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Soil Reports • Site Assessments • Manufactured Home Foundations • Expert Witness • Real Estate Inspections

Project No. 14047
January 5, 2017

David Joseph
193 Vega Road
Watsonville, California 9507

SUBJECT: **ADDENDUM TO GEOTECHNICAL INVESTIGATION REPORT**
Proposed Steel Buildings and Office Building
1400 Ranport Road, Watsonville, California
Portion of APN: 052-511-08

REFERENCES: See Attached

Dear Mr. Joseph:

Based on our review of the current plans for the site prepared by Roper Engineering (Reference 3), it is our understanding that you are planning on extending the footprint of Storage Warehouse #1. The new footprint will extend beyond the setback of 100 feet from the centerline of Harkins Slough which was recommended in the referenced Geotechnical Investigation report (Reference 2). Additionally, a new office building and another warehouse building are now proposed.

As a result of the changes to the proposed development, we advanced 3 borings in the areas of the new development. The locations of the borings are shown on **Figure A-1.**

Details of the field exploration and laboratory testing are presented in Appendix A.

The conclusions and recommendations based on our field exploration are presented herein.

New Storage Warehouse #1 and #2

a. Boring B-6 was advanced in the area of the footprint of Storage Warehouse #1, where it is located in the setback of 100 feet from the centerline of Harkins Slough. Boring B-7 was advanced in the area of Storage Warehouse #2. The soil stratums encountered were generally consistent with the initial borings advanced at the site.

b. It is our opinion that the warehouse structures may be supported by a **foundation system composed of helical screw piles** founded below the liquefiable stratum and peat layers, in accordance with our original report (Reference 2). Recommendations for these foundation systems are provided in Section 5.3, Foundations.

New Office Building

a. Boring B-8 was advanced in the area of the proposed office building. The soil stratums encountered were fairly consistent with the initial borings advanced at the site.

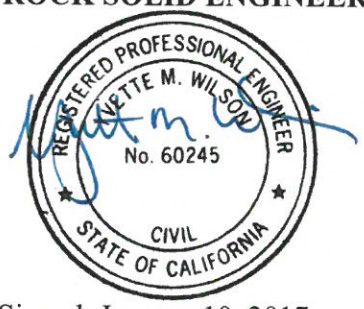
b. It is our opinion that the proposed office building may be supported by a **foundation system composed of helical screw piles** founded below the liquefiable stratum and peat layers, in accordance with our original Geotechnical Investigation report (Reference 2). Recommendations for these foundation systems are provided in Section 5.3, Foundations.

c. A significant layer of peat was encountered underlying the building pad. The peat layer may cause significant settlement of concrete slab floors. Based on the potential for settlement of the building site, we recommend that the new office building be designed with raised wood floors supported by the helical anchors. Should the office building be designed with slab-on-grade floors the slab shall be designed to span all loads to the helical anchors. For further recommendations see Section 5.5 of our original Geotechnical Investigation report (Reference 2), Slabs-on-Grade.

The remaining portions of the Geotechnical Investigation report generally continue to apply. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

Sincerely,

ROCK SOLID ENGINEERING, INC.



Signed: January 10, 2017

Yvette M. Wilson, P.E.
Principal Engineer
R.C.E. 60245

Attachments: References
Appendix A: Field Exploration and Laboratory Testing Program

Distribution: (4) Addressee and via email

REFERENCES

1. Mid Coast Engineers, Topographic Map, Western Farm Service, APN 052-011-58, Job No. 95109, Revision Date, 4-17-96.

2. Rock Solid Engineering, Inc., Geotechnical Investigation-Design Phase, Proposed Steel Building, 1400 Ranport Road, Watsonville, Santa Cruz County, California, APN: 052-511-08, Job No. 14047, Dated November 10, 2014.

3. Roper Engineering, New Processing Mill for Pacific Coast Hardwoods, 1400 Ranport Road, APN 052-511-06 & 058, Job No. 15027, Sheet C2, Dated July 11, 2016.

