

GEOTECHNICAL INVESTIGATION
for
PROPOSED RESIDENTIAL PROJECT
Henry Cowell Drive (APN 061-461-46)
Santa Cruz County, California

Prepared For
David Cook

Prepared By
HARO, KASUNICH AND ASSOCIATES, INC.
Geotechnical & Coastal Engineers
Project No. SC8906
June 2005

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20 June 2005

MR. DAVID COOK
111 Baymount Street
Santa Cruz, California 95062

Subject: Geotechnical Investigation

Reference: Residential Construction
Lot 46, Henry Cowell Drive (APN 061-461-46)
Santa Cruz County, California

Dear Mr. Cook:

The following report presents the results and conclusions of our Geotechnical Investigation for the proposed residential construction. This report includes design criteria and recommendations addressing the geotechnical aspects of the proposed development.

The results of our investigation indicate there are no significant geotechnical concerns at the site provided the recommendations presented in this report are followed in development of project plans and specifications.

If you have any questions concerning the data or conclusions presented in this report, please call our office.

Very truly yours,

HARO, KASUNICH & ASSOCIATES, INC.

Greg Bloom
C.E. 58819

GB/sq

Copies: 5 to Addressee

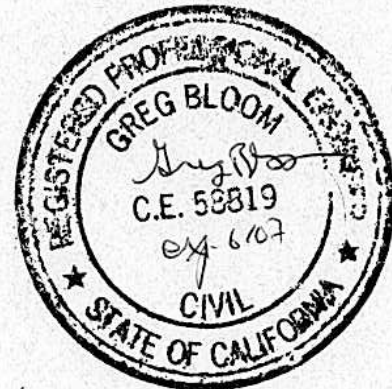


TABLE OF CONTENTS

LETTER OF TRANSMITTAL

GEOTECHNICAL INVESTIGATION	1
Introduction.....	1
Purpose and Scope	1
Site Location and Description	2
Field Exploration.....	3
Subsurface Conditions.....	3
Groundwater	3
Seismicity	3
DISCUSSIONS AND CONCLUSIONS	4
RECOMMENDATIONS	5
Site Grading	5
Conventional Shallow Foundations	8
Retaining Walls and Lateral Pressures.....	9
1997 UBC Seismic Design Considerations	10
Slabs-on-Grade	11
Site Drainage.....	12
Plan Review, Construction Observation, and Testing.....	13
LIMITATIONS AND UNIFORMITY OF CONDITIONS.....	14
APPENDIX A.....	15
Vicinity Map.....	16
Site Plan.....	17
Keying and Benching Detail	18
Subdrain Detail	19
Boring Logs from Previous Studies.....	20

GEOTECHNICAL INVESTIGATION

Introduction

This report presents the results of our Geotechnical Investigation for the proposed residential project to be located at Lot #46 Henry Cowell Drive (APN 061-461-46) in Santa Cruz County, California. Haro, Kasunich, and Associates has previously submitted geotechnical reports for infrastructure improvements for the subdivision.

Purpose and Scope

The purpose of our investigation was to explore and evaluate the surface and subsurface conditions at the building site and provide geotechnical criteria for design and construction of the proposed development. The specific scope of our services was as follows:

1. Review the data in our files pertinent to the site. Specifically, our firm reviewed reports by M. Jacobs and Associates, dated 2 October 1980; geologic report, Graham Hill Showgrounds by Rogers E. Johnson and Associates, dated 13 September 1988; preliminary geotechnical investigation for Graham Hill Showgrounds by Haro, Kasunich, and Associates, dated 31 October 1988; Geotechnical Investigation for Graham Hill Estates On-Site Sewer Pipelines, dated 19 May 1999; Supplemental geologic investigation addressing geologic issues by Rogers E. Johnson, dated 18 February 2000; and geotechnical investigation for Terravel Subdivision (Woods Cove) dated 21 August 2001.

2. Review a total of 36 geotechnical borings within the subdivision developed as part of previous engineering and geologic studies.
3. Evaluate the existing field and laboratory data to develop geotechnical design criteria and recommendations for site grading, building foundations, retaining walls, slab-on-grades, and site drainage.
4. Present the results of our investigation in a report.

Site Location and Description

The project site is located within the Woods Cove Subdivision on Henry Cowell Drive (Lot 46) in Santa Cruz County, California. The majority of infrastructure improvements for the subdivision have been installed.

The subject parcel is approximately ½ acre ± in size and located on a northwesterly facing slope. The natural gradients on the property are approximately 5 to 15 percent. The parcel is vegetated with scattered trees. The site was originally covered in a forest of redwood and oak trees that have been selectively logged to create the subdivision.

A single family residence is proposed. Preliminary plans were not provided for our review prior to submittal of this report.

Field Exploration

No additional borings were advanced for this study. Existing subsurface data were used to provide the geotechnical recommendations contained herein this report.

Subsurface Conditions

Based on previous studies, the site is generally underlain by terrace deposits overlying Quartz Diorite Bedrock. The thickness of the terrace deposits vary across the site. But, based on our previous borings within the immediate vicinity it is anticipated that the terrace deposits will be up to 50 feet thick across this specific lot. The terrace deposits generally decrease in thickness as one goes downslope.

The terrace deposits consist of medium dense to dense silty sand and stiff lean clays.

Groundwater

Groundwater was encountered in several of the borings perched on the quartz diorite bedrock.

Seismicity

Detailed studies of geologic hazards are beyond the scope of this study. Refer to the engineering geologic report by Rogers E. Johnson for a discussion of geologic hazards.

DISCUSSIONS AND CONCLUSIONS

Based on the results of our investigation, the proposed development, from a geotechnical standpoint, is feasible. The recommendations presented in this report are to be incorporated into the design and construction of the proposed development.

The proposed improvements may be supported on conventional shallow foundations.

All topsoil and roots must be removed prior to the placement of any fill or foundations. This is a significant concern because of the large amount of trees that were previously on the property. Based on our experience within the subdivision the root zone appears to be approximately 24 inches thick, but isolated areas may have root/stump depths of up to 6 feet deep.

RECOMMENDATIONS

The following recommendations should be used as guidelines for preparing project plans and specifications:

Site Grading

1. We request the opportunity to review project grading and foundation plans during the design phase of the project. We can then provide our opinion regarding geotechnical considerations.
2. Observation and testing services for earthwork performed at the project site should be provided by Haro, Kasunich and Associates. The observation and testing of earthwork allows for contractors compliance evaluation to project plans and specifications and our geotechnical recommendations. It also allows us the opportunity to confirm that actual soil conditions encountered during construction are essentially the same as those anticipated based on the subsurface exploration.
3. The geotechnical engineer should be notified at least four (4) working days prior to any site clearing or grading so that the work in the field can be coordinated with the grading contractor and arrangements for testing and observation can be made. The recommendations of this report are based on the assumption that the geotechnical

engineer will perform the required testing and observation during grading and construction.

It is the owner's responsibility to make the necessary arrangements for these required services.

4. Where referenced in this report, Percent Relative Compaction and Optimum Moisture Content shall be based on ASTM Test Designation D1557-91.

5. Areas to be graded or to receive building foundations should be cleared of obstructions including loose fill, debris, foundations, trees not designated to remain and their principal roots, or other unsuitable material. Existing depressions or voids created during site clearing should be backfilled with engineered fill. A minimum stripping depth of 24 inches is anticipated with isolated areas needing to be stripped to depths of 6 feet.

