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Geotechnical Engineering • Materials Testing • Environmental Engineering

PAVEMENT SECTION DESIGN
CERRILLOS ROAD
SANTA FE, NEW MEXICO

Prepared for:

Parsons Brinckerhoff

Project No.: 99-1-299

November 3, 1999

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1.0 INTRODUCTION

This report presents the results of our geotechnical investigation and pavement section design for Cerrillos Road from Airport Road to St. Francis Drive.

The investigation was performed to determine site subsurface conditions and based upon the conditions observed in the test holes to develop pavement section recommendations for reconstruction of Cerrillos Road.

The conclusions and recommendations presented are based on information provided to us regarding the proposed development, on subsurface conditions disclosed by the test holes, on laboratory testing, and upon the local standards of our profession at the time this report was prepared.

This investigation was not performed to determine the presence of potentially hazardous waste or radon gas. Determination of the presence of potentially hazardous materials was beyond the scope of this investigation and requires the use of exploration techniques and analytic testing which were not appropriate for this investigation. If desired, Vinyard & Associates, Inc. will perform an environmental audit of the site.

2.0 PROPOSED CONSTRUCTION

Based upon information obtained from Parsons Brinckerhoff we anticipate Cerrillos Road from Airport Road to St. Francis Drive will be completely reconstructed. The project will include new pavement, widening of the roadway, bus turnouts, and new turn lanes. If the proposed road configuration differs from that indicated in this report, this office should be notified.

Final site grading plans were not available during preparation of this report. We anticipate that limited cut/fill earthwork will be required to develop the right-of-way.

3.0 SITE CONDITIONS

The segment of Cerrillos Road to be reconstructed is located between Airport Road and St Francis Drive. The segment is currently two and three lanes in each direction. The south end of the project area has recently been repaved. The right-of-way is bound primarily by commercial development.

4.0 EXISTING PAVEMENT AND SITE SUBSURFACE CONDITIONS

To explore the site subsurface conditions, thirty-two test holes were drilled at the approximate locations shown on the Site Plan, Figure 1. The existing pavement section was measured in each test hole. The existing pavement sections are summarized in the table below.

Segment 1 – Airport to Richards

Test Hole	Station	Asphaltic Concrete (inches)	Aggregate Base Course (inches)	Granular Sub Base (inches)
1	30+50	12	12	0
2	38+00	8	4	24
3	44+50	6	6	6
4	52+00	8	4	12
5	58+50	7	7	24
6	66+00	8	10	12
7	72+50	9	9	18
8	80+00	8	4	18
Average		8.25	7.0	14.25

Segment 2 – Richards to St. Michael's

Test Hole	Station	Asphaltic Concrete (inches)	Aggregate Base Course (inches)	Granular Sub Base (inches)
9	86+50	6	6	18
10	94+00	6	6	12
11	101+50	6	6	24
12	108+00	8	0	27
13	116+00	8	6	18
14	122+50	8	0	15
15	129+50	8	0	10
16	135+00	8	6	24
17	143+50	6	6	24
18	150+00	10	6	2
19	157+50	10	2	0
20	164+00	9	3	0
Average		7.75	4.0	14.5

Segment 3 – St. Michael's to St. Francis

Test Hole	Station	Asphaltic Concrete (inches)	Aggregate Base Course (inches)	Granular Sub Base (inches)
21	178+00	12	6	0
22	185+50	10	8	12
23	192+00	12	6	0
24	199+50	7	3	0
25	207+00	7	5	0
26	214+50	6	3	3
27	222+00	7	5	0
28	229+00	10	2	12
29	236+50	7	5	12
30	244+00	6	6	0
31	251+50	8	4	0
32	255+00	8	4	12
Average		8.33	4.75	4.25

The asphaltic concrete was highly variable in thickness. Measured thickness ranged from six to twelve inches. The asphaltic concrete was underlain by aggregate base course which varied in thickness from zero to twelve inches. In most areas, a layer of granular subbase was present. The subbase was typically composed of silty to clayey sand. The thickness of the subbase ranged from zero to twenty-four inches.

A petroleum smell was noted in some samples from borings 12 and 19.

The natural soils encountered below the existing pavement section consisted of alluvial and terrace deposits. As shown on the Logs of Test Holes, Figures 2 through 33, the soils encountered in the test holes consisted of layers of sandy clay,

sandy silt, silty sand, and clayey sands. Occasional gravel layers were also encountered. The soils were typically medium dense with layers of loose and dense material also being encountered. The soils were typically moist. Detailed soil descriptions are provided on the Logs of Test Holes.

Neither groundwater nor bedrock was encountered to a depth of eleven feet, the maximum depth of exploration. However, groundwater conditions may change with time due to precipitation, variations in groundwater level, seepage from ponding areas or leaking utilities.

The test holes allow observation of a very small portion of the soils below the site. Significant variations in subsurface conditions may occur across the site which were not disclosed by the test holes.

5.0 LABORATORY TESTING

A laboratory testing program was performed on samples obtained during the field investigation which appeared representative of the soils encountered in the test holes. The laboratory testing program was structured to determine the physical properties of the soils encountered in the test holes necessary for development of geotechnical recommendations and design of pavement sections.

The laboratory testing program included:

- Moisture Content;
- Sieve Analysis;
- Atterberg Limits; and
- R-Value.

The natural soil moisture content averaged approximately eleven percent. Test results are presented on the Logs of Test Holes, Figures 2 through 33, and are summarized on Table 1.

Sieve Analysis and Atterberg Limits tests were performed to confirm field soil classifications and to provide information on general physical soil properties. Test results are presented on Table 1.

A total of twenty-seven R-Value tests were performed on representative samples. Test results are presented in Appendix A. A tabular summary of the R-Value and Sieve Analysis tests is presented on Tables 2 and 3.

The average R-Values obtained for the various soil types encountered is summarized below.

AASHTO CLASSIFICATION	UNIFIED CLASSIFICATION	AVERAGE R-VALUE
A-2-4	SC,SP-SM	33
A-2-6	SC	21
A-6	SC, CL	20
A-7-6	SC, CL	10

*Test Hole 2 at 0-3' not included.

Detailed R-Value test results are presented on Tables 2 and 3, and in Appendix A.

6.0 ASPHALTIC CONCRETE PAVEMENT

The pavement recommendations presented herein are based upon New Mexico State Highway and Transportation Department design procedures. The project area was divided into three segments for design purposes. The three segments are as follows:

Section 1: Airport Road to Richards Avenue (three lanes each direction)

Section 2: Richards Avenue to St. Michael's Drive (three lanes each direction)

Section 3: St. Michael's Drive to St. Francis Drive (two lanes each direction)

Traffic for the each section was calculated based on the maximum peak traffic

values for each section. Peak traffic information was provided by Parsons Brinckerhoff. The peak value was assumed to be 10% of the Average Daily Traffic. The Average Daily Traffic values in one direction used for design were:

	Vehicles/Day, One Direction	
Section 1:	22250	Airport Road to Richards Avenue
Section 2	25540	Richards Avenue to St. Michaels Dr.
Section 3	20760	St. Michaels Dr. to St. Francis Dr.

The above values are projections for the year 2020. Therefore, no growth factor was utilized.

A default traffic distribution was assumed. The assumed traffic distribution is presented below:

	Traffic Distribution	Equivalency Factor
Passenger Car	74%	0.0008
Other	20%	0.0087
Single Unit Truck	3%	0.189
Single Trailer Truck	1%	2.3719
Multi-Trailer Truck	1%	2.3187
Bus	1%	0.6808
Total	100%	

Seventy percent of traffic was assumed to be in the design lane for Sections 1 and 2, and ninety percent in the design lane for Section 3. If traffic conditions will vary from the assumed values, this office should be contacted.

Based on the above values, the Equivalent Daily 18 kip Single Axle Load applications for the three sections are:

	EDLA	Location
Section 1:	961	Airport Rd. to Richards Ave.
Section 2:	1103	Richards Ave. to St. Michaels Dr.
Section 3:	1153	St. Michaels Dr. to St. Francis Dr.

Additional design coefficients utilized in our analysis are:

Design Period*	20 years
Regional Factor	2.0
Serviceability Index	2.0

*Periodic pavement maintenance will be required during this period.

The subgrade soils along the alignment are highly variable. For design purposes, we utilized an R-Value of 16.

To evaluate the required pavement section the following structural coefficients were utilized in our analysis:

Material	Coefficient
Asphaltic Concrete	0.42
Asphalt Treated Base	0.25
Aggregate Base Course	0.10
Granular Subbase	0.08

Based upon the above criteria and the design nomograph presented in Appendix B, the following required structural numbers were calculated.

	Location	Required Structural Number
Section 1:	Airport Rd. to Richards Ave.	5.0
Section 2:	Richards Ave. to St. Michael's Dr.	5.2
Section 3:	St. Michael's Dr. to St. Francis Dr.	5.2

Based upon the above criteria we recommend the following asphaltic concrete pavement sections:

Section 1: Airport Road to Richards Avenue

	Option 1	Option 2
Asphaltic Concrete	6"	6"
Aggregate Base Course	12"	
Asphalt Treated Base Course		6"
Granular Subbase	16"	13"
Total Thickness	**34"**	**25"**

Sections 2 and 3 : Richards Ave. to St Francis Dr.

	Option 1	Option 2
Asphaltic Concrete	6"	6"
Aggregate Base Course	12"	
Asphalt Treated Base Course		6"
Granular Subbase	18"	15"
Total Thickness	**36"**	**27"**

Option 1 is the preferred option. However, this option will require hauling off more material and could impact shallow utility lines.

Pavement subgrade and all fill below paved areas should be placed and compacted as detailed in the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction." Aggregate Base Course should consist of Class I or Class II material as specified in Section 304 of the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction". Base course should be compacted to a minimum of 95% of maximum density as determined by ASTM D-1557.

Granular subbase should be Class III, IV or V as detailed in Section 304 of the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction". Bituminous treated base should conform to Section 301 of the "New Mexico State Highway and

Transportation Department Standard Specifications for Highway and Bridge Construction".

If required, the proposed road may be surfaced with open graded friction course. In this case the asphaltic concrete should be Grading A. If OGFC is not utilized, the top mat of asphaltic concrete may be Grading B. Asphaltic concrete should conform to Section 401 of the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction".

Fill in utility line trenches below the pavement must be properly compacted to prevent localized pavement settlement. To minimize settlement and maintenance of the pavement, all trenches should be backfilled with compacted fill as detailed in the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction".

The site should be graded to prevent saturation of pavement subgrade soils. If soils supporting the proposed pavement increase in moisture content, their ability to support the proposed pavement is significantly reduced.

7.0 RIGID PAVEMENT ANALYSIS

The intersections with Richards Avenue and St. Francis Drive may be paved with Portland Cement Concrete.

To evaluate the required pavement section, the computer program "Pavement Analysis Software" (PAS5) was utilized. This program was developed by the American Concrete Pavement Association. The program is based upon the 1993 AASHTO "Guide for the Design of Pavement Structures." Printouts from the program are presented in Appendix B.

The traffic volume utilized for design was the combination of traffic on Cerrillos Road and the cross traffic. Traffic volumes for the year 2020 are summarized below.

Cerrillos Road		22,250
Richards Avenue		9,870
	TOTAL	**32,120**

Cerrillos Road		17,180
St. Francis Drive		20,090
	TOTAL	**37,270**

The equivalent single axle loads for both a 20 and 30 year design life were computed. Computations are presented in Appendix B.

Input parameters for the program are discussed below:

Reliability = 90%

This is the average of the recommended range.

Overall Deviation = 0.35

Modulus of Rupture = 630

Typical Modulus for 4,000 PSI concrete.

Modulus of Elasticity = 4,252,500 PSI

Selected as 6750 x the Modulus of Rupture

Load Transfer = 3.4

Modulus of Subgrade Reaction = 513

Selected based upon an R-Value of 16

Drainage Coefficient = 1.15

Initial serviceability = 4.50

Terminal serviceability = 2.50

The following rigid pavement sections are recommended.

Intersection	Portland Cement Concrete		Cement Treated Base Course
	20 year	30 year	
Cerrillos & Richards	9.0	9.75	8"
Cerrillos & St. Francis	9.75	10.5"	8"

To provide more uniform support, reduce the required portland cement concrete section and to provide a stable working surface, eight inches of cement treated base course was utilized.

The above design is based upon portland cement concrete which exhibits a 28 day compressive strength of 4,000 PSI and a modulus of rupture of 630. Portland cement concrete should conform to Section 451 of the "New Mexico State Highway and Transportation Department Standard Specifications for Highway and Bridge Construction".

8.0 TRENCHES AND EXCAVATIONS

All trenches greater than four feet in depth must be sloped, shored or braced or otherwise supported according to OSHA Construction and Safety Standards. Material excavated from the trench or spoil must be placed a minimum of two feet from the edge of the excavation. The spoil should be retained in an effective manner such that no loose material can fall into the excavation.

Temporary construction excavations less than eight feet deep should be sloped no steeper than 1-1/2:1 (horizontal:vertical). If deeper excavations are required, this office should be contacted for supplemental recommendations. Limited raveling of slopes will occur particularly as the exposed soils dry out. Heavy equipment and material stockpiles should be located a minimum of five feet from the top of slope.

9.0 CLOSURE

The recommendations presented in this report are based upon the subsurface conditions disclosed by the test holes. Soil and groundwater conditions may vary between test holes and with time.

This report reflects our interpretation of the site subsurface conditions. We strongly recommend that prior to bidding all contractors perform their own subsurface investigation to form their own opinion of the site soil, rock and groundwater conditions. Should contractors elect to use this report for construction, bidding or estimating purposes, they do so at their own risk.

In a southwest climate it is particularly important to protect the soils supporting the proposed structure from an increase in moisture content. If soils supporting the structure increase in moisture content due to any cause such as poor site drainage, ponding areas, or leaking utility lines, significant structural settlement and distress may occur.

If conditions are encountered during construction which differ from those presented herein, this office should be contacted for supplemental recommendations. The staff of **Vinyard & Associates, Inc.** is available for supplemental consultation as necessary.

This office would be pleased to review site grading and drainage plans to evaluate conformance with the recommendations presented herein. All site

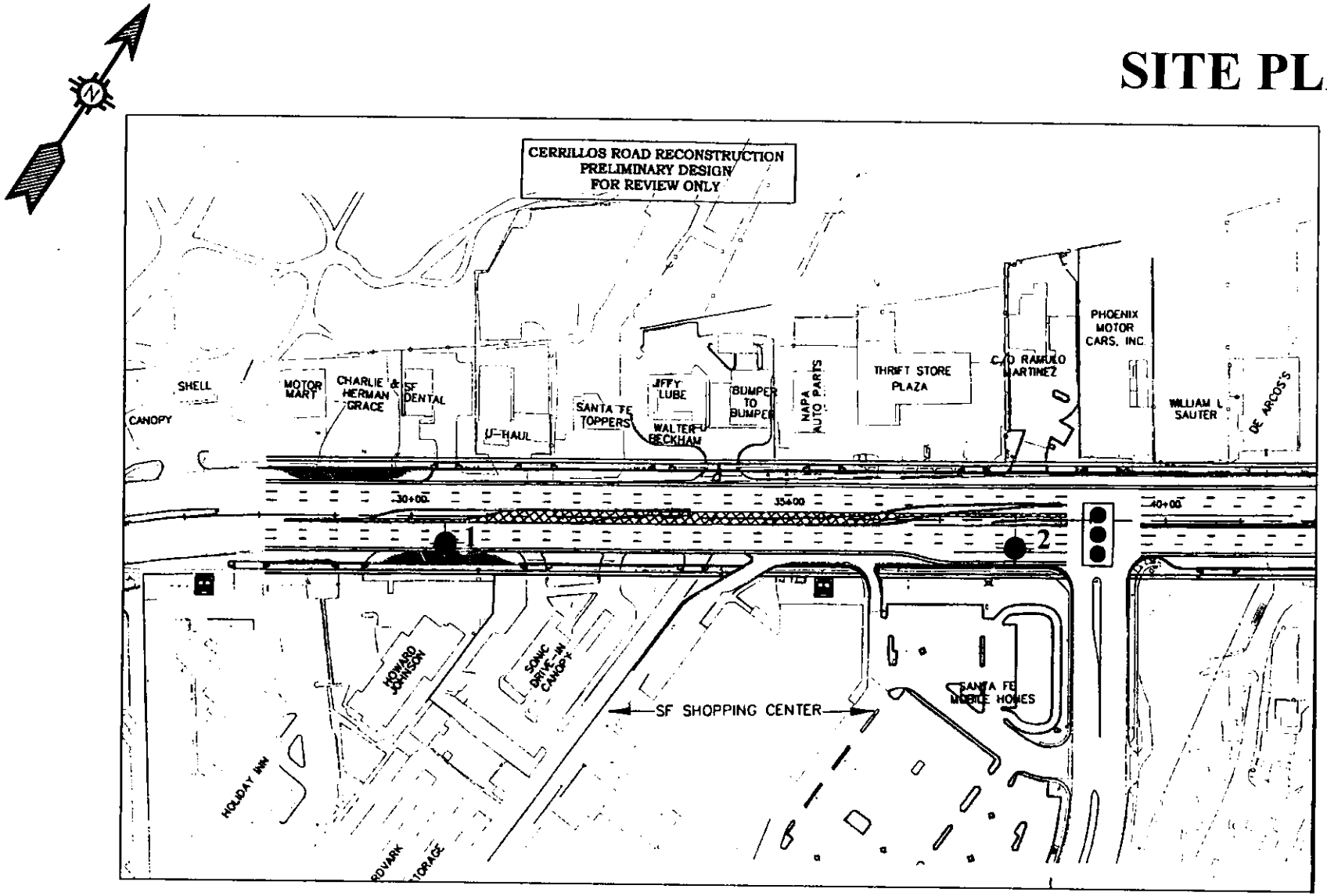
earthwork should be observed by a qualified geotechnical engineer or his representative. **Vinyard & Associates, Inc.** would be pleased to provide these services.

Vinyard & Associates, Inc.

Martin D. Vinyard, P.E.

MDV/pgt

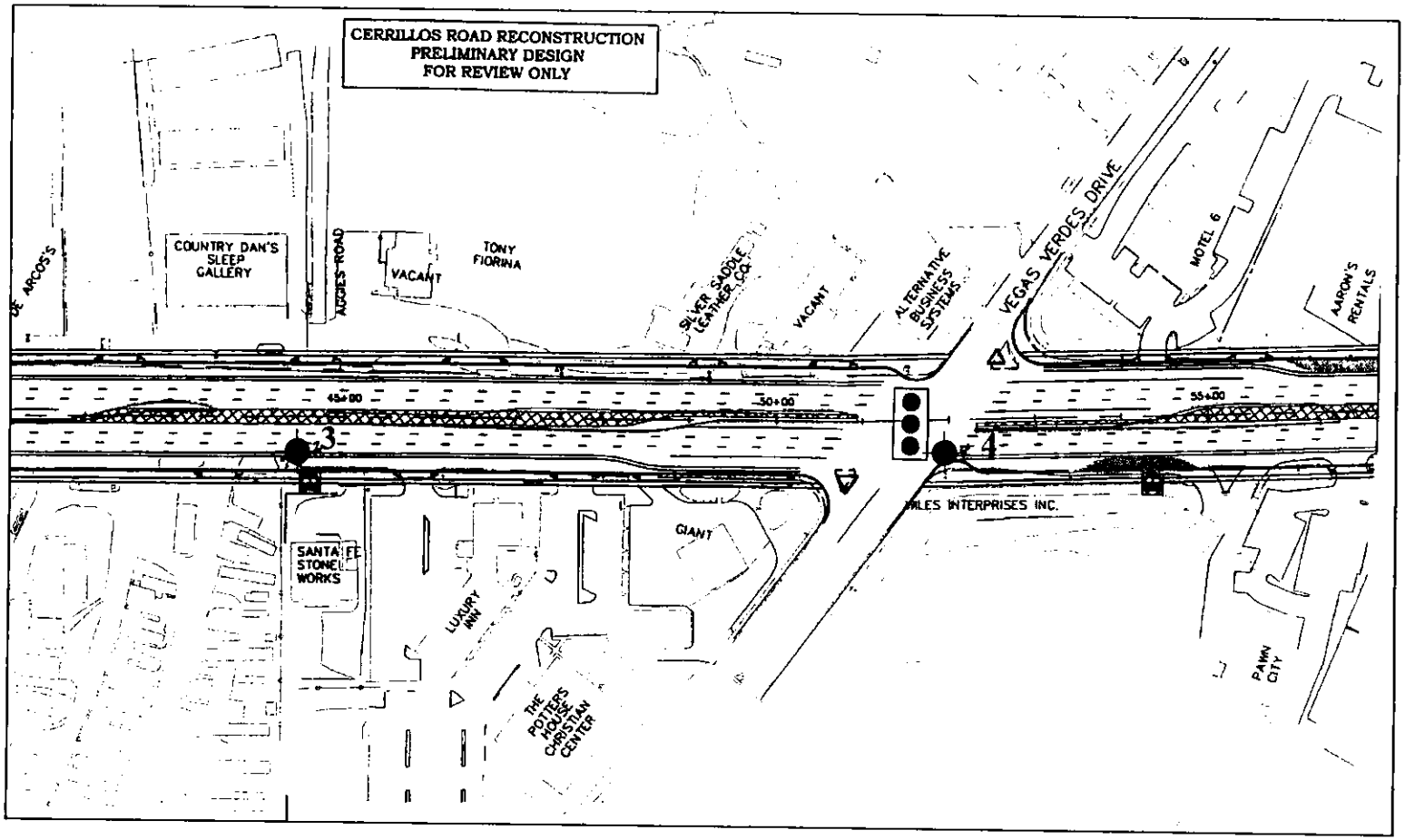
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1a.

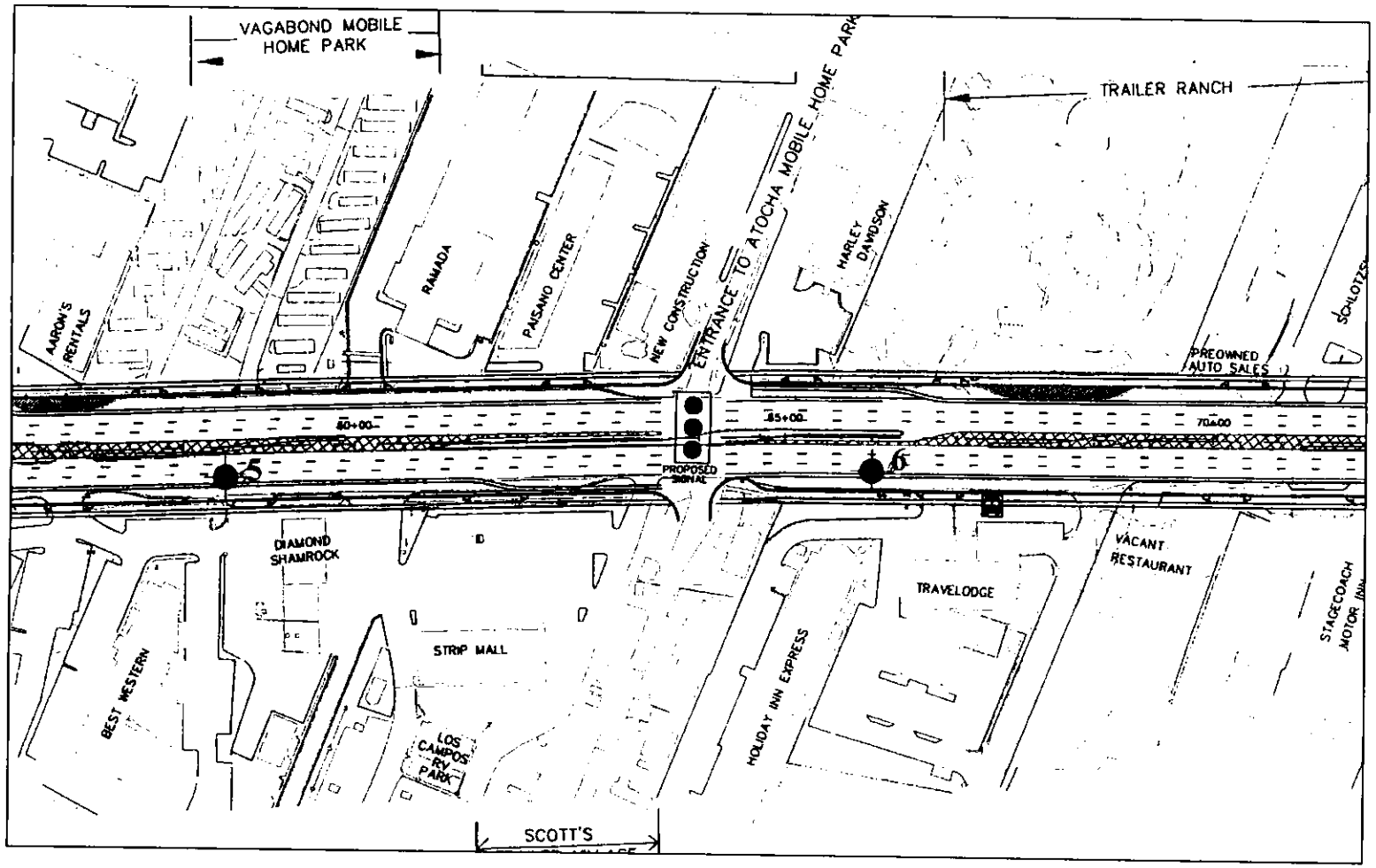
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1b.