APPENDIX A

FIELD EXPLORATION AND LABORATORY TESTING PROGRAM

- Field Exploration Procedures — Page A-1
- Laboratory Testing Procedures — Page A-2
- Boring Location Plan — Figure A-1
- Key to Logs — Figure A-2
- Logs of Exploratory Borings — Figures A-3 thru A-5
- Summary of Laboratory Test Results — Figure A-6
- Consolidation Test Results — Figures A-7 and A-8

FIELD EXPLORATION PROCEDURES

A-1. Subsurface conditions were explored by drilling 3 borings to depths between 25 and 40 feet below existing grade. The borings were advanced with a truck mounted drill rig equipped with 8 inch hollow stem augers. The approximate locations of the borings are shown on the Boring Location Plan, **Figure A-1**. The Key to Logs, **Figure A-2**, gives definitions of the terms used in the Logs of Exploratory Borings. The Logs of Exploratory Borings are presented in **Figures A-3** through **A-5**.

A-2. Drilling of the borings was observed by our Field Engineer who logged the soils and obtained bulk and relatively undisturbed samples for classification and laboratory testing. The soils were classified, based on field observations and laboratory testing, in accordance with Unified Soil Classification System.

A-3. Relatively undisturbed soil samples were obtained by means of a drive sampler. The hammer weight and drop being 140 pounds and 30 inches, respectively. The number of "Blows/Foot"required to drive samplers are indicated on the logs.

A-4. Exploratory borings were located in the field by measuring from know landmarks. The locations, as shown, are therefore within the accuracy of such a measurement.

A-5. Groundwater was encountered at depths between 13.5 and 28 feet below existing grade during the course of our field exploration.

LABORATORY TESTING PROCEDURES

A-6. Classification

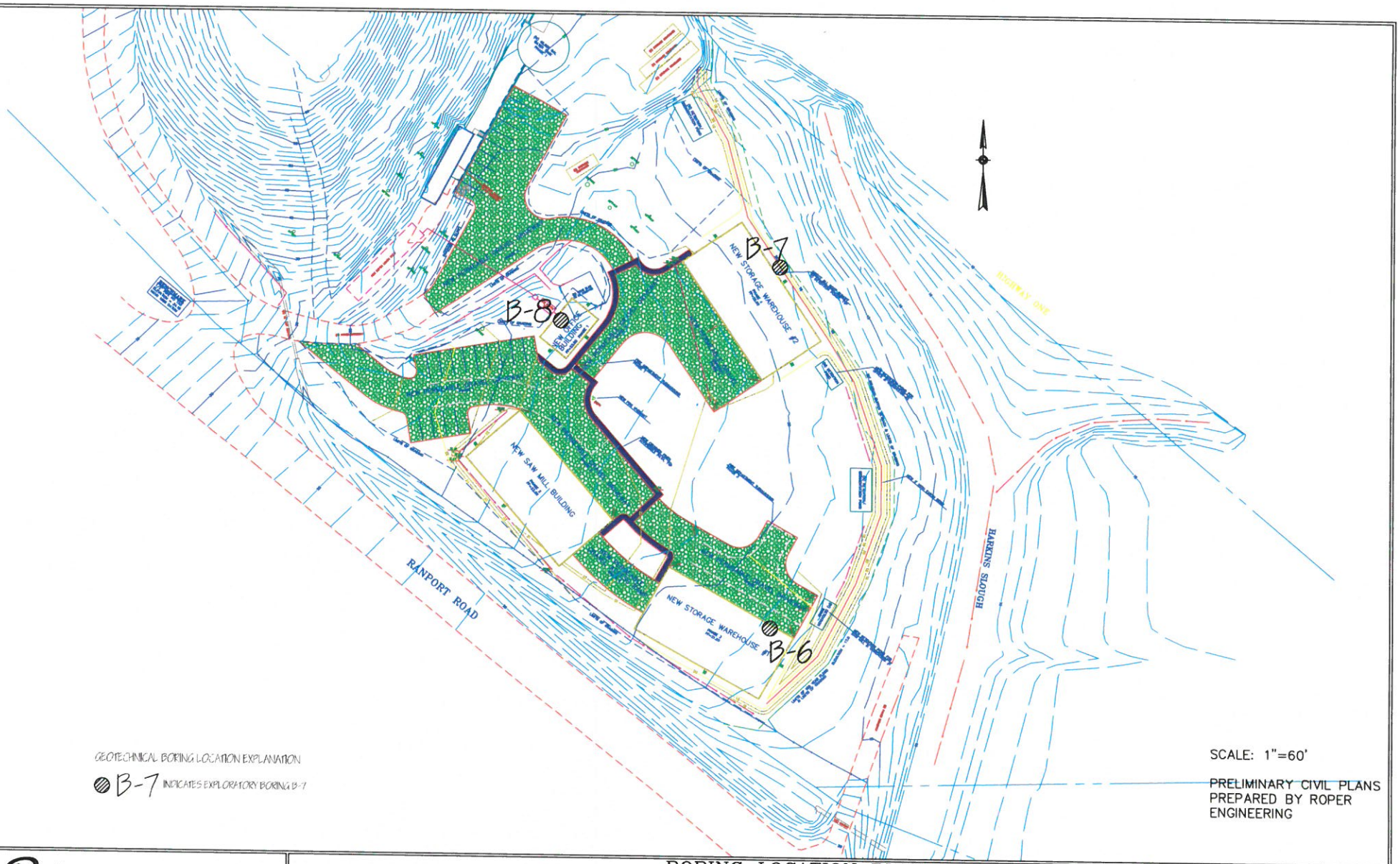
Soils were classified in accordance with the Unified Soil Classification System. Moisture content and in-situ density determinations were made from relatively undisturbed soil samples. The results are presented in the Logs of Exploratory Borings and in the Summary of Laboratory Test Results, **Figure A-6**.