6. Engineered fill should be placed in thin lifts not exceeding 8 inches in loose thickness, moisture conditioned, and compacted to a minimum of 90 percent relative compaction. The upper 8 inches should be compacted to a minimum of 95 percent relative compaction. Engineered fill placed on slopes steeper than 15 percent should be keyed and benched into the hillside. A typical keying and benching detail is attached in the Appendix.

7. Areas to receive engineered fill should be scarified, moisture conditioned, and compacted to a relative density of 90 percent.

8. The on-site material may be reused as engineered fill once the majority of organics and other deleterious material is removed.

9. Any imported fill should meet the following criteria:
 - a. Be free of wood, brush, roots, grass, debris and other deleterious materials.
 - b. Not contain rocks or clods greater than 2.5 inches in diameter.
 - c. Not more than 20 percent passing the #200 sieve.
 - d. Have a plasticity index less than 15.
 - e. Be approved by the geotechnical engineer. Submit to the geotechnical engineer samples of import material or utility trench backfill for compliance testing a minimum of 4 days before it is delivered to the job site.

10. After the earthwork operations have been completed and the geotechnical engineer has finished his observation of the work, no further earthwork operations shall be performed except with the approval of and under the observation of the geotechnical engineer.

11. Disturbed slopes and engineered fill slopes should be planted with erosion resistant material.

Conventional Shallow Foundations

The proposed residence may be supported on conventional shallow foundations.

12. The proposed structure may be supported on conventional spread footings founded on medium dense in-situ soil or engineered fill as outlined in the grading section of this report. Footing dimensions should be determined in accordance with anticipated use and applicable design standards, but should be a minimum of 15 inches wide and be embedded a minimum of 12 inches for one-story structures, 18 inches for two-story structures, and 24 inches for three-story structures. The footings should be reinforced as required by the structural designer based on the actual loads transmitted to the foundation.

13. Foundations designed in accordance with the above may be designed for an allowable soil bearing pressure of 2,500 psf for dead plus live loads. This value may be increased by one-third to include short-term seismic and wind loads.

14. Lateral load resistance for the buildings supported on footings may be developed in friction between the foundation bottom and the supporting subgrade. A friction coefficient of 0.35 is considered applicable. Passive resistance of 250 pcf may be used below a depth of 12 inches against medium dense in-situ soil.

Retaining Walls and Lateral Pressures

15. Retaining walls should be designed to resist the lateral earth pressures listed in Table 1. The values listed in Table 1 are for non-seismic conditions and are based on the assumption that walls will be adequately drained.

Table 1 - Active and At-Rest Pressures

Backslope	Active Pressure (pcf)	At-Rest Pressure (pcf)
Level	37½	57½
2:1	45	65

16. Active pressures should be used for walls where horizontal movement at the top of the wall is not restricted. At-rest pressures should be used to design walls with movement restrained at the top, such as basement walls and walls structurally connected at the top. The walls should also be designed to resist one half of any surcharge loads imposed on the backfill behind the walls. The designer should account for the surcharge loading created during backfill operations.

17. To account for seismic loading, a horizontal line load surcharge equal to $10H^2$ lbs/horizontal foot of wall may be assumed to act at $0.6H$ above the heel of the wall base (where H is the height of the wall.)

18. The above lateral pressures assume the walls are fully drained to prevent hydrostatic pressure behind the walls. Drainage materials behind the wall should consist of Class 1, Type A permeable material complying with Section 68 of CalTrans Standard Specifications, latest edition, or 3/4 inch permeable drainrock wrapped in Mirafi 140 N or equivalent. The drainage material should be at least 12 inches thick. The drains should extend from the base of the walls to within 12 inches of the top of the backfill. A perforated pipe should be placed (holes down) about 4 inches above the bottom of the wall and discharge at a suitable location. Wall backdrains should be plugged at the surface with clayey material to prevent infiltration of surface runoff into the backdrains.

1997 UBC Seismic Design Considerations

For purposes of design of structural features for the proposed project seismic coefficients may be used based on a soil profile S_c as described in Table 16-J of the 1997 UBC. The distance to regional faults is provided in the geologic reports by Rogers E. Johnson and Associates

Slabs-on-Grade

19. Concrete slabs-on-grade planned for the site should be constructed on either medium dense in-situ soil or engineered fill as outlined in the grading section of this report. Prior to construction of the slab, the subgrade surface should be proof-rolled to provide a smooth, firm, uniform surface for slab support. Slab reinforcement should be provided in accordance with the anticipated use and loading of the slab. As a minimum, we recommend the use of number 4 bars placed within the slab at 18 inches on center. Slab joints should be spaced no more than 15 feet on center to minimize random cracking. While some movement of slabs is likely, a well-prepared subgrade including pre-moistening prior to pouring concrete, adequately spaced expansion joints, and good workmanship should minimize cracking and movement.

20. In areas where floor wetness would be undesirable, a blanket of 4 inches of free-draining gravel should be placed beneath the floor slab to act as a capillary break. In order to minimize vapor transmission, an impermeable membrane should be placed over the gravel. The membrane should be covered with 2 inches of sand or rounded gravel to protect it during construction. The sand or gravel should be lightly moistened just prior to placing the concrete to aid in curing the concrete. If moisture is expected a surface treatment or moisture retardant should be added to the concrete.

Site Drainage

21. Proper control of drainage will be essential to the project.

22. Surface drainage should include positive gradients so that surface runoff is not permitted to pond adjacent to foundations, slabs or retaining walls. Surface drainage should be directed away from building foundations. The slope from the foundation elements should be 2 percent.

23. Full roof gutters and downspouts should be placed around eaves. Discharge from the roof gutters should be conveyed away from the building site via closed plastic conduits that are released into Energy Dissipators.

24. Subdrains may be required to capture perched groundwater. Placement and depth of the subdrains will be reviewed in the field during construction. A typical subdrain detail is provided in the appendix.

25. The migration of water or spread of extensive root systems below foundations, slabs, or pavements may cause undesirable differential movements and subsequent damage to these structures. Landscaping should be planned accordingly.

Plan Review, Construction Observation, and Testing

26. Our firm must be provided the opportunity for a general review of the final project plans prior to construction so that our geotechnical recommendations may be properly interpreted and implemented. If our firm is not accorded the opportunity of making the recommended review, we can assume no responsibility for misinterpretation of our recommendations. We recommend that our office review the project plans prior to submittal to public agencies, to expedite project review. The recommendations presented in this report require our review of final plans and specifications prior to construction and upon our observation and, where necessary, testing of the earthwork and foundation excavations. Observation of grading and foundation excavations allows anticipated soil conditions to be correlated to those actually encountered in the field during construction.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be given.

2. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to ensure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to ensure that the Contractors and Subcontractors carry out such recommendations in the field. The conclusions and recommendations contained herein are professional opinions derived in accordance with current standards of professional practice. No other warranty expressed or implied is made.

3. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or to the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside our control. Therefore, this report should not be relied upon after a period of three years without being reviewed by a geotechnical engineer.

