APPENDIX B
Laboratory Test Results

B.1 Laboratory Testing

Representative soil samples obtained from the borings were reviewed in our office to confirm field classifications and selected samples were submitted for laboratory testing. Geotechnical testing was performed by Sierra Testing Laboratories of El Dorado Hills, California. Laboratory testing was performed to determine the following properties:

- Dry density and moisture content per ASTM D2937 or D2216;
- Atterberg Limits (Plasticity Index) per ASTM D4318;
- Percent Passing the No. 200 sieve (Fines Content) per ASTM D1140;
- Particle-Size Analysis of Soils per ASTM D422;
- One-Dimensional Swell/Settlement per ASTM D4546;
- One-Dimensional Consolidation per ASTM D2435
- Direct Shear per ASTM D3080;
- Unconsolidated-Undrained Triaxial Compression per ASTM D2850;
- Permeability per ASTM D5084;
- Pinhole Dispersion Test per ASTM D4647 Method A; and
- R-Value per California Test Method 301.

Additionally, representative near surface samples (upper 10 feet) were tested for corrosion potential by Sunland Analytical of Rancho Cordova, California. The following corrosivity tests were performed on each sample: chlorides and sulfates.

The laboratory reporting sheets for the laboratory testing follow.

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-1 #5	15			41.0
B-1 #6	20	117.8	93.9	25.5

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

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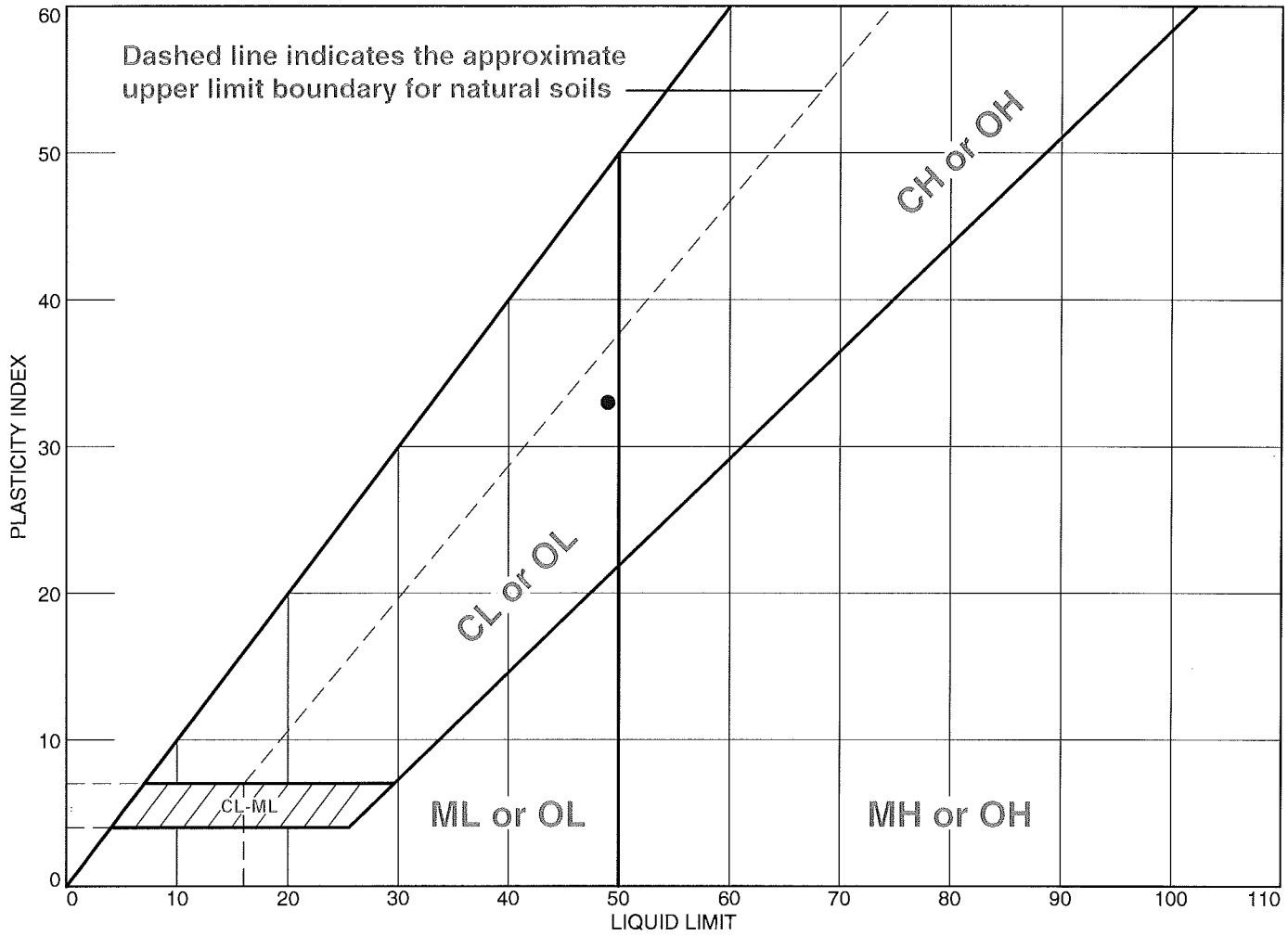
Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		49	16	33			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-1 #1 **Depth:** 5.5 **Sample Number:** S32106

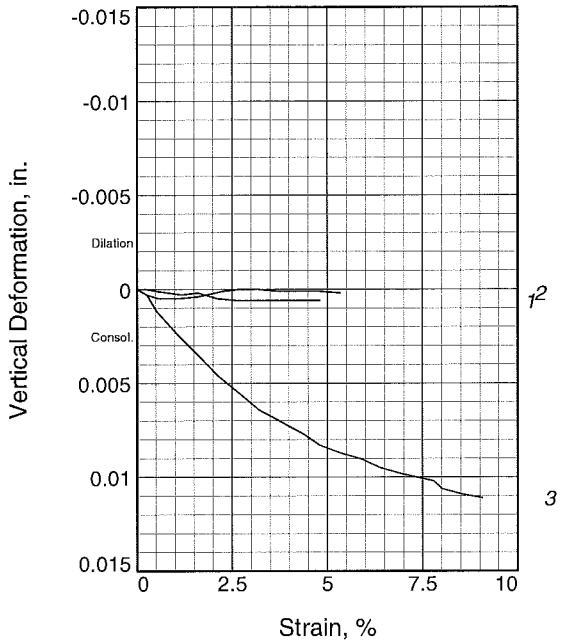
Remarks:

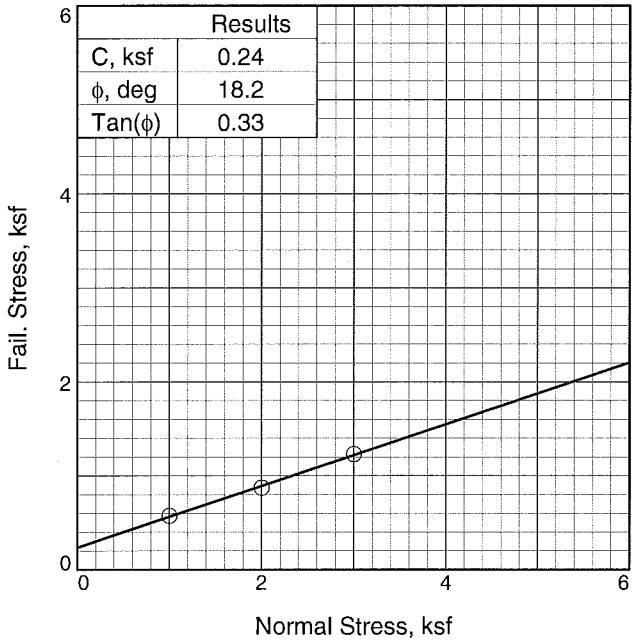
SIERRA TESTING LABS, INC.

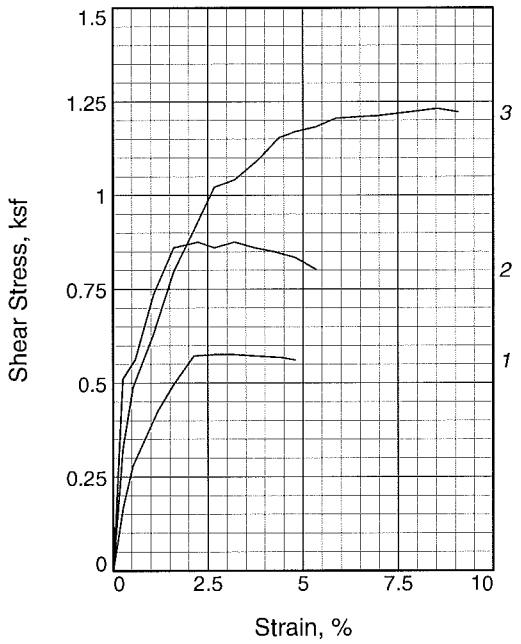
El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** mn







Sample No.		1	2	3
Initial	Water Content, %	20.2	19.6	20.1
	Dry Density, pcf	108.4	109.8	109.3
	Saturation, %	98.5	98.9	99.9
	Void Ratio	0.5543	0.5348	0.5425
	Diameter, in.	1.88	1.88	1.88
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	19.8	18.2	16.6
	Dry Density, pcf	109.7	113.0	116.4
	Saturation, %	100.0	99.9	100.0
	Void Ratio	0.5360	0.4921	0.4484
	Diameter, in.	1.88	1.88	1.88
	Height, in.	0.99	0.97	0.94
Normal Stress, ksf		1.00	2.00	3.00
Fail. Stress, ksf		0.58	0.88	1.23
Strain, %		2.7	2.2	8.5
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Undisturbed
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

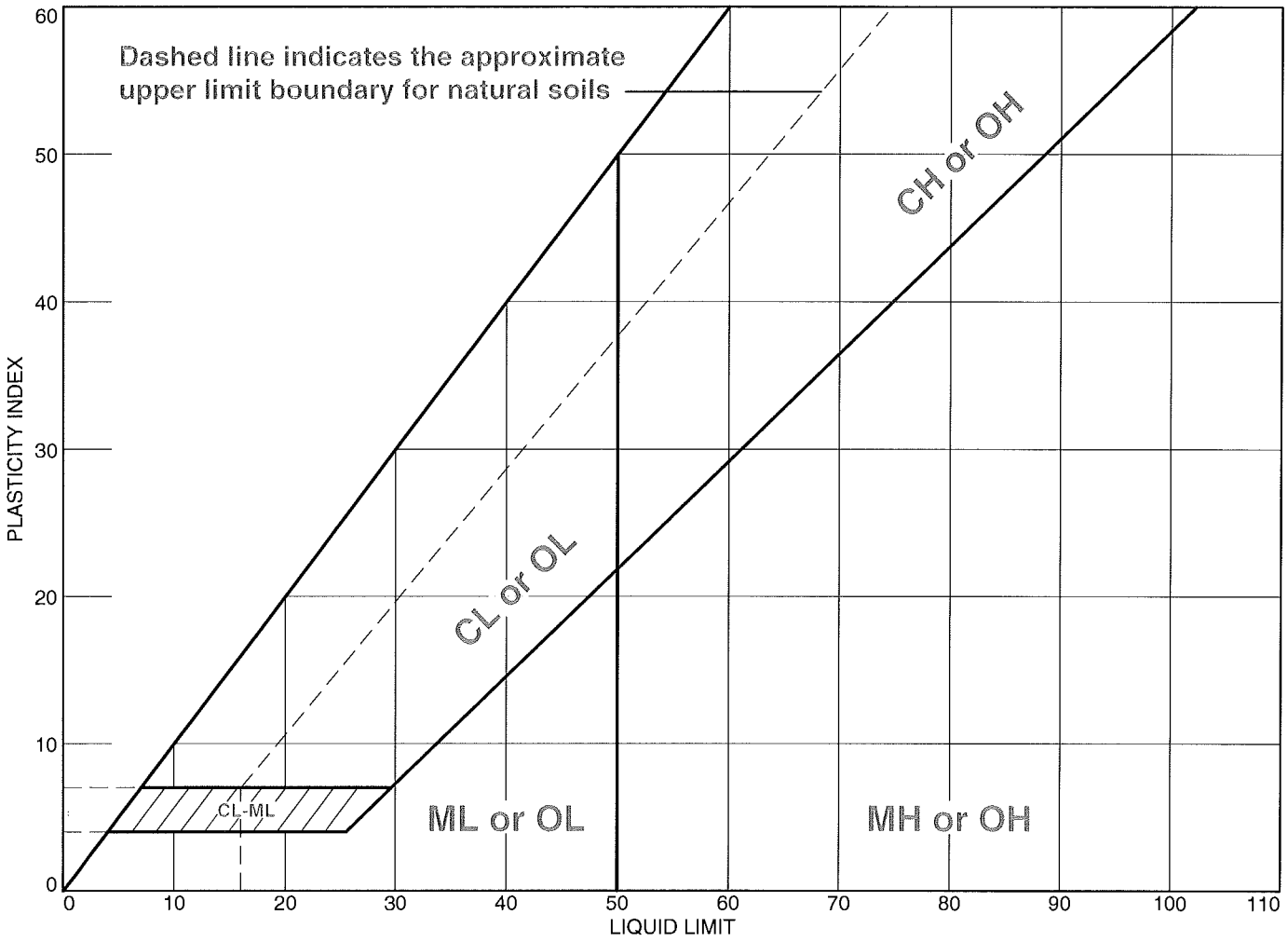
Client: Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-1 #2
Sample Number: S32107 **Depth:** 6.0
Proj. No.: 11-236 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw **Checked By:** mpw

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		33	33	NP		77.5	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-1 #3 **Depth:** 10.0 **Sample Number:** S32108

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** mn

PINHOLE DISPERSION TEST RESULTS

SAMPLE PARAMETERS AT TESTING

Wet Unit Weight, pcf :	115.1
Dry Unit Weight, pcf :	82.1
Moisture Content, % :	40.1

HYDRAULIC PARAMETERS AND OBSERVATIONS AT COMPLETION OF TEST

Hydraulic Head, in. :	15	Flow Rate, ml / second :	3.2

Length of Test, min.:	5

Description Of Flow Hole At End of Test :	Approximately 1 mm

Note: Flow hole was 1 mm at start of test.

Turbidity Description at End of Test :	Clear

DISPERSIVE CLASSIFICATION :	ND2

Test Method: ASTM D4647 Method: C

SAMPLE IDENTIFICATION: B-1 #3 SAMPLE DEPTH, ft.: 10

SAMPLE DESCRIPTION:

REMARKS: Ran at as received moisture and density

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements

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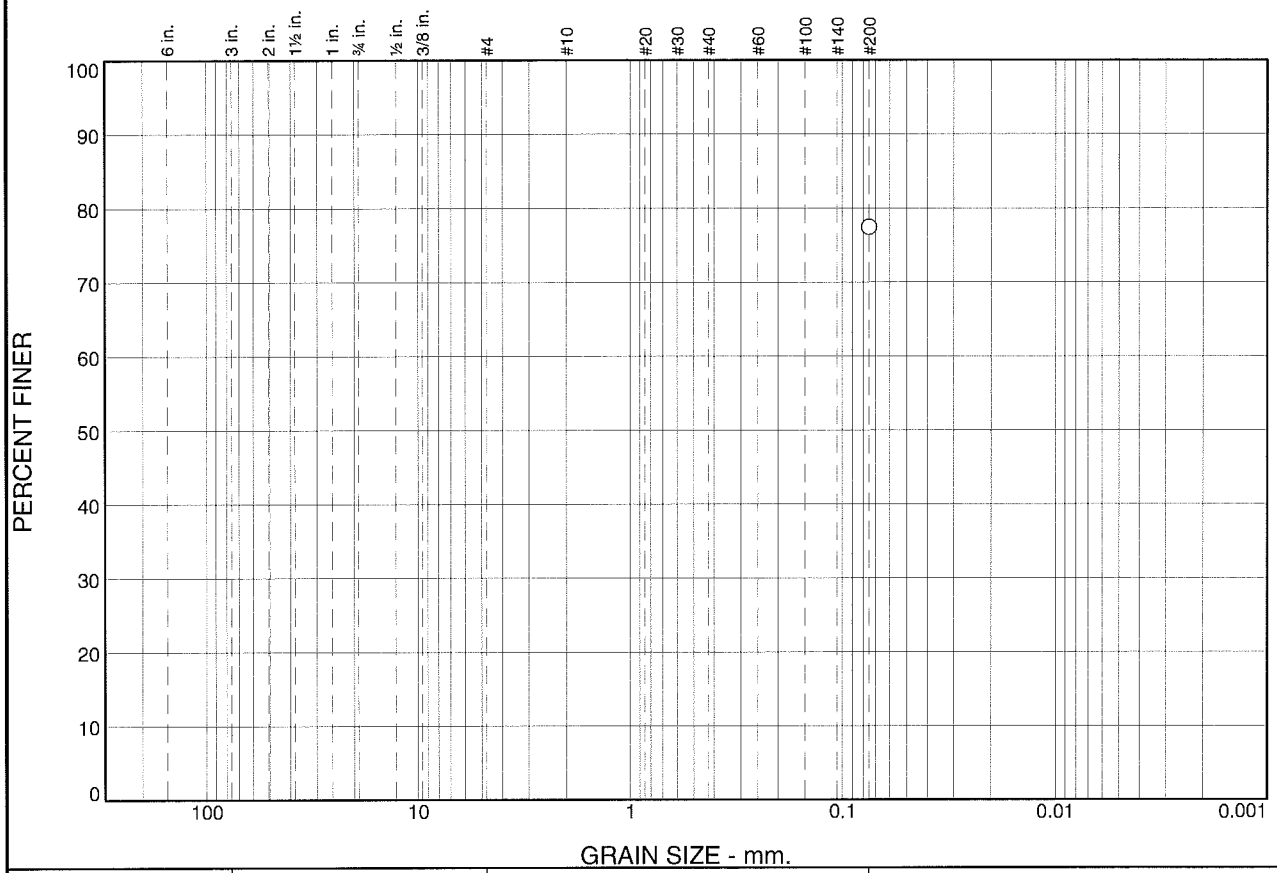
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						77.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	77.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= 33 LL= 33 PI= NP

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-1 #3
Sample Number: S32108 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

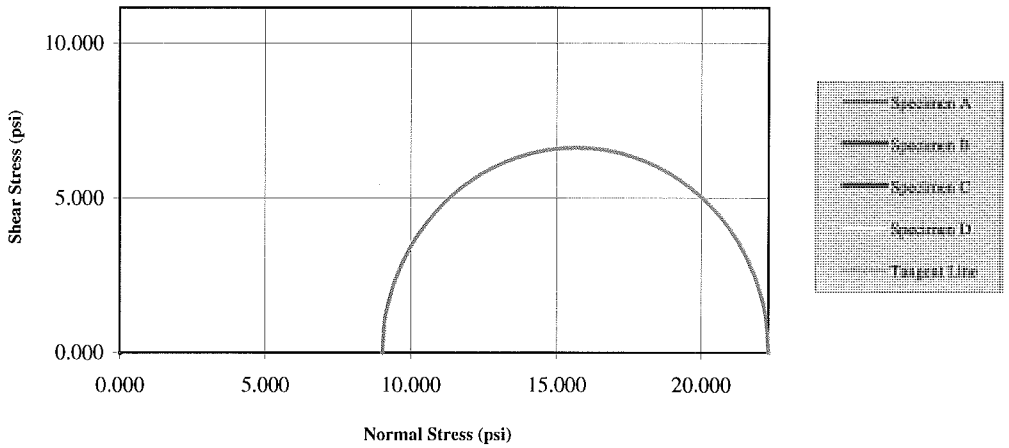
Date: 09/14/11

Checked By: MN

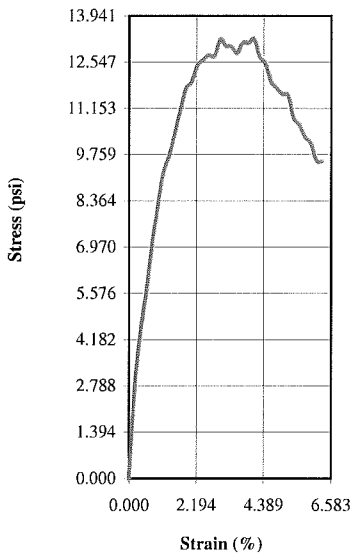
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

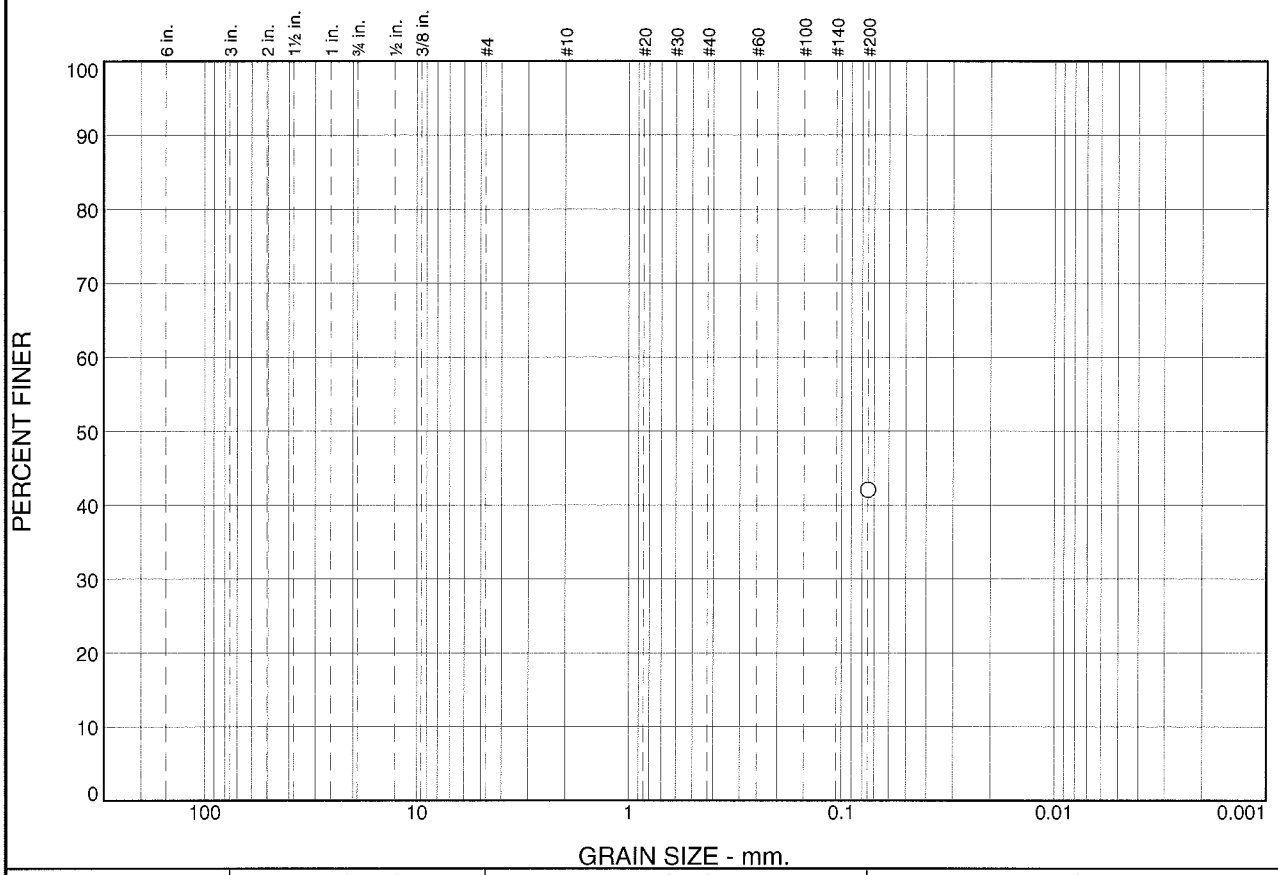


Before Test	Specimen A	B	C	D
Water Content (%)	30.70	0.00	0.00	0.00
Dry Density (pcf)	91.07	0.00	0.00	0.00
Saturation (%)	99.63	0.00	0.00	0.00
Void Ratio	0.82	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	5.500	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	30.49	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	13.277	0.000	0.000	0.000
Axial Strain @ Failure (%)	4.073	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	9.0	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	22.3	0.0	0.0	0.0
σ3 (psi)	9.0	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	6.6	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-1, #4 @ 11.0'
Client:	SAGE	Sample Number:	S32109
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						42.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	42.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

Location: B-1 #5
Sample Number: S32110 **Depth:** 15.0 **Date:** 8/25/11

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El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-2 #2	10	121.5	96.6	25.8
B-2 #4	15			38.6
B-2 #5	20	123.7	93.6	32.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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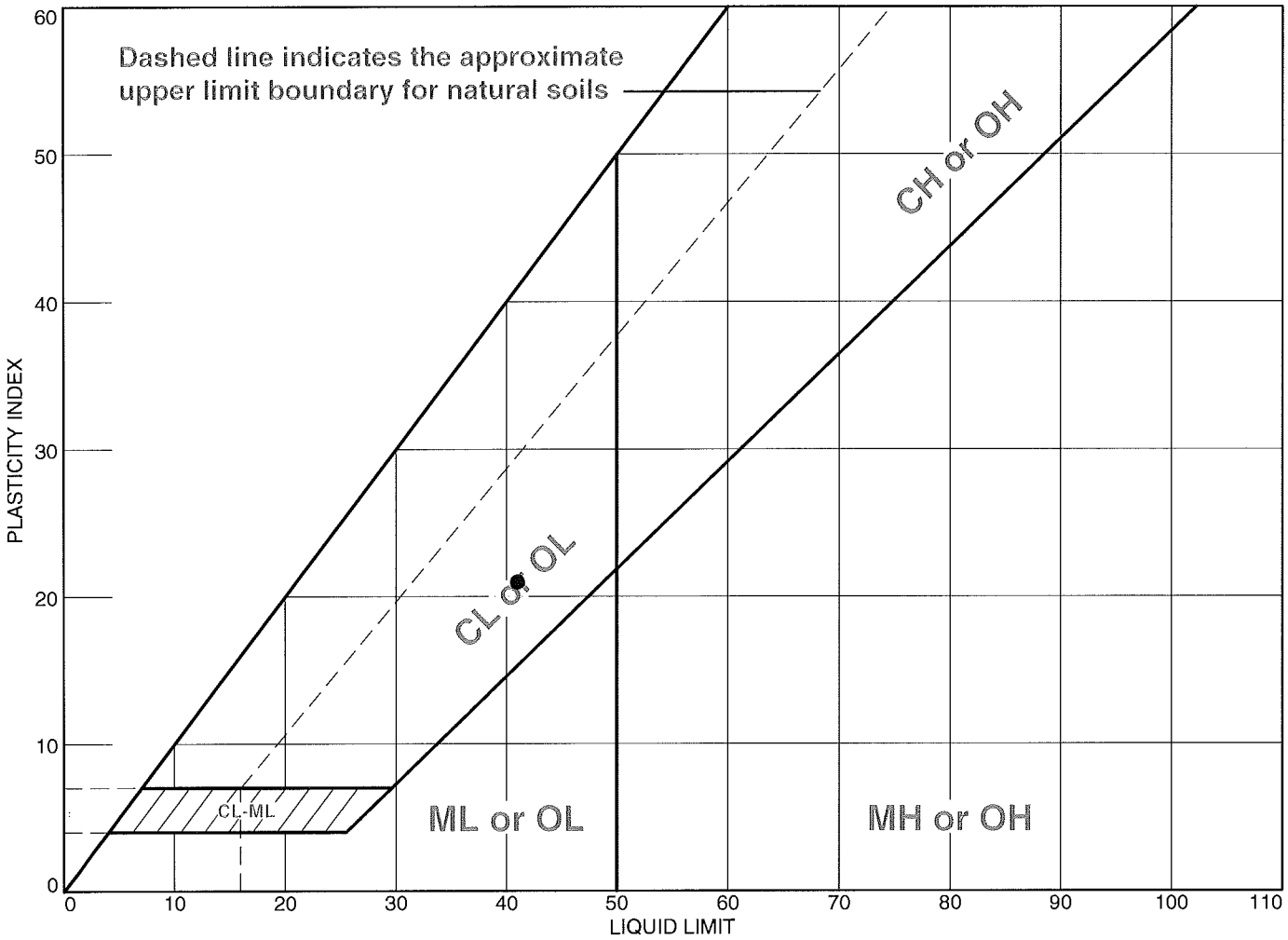
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		41	20	21			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-2 #2 **Depth:** 10.0 **Sample Number:** S32113

Remarks:

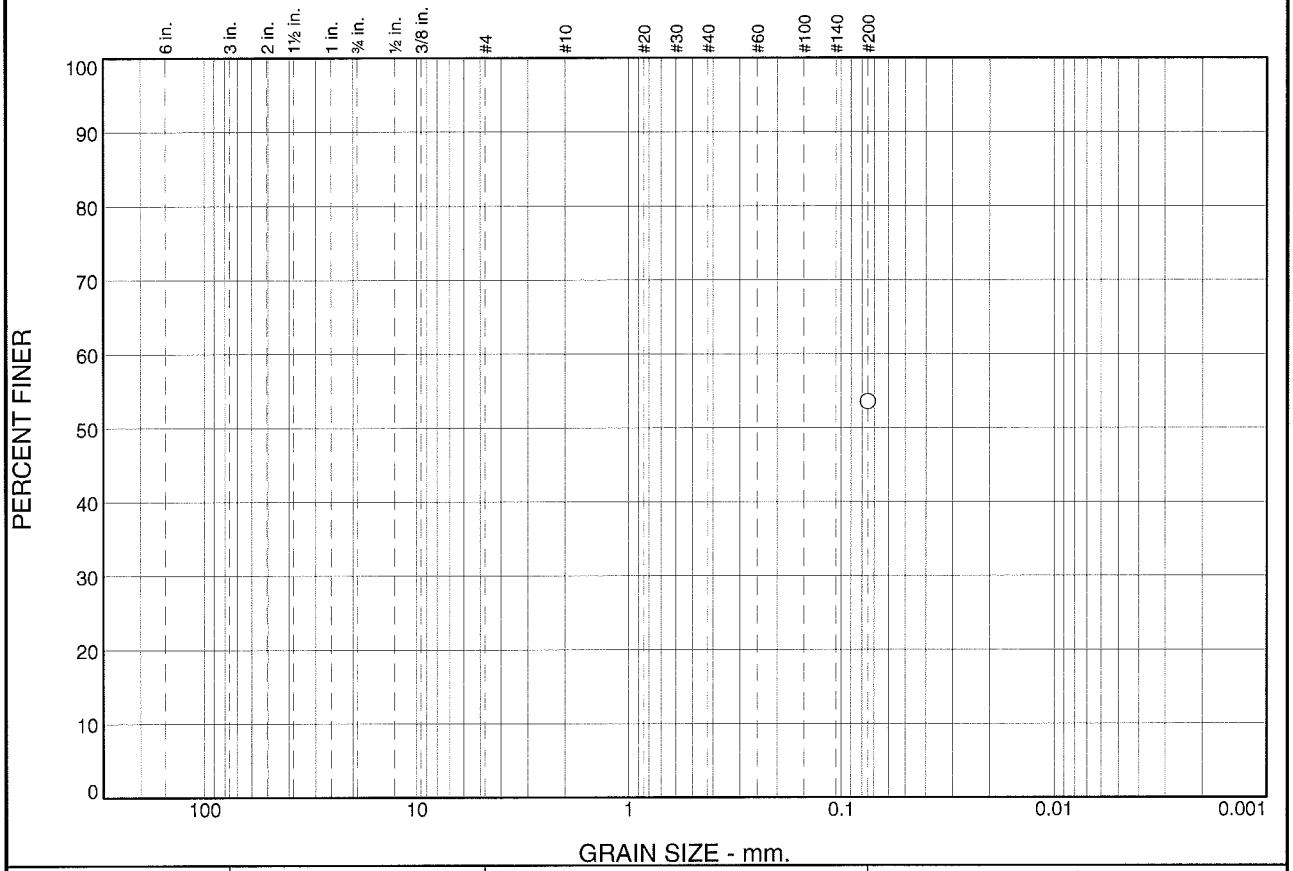
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						53.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	53.6		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-2 #7
Sample Number: S32116 **Depth:** 25.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-3 #1	1			16.7
B-3 #4	10			19.7
B-3 #5	15			42.0
B-3 #6	20	123.9	99.6	24.4

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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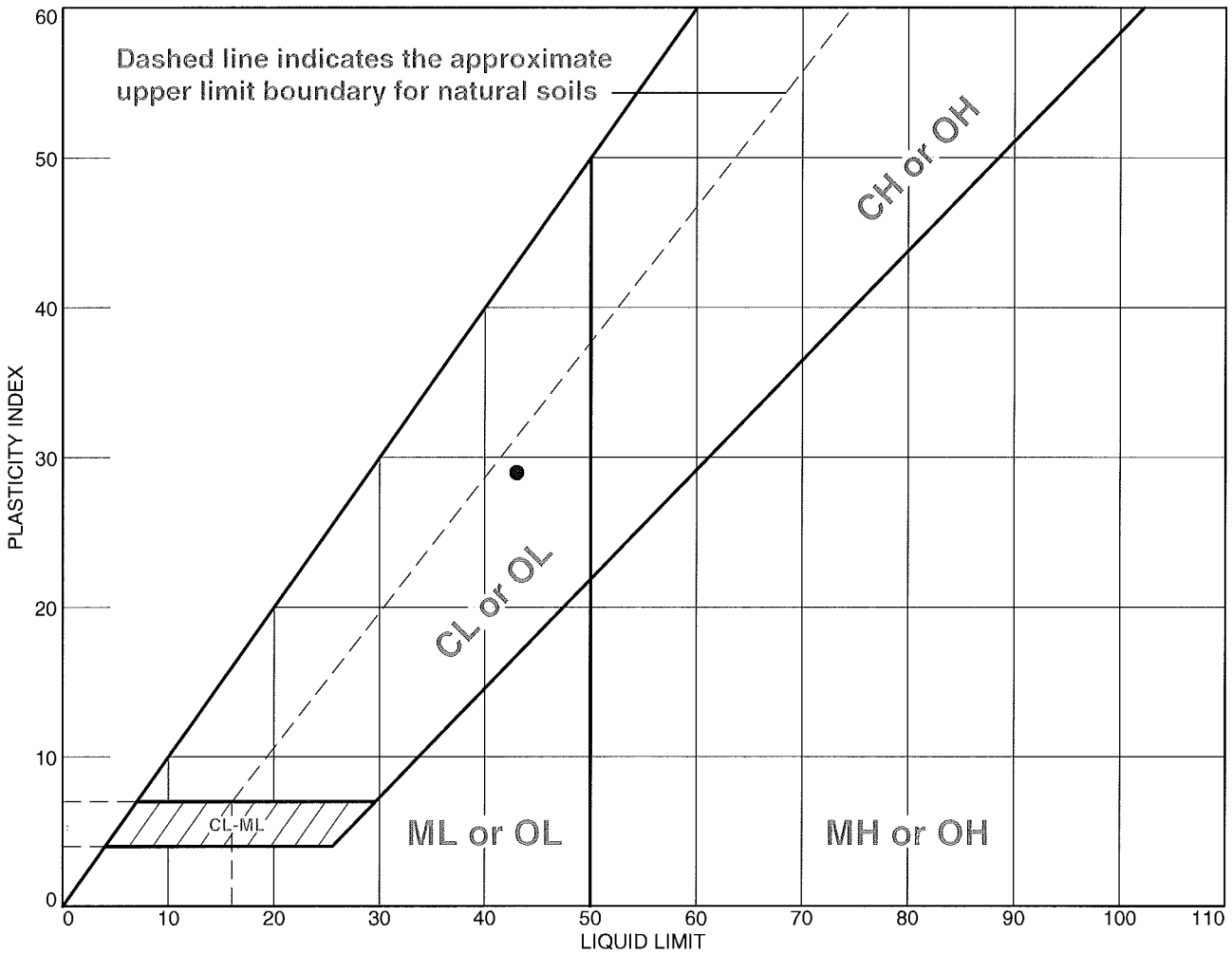
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		43	14	29			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-3 #2 **Depth:** 5'1" **Sample Number:** S32118

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

PINHOLE DISPERSION TEST RESULTS

SAMPLE PARAMETERS AT TESTING

Wet Unit Weight, pcf :	112.3
Dry Unit Weight, pcf :	74.4
Moisture Content, % :	51.1

HYDRAULIC PARAMETERS AND OBSERVATIONS AT COMPLETION OF TEST

Hydraulic Head, in. :	7	Flow Rate, ml / second :	3

Length of Test, min.:	5

Description Of Flow Hole At End of Test :	> 1.5 mm

Note: Flow hole was 1 mm at start of test.