A-7. Consolidation

Consolidation tests were performed on representative, relatively undisturbed samples of the underlying soils to determine compressibility characteristics. The samples were saturated during the tests to simulate possible adverse field conditions. The test results are presented in **Figures A-7 and A-8**.

A-8. Soluble Sulfates

The soluble sulfate content was determined for samples considered representative of the on-soils likely to come in contact with concrete in accordance with test method California 417. The test results are presented in **Figure A-6**.



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BORING LOCATION PLAN

1400 RANPORT ROAD
WATSONVILLE, CALIFORNIA

FIGURE A-1

KEY TO LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS More than half of the material is larger than the No. 200 sieve	GRAVELS More than half of the coarse fraction is larger than the No. 4 sieve	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS More than half of the coarse fraction is smaller than the No. 4 sieve	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		SAND WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS More than half of the material is smaller than the No. 200 sieve	SILTS AND CLAYS Liquid limit less than 50		ML	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50		MH	Inorganic silts, micaceous or diatomacaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils

GRAIN SIZE LIMITS

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

No. 200 No. 40 No. 10 No. 4 3/4 in. 3 in. 12 in.

US STANDARD SIEVE SIZE

RELATIVE DENSITY	
SAND AND GRAVEL	BLOWS/FT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY	
SILT AND CLAY	BLOWS/FT*
VERY SOFT	0 - 2
SOFT	2 - 4
FIRM	4 - 8
STIFF	8 - 16
VERY STIFF	16 - 32
HARD	OVER 32

MOISTURE CONDITION
DRY
DAMP
MOIST
WET

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1 3/8 inch I.D.) split spoon (ASTM D-1586).

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B6
Project:	1400 Ranport Road Watsonville, California	Location:	Storage Warehouse #1
		Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem Auger, 140lb. Safety Hammer
Logged By:	YW/CF		