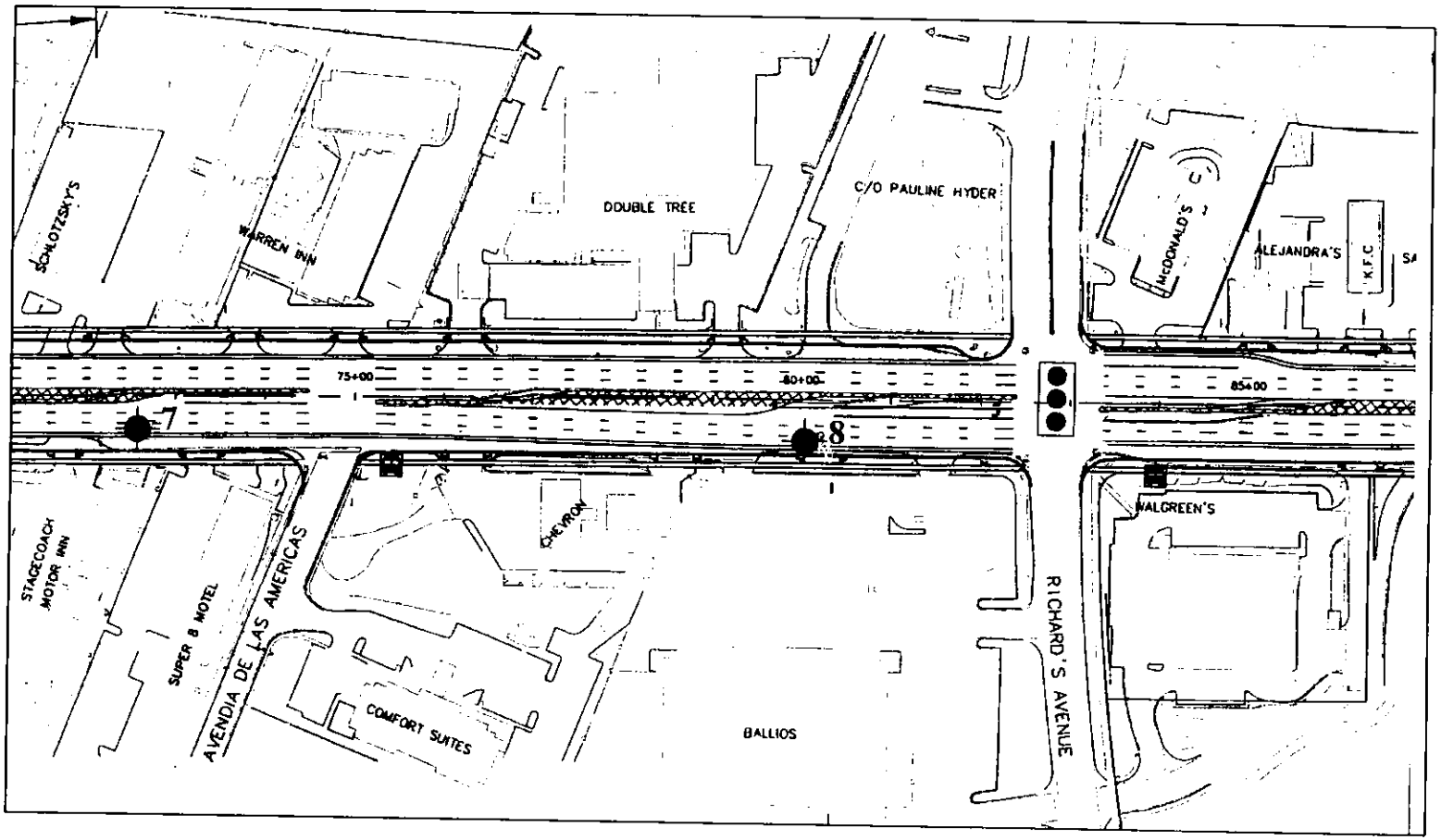
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1c.

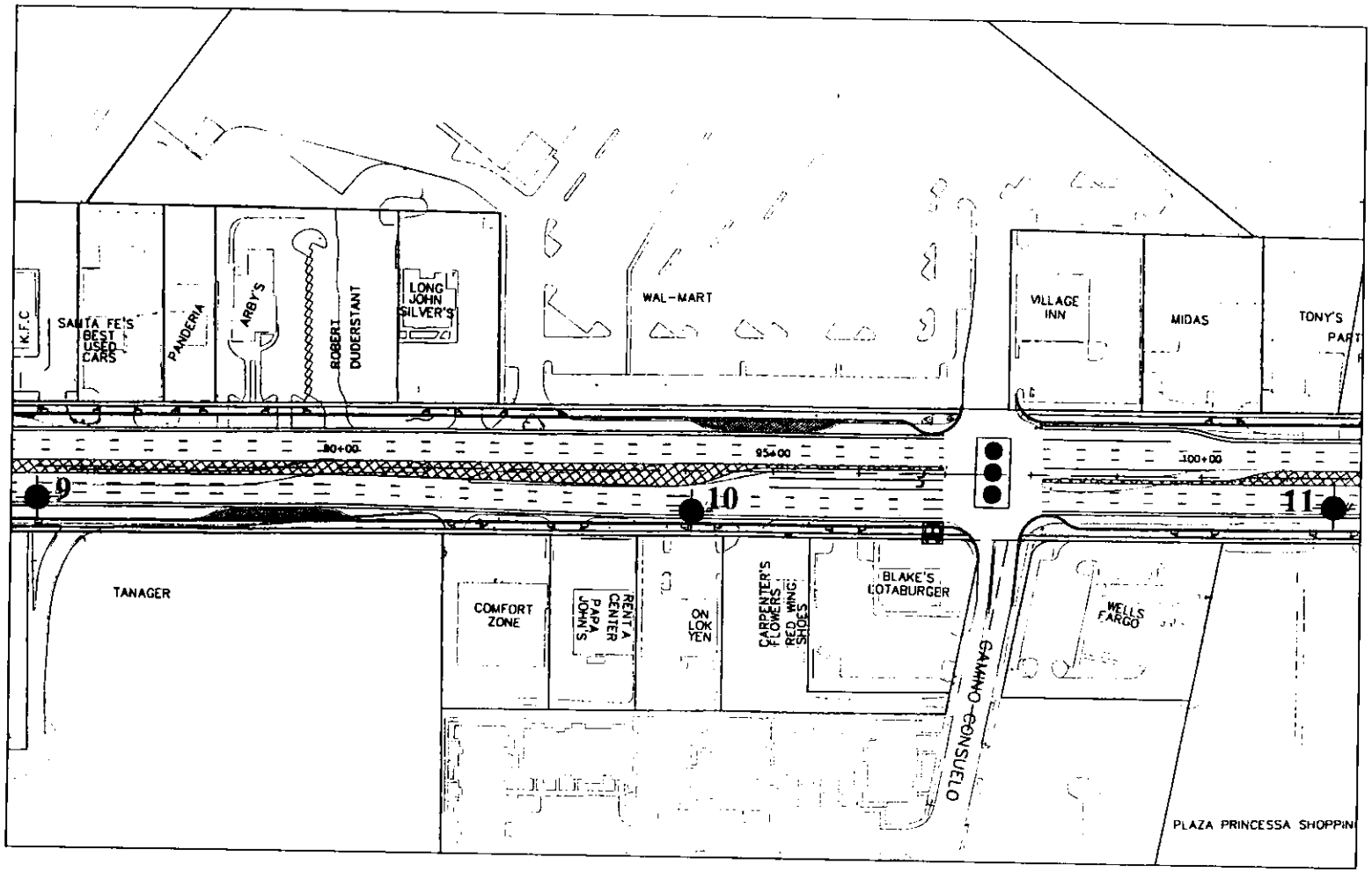
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1d.

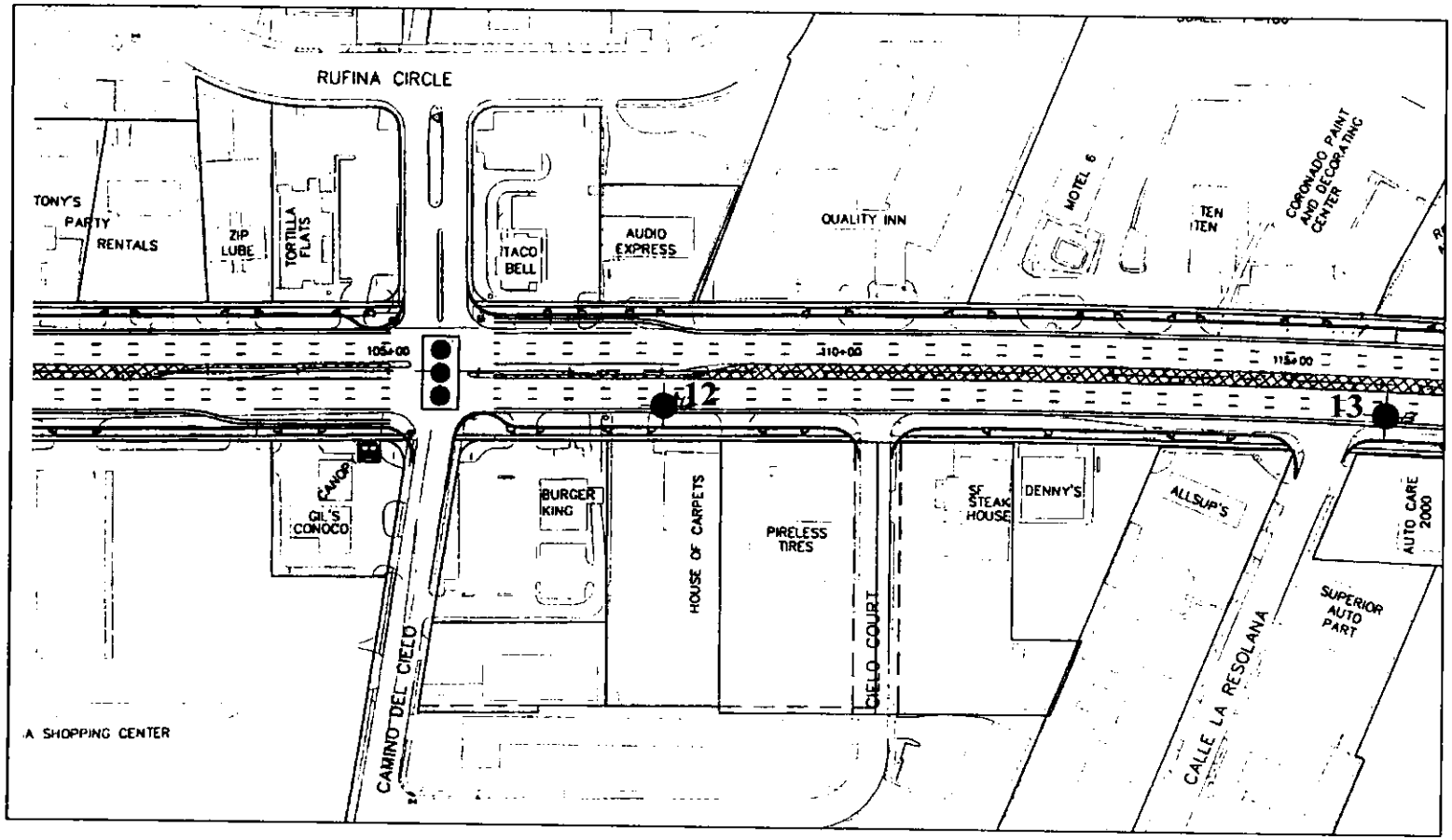
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1e.

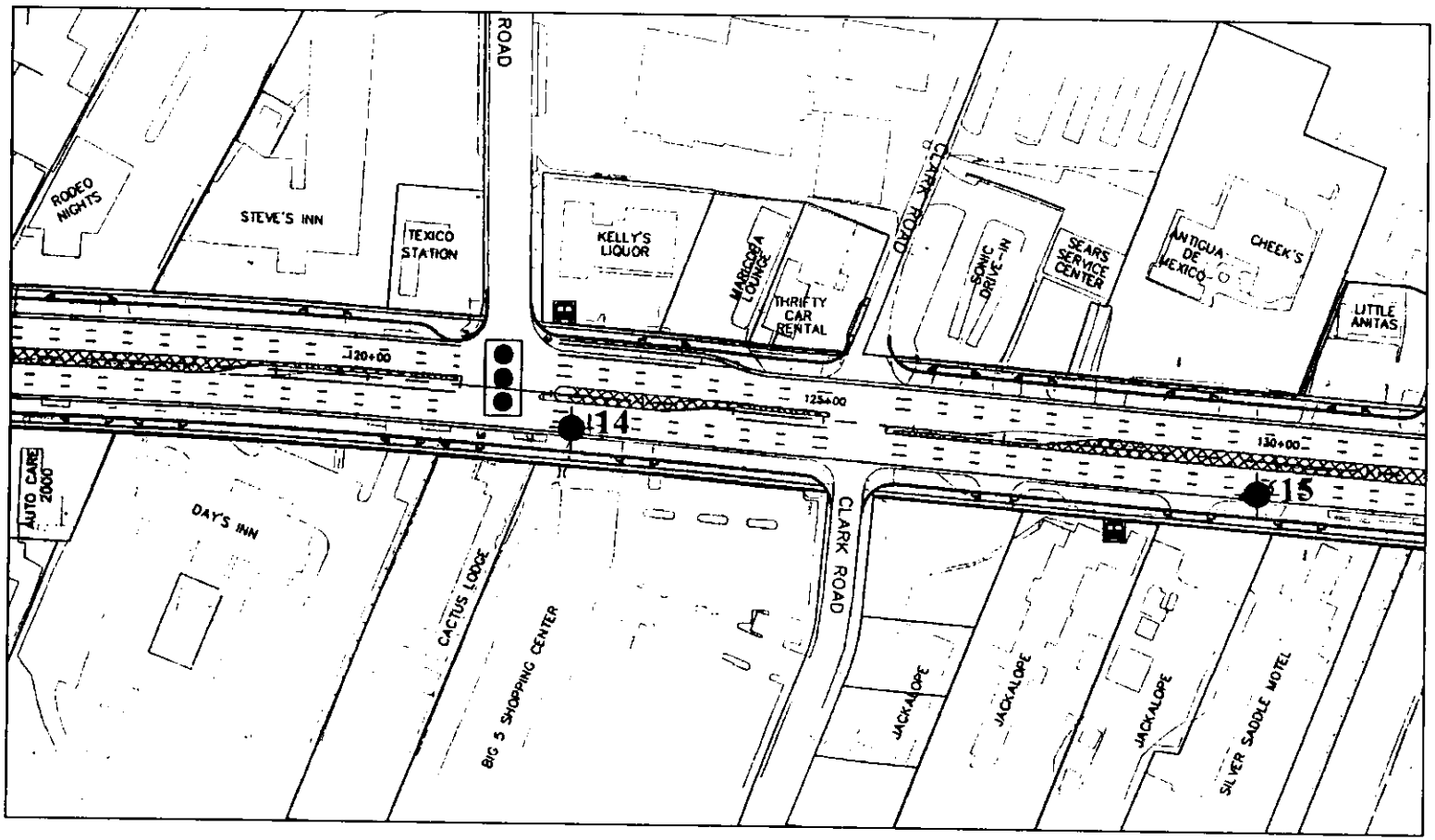
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1f.

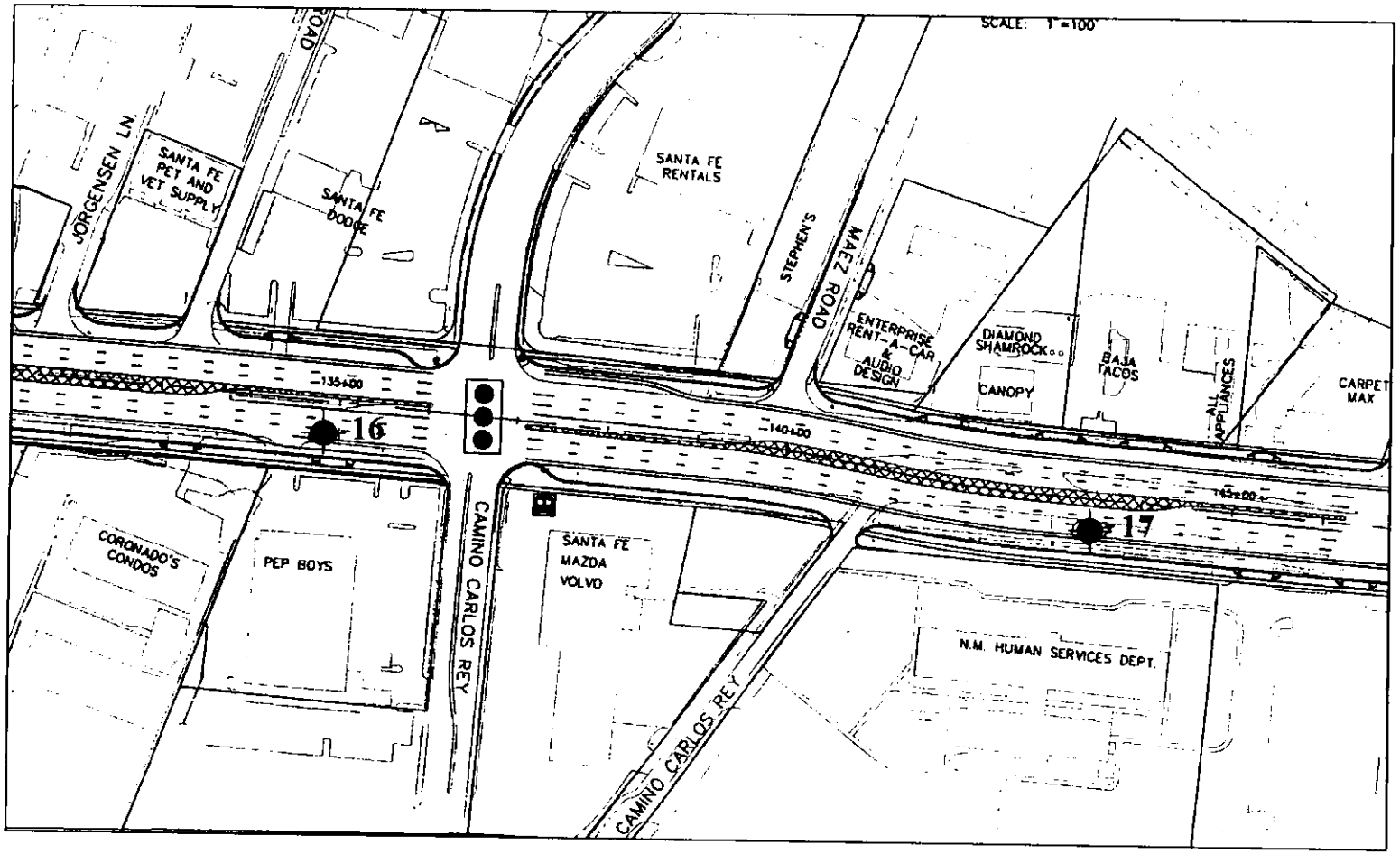
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1g.

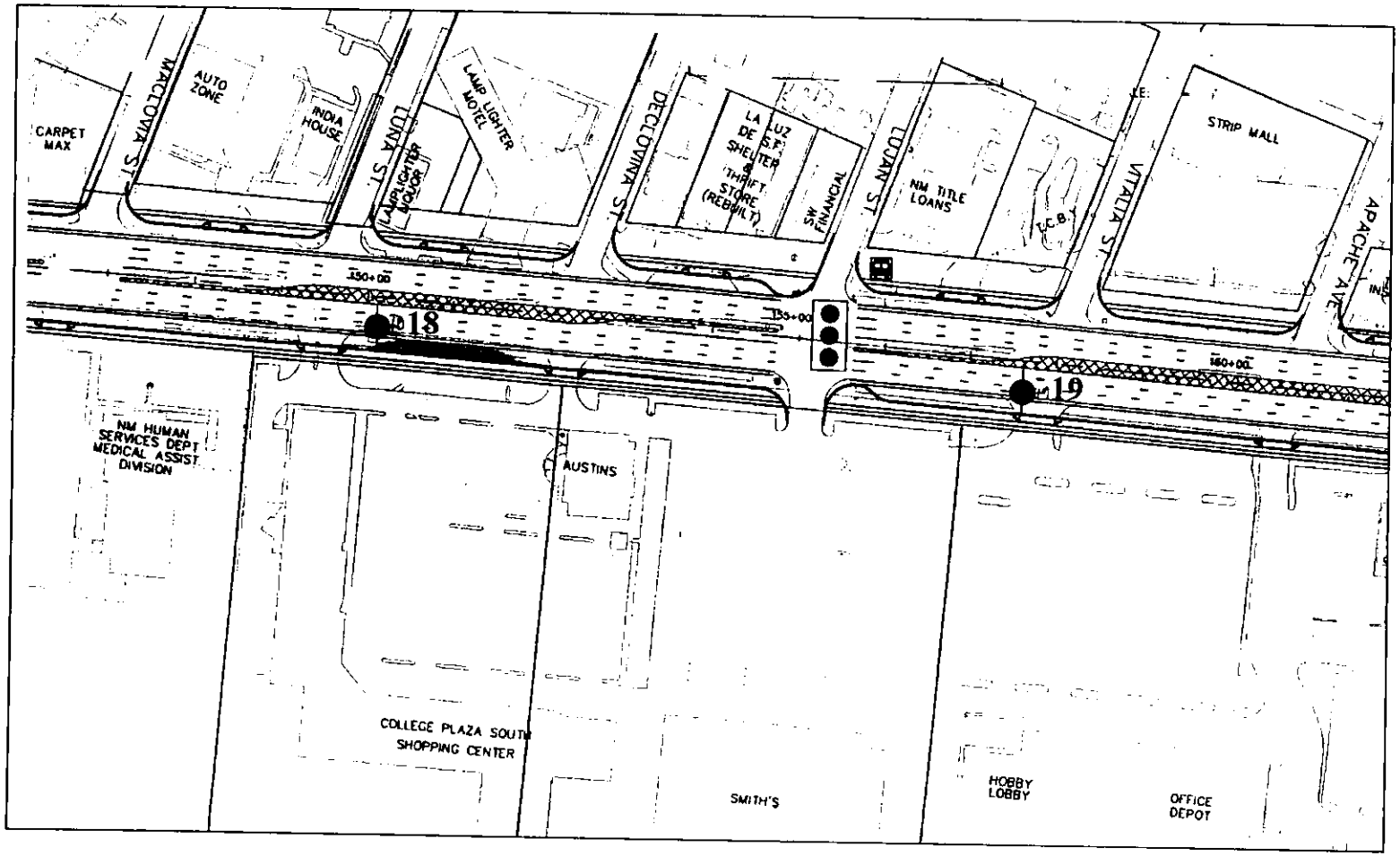
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1h.