Project No. SC8906
20 June 2005

APPENDIX A

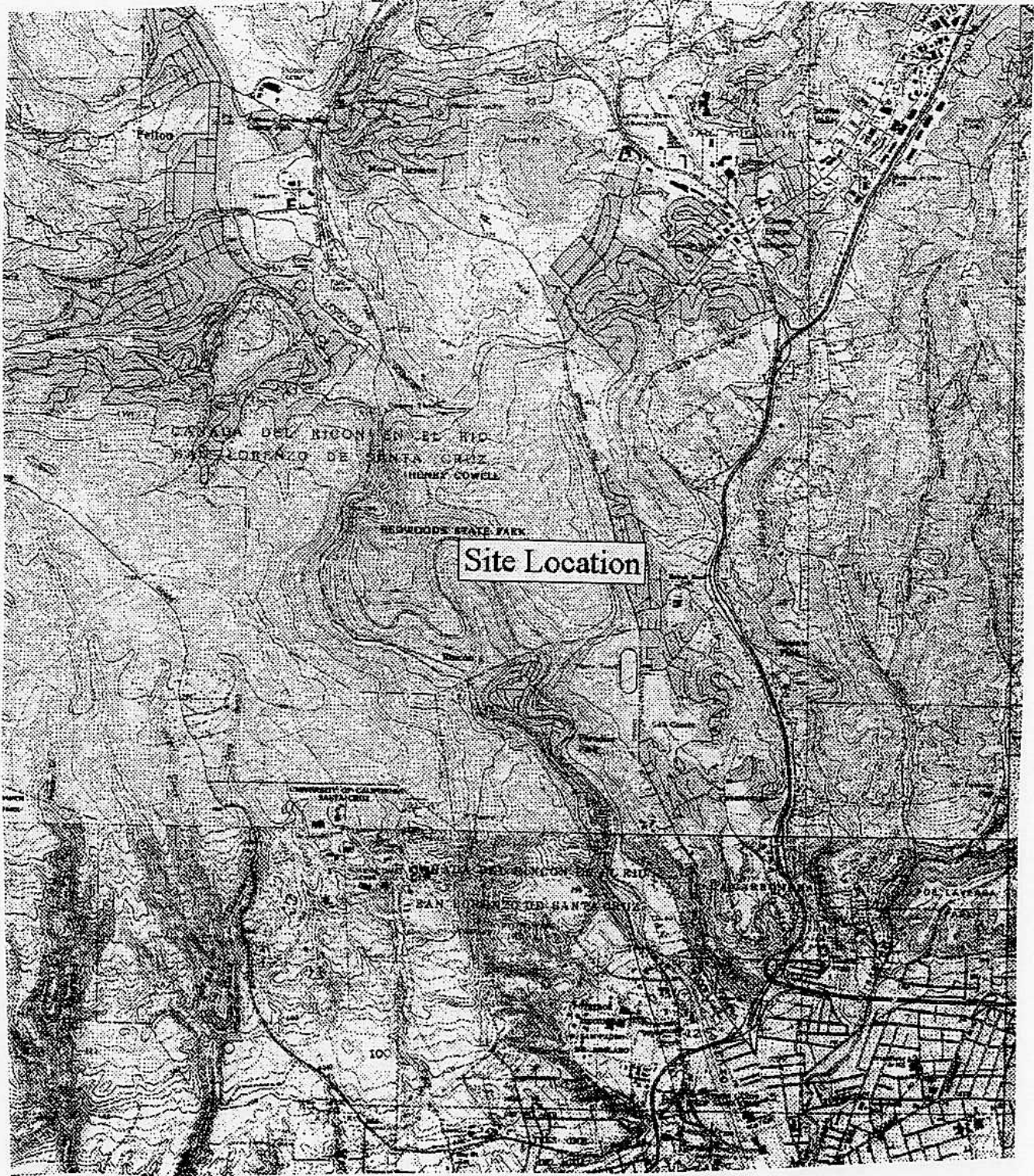
Vicinity Map

Site Plan

Keying and Benching Detail

Subdrain Detail

Boring Logs from Previous Studies



Site Location

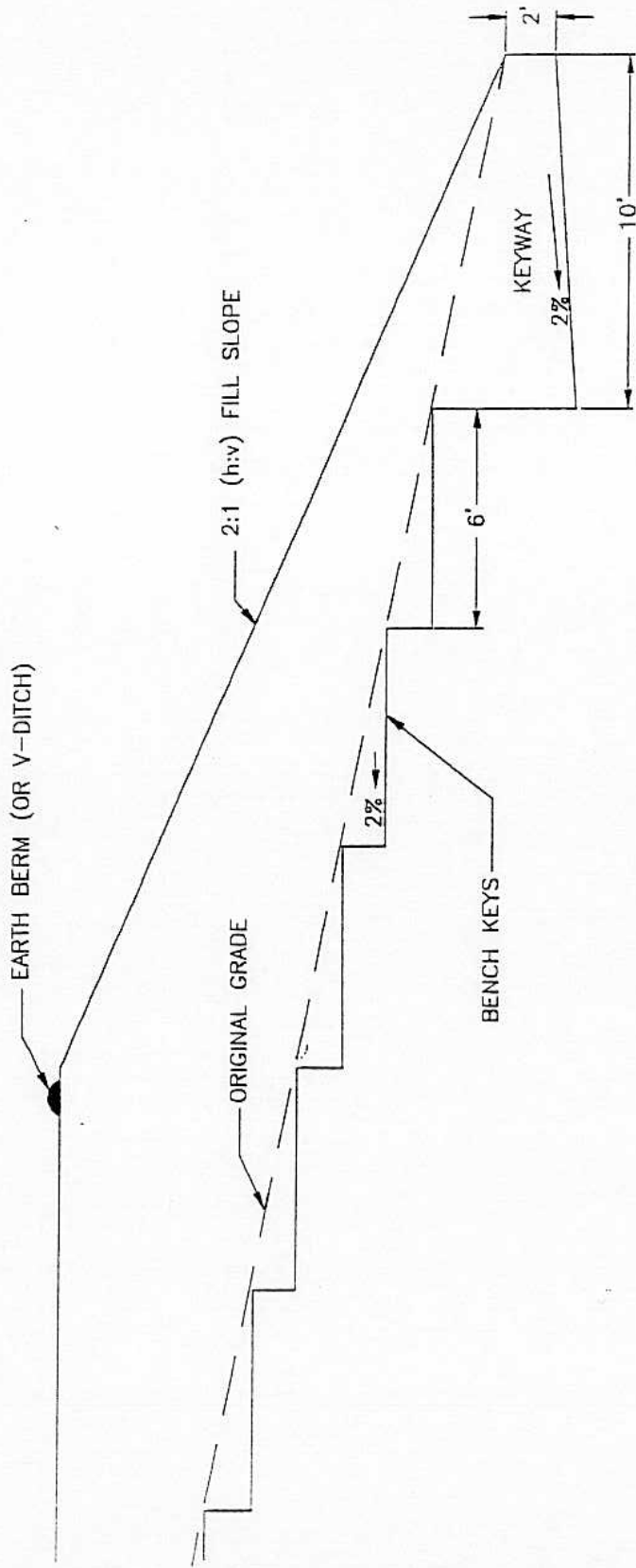
PROJECT No: SC 8904

DATE: 6/20/05

SCALE:

DRAWN BY:

LOT 416, Henry Cowell Dr.
(APN 061-461-46)



