November 3, 2023
File: 502.302cltr.doc

Monahan Pacific Corporation
1101 Fifth Avenue, Suite 300
San Rafael, CA 94901

Attn: Mr. Collin Monahan

Re: Geotechnical Site Plan Review
Cotati Village
Cotati, California

Introduction

This letter presents our opinion regarding the revised site plan[1]. for the Cotati Village project in Cotati, California. We understand the site plan was modified slightly from its original orientation. The shifting of proposed building and road locations on the property does not impact the recommendations we have provided to date. Additionally, the pavement sections provided in our letter report dated April 24, 2017 were originally provided assuming a lime treated subgrade. However, we provided revised pavement sections in this report for un-treated soils. These pavement sections were provided in handwritten "redlines". These values remain valid for the project. We hope this provides you with the information you require at this time. Please do not hesitate to contact us with any questions.

Sincerely,
MILLER PACIFIC ENGINEERING GROUP

Benjamin S. Pappas
Geotechnical Engineer No. 2786
(Expires 9/30/24)

[1] Tachtenberg Architects, "Cotati Village Community," Progress Plan, October 23, 2023.

December 16, 2021
File: 502.11dltr.doc

Monahan Pacific Construction Corp.
1101 Fifth Avenue, Suite 300
San Rafael, California 94901
Attn: Mr. Collin Monahan

Re: Pavement Recommendation for
8239 Highway 116
Cotati, California

Following discussions with you, we understand the planned pavement improvements for the proposed Cotati Village development will commence in early 2022. The site is located at 8239 Highway 116 in Cotati, California. We previously provided a pavement recommendation letter dated August 24, 2007, which provided lime treatment recommendations and asphalt sections for various traffic indices. It is our opinion the recommendations and asphalt sections provided in our previous report remain valid.

We hope this provides you with the information you require at this time. Please do not hesitate to contact us with any questions or concerns.

Very truly yours,
MILLER PACIFIC ENGINEERING GROUP

Benjamin S. Pappas
Geotechnical Engineer No. 2786
(Expires 9/30/22)

1333 N. McDowell Blvd, Suite C, Petaluma, California 94954
phone 707-765-6140 / fax 707-765-6222

Miller Pacific
ENGINEERING GROUP

504 Redwood Blvd.
Suite 220
Novato, California 94947
T 415 / 382-3444
F 415 / 382-3450

August 24, 2007
File: 502-11bltr.doc

Monahan Pacific Construction Corp.
1101 Fifth Avenue, Suite 300
San Rafael, CA 94901
Attn: Mr. Doug Eikenbary

Re: Pavement Design Criteria for Cotati Village Development
8239 Highway 116
Cotati, California
(APN 144-050-006)

Dear Doug:

Introduction

This letter summarizes our geotechnical recommendations and design criteria for lime-treated pavement structural sections at the Cotati Village development currently under final design. The project location is shown on the attached Figure 1 and it consists of a mixed use development with about 40 new single-family homes and three new commercial buildings. New driveways and parking areas are planned, and Adobe Associates are preparing grading plans. The site is relatively flat and relatively minor grading is anticipated to attain building and street subgrade elevations. We are performing our services as described in our proposal letter dated July 20, 2007.

Kleinfelder has prepared Geotechnical Reports for the project that are dated February 22, 1988 and June 29, 2000. These reports include a discussion of geologic hazards and recommendations for site grading, foundations, and pavement and concrete subgrade criteria. In general, they recommended overexcavating the upper 18 to 24 inches of on-site soils, and recompacting these soils at a relatively high moisture contents to reduce both settlement potential and expansive behavior.

Since construction will likely occur during the winter months and the on-site soils are somewhat expansive, we have discussed the use of lime treatment to decrease the expansive potential of the site soils, improve constructability during the winter months, and eliminate the need to remove and recompact the upper soils as recommended in the Kleinfelder report.

One caveat we have discussed however. Lime treatment, although it reduces the expansion potential of highly-plastic soils and improves performance during wet-weather construction, the increased pH of the soil adversely impacts vegetation growth. Therefore, while lime treatment makes considerable sense in paved areas, treating individual building pads will likely require future overexcavation and replacement of overbuilt lime-treated soils in landscape areas. Therefore, we understand lime treatment will likely be limited to the roadway/driveway areas, and pad grading for the structures will be performed as recommended in the Kleinfelder reports.