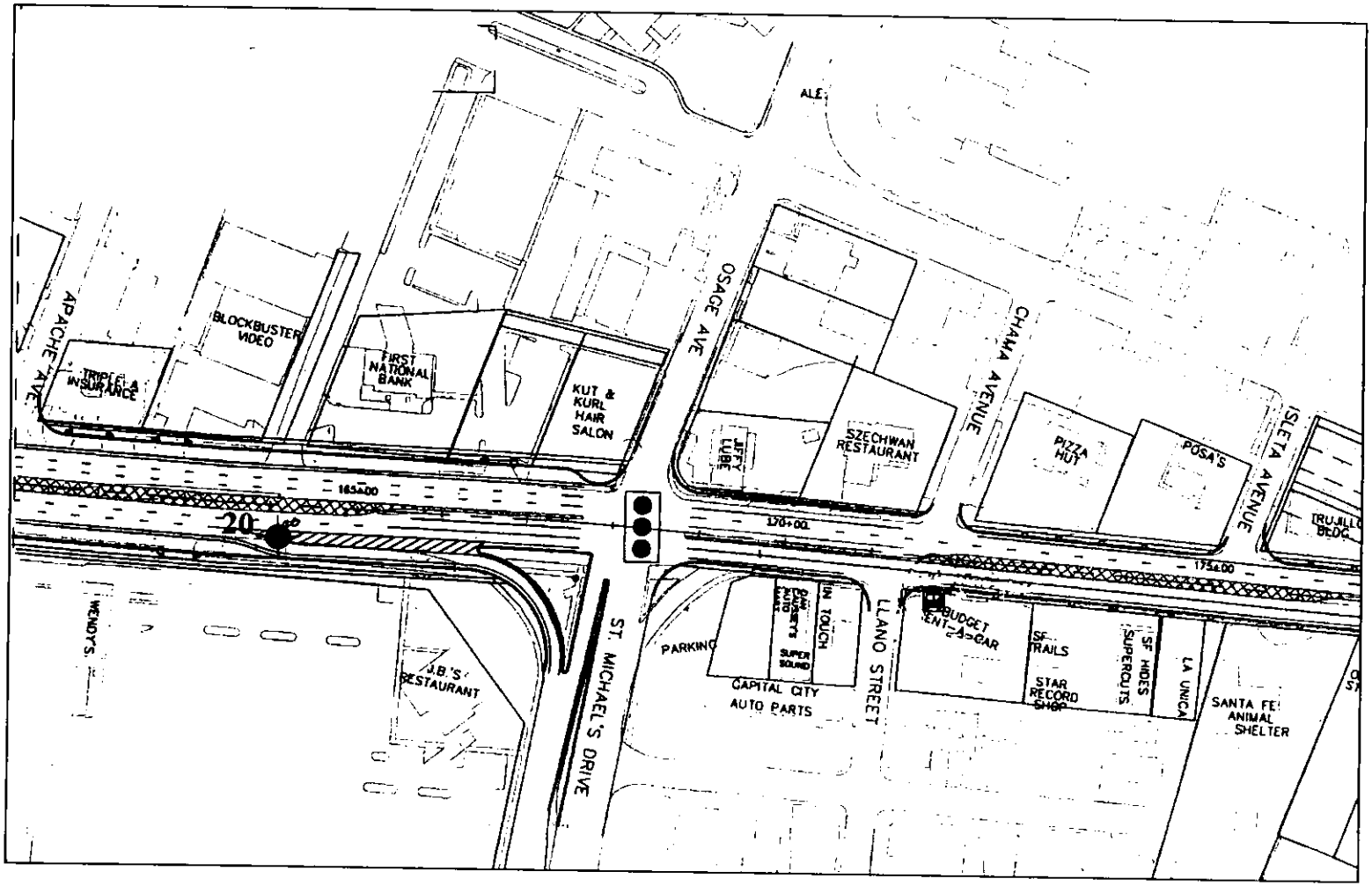
SITE PLAN



● TEST HOLE LOCATIONS

FIGURE 1i.

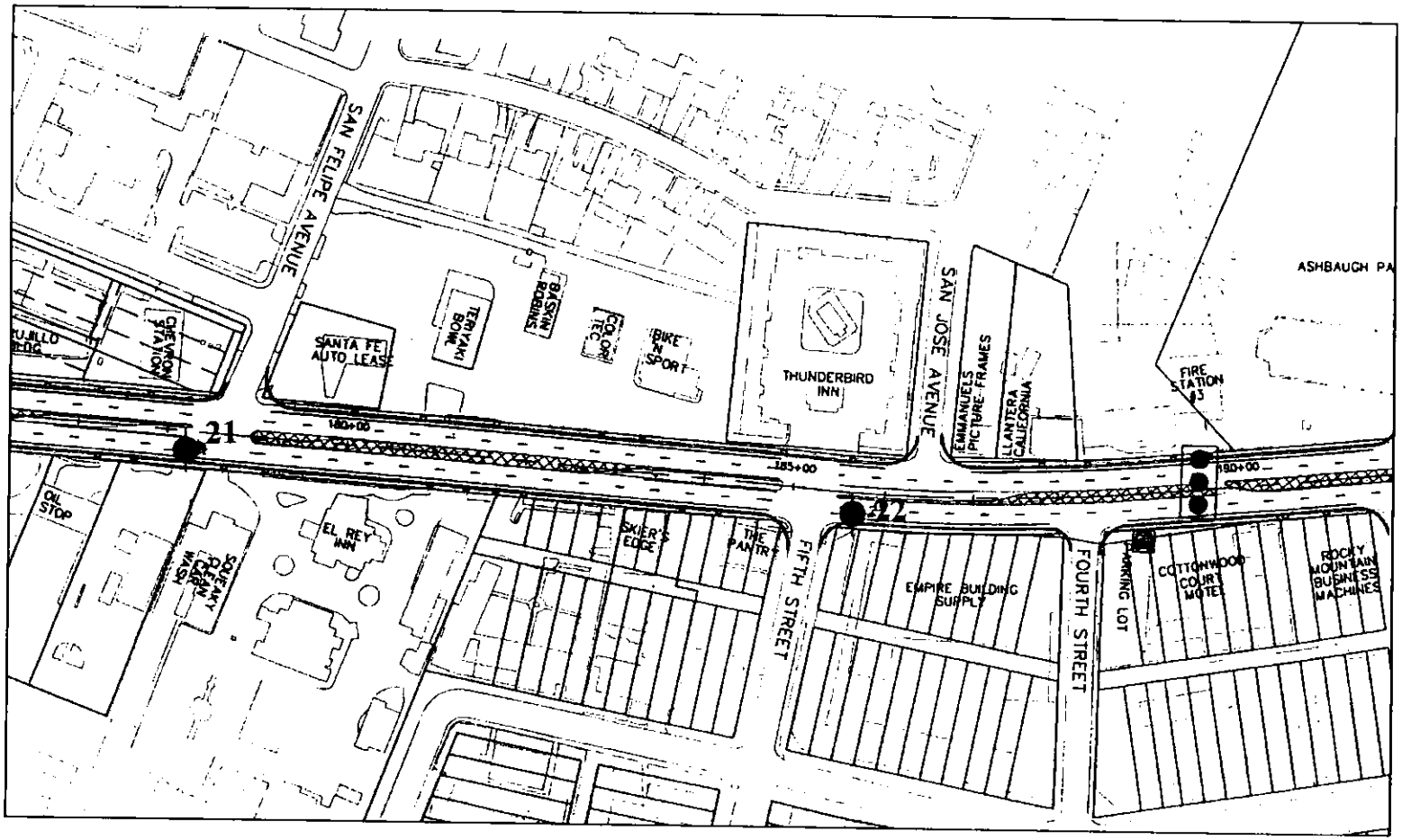
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1j.

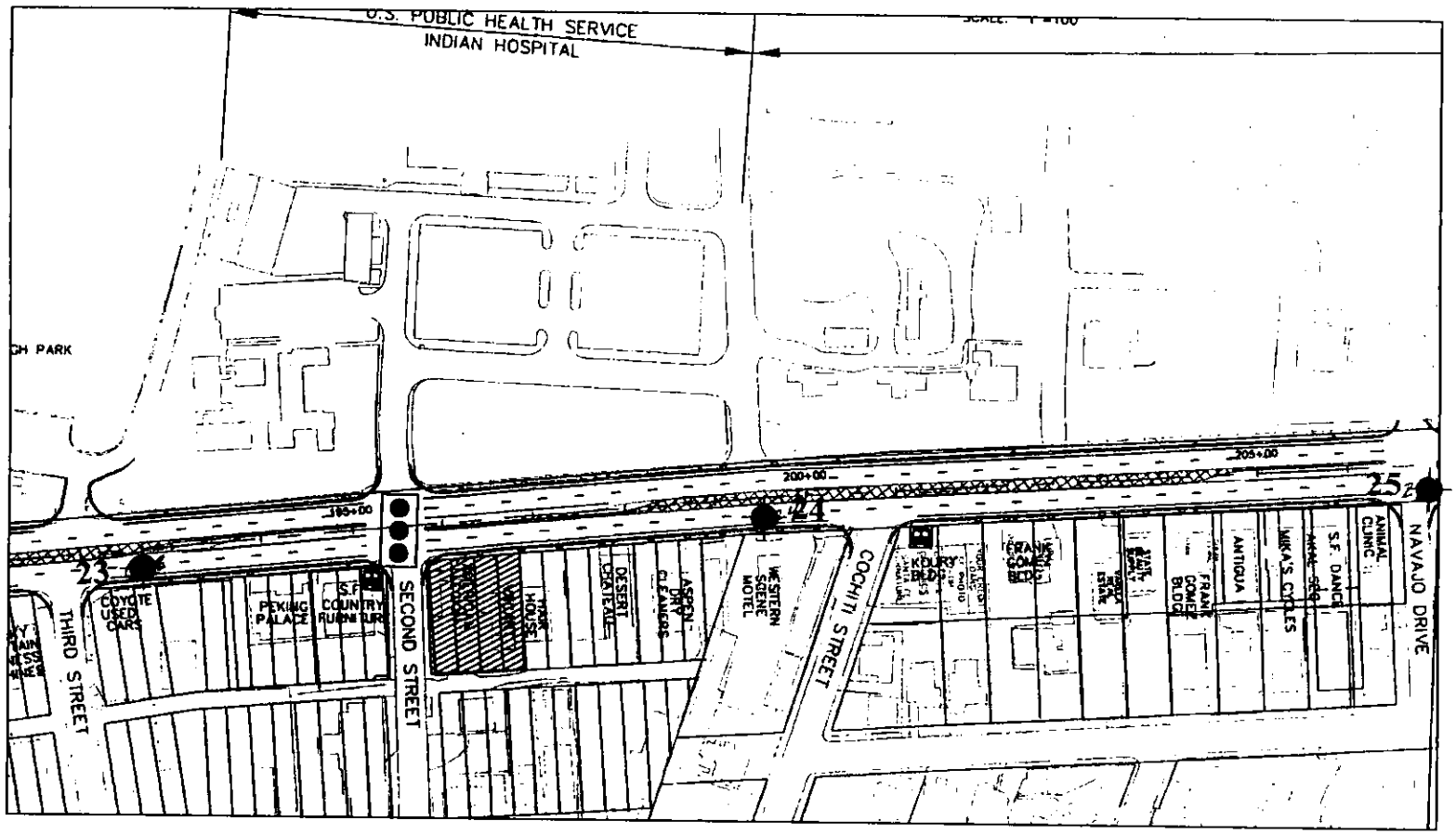
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1k.

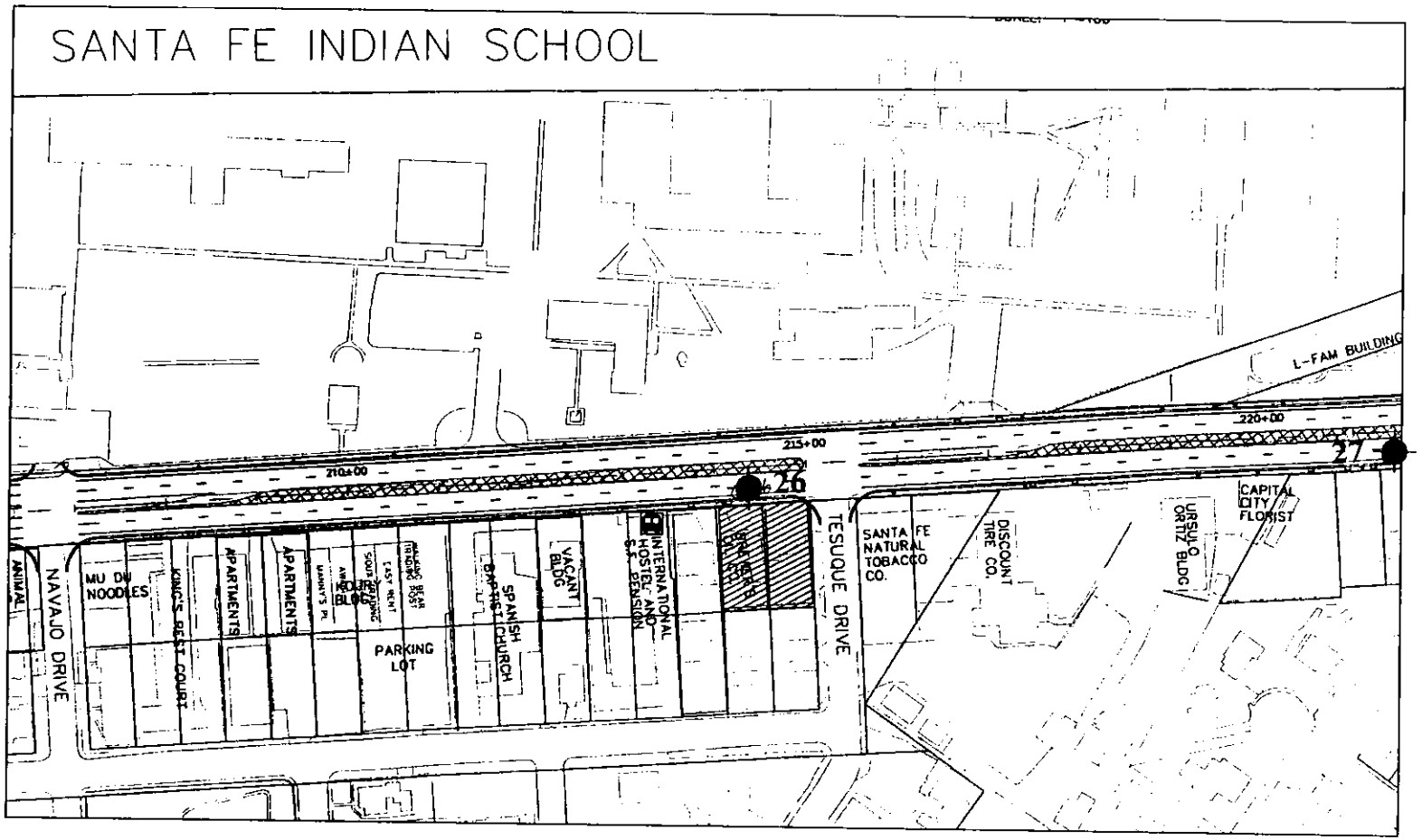
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 11.

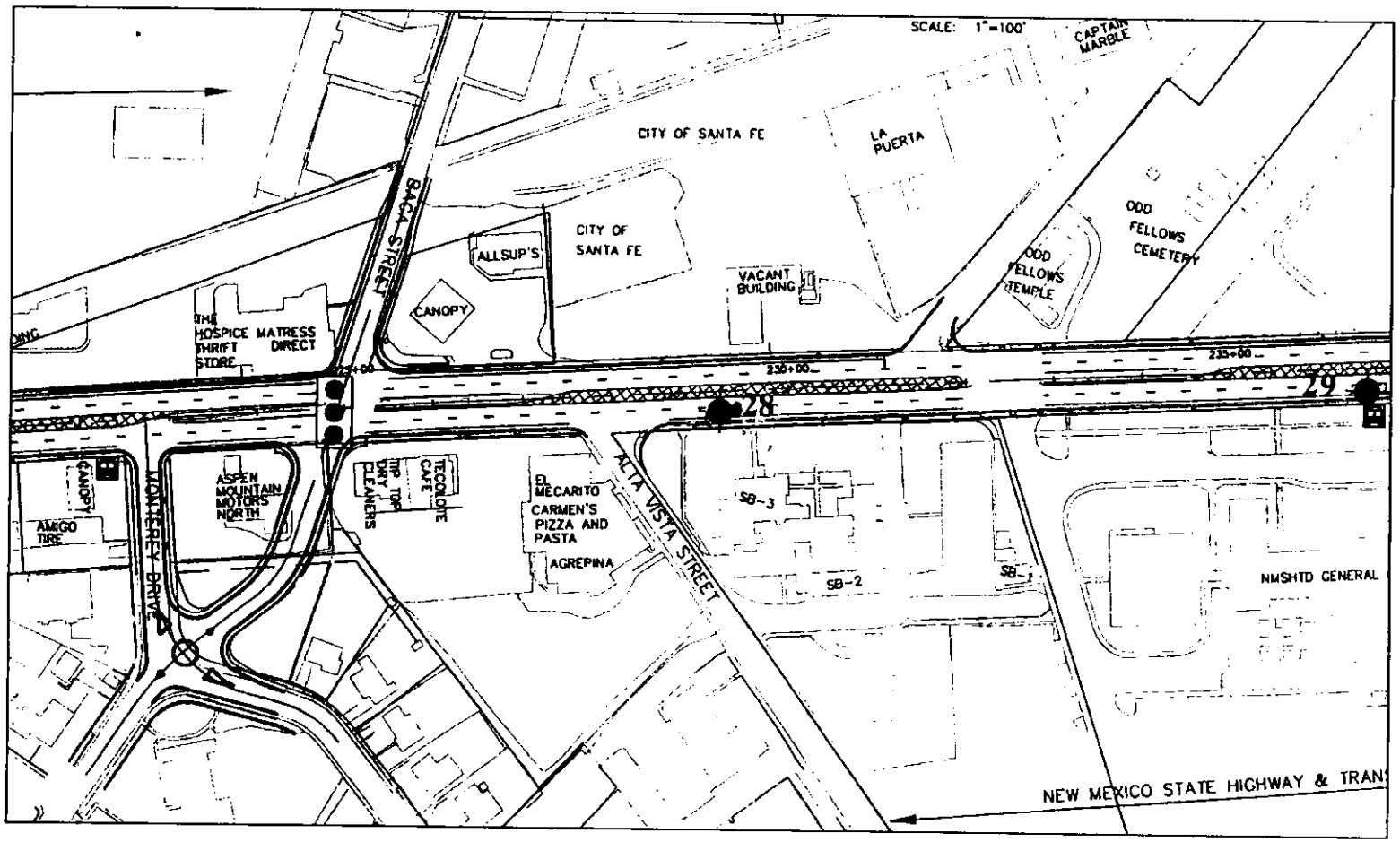
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1m.

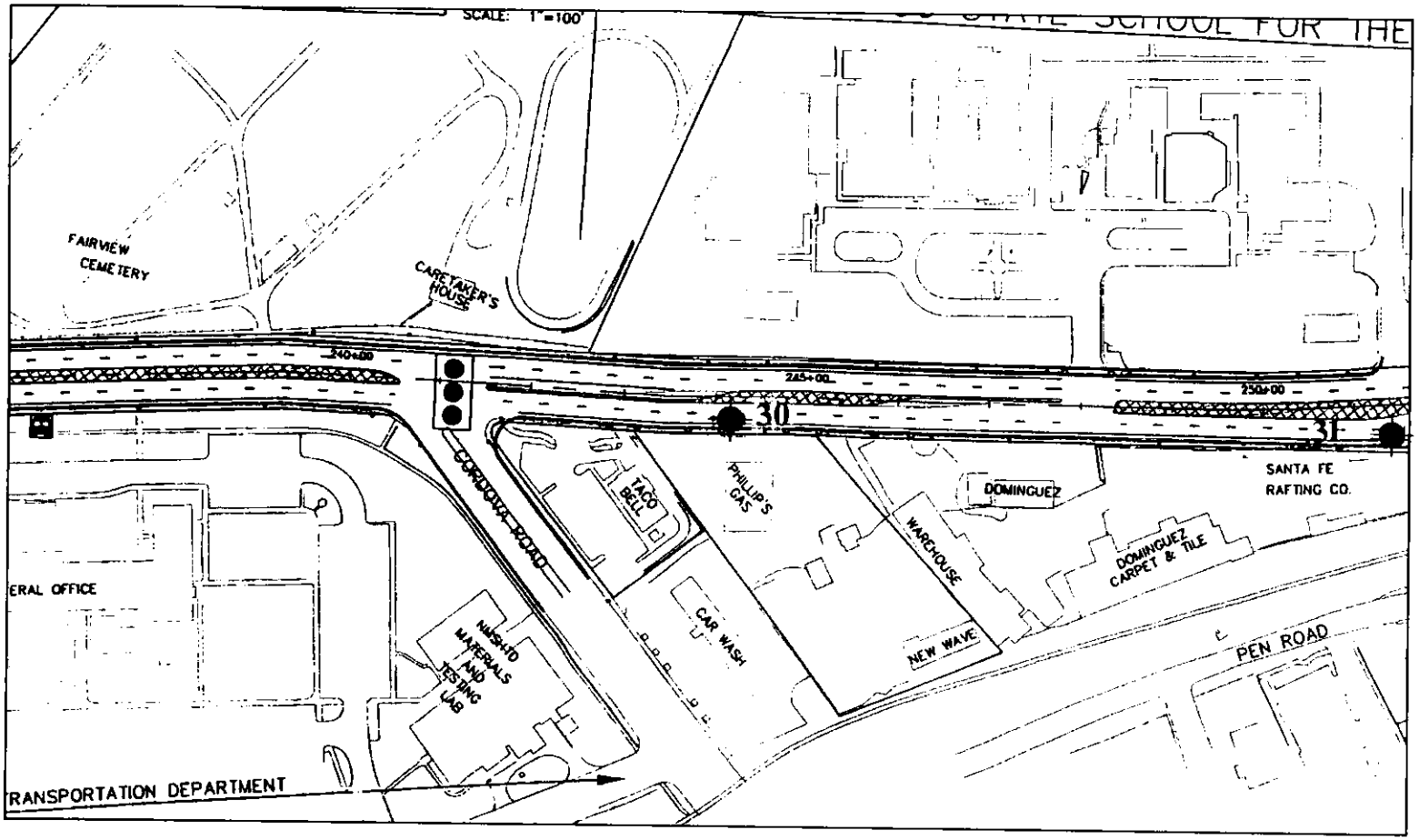
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1n.

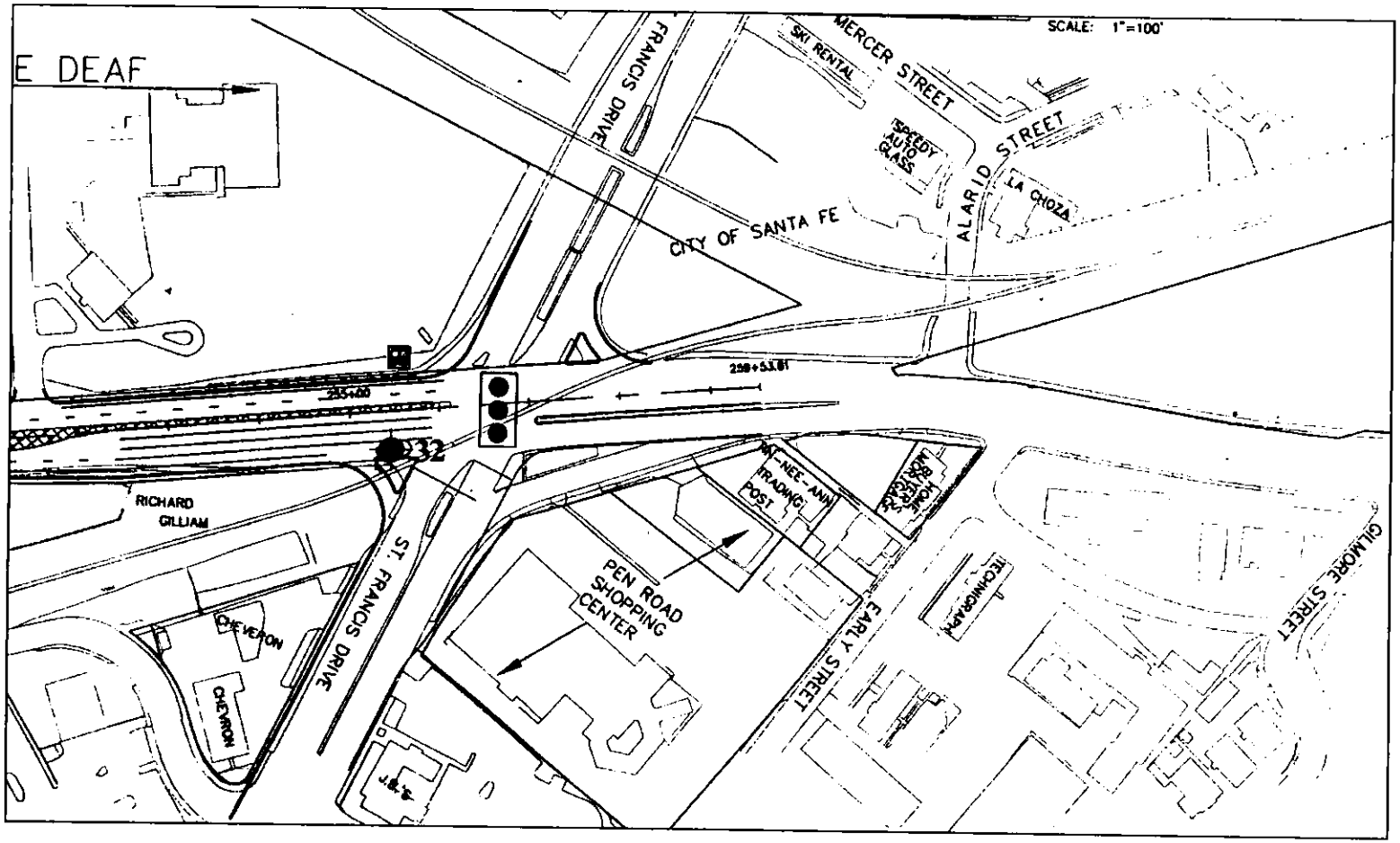
SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1o.