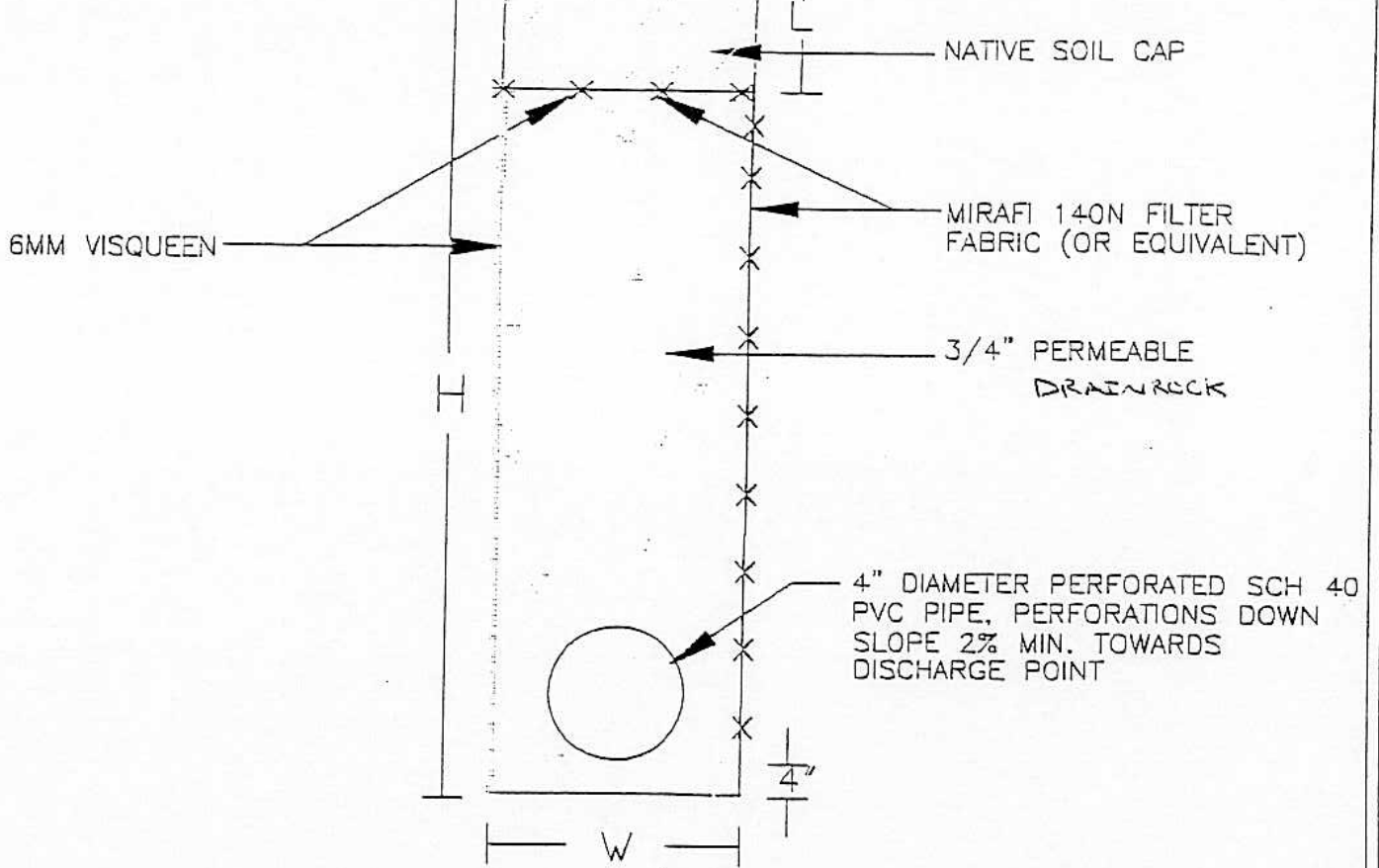
NOTES

1. FOR SLOPES GREATER THAN 20' HIGH, AN INTERMEDIATE BENCH AT LEAST 8 FEET WIDE SHALL BE CONSTRUCTED
2. REFER TO GEOTECHNICAL REPORT FOR COMPACTION REQUIREMENTS.
3. DOWNSLOPE SIDE OF KEYWAY TO BE AT LEAST 2 FEET DEEP BELOW NATIVE GRADE, TO BE VERIFIED BY GEOTECHNICAL ENGINEER
4. DRAWING IS NOT TO SCALE

TYPICAL KEYWAY DETAIL
 FILL SLOPE CONSTRUCTION REQUIREMENTS

EDGE OF BUILDING

GROUND SURFACE



(VARIES) $\left\{ \begin{array}{l} L=6 \text{ INCHES} \\ H= 3.0 \text{ FEET} \\ W= 12 \text{ INCHES} \end{array} \right.$

PROJECT NO:

DATE:

SCALE: NONE

DRAWN BY: DEK

HARC, KASUNICH & ASSOCIATES INC.

TYPICAL SUBDRAIN DETAIL

FIGURE NO.

2 October 1980

LOGGED BY JEK DATE DRILLED 29 Sept. 1980 BORING DIAMETER 2 BORING NO. 2

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. . Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	2-1		Dark brown Silty SAND with organics medium dense		59	4.5+	89	17.1	
2	L		Brown Silty SAND with clay binder, damp, medium dense						
3			Mottled Brown tan Silty SAND with intersperced clay lens (1/2-2" thick) very damp, dense some gravels		84	4.5+	92	21.3	
4	2-2								
5	L								
6			increase in moisture & clay content						
7			marked increase in density						
8									
9									
10									
11									
12			Brown Silty SAND, very damp, dense to very dense						
13			less silt						
14									
15			increase in density and moisture, less silt content						
16									
17			very dense						
18									
19									
20									
21			Boring terminated at 20'						
22									
23									
24									

LOGGED BY SR DATE DRILLED 29 Sept. 1980 BORING DIAMETER 6" BORING NO. 3

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	3-1		Dark Brown Silty SAND with some organic, dry		77	4.5+	96	14.5	0.7% swell Qu=4940 psf
2	L		Brown Silty SAND, dry to damp, dense, some light						
3			Brown Silty SAND with clay lenses, damp very dense						
4			Brown Silty SAND with clay lenses, damp very dense						Qu=11 ksf +
5	3-2		increase in clay content very dense - hand drilling		87	4.5+	107	16	
6	L		increase in clay content very dense - hand drilling						
7			increase in clay content very dense - hand drilling						
8			Gray brown Clayey SAND, damp, very dense						21.7
9			Gray brown Clayey SAND, damp, very dense						
10			Gray brown Clayey SAND, damp, very dense						
11			Gray brown Clayey SAND, damp, very dense						
12			Gray brown Clayey SAND, damp, very dense						
13			Gray brown Clayey SAND, damp, very dense						
14			Darker brown Clayey SAND, less clay content, very dense						
15			Darker brown Clayey SAND, less clay content, very dense						Boring terminated at 20'
16			Darker brown Clayey SAND, less clay content, very dense						
17			Darker brown Clayey SAND, less clay content, very dense						
18			Darker brown Clayey SAND, less clay content, very dense						
19			Brown Clayey SAND, damp, marked decrease in clay, very dense						
20			Brown Clayey SAND, damp, marked decrease in clay, very dense						
21			Boring terminated at 20'						
22									
23									
24									

LOGGED BY SR DATE DRILLED 29 Sept. 1980 BORING DIAMETER 6" BORING NO. 4

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	4-1	█	Dark brown Silty SAND with organics, dry		66	4.5+	106	11.7	Qu=11 ksf +
2	L	█	Brown Silty SAND, dry, medium dense to dense, roots increase in density						
3		█							
4	4-2	█	Mottled Silty SAND with clay lenses, dry, very dense						
5	L	█	Light brown Silty SAND with clay binder Dry, very dense		50/4.5"	4.5+	82	17.5	
6		█							
7		█							
8		█	increase in clay, hand drilling						
9		█							
10		█							
11		█							
12		█							
13		█							
14		█	Brown Silty SAND, dry to damp, very dense, some clay binder						
15		█							
16			Boring terminated at 15'						
17									
18									
19									
20									
21									
22									
23									
24									