Sample Collection and Laboratory Testing

We observed the site conditions and obtained representative bulk samples of the surface soils for laboratory testing during a site visit on July 18, 2007. The site is described in more detail in Kleinfelder's reports, but it generally consists of an undeveloped, square-shaped property with relatively flat topography. Import fill soils have been stockpiled at the southwestern corner of the site, and will be used to raise site elevations for the currently-planned project.

We obtained near surface bulk samples of the site soils from the eastern and western portions of the project site for optimum lime content and R-value testing. Part of the Sandy Clay (CL) bulk samples obtained during our site visit were composited and tested for "optimum" lime content. The remainder of the two bulk samples were then treated with the optimum lime content and tested for Resistance (R-value).

"Optimum" lime content was determined per ASTM D6276, and this test includes mixing enough lime so that the pH of the soil becomes greater than 12.4. The results of the lime content testing is summarized on Figure 2 and the test indicates on-site soils should be treated with 4% (by weight) to achieve the minimum pH. There are two commonly available lime types available, and in this case, high-calcium quicklime was used for the test. High calcium quicklime should therefore be used or we will need to re-test the soils using dolomitic lime, the other common lime type. If alternative lime types are used, the treatment percentages may change slightly.

The remaining bulk samples were then treated with 4% lime and tested for R-value (Caltrans 301), with results of 83 for the western sample and 74 for the eastern sample. Results of the lime-treated R-value testing are shown on Figures 3 and 4. Kleinfelder performed R-value testing on untreated soils at the site, with a result of 20, indicating substantial improvement in strength is achieved with the lime treat process.

Pavement Design

From our experience with similar projects with clayey soil subgrades, lime treatment will be a cost-effective option at the site, and will reduce the necessary import of baserock and asphalt concrete for similar performance compared to an un-treated subgrade. Lime treatment could also allow grading to occur when wet weather conditions would otherwise prevent construction from occurring. Based on the results of our investigation and laboratory testing, we have developed recommendations for alternative asphalt and base layer thicknesses.

From our laboratory testing of the lime-treated near surface soils, we recommend a conservative R-value of 60 be used for the parking lot. Kleinfelder selected assumed Traffic Index (T.I.) values of 4.5 for the parking areas and 5.5 for driveways, so we have prepared pavement structural section designs for those values. If portions of the driveways will be subjected to frequent or very heavy truck traffic, a higher TI may be selected to improve pavement performance. If estimated traffic counts are available, the project Civil Engineer should select an appropriate TI for areas of the site that will experience different levels of vehicle usage. We can also provide additional pavement sections, if other TI's are predicted.

TABLE A
PAVEMENT SECTION RECOMMENDATIONS
COTATI VILLAGE DEVELOPMENT

"UNTREATED" SOILS, R-VALUE ~ 15

For subgrade R-Value = 60[1]

T.I.	Asphalt Concrete[2] (inches)	Aggregate Base[3] (inches)	AB
4.5	2.5	6.0	8.0
5.5	3.0	6.0	10.0
6.5	3.5	6.0	12.0

← SAME w/o LIME

(1) Lime Treatment required; **high calcium quicklime** at 4% by weight should be thoroughly mixed into the subgrade soils and compacted to at least 95% relative compaction (ASTM D-1557). Lime Treatment should be performed per Caltrans Standard Specifications and be 18-inches deep.

(2) The asphalt concrete should conform to the criteria for asphalt presented in Section 39 of the Caltrans Standard Specifications. The asphalt concrete shall be placed in layers not exceeding 2.5 inches in thickness and compacted to at least 95 percent relative compaction.

(3) Class 2 Aggregate Base shall conform to Caltrans Standard Specifications

Subgrade preparation should involve removing all grass, brush, roots, over-sized debris and organic material from areas that will be within the new pavement areas. Any construction debris encountered during site grading should be removed from the site. Provided lime treatment is performed to the depths (from existing ground surface) and levels of compaction described in Table A, Kleinfelder's recommendation to remove and recompact the upper 18 inches of site soils is unnecessary and the intent of this recompaction is achieved with the lime-treatment process. Lime treatment for "best" results, should extend 3 feet beyond the limits of the overlying structural improvements.