SITE PLAN



TEST HOLE LOCATIONS

FIGURE 1p.

V & A

LOG OF TEST HOLE NO. 1

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	28	S		10.5	1,2		12" Asphaltic Concrete, 12" Aggregate Base Course
5	65 NR	R		16.8		CL	NATURAL GROUND-CLAY, sandy, fine grained, hard, moist, brown
10	75	S		15.5		SM	SAND, very silty, fine to coarse grained, trace gravel, dense, very moist, light brown Sampler drove a rock
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 2

V & A

LOG OF TEST HOLE NO. 2

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	30	S		4.0	1,2		8" Asphaltic Concrete, 4" Gravel, 24" Granular Sub Base
5	27	S		18.5		CL	NATURAL GROUND-CLAY, very sandy, fine grained, trace gravel, very stiff, medium moist, light
							6" silt lens, moist
10	9	S		12.0			Stiff
15							Bottom of Hole @ 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3

V & A

LOG OF TEST HOLE NO. 3

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description 6" Asphaltic Concrete, 6" Aggregate Base Course, 6" Granular Sub Base
	12	S		11.2	1,2		6" Asphaltic Concrete, 6" Aggregate Base Course, 6" Granular Sub Base
5	12	S		15.0		CL	NATURAL GROUND-CLAY, sandy, fine grained, stiff, moist, brown
10	25	S		7.6		SC	SAND, very clayey, fine grained, medium dense, medium moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 4

V & A

LOG OF TEST HOLE NO. 4

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	13	S		23.4	1		8" Asphaltic Concrete, 4" Aggregate Base Course, 12" Granular Sub Base
5	61	S		24.4	1	CL	NATURAL GROUND-CLAY, very sandy, fine grained, trace gravel, stiff, medium moist, brown Calcareous, hard, slightly moist
10	6	S		18.5	1	CL	CLAY, very sandy, fine grained, medium stiff, medium moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 5

V & A

LOG OF TEST HOLE NO. 5

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	14	S		17.6	1,2		7" Asphaltic Concrete, 7" Aggregate Base Course, 24" Sub Base
5	3	S		7.6	1,2	SC	NATURAL GROUND-SAND, very clayey, silty, fine grained, loose, medium moist, light brown
10	42	S		1.6		SP-SM	SAND, slightly silty, fine to coarse grained, gravelly, dense, medium moist, light brown
15							Bottom of Hole @ 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 6

V & A

LOG OF TEST HOLE NO. 6

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	10	S		9.0	1,2		8" Asphaltic Concrete, 10" Aggregate Base Course, 12" Granular Sub Base
5						CL	NATURAL GROUND-CLAY, very sandy, fine grained, trace gravel, medium moist, brown
	15	S		15.5		SM	SAND, very silty, fine to coarse grained, trace gravel, medium dense, very moist, light brown
10	50	S		4.0		SP-SM	SAND, slightly silty, medium to coarse grained, very gravelly, dense, medium moist, brown
15							Bottom of Hole @ 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 7

V & A

LOG OF TEST HOLE NO. 7

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	12	S		8.9	1,2		9" Asphaltic Concrete, 9" Aggregate Base Course, 18" Granular Sub Base
5	4	S		18.4	1	ML	NATURAL GROUND-SILT, very sandy, clayey, fine grained, soft, moist, brown
10	88	S		2.4		GP-GM	GRAVEL, silty, coarse grained, dense, medium moist, light brown
15							Bottom of Hole @ 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 8

V & A

LOG OF TEST HOLE NO. 8

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	17	S		4.2	1,2		8" Asphaltic Concrete, 4" Aggregate Base Course, 18" Granular Sub Base
5	9	S		17.9		CL	NATURAL GROUND-CLAY, very silty, sandy, fine grained, stiff, medium moist, light brown Silt lens, stiff, medium moist, light brown Calcareous
10	17	S		17.2		ML	SILT, very sandy, fine grained, very stiff, moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 9

V & A

LOG OF TEST HOLE NO. 9

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	22	S		6.3	1,2		6" Asphaltic Concrete, 6" Aggregate Base Course, 18" Granular Base Course
5	67	S		10.6	1	SC	NATURAL GROUND-SAND, clayey, fine grained, very stiff, moist, light brown Calcareous
10	20	S		17.3	1	ML	SILT, very sandy, fine grained, very stiff, medium moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 10

V & A

LOG OF TEST HOLE NO. 10

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	15	S		19.8	1,2		6" Asphaltic Concrete, 6" Aggregate Base Course, 12" Granular Sub Base
5						CL	NATURAL GROUND-CLAY, sandy, fine grained, stiff, medium moist, brown
	80	S		17.7	1	SM	SAND, very silty, fine grained, hard, very moist, light brown
10	54	S		2.2		SP-SM	SAND, slightly silty, fine to coarse grained, gravelly, dense, medium moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 11

V & A

LOG OF TEST HOLE NO. 11

Project: Cerrillos Road
Elevation - Top of Test Hole: N/A
Depth to Groundwater: Not Encountered

Project No.: 99-1-299
Date Drilled: 10/07/1999
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	22	S		4.1	1,2		6" Asphaltic Concrete, 6" Aggregate Base Course, 24" Granular Sub Base
5	10	S		15.7		CL	NATURAL GROUND-CLAY, sandy, fine grained, stiff, medium moist, brown Silt lens approximately 2-3"
10	60 NR	S				SP-SM	SAND, slightly silty, fine to coarse grained, gravelly, dense, medium moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 12

V & A

LOG OF TEST HOLE NO. 12

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	21	S		5.8	1,2		8" Asphaltic Concrete, 27" Granular Sub Base
5	13	S		13.2	1,2	SC	NATURAL GROUND-SAND, very clayey, fine grained, slightly gravel, moist, brown, faint petroleum smell
10	32	S		9.3	1	SM	SAND, very silty, fine to coarse grained, trace gravel, dense, moist, brown
15							Bottom of Hole @ 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 13

V & A

LOG OF TEST HOLE NO. 13

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	23	S		8.0	1,2		8" Asphaltic Concrete, 6" Aggregate Base Course, 18" Granular Sub Base
5	14	S		23.1		CL	NATURAL GROUND-CLAY, sandy, fine grained, trace gravel, stiff, very moist, brown to light brown
10	78	S		0.7		GP	GRAVEL, very sandy, trace silt, coarse grained, dense, slightly moist, light brown
15							Bottom of Hole @ 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 14

V & A

LOG OF TEST HOLE NO. 14

Project: Cerrillos Road
Elevation - Top of Test Hole: N/A
Depth to Groundwater: Not Encountered

Project No.: 99-1-299
Date Drilled: 10/07/1999
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	16	S		17.6	1,2		8" Asphaltic Concrete, 15" Sub Base
5	15 NR	S		16.3		CL	NATURAL GROUND-CLAY, very silty, sandy, fine grained, stiff, medium moist, light brown Calcareous
10	11	S		8.9	1	SM	SAND, very silty, fine grained, trace gravel, stiff, moist, brown
15 20 25 30 35							Bottom of Hole @ 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 15

V & A

LOG OF TEST HOLE NO. 15

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	12	S		14.6	1,2		8" Asphaltic Concrete, 10" Granular Sub-Base
5	17 NR	S		13.6		CL	NATURAL GROUND-CLAY, very sandy, fine grained, trace gravel, stiff, medium moist, brown Sampler drove a rock
10	12	S		17.8		SC	SAND, very clayey, fine to medium grained, trace gravel, medium dense, moist, brown
15 20 25 30 35							Bottom of hole at 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 16

V & A

LOG OF TEST HOLE NO. 16

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	14	S		9.1	1,2		8" Asphaltic Concrete, 6" Aggregate Base Course, 24" Granular Sub Base
5	3	S		1.5	1	SC	NATURAL GROUND-SAND, very clayey, fine grained, gravelly, loose, slightly moist, brown, calcium nodules
10	Bounce	S		3.2		SP-SM	SAND, slightly silty, medium to coarse grained, very gravelly, dense, medium moist, brown - sampler bounce
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 17

V & A

LOG OF TEST HOLE NO. 17

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	14	S		20.0	1,2		6" Asphaltic Concrete , 6" Aggregate Base Course, 24" Granular Sub Base
5	4	S		15.5		CL	NATURAL GROUND-CLAY, very sandy, very silty, fine grained, trace gravel, soft, medium moist, light brown, calcareous ML lenses
10	55	S		1.4		GP	GRAVEL, very sandy, trace silt, coarse grained, dense, slightly moist, light brown
15 20 25 30 35							Bottom of hole at 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 18

V & A

LOG OF TEST HOLE NO. 18

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	17	S		13.7	1,2		10" Asphaltic Concrete , 6"Aggregate Base Course, 2" Granular Sub Base
5	15	S		17.2		CL	NATURAL GROUND-CLAY, very sandy, fine grained, trace gravel, very stiff, medium moist, light brown - calcareous, stiff
10	32	S		11.4		SC	SAND, very clayey, fine to coarse grained, trace gravel, dense, very moist, light brown
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 19

V & A

LOG OF TEST HOLE NO. 19

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							10" Asphaltic Concrete, 2" Aggregate Base Course
5	4	S		11.7	1,2	CL	CLAY, very sandy, fine grained, trace gravel, soft, medium moist, brown - strong petroleum smell
	20	S		11.3	1	SC	SAND, very clayey, fine to coarse grained, slight gravel, medium dense, moist, light brown - calcareous
10	Bounce NR	S		3.0		SC	SAND, slightly clayey, fine to coarse grained, very gravelly, dense, medium moist, brown to light brown - calcareous
15, 20, 25, 30, 35							Bottom of hole at 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 20

V & A

LOG OF TEST HOLE NO. 20

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							9" Asphaltic Concrete, 3" Aggregate Base Course
	14	S		18.1	1,2	CL	CLAY, very sandy, fine grained, stiff, moist, brown
5	28	S		15.7			Very stiff, medium moist
10	53	S		3.3		SP-SM	SAND, slightly silty, fine to coarse grained, very gravelly, dense, slightly moist, light brown
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 21

V & A

LOG OF TEST HOLE NO. 21

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	12	S		18.7	1,2		1' Asphaltic Concrete, 6" Aggregate Base Course
5						SC	SAND, very clayey, fine grained, trace gravel, stiff, moist, brown
	16	S		22.1		ML	SILT, very sandy, clayey, fine grained, trace gravel, very stiff, moist, light brown - calcareous
10	72	S		2.9		GM	GRAVEL, very sandy, silty, coarse grained, dense, slightly moist, brown
15, 20, 25, 30, 35							Bottom of hole at 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 22

V & A

LOG OF TEST HOLE NO. 22

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	16	S		12.6	1		10" Asphaltic Concrete, 8" Aggregate Base Course, 1' Granular Sub-Base
5	8	S		7.2		SC	SAND, very clayey, fine to coarse grained, gravelly, loose, moist, light brown - calcareous
10	90	S		1.7		GP-GM	GRAVEL, very sandy, slightly silty, coarse grained, dense, slightly moist, light brown
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 23

V & A

LOG OF TEST HOLE NO. 23

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							1" Asphaltic Concrete, 6" Aggregate Base Course
	20	S		14.7	1,2		
5	36	S		9.8		SC	SAND, very clayey, fine grained, trace gravel, very stiff, very moist, brown - calcareous
10	Bounce	S		9.0			Refusal at 9-1/2' on rock - sample bagged
15							
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 24

V & A

LOG OF TEST HOLE NO. 24

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							7" Asphaltic Concrete, 3" Aggregate Base Course
	16	S		19.6	1,2	CL	CLAY, very sandy, fine grained, trace gravel to gravelly, very stiff, moist, brown
5				3.9		SM	SAND, very silty, some clay, fine to coarse grained, very gravelly, dense, medium moist, light brown
							Refusal at 5' on rock
10							
15							
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 25

V & A

LOG OF TEST HOLE NO. 25

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							7" Asphaltic Concrete, 5" Aggregate Base Course
	17	S		17.1	1,2	CL	CLAY, very sandy, fine grained, trace gravel, very stiff, medium moist, light brown, calcareous
5	14	S		6.4			
10	29	S		3.1		SP-SM	SAND, slightly silty, fine to coarse grained, gravelly, medium dense, medium moist, light brown
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 26

V & A

LOG OF TEST HOLE NO. 26

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							6" Asphaltic Concrete, 3" Aggregate Base Course, 3" Granular Sub Base
	17	S		1.7			
5						CL	CLAY, very sandy, fine grained, gravelly, very stiff, dry, black, gray
	19	S		15.0	1,2	SC	SAND, very clayey, fine to coarse grained, slightly gravelly, dense, very moist, brown
10							Refusal on rock at 6'
15							
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 27

V & A

LOG OF TEST HOLE NO. 27

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							7" Asphaltic Concrete, 5" Aggregate Base Course
	11	S		16.5	1,2	SC	SAND, very clayey, fine grained, trace gravel, stiff, very moist, brown, calcium nodules
5	8	S		13.7			Loose
10	19	S		13.4	1,2	SC	SAND, very clayey, some silt, fine grained, trace gravel, medium dense, very moist, brown
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 28

V & A

LOG OF TEST HOLE NO. 28

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	18	S		13.9	1,2		10" Asphaltic Concrete, 2" Aggregate Base Course, 1' Granular Sub Base
5	23	S		5.4		CL	NATURAL GROUND-CLAY, very sandy, fine grained, trace gravel, vey stiff, slightly moist, brown - no nodules or calcareous
10						SC	SAND, very clayey, silty, fine to coarse grained, gravelly, dense, medium moist, brown
15 20 25 30 35	Bounce NR	S		5.5			Sampler bounce at 10'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 29

V & A

LOG OF TEST HOLE NO. 29

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	5	S		10.2	1,2		7" Aphaltic Concrete, 5" Aggregate Base Course, 1' Granular Sub-Base
5						CL	NATURAL GROUND-CLAY, sandy, fine grained, trace gravel, soft, medium moist, light brown - calcareous
	18	S		6.4		SC	SAND, very clayey, fine to coarse grained, gravelly, medium dense, medium moist, brown
10				3.7		GM	GRAVEL, very silty, sandy, some clay, dense, medium moist, brown
15							Refusal at 9-1/2' on rock (cobbles)
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 30

V & A

LOG OF TEST HOLE NO. 30

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							6" Asphaltic Concrete, 6" Aggregate Base Course
	18	S		17.2	1,2	CL	CLAY, very sandy, very silty, fine grained, trace gravel, very stiff, medium moist, brown, 3' light brown - calcareous stiff, brown
5	10	S		11.4			
10	100	S		17.6		SP-SM	SAND, slightly silty, fine to coarse grained, gravelly, dense, vey moist, light brown
15							Bottom of hole at 11-1/2'
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 31

V & A

LOG OF TEST HOLE NO. 31

Project: Cerrillos Road
Elevation - Top of Test Hole: N/A
Depth to Groundwater: Not Encountered

Project No.: 99-1-299
Date Drilled: 10/07/1999
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
							8" Asphaltic Concrete, 4" Aggregate Base Course
	21	S		17.4	1,2	SC	SAND, very clayey, silty, fine grained, trace gravel, very stiff, medium moist, light brown, calcareous, hard, brown
5	36	S		10.8			
				8.8		SP-SM	SAND, slightly silty, fine to coarse grained, gravelly, dense, moist, light brown
10							Refusal at 7' on rock
15							
20							
25							
30							
35							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 32

V & A

LOG OF TEST HOLE NO. 32

Project: Cerrillos Road
Project No.: 99-1-299
Elevation - Top of Test Hole: N/A
Date Drilled: 10/07/1999
Depth to Groundwater: Not Encountered
Drilling Method: 6" H.S.A.

Depth, feet	Blows/Foot	Sample Type	Dry Density pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
	17	S		9.0	1,2		8" Asphaltic Concrete, 4" Aggregate Base Course, 1' Granular Sub Base
5	21	S		18.9		CL	NATURAL GROUND-CLAY, sandy, silty, fine grained, trace gravel, medium moist, brown Very stiff, some calcium nodules
10	Bounce NR	S		1.5		SP-SM	SAND, slightly silty, fine to coarse grained, very gravelly, dense, slightly moist, light brown
15 20 25 30 35							Bottom of hole at 11-1/2'

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 33

V
&
A

NOTES - LOGS OF TEST HOLES

Test hole locations were determined by compass bearing and pacing distances from known topographic points.

"Drilling Method" refers to the equipment utilized to advance the test hole. Six inch outside diameter, continuous flight, hollowstem auger was utilized.

"S" under "Sample Type" indicates a Standard Penetration test (ASTM D-1586). The Standard Penetration sampler is 2 inches in outside diameter and 1 3/8 inches inside diameter.

"R" under "Sample Type" indicates a 3 inch outside diameter by 2.5 inch inside diameter sampler. The sampler is lined with 1 inch high brass rings.

"B" under "Sample Type" indicates a bulk sample.

"Blows Per Foot" indicates the number of blows of a 140 pound hammer falling 30 inches required to drive the indicated sampler 12 inches.

"NR" under "Blows/Foot" indicates that no sample was recovered.

"Dry Density PCF" indicates the laboratory determined soil dry density in pounds per cubic foot.

"Water Content %" indicates the laboratory determined soil moisture content in percent (ASTM D-2216).

"Unified Classification" indicates the field soil classification as per ASTM D-2488. When appropriate, the field classification is modified based upon subsequent laboratory tests.

Variations in soil profile, consistency, and moisture content may occur between test holes. Subsurface conditions may also vary between test holes and with time.

Figure No.: 34

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
1	1	SC		10.5	38	19		100	88	78	73	68	62	56	50	42.0	SAND, very clayey, very gravelly
	5			16.8													
	10			15.5													
2	1	SM		4.0	NV	NP		100	97	95	87	74	57	41	27	13.4	SAND, silty, trace gravel
	5			18.5													
	10			12.0													
3	1	CL		11.2					100	99	96	93	89	84	78	57.2	CLAY, very sandy, trace gravel
	5			15.0													
	10			9.6													
4	1	CL		23.4						100	99	98	96	93	88	82.2	CLAY, sandy
	5	CL		24.4				100	98	96	92	88	83	76	68	53.6	CLAY, very sandy, trace gravel
	10	CL		18.5	37	14				100	99	98	92	86	78	60.7	CLAY, very sandy

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
5	1			17.6													
	5	SC		7.6	29	12				100	91	80	65	49	29	22.9	SAND, very clayey
	10			1.6													
6	1	SC		9.0	29	11		100	83	72	60	48	39	33	32	27.2	SAND, very clayey, very gravelly
	5			15.5													
	10			4.0													
7	1	SC		8.9	28	10		100	94	88	80	70	59	50	43	34.3	SAND, very clayey, gravelly
	5	ML		18.4				100	99	99	97	94	91	85	78	66.6	SILT, very sandy, trace gravel
	10			2.4													
8	1	SP-SM		4.2	NV	NP		100	90	84	71	52	31	17	11	8.4	SAND, slightly silty, gravelly
	5			17.9													
	10			17.2													

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
9	1	SM		6.3	NV	NP		100	95	92	89	86	81	70	55	38.4	SAND, very silty, slight gravel
	5	SC		10.6					100	91	77	66	50	37	28	19.7	SAND, clayey, slight gravel
	10	ML		17.3					100	99	97	96	95	91	85	71.7	SILT, very sandy, trace gravel
10	1	CL		19.8	36	17					100	98	95	90	82	69.4	CLAY, very sandy
	5	SM		17.7					100	94	88	80	70	60	45	24.5	SAND, very silty, slight gravel
	10			2.2													
11	1	SM		4.1	NV	NP		100	93	78	64	50	39	29	22	15.5	SAND, silty, very gravelly
	5			15.7													
12	1	SM		5.8	NV	NP		100	93	85	74	59	44	33	26	19.4	SAND, silty, gravelly
	5	SC		13.2	39	10		100	91	88	83	77	69	68	51	31.3	SAND, very clayey, slight gravel
	10	SM		9.3				100	99	93	88	81	72	60	48	34.9	SAND, very clayey, slight gravel
13	1	SM		8.0	NV	NP		100	99	93	84	69	53	40	33	25.7	SAND, very silty, slight gravel
	5			23.1													
	10			0.7													

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
14	1	CL		17.6	38	15		100	97	94	88	82	76	69	63	53.2	CLAY, very sandy, slight gravel
	5			16.3													
	10	SM		8.9					100	99	96	92	86	75	63	43.7	SAND, very silty, trace gravel
15	1	SC		14.6	40	17		100	94	85	78	69	91	53	47	38.8	SAND, very clayey, gravelly
	5			13.6													
	10			17.8													
16	1	SC		9.1	34	16		100	92	85	77	65	51	40	33	25.6	SAND, very clayey, gravelly
	5	SC		1.5			100	92	74	66	59	52	45	38	31	23.7	SAND, very clayey, gravelly
	10			3.2													
17	1	CL		20.0	30	12			100	98	95	90	83	74	65	50.8	CLAY, very sandy, trace gravel
	5			15.5													
	10			1.4													

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
18	1	SC		13.7	26	9		100	87	84	80	76	70	65	54	41.6	SAND, very clayey, gravelly
	5			17.2													
	10			11.4													
19	1	CL		11.7	31	13			100	99	97	94	88	81	74	62.3	CLAY, very sandy, trace gravel
	5	SC		11.3				100	97	90	74	68	62	55	48	39.5	SAND, very clayey, slight gravel
	10			3.0													
20	1	CL		18.1	38	18					100	99	98	96	94	90.3	CLAY, slightly sandy
	5			15.7													
	10			3.3													
21	1	SC		18.7	34	21		100	99	95	89	82	76	67	58	40.9	SAND, very clayey, trace gravel
	5			22.1													
	10			2.9													

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
22	1	GC		12.6			100	78	71	67	62	58	54	49	43	34.9	GRAVEL, very clayey, very sandy
	5			7.2													
	10			1.7													
23	1	SC		14.7	35	21				100	99	97	93	85	70	46.8	SAND, very clayey
	5			9.8													
	10			9.0													
24	1	CL		19.6	35	15				100	98	96	93	91	87	79.7	CLAY, very sandy
	5			3.9													
25	1	CL		17.1	31	11		100	99	98	96	92	85	75	64	50.2	CLAY, very sandy, trace gravel
	5			6.4													
	10			3.1													

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
26	1			1.7													
	5	SC		15.0	37	15		100	97	91	83	76	70	61	50	31.9	SAND, very clayey, slight gravel
27	1	SC		16.5	38	18			100	98	90	83	77	71	62	42.9	SAND, very clayey, trace gravel
	5			13.7													
	10	SC		13.4	22	10		100	99	95	90	83	76	67	57	43.8	SAND, very clayey, trace gravel
28	1	CL		13.9	30	17		100	99	96	95	93	91	87	80	57.6	CLAY, very sandy, trace gravel
	5			5.4													
	10			5.5													
29	1	SC		10.2	31	21		100	92	83	77	70	62	54	46	35.9	SAND, very clayey, gravelly
	5			6.4													
	10			3.7													

Project No.: 99-1-299
Table No.: 1

SUMMARY OF LABORATORY TEST DATA

Test Hole No.	Depth (feet)	Unified Classi-fication	Natural Dry Density	Natural Moisture Content	Atterberg Limits		SIEVE ANALYSIS- % PASSING BY WEIGHT										Description
					LL	PI	1½"	¾"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
30	1	CL		17.2	38	24			100	99	97	95	92	87	82	76.0	CLAY, very sandy, trace gravel
	5			11.4													
	10			17.6													
31	1	SC		17.4	27	13		100	99	98	97	95	91	86	80	68.3	SAND, very clayey, trace gravel
	5			10.8													
	6			8.8													
32	1	SM		9.0	27	NP		100	86	79	73	67	61	54	47	38.1	SAND, very silty, very gravelly
	5			18.9													
	10			1.5													

