

Appendix B
Geotechnical Feasibility Report



Earth Systems Pacific

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August 30, 2007

File No. SH-10844-SA

Mr. Dan Roth
240 Cole Road
Aromas, CA 95004

RECEIVED

AUG 13 2007

SAN BENITO COUNTY
PLANNING & BUILDING

Project: **Roth Residential Development -- APN 011-270-007**
Ricardo Drive and Cole Road, Aromas
San Benito County, California

Subject: **Geologic/Geotechnical Feasibility Report**

- References:
- 1) Proposal for a Geotechnical Feasibility Investigation and Soil Percolation Testing, Roth Residential Development, Cole Road and Ricardo Drive, APN 011-270-007, San Benito County, California, by Earth Systems Pacific, dated August 10, 2007
 - 2) Study Plan "A" Allocation Map for Lands of Roth, by MH Engineering Company, Sheet 1 of 1, dated 05/07

Dear Mr. Roth:

In accordance with your authorization of the above-referenced proposal, we have evaluated the geotechnical feasibility of the planned 6-lot residential development of your property located northwest of the intersection of Cole Road and Ricardo Drive in the Aromas area of San Benito County (APN 011-270-007). The purpose of this feasibility investigation was to assess geologic and geotechnical issues that could affect the future development of the property, for use in the County allocation process. A future comprehensive design-level geotechnical engineering investigation to fulfill the requirements of Sections 1804.3-5 and 3309.5 of the California Building Code will be necessary to either confirm or modify the conclusions of the feasibility investigation, and to develop detailed geotechnical recommendations for design and construction of the planned improvements.

The investigation was based on a site reconnaissance, a review of the subsurface conditions revealed in the profile test pits excavated in conjunction with soil percolation tests performed at the site, a review of available geologic and geotechnical literature pertaining to the site, and our experience with soil and geologic conditions in the site vicinity. The report of soil percolation testing is submitted under separate cover.

Project Description

As shown on the Study Plan "A" Allocation Map by MH Engineering Company, the property will be subdivided to create six new parcels having minimum lot sizes of about 5 acres. The remainder parcel along Cole Road will not be further developed. The lots will be accessed by a new cul-de-sac street originating at Ricardo Drive. Plans for the residences are not currently available, but we assumed that they will be one or two story, conventional light frame structures with attached garages. A substantial amount of grading is anticipated. Effluent will be disposed via individual on-site septic systems.



Site Description

The site (APN 011-270-007) is a trapezoidal-shaped approximately 37-acre parcel located at the northwest corner of the intersection of Cole Road and Ricardo Drive in the Aromas area of San Benito County, California. The property is in a rural-residential/agricultural district. The site occupies portions of the top and southwestern face of a northeast-southwest trending ridge. The ridge has a broad rounded top and wide side drainage swales. Two southwest-trending drainage swales cross the eastern section of property. The slope inclinations at the proposed building sites generally range from less than 10 to about 20 percent. The maximum slope inclinations beyond the building sites are in excess of 30 percent in some areas. At the time of this report, the proposed remainder parcel at the eastern end of the site was occupied by an arena and other equestrian facilities. The balance of the site was vacant of structures and was utilized for horse grazing. The site was vegetated with native grass, with several mature oak trees on the northwest section of the property.

Site Geologic Setting

The site is located within the geologically complex Coast Ranges Geomorphic Province of central coastal California. Discontinuous northwest-southeast trending mountain ranges, valleys and faults formed by tectonic, mountain-building processes characterize the province. The site is located in an area of rolling hills at the northeastern extent of the Gabilan Mountain range.

The predominant structural feature in the California Coast Ranges is the San Andreas fault, which is the structural boundary between two tectonic plates: the Pacific Plate to the southwest of the fault and the North American Plate northeast of the fault zone. The site is west of the San Andreas Fault with basement rocks of Paleozoic age high-grade metamorphic and Cretaceous age plutonic rocks overlain by late Mesozoic age and younger sedimentary rocks (Hall, 1991)¹. Majmundar, (1994)², (after Dibblee et al.) mapped the geology in the vicinity of the site and shows the site and the surrounding areas underlain by older alluvial deposits of Holocene-Pleistocene age. The older alluvium is described as undifferentiated floodplain deposits consisting of unconsolidated to semi-consolidated gravel, sand, silt and clay.

