Coast-Valley Testing, Inc.

Order Number

52663

Reference Number

09-6502

Foundation Exploration

For

The Carey Group, Inc.

5325 Calle Real

Santa Barbara, California 93111

Proposed

Residential Development

457 & 459 N. Hope Avenue

Santa Barbara, California 93110

August 21, 2009

EXHIBIT B

360 South Fairview Avenue Suite A. Goleta. California 93117
Goleta Office (805) 964-3509 Los Olivos Office (805) 688-3577
Fax (805) 964-9897

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INTRODUCTION

The proposed residential development is to be located at 457 & 459 Hope Avenue in Santa Barbara, California as shown on Appendix # 1. The site is presently developed with an existing residence. Site drainage is to the east/west at slopes of 3 to 5 percent.

It is the purpose of this investigation to provide sufficient information about the soils in the supporting soil mantle to enable a suitable foundation design for the proposed structure. This investigation does not include analysis of any geological conditions such as: faults, fractures, potential geological movement, or slope stability. This investigation was conducted in accordance with presently accepted soils engineering procedures consistent with the proposed development and no warranty is implied.

FIELD INVESTIGATION

The subsurface soil conditions were explored by 7 truck mounted auger borings that were drilled to depths of up to 30.0 feet below present ground surface. Soil samples were obtained during the drilling operations for laboratory testing and analysis and the borings were supplemented by 7-field density test that were performed by the tube method. The boring and density test locations are shown on Appendix # 1, while the boring data is presented graphically on Appendix # 2 through #8.

LABORATORY TESTING

Laboratory testing and analysis consisted of soil field moisture content summary, Maximum Density-Optimum Moisture content determinations, field density summary, soil grain size analysis (mechanical and hydrometer method), and soil expansion potential tests. The results of our laboratory testing are presented in the Appendix.

FINDINGS

1. No free ground water was encountered in the borings.
2. In general, the top 18 to 30 inches of existing surface soils were found to be loose and porous, becoming moderately firm to firm below this depth.
3. The existing surface soils were found to be moderately expansive to expansive.
4. Three existing structures are present on the site.
5. At the time of this exploration, surface vegetation consisted of a low grasses, weeds and scattered.

LIQUEFACTION:

Based upon the results of our testing, indicating no free ground water in the top 30.0 feet of existing surface soils and the soils encountered (sandy clays and clayey sand), which are typically non-liquefiable, it is the opinion of this office, that the potential for Liquefaction at this site during Seismic Activity is *Not Probable.*

RECOMMENDATIONS:

Based upon the results of our testing and the understanding of this office that the proposed construction will consist of (9) single family residences (wood frame; slab on grade construction) and the further understanding that the site will be mass graded, to create building pads and street network, this office recommends the following:

GRADING RECOMMENDATIONS:

1. Remove the existing structures including the foundation systems and all other existing man-made facilities, such as septic tanks, leach lines, cisterns, etc.
2. The area to be graded shall be cleared of all surface vegetation, including roots and root structures.
3. In areas where fill is to be placed and the existing slope is less than 10 percent, the top 1.0 foot of existing surface soils be removed or otherwise compacted to a minimum of 90 percent relative compaction, prior to fill placement. If the existing slope is steeper than 10 percent, keys and benches will be required. Keys and benches shall be a minimum of 10.0 feet wide and 36 inches deep and shall be inspected and approved by the soil engineer, prior to fill placement.

#3 – continued -

Subsequent fill shall than be placed in lifts not to exceed 6 inches in depth, moistened or dried to near optimum moisture content and compacted to a minimum of 90 percent relative compaction, up to final grade, as tested and certified by the soil engineer.

4. The Compaction Standard shall be the ASTM D -1557-91.

5. Structures shall not be founded partially on cut and partially on fill. Therefore, grading shall be performed in such a manner that all structures shall be supported on a nearly uniform depth compacted fill. This fill section (over excavation and re-compaction) shall extend a minimum of 24 inches below the bottom of the proposed footings and shall extend a minimum of 5.0 feet beyond the exterior perimeters of the proposed structure, including porches and other appendages. The fill shall be compacted to a minimum of 90 percent relative compaction, as tested and certified by the soil engineer.

6. In patio areas and walkways the top 1.0 foot of sub grade soils shall be removed and re-compacted to a minimum of 90 percent relative compaction, as tested and certified by the soil engineer.

7. In driveway and /or parking areas, the top 1.0 foot of sub grade soils shall be removed and re-compacted to a minimum of 95 percent relative compaction, as tested and certified by the soil engineer.