Project No.: 99-1-299
Table No.: 1

Test Hole	Depth (feet)	Unified Classification	AASTO Classification	R-Value	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT									
					LL	PI	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
1	1-4	SC	A-7-6	7	41	25				100	99	94	84	69	60	45.2
2	0-3	SC-SM	A-2-4	50	23	7			100	98	96	88	71	32	21	15.9
3	1-3	SC	A-6	17	30	15				100	99	96	88	61	48	36.9
4	1-3	SC	A-2-6	16	32	16			100	98	96	88	75	51	42	33.5
5	1-3	SC	A-2-6	19	28	16			100	99	98	93	83	55	42	31.0
6	1-4	SC	A-2-6	23	31	17		100	98	94	92	87	74	46	35	26.9
7	1-4	SC	A-6	21	30	14				100	99	95	86	66	56	44.3
8	1-3	SC-SM g	A-2-4	30	21	6			100	92	89	82	71	40	26	18.2
9	3-5	SC	A-6	19	39	22					100	98	91	69	57	43.5
10	1-5	SC	A-2-4	33	26	10			100	97	95	86	75	50	38	27.5
11/12	1-3	SC	A-2-6	24	29	14			100	99	96	91	79	45	33	24.5
13	2-4	SC	A-2-6	22	31	17			100	99	99	96	86	56	43	33.7
14/15	3-5	SC	A-6	19	35	17				100	99	95	85	62	50	39.3
16/17	1-3	SC g	A-2-4	39	23	8		100	99	94	91	84	74	49	36	26.5
18	1.5-5	CL	A-7-6	9	45	35					100	99	96	83	71	53.6
19	1-5	CL	A-6	16	39	28				100	99	98	94	83	75	62.6
20	1-5	CL	A-6	23	37	17		100	99	99	99	97	93	85	79	69.3
21	1.5-5	CL	A-7-6	14	45	25					100	98	93	82	74	63.3
22	2-6	SC g	A-2-4	28	27	10		100	98	95	92	85	76	59	34	31.7
23	1.5-5	CL	A-6	16	39	22				100	98	95	91	80	71	53.6
24/25	1-3.5/1-4	SC	A-6	23	35	22		100	99	97	97	92	83	62	48	37.4
26	1-5	SC	A-6	29	38	22				100	99	95	89	72	58	39.9
27/28	1-5/2-4	SC	A-6	22	33	17			100	99	97	91	82	63	53	43.2
29	2-5	SC	A-6	15	35	19	100	95	95	94	93	87	78	61	49	39.2
30	1-5	CL	A-6	17	35	20				100	98	95	88	69	59	44.7
31	1-4.5	CL	A-6	17	40	25					100	98	93	79	67	51.6
32	2-5	SC	A-6	24	33	18			100	99	98	94	87	70	60	45.6

Parsons Brinkerhoff Inc
Cerrillos Road Improvements

V & A Project No.: 99-1-299
R-Values

TABLE 2A

Cerrillos Road Improvements

AASHTO Classification	Test Hole	Depth (feet)	Unified Classification	R-Value	Liquid Limit	Plasticity Index	SIEVE ANALYSIS % PASSING BY WEIGHT 1 1/2"	1"	3/4"	1/2"	3/8"	No 4	No 10	No 40	No 80	No 200
A-2-4																
	10	1-5	SC	33	26	10			100	97	95	86	75	50	38	27
	16/17	1-3	SC g	39	23	8		100	99	94	91	84	74	49	36	27
	2	0-3	SC-SM	50	23	7			100	98	96	88	71	32	21	16
	22	2-6	SC g	28	27	10		100	98	95	92	85	76	59	34	32
	8	1-3	SC-SM g	30	21	6			100	92	89	82	71	40	26	18
A-2-6																
	11/12	1-3	SC	24	29	14			100	99	96	91	79	45	33	24
	13	2-4	SC	22	31	17			100	99	99	96	86	56	43	34
	4	1-3	SC	16	32	16			100	98	96	88	75	51	42	33
	5	1-3	SC	19	28	16			100	99	98	93	83	55	42	31
	6	1-4	SC	23	31	17		100	98	94	92	87	74	46	35	27
A-6																
	14/15	3-5	SC	19	35	17				100	99	95	85	62	50	39
	19	1-5	CL	16	39	28				100	99	98	94	83	75	63
	20	1-5	CL	23	37	17		100	99	99	99	97	93	85	79	69
	23	1.5-5	CL	16	39	22				100	98	95	91	80	71	54
	24/25	1-3.5/1-4	SC	23	35	22		100	99	97	97	92	83	62	48	37
	26	1-5	SC	29	38	22				100	99	95	89	72	58	40
	27/28	1-5/2-4	SC	22	33	17			100	99	97	91	82	63	53	43

Tuesday, November 02, 1999

TABLE 3A

AASHTO Classification	Test Hole	Depth (feet)	Unified Classification	R-Value	Liquid Limit	Plasticity Index	1 1/2"	1"	3/4"	1/2"	3/8"	No 4	No 10	No 40	No 80	No 200
	29	2-5	SC	15	35	19	100	95	95	94	93	87	78	61	49	39
	3	1-3	SC	17	30	15				100	99	96	88	61	48	37
	30	1-5	CL	17	35	20				100	98	95	88	69	59	45
	31	1-4.5	CL	17	40	25					100	98	93	79	67	52
	32	2-5	SC	24	33	18			100	99	98	94	87	70	60	46
	7	1-4	SC	21	30	14				100	99	95	86	66	56	44
	9	3-5	SC	19	39	22					100	98	91	69	57	43
A-7-6																
	1	1-4	SC	7	41	25				100	99	94	84	69	60	45
	18	1.5-5	CL	9	45	35					100	99	96	83	71	54
	21	1.5-5	CL	14	45	25					100	98	93	82	74	63

TABLE 3B

APPENDIX A

R-VALUE TEST RESULTS

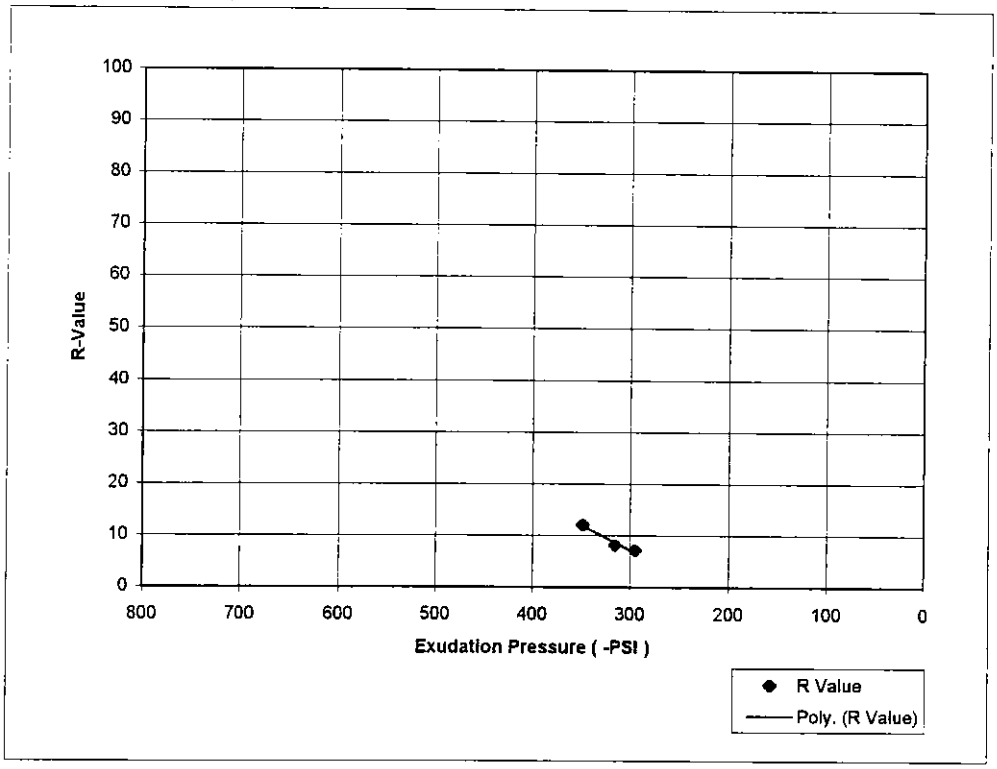
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#1 @ 1-4

Sample No.:	A	B	C
Moisture Content (%)	20.2	18.3	16.5
Dry Density (pcf)	106.2	109.4	112.4
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	295	316	349
R Value	7	8	12

R VALUE AT 300 psi = 7



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	99	94	84	69	60	45.2

Atterberg Limits: LL: 41 ASTM Classification : (SC)
PI: 25 AASHTO Classification: A-7-6

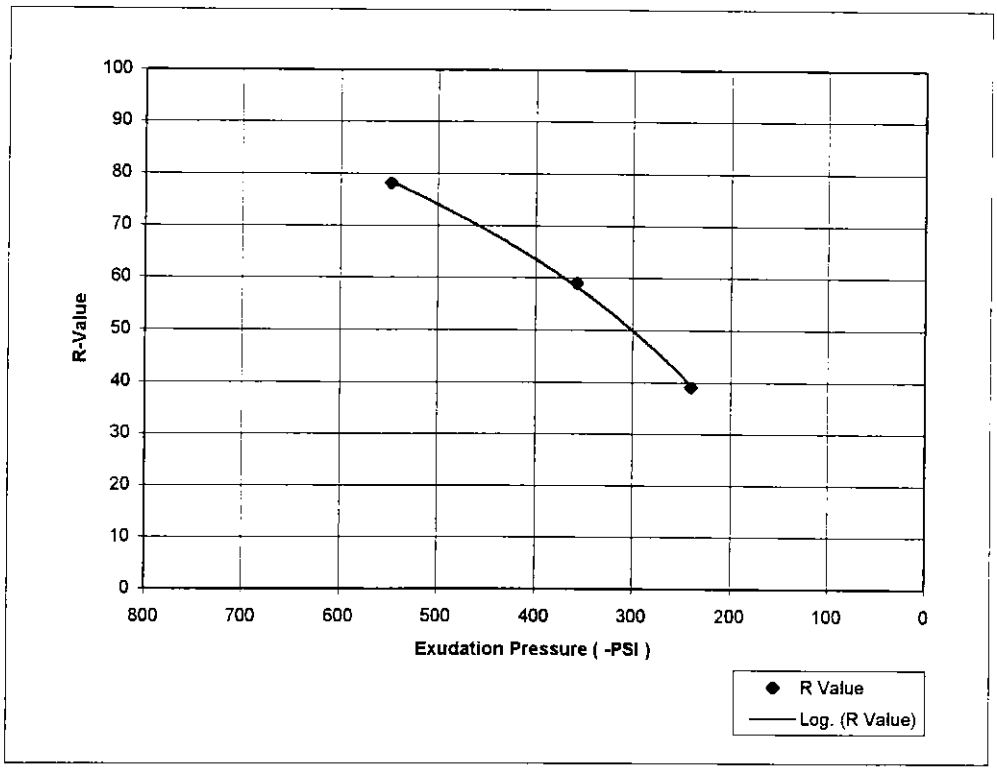
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#2 @ 0-3

Sample No.:	A	B	C
Moisture Content (%)	8.9	8.0	7.2
Dry Density (pcf)	133.1	134.1	134.5
Expansion Pressure (psi)	0.0	0.0	0.4
Exudation Pressure (psi)	240	358	548
R Value	39	59	78

R VALUE AT 300 psi = 50



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	98	96	88	71	32	21	15.9

Atterberg Limits: LL: 23 PI: 7

ASTM Classification : (SC-SM)
AASHTO Classification: A-2-4

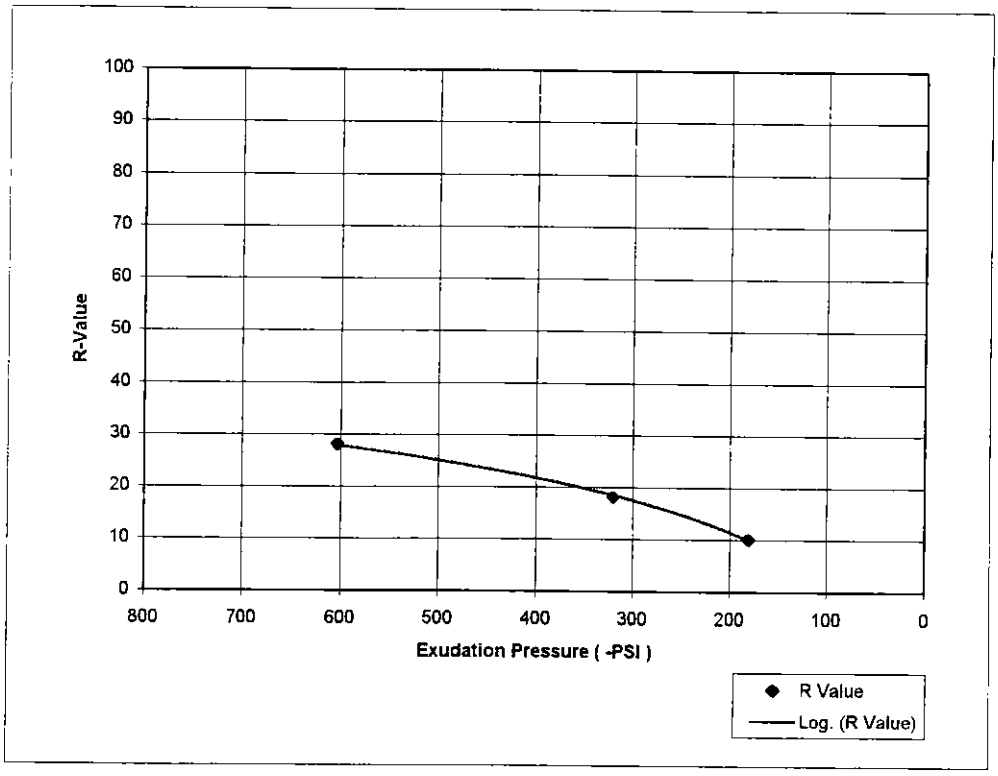
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#3 @ 1-3

Sample No.:	A	B	C
Moisture Content (%)	12.7	11.8	10.9
Dry Density (pcf)	122.3	123.8	125.5
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	180	321	603
R Value	10	18	28

R VALUE AT 300 psi = 17



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	99	96	88	61	48	36.9

Atterberg Limits: LL: 30 PI: 15

ASTM Classification : (SC)
AASHTO Classification: A-6

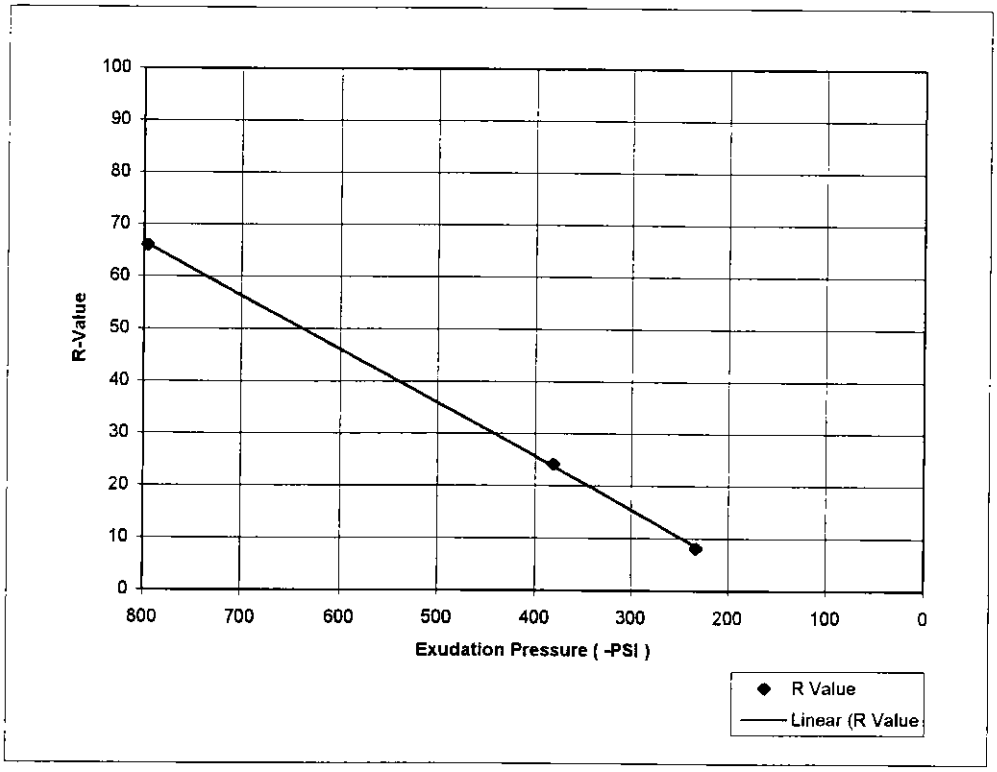
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#4 @ 1-3

Sample No.:	A	B	C
Moisture Content (%)	12.2	10.5	9.6
Dry Density (pcf)	122.7	126.8	129.4
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	233	381	796
R Value	8	24	66

R VALUE AT 300 psi = 16



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	98	96	88	75	51	42	33.5

Atterberg Limits: LL: 32 PI: 16

ASTM Classification : (SC)
AASHTO Classification: A-2-6

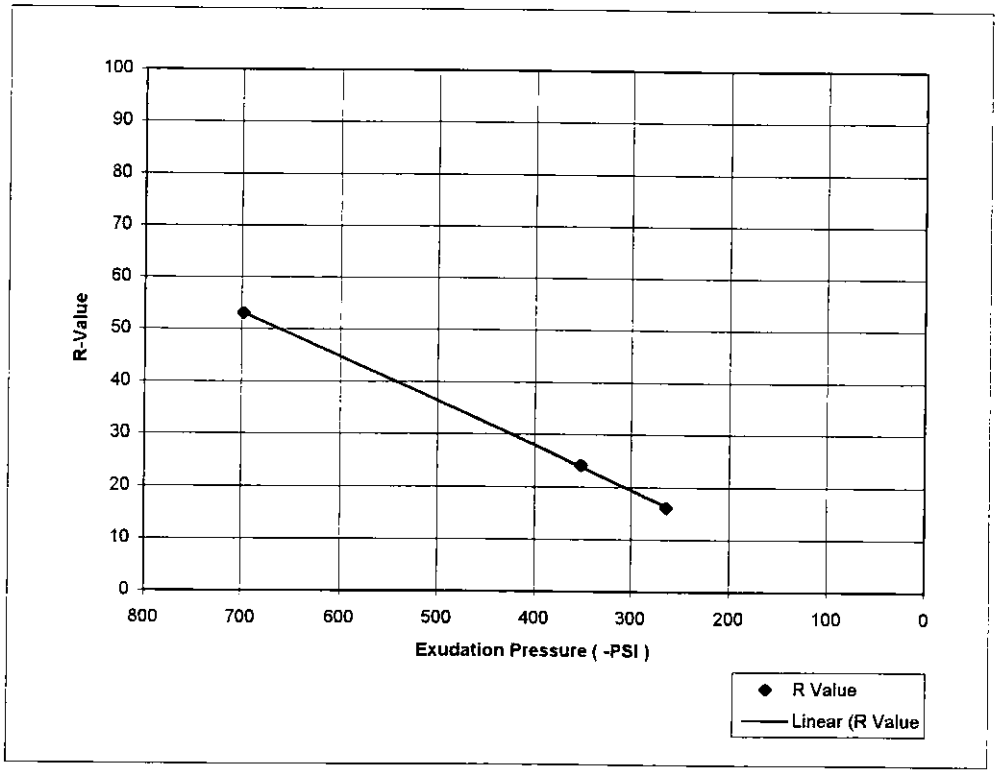
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#5 @ 1-3

Sample No.:	A	B	C
Moisture Content (%)	9.5	8.7	7.8
Dry Density (pcf)	129.3	131.6	132.9
Expansion Pressure (psi)	0.0	0.0	0.3
Exudation Pressure (psi)	264	352	698
R Value	16	24	53

R VALUE AT 300 psi = 19



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	99	98	93	83	55	42	31

Atterberg Limits: LL: 28 PI: 16

ASTM Classification : (SC)
AASHTO Classification: A-2-6

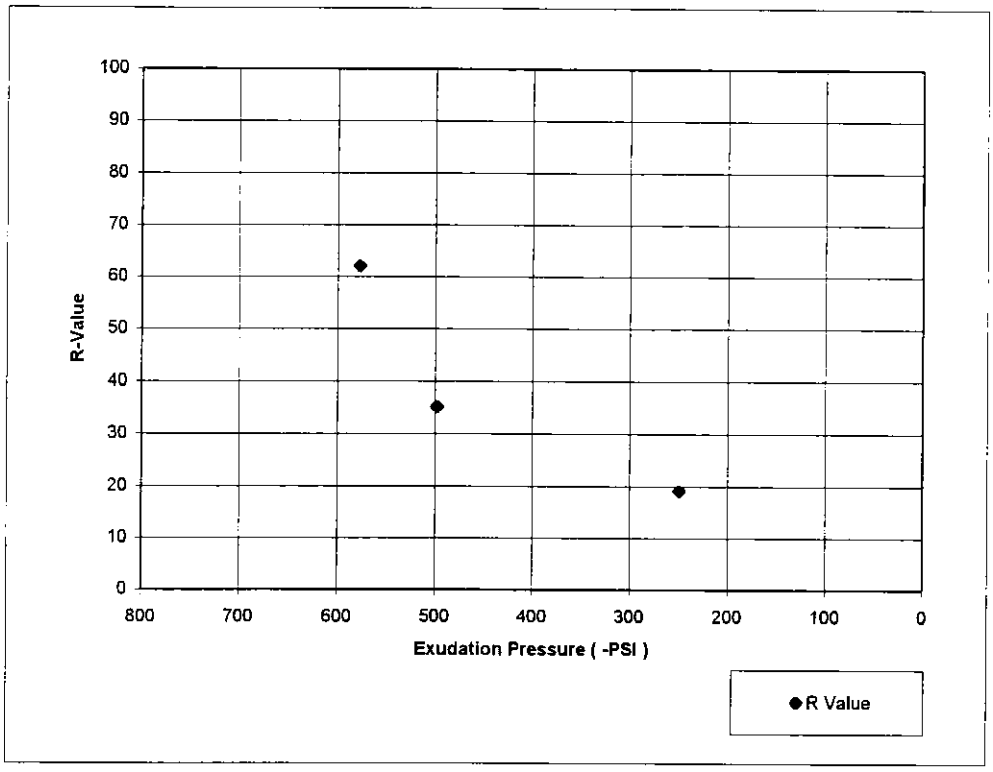
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#6 @ 1-4

Sample No.:	A	B	C
Moisture Content (%)	11.3	10.4	9.6
Dry Density (pcf)	126.0	128.8	130.7
Expansion Pressure (psi)	0.0	0.4	1.8
Exudation Pressure (psi)	249	498	577
R Value	19	35	62

R VALUE AT 300 psi = 23



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
98	94	92	87	74	46	35	26.9

Atterberg Limits: LL: 31 ASTM Classification : (SC)
PI: 17 AASHTO Classification: A-2-6