In addition to his geologic map, Majmundar (1994) prepared a Relative Landslide Susceptibility Map and a Landslides and Related Features Map for the San Juan Bautista area. According to his maps, the western ridge top areas are deemed to be generally susceptible to landsliding, and the southwest facing slopes are deemed to be most susceptible to landsliding. However, no landslides are mapped on the site.

¹ Hall, C.A., Jr., 1991, Geology of the Point Sur-Lopez Point Region, Coast Ranges, California: A Part of the Southern California Allocthon, Geologic Society of America, Special Paper 226.

² Majmundar, H.H., 1994, Landslide Hazards in the Chittenden-San Juan Bautista Area, San Benito County, California, Landslide Hazards Identification Map 30, DMG Open-File Report 94-02, 1:24,000 scale (3 sheets-Relative Landslide Susceptibility, Landslides and Related Features and Geologic Map (after Dibblee et al.)).



The site is not within any Alquist-Priolo Earthquake Fault Zones. The major active fault recognized in the site region is the San Andreas fault. Other faults considered to be active in the region include the Zayante-Vergeles and Sargent faults. According to the Maps of Known Active Fault Near Source Zones in California and Adjacent Portions of Nevada (International Conference of Building Officials, February 1998), the site is approximately 3-½ km southwest of the Type A San Andreas Fault (Pajaro segment), and 2-½ km northeast of the Type B Zayante-Vergeles Fault.

General Subsurface Conditions

The soils encountered in the test pits excavated in conjunction with the percolation testing program were predominantly silty sands (SM), with lesser amounts of clayey sand (SC). Occasional layers of lean clay with sand (CL), silty gravel (GM), and sandy silt (ML) were also encountered in the test pits. The predominantly granular soils generally had a medium dense consistency, although some dense to very dense zones were present. The predominantly fine grained soils were typically stiff to very stiff. The surface soils were slightly moist, and the underlying materials were generally moist at the time of the investigation. Free subsurface water was not encountered in the 15-foot depths of the test pits. The approximate locations of the test pits are indicated on the attached Test Pit and Percolation Test Location Map. Copies of the test pit logs are also attached.

Geologic and Geotechnical Feasibility

Based on our site reconnaissance and review of geologic literature and geotechnical information pertaining to the site, in our opinion, the proposed Roth residential development should be feasible from a geologic and geotechnical engineering standpoint. Some of the anticipated geologic and geotechnical issues are as follows:

Faulting and Ground Shaking: No active faults are known to cross the site or to be immediately adjacent to the site. Therefore, the potential for surface fault rupture should be low.

The site is located within a seismically active area near the San Andreas fault but is outside Alquist-Priolo Earthquake Fault Zones. However, strong ground shaking should be expected during the design life of the planned structures. At a minimum, the planned improvements should be designed to resist strong seismic shaking in accordance with current California Building Code requirements.

Liquefaction Potential: The term liquefaction refers to the liquefied condition and subsequent softening that can occur in soils when they are subjected to cyclic strains, such as those generated during a seismic event. Studies of areas where liquefaction has occurred have led to the conclusion that saturated soil conditions, low soil density, grain sizes within a certain range, and a sufficiently strong earthquake, in combination, create a potential for liquefaction. The effects of liquefaction can include ground settlement, lateral soil spreading, and localized loss of foundation support. Previous studies of the site vicinity indicated that the liquefaction potential of the soil should be low. Thus, measures to mitigate liquefaction should not be necessary for the project.



Slope Stability: According to the Landslide Identification Map (Majmudar, 1994), the site is in an area deemed to be generally and most susceptible to landsliding. Therefore, the potential for landsliding is considered to be moderate. However, there are no landslides mapped on or adjacent to the site and we did not observe evidence of landsliding on the site during our reconnaissance. Slope stability should be evaluated in the design-level geotechnical engineering report for the development. Due to the sloping nature of the site, common hillside grading methods should be used during construction. Fill should be placed using a combination of keyways and benches.

Soil Expansion Potential: Expansive soils tend to swell with increases in soil moisture and shrink as the soil moisture decreases. The volume changes that the soils undergo in this cyclical pattern can stress and damage slabs and foundations if precautionary measures are not incorporated into the construction procedure. The soils encountered in the test pits were predominantly low-plasticity sandy materials that should have a low expansion potential. However, some potentially expansive clayey material was present. The expansion potential of the clayey soils should be evaluated during the design level geotechnical engineering investigation, and recommendations for mitigation of soil expansion and contraction should be developed as necessary.