LOGGED BY SR DATE DRILLED 29 Sept. 1980 BORING DIAMETER 6" BORING NO. 5

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	5-1 L		Light brown Silty SAND						
2			Light brown Silty SAND, dry, dense, mottled		87	4.5+	104	12.4	Qu=11 ksf +
3									
4									
5			Light brown Silty SAND with clay binder damp, dense						
6									
7			Light brown SAND with trace of Silt, damp, dense						
8									
9			Lighter SAND, clean, damp, dense						
10									
11									
12									
13			increase in moisture						
14									
15			Boring terminated at 15'						
16									
17									
18									
19									
20									
21									
22									
23									
24									

2 October 1980

LOGGED BY SR DATE DRILLED 29 Sept. 1980 BORING DIAMETER 6" BORING NO. 6

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. . Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Brown Silty SAND, dry						
2			clay binder, medium dense clay lense 2-3'						
3									
4			increase in density						
5									
6			Silty SAND, very damp, clay binder						
7									
8			very dense						
9			igneous gravel						
10			less binder						
11									
12			very dense						
13									
14			Tan SAND with trace SILT binder, very damp, very dense						
15									
16			Boring terminated at 15'						
17									
18									
19									
20									
21									
22									
23									
24									

LOGGED BY SR DATE DRILLED 29 Sept. 1980 BORING DIAMETER 6" BORING NO. 7

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	7-1		Brown Silty SAND, fine grained, dry						
2	L		Brown Silty SAND, damp, medium dense		54	4.5+	106	7.9	Qu=3720 psf
3									
4			Brown Silty SAND with clay binder, damp, medium dense, coarser grains						
5	7-2		mottled brown - orange - gray Brown Silty SAND with clay lenses damp, dense		76	4.5+	92	23.8	Qu=11 ksf
6	L								
7									
8									
9									
10			increase in density						
11									
12									
13			Brown Clayey SAND, damp, very dense						
14									
15			Tan SAND, very damp, very dense						
16			Boring terminated at 15'						
17									
18									
19									
20									
21									
22									
23									
24									

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 1

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray, fine Silty SAND, dry, very loose	SM					
2	1-1		Yellow-brown Silty SAND with Gravels, highly weathered, friable, damp, medium dense to dense	SM	63		103	11.4	
3	L								
4									
5	1-2								
6			Buff-white, fine, uniform grain SAND (Tertiary Santa Margarita Sandstone), dry, medium dense	SP	28		97	8.8	
7	L								
8									
9									
10	1-3		Buff-white, fine, uniform grain SAND (Tertiary Santa Margarita Sandstone), dry, medium dense	SP	12		10.0		
11	L								
12	1-4								
13	T								
14			Buff-white, fine, uniform grain SAND (Tertiary Santa Margarita Sandstone), dry, medium dense	SP	38		101	10.0	
15	1-5								
16	L								
17									
18			Buff-white, fine, uniform grain SAND (Tertiary Santa Margarita Sandstone), dry, medium dense	SP	28		95	6.9	
19									
20	1-6								
21	L								
22									
23									

FIGURE NO. 2 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 1(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25	1-7	[Symbol: Dotted pattern]	Yellow-white, fine Silty SAND, (Tertiary Santa Margarita Sandstone)	SP	30		104	9.2	
26	L								
27									
28		[Symbol: Dotted pattern]	Lenses of medium grain SAND with trace Clay binder, moist, medium dense to dense		65		102	6.3	
29									
30	1-8								
31	L								
32									
33									
34		[Symbol: Dotted pattern]	Saturated zone at 40', yellow-brown, angular, coarse grain SAND and small Gravel		68		16.2		
35									
36									
37									
38									
39									
40	1-9								
41	T								
42		[Symbol: Wavy pattern]	Blue-gray Schist, highly weathered, saturated, dense						
43									
44									
45									
46									
47									

FIGURE NO. 3 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 1 (Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
49			Blue-gray Schist, highly weathered, saturated, dense						
50	1-10								
51	T		Blue-green Quartz Diorite, highly weathered, saturated, dense		66			29.5	
52									
53									
54									
55			Dry						
56									
57									
58									
59									
60	1-11				50				
	T				3"				
			BORING TERMINATED AT 60.3'						

FIGURE NO. 4 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 2

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Silty SAND, dry, loose	SM					
2			Gray reddish-brown Clayey SAND to Sandy CLAY, stiff to very stiff	SC					
3									
4									
5									
6			Yellow-brown Clayey SAND, damp	SC					
7									
8									
9			Grading to very fine Silty SAND, damp, medium dense	SM	22		17.3		
10	2-1								
11	T								
12									
13			Gravels at 17', dense						
14									
15									
16									
17			Brown, fine to medium grain SAND (Tertiary Santa Margarita Sandstone), damp, medium dense	SP	26		12.9		
18									
19									
20	2-2								
21									
22	T								
23									

FIGURE NO. 5 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 2(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25	2-3		Brown, fine to medium grain SAND, damp, dense (Tertiary Santa Margarita Sandstone)	SP					
26	T				47			1.8	
27			Whitish, very fine grain at 25.5'						
28									
29									
30			Yellow-brown Silty SAND (more fines than typical S.S.), damp, medium dense	SM					
31									
32									
33									
			Break in Log						
39									
40	2-4								
41	T								
42			Dense		54			6.4	
43									
44									
45									
46			Blue-gray, red Schist, friable, highly weathered, dense						
47									
48									
49									
50	2-5 T				57 6"			10.6	
			BORING TERMINATED AT 50.5'						

FIGURE NO. 6 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 3

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Silty SAND, damp, very loose	SM					
2			Gray CLAY, fat, very stiff	CL					
3									
4			Yellow-brown Silty, fine SAND, damp	SM					
5									
6									
7									
8									
9			Subrounded Gravels 9'-10'±						
10									
11									
12									
13									
14									
15			Large Gravel 14'-15.5'±						
16									
17									
18			Gravels 18'-19'±						
19									
20	3-1								
21									
22	T				28			20.5	
23			Increase in Silt content						

FIGURE NO. 7 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 3(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25			Yellow-brown Silty SAND, damp, medium dense	SM					
26									
27									
28									
29									
30	3-2								
31	T								
32					22			12.2	
33			Grading to a Silty SAND (Tertiary Santa Margarita Sandstone)	SP					
34									
35									
36									
37									
38									
39			Greenish and reddish-brown Quartz Diorite, highly weathered, friable, damp, medium dense						
40	3-3								
41	T								
42					25			19.4	
43									
44									
45	3-4								
46	T								
					33				
BORING TERMINATED AT 46.5'									

FIGURE NO. 8 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-13-88 BORING DIAMETER 6" BORING NO. 4

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Silty SAND, dry, loose	SM					
2			Dark brown Clayey SAND, damp, medium dense	SC					
3									
4									
5									
6									
7			Grading to Silty SAND, damp, medium dense to dense	SM					
8									
9									
10	4-1								
11	L								
12					39		115	9.1	
13									
14			Heavy Gravels at 12.5'						
15									
16			Buff-whitish, very fine SAND (Tertiary Santa Margarita Sandstone), damp, medium dense	SP					
17									
18									
19									
20	4-2								
21	L								
22			Loose to medium dense		21		96	4.0	
23									

FIGURE NO. 9 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 5

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Silty SAND, Topsoil, loose	SM					
2			Yellow, orange-brown Silty SAND with Gravels, damp, medium dense	SM					
3									
4									
5									
6									
7									
8			Heavy Gravels at 8'						
9									
10	5-1								
11									
12	L				29		100	15.0	
13									
14									
15	5-2								
16									
17	L		Yellow-whitish, very fine SAND (Tertiary Santa Margarita Sandstone), damp, medium dense	SP	28		100	4.2	
18									
19									
20									
21									
22									
23			Reddish-brown Decomposed Quartz Diorite, highly weahtered, damp						