2" DIA Sample; 2.5" DIA Sample w/ Liners; Bulk Sample; Terzaghi Split Spoon Sample; 2.5" DIA Sample w/out Liners; Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear ϕ°	Miscellaneous Laboratory Testing
	SP			Brown SAND with Trace Fines. Dry to Moist, Non-Plastic. (Possible Fill)							
5	CL		X	Blue Grey CLAY. Moist to Wet, Firm, Plastic. (Native). Black Silty CLAY. Moist to Wet, Firm, Plastic.	6						
10	CL		X	Black Silty CLAY. Wet, Firm, Plastic.	7						
	Pt		X	Dark Brown Peat.							
	CL		X	Black Silty CLAY. Wet, Stiff, Plastic. Wood at Bottom of Sample.	15						
15											
	Pt		X	Dark Brown Peat.							
20	CL		X	Black Silty CLAY with Organics. Wet to Saturated, Firm, Plastic.	7		59.0				
				Material Consistent.							
25	CL		X	Blue Grey Clayey SAND. Wet, Loose, Medium Plastic. Trace Gravels. No Organics.	8		19.1				

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FIGURE A-3.1

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B6 Continued
Project:	1400 Ranport Road	Location:	Storage Warehouse #1
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem Auger, 140lb. Safety Hammer
Logged By:	YW/CF		

2" DIA Sample; 2.5" DIA Sample; Bulk Sample; Terzaghi Split Spoon Sample; Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
	CL		X	Material Consistent. Clay Content Varies. Some Sandstone Clasts.	12		18.0				
	▽			Groundwater.							
	SC		X	Greyish Brown Clayey SAND with Gravels. Saturated, Loose, Non-Plastic.	14						
30				Boring Terminated @ 30 ft. Groundwater Encountered @ 28 ft. Boring Backfilled with Cuttings.							
35											
40											
45											
50											

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FIGURE A-3.2

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B7
Project:	1400 Ranport Road Watsonville, California	Location:	Storage Warehouse #2
		Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem Auger, 140lb. Safety Hammer
Logged By:	YW/CF		

2" DIA Sample; 2.5" DIA Sample; Bulk Sample; Terzaghi Split Spoon Sample; Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
				FILL: Brown Silty SAND. Dry, Non-Plastic.							
	SM			Brown Silty SAND. Dry, Loose, Non-Plastic. Organics, Wood Chips, Some Gravels.	9	100.2	15.0	115.2			Consolidation
	ML			Dark Gray to Black Clayey SILT. Moist, Plastic. No Recovery	7						
5				Layer of Wood and Roots							
	CL			**NATIVE**: Dark Gray to Black Silty CLAY. Wet, Very Soft, Plastic.	3						
	SC			Gray Clayey SAND. Wet to Saturated, Non-Plastic. Some Organics.							
	Pt			Dark Brown Clayey SILT. Wet. Highly Organic. Material Consistent.	8						
10	SC			Dark Gray Clayey SAND. Wet, Loose.							
	CL			Blue Gray Silty CLAY. Wet, Firm, Plastic. Some Organics.	6						
				Dark Gray CLAY. Moist to Wet, Plastic. No Organics.							
	CL			Blue Gray Silty CLAY. Wet, Stiff, Plastic. Some Organics.	16						
15	Pt			Peat.							
				Peat.	6						
				Peat.	7		233.7				
20				Peat.							
	CL			Dark Gray to Black Silty CLAY. Wet, Firm, Plastic. No Organics.	6		32.5				
25				Dark Gray to Black Sandy CLAY. Wet, Stiff, Medium Plastic. No Organics.	12		20.0				

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FIGURE A-4.1

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B7 Continued
Project:	1400 Ranport Road	Location:	Storage Warehouse #2
	Watsonville, California	Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem Auger, 140lb. Safety Hammer
Logged By:	YW/CF		

2" DIA Sample; 2.5" DIA Sample; Bulk Sample; Terzaghi Split Spoon Sample; Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear ϕ °	Miscellaneous Laboratory Testing
	CL			Dark Gray to Black Sandy CLAY. Wet, Stiff, Medium Plastic. Sandier with Depth							
			X	Dark Gray Clayey SAND.	12		17.7				
	SC	X	X	Gray Clayey SAND. Wet to Saturated, Loose, Medium Plastic	12						
30				Material Consistent.							
	CL		X	Gray Sandy CLAY. Wet, Stiff, Medium Plastic. Trace Gravels.	11						
	SC			Groundwater. Blue Gray Clayey SAND. Saturated, Loose, Medium Plastic. Clay Content Varies.	7						
35											
	SP-SC			Blue Gray SAND. Saturated, Dense, Non-Plastic. Some Gravels.	58						
40				Boring Terminated @ 40 ft. Groundwater Encountered @ 33.5 ft. Groundwater Measured After Drilling @ 20 ft. 5 in. Boring Backfilled with Cuttings.							
45											
50											