Turbidity Description at End of Test :	Barely visible

DISPERSIVE CLASSIFICATION :	ND3

Test Method: ASTM D4647 Method: C

SAMPLE IDENTIFICATION: B-3 #2 SAMPLE DEPTH, ft.: 5' 1"

SAMPLE DESCRIPTION:

REMARKS: Ran at as received moisture

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements

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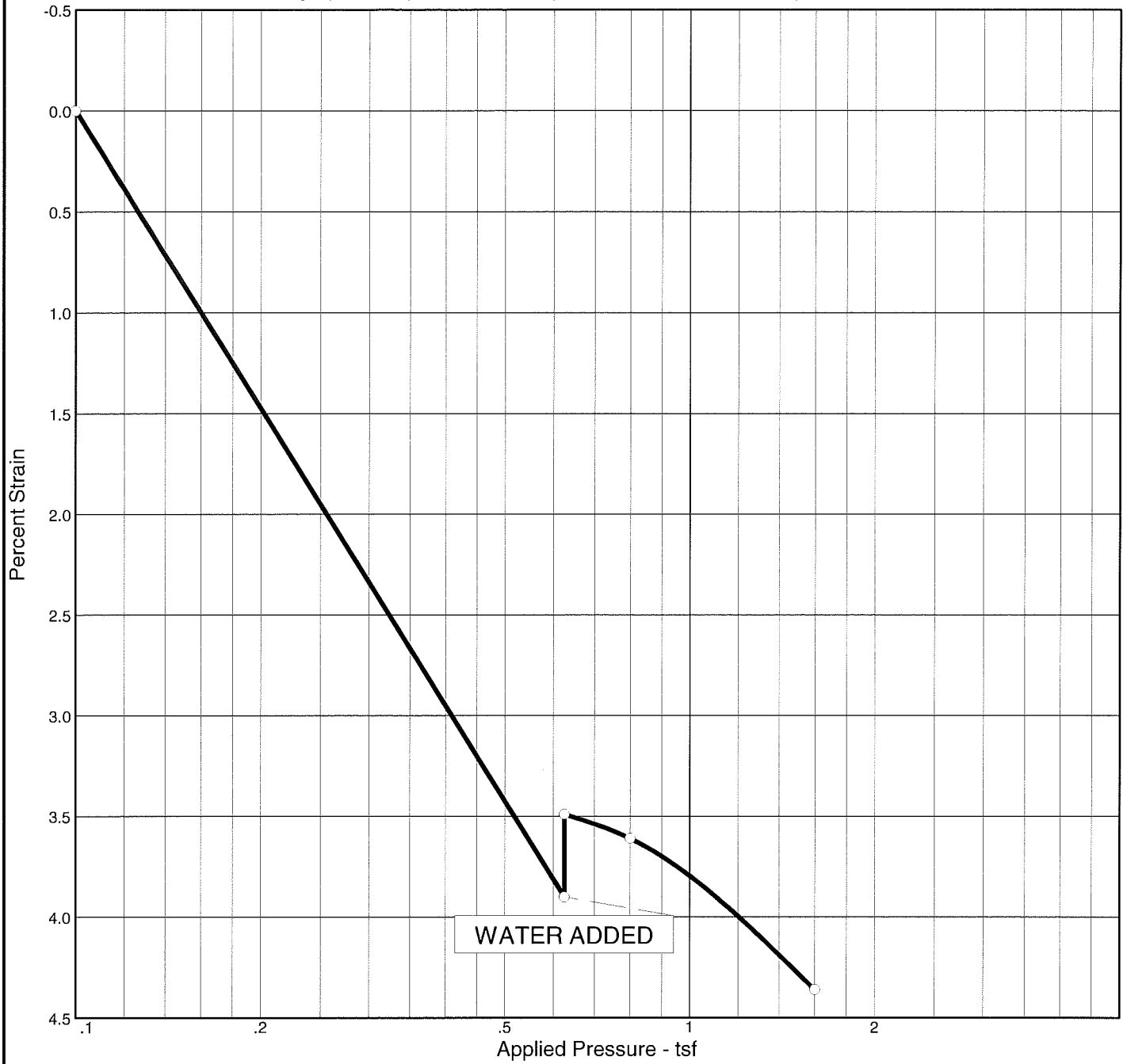
CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Swell %	e_o
Sat.	Moist.											
91.5 %	29.7 %	89.8			2.70		0.88	0.05		1.10	0.4	0.877

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-3 #3

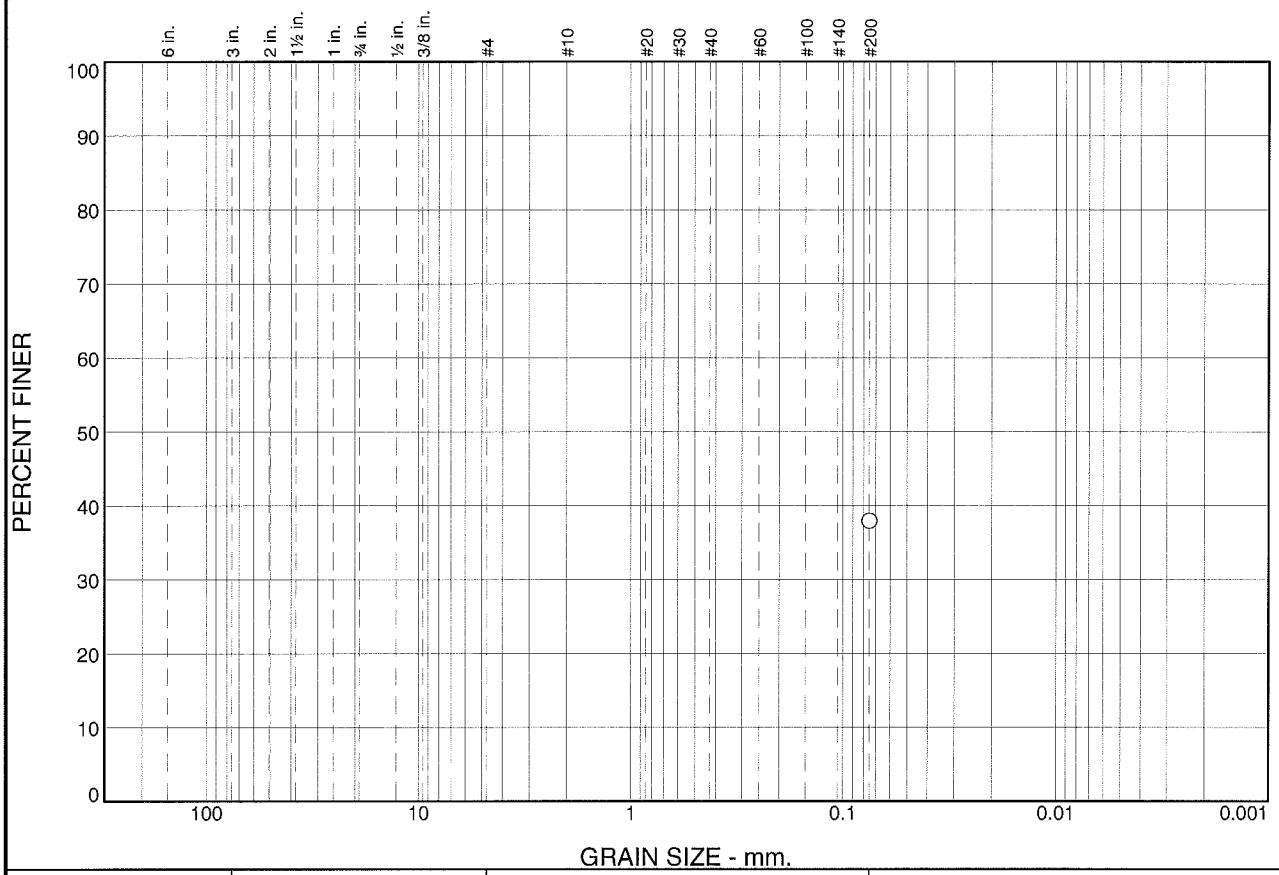
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Remarks:

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						38.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	38.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

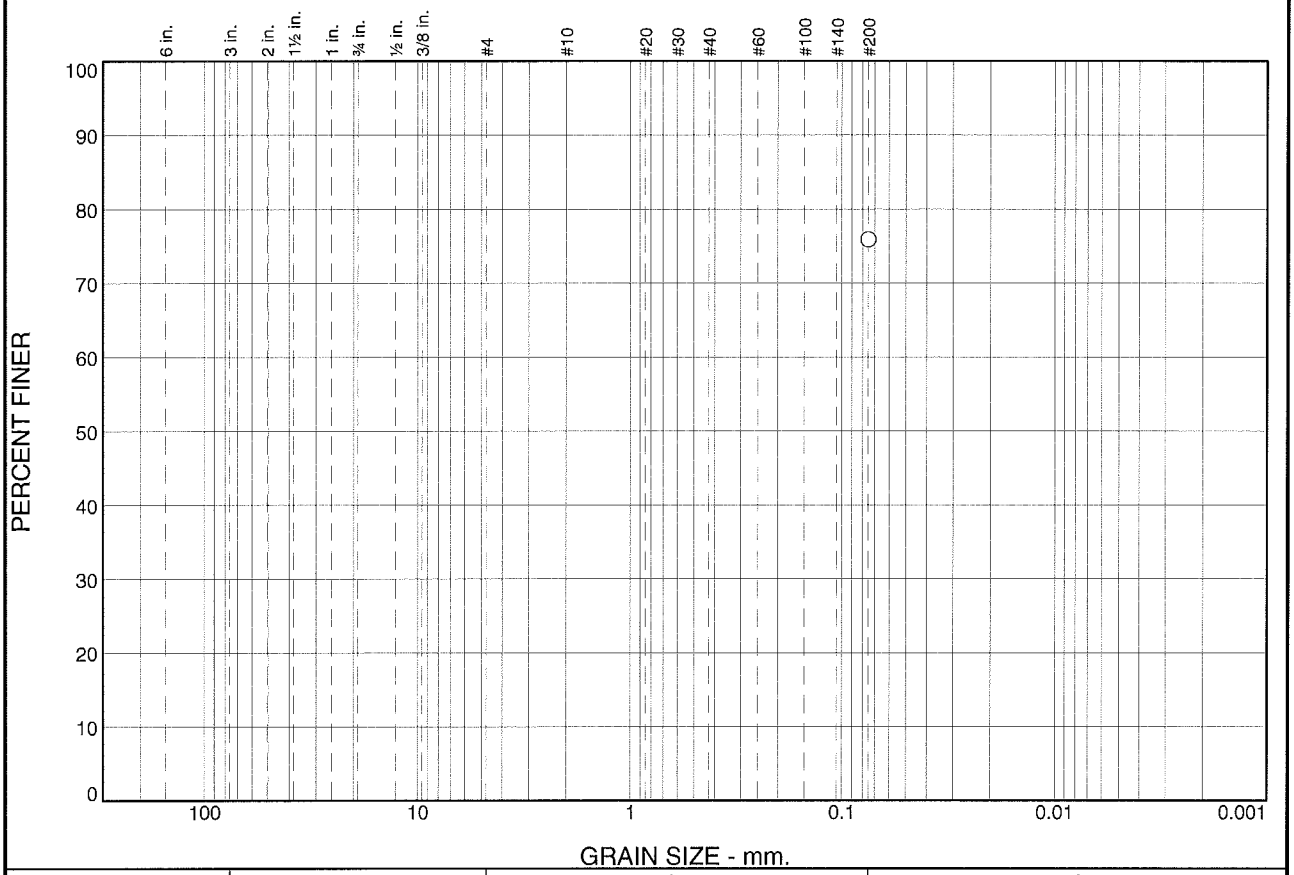
Location: B-3 #4
Sample Number: S32120 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	75.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

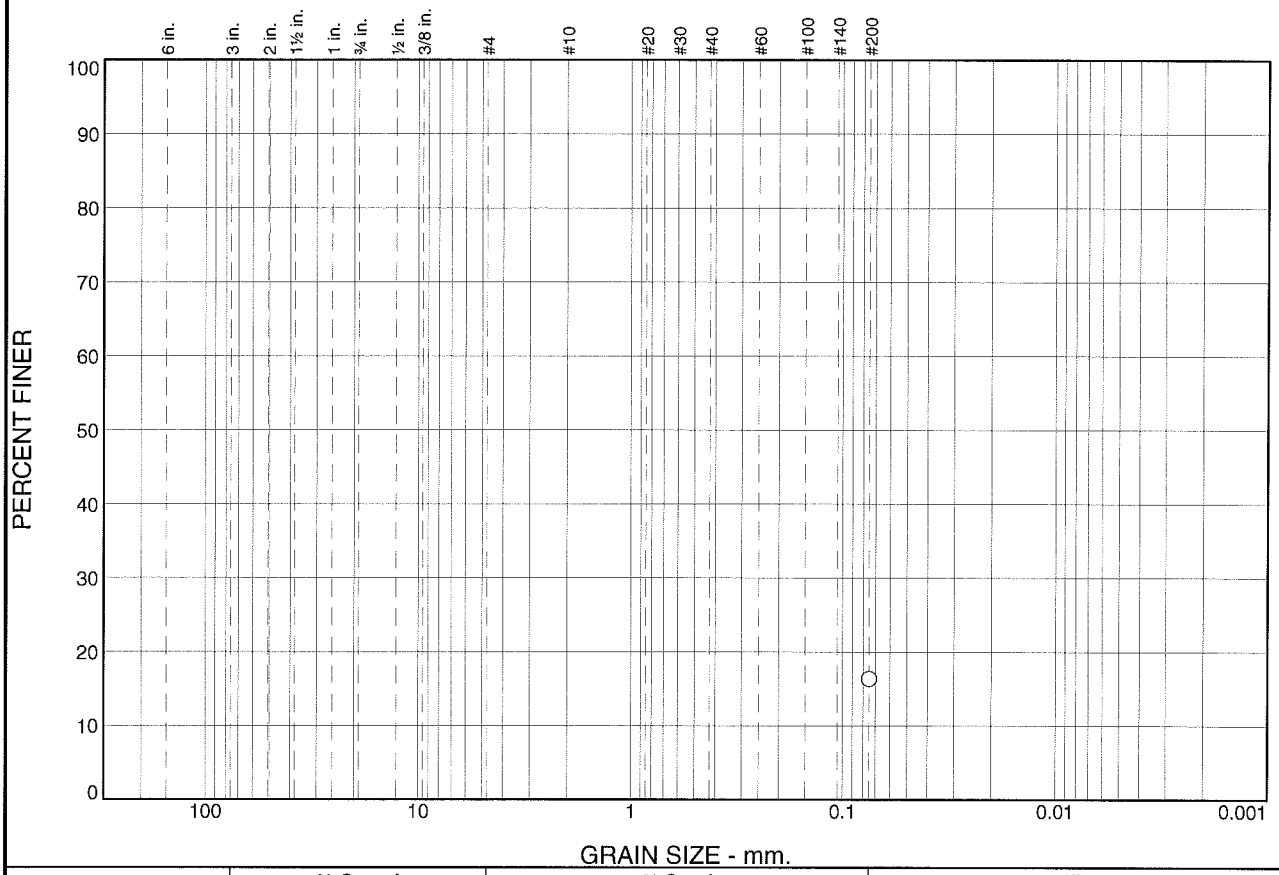
Location: B-3 #5
Sample Number: S32121 **Depth:** 15.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						16.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	16.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

Location: B-3 #6
Sample Number: S32122 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-4 #4	16.5	128.8	108.7	18.6
B-4 #6	20			33.5
B-4 #7	25.5	118.6	88.7	33.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

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Biggs-West Gridley Canal Improvements

10-066.00

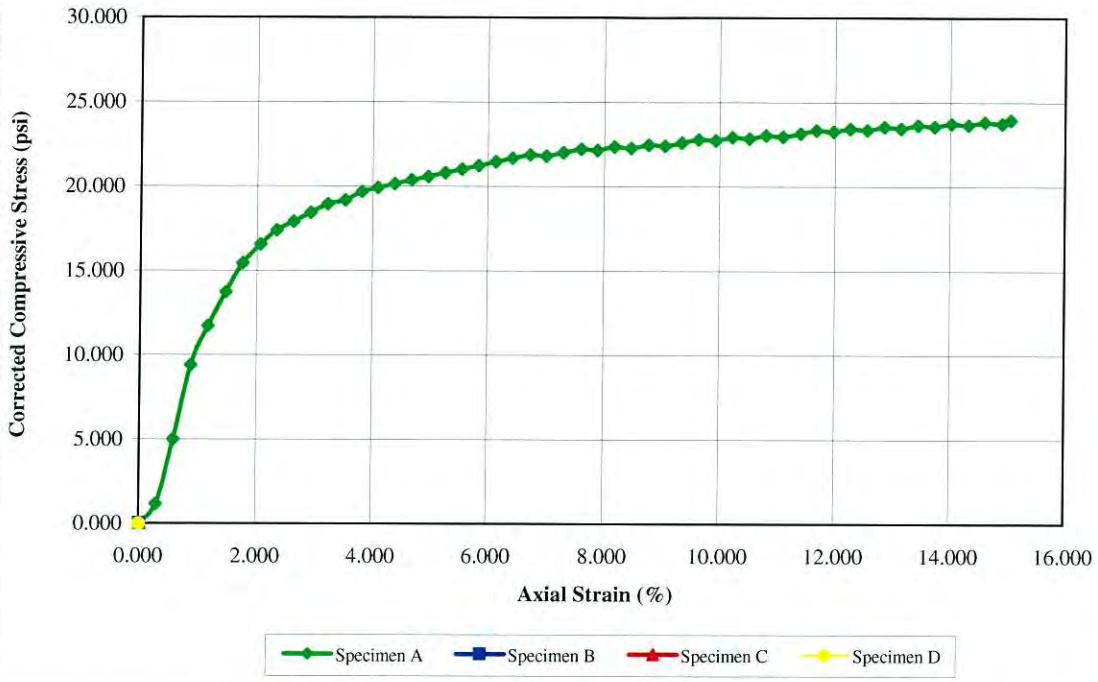
Sierra Testing Laboratories, Inc.

Unconfined Compression Test Report (ASTM D2166)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Date: 21-Oct
Checked By: MN
Date: 20-Oct
Computed By: JS
Date: 19-Oct
Tested By: CHM

Compressive Stress Axial Strain Curve

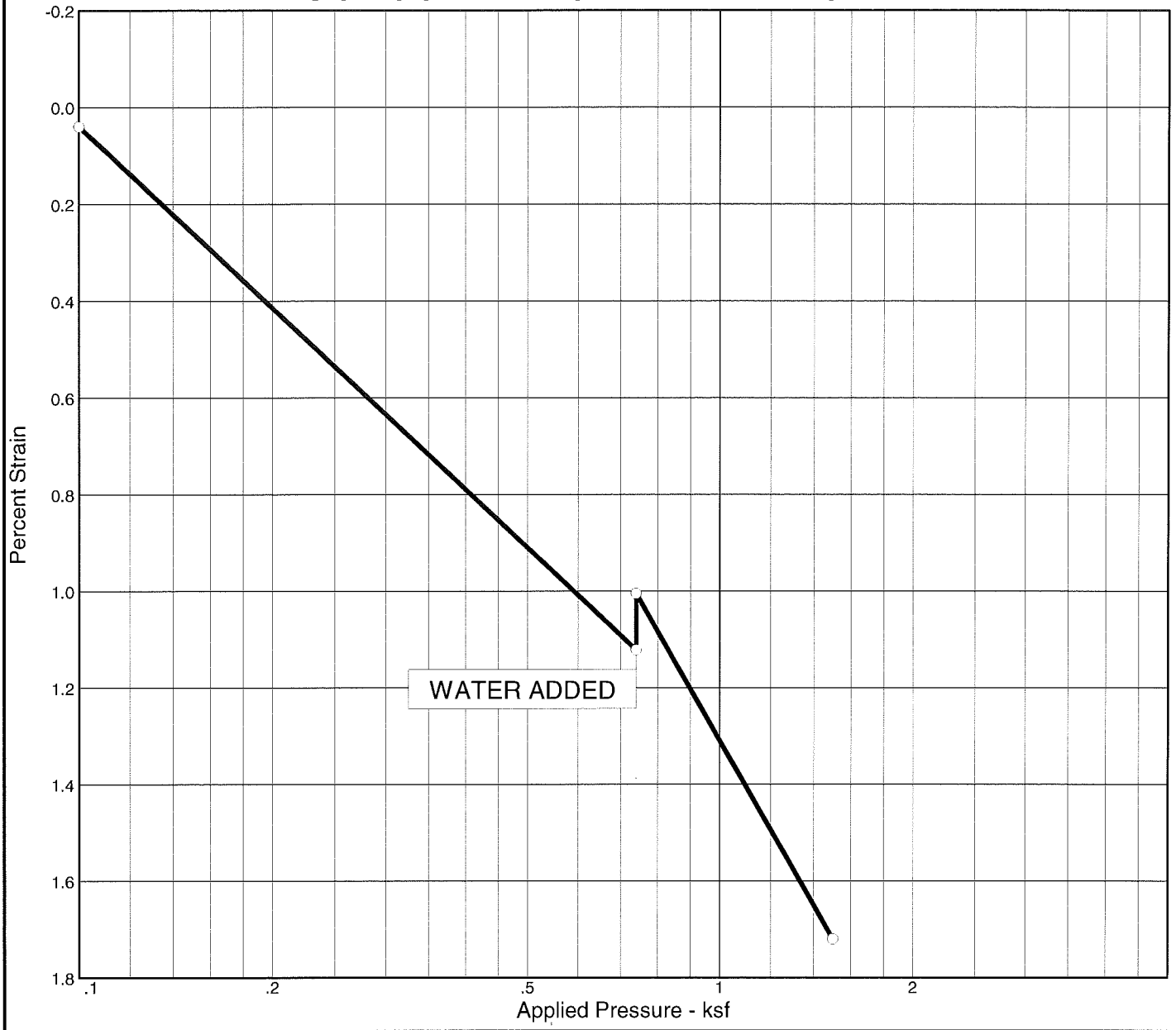


Before Test	Specimen A	B	C	D
Water Content (%)	20.69			
Dry Density (pcf)	106.800			
Saturation (%)	99.79			
Void Ratio	0.55			
Diameter (in)	1.880			
Height (in)	3.490			
Test Data	**A**	**B**	**C**	**D**
Unconfined Strength (psi)	23.953			
Undrained Shear Strength (tsf)	0.862			
Undrained Shear Strength (psi)	11.977			
Rate of Strain (in/min)	0.050000			
Strain at Failure (%)	15.04			
Description				

Project Information		Specimen Description	
Project Num	11-236	Specimen A	B-4 #2
Project	Biggs-West Gridley Canal Improv.	Specimen B	
Sampling Date		Specimen C	
Sample #	B-4 #2 @ 6.0' - S34781	Specimen D	
Client	SAGE	**Test Variables**	
		Specific Gravity	2.65
		Liquid Limit:	
		Plastic Limit:	

Remarks

CONSOLIDATION TEST REPORT



MATERIAL DESCRIPTION	USCS	AASHTO

LL	PI	Sp. Gr.	Overburden (ksf)	Dry Dens. (pcf)		Moisture		Saturation		Void Ratio		P_c (ksf)	C_c
				Init.	Final	Init.	Final	Init.	Final	Init.	Final		
		2.70		100.6		22.9 %	23.6 %	91.4 %	98.6 %	0.675	0.646		

Preparation Process:	D2435 Method	C_r	Swell Press. (ksf)	Swell %
Condition of Test:			0.83	0.1

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering,

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-4 #3

Remarks:

SIERRA TESTING LABS, INC.

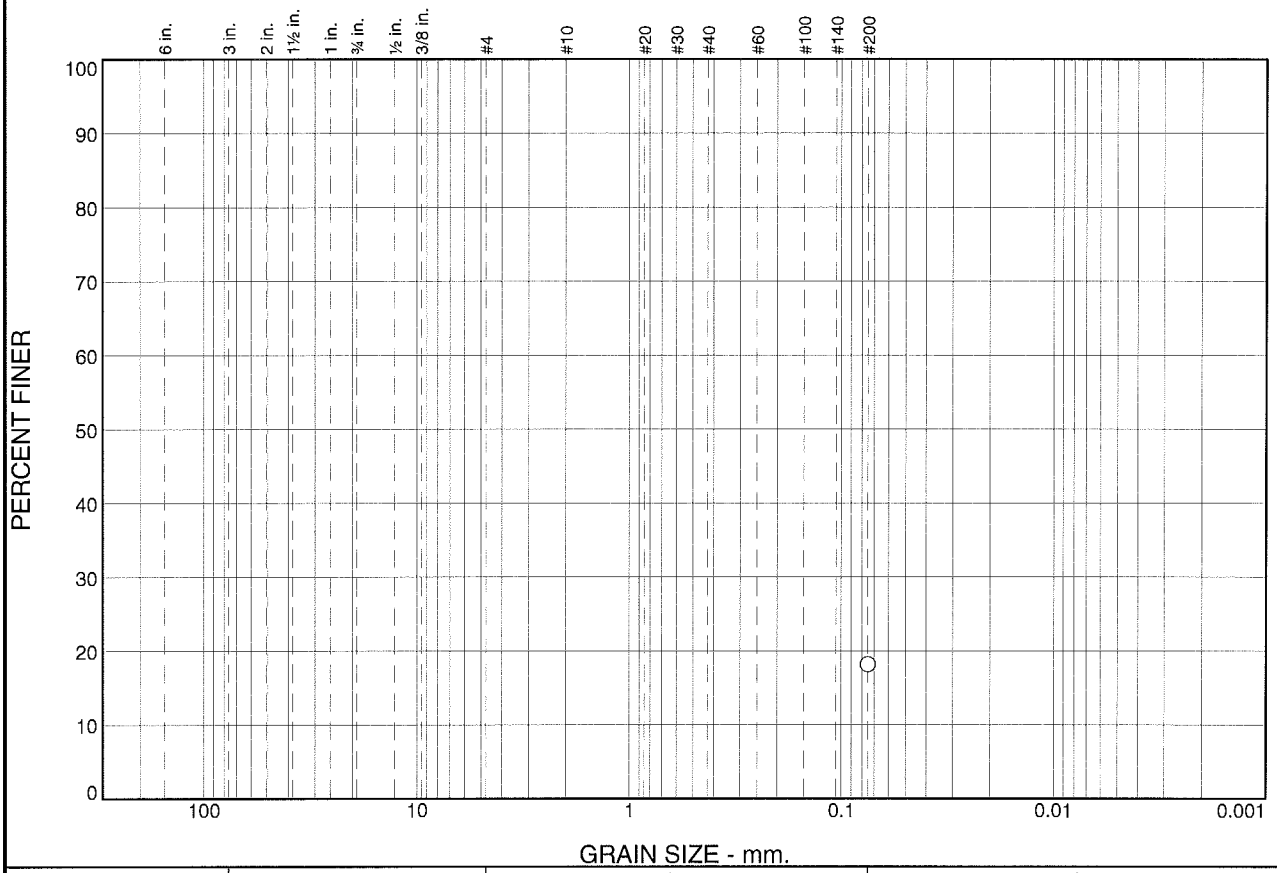
El Dorado Hills, CA

Checked By:

Title:

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						18.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	18.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

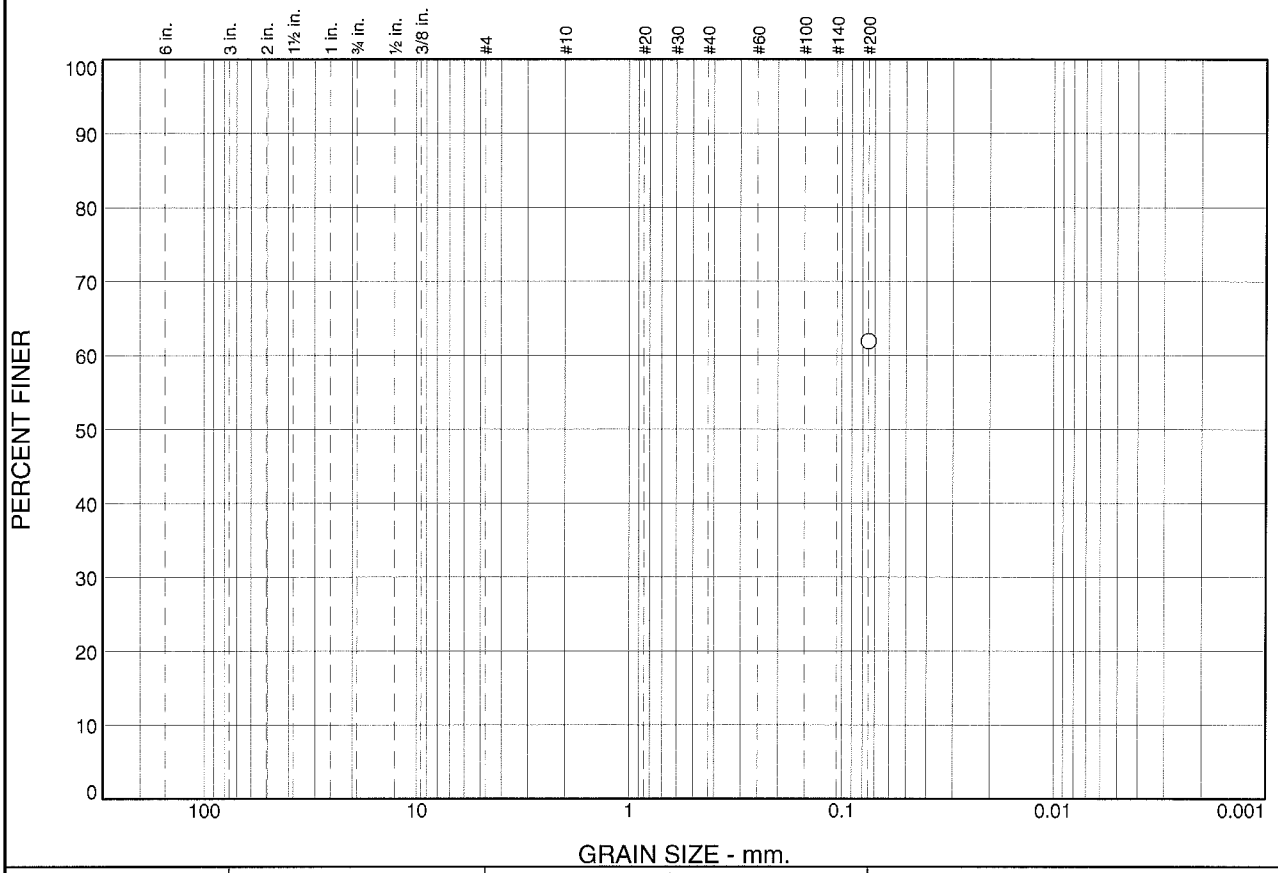
Location: B-4 #4
Sample Number: S32124 **Depth:** 16.5 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	62.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

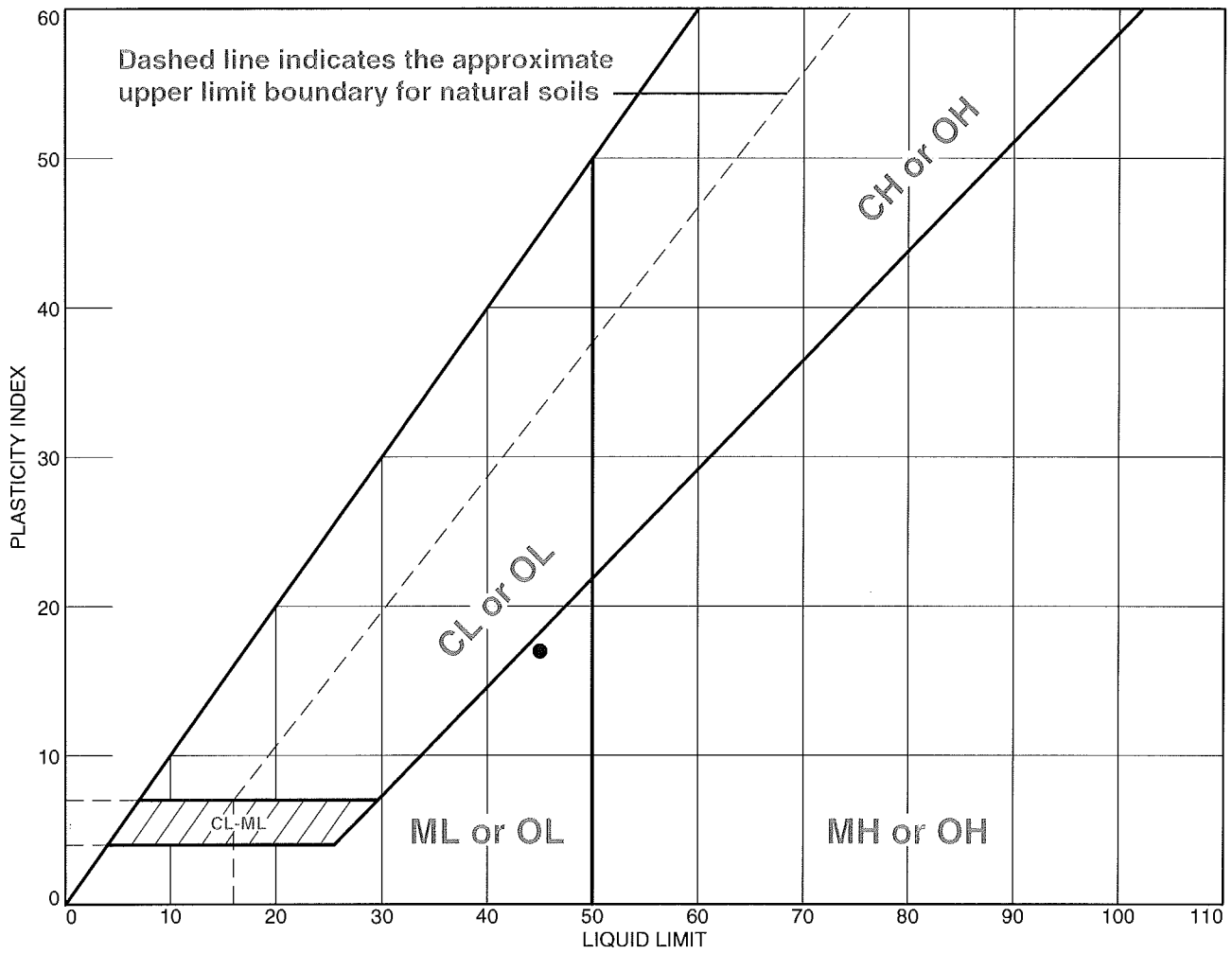
Location: B-4 #6
Sample Number: S32125 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		45	28	17			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-4 #7 **Depth:** 25.5 **Sample Number:** S32126

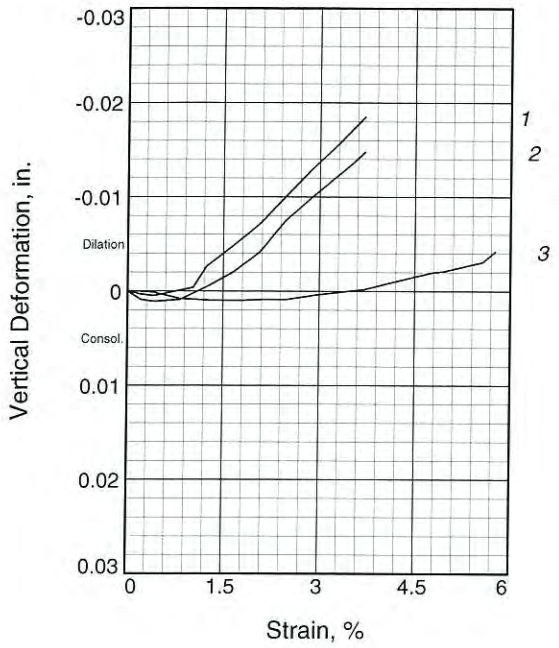
Remarks:

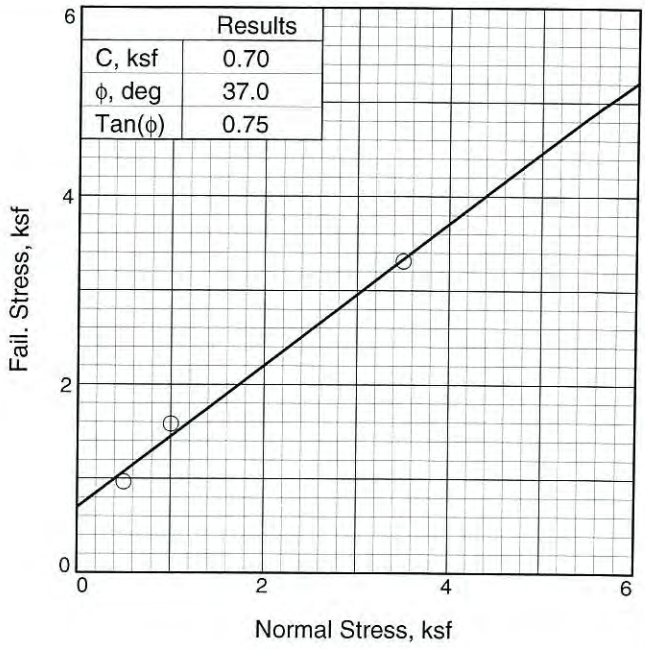
SIERRA TESTING LABS, INC.

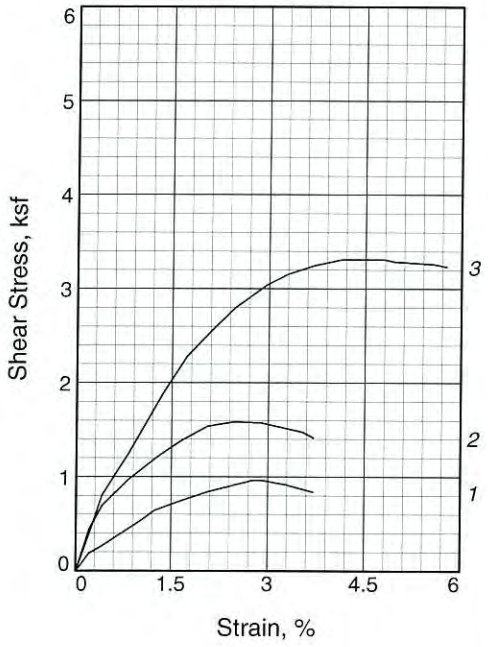
El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn







Sample No.		1	2	3
Initial	Water Content, %	27.6	28.5	25.6
	Dry Density, pcf	95.4	93.4	96.7
	Saturation, %	97.3	95.6	93.2
	Void Ratio	0.7674	0.8047	0.7431
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	27.8	28.8	26.0
	Dry Density, pcf	96.3	94.8	99.0
	Saturation, %	99.9	99.9	99.9
	Void Ratio	0.7504	0.7776	0.7028
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.98	0.98
Normal Stress, ksf		0.50	1.00	3.50
Fail. Stress, ksf		0.97	1.58	3.31
Strain, %		2.9	2.5	4.8
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Undisturbed
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-4 #8
Sample Number: S34782 **Depth:** 16.0
Proj. No.: 11-236 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw **Checked By:** mpw

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-5 #1	10			13.9
B-5 #4	10			36.3
B-5 #7	20			35.5

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

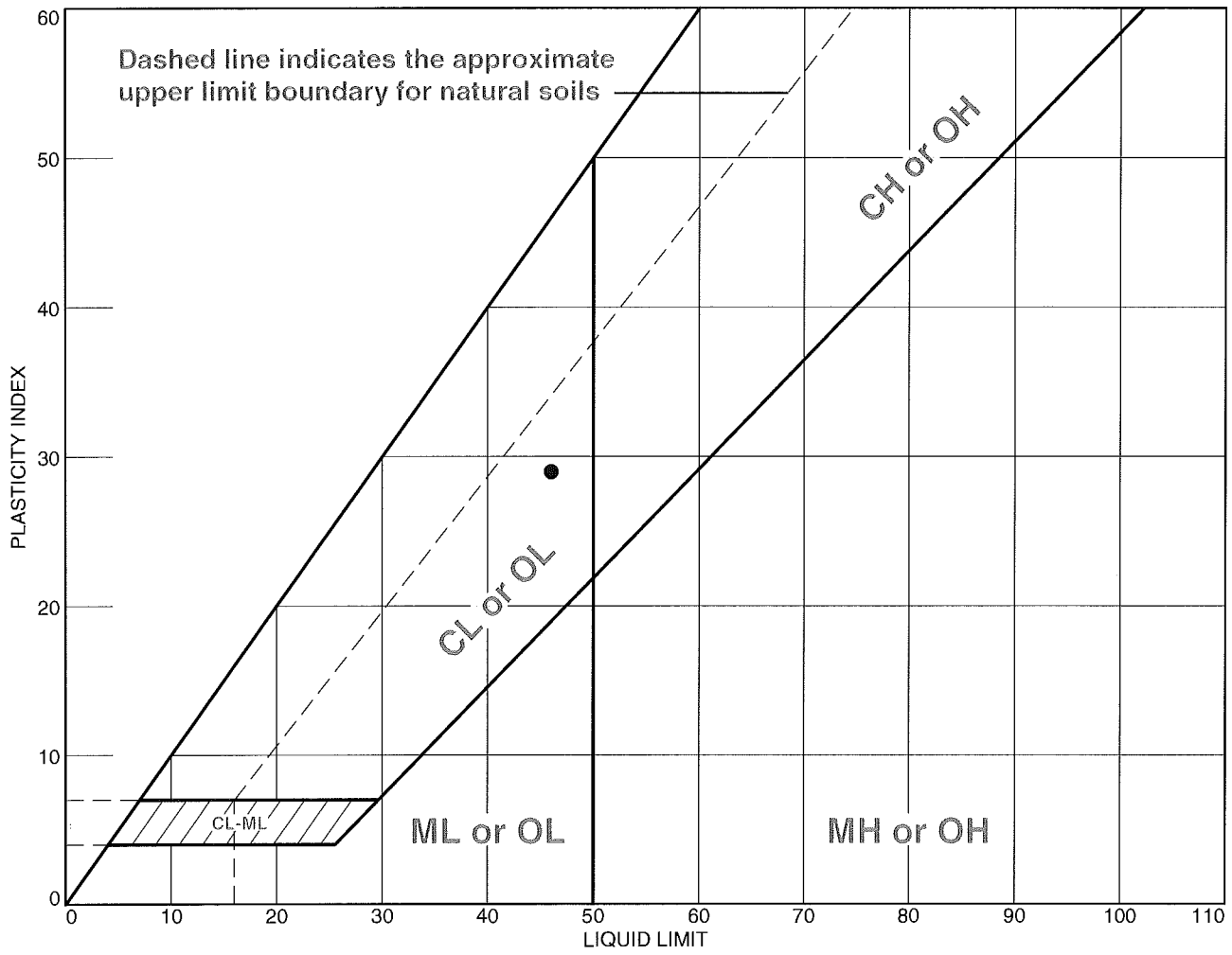
SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		46	17	29		62.3	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-5 #1 **Depth:** 1.0 **Sample Number:** S32127

Remarks:

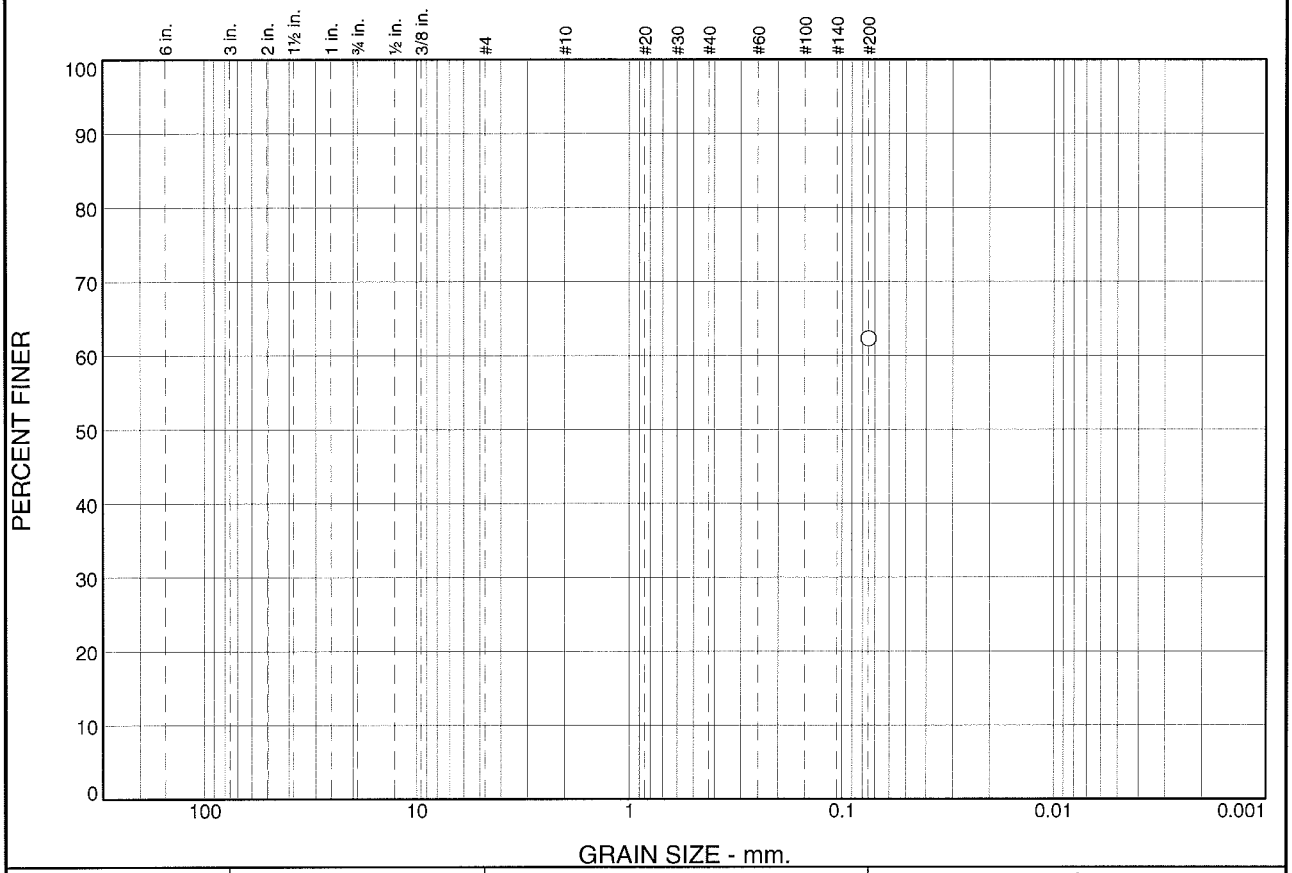
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ef **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	62.3		

* (no specification provided)

Material Description

Atterberg Limits

PL= 17 LL= 46 PI= 29

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-5 #1
Sample Number: S32127 **Depth:** 1.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

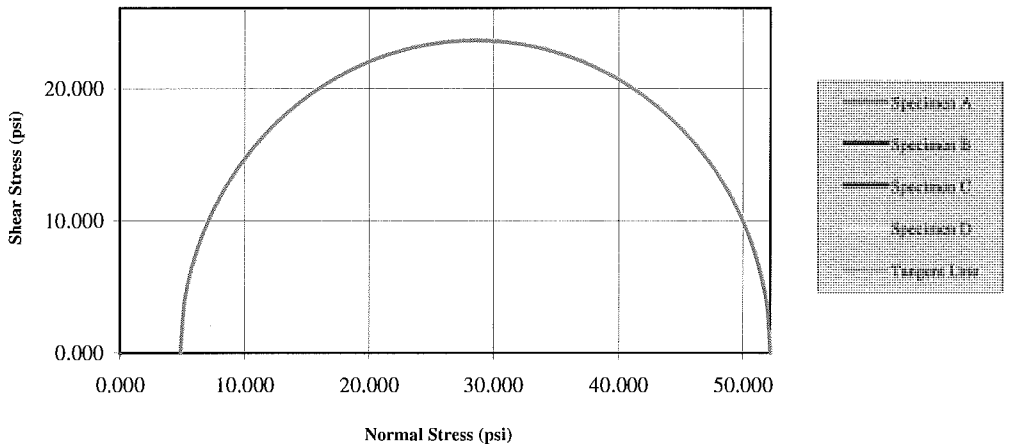
Date: 09/14/11

Checked By: MN

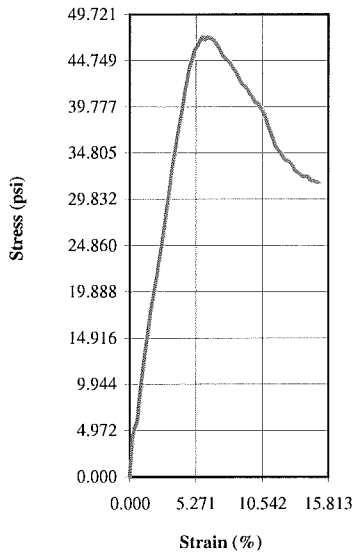
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

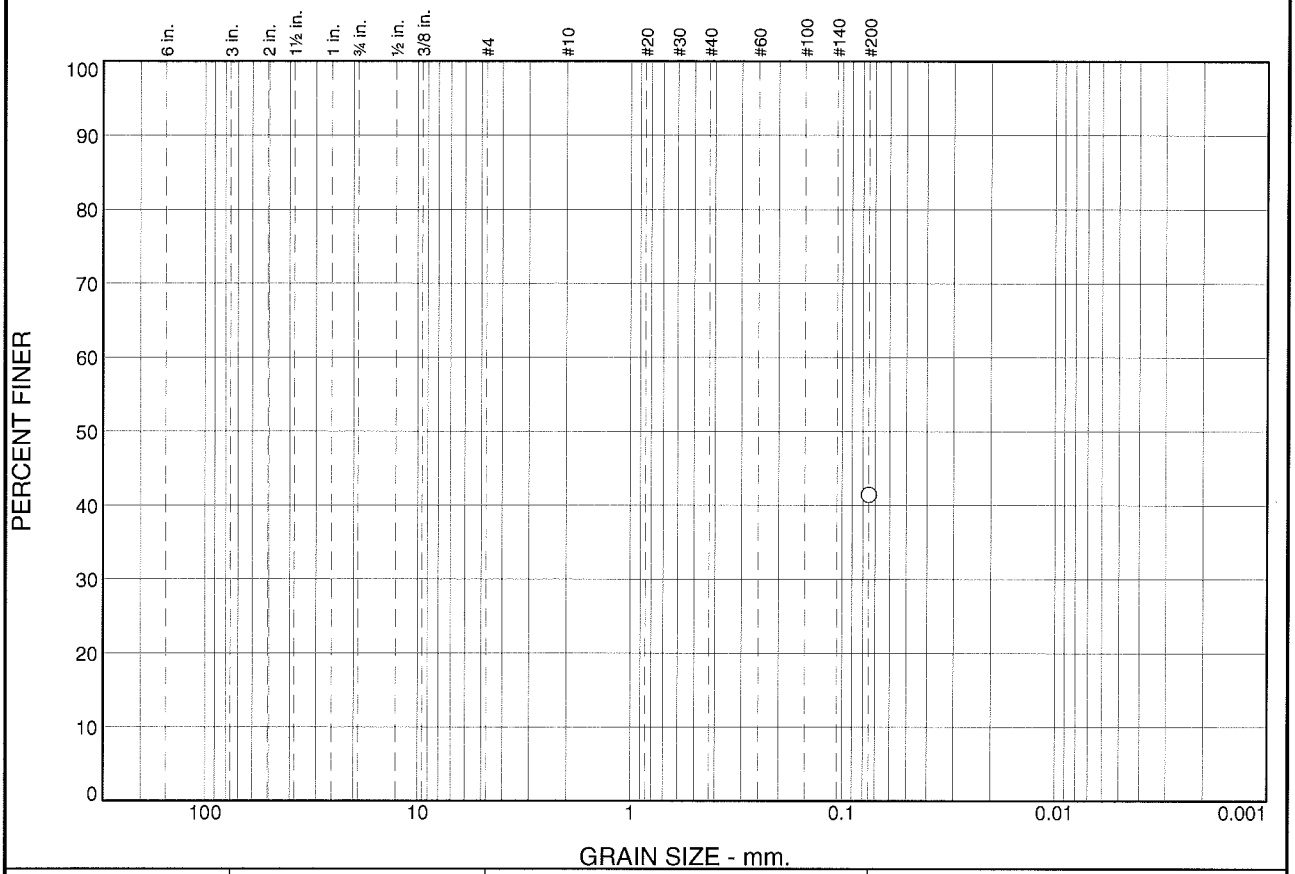


Before Test	Specimen A	B	C	D
Water Content (%)	19.80	0.00	0.00	0.00
Dry Density (pcf)	107.23	0.00	0.00	0.00
Saturation (%)	96.67	0.00	0.00	0.00
Void Ratio	0.54	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	5.100	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	19.66	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	47.353	0.000	0.000	0.000
Axial Strain @ Failure (%)	5.789	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	52.2	0.0	0.0	0.0
σ3 (psi)	4.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	23.7	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-5, #3 @ 6.0'
Client:	SAGE	Sample Number:	S32128
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						41.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	41.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

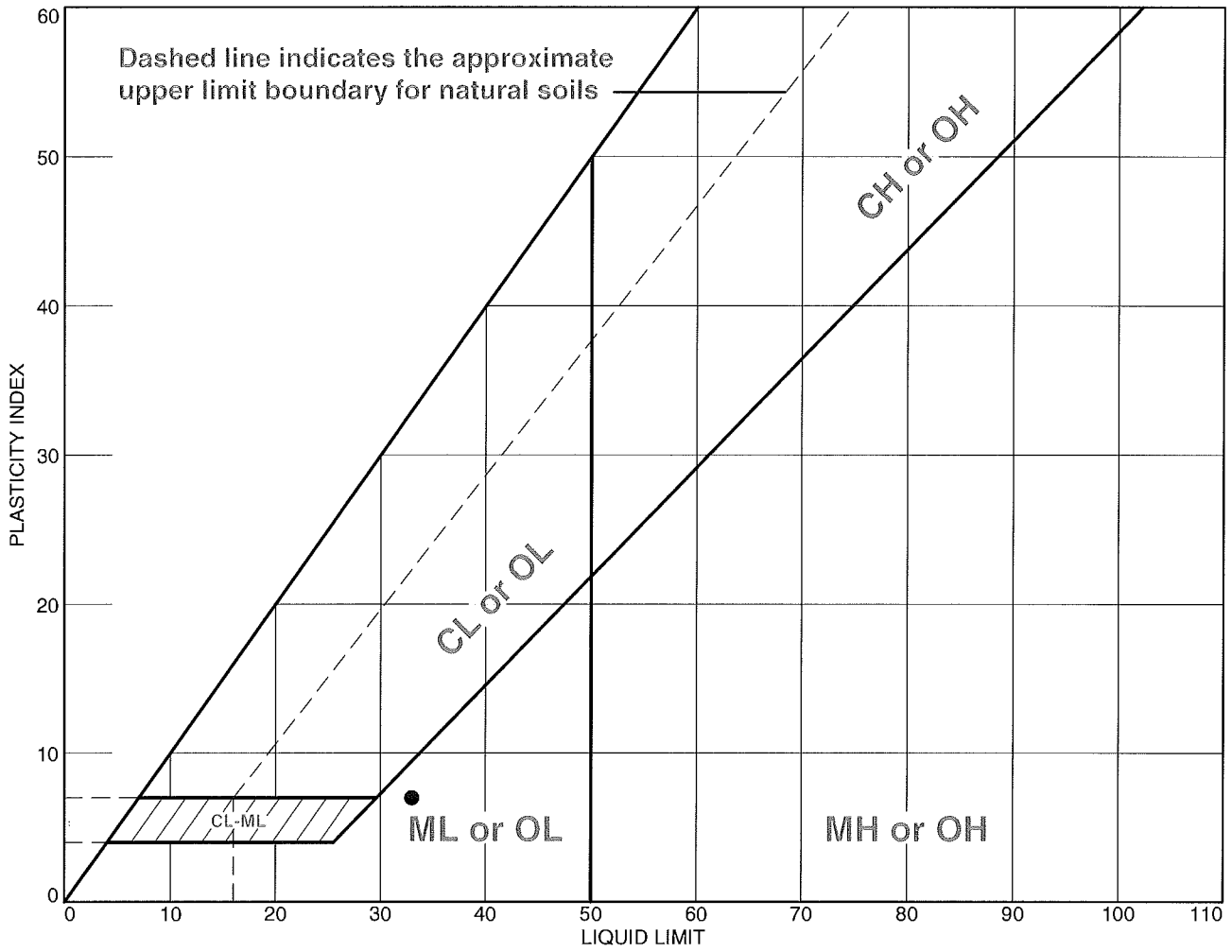
Location: B-5 #4
Sample Number: S32129 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		33	26	7			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-5 #5 **Depth:** 15.5 **Sample Number:** S32130

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

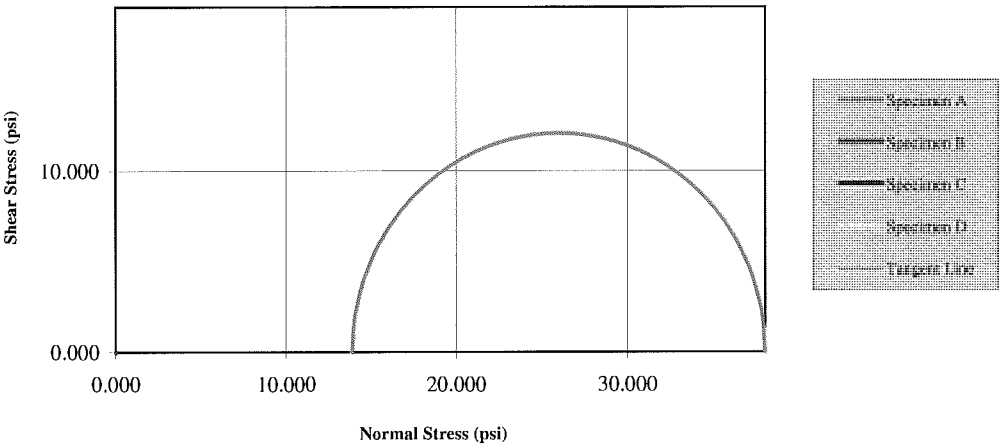
Date: 09/14/11

Checked By: MN

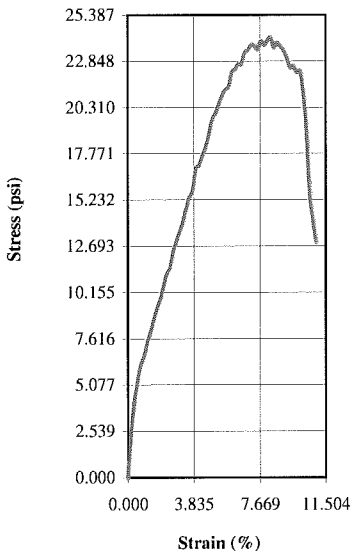
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve



Before Test	Specimen A	B	C	D
Water Content (%)	27.56	0.00	0.00	0.00
Dry Density (pcf)	95.29	0.00	0.00	0.00
Saturation (%)	99.22	0.00	0.00	0.00
Void Ratio	0.74	0.00	0.00	0.00
Diameter (in)	2.360	0.000	0.000	0.000
Height (in)	5.390	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	27.19	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	24.178	0.000	0.000	0.000
Axial Strain @ Failure (%)	8.303	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	13.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	38.1	0.0	0.0	0.0
σ3 (psi)	13.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	12.1	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-5, #6 @ 16.0'
Client:	SAGE	Sample Number:	S32131
Remarks:			

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-6 #1	2			5.8
B-6 #4	10			47.4
B-6 #7	20			59.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

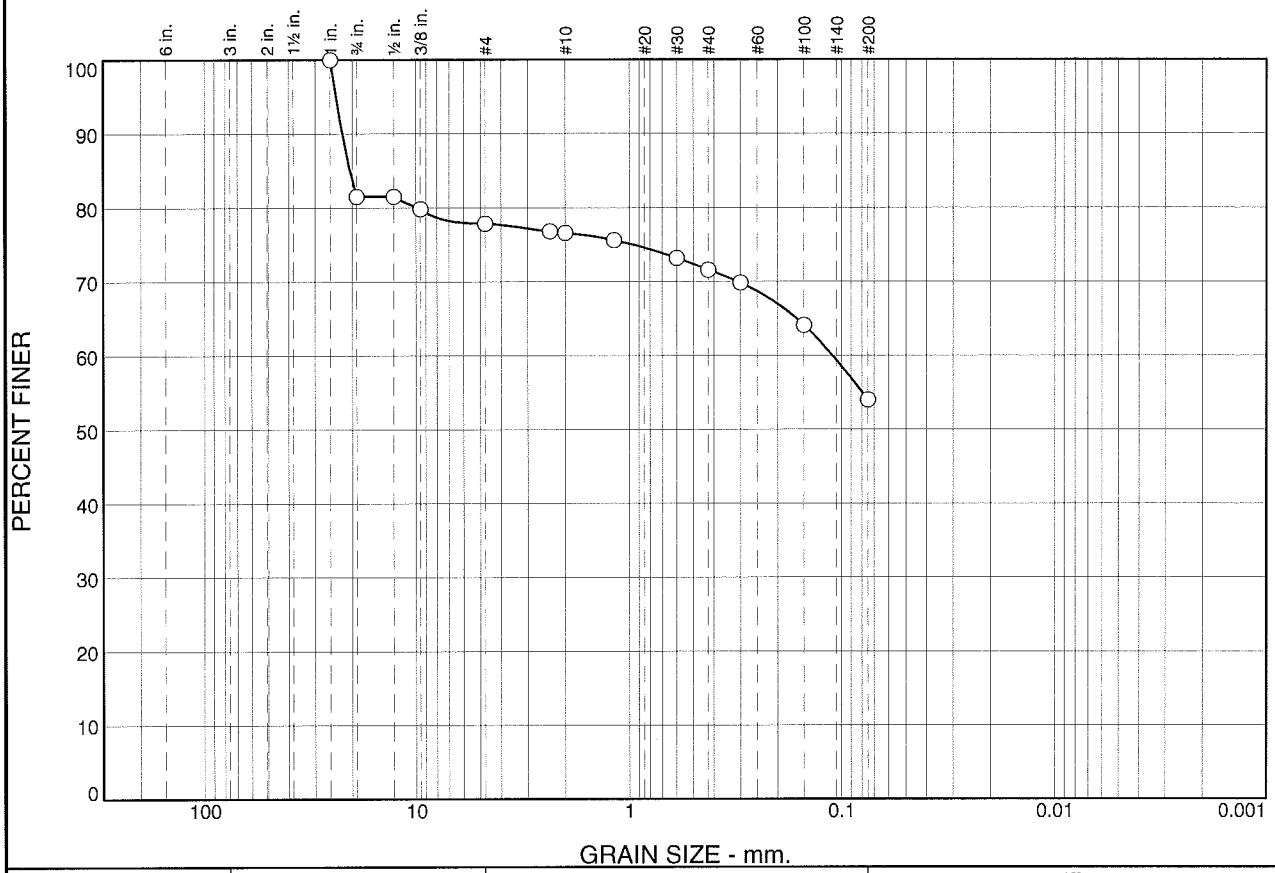
Biggs-West Gridley Canal Improvements

10-066.00

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	18.5	3.6	1.3	5.0	17.6	54.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 Inch	100.0		
3/4 Inch	81.5		
1/2 Inch	81.5		
3/8 Inch	79.9		
#4	77.9		
#8	76.8		
#10	76.6		
#16	75.6		
#30	73.2		
#40	71.6		
#50	69.8		
#100	64.1		
#200	54.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 22.2707 D_{85}= 20.5697 D_{60}= 0.1102
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

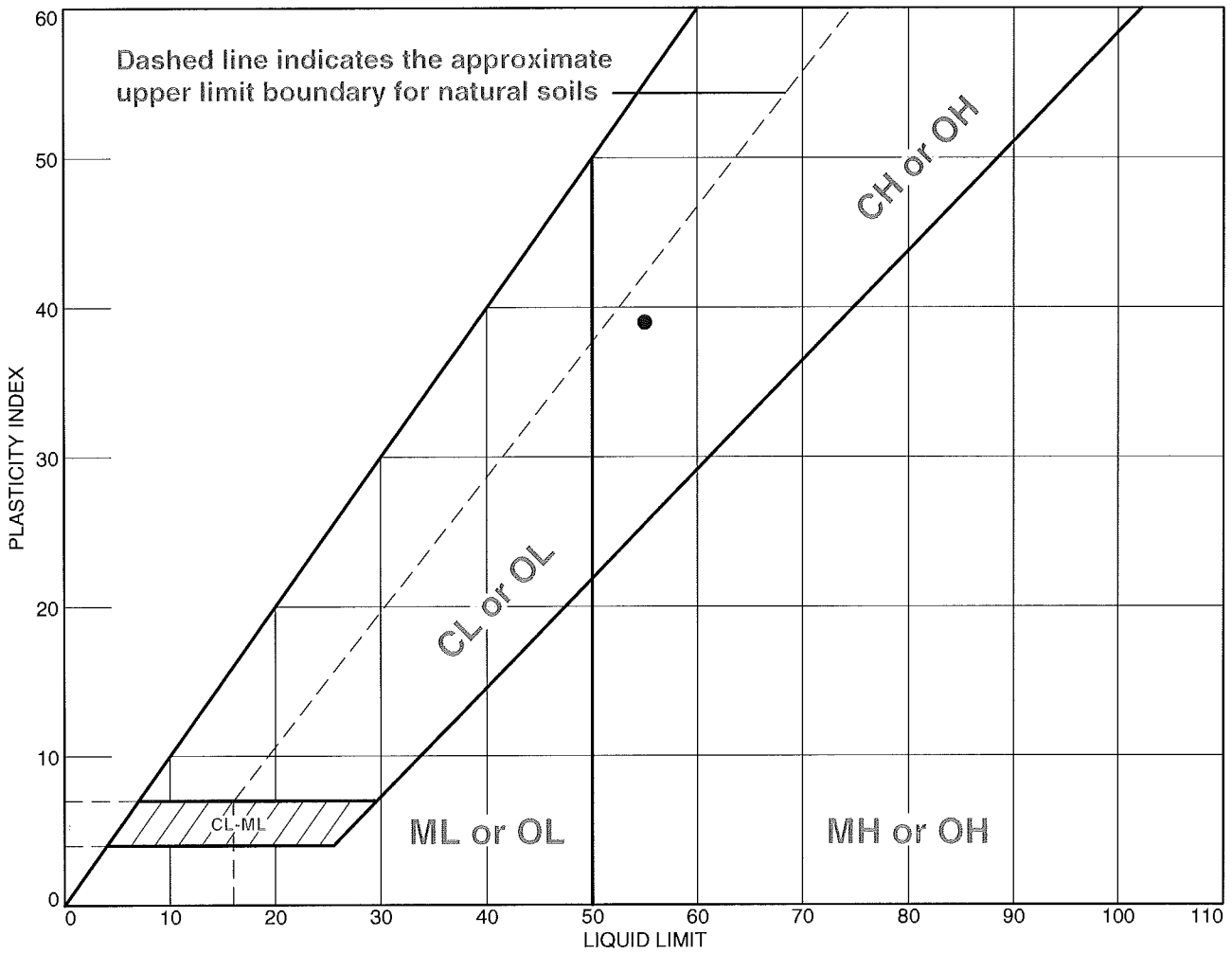
Location: B-6 #1
Sample Number: S32137 **Depth:** 2.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		55	16	39			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-6 #3 **Depth:** 5'7" **Sample Number:** S32138

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

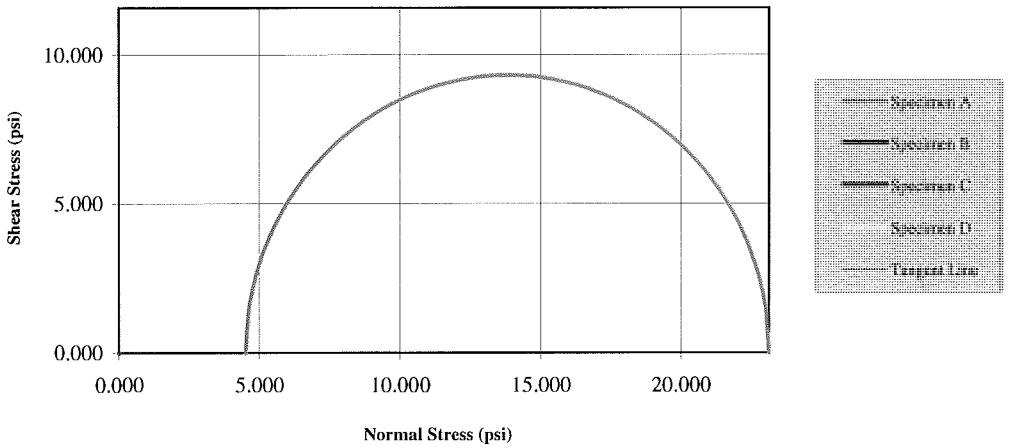
Date: 09/14/11

Checked By: MN

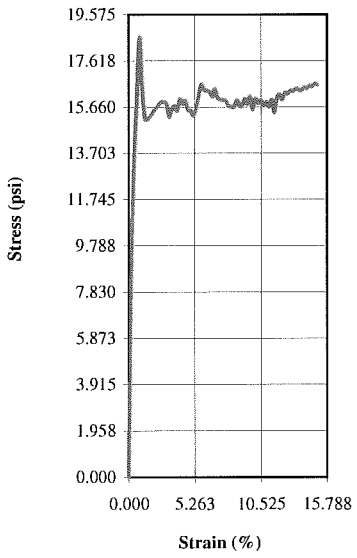
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

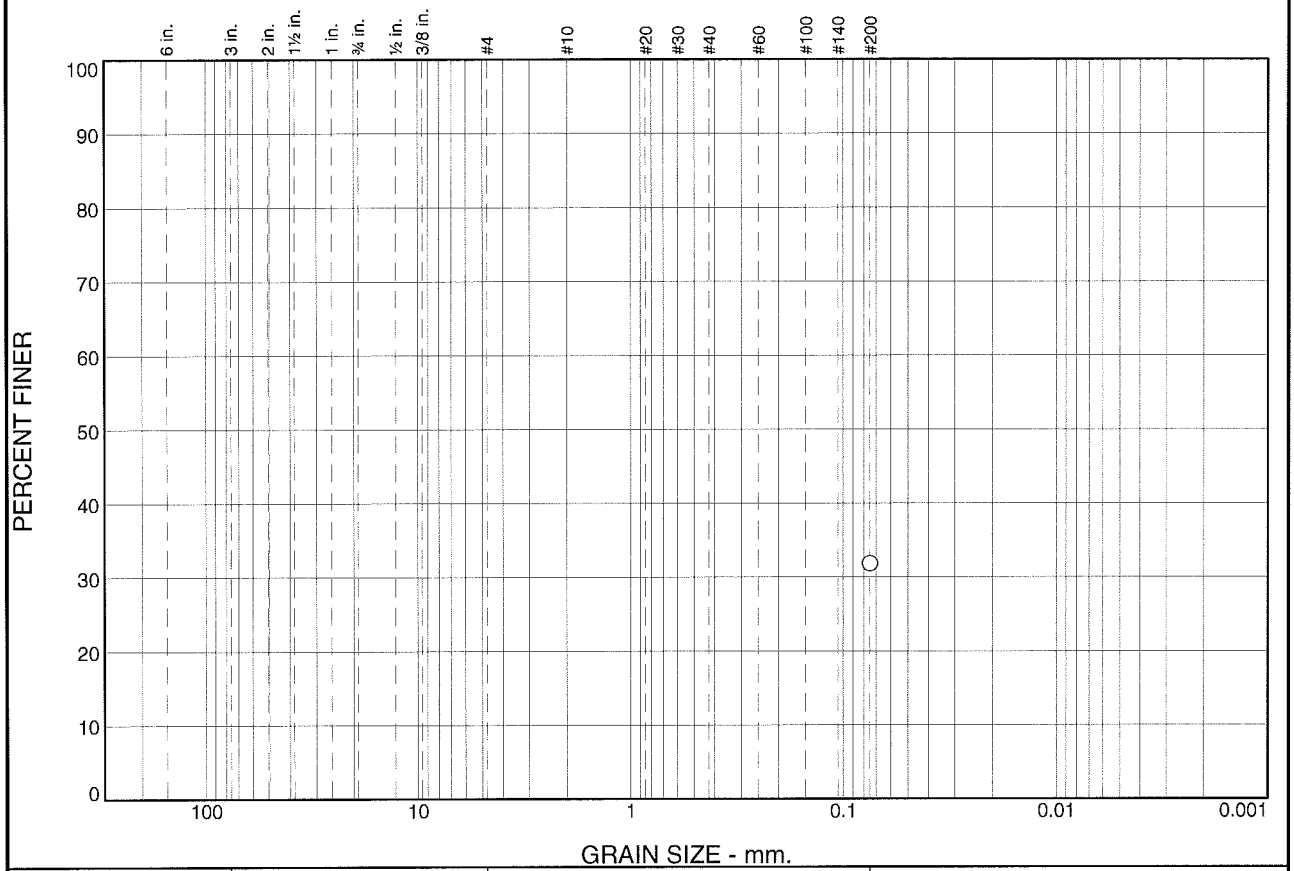


Before Test	Specimen A	B	C	D
Water Content (%)	28.05	0.00	0.00	0.00
Dry Density (pcf)	87.46	0.00	0.00	0.00
Saturation (%)	83.38	0.00	0.00	0.00
Void Ratio	0.89	0.00	0.00	0.00
Diameter (in)	2.350	0.000	0.000	0.000
Height (in)	4.740	0.000	0.000	0.000
Liquid Limit	55.0			
Plastic Limit	16.0			
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	28.35	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	18.643	0.000	0.000	0.000
Axial Strain @ Failure (%)	0.859	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.5	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	23.2	0.0	0.0	0.0
σ3 (psi)	4.5	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	9.3	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Imp.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-6, #3 @ 5'7"
Client:	SAGE	Sample Number:	S32138
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						31.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	31.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

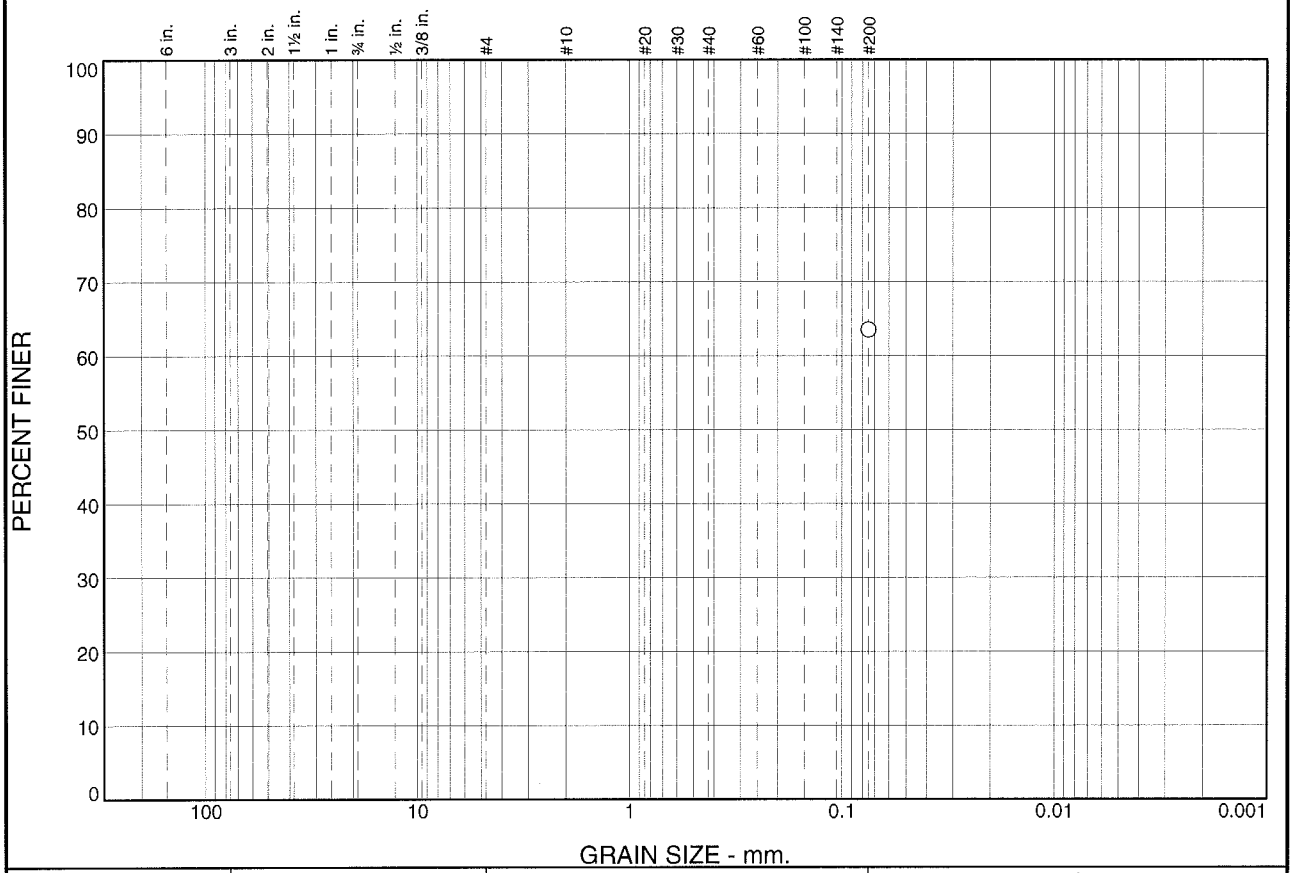
Location: B-6 #4
Sample Number: S32139 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** tt

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						63.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	63.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

Location: B-6 #6
Sample Number: S32140 **Depth:** 15'8" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-6 #6 | Sample Depth, ft.: 15'8" | Lab No.: S32140

Visual Description: N/A | Sample Type:

Remarks:

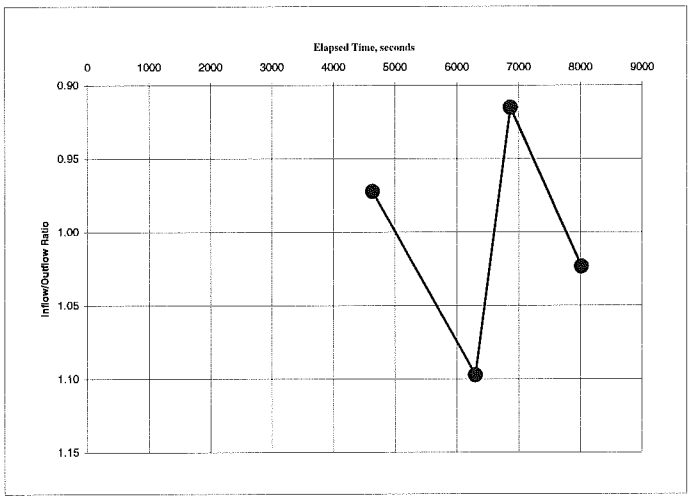
TEST RESULTS

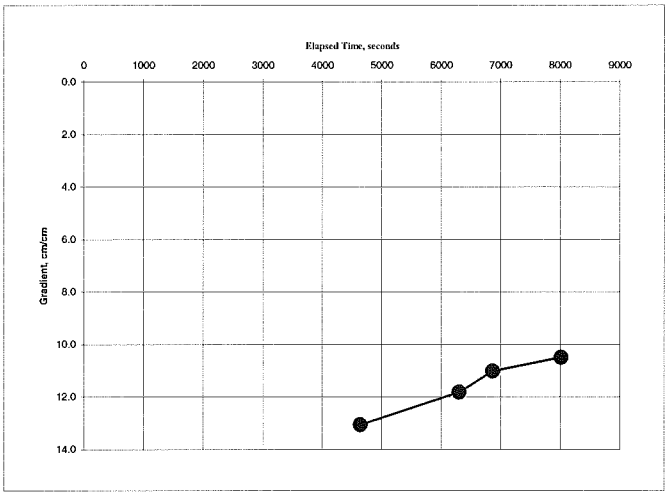
Permeability, cm/sec.: 2.12E-06 | **Average Hydraulic Gradient: 11.6**

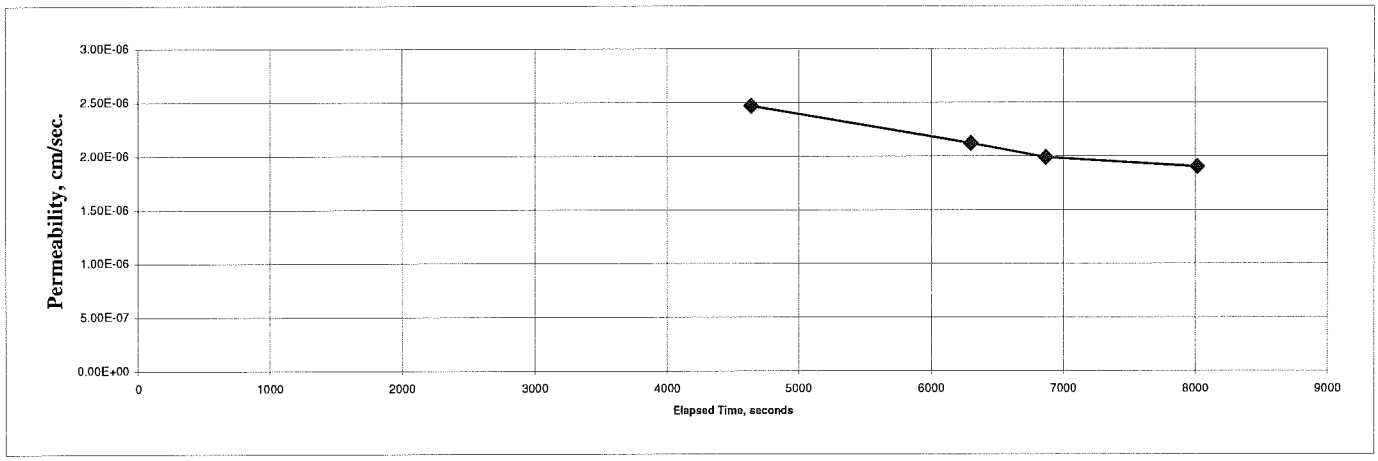
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.11	Specimen Height, cm:	7.11
Specimen Diameter, cm:	6.10	Specimen Diameter, cm:	6.10
Dry Unit Weight, pcf:	96.4	Dry Unit Weight, pcf:	100.6
Moisture Content, %	28.5	Moisture Content, %	29.0
Specific Gravity, Assumed	2.78		
Percent Saturation:	98.9		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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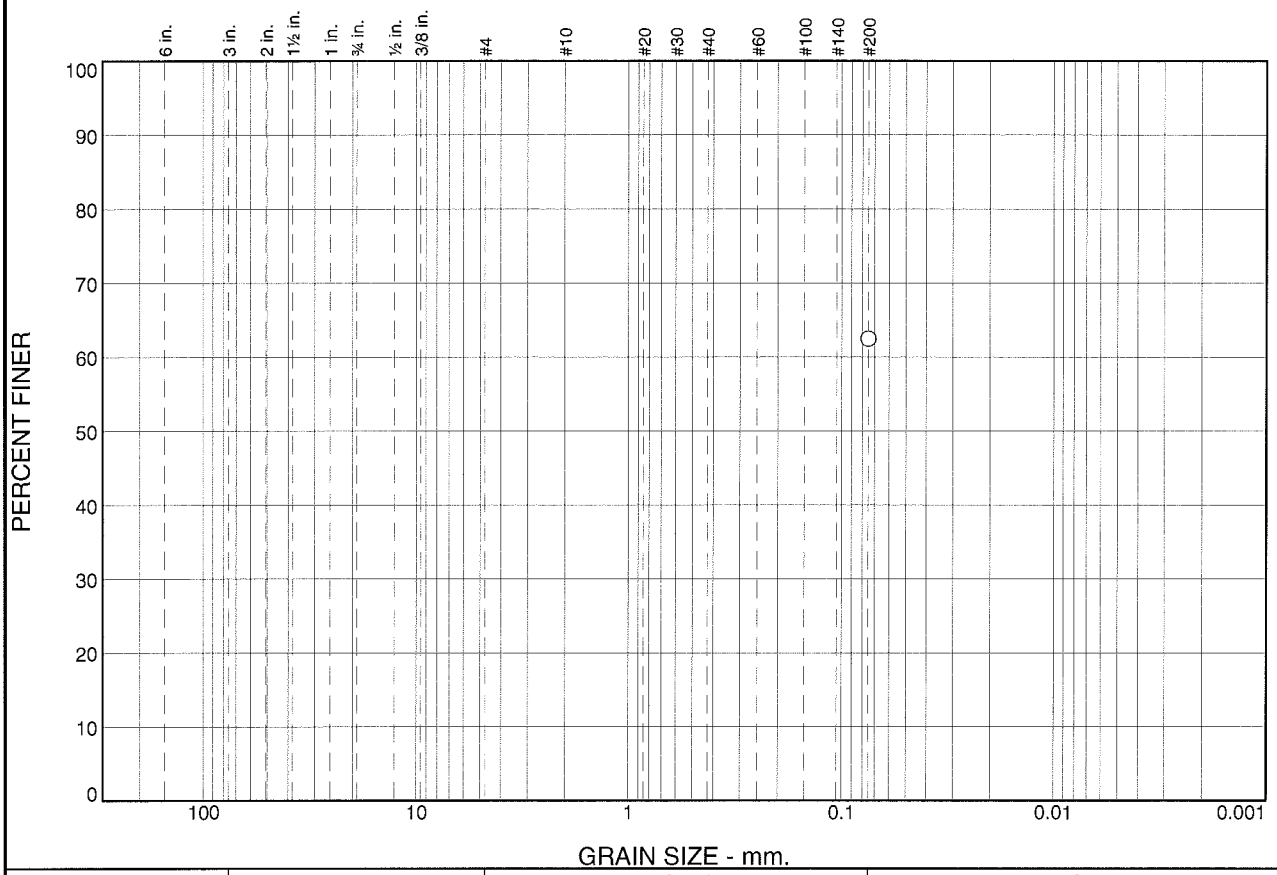
Biggs-West Gridley Canal Improvements