Where planned subgrade elevations (in lime treatment areas) are more than a few inches above existing site grades (i.e. new fill is required), we suggest lime treating the existing stripped ground surface to a depth of 18 inches and then placing and compacting additional lime treated soils over the previously treated soils to achieve the planned subgrade elevation. This will "recompact" the softer (existing) suficial layer, rather than leaving a potentially compressible layer below an 18-inch thick lime treated fill/natural soil zone.

The finished subgrade, compacted as noted in Table A, should be smooth and unyielding under a moving, fully-loaded water truck. The subgrade should also be sloped slightly to diminish ponding of water that could allow rainfall to infiltrate and soften the lime treated soils. The subgrade should also be maintained at a near optimum moisture content prior to placement of aggregate baserock. Areas of soft or saturated soils encountered during construction should be excavated and replaced with properly moisture conditioned fill or aggregate base under the direction of the Geotechnical Engineer.

The aggregate base material should conform to Class 2 Aggregate Base in the current edition of Caltrans Standard Specifications. The aggregate base should be moisture conditioned to near

optimum moisture content and compacted to at least 95 percent relative compaction in lifts no more than six inches thick.

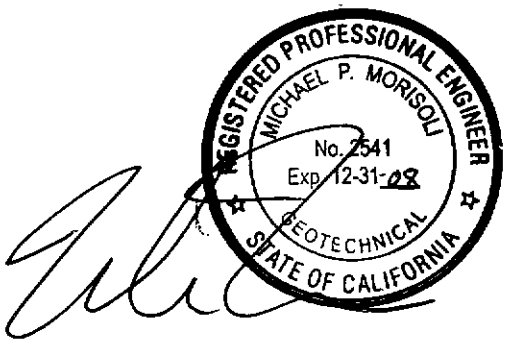
Supplemental Recommendations for Concrete Slabs-on-Grade

In general, Kleinfelder has provided recommendations for concrete slabs-on-grade at the site. Placing 12-inches of non-expansive import soils under new slabs (as recommended by Kleinfelder) is prudent given the plasticity of the on-site soils. If lime treatment is performed, perhaps under the commercial buildings, the non-expansive import could be eliminated.

In addition to the 4-inches of under-slab rock recommended on Page 14 of the 2000 Kleinfelder report, we recommend that interior living spaces, office space, or garage space include a plastic membrane vapor barrier, 10 mils or thicker and meeting the requirements of ASTM E-1745. This vapor barrier should be placed over the rock layer as is the "standard of care" currently practiced. To aid concrete curing and protect the vapor barrier, cover the membrane with about 2-inches of dry sand. Eliminating the capillary moisture break and/or plastic vapor barrier may result in excess moisture intrusion through the floor slabs resulting in poor performance of floor coverings, mold growth or other adverse conditions. As an alternative to the plastic vapor barrier and sand layer, a stronger vapor barrier, such as Stegowrap or other equal material could be used directly over the rock layer.

Please call if there are any questions, or if we can be of further assistance.