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FIGURE A-4.2

LOG OF EXPLORATORY BORING

Project No.:	14047	Boring:	B8
Project:	1400 Ranport Road Watsonville, California	Location:	Proposed Office
		Elevation:	
Date:	September 28, 2016	Method of Drilling:	Truck Mounted Drill Rig, 8in. Hollow Stem Auger, 140lb. Safety Hammer
Logged By:	YW/CF		

2" DIA Sample; 2.5" DIA Sample; Bulk Sample; Terzaghi Split Spoon Sample; Static Water Table

Depth (ft.)	Soil Type	Undisturbed	Bulk	Description	Blows	Dry Density (pcf)	Moisture Content (%)	Wet Density (pcf)	Direct Shear c (psf)	Direct Shear φ°	Miscellaneous Laboratory Testing
				FILL: Light Brown Silty SAND. Dry, Non-Plastic.							
	SM			Light Brown Silty SAND. Dry, Medium Dense, Non-Plastic.							
	SC			Dark Brown Clayey SAND.	31	105.4	15.4	121.6			Consolidation Sulfate
				Material Consistent. Loose. Trace Gravels.	8						
5				Material Consistent. Small Roots and Orange Staining.	11						
	CL			Dark Brown Sandy CLAY with Orange Staining. Moist, Soft, Medium Plastic. Trace Organics.							
10				Dark Gray Silty CLAY. Wet, Soft, Plastic. No Organics.	4						
				Groundwater.							
	SC			Gray Clayey SAND. Saturated, Loose, Non-Plastic.							
15	CL			Gray Silty CLAY. Saturated, Firm, Plastic.	9						
	Pt			Peat.							
	CL			Black Silty CLAY with Organics. Firm, Wet.							
	Pt			Peat.	5						
	Pt			Peat.							
20	CL			Black Silty CLAY. Wet, Soft, Plastic. Organics Present.	4						
				Boring Terminated @ 25 ft. Groundwater Encountered @ 13.5 ft. Boring Backfilled with Cuttings.							
25	SC			Gray Clayey SAND. Wet, Stiff, Medium Plastic.	10		21.0				

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FIGURE A-5

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH	SOIL TYPE	IN-SITU			DIRECT SHEAR		GRAIN SIZE (%)				EXPANSION INDEX	SOLUBLE SULFATES (ppm)
			DRY DENSITY (pcf)	MOISTURE CONTENT (%)	WET DENSITY (pcf)	COHESION (psf) (PEAK)	FRICTION ANGLE (PEAK)	GRAVEL	SAND	SILT	CLAY		
B6	18.5B	CL		59.0									
B6	23.5	CL		19.1									
B6	25.0	CL		18.0									
B7	2.0	SM	100.2	15.0	115.2								
B7	18.5	Pt		233.7									
B7	20.0	CL		32.5									
B7	23.5	CL		20.0									
B7	25.0	SC		17.7									
B8	1.0	SC	105.4	15.4	121.6								130
B8	23.5	SC		21.0									