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						62.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	62.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

friable particles

Location: B-6 #7
Sample Number: S32141 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-7 #1	1			13.9

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

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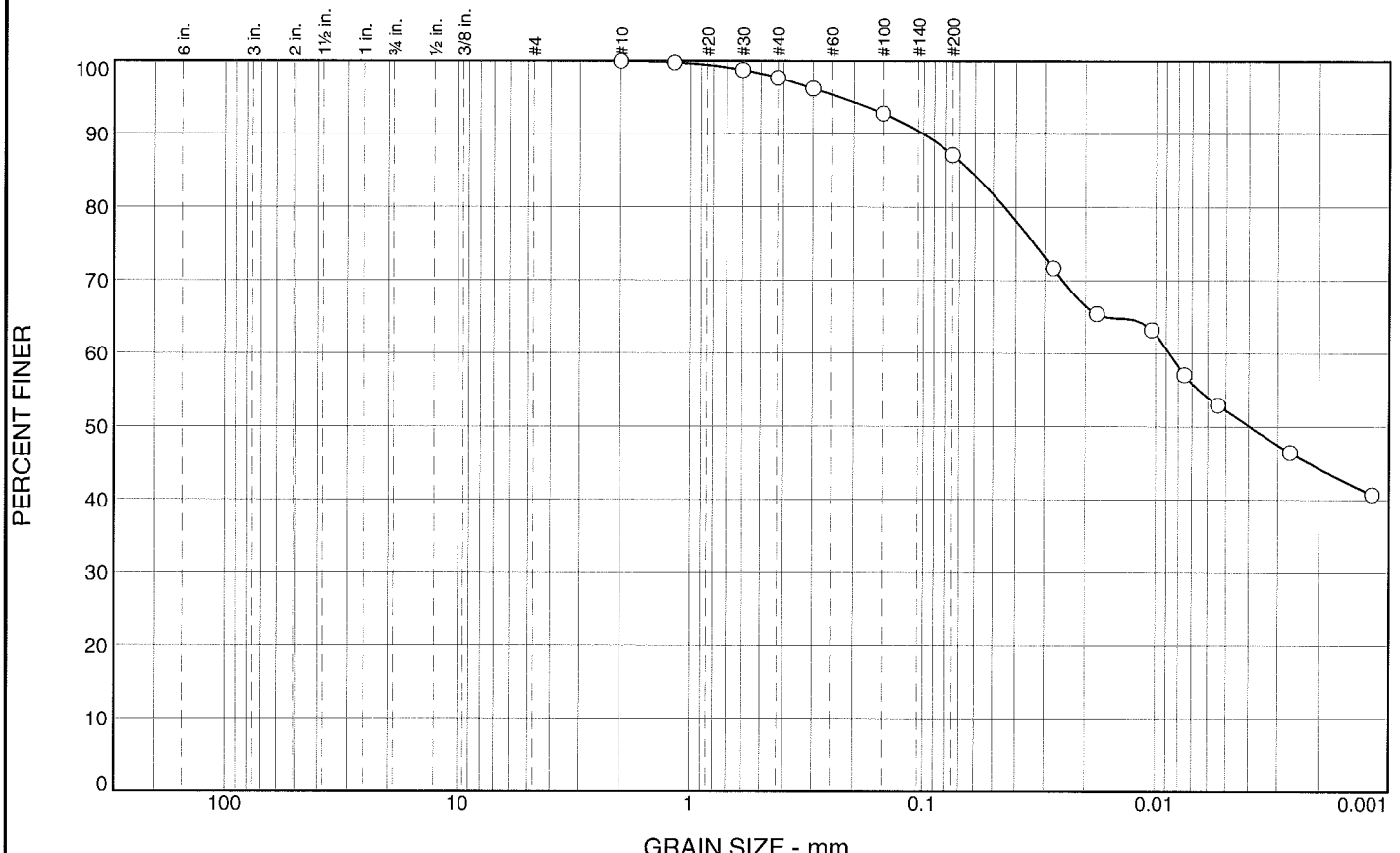
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.3	10.6	34.9	52.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#16	99.8		
#30	98.7		
#40	97.7		
#50	96.2		
#100	92.8		
#200	87.1		
0.0276 mm.	71.7		
0.0179 mm.	65.4		
0.0104 mm.	63.3		
0.0075 mm.	57.1		
0.0054 mm.	53.0		
0.0027 mm.	46.5		
0.0012 mm.	40.7		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1004 D_{85}= 0.0630 D_{60}= 0.0087
D_{50}= 0.0040 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

F.M.=0.12

Location: B-7 #2
Sample Number: S32144 **Depth:** 5.5 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: jm/pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-7 #2 | Sample Depth, ft.: 5.5 | Lab No.: S32144

Visual Description: N/A | Sample Type:

Remarks:

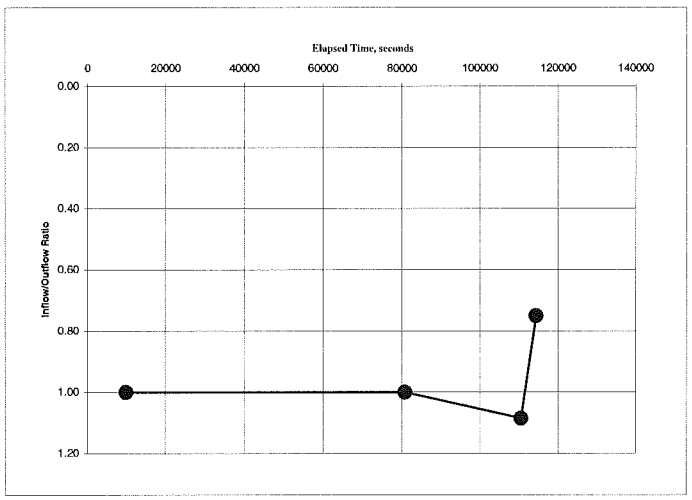
TEST RESULTS

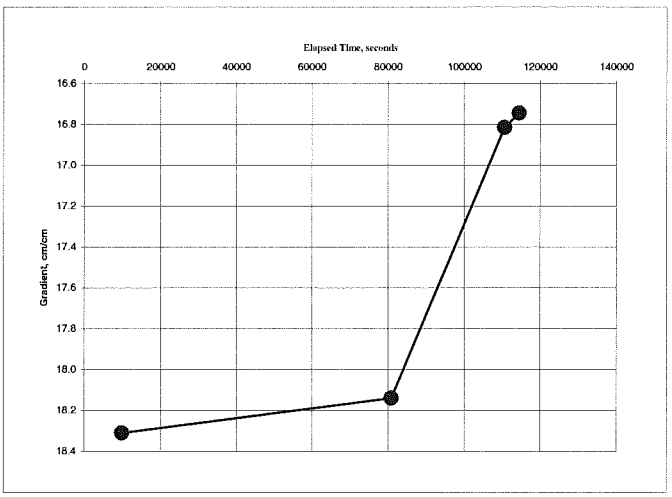
Permeability, cm/sec.: 9.62E-09 | **Average Hydraulic Gradient: 17.5**

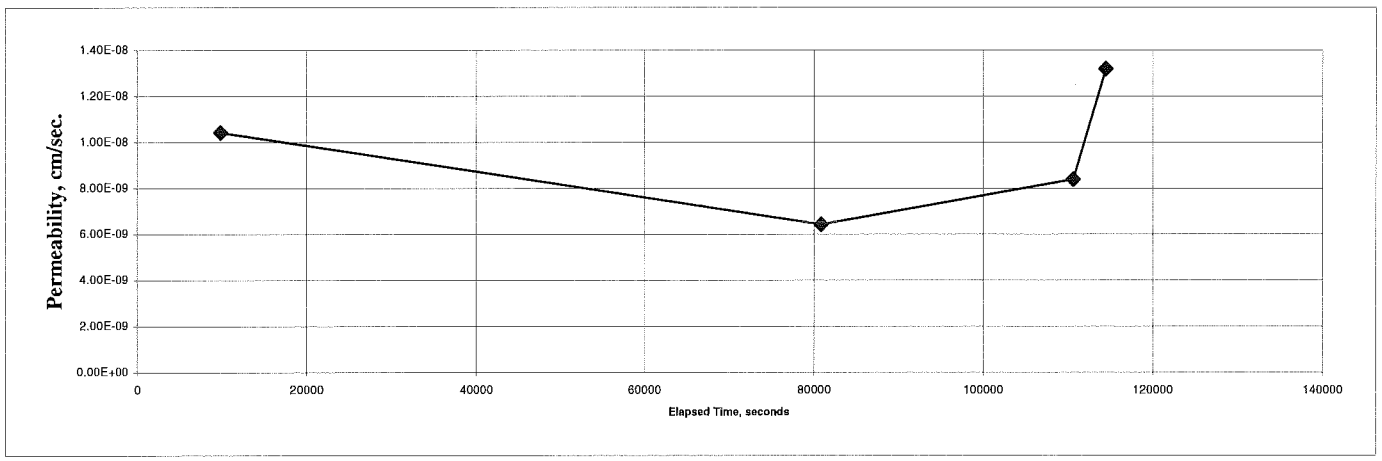
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.35	Specimen Height, cm:	6.45
Specimen Diameter, cm:	6.07	Specimen Diameter, cm:	6.07
Dry Unit Weight, pcf:	107.5	Dry Unit Weight, pcf:	109.4
Moisture Content, %	21.5	Moisture Content, %	22.6
Specific Gravity, Assumed	2.75		
Percent Saturation:	98.9		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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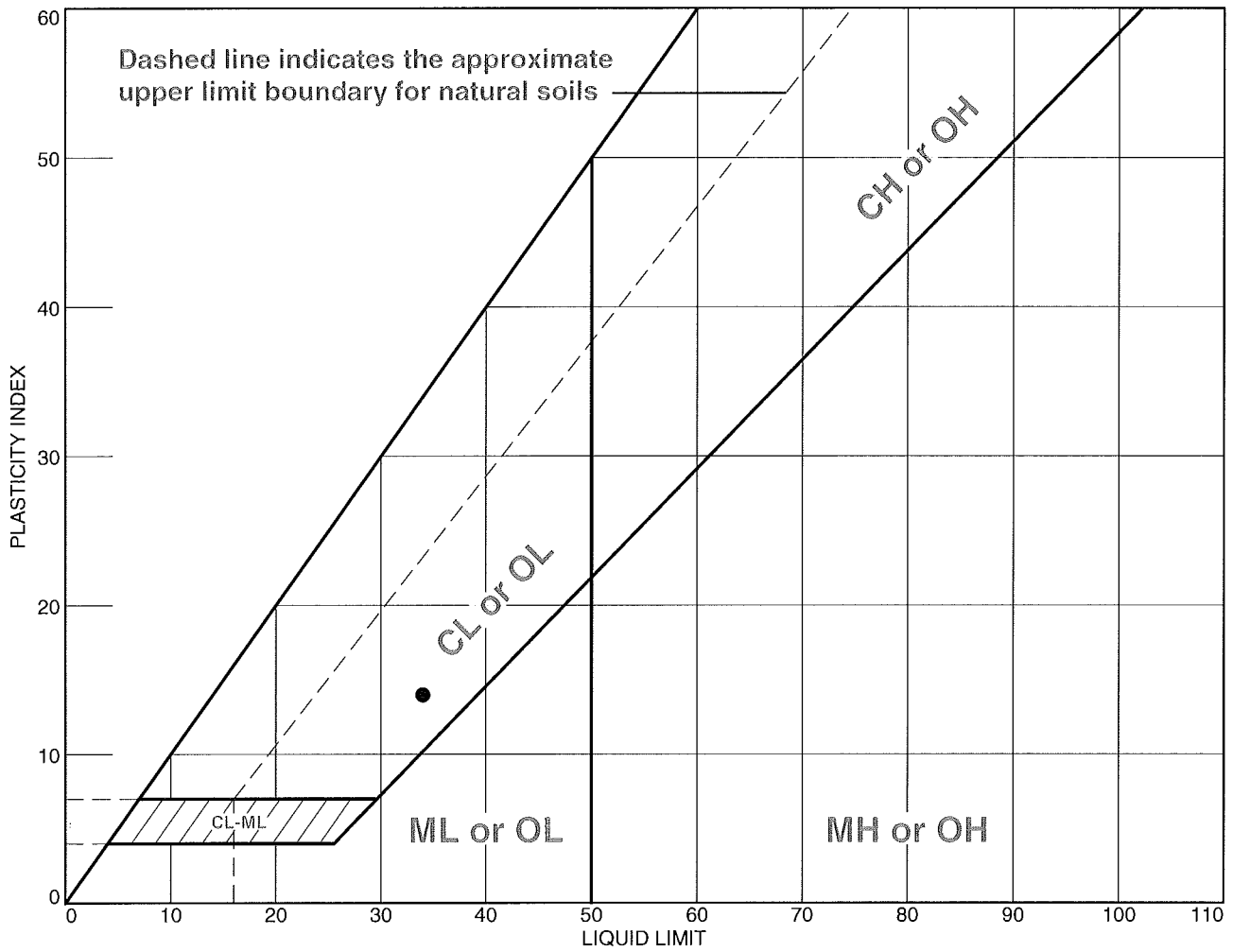
Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		34	20	14		61.7	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-7 #4 **Depth:** 10.0 **Sample Number:** S32145

Remarks:

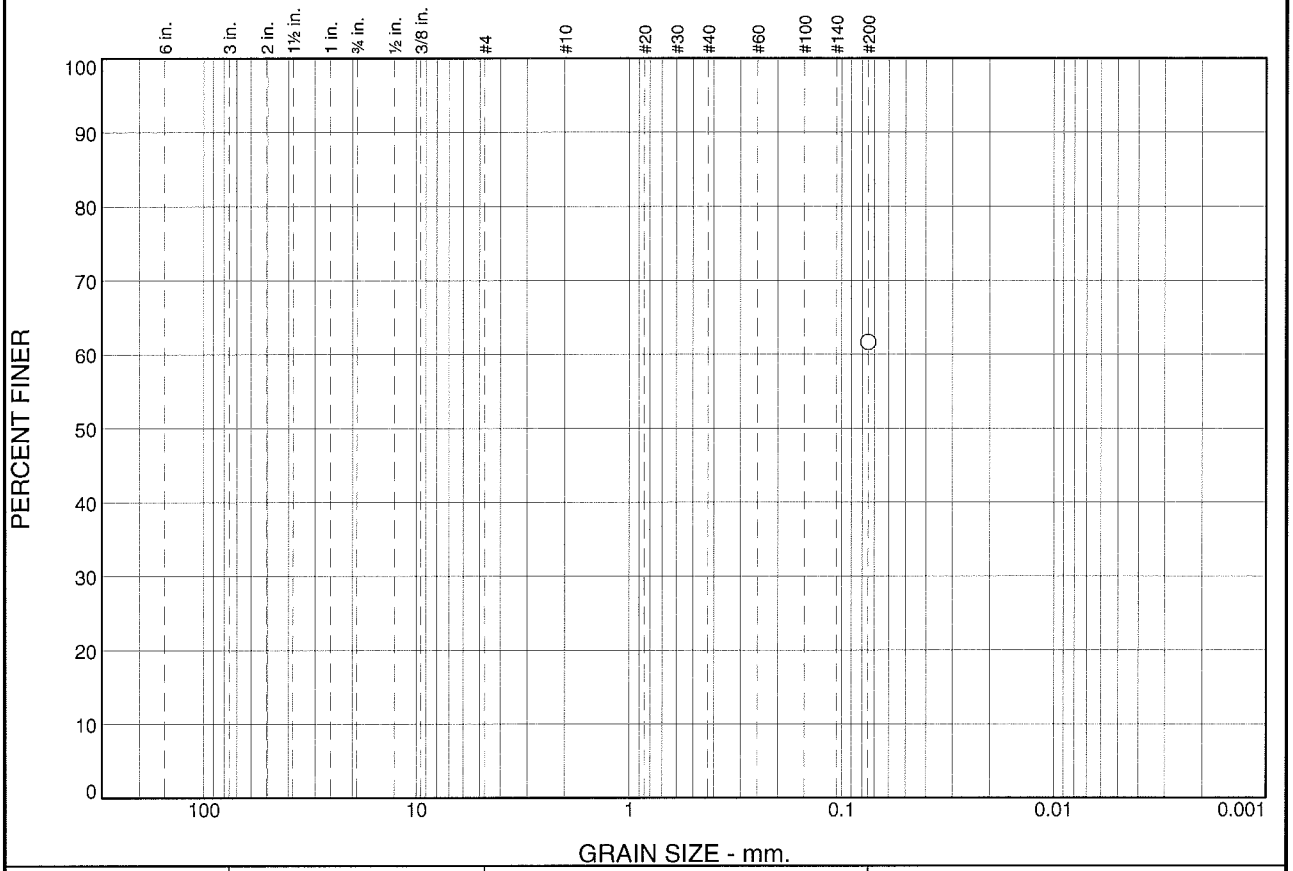
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	61.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= 20 LL= 34 PI= 14

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-7 #4
Sample Number: S32145 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-7 #5 | Sample Depth, ft.: 15 | Lab No.: S32146

Visual Description: N/A | Sample Type:

Remarks:

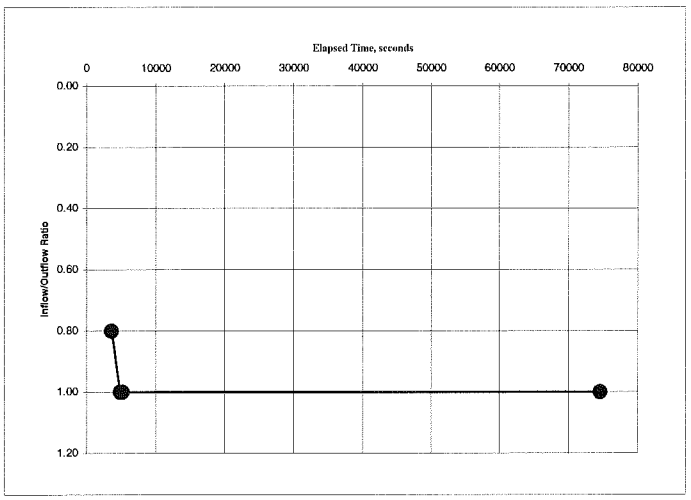
TEST RESULTS

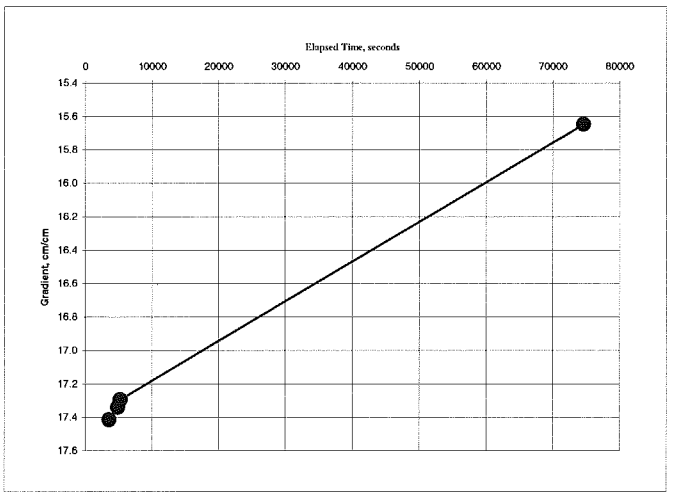
Permeability, cm/sec.: 1.03E-07 | **Average Hydraulic Gradient: 16.9**

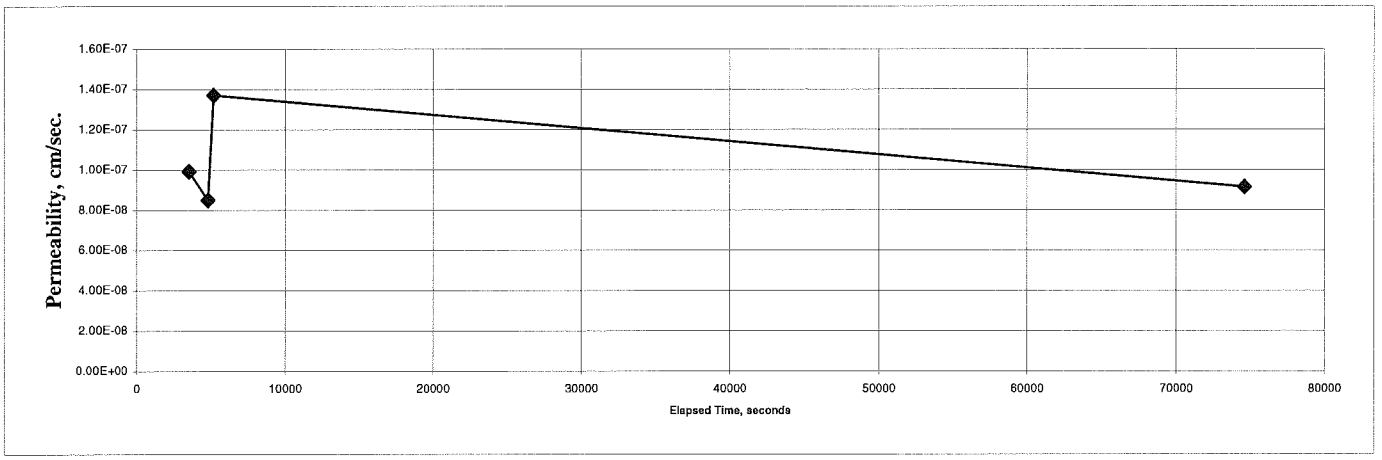
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.65	Specimen Height, cm:	6.65
Specimen Diameter, cm:	6.10	Specimen Diameter, cm:	6.10
Dry Unit Weight, pcf:	98.6	Dry Unit Weight, pcf:	98.6
Moisture Content, %	25.5	Moisture Content, %	27.8
Specific Gravity, Assumed	2.70		
Percent Saturation:	96.7		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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GEOTECHNICAL AND MATERIALS TESTING SERVICES

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Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-8 #6	15.5	82.0	67.9	20.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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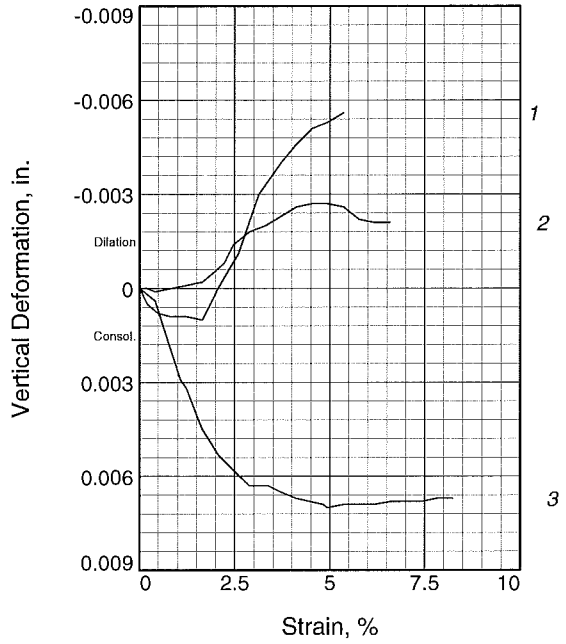
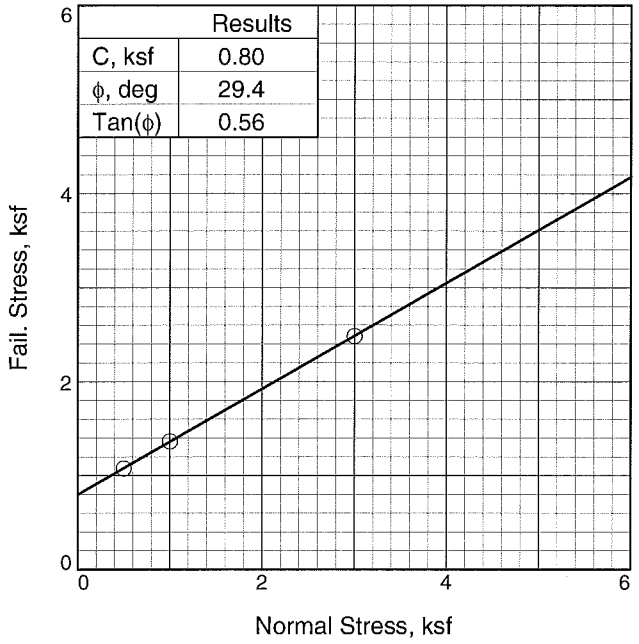
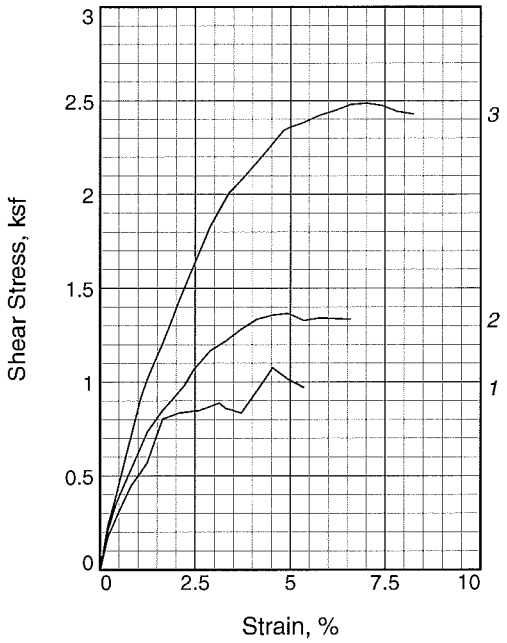
Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

10-066.00







Sample No.		1	2	3
Initial	Water Content, %	29.6	27.2	25.4
	Dry Density, pcf	91.4	89.5	96.9
	Saturation, %	94.9	83.0	92.9
	Void Ratio	0.8436	0.8843	0.7389
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	30.8	30.8	25.3
	Dry Density, pcf	91.9	92.0	100.1
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.8333	0.8315	0.6847
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.97	0.97
Normal Stress, ksf		0.50	1.00	3.00
Fail. Stress, ksf		1.08	1.37	2.49
Strain, %		4.5	4.9	7.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Undisturbed
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

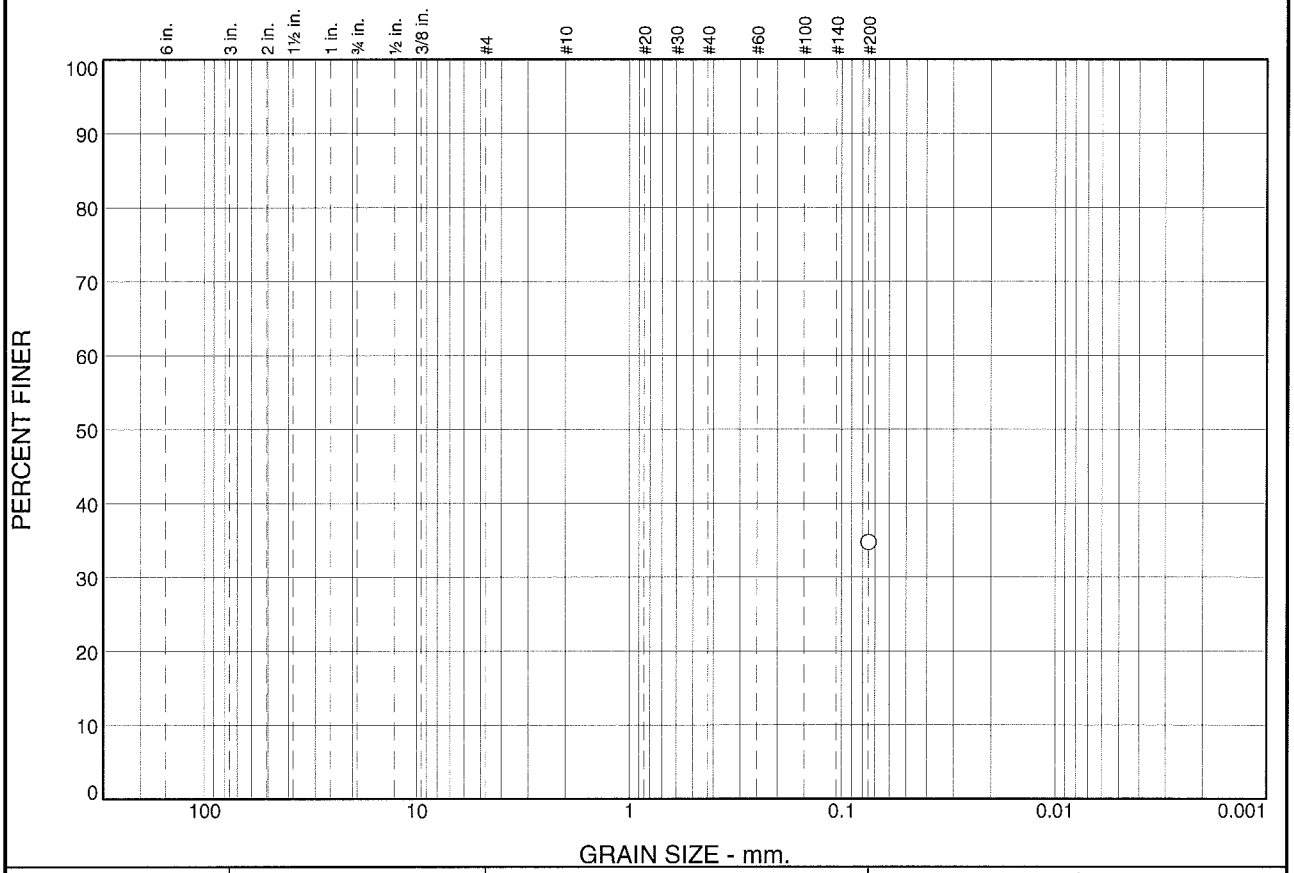
Client: Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-8 #3
Sample Number: S32147 **Depth:** 5.5
Proj. No.: 11-236 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw **Checked By:** mpw

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						34.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	34.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

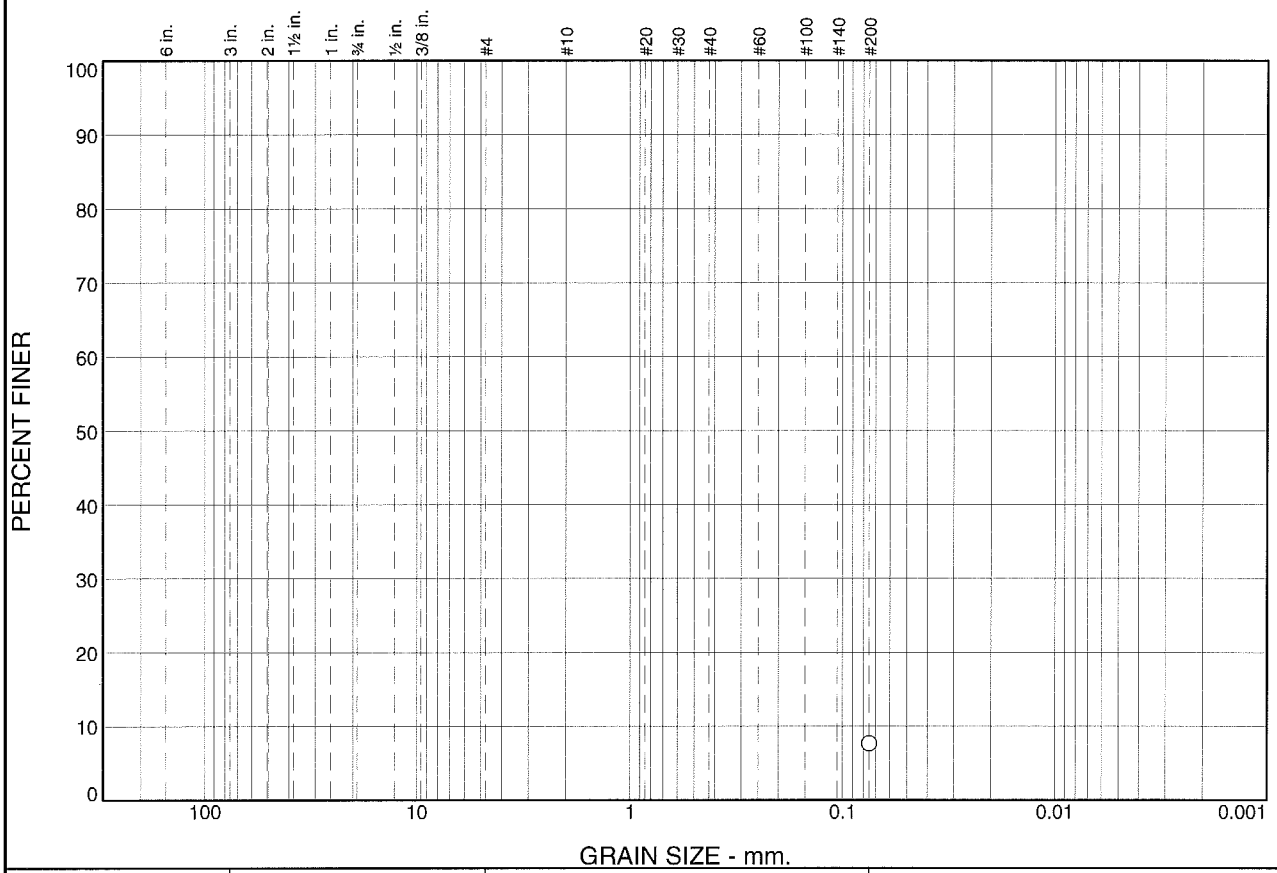
Location: B-8 #8
Sample Number: S32149 **Depth:** 25.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-8 #11
Sample Number: S32150 **Depth:** 35.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-9 #4	5.5	Sample Disturbed		24.5

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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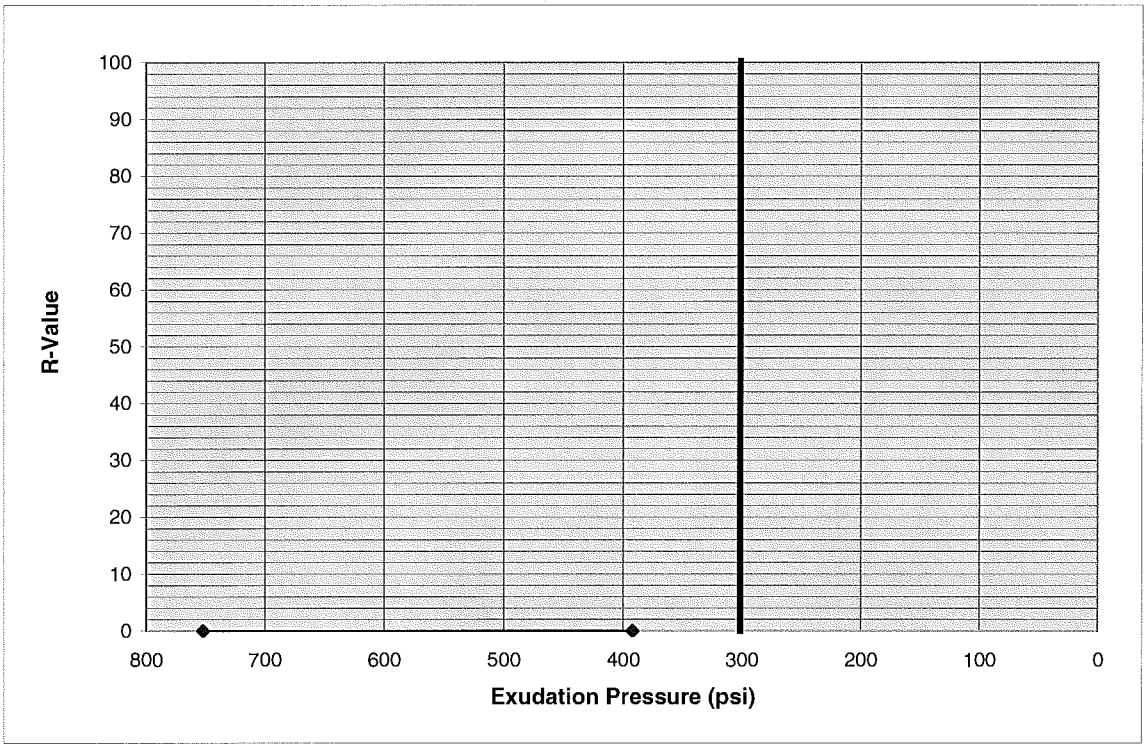
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Resistance Value

Test Procedure: CAL 301

Client Project:	Biggs-West Gridley Canal Improvements
STL Project Number:	11-236
Client Project Number:	10-066.00
Sample Number:	B-9 #2 @ 0-5' (S32151)
Sample Received Date:	8/25/2011
Material Description:	VISUAL: Black Clay