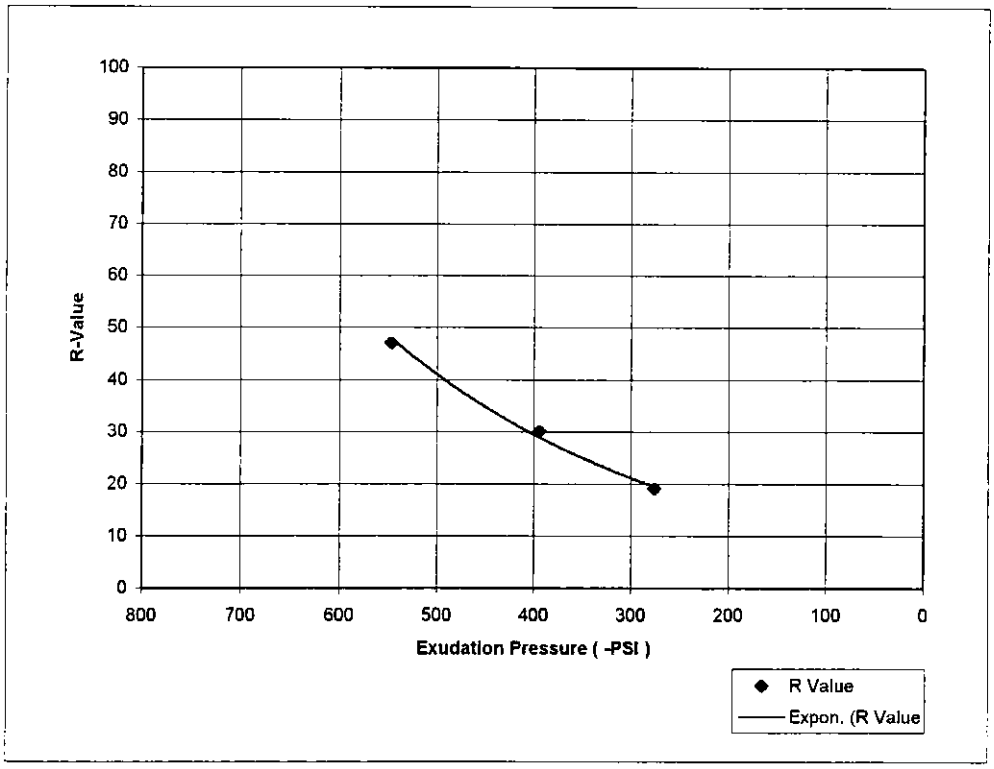
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#7 @ 1-4

Sample No.:	A	B	C
Moisture Content (%)	13.8	12.9	12.0
Dry Density (pcf)	119.1	120.8	122.4
Expansion Pressure (psi)	1.6	1.8	2.2
Exudation Pressure (psi)	276	394	547
R Value	19	30	47

R VALUE AT 300 psi = 21



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	99	95	86	66	56	44.3

Atterberg Limits: LL: 30 PI: 14

ASTM Classification : (SC)
AASHTO Classification: A-6

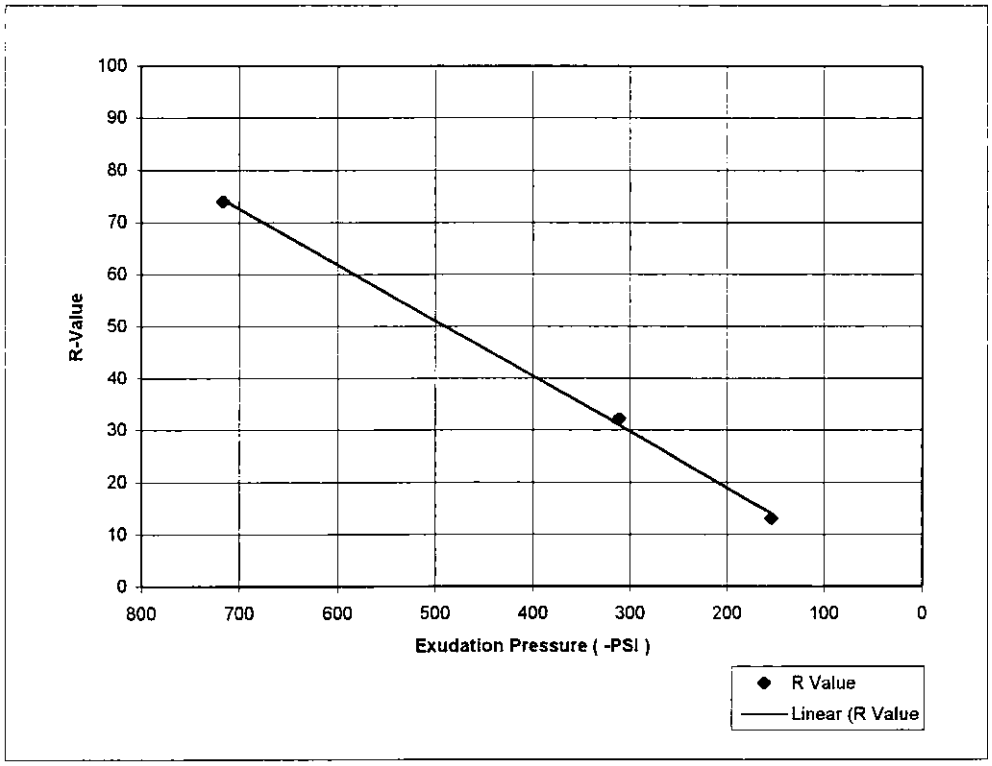
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#8 @ 1-3

Sample No.:	A	B	C
Moisture Content (%)	10.0	9.1	8.2
Dry Density (pcf)	130.7	132.9	133.8
Expansion Pressure (psi)	0.0	0.0	0.3
Exudation Pressure (psi)	154	311	717
R Value	13	32	74

R VALUE AT 300 psi = 30



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	92	89	82	71	40	26	18.2

Atterberg Limits: LL: 21 ASTM Classification : (SC-SM) g
PI: 6 AASHTO Classification: A-2-4

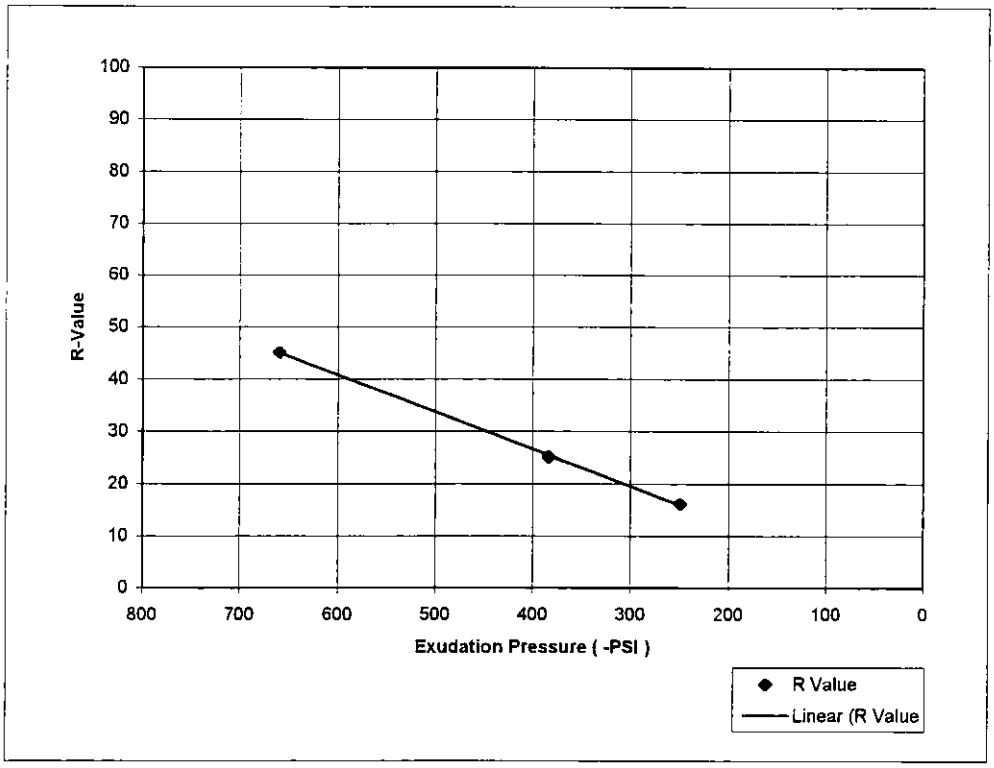
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#9 @ 3-5

Sample No.:	A	B	C
Moisture Content (%)	15.9	15.0	14.0
Dry Density (pcf)	118.2	115.6	117.4
Expansion Pressure (psi)	0.0	0.0	2.9
Exudation Pressure (psi)	249	384	659
R Value	16	25	45

R VALUE AT 300 psi = 19



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	100	98	91	69	57	43.5

Atterberg Limits: LL: 39 ASTM Classification : (SC)
PI: 22 AASHTO Classification: A-6

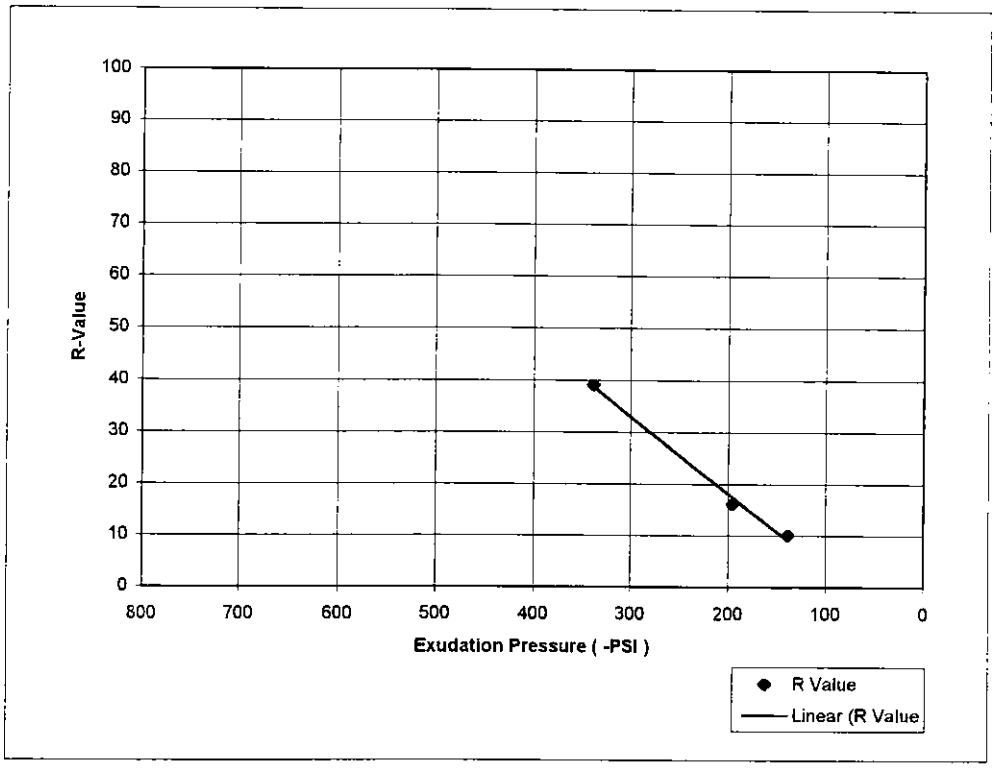
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#10 @ 1-5

Sample No.:	A	B	C
Moisture Content (%)	10.1	9.2	8.4
Dry Density (pcf)	126.4	129.6	130.3
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	139	195	339
R Value	10	16	39

R VALUE AT 300 psi = 33



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	97	95	86	75	50	38	27.5

Atterberg Limits: LL: 26 PI: 10

ASTM Classification : (SC)
AASHTO Classification: A-2-4

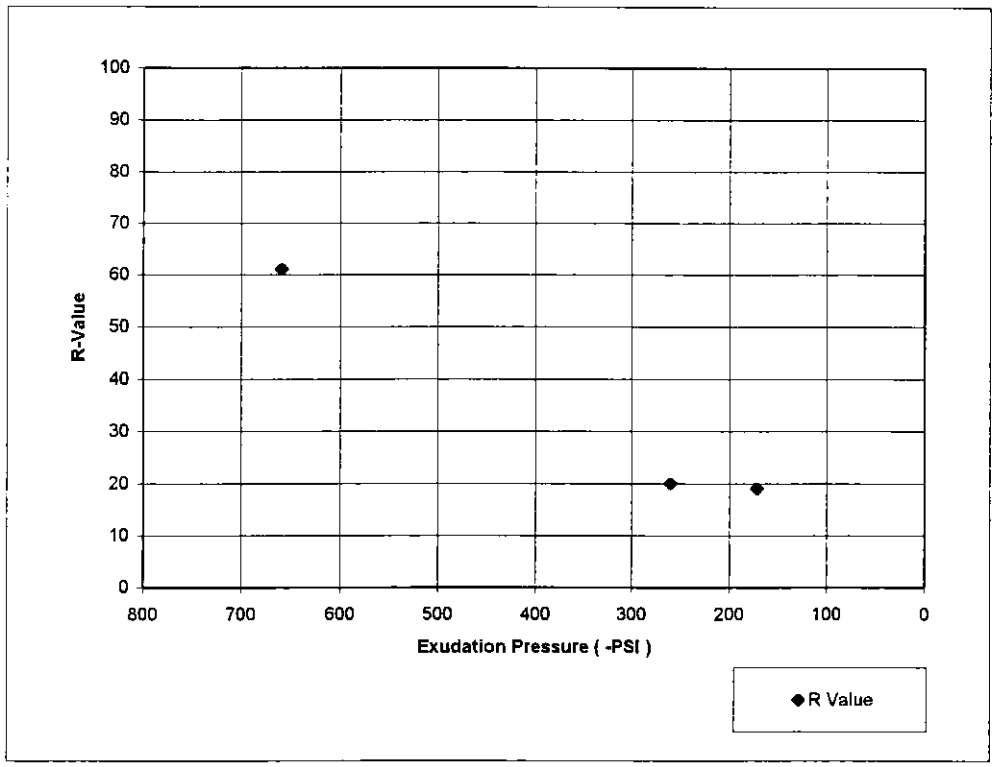
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#11/12 @ 1-3

Sample No.:	A	B	C
Moisture Content (%)	9.9	9.0	8.1
Dry Density (pcf)	130.7	131.1	133.0
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	171	260	659
R Value	19	20	61

R VALUE AT 300 psi = 24



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	99	96	91	79	45	33	24.5

Atterberg Limits: LL: 29 ASTM Classification : (SC)
PI: 14 AASHTO Classification: A-2-6

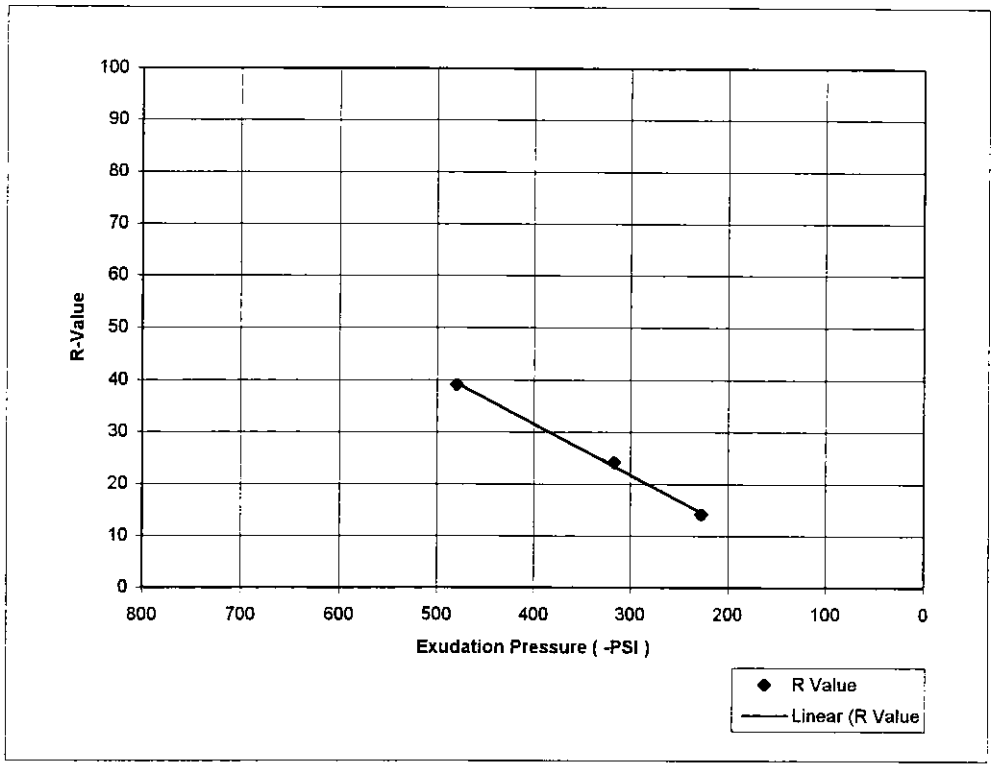
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#13 @ 2-4

Sample No.:	A	B	C
Moisture Content (%)	11.0	10.1	9.2
Dry Density (pcf)	126.3	127.7	131.0
Expansion Pressure (psi)	0.0	0.0	0.4
Exudation Pressure (psi)	227	317	480
R Value	14	24	39

R VALUE AT 300 psi = 22



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	99	99	96	86	56	43	33.7

Atterberg Limits: LL: 31 PI: 17

ASTM Classification : (SC)
AASHTO Classification: A-2-6

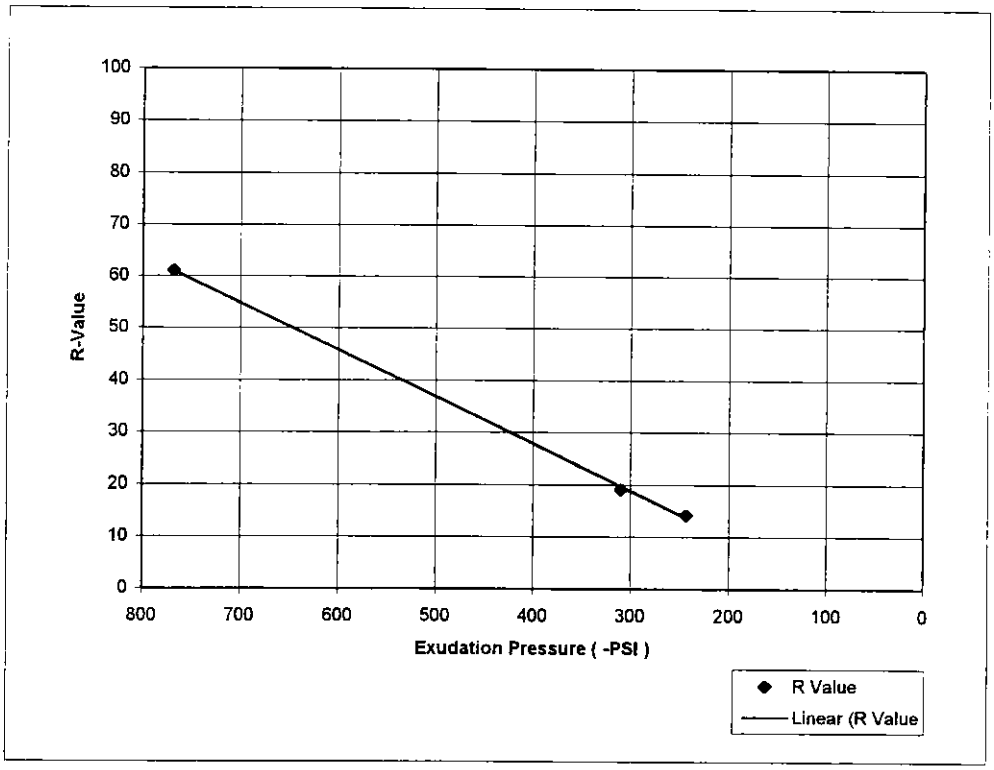
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#14/15 @ 3-5

Sample No.:	A	B	C
Moisture Content (%)	11.3	10.4	9.6
Dry Density (pcf)	124.6	126.8	130.1
Expansion Pressure (psi)	0.0	0.4	2.2
Exudation Pressure (psi)	243	310	768
R Value	14	19	61

R VALUE AT 300 psi = 19



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	99	95	85	62	50	39.3

Atterberg Limits: LL: 35 ASTM Classification : (SC)
PI: 17 AASHTO Classification: A-6

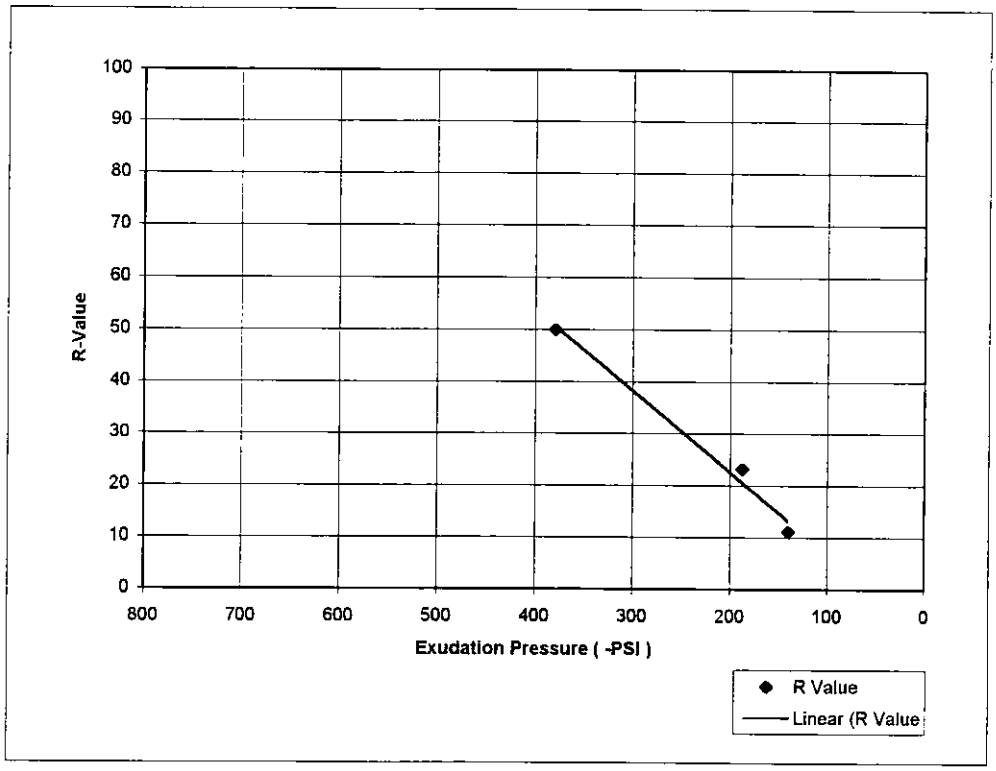
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#16/17 @ 1-3

Sample No.:	A	B	C
Moisture Content (%)	10.1	9.2	7.4
Dry Density (pcf)	129.8	130.5	133.9
Expansion Pressure (psi)	0.0	0.0	0.3
Exudation Pressure (psi)	140	187	379
R Value	11	23	50

R VALUE AT 300 psi = 39



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
99	94	91	84	74	49	36	26.5

Atterberg Limits: LL: 23 PI: 8

ASTM Classification : (SC) g
AASHTO Classification: A-2-4

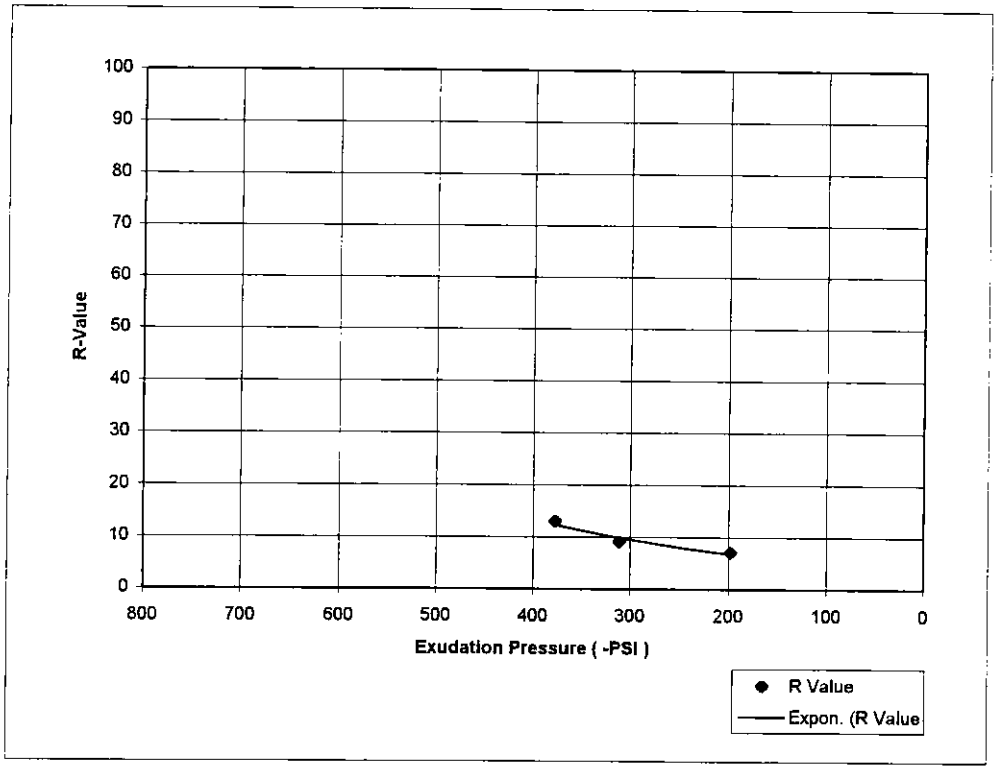
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#18 @ 1.5-5