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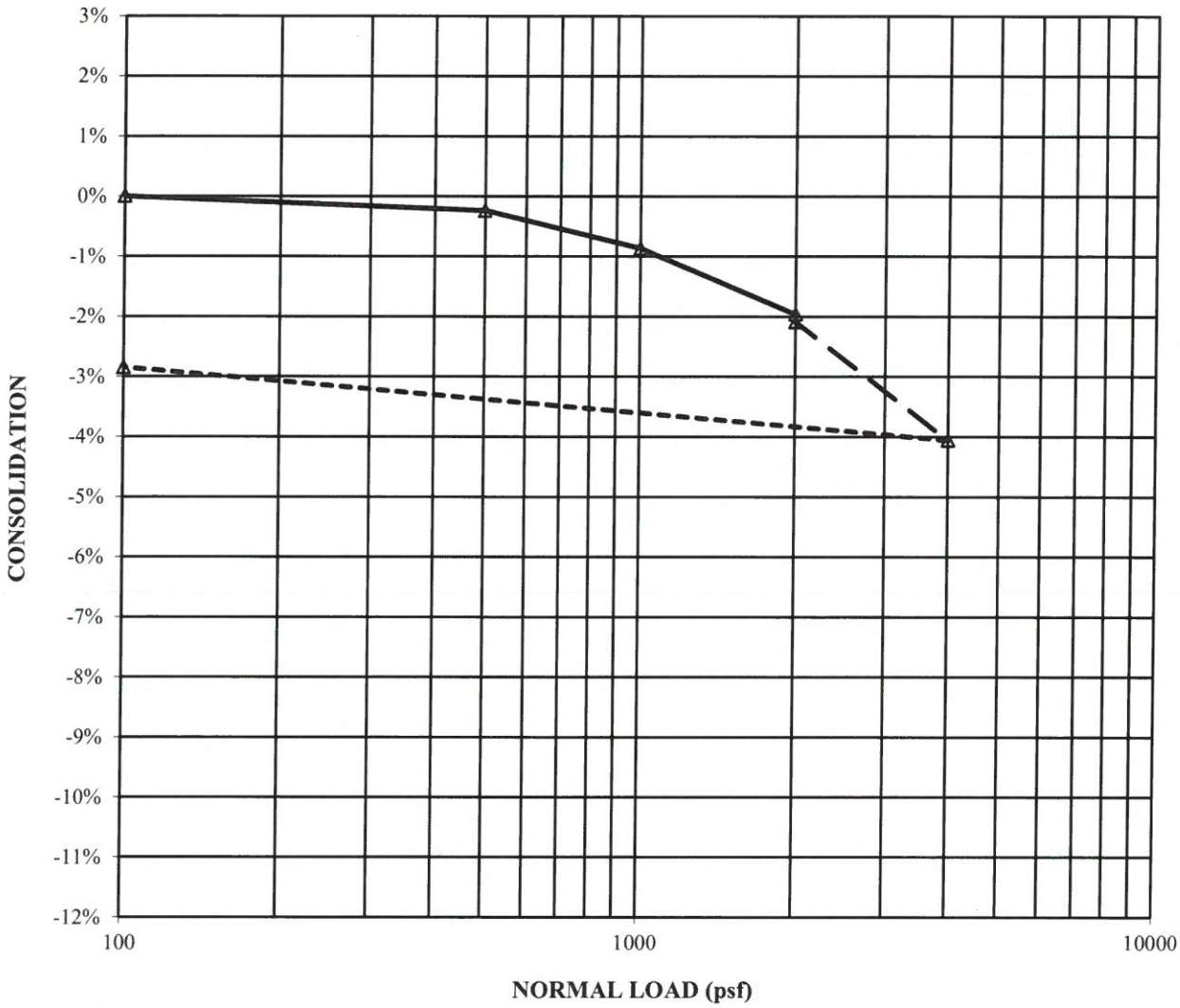
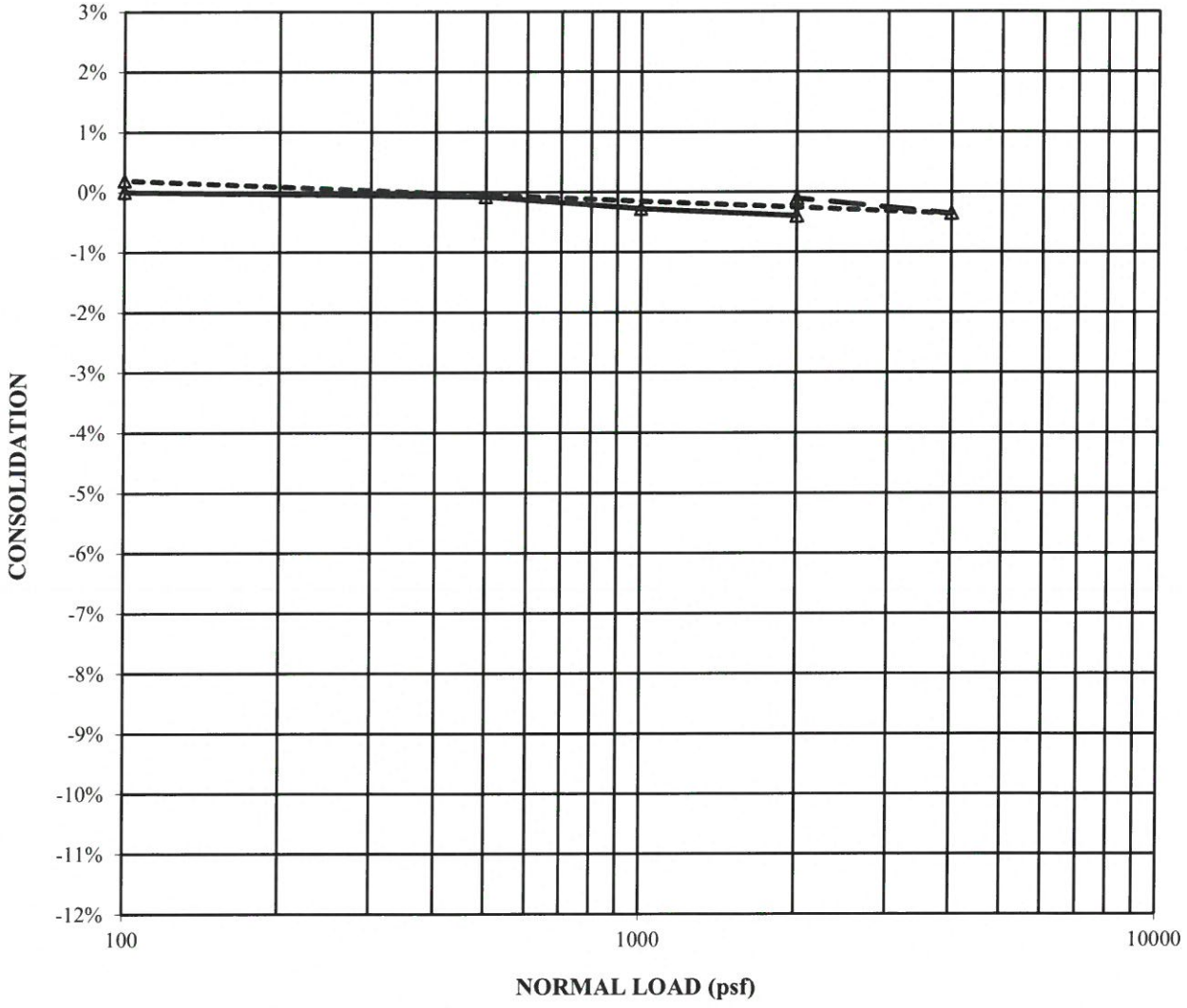
FIGURE A-6

BORING:	B7	FIELD MOISTURE	
DEPTH (ft):	2.0	SATURATED	
SOIL TYPE (USCS):	SM	REBOUND	
SEATING WEIGHT:	220 psf	FIELD MOISTURE:	15.0%
		SATURATED MOIST:	24.8%



ROCK SOLID ENGINEERING, INC.	**CONSOLIDATION TEST RESULTS**	FIGURE
	1400 Ranport Road, Watsonville	A-7

BORING:	B8	FIELD MOISTURE	
DEPTH (ft):	1.0	SATURATED	
SOIL TYPE (USCS):	SC	REBOUND	
SEATING WEIGHT:	250 psf	FIELD MOISTURE:	15.4%
		SATURATED MOIST:	21.0%



ROCK SOLID ENGINEERING, INC.	**CONSOLIDATION TEST RESULTS**	FIGURE
	1400 Ranport Road, Watsonville	A-8