FIGURE NO. 11 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 5(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25	5-3		Reddish-brown Decomposed Quartz Diorite, highly weahtered, damp, dense, friable		62 12"		120	4.1	
26	L								
27									
28									
29									
30									
31									
32									
33									
34			Less weathered but fractured						
35									
			BORING TERMINATED AT 35.0'						

FIGURE NO. 12 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 6

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS	
1			Gray Silty CLAY, stiff	CL						
2										
3										
4										
5	6-1		Reddish-brown Silty SAND, damp, mica	SM						
6										
7	6-2	L			30					
8		L	Weathered Gneiss							
9										
10	6-3									
11										
12		L			31		93	20.1	Qu= 7870psf	
13										
14										
15	6-4									
16										
17		L	Greenish-white Decomposed Quartz Diorite, highly weathered, damp, medium dense		28		98	9.3		
18										
19										
20										
21										
22										
23										

FIGURE NO. 13 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 6 (Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25	6-5		Greenish-white Decomposed Quartz Diorite, highly weathered, damp, medium dense		42		113	9.2	
26	L								
27									
28									
29									
30									
31									
32									
33									
34									
35			Fractured rocks		57		118	7.8	
36									
37									
38									
39									
40	6-6								
41	L								
42									
43									
44									
45	BORING TERMINATED AT 45.0'								

FIGURE NO. 14 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 7

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Silty CLAY, dry, loose	CL					
2			Yellow-brown Silty SAND, damp	SM					
3									
4									
5	7-1								
6	T				25		15.9		
7									
8									
9									
10	7-2		Yellow-brown, very fine Silty SAND (Tertiary Santa Margarita Sandstone), damp, loose to medium dense	SP					
11	T				11		8.9		
12									
Break in Log									
20	7-3								
21	T				16		7.4		
22									
23									
24									
25	7-4		Reddish-brown Decomposed Quartz Diorite at 24±, damp, dense, friable						
26	T				$\frac{69}{12''}$		8.5		
27									
28									
29									
30									
BORING TERMINATED AT 30.0'									

FIGURE NO. 15 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 8

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Yellow-brown Silty SAND, damp, loose to medium dense	SM					
2									
3									
4									
5	8-1		Yellow, reddish-brown Decomposed Quartz Diorite, highly weathered, damp, dense		65	118	9.0		
6	L								
7									
8									
9									
10	8-2								
11	T								
12									
13									
14									
15									
16									
17									
24			Break in Log						
25	8-3				56		8.4		
26	T								
			BORING TERMINATED AT 26.5'						

FIGURE NO. 16 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 9


Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Sandy CLAY	CL					
2			Brown Silty SAND, trace Gravels, dry, medium dense	SM					
3									
4									
5	9-1								
6									
7	T		Moist, dense		38			7.9	
8									
9									
10	9-2								
11	T		Gray, medium to coarse grain, small Gravels, moist		25			11.3	
12									
13									
14			Increase in moisture, some plastic Clay binder						
15	9-3								
16									
17	L				44		94	21.1	
18			Gray Clayey SAND, wet	SC					
19			 Water Level, first encountered						
20	9-4								
21									
22	L 9-5				27		96	25.2	
23	S								

FIGURE NO. 17 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-14-88 BORING DIAMETER 6" BORING NO. 9 (Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25	9-6		Gray Clayey, medium grain SAND, wet, medium dense to dense	SC					
26	L		Gravel lenses(?)		49				
27									
28									
29									
30	9-7		Blue-gray Schist, highly weathered						
31									
32									
33									
34									
35									
36									
37									
38									
39									
40	T		Blue-green Quartz Diorite, weathered, dense		26			17.6	
41									
42									
43									
44									
45	BORING TERMINATED AT 45.0'								

FIGURE NO. 18 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 10

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Gray Silty SAND	SM					
2			Gray CLAY, very stiff	CL					
3			Yellowish-gray Clayey, fine SAND, damp, dense	SC					
4	10-1								
5	T				43		13.4		
6			Less binder						
7									
8			Yellow-brown Silty SAND, damp, medium dense	SM					
9	10-2								
10	T				20		10.0		
11									
12									
13									
14									
15									
16									
17			Dark gray-brown Clayey SAND, moist	SC					
18									
19									
20	10-3		▽ Water Level, first encountered						
21	L		Light greenish-brown Clayey, medium to coarse grain SAND, trace of small pebbles, medium dense to dense (Siltstone pebbles)	SP					
22					50		98	20.8	
23									

FIGURE NO. 19 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 10(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25		..	Greenish, gray-brown Clayey SAND with trace of small pebbles, wet, medium dense	SP					
26		..							
27		..							
28		..							
29		..							
30	10-4	—	Medium to coarse grain Sand seams with little to no fines						
31	T	—			25			20.9	
32		—	Break in Log						
43		..							
44		..							
45	10-5	—	Interbedded Clayey Silt lenses .5"-2" thick						
46	T	—			48			23.0	
47		..							
48		..							
48		—	Break in Log						
66		..							
67		..	2'± lense gray Silty CLAY with non-fibrous peat, odorous						
68		..							
69		7<7							
70		—	Weathered Quartz Diorite						
			BORING TERMINATED AT 70.0'						

FIGURE NO. 20 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 11

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Dark brown Silty SAND, dry, loose	SM					
2									
3			Yellow-brown Silty SAND, damp, medium dense	SM					
4			Gravels						
5	11-1								
6	T								
7					27			13.1	
8									
9									
10	11-2								
11	T		Buff, yellow-brown Silty, very fine SAND (Tertiary Santa Margarita Sandstone), dry, dense	SP					
12					36			6.3	
13									
14									
15									
16									
17									
18									
19									
20	11-3								
21	T								
22			Very dense		63			6.3	
23									

FIGURE NO. 21 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 11(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25			Yellow-brown Silty SAND (Tertiary Santa Margarita Sandstone), damp, dense	SP					
26									
27									
28									
29									
30	11-4								
31	T								
32					60			3.0	
33									
34									
35									
36									
37									
38			Orange-brown						
39									
40	11-5								
41	T							2.6	
42			Gray Schist, weathered, damp, soft rock		50			18.2	
43									
44			Break in Log						
49									
50									
			BORING TERMINATED AT 50.0'						

FIGURE NO. 22 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 12

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1		•	Large Cobbles and Gravel in Silty Sand matrix (Quaternary Colluvium), dry	GP					
2		•							
3		•							
4		•							
4			No Gravels at 4'±						
5			Weathered Gneiss						
6									
7									
8			Hard zones						
9									
10	12-1	T	Loose to medium dense		18			3.8	
11									
12									
13									
14									
15	12-2	T			22			2.8	
16									
17									
18									
19									
19			Break in Log						
24									
25	12-3	T			30			3.8	
26									
BORING TERMINATED AT 26.5'									

FIGURE NO. 23 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 13

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Brown Silty SAND, topsoil	SM					
2									
3			Yellow-brown Sandy CLAY, dense	SC					
4									
5									
6			Orange-brown Silty SAND with Gravel	SM					
7									
8									
9									
10									
11									
12									
13			Medium grain SAND						
14			White Silty SAND, very fine SAND, (Tertiary Santa Margarita Sandstone)	SP					
15									
16									
17									
18									
19									
20									
21									
22									
23									