Sample No.:	A	B	C
Moisture Content (%)	19.0	17.3	15.9
Dry Density (pcf)	109.0	111.7	114.1
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	198	311	377
R Value	7	9	13

R VALUE AT 300 psi = 9



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	100	99	96	83	71	53.6

Atterberg Limits: LL: 45 PI: 35

ASTM Classification : CL
AASHTO Classification: A-7-6

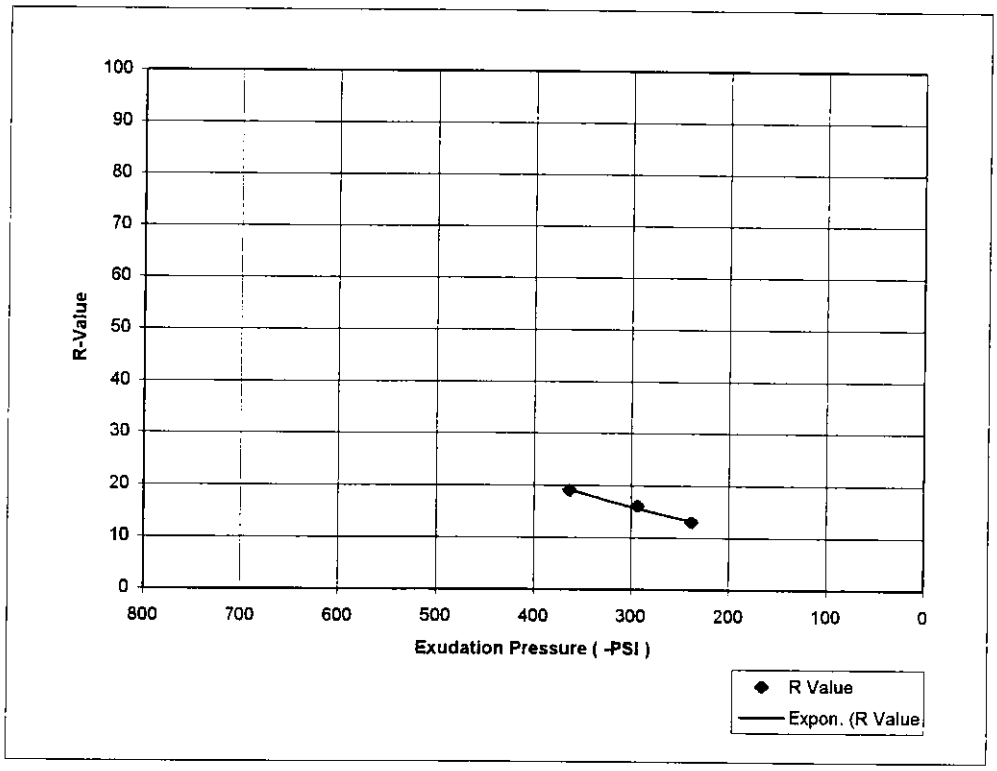
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#19 @ 1-5

Sample No.:	A	B	C
Moisture Content (%)	13.1	12.3	11.4
Dry Density (pcf)	114.4	118.3	119.9
Expansion Pressure (psi)	0.0	0.1	0.8
Exudation Pressure (psi)	238	294	364
R Value	13	16	19

R VALUE AT 300 psi = 16



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	99	98	94	83	75	62.6

Atterberg Limits: LL: 39 PI: 28

ASTM Classification : CL
AASHTO Classification: A-6

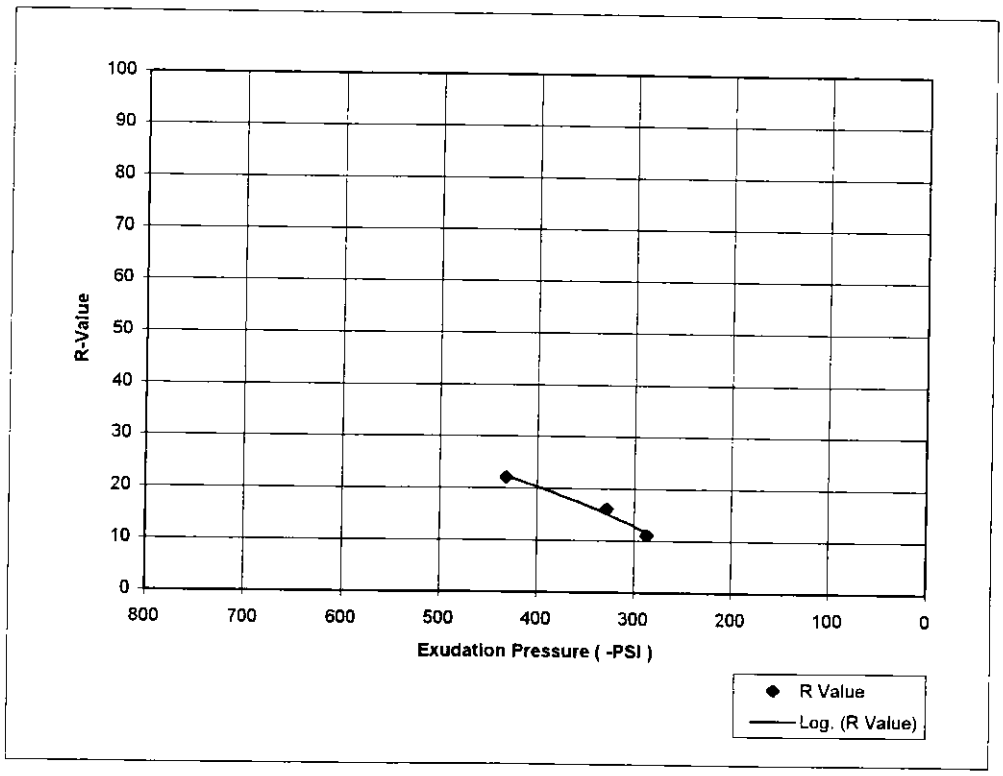
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#20 @ 1-5

Sample No.:	A	B	C
Moisture Content (%)	13.1	12.3	11.4
Dry Density (pcf)	114.4	116.2	118.6
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	287	329	432
R Value	11	16	22

R VALUE AT 300 psi = 23



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
99	99	99	97	93	85	79	69.3

Atterberg Limits: LL: 37 PI: 17

ASTM Classification : CL
AASHTO Classification: A-6

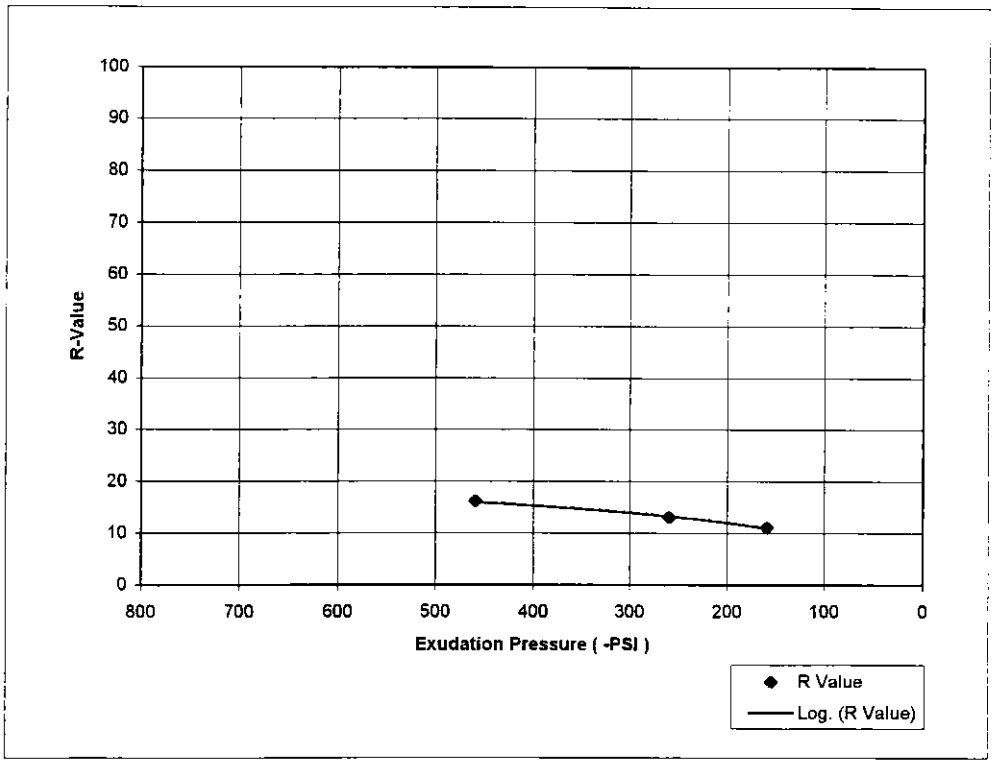
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#21 @ 1.5-5

Sample No.:	A	B	C
Moisture Content (%)	18.4	17.5	16.5
Dry Density (pcf)	108.2	111.1	114.4
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	159	259	459
R Value	11	13	16

R VALUE AT 300 psi = 14



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	100	98	93	82	74	63.3

Atterberg Limits: LL: 45 PI: 25

ASTM Classification : CL
AASHTO Classification: A-7-6

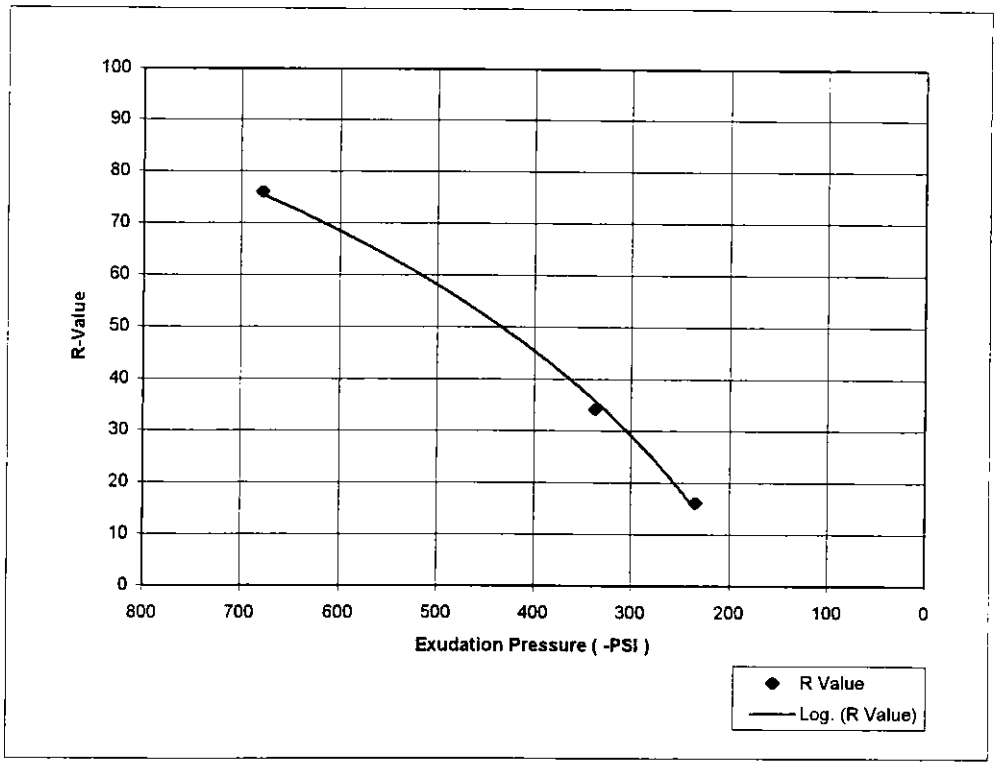
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#22 @ 2-6

Sample No.:	A	B	C
Moisture Content (%)	15.3	13.4	12.5
Dry Density (pcf)	114.6	118.1	121.3
Expansion Pressure (psi)	0.0	0.7	3.1
Exudation Pressure (psi)	234	338	678
R Value	16	34	76

R VALUE AT 300 psi = 28



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
98	95	92	85	76	59	34	31.7

Atterberg Limits: LL: 27 PI: 10

ASTM Classification : (SC) g
AASHTO Classification: A-2-4

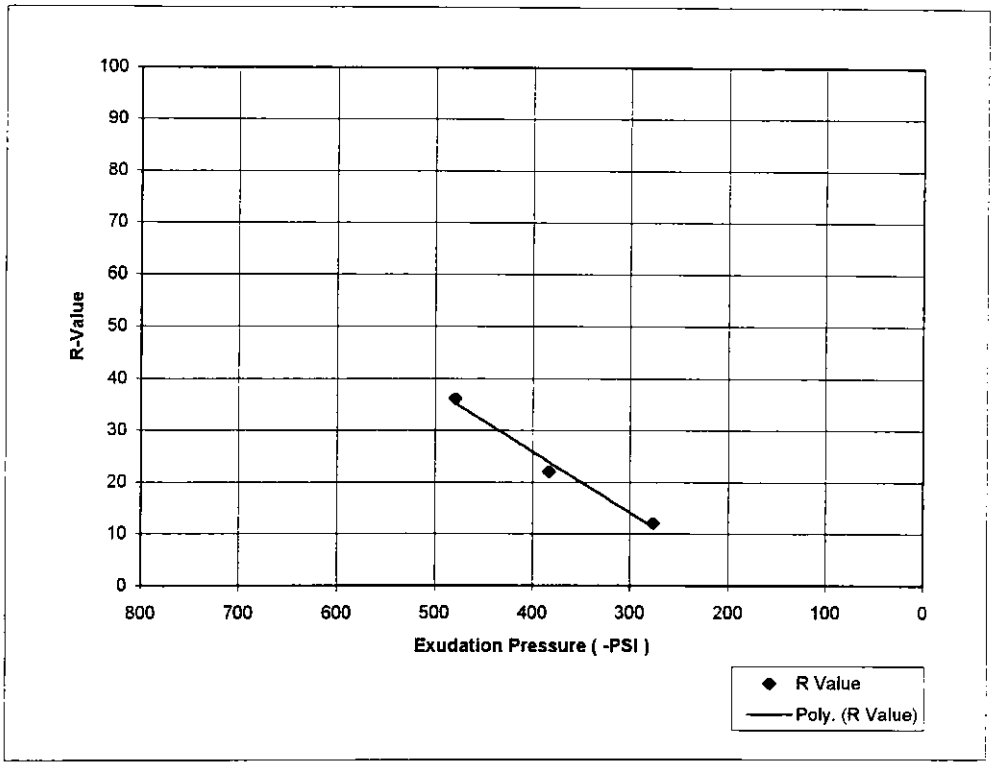
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#23 @ 1.5-5

Sample No.:	A	B	C
Moisture Content (%)	18.3	16.5	15.6
Dry Density (pcf)	111.4	113.5	115.5
Expansion Pressure (psi)	0.0	0.0	0.3
Exudation Pressure (psi)	276	383	479
R Value	12	22	36

R VALUE AT 300 psi = 16



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	98	95	91	80	71	53.6

Atterberg Limits: LL: 39 ASTM Classification : CL
PI: 22 AASHTO Classification: A-6

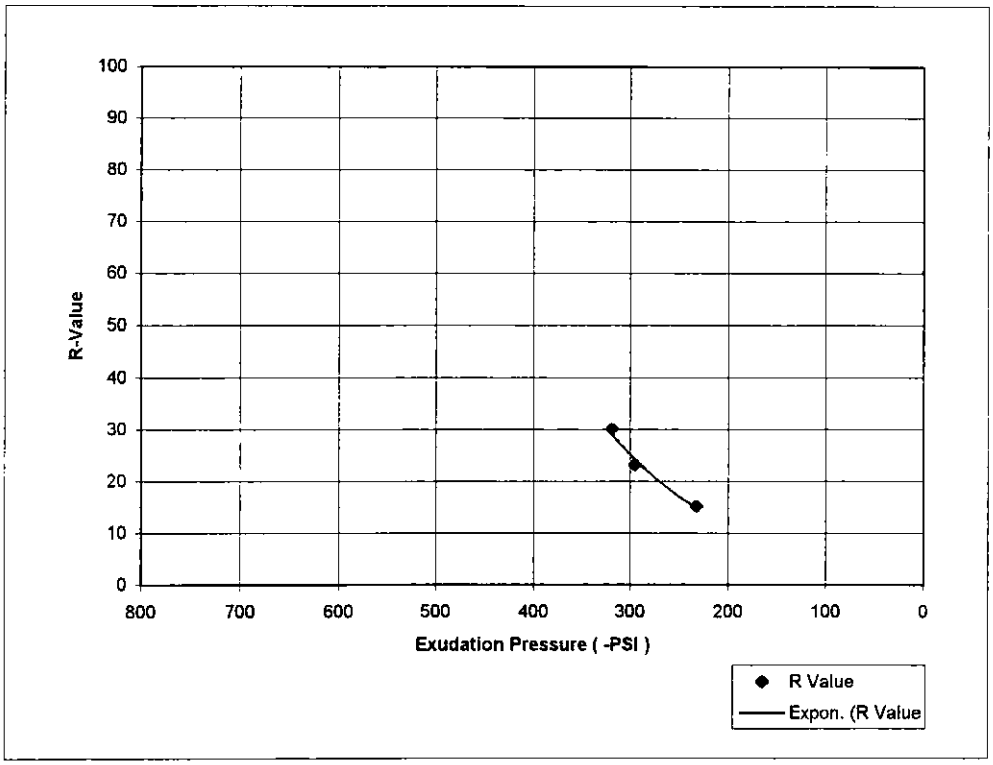
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#24/25 @ 1-3.5/1-4

Sample No.:	A	B	C
Moisture Content (%)	16.0	13.6	12.8
Dry Density (pcf)	118.0	120.9	121.6
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	232	295	319
R Value	15	23	30

R VALUE AT 300 psi = 23



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
99	97	97	92	83	62	48	37.4

Atterberg Limits: LL: 35 ASTM Classification : (SC)
PI: 22 AASHTO Classification: A-6

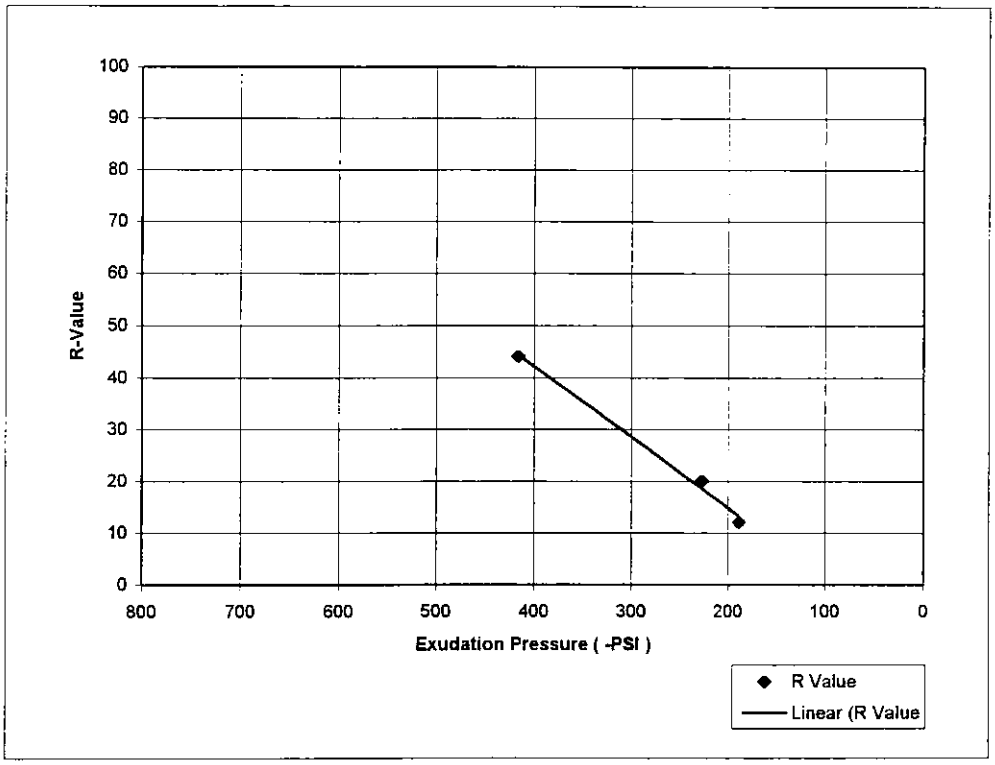
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#26 @ 1-5

Sample No.:	A	B	C
Moisture Content (%)	18.1	17.1	15.3
Dry Density (pcf)	110.4	111.9	115.7
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	188	227	416
R Value	12	20	44

R VALUE AT 300 psi = 29



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	99	95	89	72	58	39.9

Atterberg Limits: LL: 38 ASTM Classification : (SC)
PI: 22 AASHTO Classification: A-6

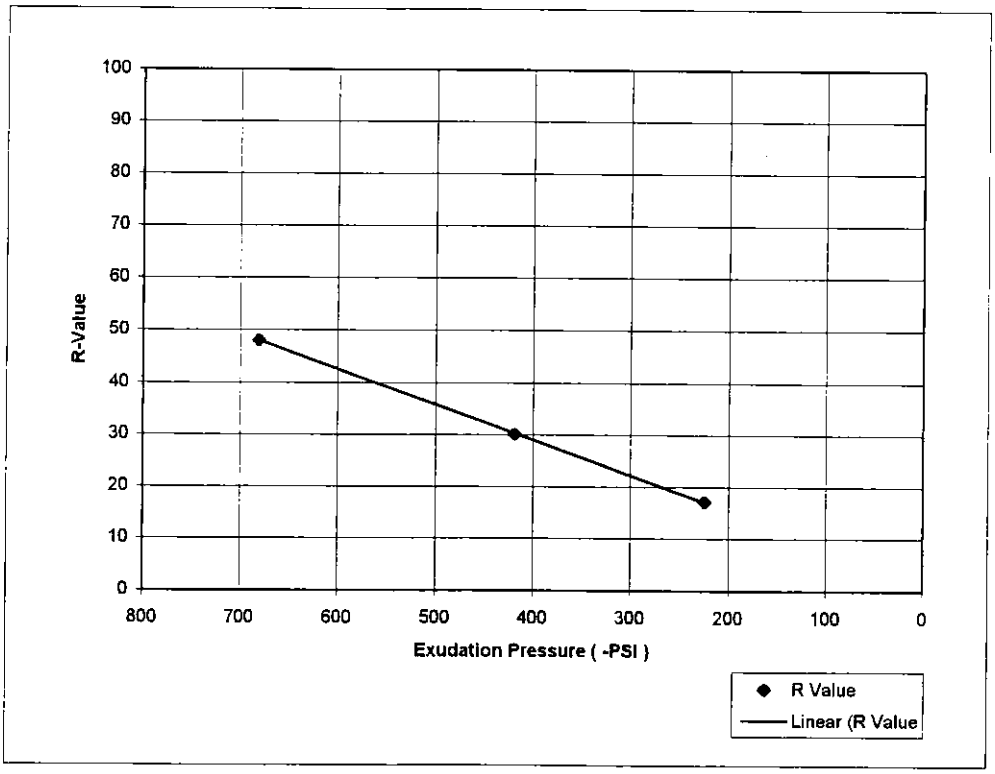
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#27/28 @ 1-5/2-4

Sample No.:	A	B	C
Moisture Content (%)	14.4	12.6	11.7
Dry Density (pcf)	117.5	120.5	123.6
Expansion Pressure (psi)	0.0	0.0	1.0
Exudation Pressure (psi)	224	419	681
R Value	17	30	48

