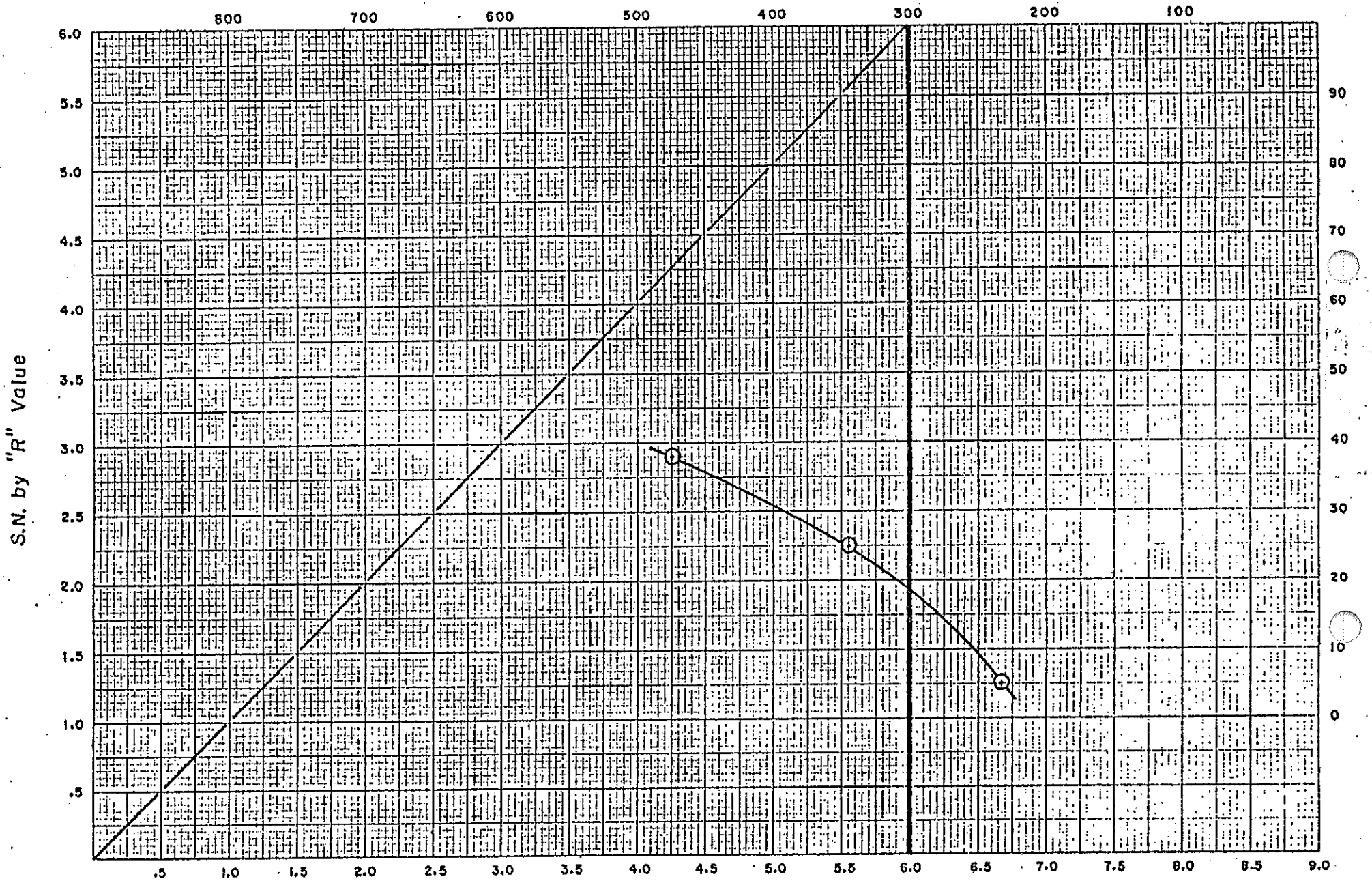
R = 17 @ 300 PSI

DIXON CREEK
TH-23 @ 1.0' TO 3.0'



R = 10 @ 300 PSI

DIXON PIT
TH-27 @ 2'-3'



R = 19 @ 300 PSI

HVEEM STABILOMETER DATA

Location	Compaction Pressure (PSI)	Density (PCF)	Water (%)	Expansion Pressure (PSI)	Horizontal Pressure Ph (PSI)**	Sample Height (Inches)	Uncorrected R-Value*	Corrected R-Value
19 @ 0.5-3.0'	100	118.6	12.9	0	142	2.60	7	8
	200	121.8	11.7	0.9	118	2.54	20	20
	350	124.8	10.6	1.1	74	2.42	45	43
23 @ 1.0-3.0'	75	103.3	22.9	0.8	142	2.52	7	7
	100	100.9	21.6	0	135	2.61	11	12
	300	107.0	18.8	3.1	107	2.49	30	30
27 @ 2.0-3.0'	100	120.7	12.3	0	149	2.51	5	5
	225	123.4	11.4	1.3	116	2.44	25	25
	250	124.7	10.6	1.0	94	2.49	38	38

* Calculated using $R = 100 - 100/2.5/D(160/Ph - 1) + 1$
**At 2000 Lb vertical load