FIGURE NO. 24 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 13(cont)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
24			White Silty, very fine SAND (Tertiary Santa Margarita Sandstone)	SP					
25									
26									
27									
28									
29									
30									
31		▽ Water Table, 7-15-88							
32		Color change to buff-yellow Increase in moisture							
33									
36			Decomposed Gabro, increase in density, blueish-gray, locally greenish						
37									
38			BORING TERMINATED AT 38' - REFUSAL						

FIGURE NO. 25 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-23-88 BORING DIAMETER 6" BORING NO. 14


Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Brown Silty SAND	SM					
2			Sandy CLAY Light brown	CL					
3									
4			Mottled yellow-brown						
5									
6									
7			Yellow-brown Silty CLAY, very stiff	CL					
8									
9			Moist						
10									
11			Gravel lens						
12									
13			Significant increase in moisture						
14									
15									
16									
17									
18									
19									
20									
21									
22									
23		 Water Level, 7-23-88							

FIGURE NO. 26 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 14(cont)


Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
24			Yellow-brown Silty SAND	SM					
25			Gravel lens						
26									
27									
28			Weathered decomposed Quartz Diorite						
29									
30									
			BORING TERMINATED AT 30'						

FIGURE NO. 27 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 15

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Brown Silty SAND	SM					
2			Light brown Sandy CLAY	CL					
3									
4									
5									
6									
7									
8			Light gray Clayey SAND	SC					
9									
10			Yellow-brown						
11									
12									
13									
14			Gravel lens						
15									
16									
17									
18			Increase in moisture						
19									
20									
21									
22									
23			Increase in density						

FIGURE NO. 28 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 15(cont)



Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - L. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
24 25 26			Yellow-brown Clayey SAND	SC					
27			Quartz Diorite						
			BORING TERMINATED AT 27.0'						

FIGURE NO. 29 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 16

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Brown Silty SAND	SM					
2			Brown Sandy CLAY, dense	CL					
3									
4									
5									
6			Light brownish-gray Clayey SAND	SC					
7									
8									
9									
10									
11									
12									
13			Gray CLAY, moist (glayed)	CL					
14									
15									
16									
17			Yellow-brown Silty CLAY	CL					
18									
19			Light brown Sandy SILT	ML					
20									
21									
22									
23									

FIGURE NO. 30 LOG OF TEST BORING

LOGGED BY EV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 16(cont)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
24			Gray SILT, moist	ML					
25			Rusty orange Sands & gravels, rounded	SP					
26			Break in Log						
35									
36			Tertiary Santa Margarita Sandstone, light brown medium SAND, well sorted	SP					
37									
38									
39			Increase in density						
40									
41									
42									
43									
44			Dark brown to reddish-brown Quartz Diorite, denser, 50 blows in 2"						
45			BORING TERMINATED AT 45.0'						

FIGURE NO. 31 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 17

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Brown Silty SAND	SM					
2			Light brown Sandy CLAY	CL					
3									
4									
5									
6			Yellow-brown Clayey SAND, increase in density	SC					
7									
8									
9									
10									
11									
12			Orange-brown, moist						
13			Gravel lens						
14									
15									
16									
17			Silty SAND	SM					
18			Tertiary Santa Margarita Sandstone, orange SAND	SP					
19									
20									
21									
22									
23									

FIGURE NO. 32 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 17(cont)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
24			Teritary Santa Margarita Sandstone, orange SAND	SP					
25									
26			Dense						
27									
28									
29									
30			Buff						
31									
32									
33									
34									
35									
36									
37									
38			Increase in density, gravels						
39			Crystalline bedrock, Quartz Diorite						
40									
			BORING TERMINATED AT 40.0'						

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 18

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Yellow-brown Silty SAND	SM					
2									
3			Yellow-brown Clayey SAND, moist	SC					
4									
5									
6			Gray CLAY	CL					
7			Grades yellow-brown						
8									
9									
10									
11									
12									
13			Clayey SILT	ML					
14			Dense Gravel, Schist, Siltstone & Quartz Diorite, rounded Clay & Sand matrix						
15									
16									
17									
18									
19									
20			Grading gray						
21									
22									
23									

FIGURE NO. 34 LOG OF TEST BORING

LOGGED BY PV DATE DRILLED 7-15-88 BORING DIAMETER 6" BORING NO. 18(cont)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
24			Dense Gravel, Schist, Siltstone and Quartz Diorite						
25									
26									
27									
28									
29									
30			Tertiary Santa Margarita Sandstone, rusty orange SAND, medium grained, moist	SP					
31									
32									
33									
34			Crystalline Decomposed Quartz Diorite bedrock						
35									
			BORING TERMINATED AT 35.0'						

FIGURE NO. 35 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 9-7-88 BORING DIAMETER 6" BORING NO. 19

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			Dark brown Silty SAND, loose	SM					
2									
3			Yellow-brown Silty SAND with Gravel, dry	SM					
4									
5									
6									
7									
8									
9			Buff-yellow and brown Silty SAND, damp (Tertiary Santa Margarita Sandstone)	SP					
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									

FIGURE NO. 36 LOG OF TEST BORING

LOGGED BY JH DATE DRILLED 9-7-88 BORING DIAMETER 6" BORING NO. 19(Con't)

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft.-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
25			Yellow-brown Silty fine SAND, damp, very dense	SP					
26									
27									
28									
29									
30			Reddish-brown and gray Schist						
31									
32									
33									
34									
35	19-1								
36	L				$\frac{100}{5''}$		99	7.1	
37									
38									
			Break in Log						
54									
55	19-2								
56	L				$\frac{90}{10''}$		95	24.9	
57									
58									
			Break in Log						
60	19-3								
	L				$\frac{100}{6''}$		109	13.2	
			BORING TERMINATED AT 60.5'						

FIGURE NO. 37 LOG OF TEST BORING

19 May, 1999 at 01:04







BORE LOG REPORT

PROJECT NO. SC6532

for

**Haro,
Kasunich & Associates,
Inc.**

LEGEND

-  Visible water level description
-  Footnoted water level description
-  Visible soil data
-  Footnoted soil data
-  Visible sample data
-  Footnoted sample data

C:\Program Files\GSS\BoreLog\Sc6532.blf

LOGGED BY J.Cook

DATE DRILLED February 25, 1999

BORING DIAMETER 6"

BORING NO. S-1

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	1 - 1		Topsoil						
1	L		Mottled brown and red lean CLAY with coarse Sand, damp, very stiff (Qt)		19		97	25.0	Unconfined Qu = 2,990 psf
2									
3									
4									
5	1 - 2		Mottled gray and red coarse Sandy CLAY with Silt, damp, hard		42		90	26.3	Unconfined Qu = 3,690 psf
6	L								
7									
8									
9									
10	1 - 3		Light brown gravelly SAND with Silt, damp, dense		40		101	17.9	
11	L		Large metamorphic cobbles(?)						
12									
13									
14			(Tsm)						
15	1 - 4		Tan Silty SAND, dry, medium dense		27		99	12.1	
16	L								
17									
18									
19									
20									
21									
22									
23									
24			Oxidized cuttings						

LOGGED BY J.Cook DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-1

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
26									
27									
28			Weathered Quartz diorite (qd)						
29			Tan to gray Silty fine SAND with globs of red micaceous Sand						
30	1 - 5								
31	T				76			9.8	
32			BORING TERMINATED AT 31.5 ft.						
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									