Site Grading: Where fill is to be placed on existing slopes, the slopes should be keyed and benched in accordance with common hillside grading practices. Installation of subsurface drains in the keyways and possibly the benches may be recommended in the design level geotechnical engineering report. Other types of remedial grading, such as overexcavation and recompaction of the upper soil, may also be recommended in the report.

Foundations: Drilled, cast-in-place concrete piers interconnected by grade beams may be the appropriate foundation system for residences that will be constructed on building pads created using a combination of cuts and fills, due to the potential for excessive differential settlement between the cut and fill portions of the pad. Conventional spread footings may be appropriate where residences will be located on relatively flat natural ground, such as on proposed Lots 2 and 3. However, overexcavation and recompaction of the soil may be recommended in the design level geotechnical engineering report to reduce the potential for excessive footing settlement.

Closure

As discussed above, a future design level geotechnical engineering report will be necessary to address the residences and other site improvements. While this document may be used in evaluating the geologic/geotechnical suitability and the overall planning of the development, it shall not be relied upon for design or construction of improvements at the development.

Our intent was to perform the geologic and geotechnical feasibility investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions for this level of investigation. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client for the subject project. Application beyond



the stated intent is strictly at the user's risk.

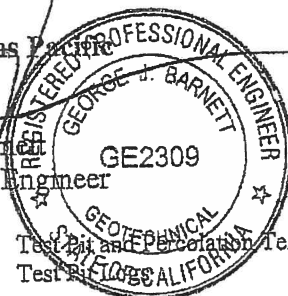
This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. Copies may be made only by Earth Systems Pacific, the client, and his authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. Please do not hesitate to contact this office if you have any questions regarding this report.