8. Positive drainage shall be provided away from the proposed structures (5 percent minimum for 10.0 feet).

9. Manufactured slopes (cut and/or fill) shall not exceed 2 horizontal to 1 vertical.

FOUNDATION RECOMMENDATIONS:

1. All footings shall be continuous.

2. All exterior footings shall extend a minimum of 30 inches below outside yard grade, while interior footings shall extend a minimum of 12 inches below the concrete slab sand blanket.

3. This office shall be notified to inspect and approve all footing excavations prior to placing formwork or reinforcing steel.

4. All footing excavations shall be pre-saturated to 140 percent of optimum moisture content, prior to concrete placement, as certified by the soil engineer.

5. All continuous footings shall be reinforced with a minimum of 4-#5 horizontal rebar placed 2 in the top and 2 in the bottom of the footing.

6. All utility trench backfill entering or under structural elements shall be pre-moistened to at/or near optimum moisture content, placed in lifts not to exceed 6 inches in depth and compacted to a minimum of 90 percent relative compaction, as tested and certified by the soil engineer.

7. Concrete slabs on grade shall be a minimum of 4 inches thick and shall be reinforced with a minimum of #3 rebar at 18 inches on center each way and shall be underlain with a 12 inch sand or pea gravel blanket in which an impervious membrane is embedded. The sand and/or gravel blanket shall be compacted to a minimum of 90 percent relative compaction, as tested and certified by the soils engineer.

8. Prior to placement of the concrete slab sand blanket, the concrete slab sub grade soils shall be pre-saturated to 140 percent of optimum moisture content, as certified by the soil engineer.

9. The concrete slab on grade shall be doweled into footings using #3 rebar dowels at 18 inches on center, embedded 24 inches into the footing and bent 36 inches into the concrete slab.

10. If tile or other brittle surfacing is to be placed over concrete slab a "slip sheet" is recommended to reduce the potential for reflective cracking.

11. Concrete slabs shall be placed at a maximum slump of 4 ½ inches. Shrinkage / control joints shall be placed at intervals not to exceed 10.0 foot on center in any direction.

12. Positive drainage shall be provided away from the proposed structures. The current California Building Code requires a 5 percent slope away from the structures for a minimum of 10.0 feet. Where yard setbacks (typically in residential sub divisions), do not allow for 10.0 feet of slope away from the structure, alternatives such as concrete apron, yard drains, etc., that effectively collect and discharge all surface water away from the structures may be utilized (2007 CBC Section 1803.3 pg. 128).

13. The finished structure shall be fitted with rain gutter and down spouts that effective collect and discharge all roof rain water run-off a minimum 10.0 feet away from the structure.

14. Based upon compliance with the above recommendations, a maximum safe soil bearing value 1800 psf , may be assumed, with a one third increase when considering wind or seismic movement.

15. Compliance with the above recommendations will reduce the potential for total settlement to 1 inch and differential settlement to ¾ of an inch in 30.0 feet.

RETAINING WALLS:

1. All retaining wall footings shall bear into firm compacted soil or firm original ground as certified by the soil engineer, prior to placement of rebar or formwork.

2. The following equivalent fluid pressures are applicable for retaining wall design (level backfill – full drained condition).

Active Earth Pressure	Pa	= 63	pcf	(yielding/non-constrained)
Active Earth Pressure	Par	= 82	pcf	(non yielding/fully constrained) (at rest)
Passive Pressure	Pp	= 230	pcf	
Friction Factor	Ff	= 0.25		
Maximum Toe Pressure	Mtp	= 2500	psf	

3. For sloping backfill add 1 pcf for the active case and 1.5 pcf to the at rest case for each 2 degrees of slope inclination.

4. Retaining wall backfill shall be pre-moistened to at/or near optimum moisture content, placed in lifts not to exceed 6 inches in depth and compacted to a minimum of 90 percent relative compaction, as tested and certified by the soil engineer.

PAVEMENT /UTILITIES:

1. Based upon a "R" Value test results of 4 and an assumed traffic index of 4.0 a minimum asphalt concrete section of 0.25 feet of asphalt concrete underlain by 0.80 feet of Class II Aggregate base is appropriate.

2. All aggregate base course and a minimum of 12 inches of sub grade soil shall be compacted to a minimum of 95 percent relative compaction, as tested and certified by the soil engineer.

3. Utility trench backfill and bedding soil shall meet or exceed the requirements of the local jurisdiction specifications.