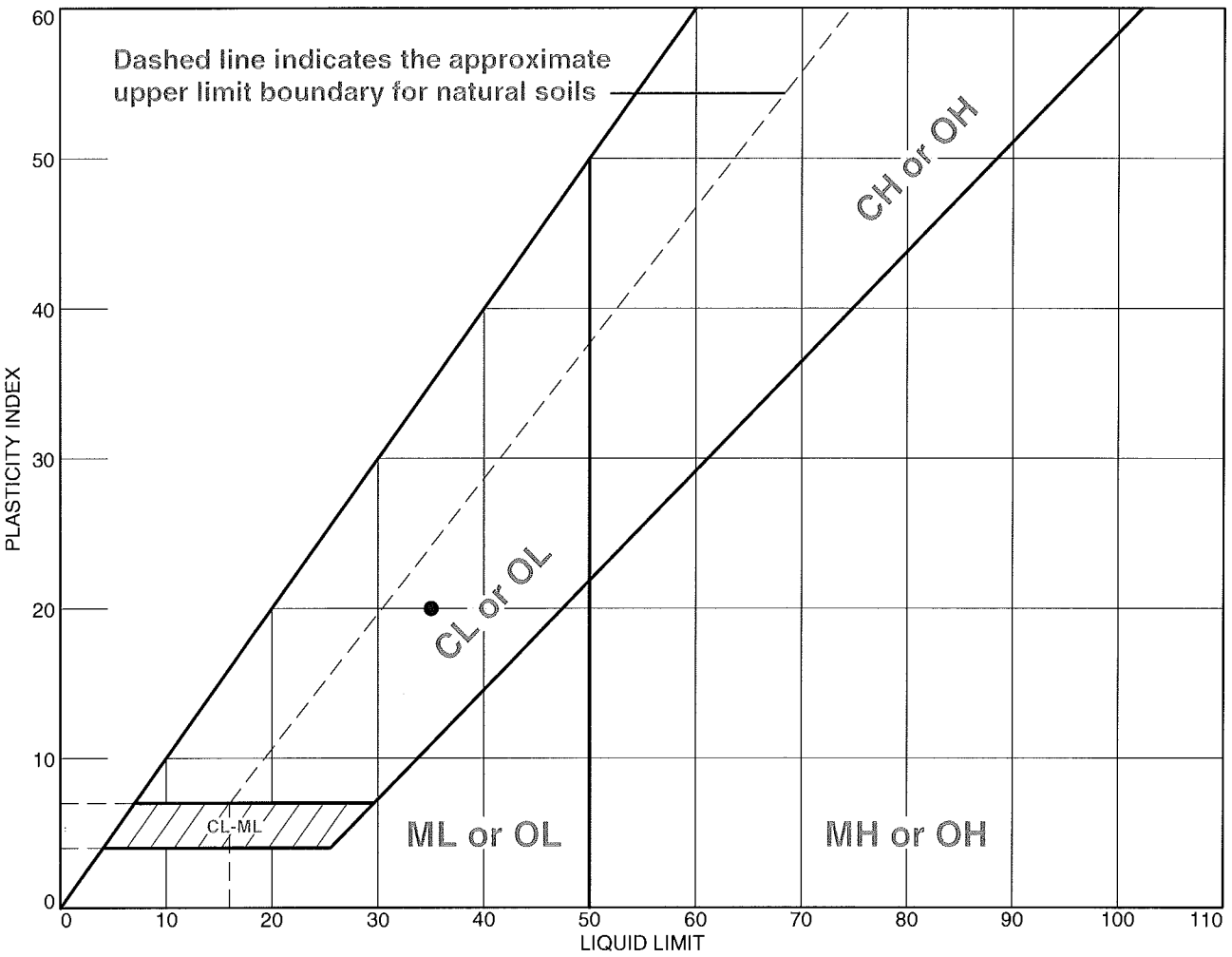


Specimen Number:	*1*	*2*	*3*	
Moisture at Test (%)	19.3	21.9	23.6	
Dry Unit Weight at Test (pcf)	108.3	103.0	101.2	
Expansion Pressure (psf)	485	386		
Exudation Pressure (psi)	752	392		
Resistance Value	N/A	N/A	Sample Extruded	
Resistance Value at 300 psi exudation pressure			<5	

NOTE:

5040 Robert J. Mathews Parkway, El Dorado Hills, CA ph: 916-939-3460 fax: 916-939-3507

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		35	15	20		64.5	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-9 #4 **Depth:** 5.5 **Sample Number:** S32152

Remarks:

● Sample disturbed

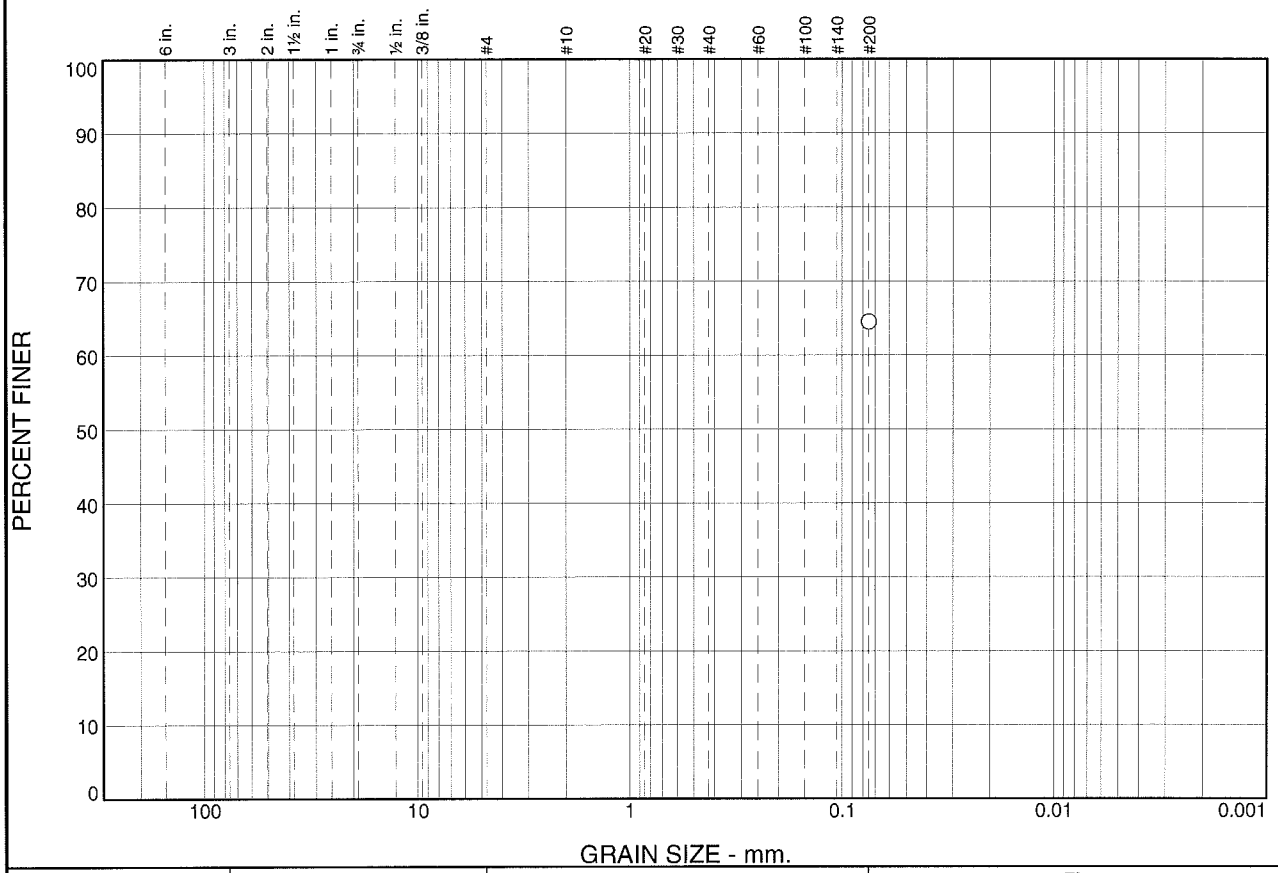
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	64.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= 15 LL= 35 PI= 20

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-9 #4
Sample Number: S32152 **Depth:** 5.5 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

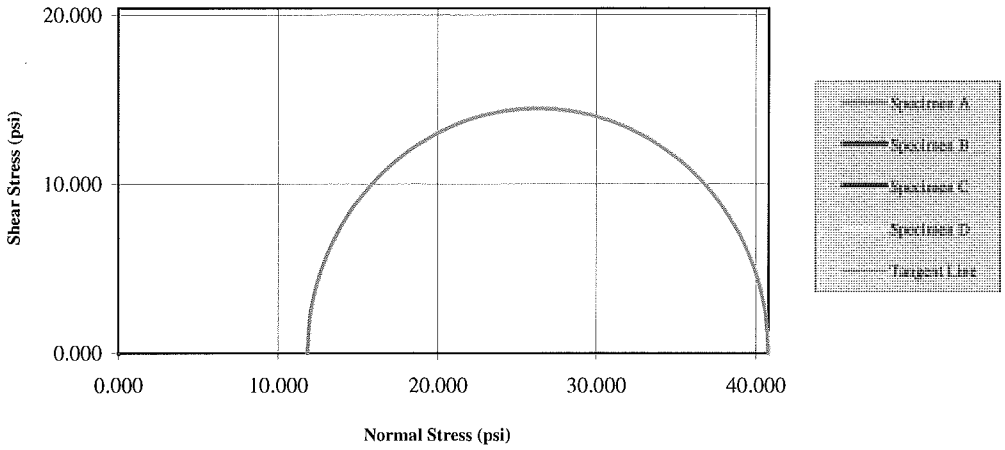
Date: 09/14/11

Checked By: MN

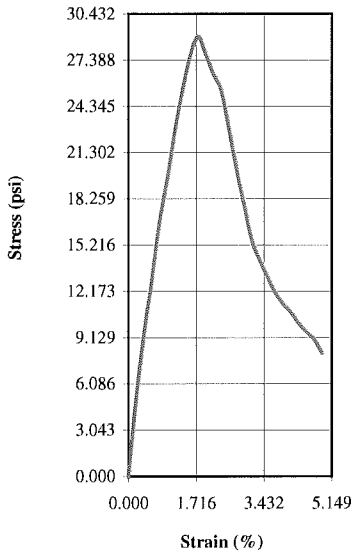
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

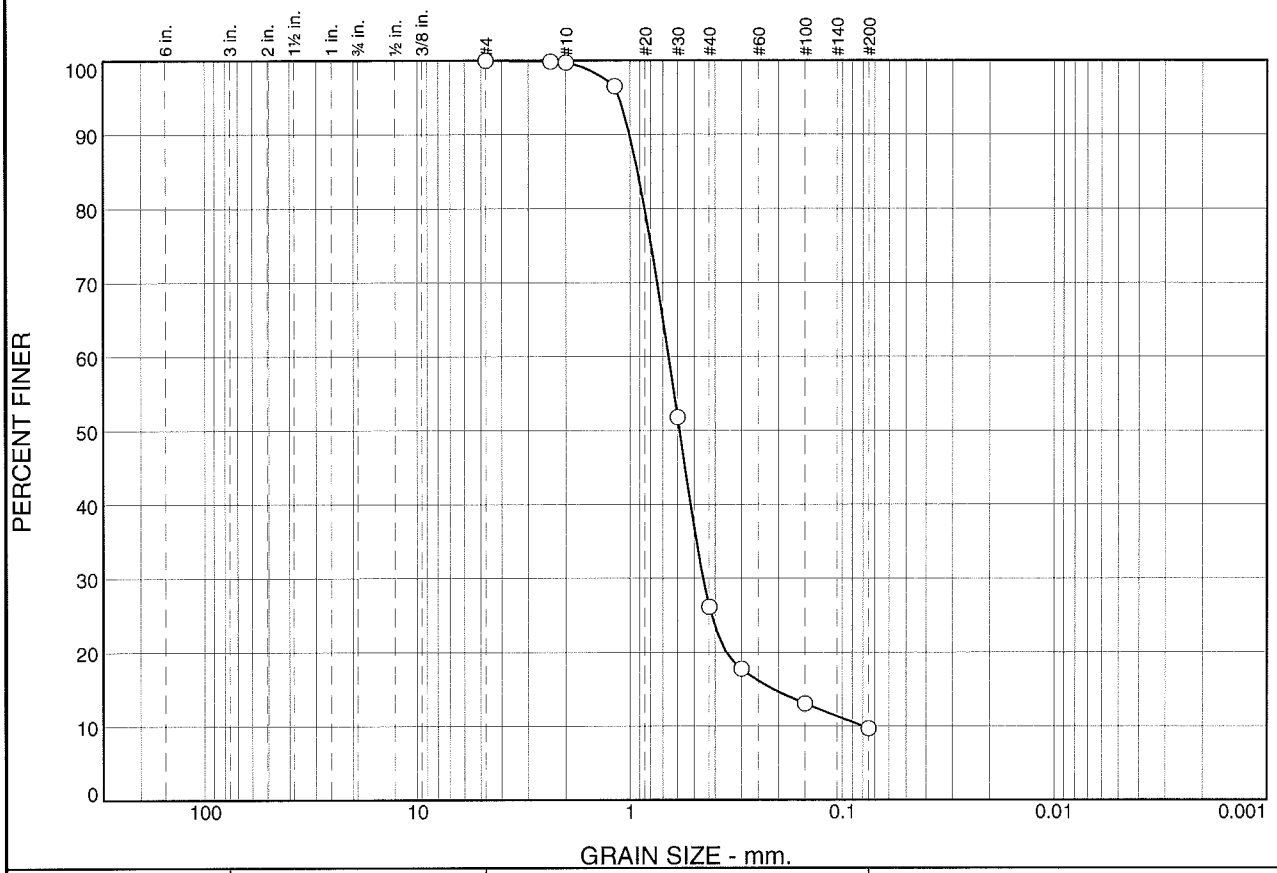


Before Test	Specimen A	B	C	D
Water Content (%)	22.30	0.00	0.00	0.00
Dry Density (pcf)	103.84	0.00	0.00	0.00
Saturation (%)	99.63	0.00	0.00	0.00
Void Ratio	0.59	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	5.200	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	22.20	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	28.982	0.000	0.000	0.000
Axial Strain @ Failure (%)	1.762	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	11.8	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	40.8	0.0	0.0	0.0
σ3 (psi)	11.8	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	14.5	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-9, #6 @ 15.0'
Client:	SAGE	Sample Number:	S32153
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	73.5	16.5	9.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.7		
#16	96.5		
#30	51.8		
#40	26.2		
#50	17.8		
#100	13.1		
#200	9.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.0075 D_{85}= 0.9228 D_{60}= 0.6606
D_{50}= 0.5874 D_{30}= 0.4547 D_{15}= 0.2119
D_{10}= 0.0799 C_u= 8.27 C_c= 3.92

Classification

USCS= AASHTO=

Remarks

Location: B-9 #13
Sample Number: S32154 **Depth:** 35.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-10 #1	5	Sample Disturbed		16.2
B-10 #5	15.5	109.9	89.6	22.6
B-10 #7	20	127.3	98.6	29.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

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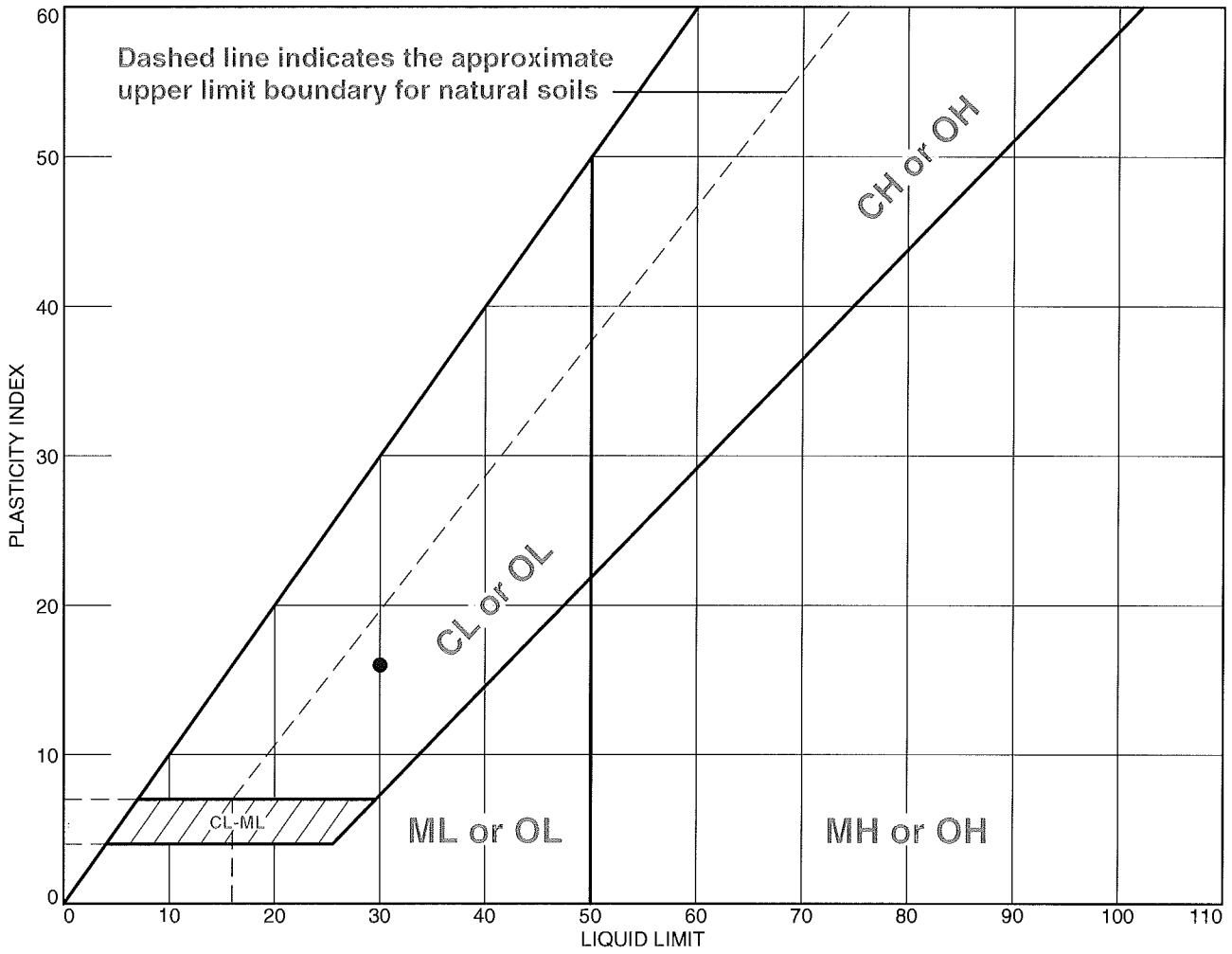
Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		30	14	16			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-10 #1 **Depth:** 5.0 **Sample Number:** S32155

Remarks:

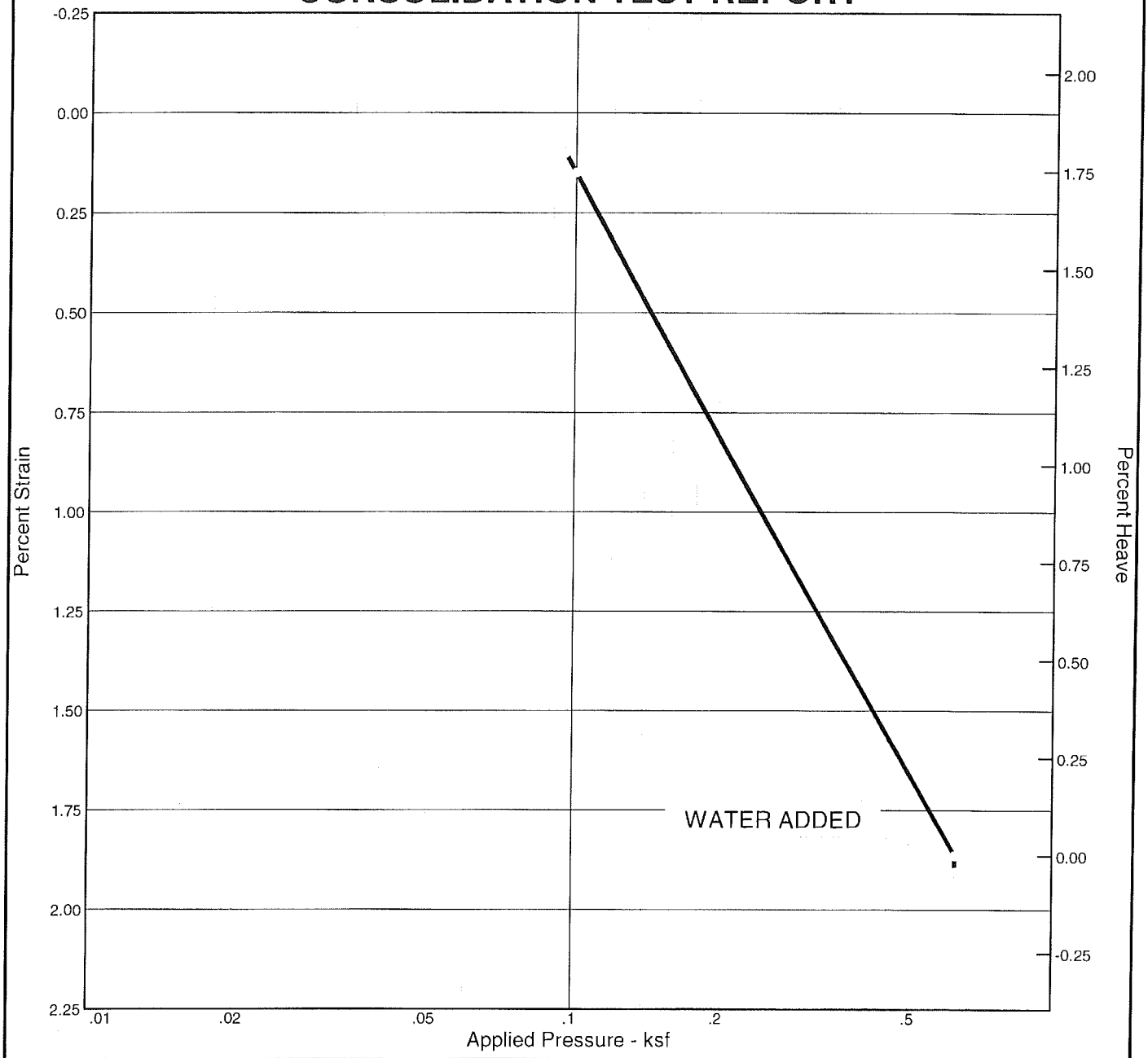
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (ksf)	C_c	Initial Void Ratio
Saturation	Moisture							
93.4 %	34.0 %	84.9			2.7		0.00	0.984

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-10 #2

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

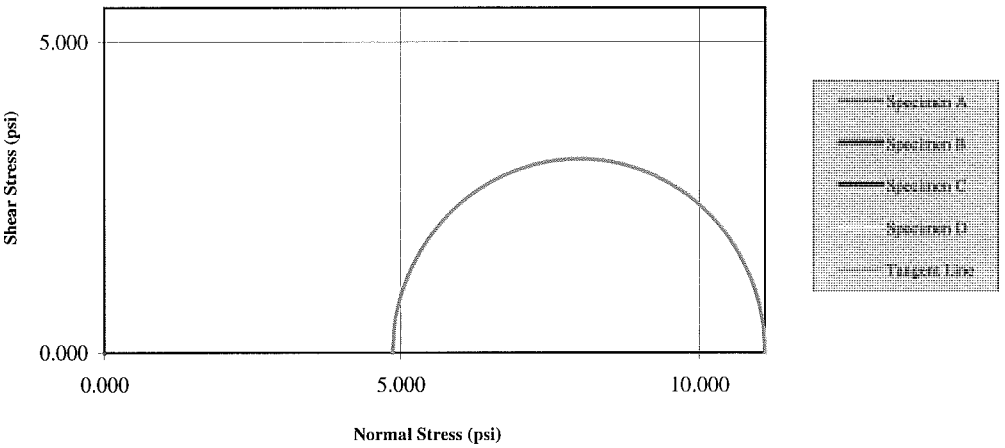
Date: 09/14/11

Checked By: MN

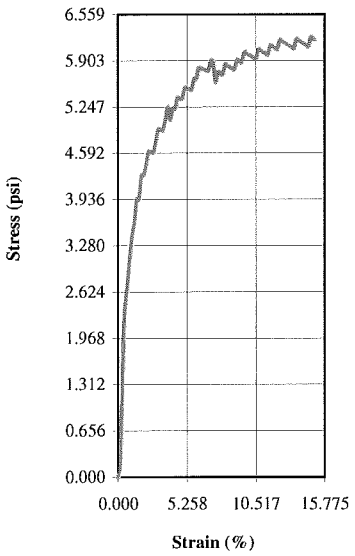
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

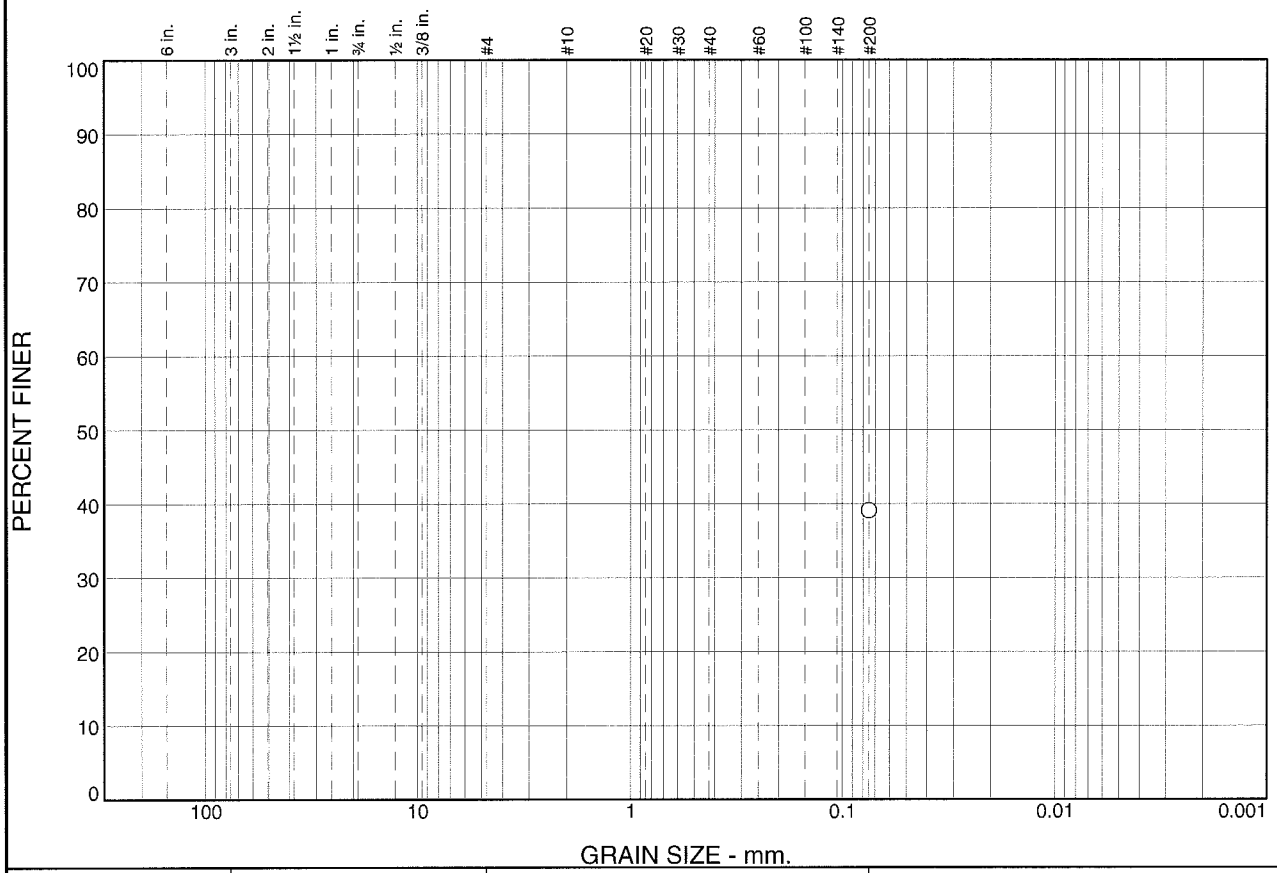


Before Test	Specimen A	B	C	D
Water Content (%)	31.80	0.00	0.00	0.00
Dry Density (pcf)	88.29	0.00	0.00	0.00
Saturation (%)	96.44	0.00	0.00	0.00
Void Ratio	0.87	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	5.610	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	32.03	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	6.247	0.000	0.000	0.000
Axial Strain @ Failure (%)	14.701	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	11.1	0.0	0.0	0.0
σ3 (psi)	4.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	3.1	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-10, #3 @ 6.0'
Client:	SAGE	Sample Number:	S32157
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						39.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	39.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-10 #7
Sample Number: S32159 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-11 #4	10			21.0

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

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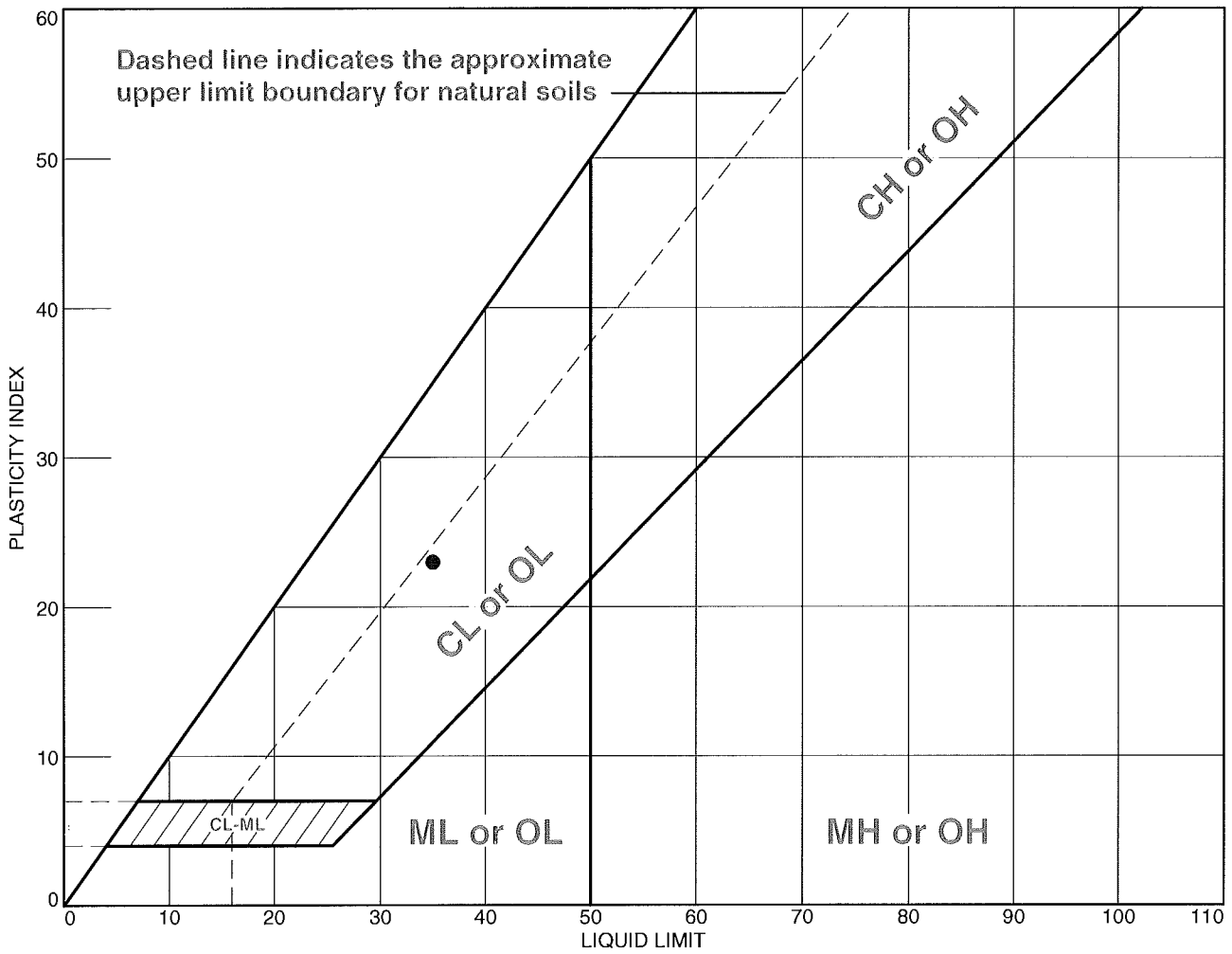
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		35	12	23			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-11 #2 **Depth:** 5.0 **Sample Number:** S32160

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

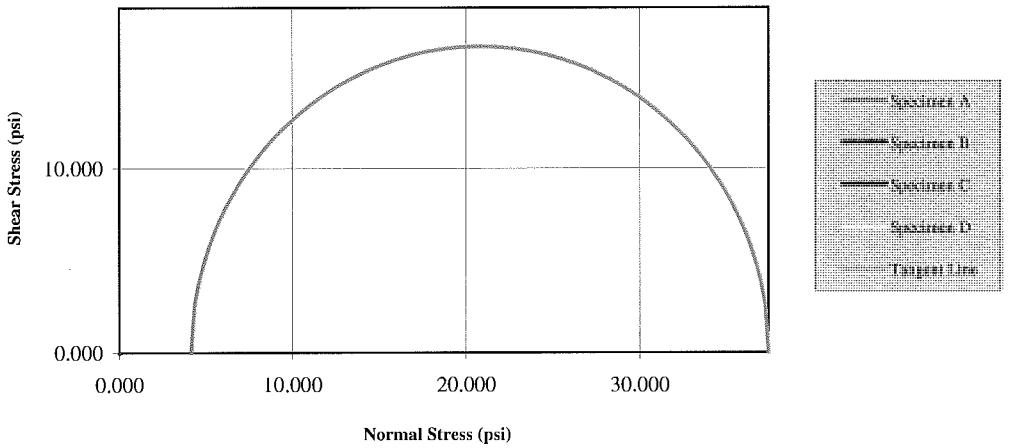
Date: 09/14/11

Checked By: MN

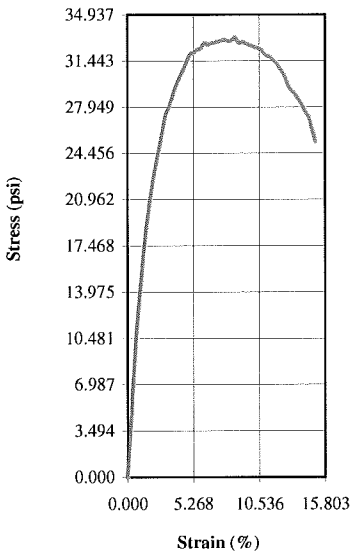
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve



Before Test	Specimen A	B	C	D
Water Content (%)	15.30	0.00	0.00	0.00
Dry Density (pcf)	100.01	0.00	0.00	0.00
Saturation (%)	61.98	0.00	0.00	0.00
Void Ratio	0.65	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	3.650	0.000	0.000	0.000
Liquid Limit	35.0			
Plastic Limit	12.0			
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	15.59	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	33.273	0.000	0.000	0.000
Axial Strain @ Failure (%)	8.647	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.2	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	37.4	0.0	0.0	0.0
σ3 (psi)	4.2	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	16.6	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improvements		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-11, #2 @ 5.0'
Client:	SAGE	Sample Number:	S32160
Remarks:			

PINHOLE DISPERSION TEST RESULTS

SAMPLE PARAMETERS AT TESTING

Wet Unit Weight, pcf :	115.5
Dry Unit Weight, pcf :	96.9
Moisture Content, % :	19.2

HYDRAULIC PARAMETERS AND OBSERVATIONS AT COMPLETION OF TEST

Hydraulic Head, in. :	7	Flow Rate, ml / second :	2.5

Length of Test, min.:	5

Description Of Flow Hole At End of Test :	> 1.5 mm

Note: Flow hole was 1 mm at start of test.