Very truly yours,
MILLER PACIFIC ENGINEERING GROUP

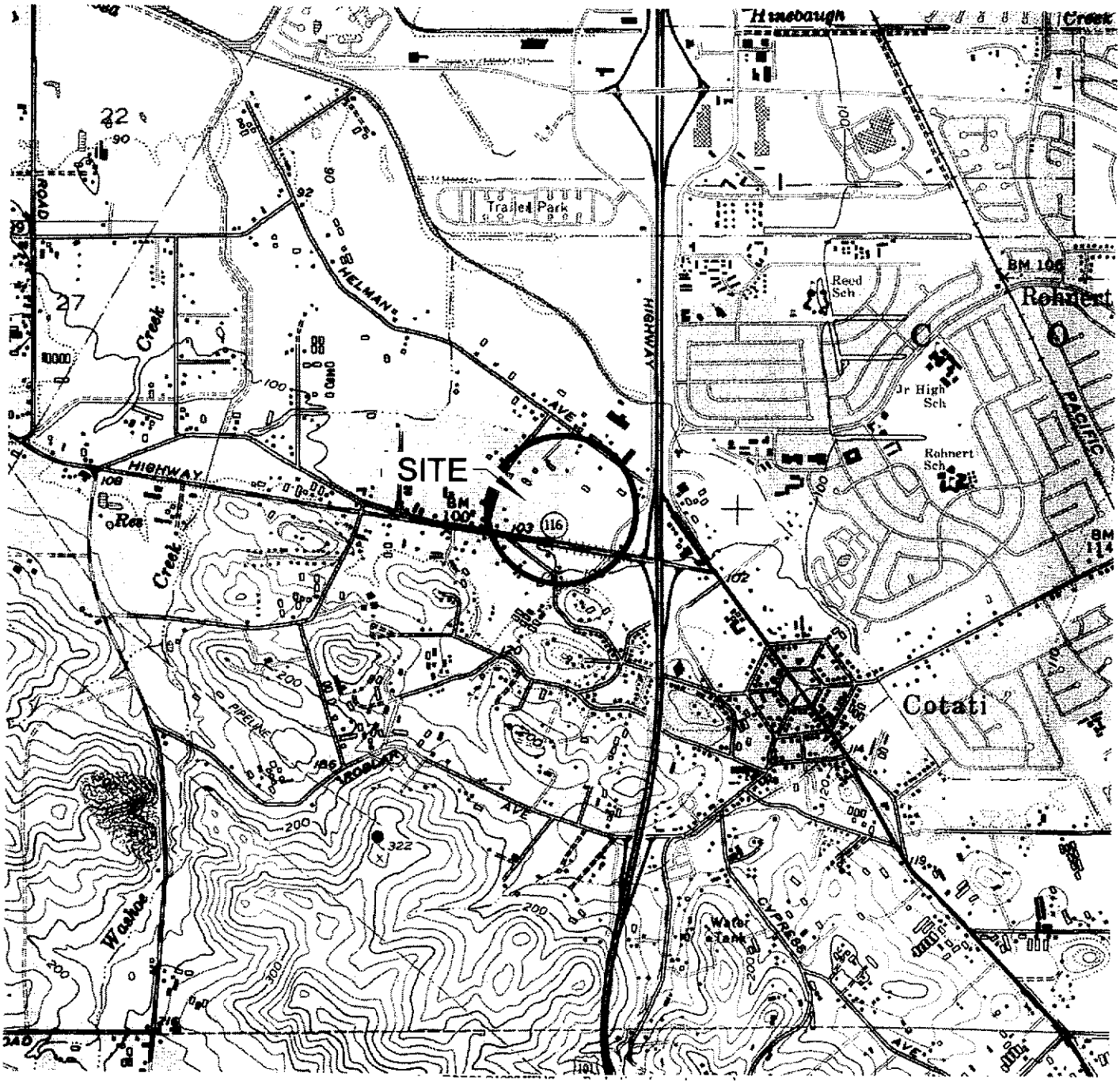


Michael Morisoli
Geotechnical Engineer No. 2541
(Expires 12/31/08)

Attachments: Figures 1 through 4

3 copies submitted

cc: Adobe Associates, Mr. Tim Schram (1 copy)



0 2000 4000 feet

SITE LOCATION MAP

(not to scale)

N

REFERENCE: USGS MAPPING

FILE: SITEPLN2.DW2

Miller Pacific
ENGINEERING GROUP

SITE LOCATION MAP
Cotati Village Development
Cotati, California

1

Project No. 502.11 Date 8/23/07 Approved By:

Figure

COOPER

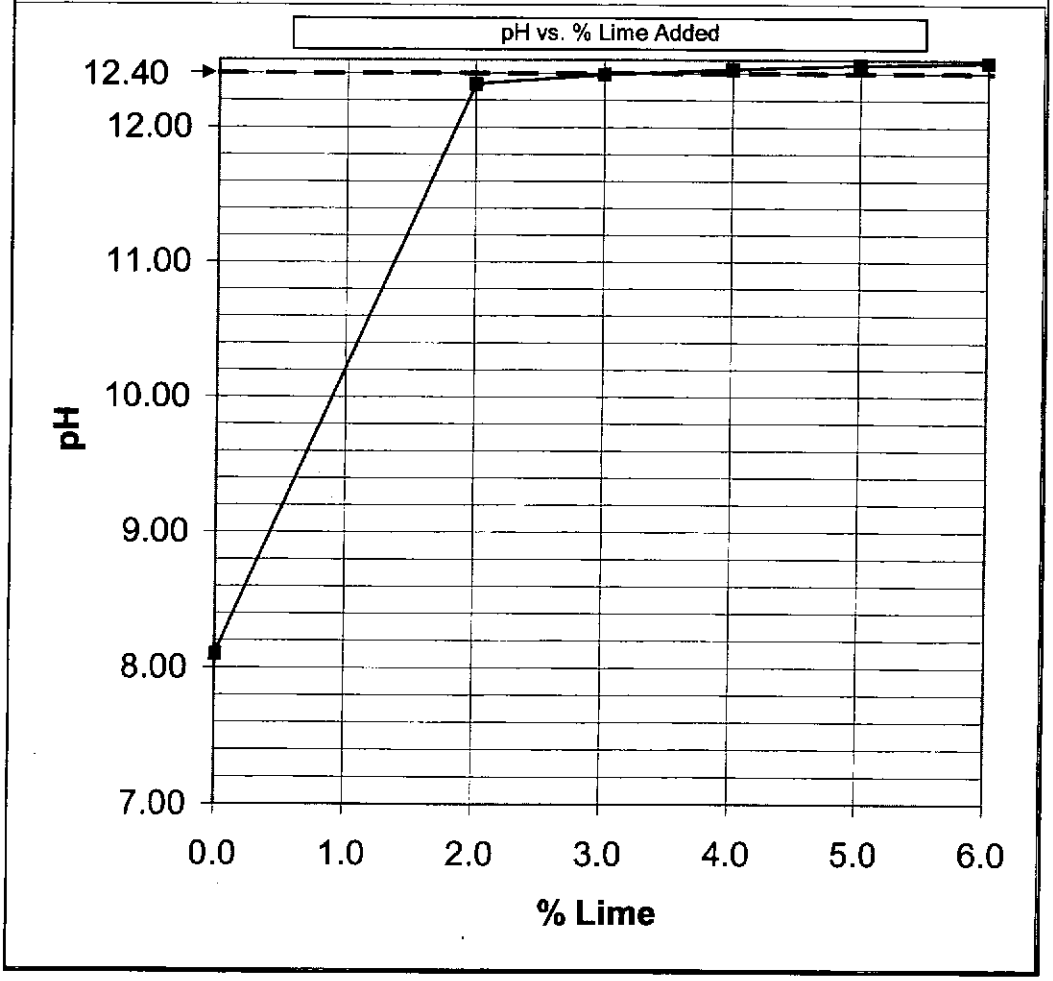
SOIL-LIME PROPORTION REQUIREMENT FOR SOIL STABILIZATION

ASTM D6276

Job No.:	081-252	**Boring:**	East & West Subgrades	**Date:**	8/13/2007
Client:	Miller Pacific Engineering Group	**Sample:**	Composite	**By:**	PJ
Project Name:	Monahah Pacific - Cotati Village	**Depth, ft:**	0-0.5	**Checked:**	PJ
Project No.	502.11				

Visual Description: Brown Clayey SAND
Type of Lime: High Calcium Quicklime
Source of Lime: Graymont Lime
Remarks: Lime was coarse and was sieved over the # 8 sieve for testing.
Used the saturated lime sample as a pH buffer.

% Lime:	0	2	3	4	5	6	Saturated
Measured pH:	8.1	12.32	12.39	12.43	12.46	12.48	12.52



Miller Pacific ENGINEERING GROUP

OPTIMUM LIME CONTENT TEST RESULTS
Cotati Village Development
Cotati, California

2

Project No. 502.11 Date 8/22/07 Approved By:

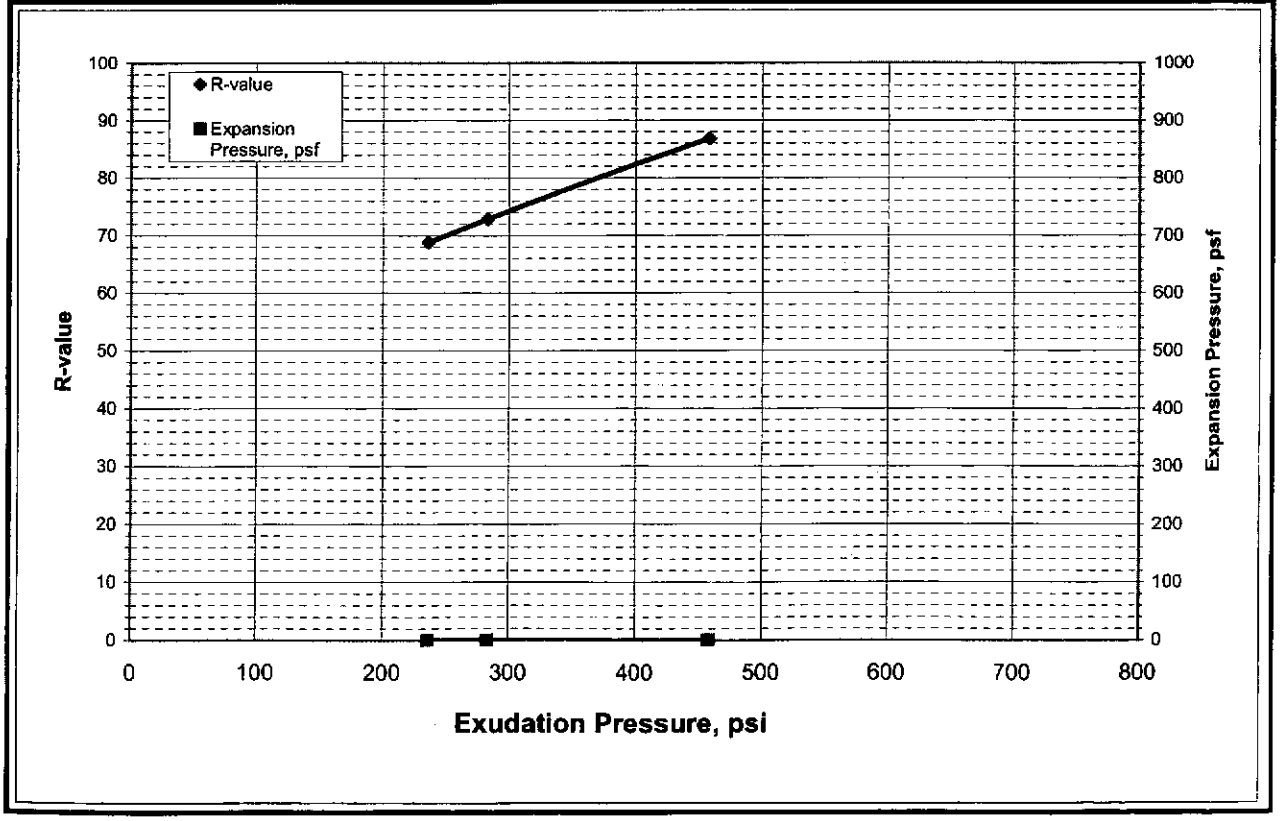
Figure

R-value Test Report (Caltrans 301)

Job No.:	081-252	**Date:**	08/20/07	**Initial Moisture,**	17.5%
Client:	Miller Pacific Engineering	**Tested**	MD	**R-value by Stabilometer**	74
Project:	Monahan Pacific - Cotati Village - 502.11	**Reduced**	RU		
Sample	East Subgrade	**Checked**	DC	**Expansion Pressure**	0 psf
Soil Type:	Gray Sandy CLAY w/ organics (roots) (+4% HCQ)				

Specimen Number	A	B	C	D
Exudation Pressure, psi	283	458	236	
Prepared Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	40	30	50	
Weight of Soil & Mold, grams	3115	3104	3058	
Weight of Mold, grams	2098	2108	2067	
Height After Compaction, in.	2.46	2.47	2.44	
Moisture Content, %	21.4	20.4	22.4	
Dry Density, pcf	103.1	101.4	100.5	
Expansion Pressure, psf	0.0	0.0	0.0	
Stabilometer @ 1000				
Stabilometer @ 2000	43	21	46	
Turns Displacement	2.45	2.47	2.66	
R-value	73	87	69	

Remarks:



Miller Pacific ENGINEERING GROUP

R-VALUE TEST RESULTS
Cotati Village Development
Cotati, California

3

Project No. 502.11 Date 8/22/07 Approved By:

Figure

COOPER

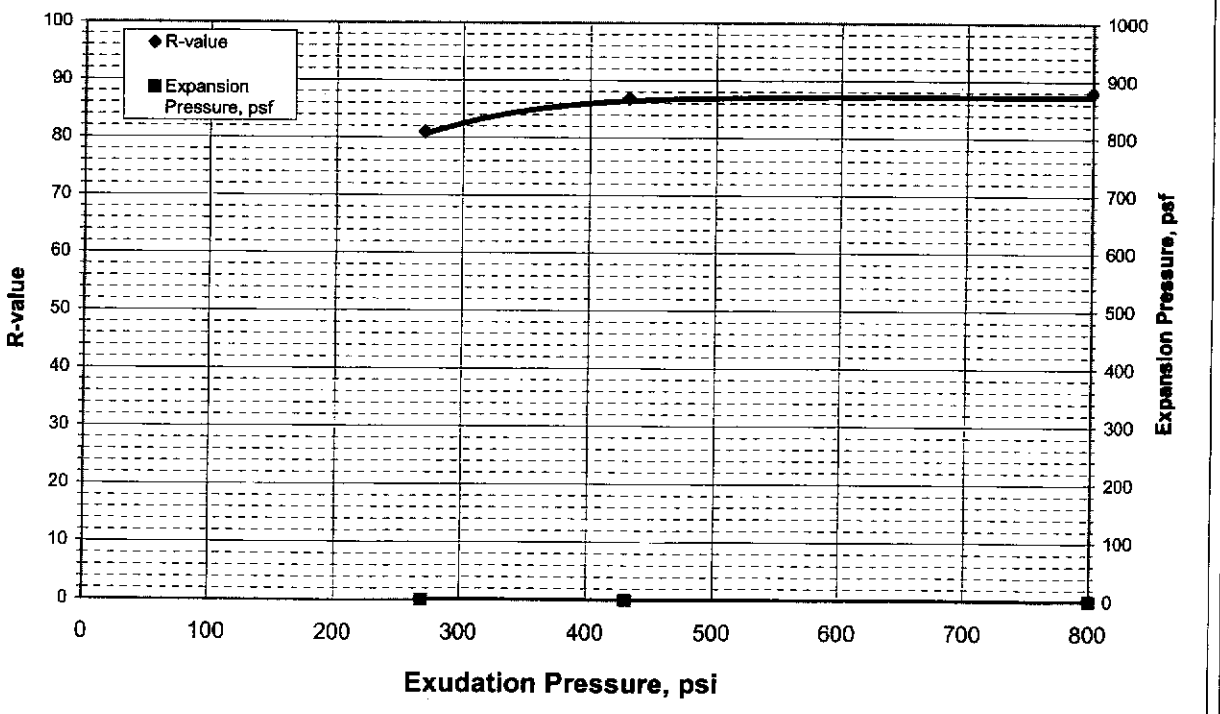
R-value Test Report (Caltrans 301)

Job No.:	081-252	**Date:**	08/20/07	**Initial Moisture,**	10.9%
Client:	Miller Pacific Engineering	**Tested**	MD	**R-value by Stabilometer**	83
Project:	Monahan Pacific - Cotati Village - 502.11	**Reduced**	RU		
Sample	West Subgrade	**Checked**	DC	**Expansion Pressure**	0 psf

Soil Type: Light Brown Clayey SAND w/ organics (roots) (+4% HCQ)

Specimen Number	A	B	C	D
Exudation Pressure, psi	800	270	431	
Prepared Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	30	50	42	
Weight of Soil & Mold, grams	3074	3093	3096	
Weight of Mold, grams	2080	2081	2089	
Height After Compaction, in.	2.46	2.42	2.48	
Moisture Content, %	13.7	15.6	14.8	
Dry Density, pcf	107.6	109.6	107.1	
Expansion Pressure, psf	0.0	0.0	0.0	
Stabilometer @ 1000				
Stabilometer @ 2000	20	30	22	
Turns Displacement	2.5	2.6	2.35	
R-value	88	81	87	

Remarks:



Miller Pacific
ENGINEERING GROUP

R-VALUE TEST RESULTS
Cotati Village Development
Cotati, California

4

Project No. 502.11 Date 8/22/07 Approved By:

Figure