4. Utility trench backfill shall be pre-moistened to at/or near optimum moisture content, placed in lifts not to exceed 6 inches in depth and compacted to a minimum of 90 percent relative compaction, up to within 18 inches of sub grade elevation. The final 18 inches of utilized trench backfill shall be compacted to a minimum of 95 percent relative compaction. All utility trench backfill shall be tested and certified by the soil engineer.

5. Jetting or ponding of utility trench backfill is not allowed.

PERCOLATION / RETENTION BASIN:

(4) Percolation tests were performed at the subject site at the locations shown on Appendix 1. To provide you with design parameters for retention basin design. The tests were performed in a 12 inch diameter boring with a 6 inch water head. The results of our percolation tests are as follows;

TEST LOCATIONS	DEPTH OF TEST (FT)	PERCOLATION RATE MIN/IN.
1	4.0	85.0
2	3.0	60.0
3	3.5	120.0
4	4.0	60.0

EXPANSIVE SOILS:

The soils at this site are expansive. Expansive soil gradients presented in the attached Appendix, should be review by the engineer, architect, owner and maintenance personnel and considered during the design of the project and future properly maintenance. The recommendations contained in this report address the expansive potential of the onsite soils, provided adequate drainage is provided away from the structure and is maintained throughout the rest of the structures.

Respectfully,
Coast Valley Testing, Inc.

Timothy J. Dolan, President
RCE 33758 Expires 06-30-2010

TJD/cp

Order Number: 52663

Reference Number: 09-6502

* * APPENDIX * *

APPENDIX

I. MAXIMUM DENSITY-OPTIMUM MOISTURE DETERMINATIONS

Maximum Density-Optimum Moisture data was determined in the laboratory using the ASTM D-1557-91 Method of Compaction. The results are as follows:

SOIL TYPE	SOIL DESCRIPTION	DRY DENSITY (LBS/CU.FT)	MOISTURE (%)
I	Brown Silty Sand	126.5	10.0
Curve Points:	(121.6 @ 7.5) (126.0 @ 10.3) (119.3 @ 12.1)		
II	Reddish Brown Sandy Silty Clay	108.0	14.0
Curve Points:	(103.1 @ 11.3) (106.6 @ 13.3) (101.9 @ 15.7)		
III	Dark Brown Silty Sand	118.0	12.5
Curve Points:	(109.0 @ 7.3) (114.7 @ 10.9) (117.3 @ 13.0)		

II FIELD DENSITY SUMMARY

TEST NUMBER	DEPTH (ft)	SOIL TYPE	FIELD MOISTURE (%)	DRY DENSITY (lbs/cu. ft)	% OF MAXIMUM DRY DENSITY
1	1.2	I	4.3	101.7	80.4
2	1.2	I	4.5	98.4	77.8
3	1.5	II	9.7	86.4	80.0
4	1.2	III	3.7	92.9	78.7
5	1.5	II	8.0	88.1	81.6

III

SOIL PARTICLE SIZE ANALYSIS MECHANICAL ANALYSIS

(Values in percent passing)

SIEVE SIZE	B -1 @ 1.0	B -1 @ 3.0	B -1 @ 5.0	B –1 @ 8.0	B – 1 @ 10.0	B – 1 @ 12.0	B – 1 @ 15.0
3/8	100	100	100	100	100	100	100
No. 4	100	100	100	100	100	100	100
No. 8	99	99	100	100	100	100	100
No. 16	98	99	100	100	100	100	100
No. 30	96	98	99	99	99	100	99
No. 50	87	88	90	94	97	98	96
No. 100	70	70	72	77	88	88	87
No. 200	56	61	62	67	76	78	77

III

SOIL PARTICLE SIZE ANALYSIS MECHANICAL ANALYSIS

(Values in percent passing)

SIEVE SIZE	B -1 @ 18.0	B -1 @ 20.0	B -1 @ 25.0	B –1 @ 30.0
3/8	100	100	100	100
No. 4	100	83	100	100
No. 8	100	82	100	98
No. 16	100	81	99	97
No. 30	99	81	97	96
No. 50	97	77	89	76
No. 100	85	67	73	55
No. 200	72	57	59	40

III

SOIL PARTICLE SIZE ANALYSIS MECHANICAL ANALYSIS

(Values in percent passing)

SIEVE SIZE	B -5 @ 1.0	B -5 @ 3.0	B -5 @ 5.0	B –5 @ 8.0	B –5 @ 10.0	B –5 @ 12.0	B – 5 @ 15.0
3/8	100	100	100	100	100	100	100
No. 4	100	100	100	100	100	100	100
No. 8	100	100	100	100	100	97	100
No. 16	99	100	100	100	100	95	100
No. 30	98	99	99	99	99	92	100
No. 50	94	95	95	95	94	85	96
No. 100	83	83	80	84	82	73	82
No. 200	73	72	70	72	72	61	69