Turbidity Description at End of Test :	Clear

DISPERSIVE CLASSIFICATION :	ND3

Test Method: ASTM D4647 Method: C

SAMPLE IDENTIFICATION: B-11 #3 SAMPLE DEPTH, ft.: 5.5

SAMPLE DESCRIPTION:

REMARKS: Ran at as received moisture and density

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements

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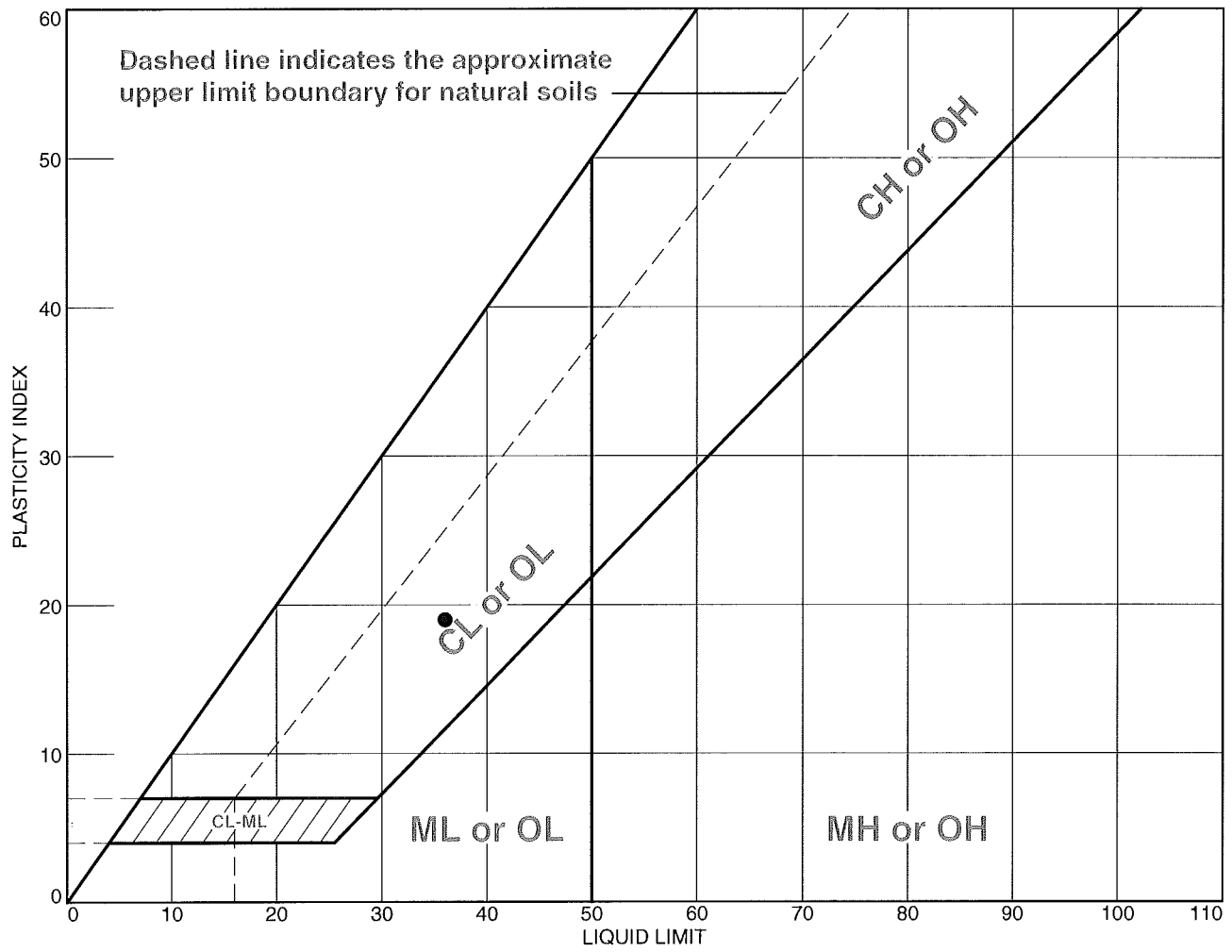
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		36	17	19			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-11 #4 **Depth:** 10.0 **Sample Number:** S32162

Remarks:

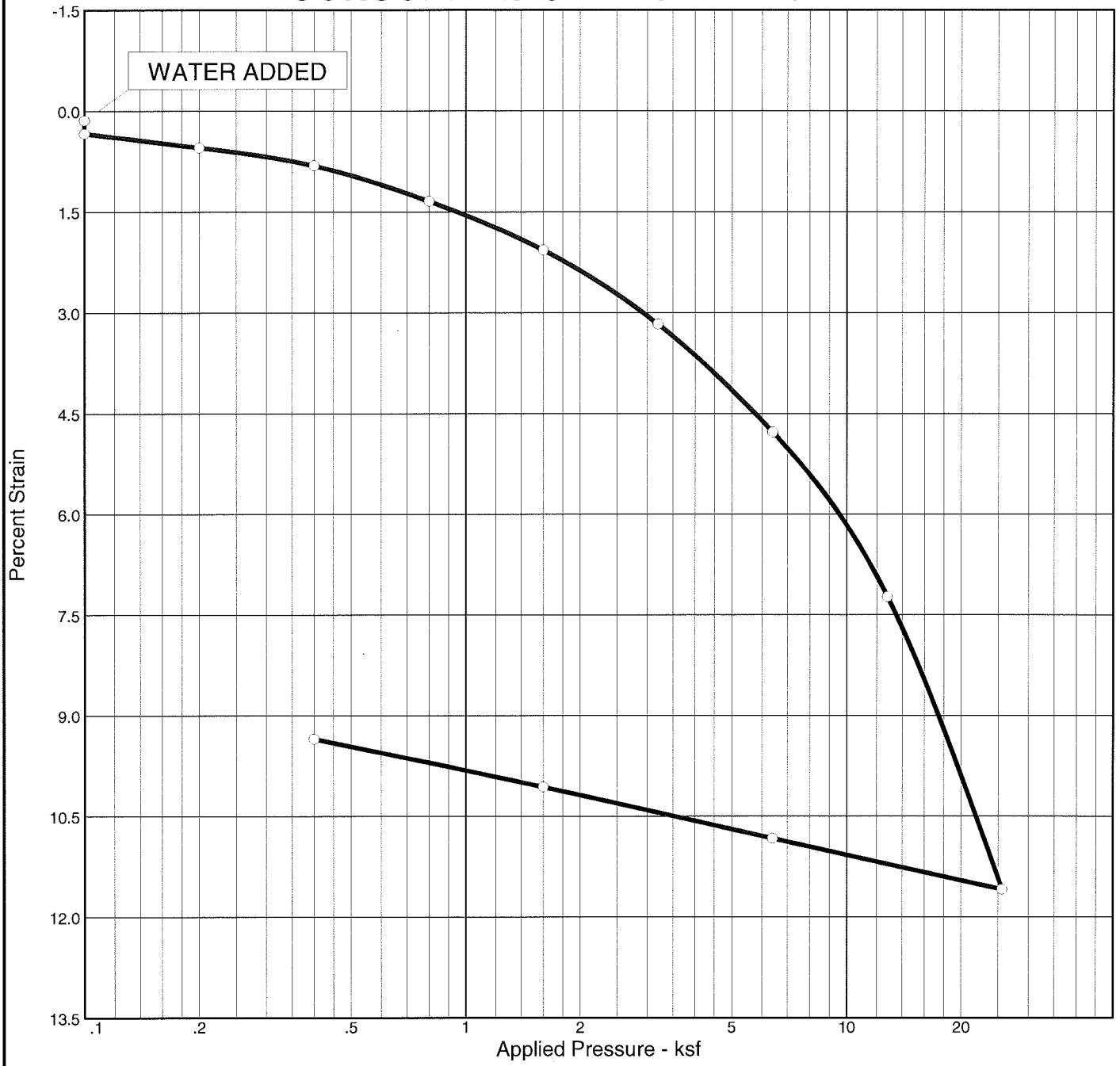
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
97.0 %	36.6 %	83.5			2.70		5.19	0.30	0.03		0.2	1.018

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-11 #6

Remarks:

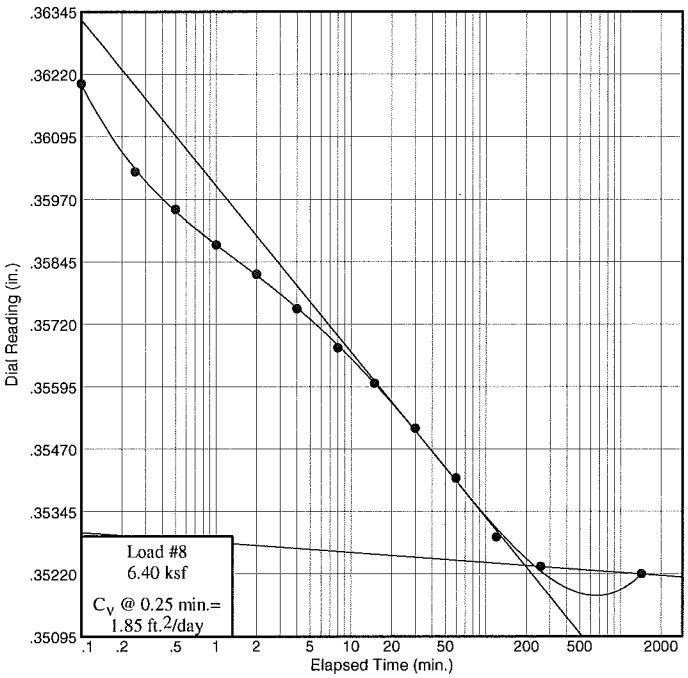
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-11 #6

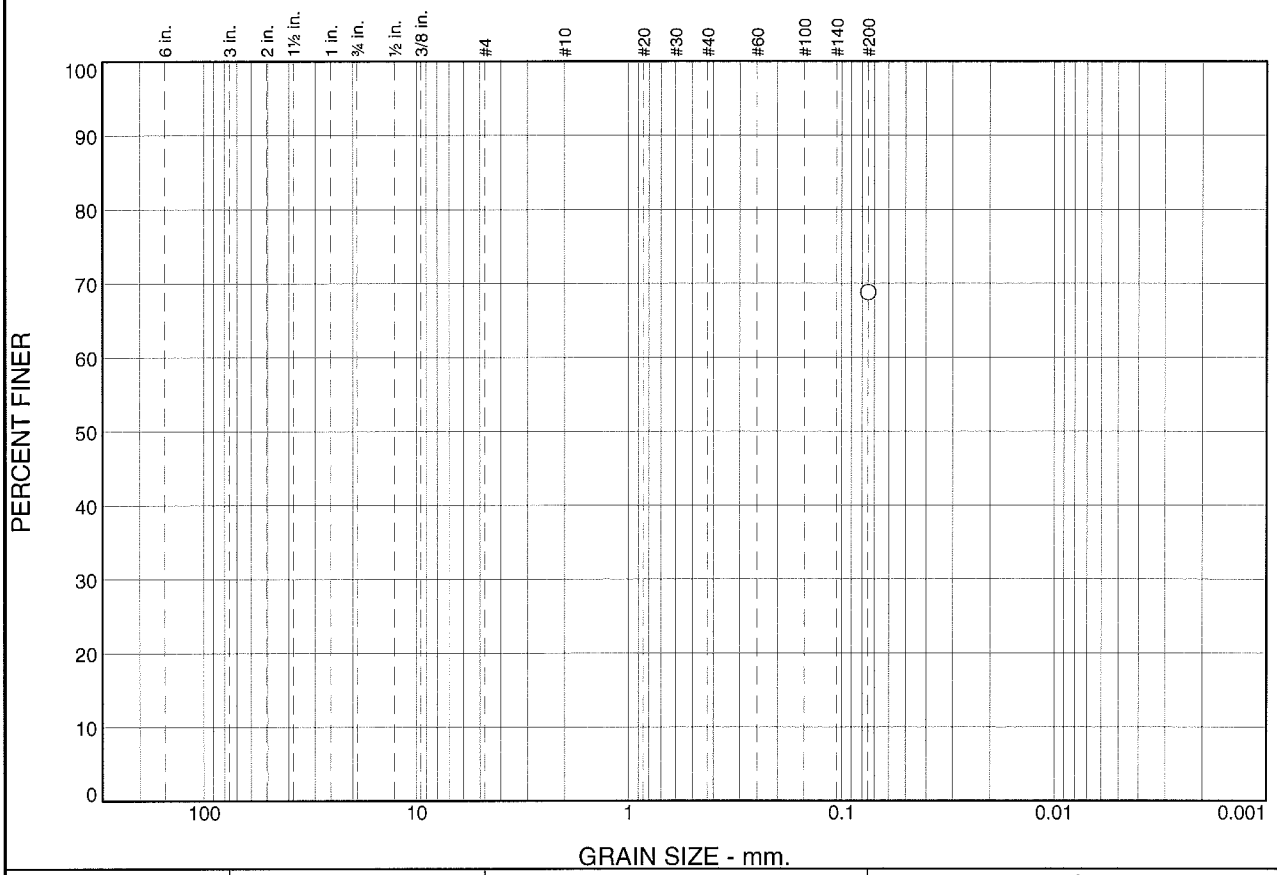


SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	68.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-11 #7
Sample Number: S32164 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-12 #1	0			12.7
B-12 #2	5'3"	122.9	99.3	23.8
B-12 #5	15'3"	115.4	88.2	30.8
B-12 #7	20			29.4
B-12 #9	25'8"	122.8	95.4	28.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

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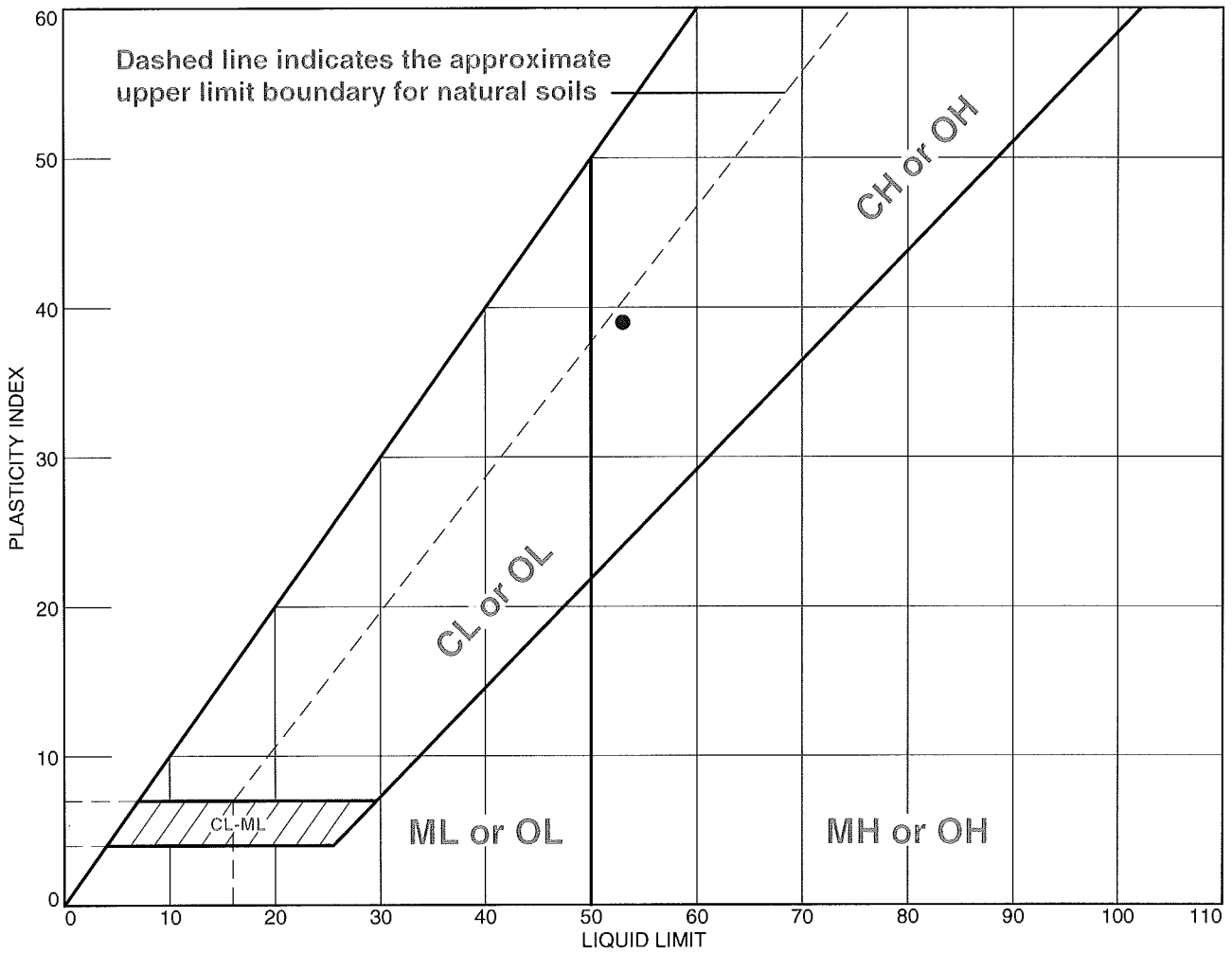
Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		53	14	39			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-12 #2 **Depth:** 5'3" **Sample Number:** S32166

Remarks:

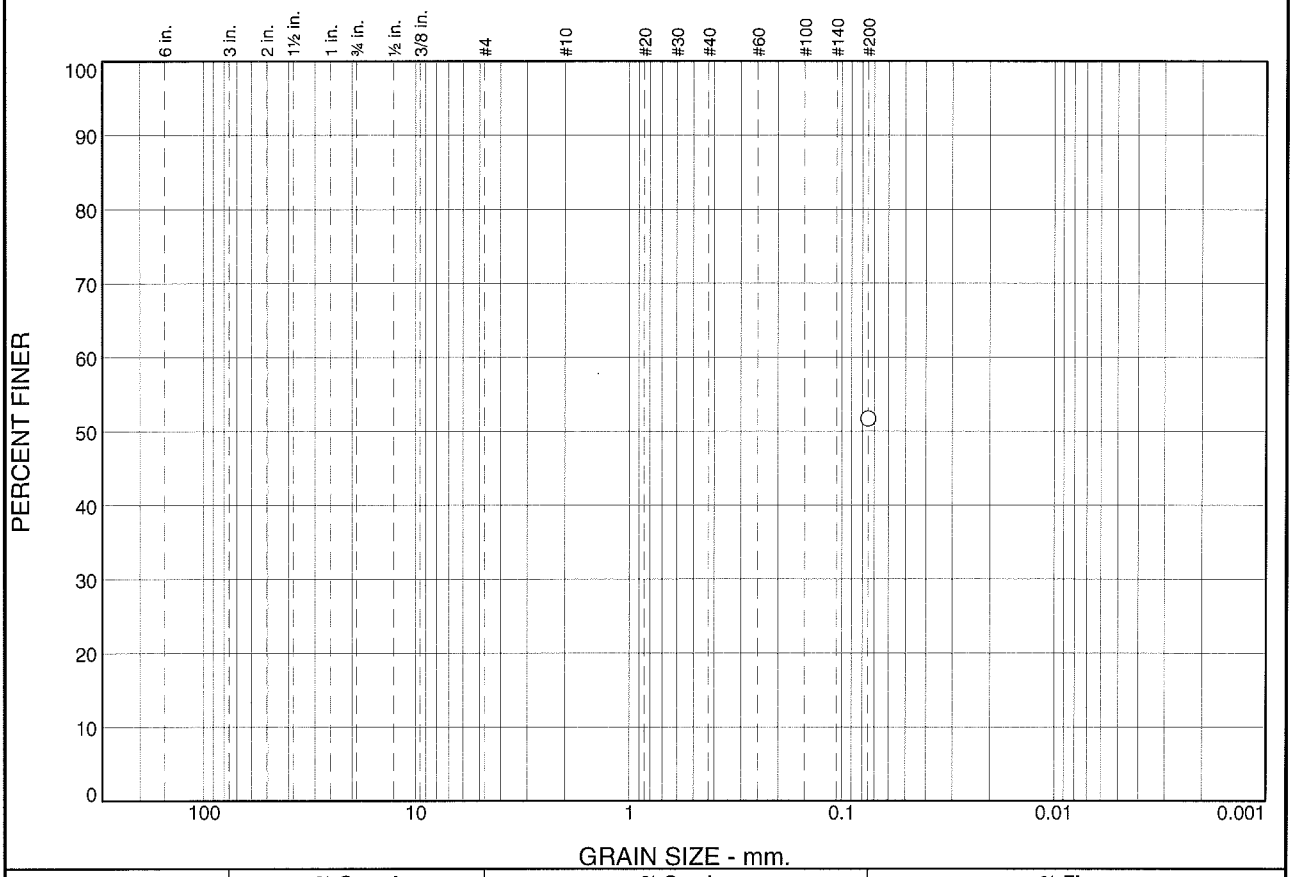
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						51.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	51.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-12 #9
Sample Number: S32169 **Depth:** 25'8" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-13 #1	0			19.0
B-13 #7	15'4"	108.9	86.5	25.9

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

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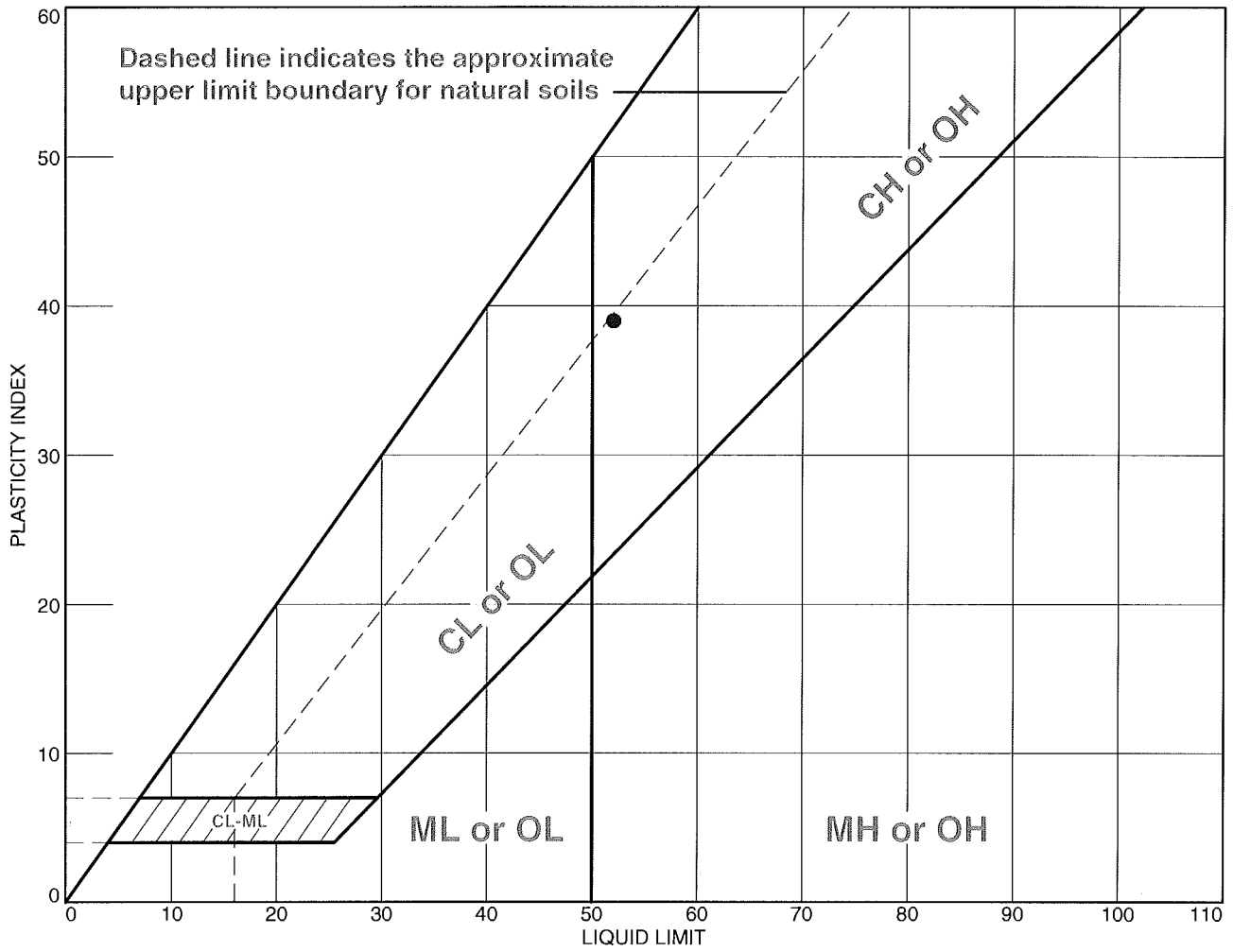
Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		52	13	39			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-13 #2 **Depth:** 5'2" **Sample Number:** S32171

Remarks:

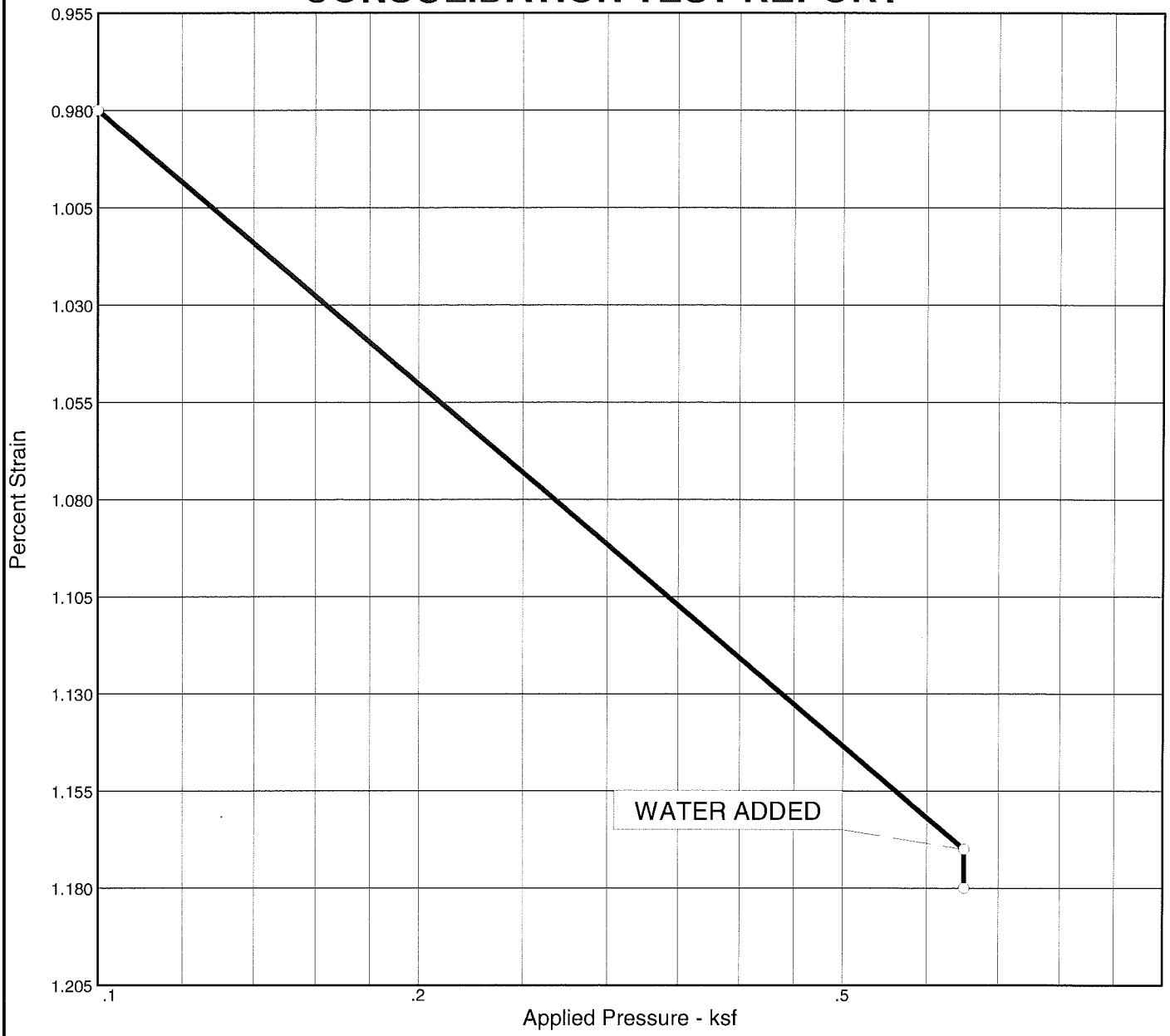
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

CONSOLIDATION TEST REPORT



MATERIAL DESCRIPTION	USCS	AASHTO

LL	PI	Sp. Gr.	Overburden (ksf)	Dry Dens. (pcf)		Moisture		Saturation		Void Ratio		P_c (ksf)	C_c
				Init.	Final	Init.	Final	Init.	Final	Init.	Final		
		2.70		100.5		24.1 %	23.0 %	96.1 %	94.3 %	0.678	0.658		

Preparation Process:	D2435 Method	C_r	Swell Press. (ksf)	Swell %
Condition of Test:				

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering,

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-13 #3

Remarks:

Checked By:

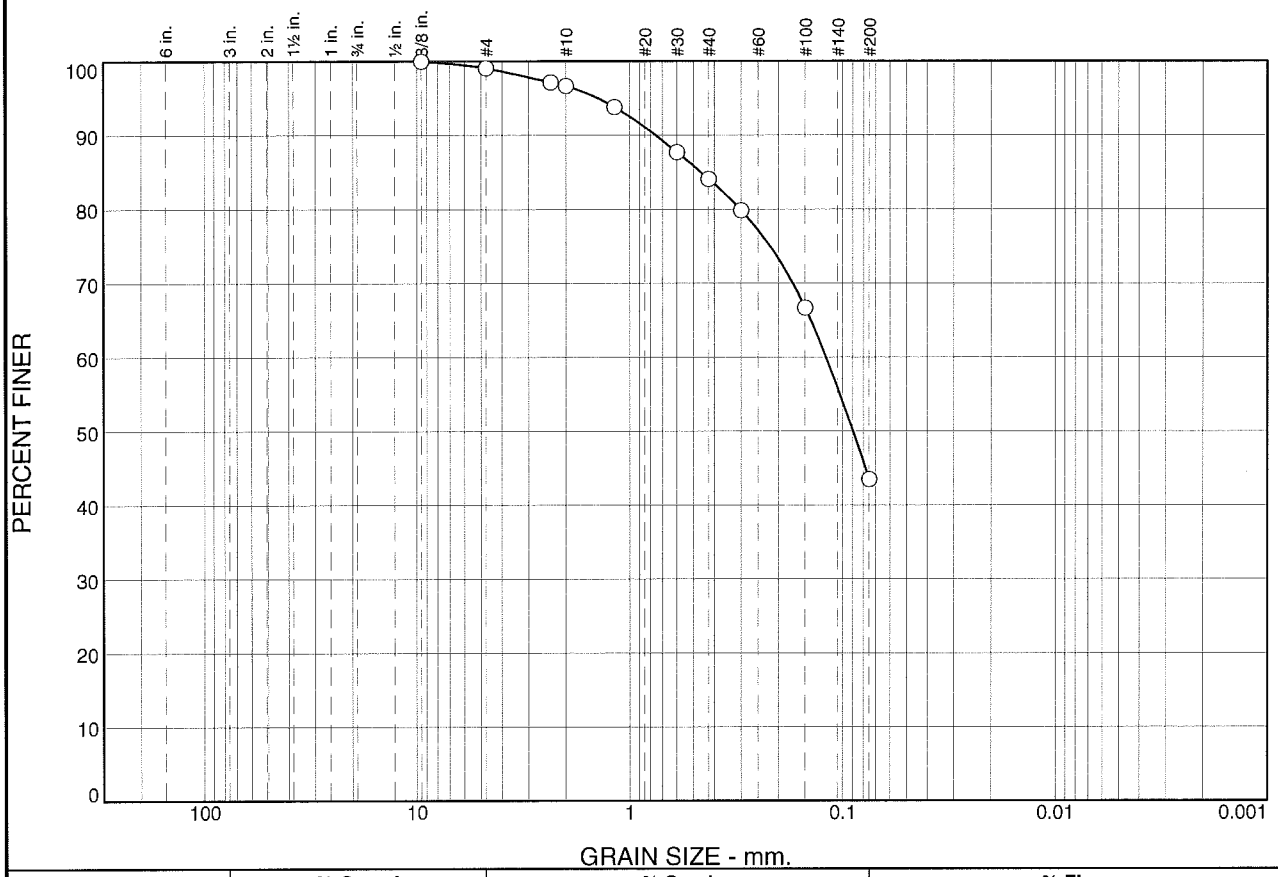
Title:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	2.4	12.6	40.6	43.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 Inch	100.0		
#4	99.1		
#8	97.1		
#10	96.7		
#16	93.8		
#30	87.7		
#40	84.1		
#50	79.8		
#100	66.7		
#200	43.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7552 D_{85}= 0.4619 D_{60}= 0.1197
D_{50}= 0.0896 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

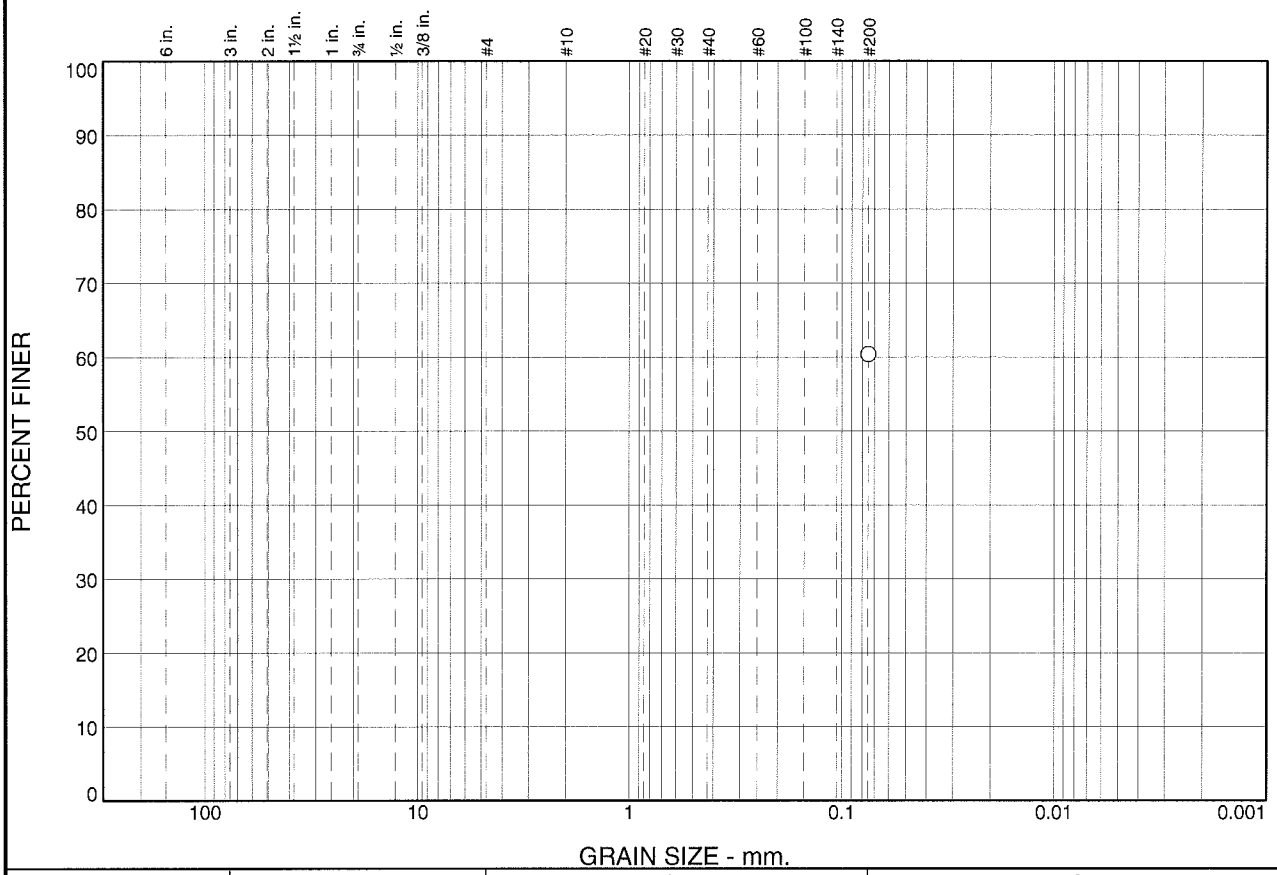
Location: B-13 #4
Sample Number: S32173 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						60.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	60.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-13 #9
Sample Number: S32175 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-14 #3	5.5	122.1	104.9	16.3
B-14 #7	15'4"	119.0	96.4	23.4

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

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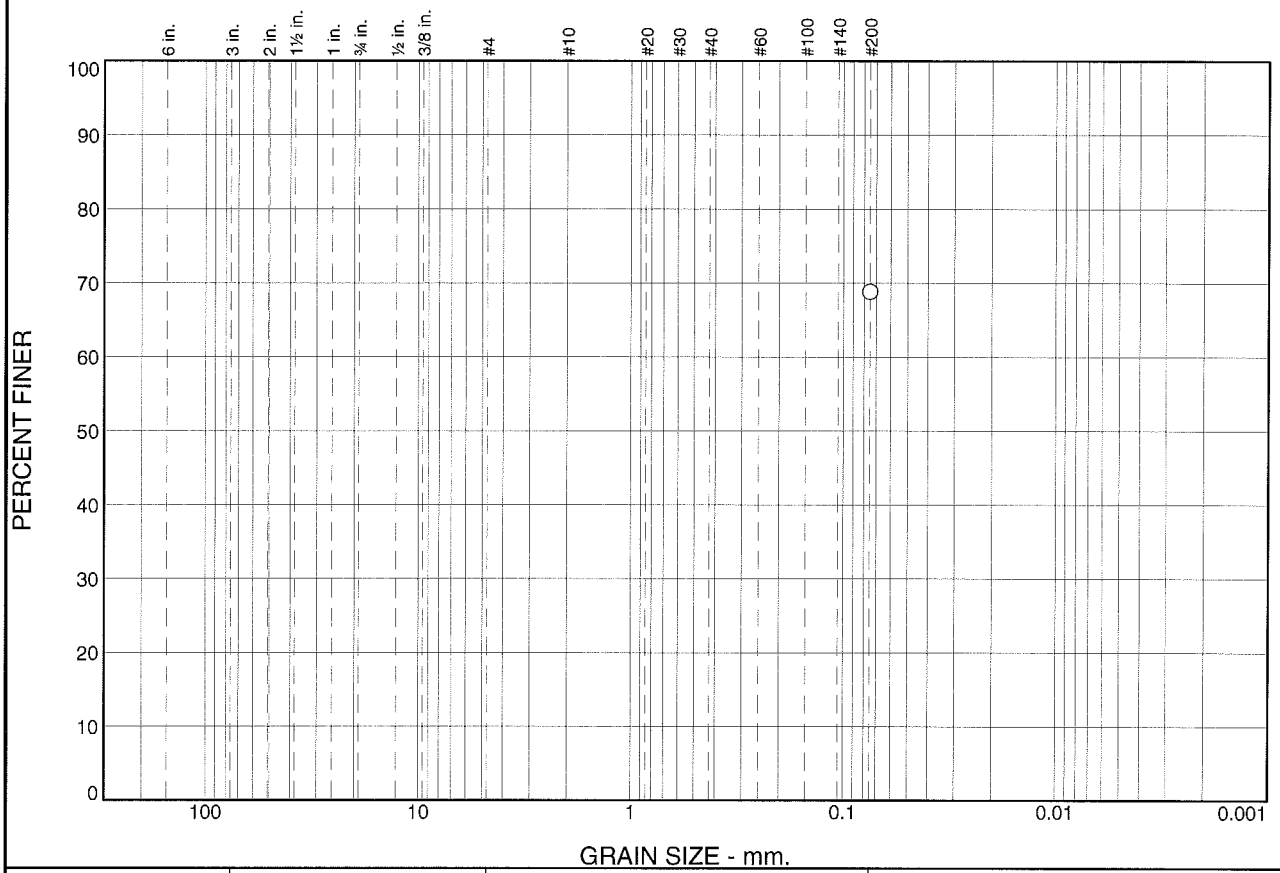
Biggs-West Gridley Canal Improvements

10-066.00

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						68.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	68.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

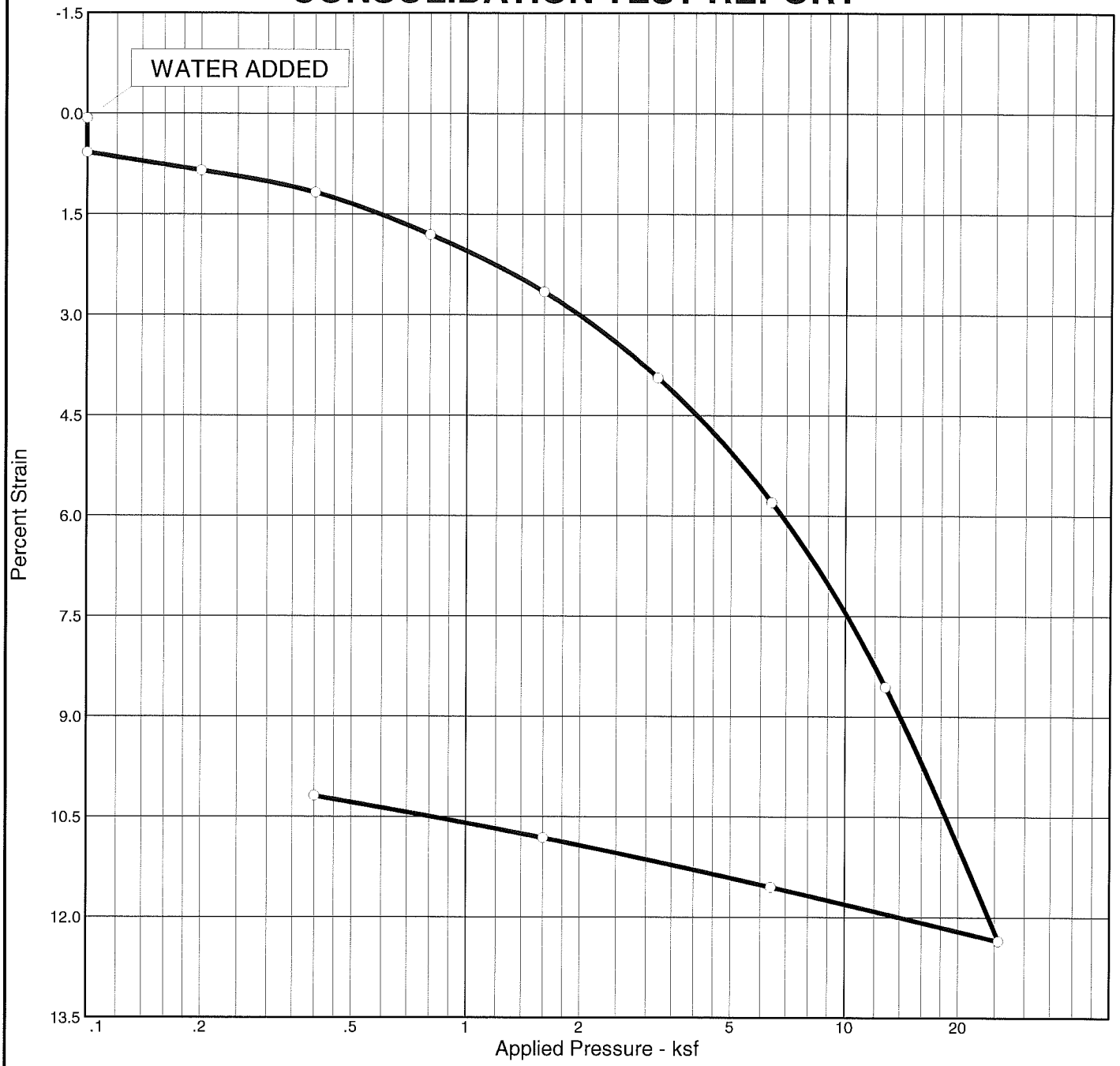
Location: B-14 #6
Sample Number: S32177 **Depth:** 10.3 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
98.8 %	35.7 %	85.3			2.70		5.48	0.25	0.02		0.5	0.977

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-14 #11

Remarks:

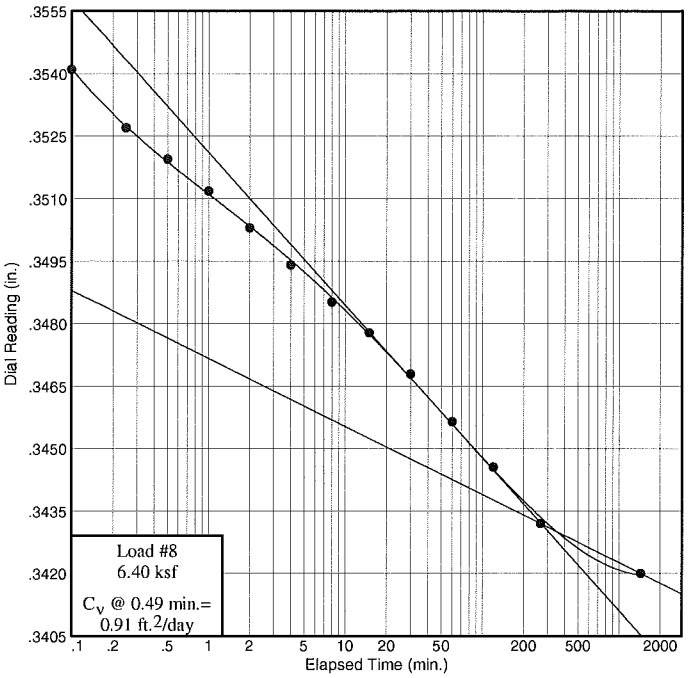
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-14 #11



SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-15 #1	0			9.3
B-15 #7	10.5	123.0	96.6	27.3
B-15 #9	20	116.3	84.2	38.0

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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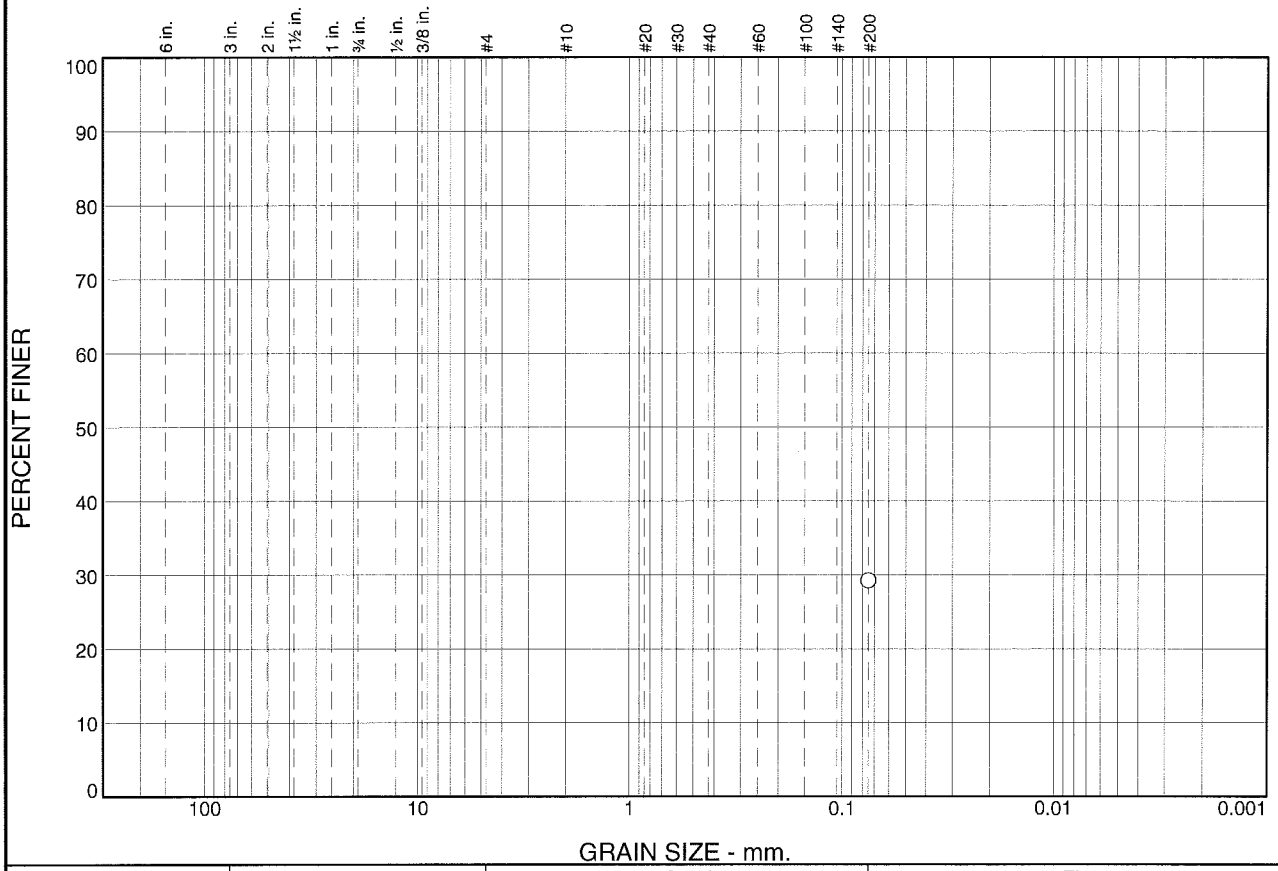
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						29.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	29.3		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

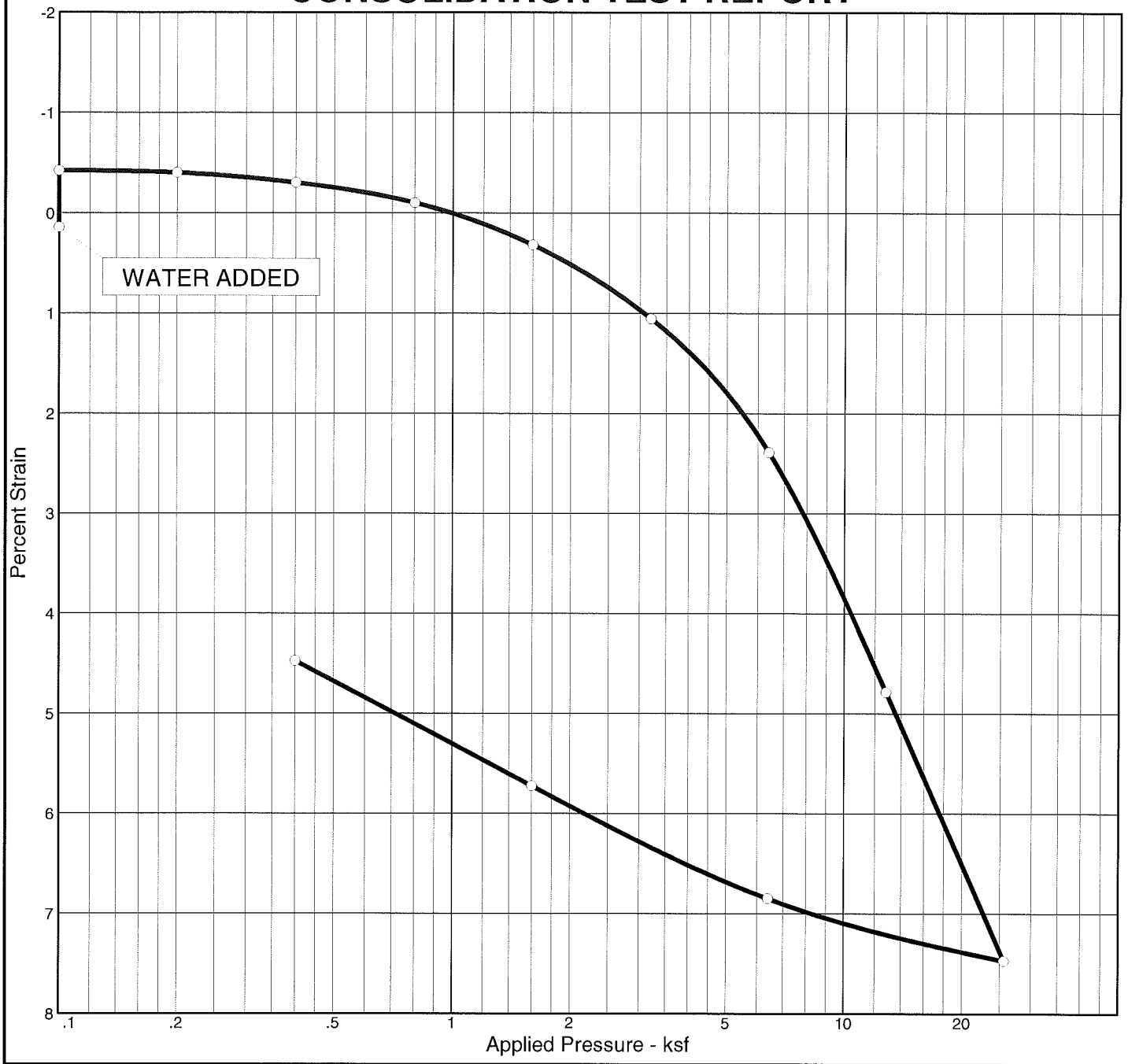
Location: B-15 #1
Sample Number: S32180 **Depth:** 0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
96.5 %	30.4 %	91.1			2.7		4.96	0.17	0.03	1.26	0.5	0.850

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-15 #5

Remarks:

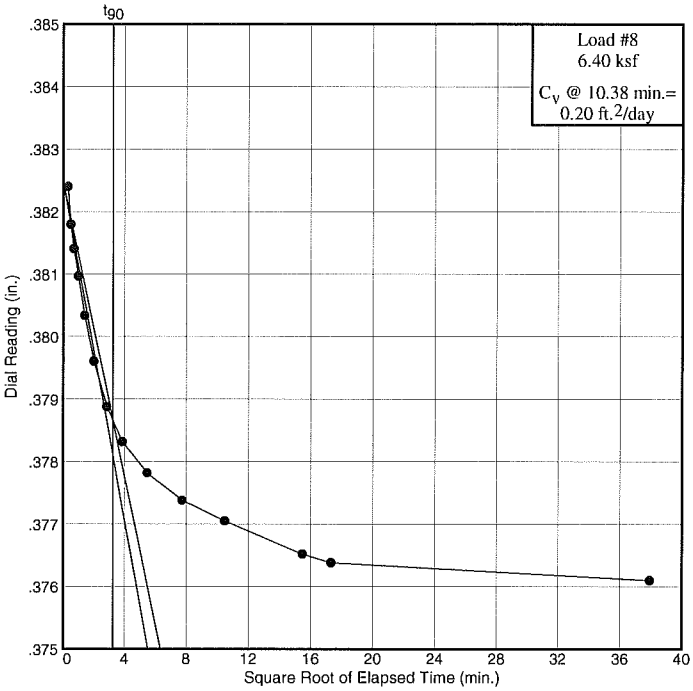
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-15 #5



SIERRA TESTING LABS, INC.

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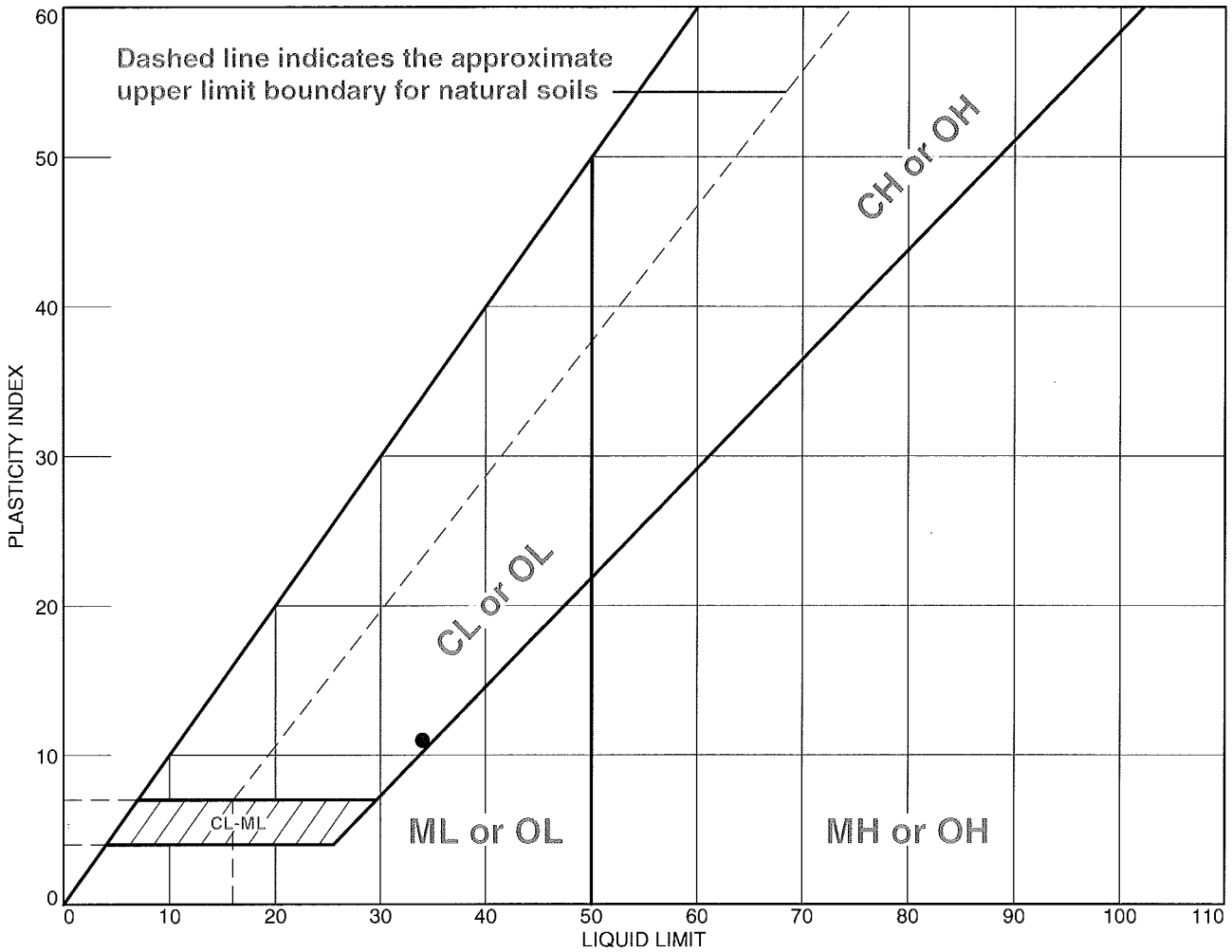
Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		34	23	11		66.8	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-15 #8 **Depth:** 15.0 **Sample Number:** S32183

Remarks:

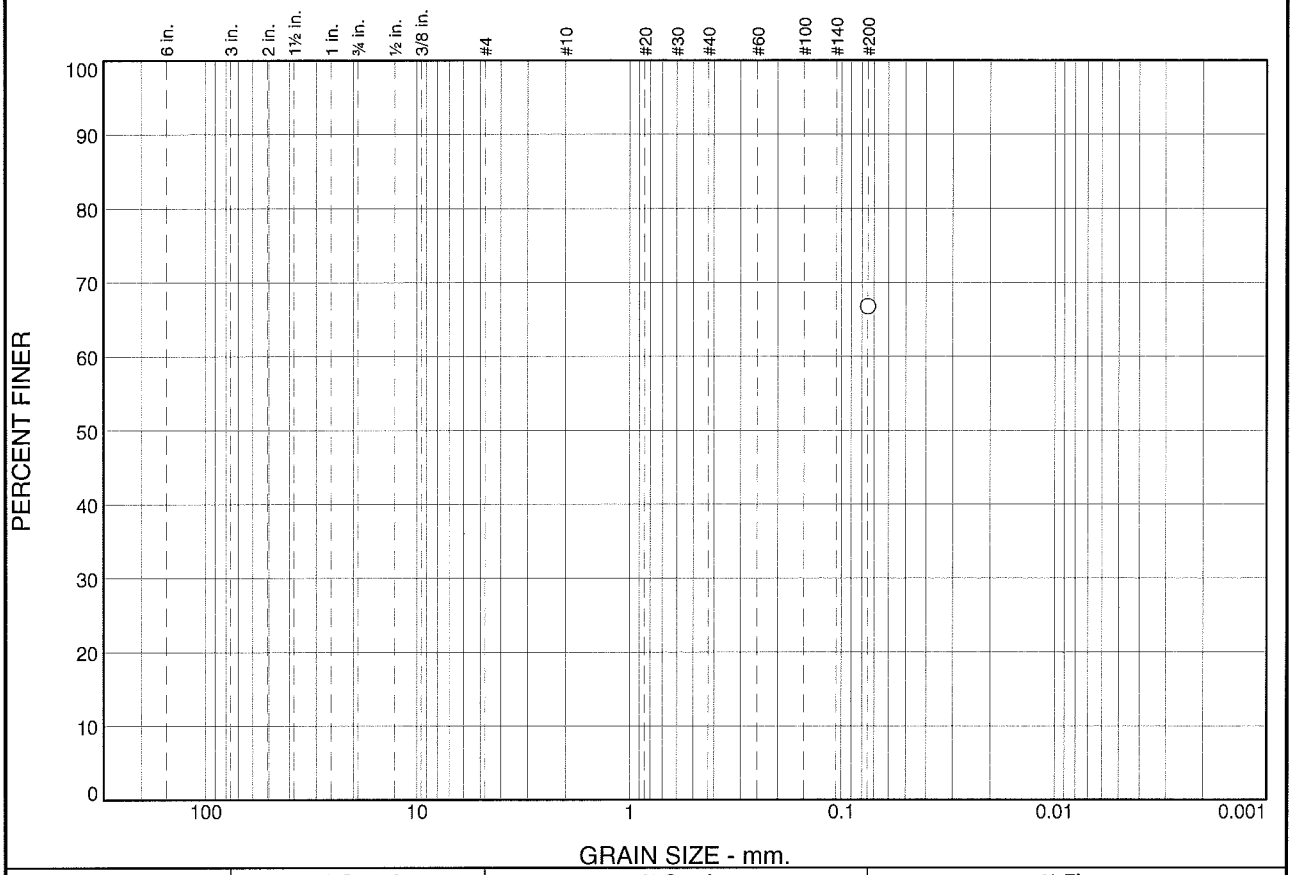
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						66.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	66.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= 23 LL= 34 PI= 11

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-15 #8
Sample Number: S32183 **Depth:** 15.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-16 #2	5	122.2	103.4	18.2
B-16 #7	15'11"	126.7	106.0	19.5
B-16 #9	20'4"			36.2

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

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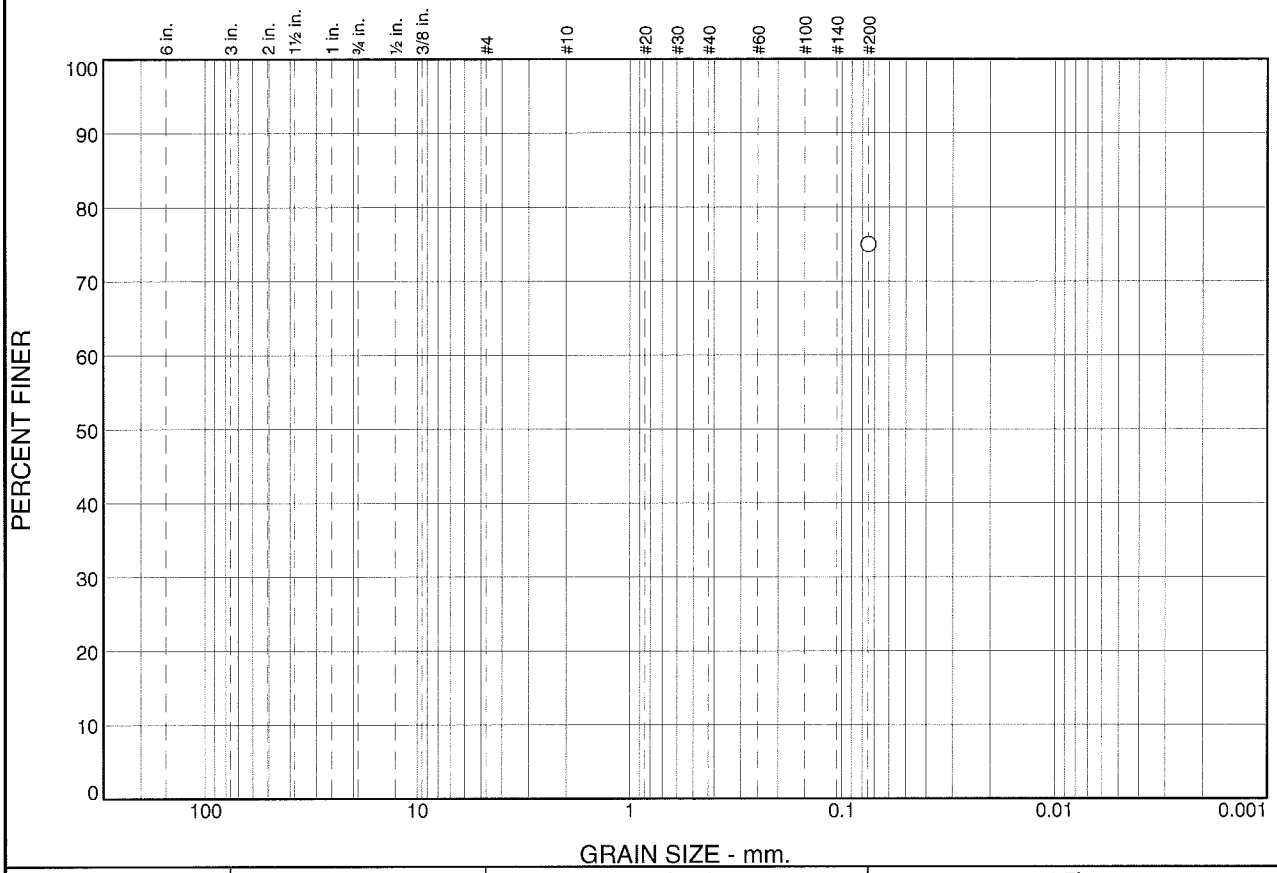
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						75.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	75.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

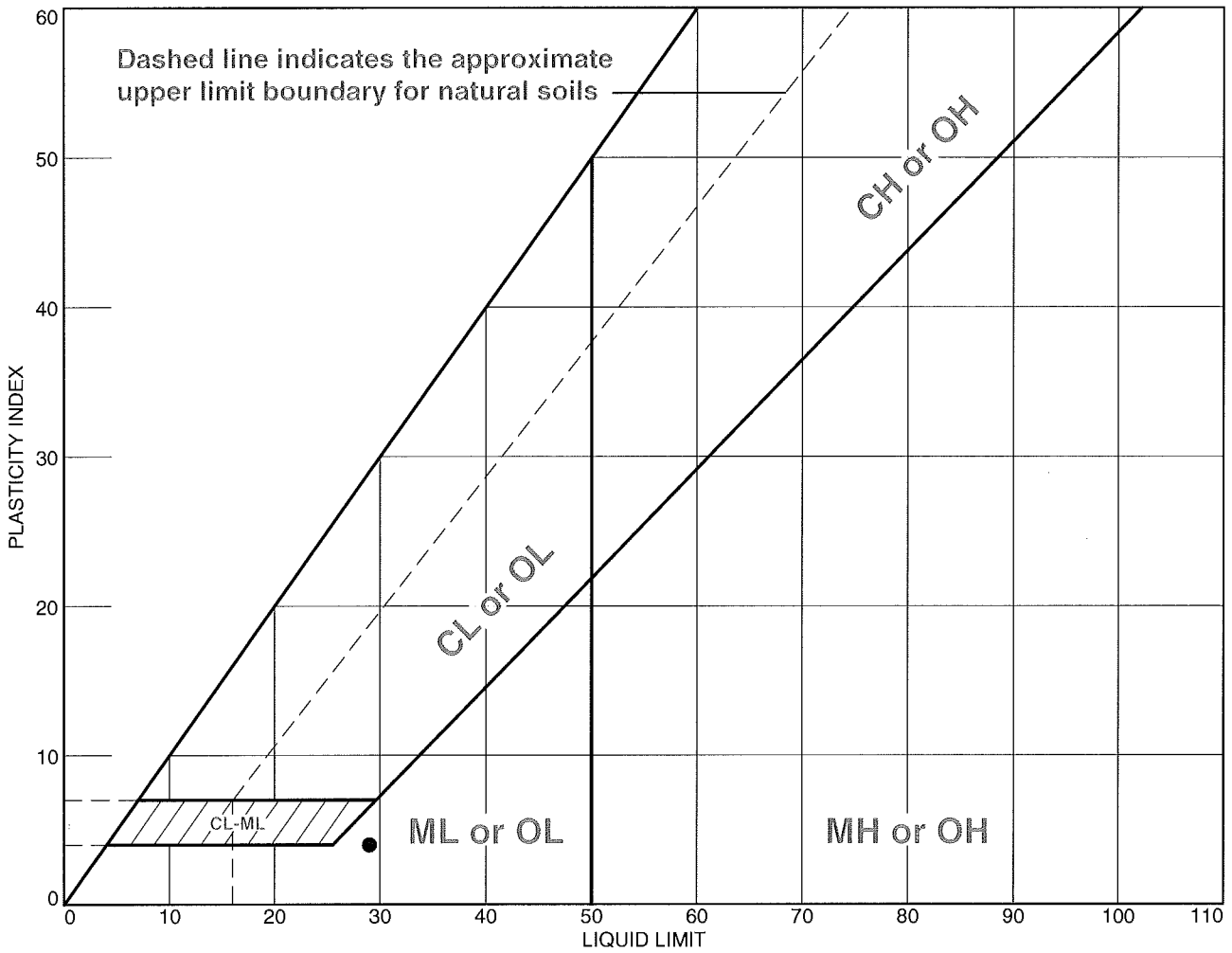
Location: B-16 #5
Sample Number: S32186 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		29	25	4		73.7	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-16 #9 **Depth:** 20'4" **Sample Number:** S32188

Remarks:

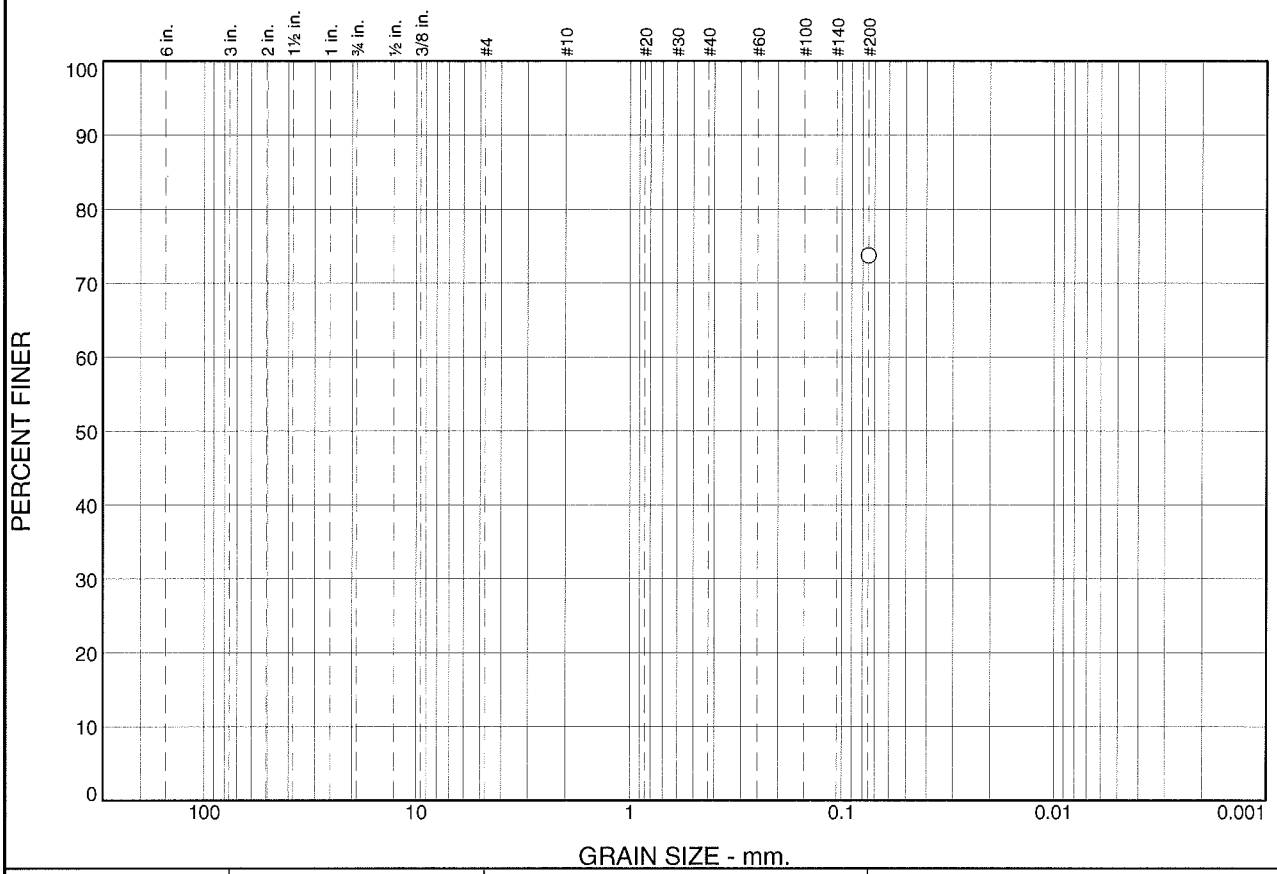
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: jl **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						73.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	73.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= 25 LL= 29 PI= 4

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-16 #9
Sample Number: S32188 **Depth:** 20'4" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-17 #1	0			19.6
B-17 #4	10			28.0

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

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Biggs-West Gridley Canal Improvements

10-066.00

PINHOLE DISPERSION TEST RESULTS

SAMPLE PARAMETERS AT TESTING

Wet Unit Weight, pcf :	120.1
Dry Unit Weight, pcf :	92.6
Moisture Content, % :	29.7

HYDRAULIC PARAMETERS AND OBSERVATIONS AT COMPLETION OF TEST

Hydraulic Head, in. :	7	Flow Rate, ml / second :	2.3

Length of Test, min.:	5

Description Of Flow Hole At End of Test :	> 1.5 mm

Note: Flow hole was 1 mm at start of test.

Turbidity Description at End of Test :	Barely visible

DISPERSIVE CLASSIFICATION :	ND3

Test Method: ASTM D4647 Method: C

SAMPLE IDENTIFICATION: B-17 #2 SAMPLE DEPTH, ft.: 5' 4"

SAMPLE DESCRIPTION:

REMARKS: Ran at as received moisture and density

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements

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HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-17 #3 | Sample Depth, ft.: 5'10" | Lab No.: S32191

Visual Description: N/A | Sample Type:

Remarks:

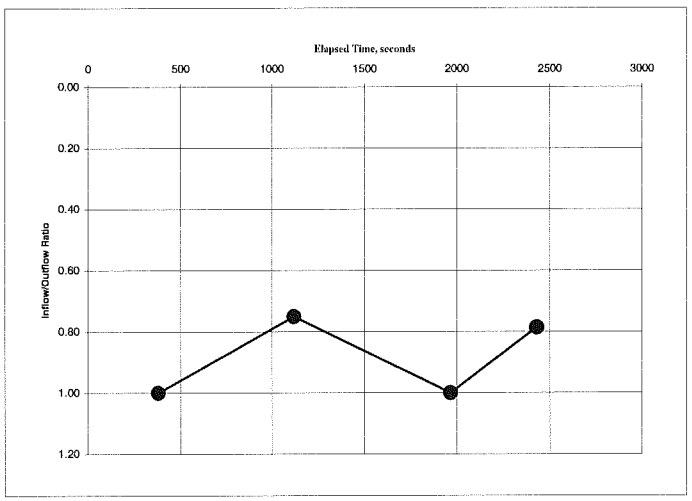
TEST RESULTS

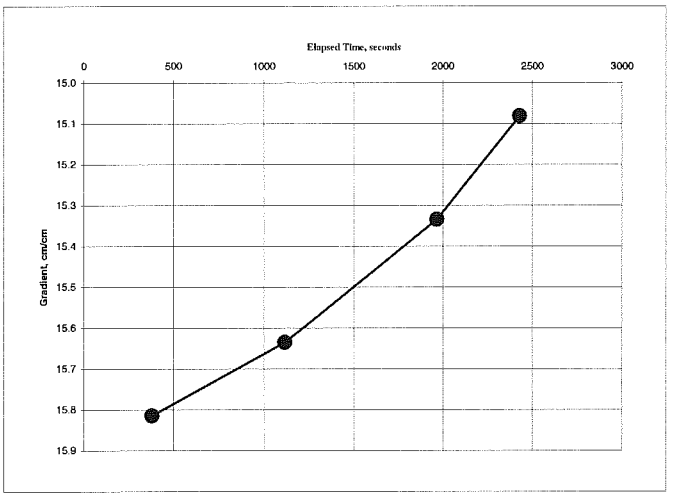
Permeability, cm/sec.: 8.80E-07 | **Average Hydraulic Gradient: 15.5**

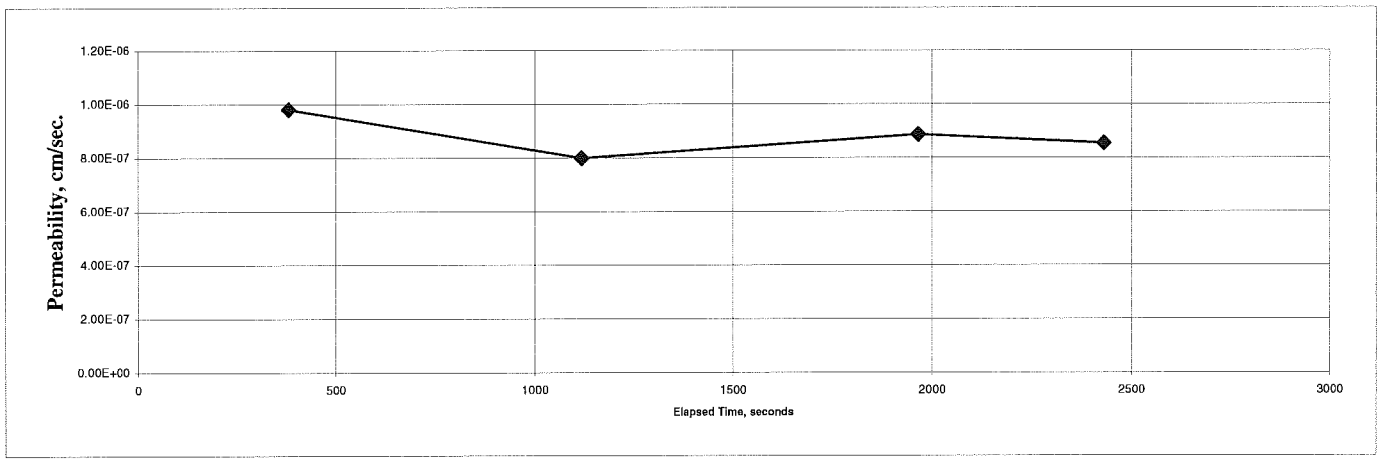
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.57	Specimen Height, cm:	7.49
Specimen Diameter, cm:	6.07	Specimen Diameter, cm:	6.07
Dry Unit Weight, pcf:	101.8	Dry Unit Weight, pcf:	103.9
Moisture Content, %	22.3	Moisture Content, %	27.6
Specific Gravity, Assumed	2.70		
Percent Saturation:	91.7		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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Biggs-West Gridley Canal Improvements

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-17 #6 | Sample Depth, ft.: 16 | Lab No.: S32193

Visual Description: N/A | Sample Type:

Remarks:

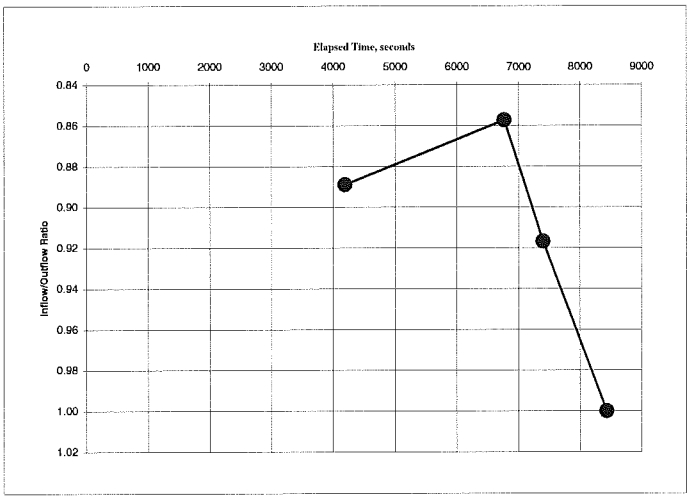
TEST RESULTS

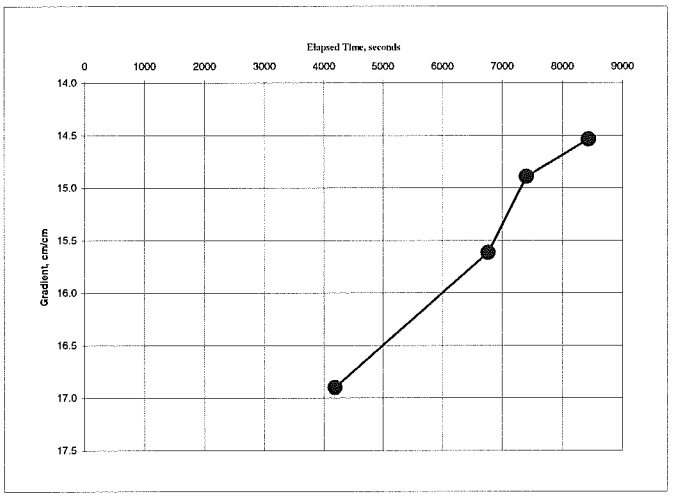
Permeability, cm/sec.: 8.95E-07 | **Average Hydraulic Gradient: 15.5**

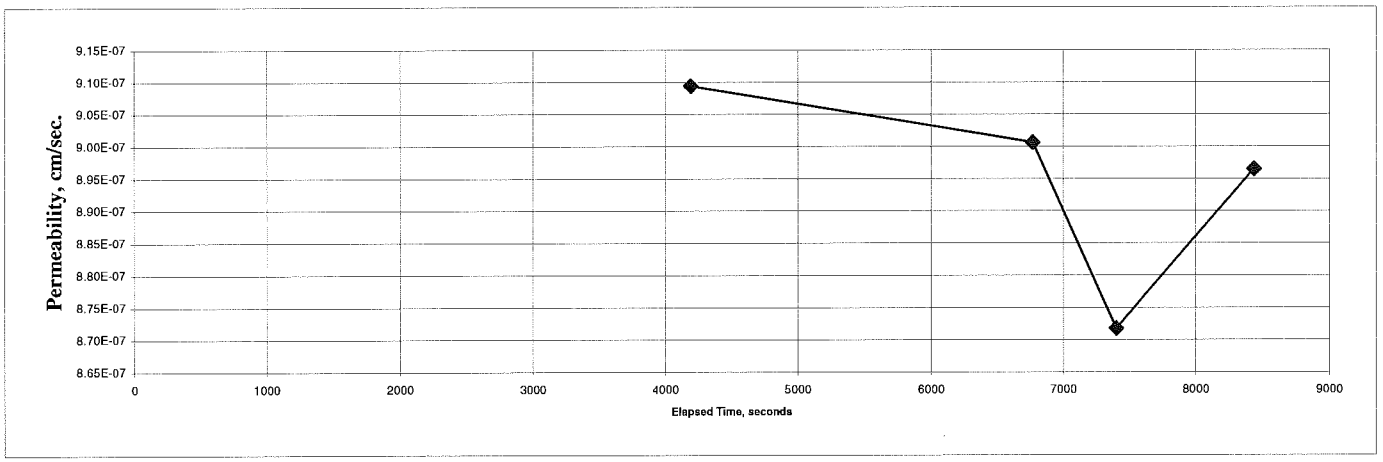
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.55	Specimen Height, cm:	6.35
Specimen Diameter, cm:	6.07	Specimen Diameter, cm:	6.07
Dry Unit Weight, pcf:	96.7	Dry Unit Weight, pcf:	105.1
Moisture Content, %	26.6	Moisture Content, %	25.4
Specific Gravity, Assumed	2.70		
Percent Saturation:	96.6		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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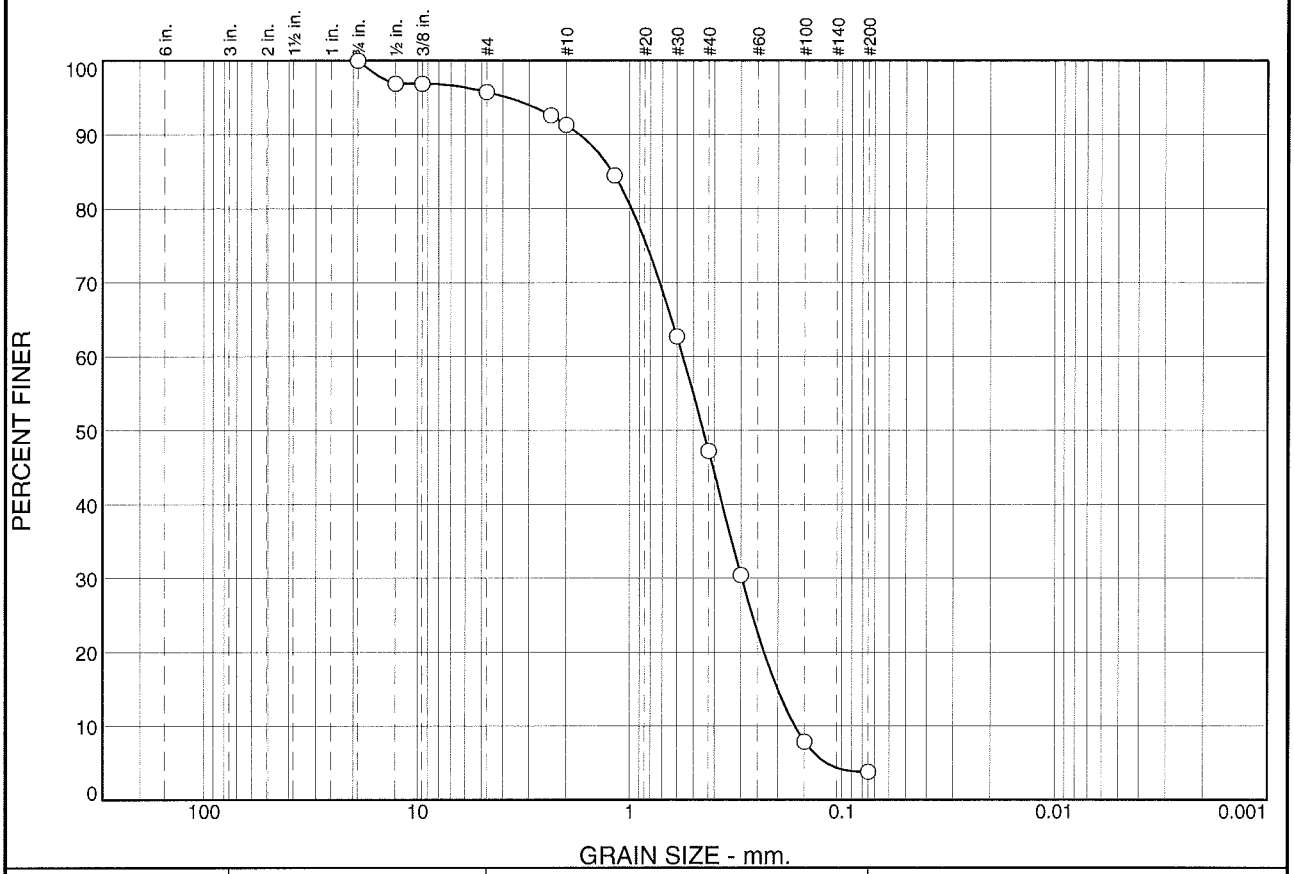
Biggs-West Gridley Canal Improvements