LOGGED BY J.Cook DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-2

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - L. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	2 - 1	(Qt)	Red to gray coarse Sandy CLAY, dry, very stiff, organics present		27		93	25.2	
2	L								
3									
4									
5	2 - 2		Gray to red Silty SAND with Clay, damp, medium dense		13			28.9	
6	T								
7									
8			Yellow Silty SAND, damp, loose (Tsm)						
9									
10	2 - 3				8			15.5	% Passing #200 Sieve
11	T								16%
12									
13									
14									
15	2 - 4		Loose to medium dense		11			16.8	
16	T								
17									
18									
19									
20	2 - 5		Small amount of Clay present Coarser grained, very moist, medium dense		13			25.1	
21	T								
22	BORING TERMINATED AT 21.5 ft.								
23									
24									

LOGGED BY J.Cook DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-3

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1	3 - 1		Brown Clayey SILT with Sand, moist, loose (Qt)						
2	L		Yellow fine SAND, damp, loose (lens)		22		93	25.7	
3			Dark brown Sandy CLAY with Sandstone clasts, damp, very stiff						
4			Yellow Silty SAND, damp, medium dense (Tsm)						
5	3 - 2								
6	L				16		89	24.6	Direct Shear C = 200 psf $\phi = 33^\circ$
7									
8									
9									
10	3 - 3								
11	T				10			16.4	
12									
13									
14			Slight color change to tan						
15	3 - 4								
16	T		Tan medium Silty SAND, moist, loose to medium dense		10			26.2	
17									
18									
19			Red SAND						
20	3 - 5		Purple						
21	T				35			20.1	
22			Weatheredf Quartz diorite (qd)						
23									
24									

LOGGED BY J.Cook DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-3

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
26			Very hard drilling at 26'						
27									
28									
29									
30									
31			BORING TERMINATED AT 30.0 ft.						
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									


LOGGED BY GB DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-4

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS	
1										
2	4 - 1		Yellow brown Clayey SAND, wet, loose (Qt)							
3	L		Perched water		11		118	15.6		
4			Hole filled up to 4' after drilling (major seep influenced by stream)							
5	4 - 2		Gray brown Clayey SAND, moist, medium dense		26		95	26.4		
6	L								Unconfined Qu = 4,210 psf	
7										
8			(Tsm)							
9										
10	4 - 3		Whitish brown Silty SAND, damp, medium dense		21		99	21.4	% Passing #200 Sieve 21%	
11	L									
12										
13										
14										
15	4 - 4		Medium dense		18			21.6		
16	T									
17										
18										
19			Decomposed Quartz diorite, medium dense (qd)							
20	4 - 5		Decomposed Quartz diorite, medium dense (qd)							
21	T		Harder, denser at 21'		56			21.3		
22			Weathered, fractured Quartz diorite, very dense							
23										
24			BORING TERMINATED AT 23.5 ft.							

LOGGED BY GB DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-5

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - L. s. L. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1									
2	5 - 1	L	Yellow brown Silty SAND, fine to medium grained, damp, medium dense (Qt)		23		92	26.2	
3									
4									
5	5 - 2	L	Medium dense		31		107	16.7	
6									
7			Seep at 7'						
8									
9			Yellow brown Silty SAND, damp, medium dense (Tsm)						
10	5 - 3	T			17			15.8	% Passing #200 Sieve 16%
11									
12									
13									
14			Damp, medium dense						
15	5 - 4	T	Water measured at 15' 3 hours after drilling		17			16.9	
16									
17			More seeps at 17' (water perching on Granite)						
18									
19									
20	5 - 5	T			25			29.8	
21			Decomposed Quartz diorite, dense (qd)						
22									
23									
24									

LOGGED BY GB DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-5

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. l. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
26	S - 6 T				47			15.8	
27			BORING TERMINATED AT 26.5 ft.						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									

LOGGED BY GB DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-6

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1									
2	6 - 1		Orange brown Sandy lean CLAY, moist, very stiff (Qt)		36	97	22.8	Unconfined Qu = 7,850 psf	
3	L								
4									
5	6 - 2		Brown Silty SAND, damp, medium dense		39	95	21.2		
6	L								
7									
8									
9									
10	6 - 3		Alternating layers of Sand, Silty Sand, and Clayey Sand, dense		29		21.5		
11	T								
12									
13									
14									
15	6 - 4		Whitish brown Silty SAND, slightly damp, medium dense (Tsm)		24		12.7		
16	T								
17									
18									
19									
20	6 - 5		Reddish brown, dense		48		14.2		
21	T								
22	BORING TERMINATED AT 21.5 ft.								
23									
24									

LOGGED BY GB DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-7

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS	
1										
2	7-1		Red/orange/gray, lean/fat CLAY with fine Sand, moist, very stiff (Qt)		22		85	31.4	Unconfined Qu = 5,290 psf	
3	L									
4										
5	7-2		Clayey SAND, medium dense		33		94	24.6	Unconfined Qu = 5,120 psf	
6	L									
7										
8										
9										
10	7-3		Clayey SAND		19			13.9		
11	T									
12										
13										
14			Rounded gravels and cobbles 12.5' to 14.5'							
15	7-4		SAND with Chert (Decomposed Granite cobbles?)		40			13.2		
16	T									
17			BORING TERMINATED AT 16.5 ft.							
18										
19										
20										
21										
22										
23										
24										

LOGGED BY GB DATE DRILLED February 25, 1999 BORING DIAMETER 6" BORING NO. S-8

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1									
2	8 - 1		∇ Groundwater encountered Red/brown/gray Sandy lean CLAY, wet, medium stiff (perched water coming in at 2') (Qt)		10		91	29.5	Unconfined Qu = 566 psf
3	L								
4									
5	8 - 2		Moist, very stiff		29		89	26.5	Unconfined Qu = 4,780 psf
6	L								
7									
8									
9									
10	8 - 3		Tan Clayey SAND, moist, medium dense		40		105	18.9	Unconfined Qu = 4,790 psf
11	L								
12									
13									
14									
15	8 - 4		Yellow brown poorly graded SAND, damp, medium dense (Tsm)		27		94	23.4	
16	L								
17	BORING TERMINATED AT 16.5 ft.								
18									
19									
20									
21									
22									
23									
24									

LOGGED BY GB DATE DRILLED April 16, 1999 BORING DIAMETER 6" BORING NO. S-9

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1									
2	9 - 1		Gray and brown Clayey SAND/Sandy CLAY, moist, very stiff (Qt)		29		105	20.9	
3	L								
4									
5	9 - 2		Very stiff		30		84	31.2	
6	L								
7									
8									
9									
10	9 - 3		Whitish brown Silty SAND, damp, medium dense (Tsm)		28		100	11.9	
11	L								
12									
13									
14									
15	9 - 4		Medium dense		24			7.6	
16	T								
17	BORING TERMINATED AT 16.5 ft.								
18									
19									
20									
21									
22									
23									
24									

Unconfined
Qu = 2,850 psf

LOGGED BY GB

DATE DRILLED April 16, 1999

BORING DIAMETER 6"

BORING NO. S-10

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft - lbs.	Qu - t. s. t. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
1			1' dark brown lean CLAY with organics (Qt)						
2									
3									
4									
5	10 - L		Brown gray Clayey SAND, moist, medium dense		27		94	20.5	Unconfined Qu = 2,290 psf
6									
7									
8									
9									
10	10 - L		Quartz diorite cobble, decomposed		46		108	18.5	
11									
12									
13									
14									
15	10 - T		Yellow brown Silty SAND, damp, dense (Tsm)		40			10.4	
16									
17	BORING TERMINATED AT 16.5 ft.								
18									
19									
20									
21									
22									
23									
24									