III

SOIL PARTICLE SIZE ANALYSIS MECHANICAL ANALYSIS

(Values in percent passing)

SIEVE SIZE	B -7 @ 1.0	B -7 @ 3.0	B -7 @ 5.0
3/8	100	100	100
No. 4	100	100	100
No. 8	100	100	100
No. 16	100	100	100
No. 30	99	99	99
No. 50	95	98	95
No. 100	86	87	85
No. 200	75	79	76

IV BY HYDROMETER

BORING NO.	DEPTH (FT)	SAND (%)	SILT (%)	CLAY (%)	SOIL DESCRIPTION
1	1.0	56	24	20	Silty Sand
1	3.0	46	24	36	Sandy Clay
1	5.0	48	20	32	Sandy Clay
1	8.0	40	24	36	Sandy Clay
1	10.0	24	31	45	Sandy Silty Clay
1	12.0	26	30	44	Sandy Silty Clay
1	15.0	26	28	48	Sandy Silty Clay
1	18.0	30	28	42	Sandy Silty Clay
1	20.0	52	16	32	Sandy Clay
1	25.0	50	22	28	Clayey Sand
1	30.0	62	24	18	Silty Sand
5	1.0	28	32	42	Sandy Silty Clay
5	3.0	32	32	36	Sandy Silty Clay
5	5.0	32	34	34	Sandy Silty Clay
5	8.0	28	28	44	Sandy Silty Clay
5	10.0	32	26	42	Sandy Silty Clay
5	12.0	42	26	32	Sandy Clay
5	15.0	38	28	34	Sandy Silty Clay
7	1.5	34	28	42	Sandy Silty Clay
7	3.0	26	28	46	Sandy Silty Clay
7	5.0	36	19	45	Sandy Silty Clay

V. UBC EXPANSION:

The Expansion Soil Index was determined by the present UBC 29-A

Expansion determination procedure and this index were found to be:

SOIL TYPE	EXPANSION INDEX
B1 @ 2.5	79

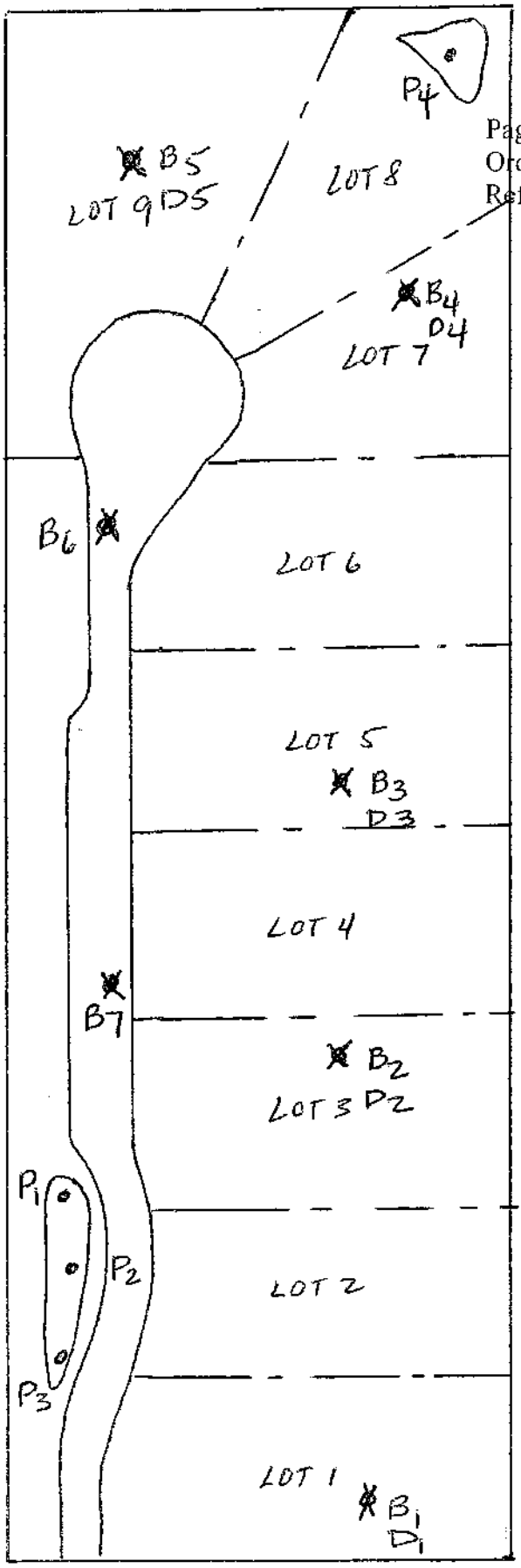
V. EXPANSION TESTS

Expansion tests were performed on a representative soil sample, which was recompacted to 90 percent relative compaction at near optimum moisture content, and allowed to air dry to a moisture content below the shrinkage limit.