R VALUE AT 300 psi = 22



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	99	97	91	82	63	53	43.2

Atterberg Limits: LL: 33 PI: 17

ASTM Classification : (SC)
AASHTO Classification: A-6

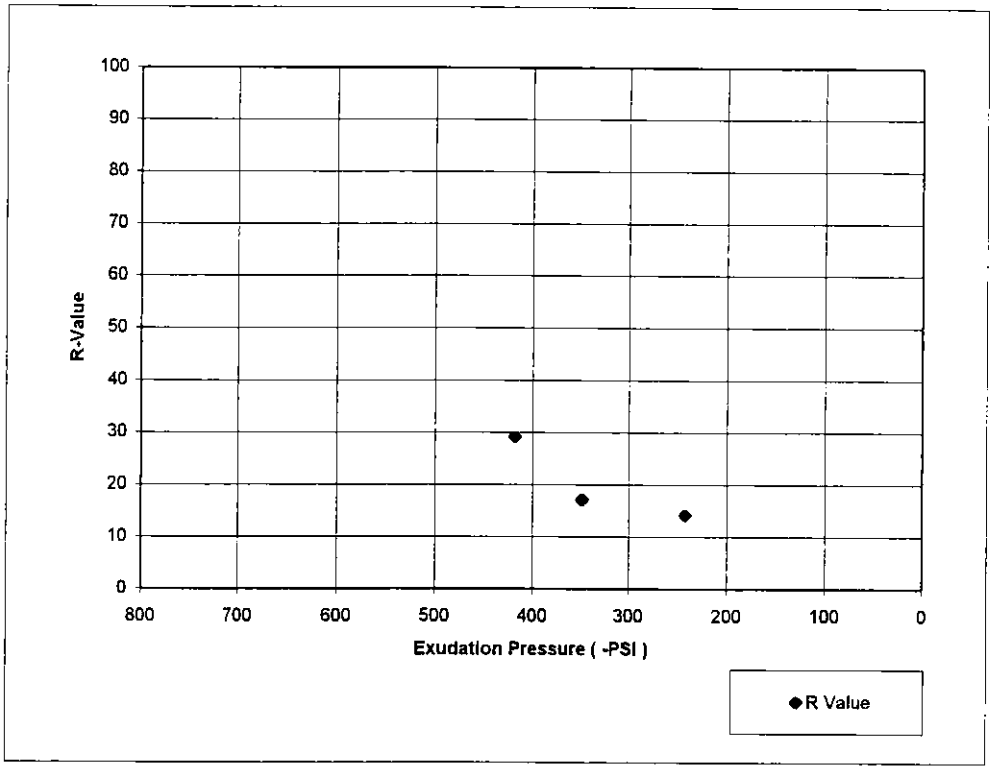
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#29 @ 2-5

Sample No.:	A	B	C
Moisture Content (%)	15.6	14.7	13.8
Dry Density (pcf)	115.1	115.0	117.5
Expansion Pressure (psi)	0.0	0.1	0.4
Exudation Pressure (psi)	242	349	418
R Value	14	17	29

R VALUE AT 300 psi = 15



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
95	94	93	87	78	61	49	39.2

Atterberg Limits: LL: 35 PI: 19

ASTM Classification : (SC)
AASHTO Classification: A-6

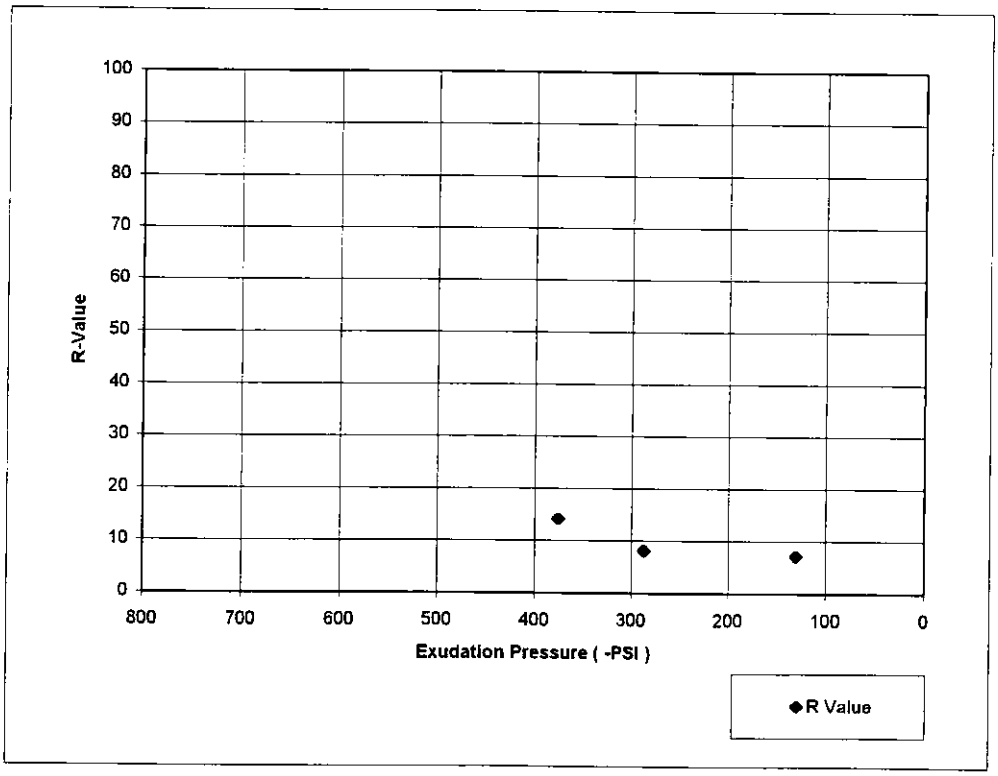
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#30 @ 1-5

Sample No.:	A	B	C
Moisture Content (%)	18.0	16.2	14.4
Dry Density (pcf)	110.1	113.4	117.0
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	130	287	376
R Value	7	8	14

R VALUE AT 300 psi = 9



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	98	95	88	69	59	44.7

Atterberg Limits: LL: 35 PI: 20

ASTM Classification : (SC)
AASHTO Classification: A-6

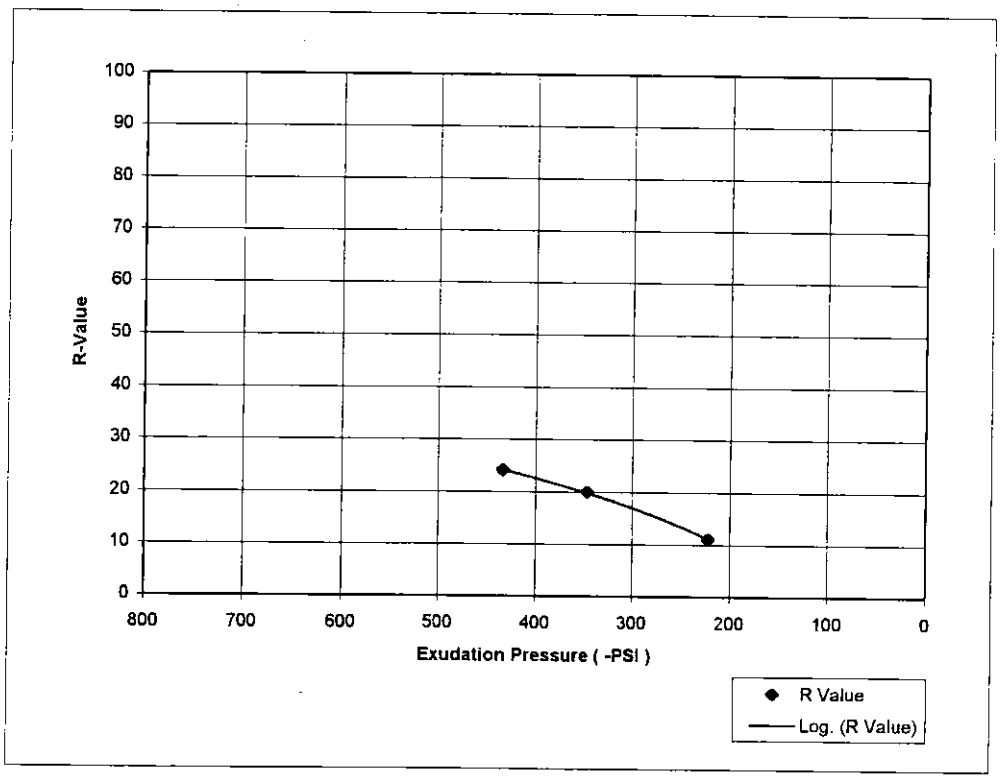
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#31 @ 1-4.5

Sample No.:	A	B	C
Moisture Content (%)	14.4	13.5	12.6
Dry Density (pcf)	119.2	120.1	121.9
Expansion Pressure (psi)	0.0	0.0	0.0
Exudation Pressure (psi)	222	347	434
R Value	11	20	24

R VALUE AT 300 psi = 17



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	100	100	98	93	79	67	51.6

Atterberg Limits: LL: 40 PI: 25

ASTM Classification : CL
AASHTO Classification: A-6

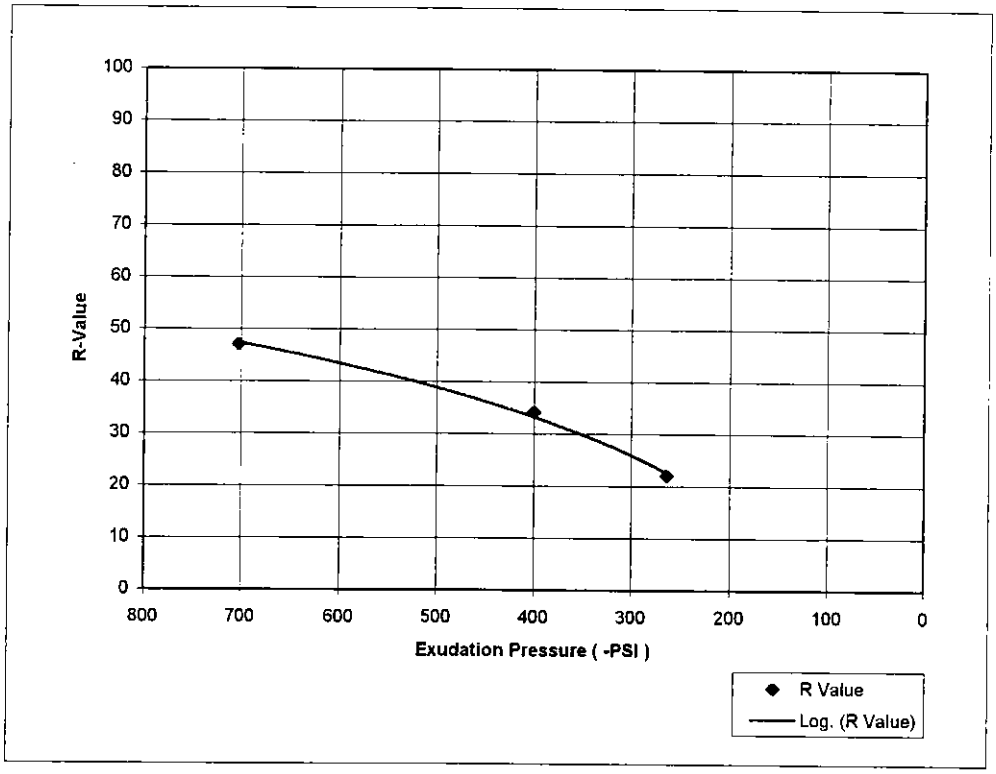
VINYARD & ASSOCIATES, INC.

R-VALUE TEST RESULTS

Client : Parsons Brinkerhoff Inc
Project : Cerrillos Road Improvements
Project No.: 99-1-299
Location : TB#32 @ 2-5

Sample No.:	A	B	C
Moisture Content (%)	14.1	13.2	12.3
Dry Density (pcf)	118.9	120.2	122.2
Expansion Pressure (psi)	0.0	0.7	1.8
Exudation Pressure (psi)	264	400	703
R Value	22	34	47

R VALUE AT 300 psi = 24



Sieve Analysis

3/4"	1/2"	3/8"	#4	#10	#40	#80	#200
100	99	98	94	87	70	60	45.6

Atterberg Limits: LL: 33 PI: 18

ASTM Classification : (SC)
AASHTO Classification: A-6

APPENDIX B

DESIGN COMPUTATIONS

Cerillos Road
Airport Road to Richards Avenue

Street Classification	Major Arterial
Traffic Lanes Each Direction	3
2020 AWDT	22250
% Traffic In Design Lane	70%
Traffic In Design Lane	15575

	Traffic Distribution	ESAL Factor
Single Unit Trucks	3.00%	0.189
Single Trailer Trucks	1.00%	2.3719
Multi Trailer Trucks	1.00%	2.3187
Automobile	74.00%	0.0008
Other 4 Wheel	20.00%	0.0087
Bus (Estimated)	1.00%	0.6808

Design Life - Years = 20

ESAL = 15575*20*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 7016955

EDLA= 961

Cerillos Road
Richards Avenue to St. Michaels

Street Classification	Major Arterial
Traffic Lanes Each Direction	3
2020 AWDT	25540
% Traffic In Design Lane	70%
Traffic In Design Lane	17878

	Traffic Distribution	ESAL Factor
Single Unit Trucks	3.00%	0.189
Single Trailer Trucks	1.00%	2.3719
Multi Trailer Trucks	1.00%	2.3187
Automobile	74.00%	0.0008
Other 4 Wheel	20.00%	0.0087
Bus (Estimated)	1.00%	0.6808

Design Life - Years = 20

ESAL = 25540*20*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 8054518

EDLA= 1103

Cerillos Road
St. Michaels to St. Francis

Street Classification	Major Arterial
Traffic Lanes Each Direction	2
2020 AWDT	20760
% Traffic In Design Lane	90%
Traffic In Design Lane	18684

	Traffic Distribution	ESAL Factor
Single Unit Trucks	3.00%	0.189
Single Trailer Trucks	1.00%	2.3719
Multi Trailer Trucks	1.00%	2.3187
Automobile	74.00%	0.0008
Other 4 Wheel	20.00%	0.0087
Bus (Estimated)	1.00%	0.6808

Design Life - Years = 20

ESAL = 18684*20*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 8417643

EDLA= 1153

SERVICEABILITY INDEX (P_t) = 2.0

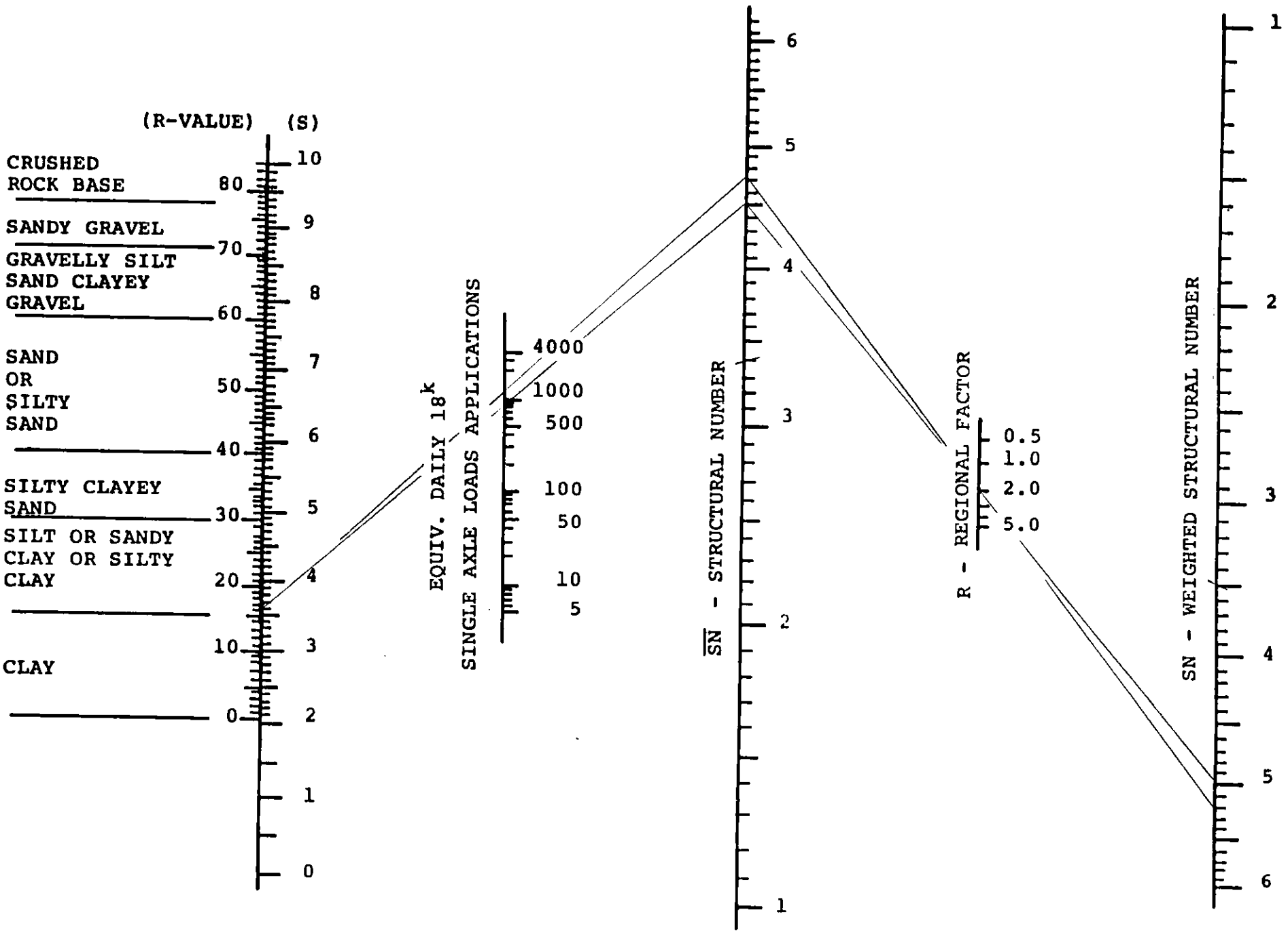


CHART NO. 2

Revised 10-65

SHEET NO. 1 OF 1

FIGURE 23.4.3 - STRUCTURAL DESIGN COMPUTATION FORM

PROJECT NAME: CERRILLOS RD
PROJECT NO. : 99-1-299
DESIGN ADL
DESIGN SN 5.0

STREET: CERRILLOS RD
FROM: AIRPORT
TO: RICHARDS
COMPUTED BY: MJ

Alternate	Subbase	CTB	BTB	ABC	AC	PMSC	SN
A	x(.08)=	x(.2)=	x(.25)=	x(.1)=	x(.42)=	x(.25)=	
B	16(.08)			12(.1)	6(.42)		5.0
C	13(.08)		6(.25)		6(.42)		5.06
D							
E							
F							

Design SN _____

Rev. 5/92

FIGURE 23.4.3 - STRUCTURAL DESIGN COMPUTATION FORM

PROJECT NAME: Cerrillos Rd.
PROJECT NO. : 99-1-299
DESIGN ADL
DESIGN SN 5.2

STREET: Cerrillos Rd
FROM: Richards
TO: St. Francis
COMPUTED BY: MJ

Alternate	Subbase	CTB	BTB	ABC	AC	PMSC	SN
A	x(.08)=	x(.2)=	x(.25)=	x(.1)=	x(.42)=	x(.25)=	
B	18(.08)			12(.1)	6(.42)		5.16
C	15(.08)		6(.25)		6(.42)		5.22
D							
E							
F							

Design SN _____

Cerillos Road
Intersection of Cerrillos Road
and Richards Avenue

Street Classification	Major Arterial
Traffic Lanes Each Direction	3
2020 AWDT (Includes cross traffic)	32120
% Traffic In Design Lane	70%
Traffic In Design Lane	22484

	Traffic Distribution	ESAL Factor
Single Unit Trucks	3.00%	0.189
Single Trailer Trucks	1.00%	2.3719
Multi Trailer Trucks	1.00%	2.3187
Automobile	74.00%	0.0008
Other 4 Wheel	20.00%	0.0087
Bus (Estimated)	1.00%	0.6808

Design Life - Years = 20

ESAL = 22484*20*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 10129645

EDLA= 1388

Design Life - Years = 30

ESAL = 22484*30*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 15194467

EDLA= 1388

11-20-1999

State: New Mexico
Agency: NMSHTD & City of Santa F
Company: Parsons Brinckerhoff
Contractor: Vinyard & Assoc.
Engineer: MV

Job Number: 99-1-299

Location: Intersection of Cerrillo and Richards Av.
20 Year Design Life

========== Rigid Analysis ==========

Pavement Depth	=	9.09	inches
Design E 18's	=	10,129,645	
Reliability	=	90.00	percent
Overall Deviation	=	0.35	
Modulus of Rupture	=	630.0	psi
Modulus of Elasticity	=	4,252,500	psi
Load Transfer, J	=	3.40	
Mod. of Subgrade Reaction	=	513	psi/in
Drainage Coefficient	=	1.15	
Initial Serviceability	=	4.50	
Terminal Serviceability	=	2.50	

For k determination:

- Resilient Mod. Subgrade	=	3,753	psi
- Resilient Mod. Base	=	1,000,000	psi
- Base Thickness	=	8.0	inches
- Depth to Rigid Foundation	=	∞	> 10 feet
- Loss of Support Value	=	0	

11-20-1999

State: New Mexico
Agency: NMSHTD & City of Santa F
Company: Parsons Brinckerhoff
Contractor: Vinyard & Assoc.
Engineer: MV

Job Number: 99-1-299

Location: Intersection of Cerrillo and Richards Av.
30 Year Design Life

========== Rigid Analysis ==========

Pavement Depth	=	9.75	inches
Design E 18's	=	15,194,467	
Reliability	=	90.00	percent
Overall Deviation	=	0.35	
Modulus of Rupture	=	630.0	psi
Modulus of Elasticity	=	4,252,500	psi
Load Transfer, J	=	3.40	
Mod. of Subgrade Reaction	=	513	psi/in
Drainage Coefficient	=	1.15	
Initial Serviceability	=	4.50	
Terminal Serviceability	=	2.50	

For k determination:

- Resilient Mod. Subgrade	=	3,753	psi
- Resilient Mod. Base	=	1,000,000	psi
- Base Thickness	=	8.0	inches
- Depth to Rigid Foundation	=	∞	> 10 feet
- Loss of Support Value	=	0	

Cerillos Road
Intersection of Cerrillos Road
and St. Francis

Street Classification	Major Arterial
Traffic Lanes Each Direction	2
2020 AWDT (Includes cross traffic)	37270
% Traffic In Design Lane	90%
Traffic In Design Lane	33543

	Traffic Distribution	ESAL Factor
Single Unit Trucks	3.00%	0.189
Single Trailer Trucks	1.00%	2.3719
Multi Trailer Trucks	1.00%	2.3187
Automobile	74.00%	0.0008
Other 4 Wheel	20.00%	0.0087
Bus (Estimated)	1.00%	0.6808

Design Life - Years = 20

ESAL = 22484*20*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 15112020

EDLA= 2070

Design Life - Years = 30

ESAL = 22484*30*365*(.03*.189+.01*2.3719+.01*2.3187+.74*.0008+.2*.0087+.01*.6808)

ESAL= 22668031

EDLA= 2070

11-20-1999

State: New Mexico
Agency: NMSHTD & City of Santa F
Company: Parsons Brinckerhoff
Contractor: Vinyard & Assoc.
Engineer: MV

Job Number: 99-1-299

Location: Intersection of Cerrillo and St. Francis
20 Year Design Life

========== Rigid Analysis ==========

Pavement Depth	=	9.74	inches
Design E 18's	=	15,112,020	
Reliability	=	90.00	percent
Overall Deviation	=	0.35	
Modulus of Rupture	=	630.0	psi
Modulus of Elasticity	=	4,252,500	psi
Load Transfer, J	=	3.40	
Mod. of Subgrade Reaction	=	513	psi/in
Drainage Coefficient	=	1.15	
Initial Serviceability	=	4.50	
Terminal Serviceability	=	2.50	

For k determination:

- Resilient Mod. Subgrade	=	3,753	psi
- Resilient Mod. Base	=	1,000,000	psi
- Base Thickness	=	8.0	inches
- Depth to Rigid Foundation	=	∞	> 10 feet
- Loss of Support Value	=	0	

11-20-1999

State: New Mexico
Agency: NMSHTD & City of Santa F
Company: Parsons Brinckerhoff
Contractor: Vinyard & Assoc.
Engineer: MV

Job Number: 99-1-299

Location: Intersection of Cerrillo and St. Francis
30 Year Design Life

========== Rigid Analysis ==========

Pavement Depth	=	10.43	inches
Design E 18's	=	22,668,030	
Reliability	=	90.00	percent
Overall Deviation	=	0.35	
Modulus of Rupture	=	630.0	psi
Modulus of Elasticity	=	4,252,500	psi
Load Transfer, J	=	3.40	
Mod. of Subgrade Reaction	=	513	psi/in
Drainage Coefficient	=	1.15	
Initial Serviceability	=	4.50	
Terminal Serviceability	=	2.50	

For k determination:

- Resilient Mod. Subgrade	=	3,753	psi
- Resilient Mod. Base	=	1,000,000	psi
- Base Thickness	=	8.0	inches
- Depth to Rigid Foundation	=	∞	> 10 feet
- Loss of Support Value	=	0	