Respectfully submitted,

Earth Systems Pacific

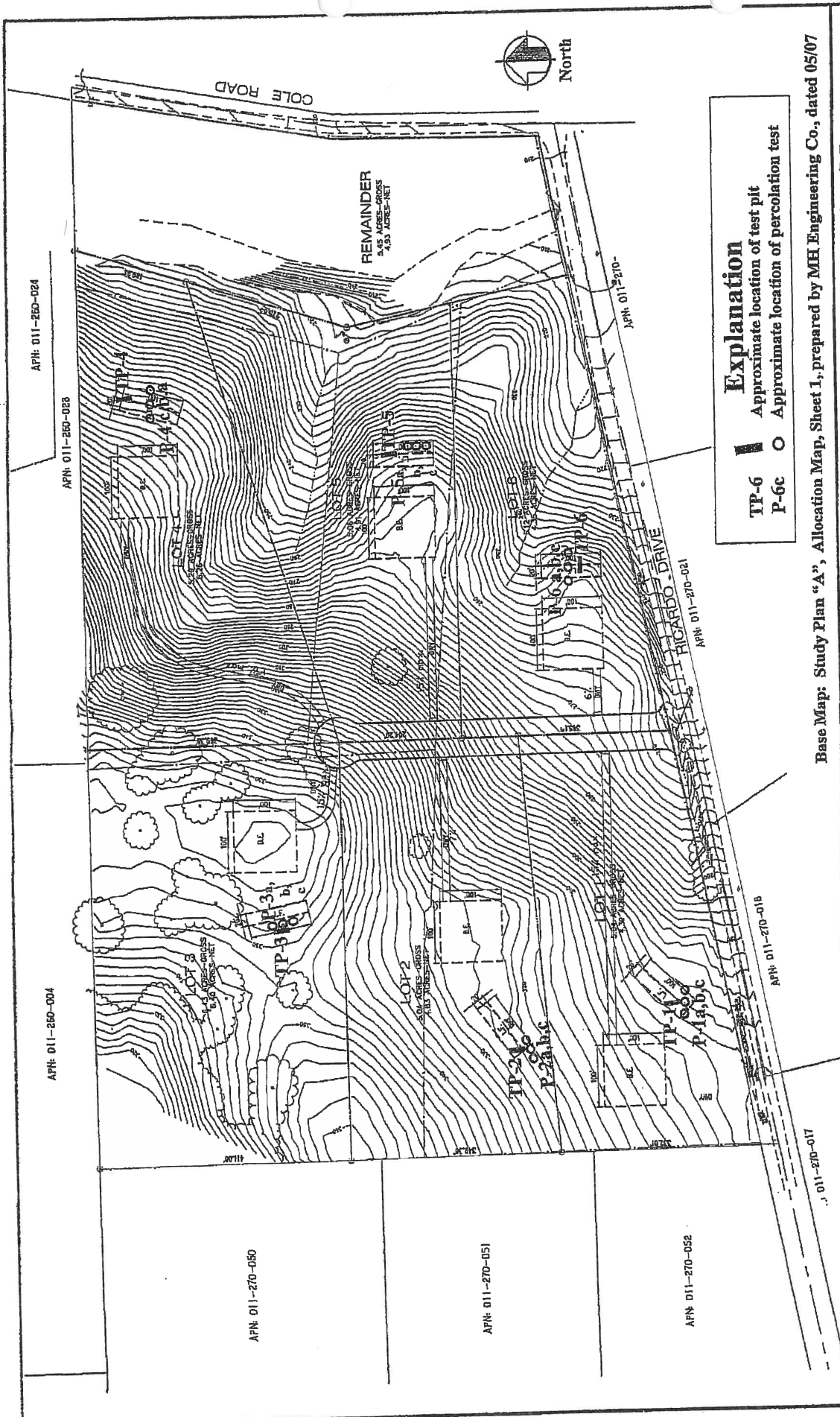
George J. Barnett
Geotechnical Engineer



Attachments: Test Pit and Percolation Test Location Map
Test Pit Log

Distribution: Mr. Dan Roth (4)

Document No.: 0709.504.RPT




Explanation

TP-6 Approximate location of test pit

P-6c Approximate location of percolation test

Base Map: Study Plan "A", Allocation Map, Sheet 1, prepared by MH Engineering Co., dated 05/07

 Earth Systems Pacific	Roth Residential Development Cole Road and Ricardo Drive Aromas, California	August, 2007	Not to scale	SH-10844-SA
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Test Pit and Percolation Test Location Map



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LOGGED BY: B. Faust
DRILL RIG: CAT 416C
AUGER TYPE: 24" Bucket

Test Pit No. 1

PAGE 1 OF 1

JOB NO.: SH-10844-SA

DATE: 08/17/07

DEPTH (feet)	USCS CLASS	SYMBOL	ROTH RESIDENTIAL DEVELOPMENT Cole Road and Ricardo Drive Aromas Area, San Benito County, California	SAMPLE DATA				
			SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 12 IN.
0	SM		Gray brown SILTY SAND, slightly moist, medium dense, porous, fine to medium sand, trace coarse sand					
1								
2								
3	CL		Yellow brown LEAN CLAY with sand, moist, medium stiff, fine to coarse gravel					
4	SC		Light yellow brown CLAYEY SAND, moist, medium dense, fine to medium sand, some fine gravel					
5								
6			—more fine to coarse gravel					
7								
8	GM		Orange brown SILTY GRAVEL with sand, moist, medium dense, fine to coarse gravel, some cobbles to 6" diameter					
9								
10								
11								
12								
13								
14	SM		Dark yellow brown SILTY SAND, moist, dense, fine to medium sand					
15								
16			End of Test Pit @ 15.0' No subsurface water was encountered					
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample □ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.



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Test Pit No. 2

PAGE 1 OF 1

LOGGED BY: B. Faust

DRILL RIG: CAT 416C

AUGER TYPE: 24" Bucket

JOB NO.: SH-10844-SA

DATE: 08/17/07

DEPTH (feet)	USCS CLASS	SYMBOL	ROTH RESIDENTIAL DEVELOPMENT Cole Road and Ricardo Drive Aromas Area, San Benito County, California	SAMPLE DATA				
			SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 12 IN.
0	SM		Gray brown SILTY SAND, moist, medium dense					
1								
2			-loose					
3	SC		Orange brown CLAYEY SAND with gravel, moist, medium dense, coarse sand, fine gravel					
4								
5								
6	SM							
7								
8			Orange brown SILTY SAND, moist, medium dense, fine to medium sand					
9								
10								
11								
12								
13								
14			-becomes dense					
15			End of Test Pit @ 15.0'					
16			No subsurface water was encountered					
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.