SOIL TYPE	SURCHARGE PRESSURE	EXPANSION (%)
B-1 @ 2.5	60	8.1

Appendix # 1

Order Number: 52663
Reference Number: 09-6502



Appendix #1-a

2007 CALIFORNIA BUILDING CODE SEISMIC DESIGN DATA

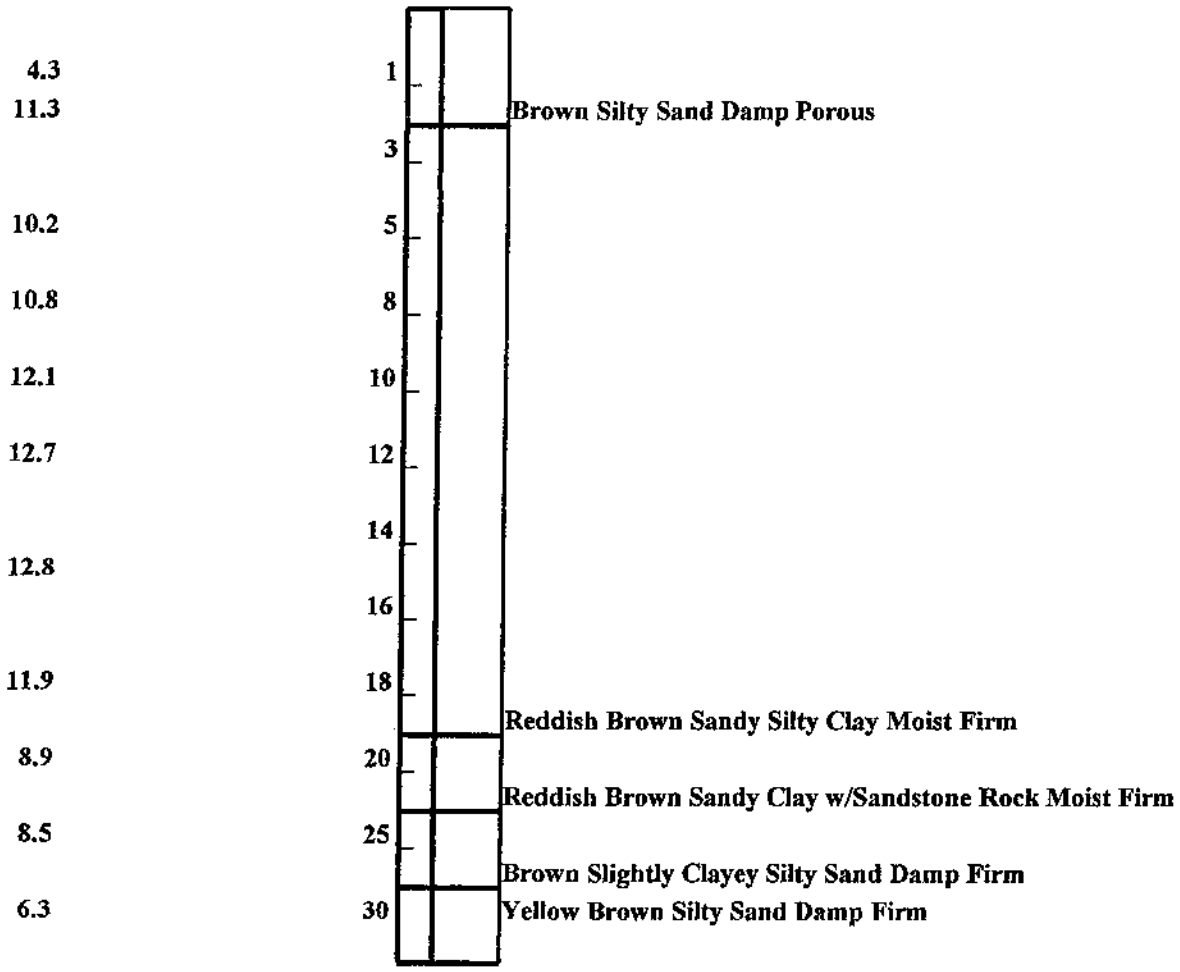
(2003 NEHRP SEISMIC DESIGN PROVISIONS)

SITE LOCATION:	**LATITUDE**	**34.4465**
	LONGITUDE	**119.7466**
SITE CLASS:	**D**	

F (a)	**1.0**	
F (v)	**1.5**	
S (ms)	**1.870**	**EQT.16-37 CBC-07**
S (m1)	**1.107**	**EQT.16-38 CBC-07**
S (ds)	**1.247**	**EQT.16-39 CBC-07**
S (d1)	**0.738**	**EQT.16-40 CBC-07**

MOISTURE %

Boring Log 1



Appendix # 3

Order Number: 52663

Reference Number: 09-6502

BORING LOG

Boring # 2

Moisture %	Depth	SOIL DESCRIPTION
	1	
4.5	2	Brown Silty Sand Damp Porous
11.5	3	
	4	
9.7	5	
	6	
	7	
11.5	8	
	9	
10.1	10	
	11	
10.8	12	
	13	Reddish Brown Sandy Silty Clay Moist Firm
	14	
7.7	15	Brown Slightly Clayey Silty Sand Damp Firm

Appendix # 4

Order Number: 52663

Reference Number: 09-6502

BORING LOG

Boring # 3

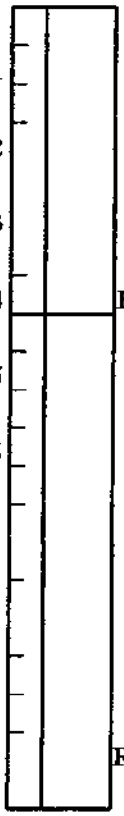
Moisture %	Depth	SOIL DESCRIPTION
9.7	1	Brown Silty Sand Dry Porous
	2	
8.9	3	
	4	
12.4	5	
	6	
	7	
11.3	8	
	9	
12.8	10	
	11	
11.5	12	
	13	
	14	
10.8	15	Reddish Brown Sandy Silty Clay Damp to Moist Moderately Firm to Firm

Appendix # 5

BORING LOG

Boring # 4

Moisture %	Depth	SOIL DESCRIPTION
	1	
	2	
4.4	3	
	4	Brown Silty Sand Damp Porous Moderately Firm to Firm @ 3.0'
8.8	5	
	6	
	7	
9.4	8	
	9	
10.1	10	Reddish Brown Sandy Silty Clay Moist Firm



Appendix # 6

BORING LOG

Boring # 5

Moisture %	Depth	SOIL DESCRIPTION
	1	Brown Silty Sand Damp Porous
	2	
8.1	3	
	4	
7.8	5	
	6	
	7	
9.7	8	
	9	
9.8	10	
	11	Reddish Brown Sandy Silty Clay Moist Firm
7.4	12	
	13	
	14	
8.5	15	Light Brown Clayey Silty Sand w/Sandstone Rock Dry Firm

Appendix # 7

BORING LOG

Boring # 6

Moisture %	Depth	SOIL DESCRIPTION
8.7	1	Brown Silty Sand Damp Porous
9.1	2	
	3	
	4	
10.7	5	Red Brown Sandy Silty Clay Damp Moderately Firm to Firm