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Test Pit No. 3

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JOB NO.: SH-10844-SA

DATE: 08/17/07

LOGGED BY: B. Faust
DRILL RIG: CAT 416C
AUGER TYPE: 24" Bucket

DEPTH (feet)	USCS CLASS	SYMBOL	ROTH RESIDENTIAL DEVELOPMENT Cole Road and Ricardo Drive Aromas Area, San Benito County, California	SAMPLE DATA				
			SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 12 IN.
0	SM		Gray brown SILTY SAND with gravel slightly moist, medium dense, fine to coarse sand, fine gravel					
1								
2	SM		Yellow brown SILTY SAND, moist, medium dense to dense, orange stringers, fine to medium sand					
3								
4								
5			-dense, black Mn staining					
6								
7			-medium dense					
8								
9								
10								
11			-black Mn staining, locally cemented					
12								
13			-light olive, very dense					
14								
15			End of Test Pit @ 15.0'					
16			No subsurface water was encountered					
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.



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Test Pit No. 4

PAGE 1 OF 1

JOB NO.: SH-10844-SA

DATE: 08/17/07

LOGGED BY: B. Faust
DRILL RIG: CAT 416C
AUGER TYPE: 24" Bucket

DEPTH (feet)	USCS CLASS	SYMBOL	ROTH RESIDENTIAL DEVELOPMENT Cole Road and Ricardo Drive Aromas Area, San Benito County, California	SAMPLE DATA				
			SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 12 IN.
0	SM		Gray to yellow brown SILTY SAND with gravel, slightly moist, medium dense, fine to coarse sand, fine to coarse gravel					
1								
2	SM		Orange brown SILTY SAND, moist, medium dense, coarse sand, some fine gravel					
3								
4								
5			-dense, black Mn staining					
6								
7	SC		Olive yellow CLAYEY SAND, moist, medium dense, fine sand					
8	SM		Orange brown SILTY SAND, moist, medium dense, fine to medium sand					
9								
10	SM		Olive gray SILTY SAND, moist, medium dense, fine sand					
11								
12			-variably a sandy silt					
13								
14			-becomes dense					
15			End of Test Pit @ 15.0'					
16			No subsurface water was encountered					
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample □ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.



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LOGGED BY: B. Faust
DRILL RIG: CAT 416C
AUGER TYPE: 24" Bucket

Test Pit No. 5

PAGE 1 OF 1

JOB NO.: SH-10844-SA

DATE: 08/17/07

DEPTH (feet)	USCS CLASS	SYMBOL	ROTH RESIDENTIAL DEVELOPMENT Cole Road and Ricardo Drive Aromas Area, San Benito County, California	SAMPLE DATA				
				INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 12 IN.
			SOIL DESCRIPTION					
0	SM		Gray brown SILTY SAND moist, medium dense, highly disturbed					
1	SC		Orange brown CLAYEY SAND, moist, medium dense, coarse sand					
2	ML		Olive gray SANDY SILT, moist, stiff, fine sand					
3	SC		Orange brown CLAYEY SAND, moist, coarse sand					
4	ML		Olive gray SANDY SILT, moist, stiff, fine sand					
5								
6			-hard, laminated					
7								
8	SM		Orange brown SILTY SAND, moist, medium dense, coarse sand					
9								
10			-locally weakly cemented, some fine and coarse gravel					
11								
12								
13								
14								
15			End of Test Pit @ 15.0'					
16			No subsurface water was encountered					
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: ■ Ring Sample ○ Grab Sample □ Shelby Tube Sample ● SPT
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.



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Test Pit No. 6

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JOB NO.: SH-10844-SA

DATE: 08/17/07

LOGGED BY: B. Faust

DRILL RIG: CAT 416C

AUGER TYPE: 24" Bucket

AUGER TYPE: 24" Bucket				SAMPLE DATA				
DEPTH (feet)	USCS CLASS	SYMBOL	ROTH RESIDENTIAL DEVELOPMENT Cole Road and Ricardo Drive Aromas Area, San Benito County, California	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 12 IN.
			SOIL DESCRIPTION					
0	SM		Red brown SILTY SAND, moist, medium dense, fine to medium sand					
1								
2								
3			-very moist					
4	SC		Red brown CLAYEY SAND, moist, dense, medium to coarse sand					
5								
6	SM		Olive gray SILTY SAND, moist, dense, fine sand, variably a sandy silt					
7								
8			-medium to coarse sand with silt partings					
9			-fine sand, laminated					
10								
11								
12								
13			-medium to coarse sand					
14								
15			End of Test Pit @ 15.0'					
16			No subsurface water was encountered					
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

LEGEND: Ring Sample Grab Sample Shelby Tube Sample SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.