Appendix # 8

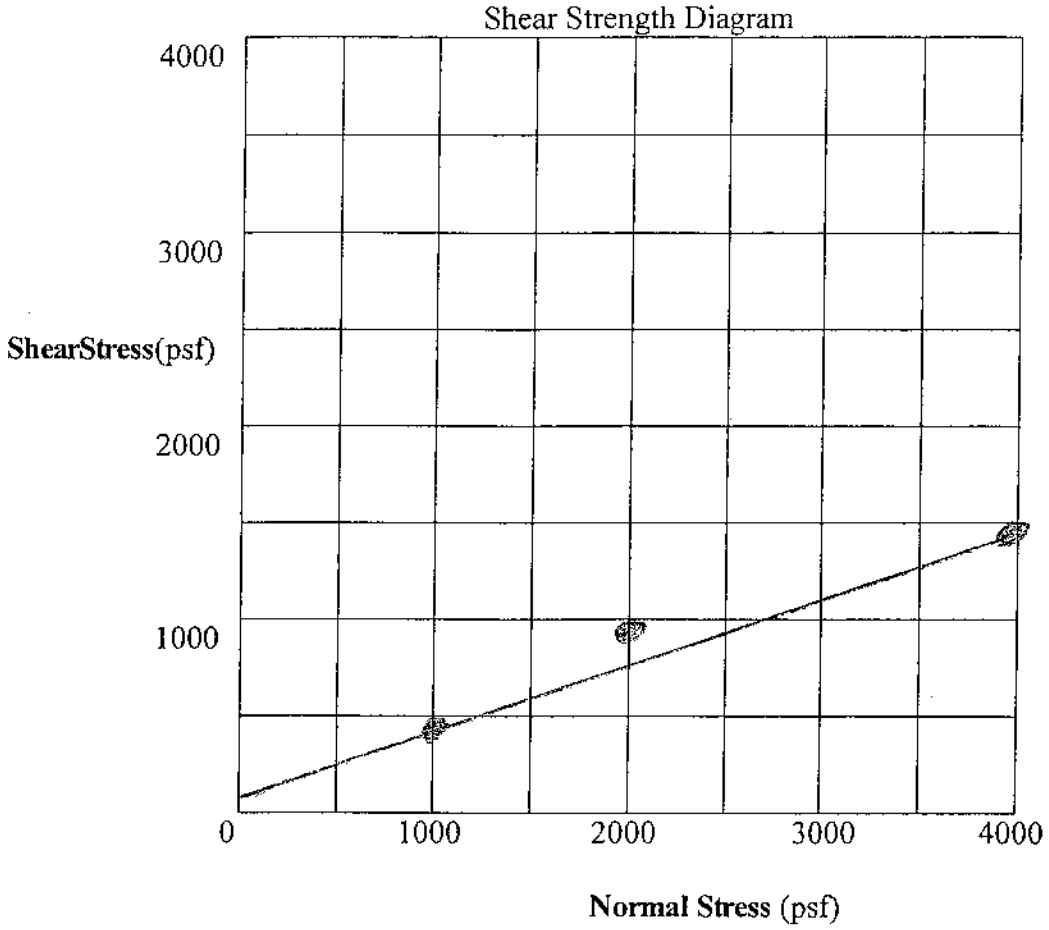
Boring # 7

Moisture %	Depth	SOIL DESCRIPTION
7.5	1	Brown Silty Sand Damp Porous
8.5	2	
	3	
	4	
8.3	5	Red Brown Sandy Silty Clay Damp Firm

DIRECT SHEAR TEST

ASTM D3080-90

(Modified for Unconsolidated Un-drained Conditions)



Sample Location: B-2 @ 3.0

Soil Description: brown clayey silt & fine sand

Peak Shear Angle: 18.3 °

Cohesion: 200 psf

Sample Type: Remolded @ 90 % of maximum dry density – sample fully saturated prior to test

BUREAU VERITAS

RESISTANCE "R" VALUE TEST

(ASTM D2844/CTM301)

July 9, 2009

File No: -
DSA/OSHPD No: -

Coast Valley Testing
360 South Fairview, Suite A
Goleta, California 93117

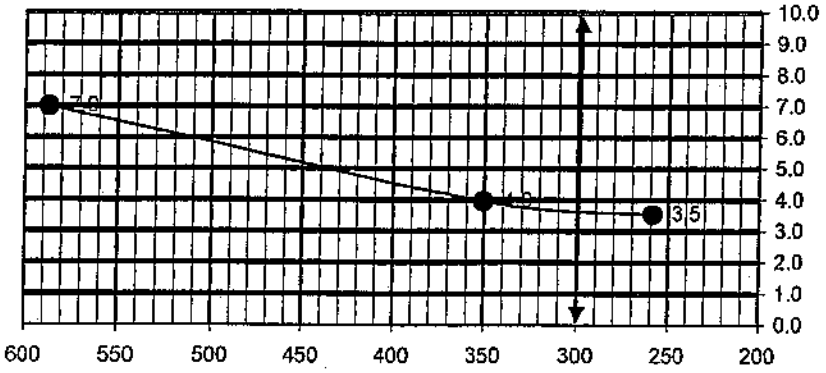
BVNA JOB No: **61243**
LAB No: 81352
W.O. No: -
Bldg. Permit No:
Govt. Contract No: -

Project: Coast Valley Testing-Misc. Tests

Material: Reddish Brown Sandy Clay (CL)
Location: Carey Group
Sampled By: Client
Date Received: 7/7/09

Depth: N/A

"R" VALUE BY EXUDATION GRAPH



TEST SPECIMEN	A	B	C	D
COMP. FOOT PRESSURE, psi	50	100	150	
INITIAL MOISTURE %	9.3	9.3	9.3	
MOISTURE @ COMPACTION %	24.4	21.7	19.4	
DRY DENSITY, pcf	100.1	106.2	111.2	
EXUDATION PRESSURE, psi	258	350	587	
STABILOMETER VALUE 'R'	3.54	3.95	7.00	
			R-Value @ Equilibrium = 4	

Reviewed By:

93003

EXPANSIVE SOIL GUIDELINES

The following expansive soil guidelines are provided for your project. The intent of these guidelines is to inform you, the client, of the importance of proper design and maintenance of projects supported on expansive soils. ***You, as the owner or other interested party, should be warned that you have a duty to provide the information contained in the soil report including these guidelines to your design engineers, architects, landscapers and other design parties in order to enable them to provide a design that takes into consideration expansive soils.***

In addition, you should provide the soil report with these guidelines to any property manager, lessee, property purchaser or other interested party that will have or assume the responsibility of maintaining the development in the future.

Expansive soils are fine grained silts and clays which are subject to swelling and contracting. The amount of this swelling and contracting is subject to the amount of fine grained clay materials present in the soils and the amount of moisture either introduced or extracted from the soils. Expansive soils are divided into five categories ranging from "very low" to "very high." Expansion indices are assigned to each classification and are included in the laboratory testing section of this report. *If the expansion index of the soils on your site, as stated in this report, is 21 or higher, you have expansive soils.* The classifications of expansive soils are as follows:

Classification of Expansive Soil

Expansion Index	Potential Expansion
0 – 20	Very Low
21 – 50	Low
51 – 90	Medium
91 – 130	High
Above 130	Very High

When expansive soils are compacted during site grading operations, care is taken to place the materials at or slightly above optimum moisture levels and perform proper compaction operations. Any subsequent excessive wetting and/or drying of expansive soils will cause the soil materials to expand and/or contract. These actions are likely to cause distress of foundations, structures, slabs-on-grade, sidewalks and pavement over the life of the structure. ***It is therefore imperative that even after construction of improvements, the moisture contents are maintained at relatively constant levels, allowing neither excessive wetting or drying of soils.***

Evidence of excessive wetting of expansive soils may be seen in concrete slabs, both interior and exterior. Slabs may lift at construction joints producing a trip hazard or may crack from the pressure of soil expansion. Wet clays in foundation areas may result in lifting of the structure causing difficulty in the opening and closing of doors and windows, as well as cracking in exterior and interior wall surfaces. In extreme wetting of soils to depth, settlement of the structure may eventually result. Excessive wetting of soils in landscape areas adjacent to concrete or asphaltic pavement areas may also result in expansion of soils beneath pavement and resultant distress to the pavement surface.

Excessive drying of expansive soils is initially evidenced by cracking in the surface of the soils due to contraction. Settlement of structures and on-grade-slabs may also eventually result along with problems in the operation of doors and windows.

Projects located in areas of expansive clay soils will be subject to more movement and "hairline" cracking of walls and slabs than similar projects situated on non-expansive sandy soils. There are, however, measures that developers and property owners may take to reduce the amount of movement over the life of the development. The following guidelines are provided to assist you in both design and maintenance of projects on expansive soils:

- Drainage away from structures and pavement is essential to prevent excessive wetting of expansive soils. Grades of at least 5% should be designed and maintained to allow flow of irrigation and rain water to approved drainage devices or to the street. Any "ponding" of water adjacent to buildings, slabs and pavement after rains is evidence of poor drainage; the installation of drainage devices or regarding of the area may be required to assure proper drainage. Installation of rain gutters is also recommended to control the introduction of moisture next to buildings. Gutters should discharge into a drainage device or onto pavement which drains to roadways.

- Irrigation should be strictly controlled around building foundations, slabs and pavement and may need to be adjusted depending upon season. This control is essential to maintain relatively uniform moisture content in the expansive soils and to prevent swelling and contracting. Over-watering adjacent to improvements may result in damage to those improvements. Coast Valley Testing Inc. makes no specific recommendations regarding landscape irrigation schedules.

- Planting schemes for landscaping around structures and pavement should be analyzed carefully. Plants (including sod) requiring high amounts of water may result in excessive wetting of soils. Trees and large shrubs may actually extract moisture from the expansive soils, thus causing contraction of the fine grained soils.

- Thickened edges on exterior slabs will assist in keeping excessive moisture from entering directly beneath the concrete. A six inch thick or greater deepened edge on slabs may be considered. Underlying interior and exterior slabs with 6 to 12 inches or more of non expansive soils and providing presaturation of the underlying clayey soils as recommended in the soil report will improve the overall performance of on grade slabs.

- Recommendations of the soil report should always be followed in the development of the project. Any recommendations regarding presaturation of the upper sub grade soils in slab areas should be performed in the field and verified by the Soil Engineer.