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	4.5	44.1	43.4	3.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 Inch	100.0		
1/2 Inch	96.9		
3/8 Inch	96.9		
#4	95.8		
#8	92.6		
#10	91.3		
#16	84.5		
#30	62.7		
#40	47.2		
#50	30.4		
#100	7.9		
#200	3.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.7274 D_{85}= 1.2109 D_{60}= 0.5625
D_{50}= 0.4504 D_{30}= 0.2971 D_{15}= 0.2010
D_{10}= 0.1667 C_u= 3.37 C_c= 0.94

Classification

USCS= SP AASHTO=

Remarks

Location: B-18 #3
Sample Number: S32194 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-19 #5	15			26.2
B-19 #7	20	Bag Sample - Disturbed		35.3

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

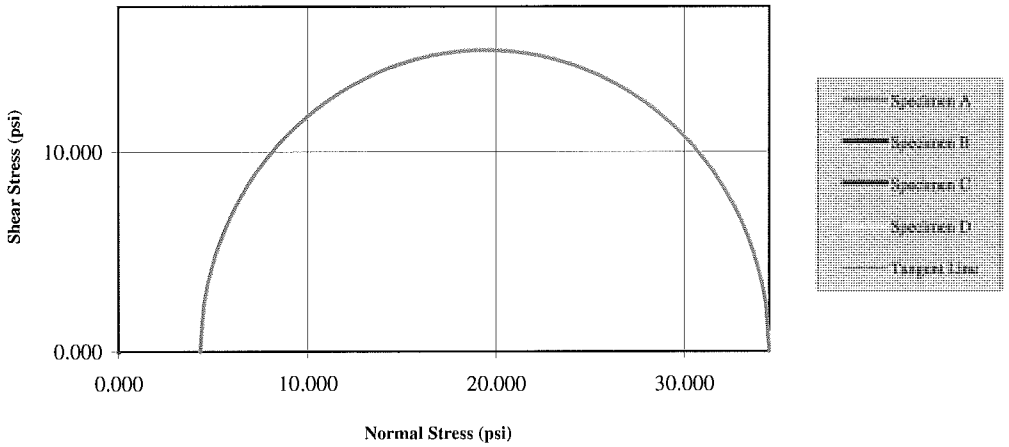
Date: 09/14/11

Checked By: MN

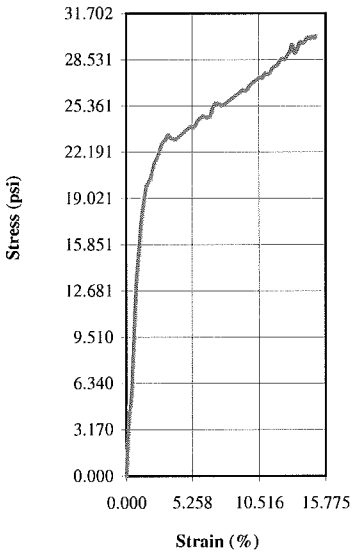
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

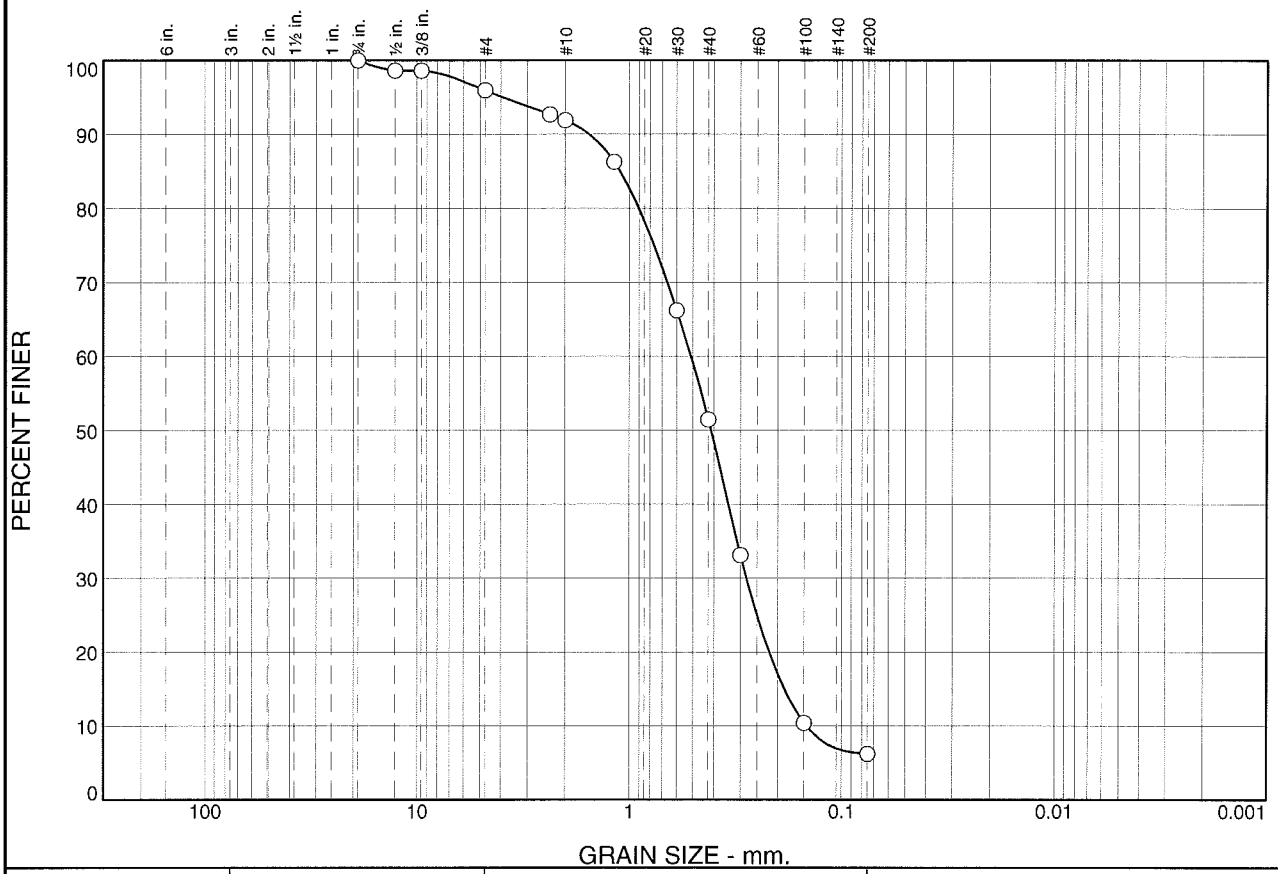


Before Test	Specimen A	B	C	D
Water Content (%)	16.10	0.00	0.00	0.00
Dry Density (pcf)	114.61	0.00	0.00	0.00
Saturation (%)	96.22	0.00	0.00	0.00
Void Ratio	0.44	0.00	0.00	0.00
Diameter (in)	2.260	0.000	0.000	0.000
Height (in)	5.180	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	16.27	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	30.192	0.000	0.000	0.000
Axial Strain @ Failure (%)	15.024	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.3	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	34.5	0.0	0.0	0.0
σ3 (psi)	4.3	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	15.1	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-19, #3 @ 5.5'
Client:	SAGE	Sample Number:	S32195
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.0	4.1	40.4	45.3	6.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 Inch	100.0		
1/2 Inch	98.6		
3/8 Inch	98.6		
#4	96.0		
#8	92.7		
#10	91.9		
#16	86.3		
#30	66.2		
#40	51.5		
#50	33.1		
#100	10.4		
#200	6.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5421 D_{85}= 1.1062 D_{60}= 0.5125
D_{50}= 0.4126 D_{30}= 0.2812 D_{15}= 0.1859
D_{10}= 0.1460 C_u= 3.51 C_c= 1.06

Classification

USCS= AASHTO=

Remarks

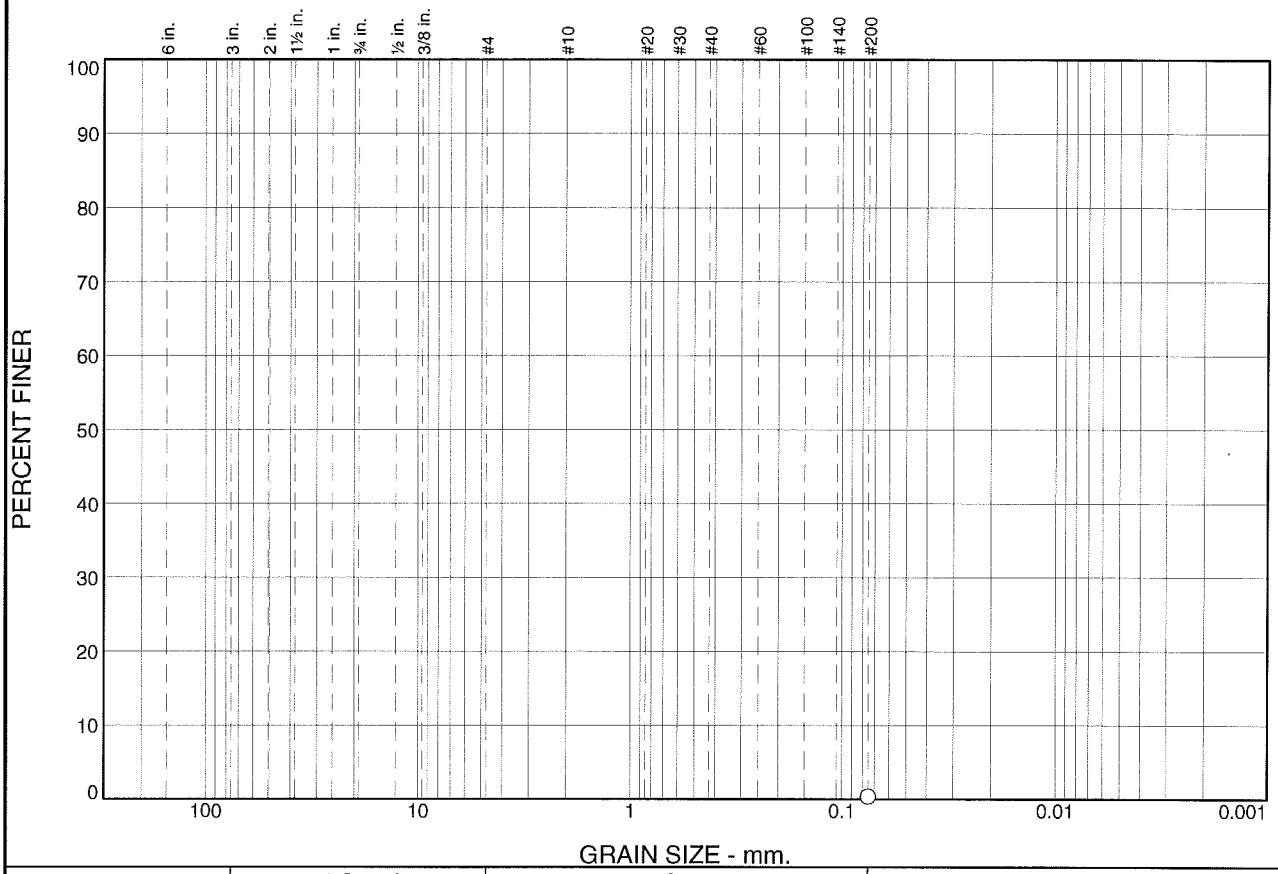
Location: B-19 #4
Sample Number: S32196 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						0.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-19 #9
Sample Number: S32199 **Depth:** 26.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-20 #1	0			17.1
B-20 #6	10'10"			24.9

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

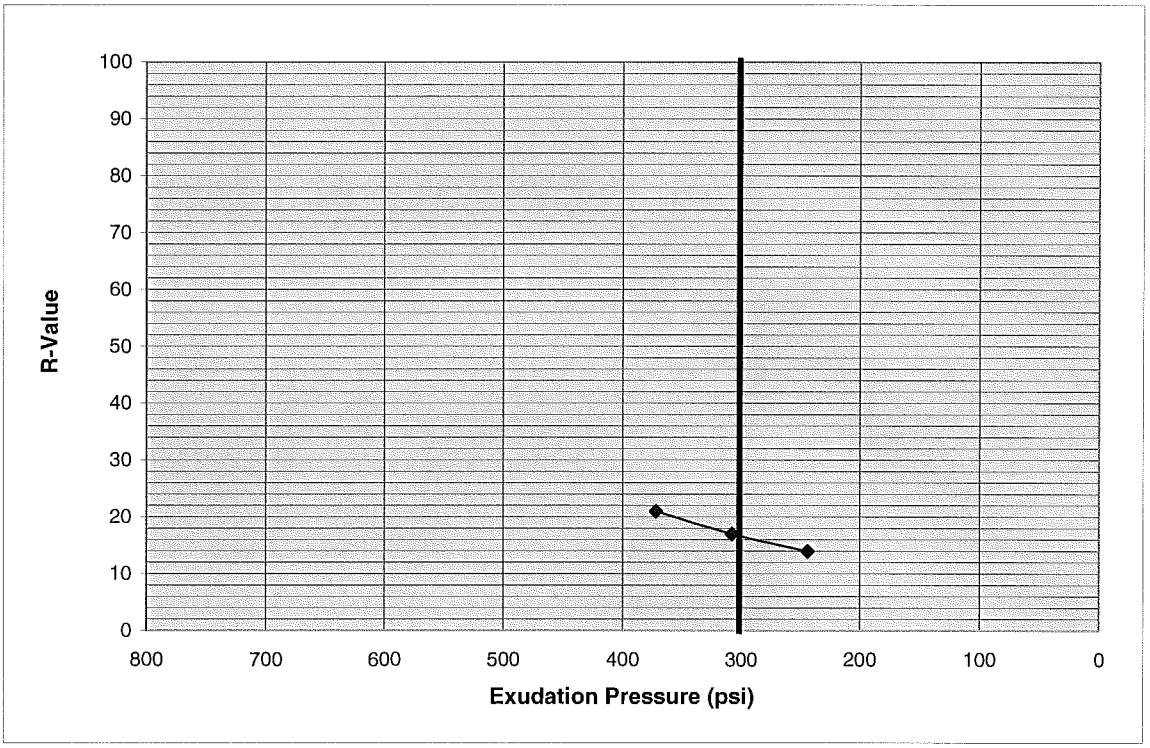
5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Resistance Value

Test Procedure: CAL 301

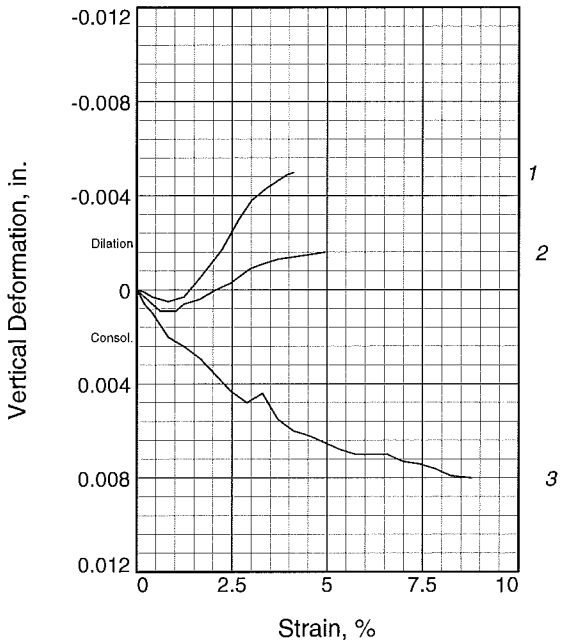
Client Project:	Biggs-West Gridley Canal Improvements
STL Project Number:	11-236
Client Project Number:	10-066.00
Sample Number:	B-20 #2 @ 0' (S32201)
Sample Received Date:	8/25/2011
Material Description:	VISUAL: Dark gray clay with gravel

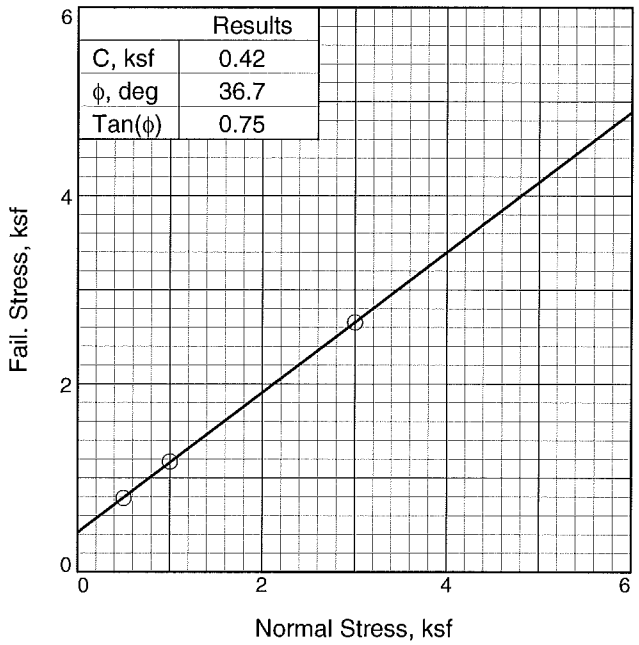


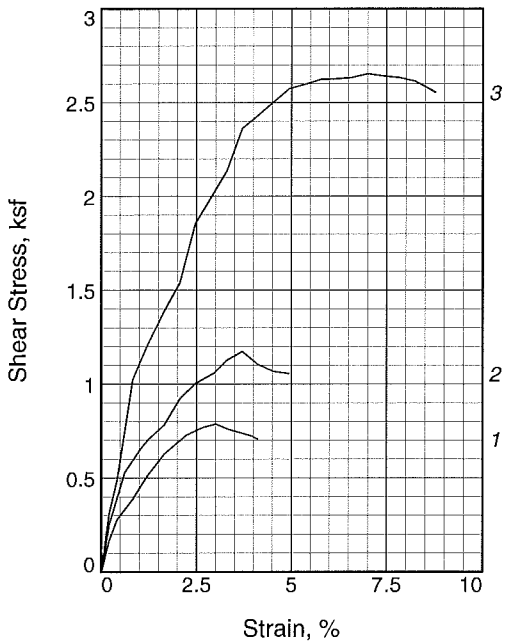
Specimen Number:	*1*	*2*	*3*	
Moisture at Test (%)	**17.1**	**18.3**	**19.6**	
Dry Unit Weight at Test (pcf)	**114.0**	**110.9**	**108.6**	
Expansion Pressure (psf)	**192**	**114**	**61**	
Exudation Pressure (psi)	**372**	**308**	**244**	
Resistance Value	**21**	**17**	**14**	
Resistance Value at 300 psi exudation pressure			**17**	

NOTE:

5040 Robert J. Mathews Parkway, El Dorado Hills, CA ph: 916-939-3460 fax: 916-939-3507







Sample No.		1	2	3
Initial	Water Content, %	35.1	35.1	33.8
	Dry Density, pcf	86.3	86.3	86.6
	Saturation, %	99.4	99.4	96.3
	Void Ratio	0.9542	0.9542	0.9468
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	33.3	32.8	29.5
	Dry Density, pcf	88.7	89.4	93.8
	Saturation, %	99.9	100.0	99.9
	Void Ratio	0.9013	0.8864	0.7973
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.97	0.97	0.92
Normal Stress, ksf		0.50	1.00	3.00
Fail. Stress, ksf		0.79	1.17	2.65
Strain, %		3.0	3.7	7.0
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Undisturbed
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

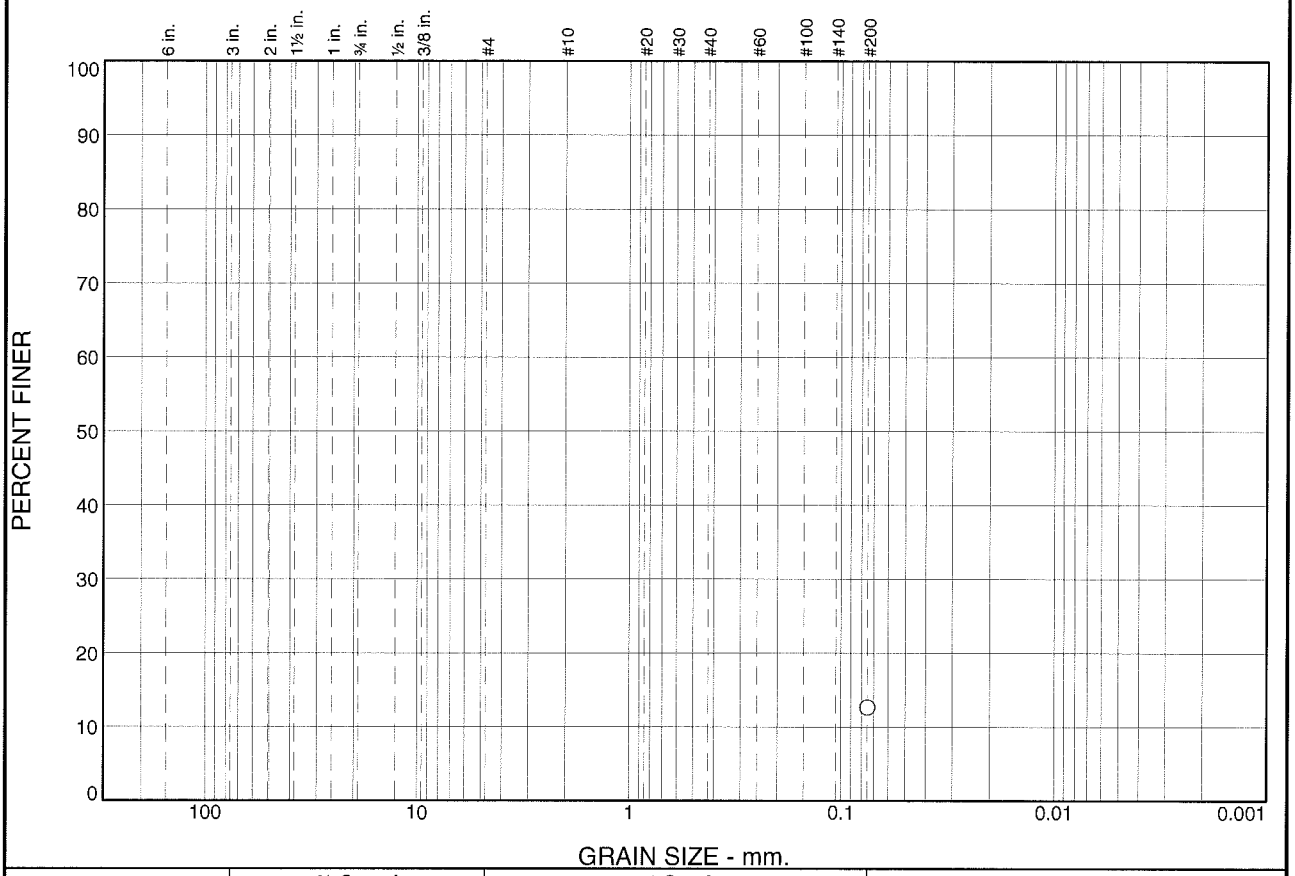
Client: Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-20 #4
Sample Number: S32202 **Depth:** 6.0
Proj. No.: 11-236 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw **Checked By:** mpw

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						12.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	12.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

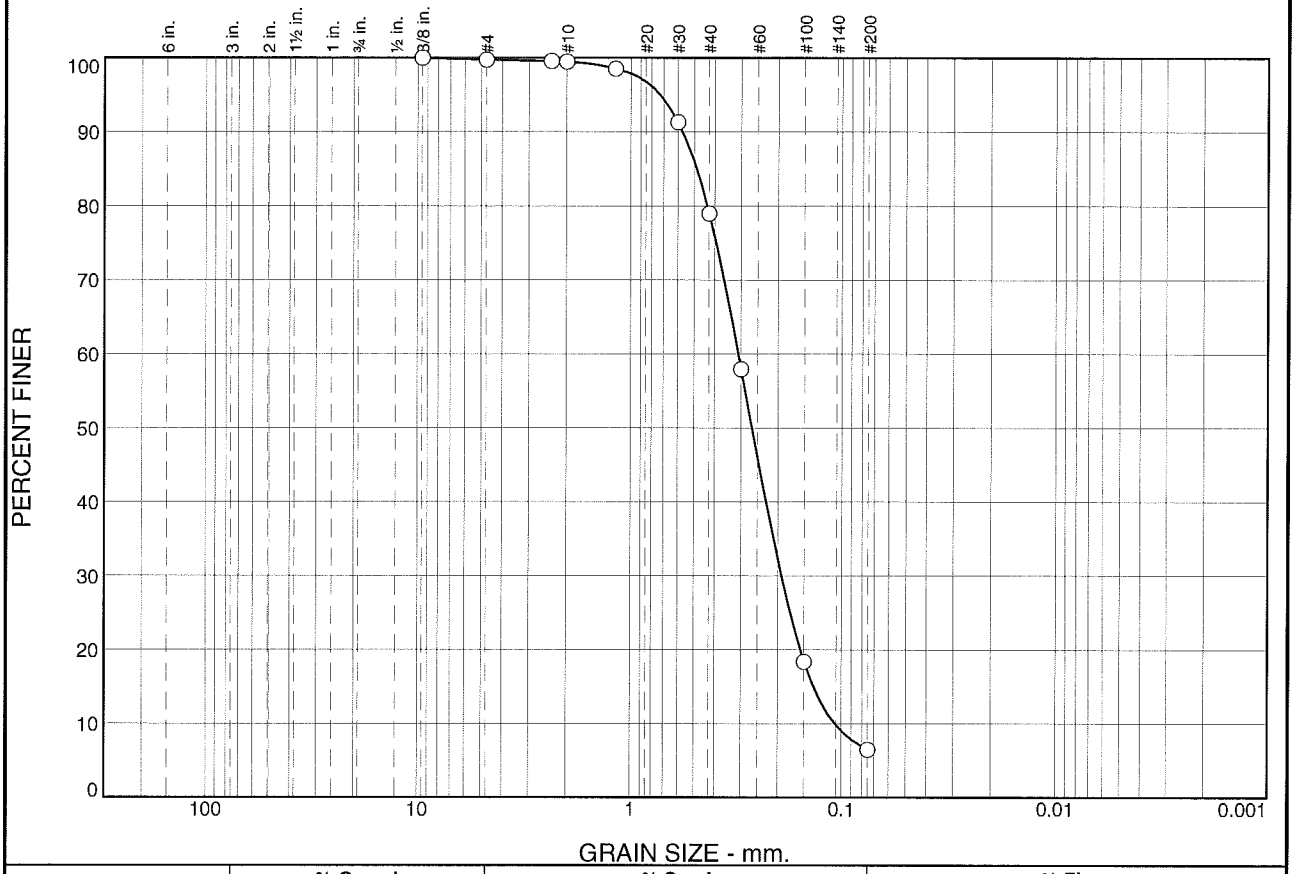
Location: B-20 #5
Sample Number: S32203 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.3	20.5	72.5	6.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 Inch	100.0		
#4	99.8		
#8	99.6		
#10	99.5		
#16	98.5		
#30	91.3		
#40	79.0		
#50	58.0		
#100	18.4		
#200	6.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5699 D_{85}= 0.4879 D_{60}= 0.3093
D_{50}= 0.2659 D_{30}= 0.1922 D_{15}= 0.1354
D_{10}= 0.1074 C_u= 2.88 C_c= 1.11

Classification

USCS= AASHTO=

Remarks

friable particles

Location: B-20 #7
Sample Number: S32205 **Depth:** 15.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

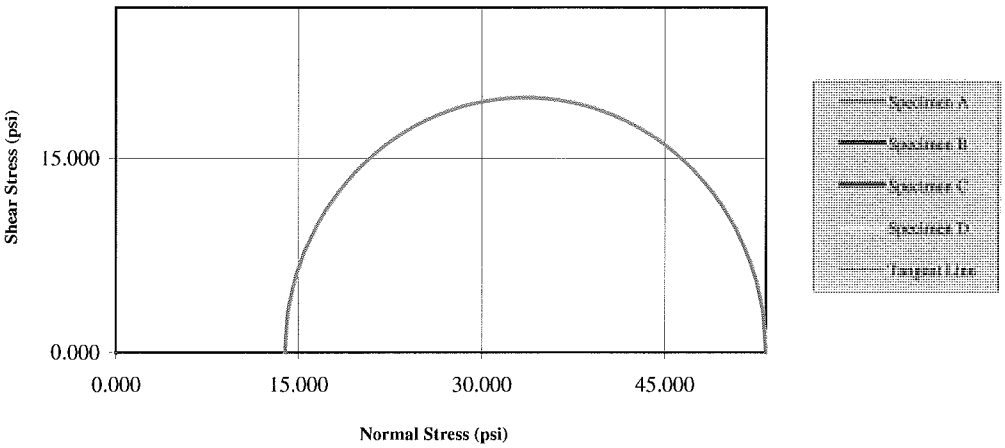
Date: 09/13/11

Checked By: MN

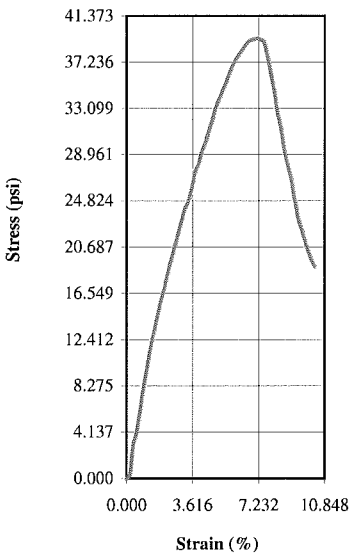
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

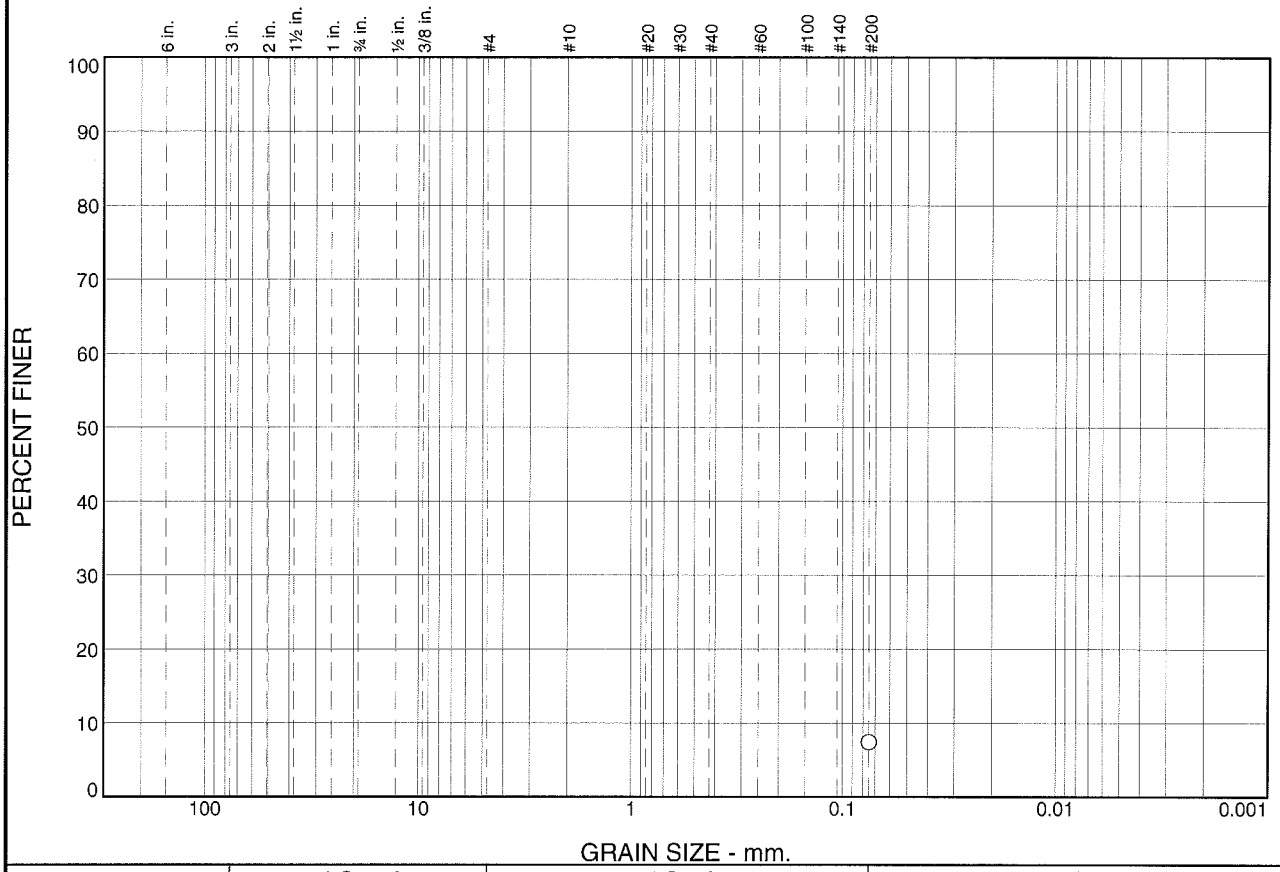


Before Test	Specimen A	B	C	D
Water Content (%)	22.10	0.00	0.00	0.00
Dry Density (pcf)	103.50	0.00	0.00	0.00
Saturation (%)	97.88	0.00	0.00	0.00
Void Ratio	0.60	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	5.420	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	22.64	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	39.403	0.000	0.000	0.000
Axial Strain @ Failure (%)	7.138	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	13.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	53.3	0.0	0.0	0.0
σ3 (psi)	13.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	19.7	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-20, #9 @ 16.0'
Client:	SAGE	Sample Number:	S32206
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

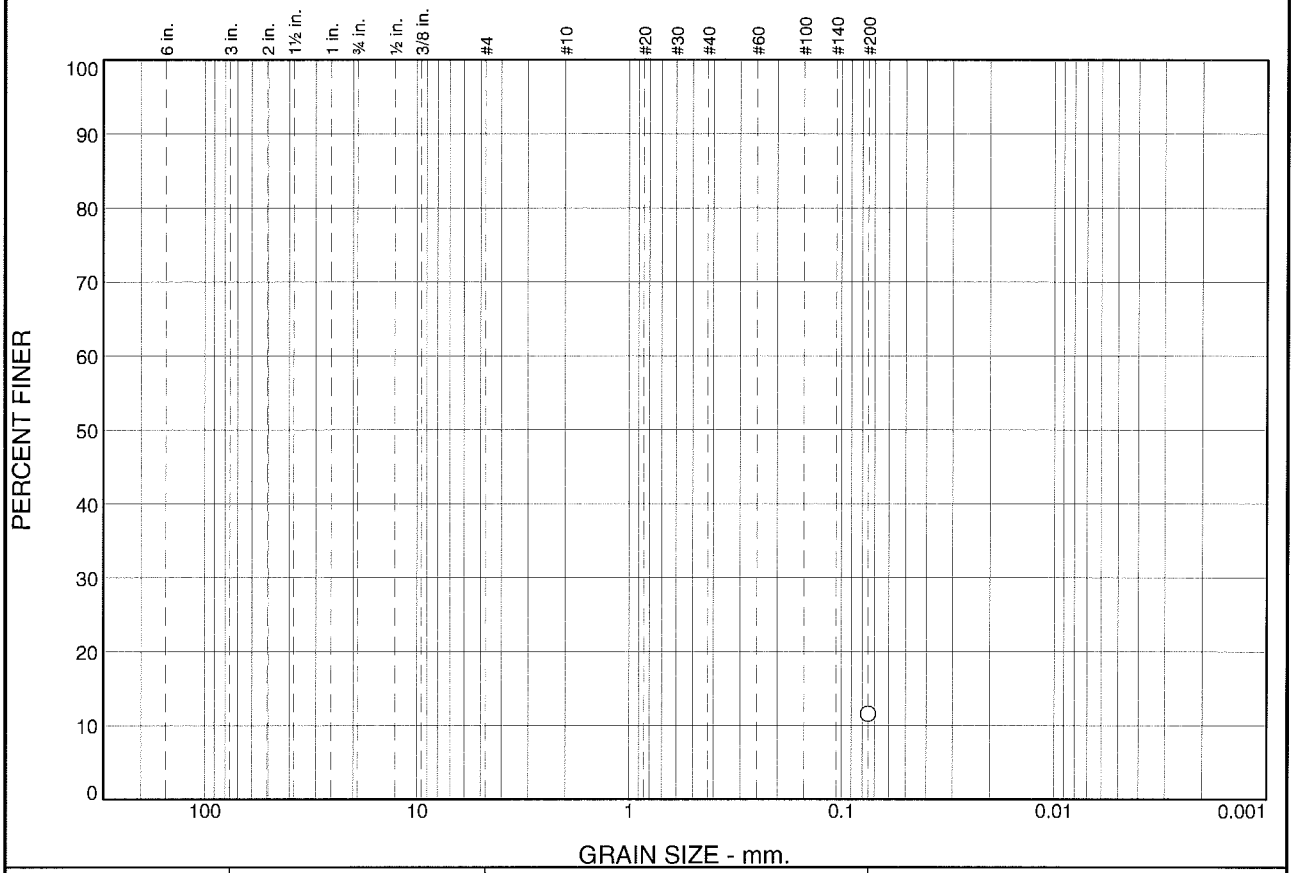
Location: B-20 #11
Sample Number: S32207 **Depth:** 25.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						11.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.6		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-20 #12
Sample Number: S32208 **Depth:** 30.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-21 #6	11			24.1
B-21 #7	20			31.2

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

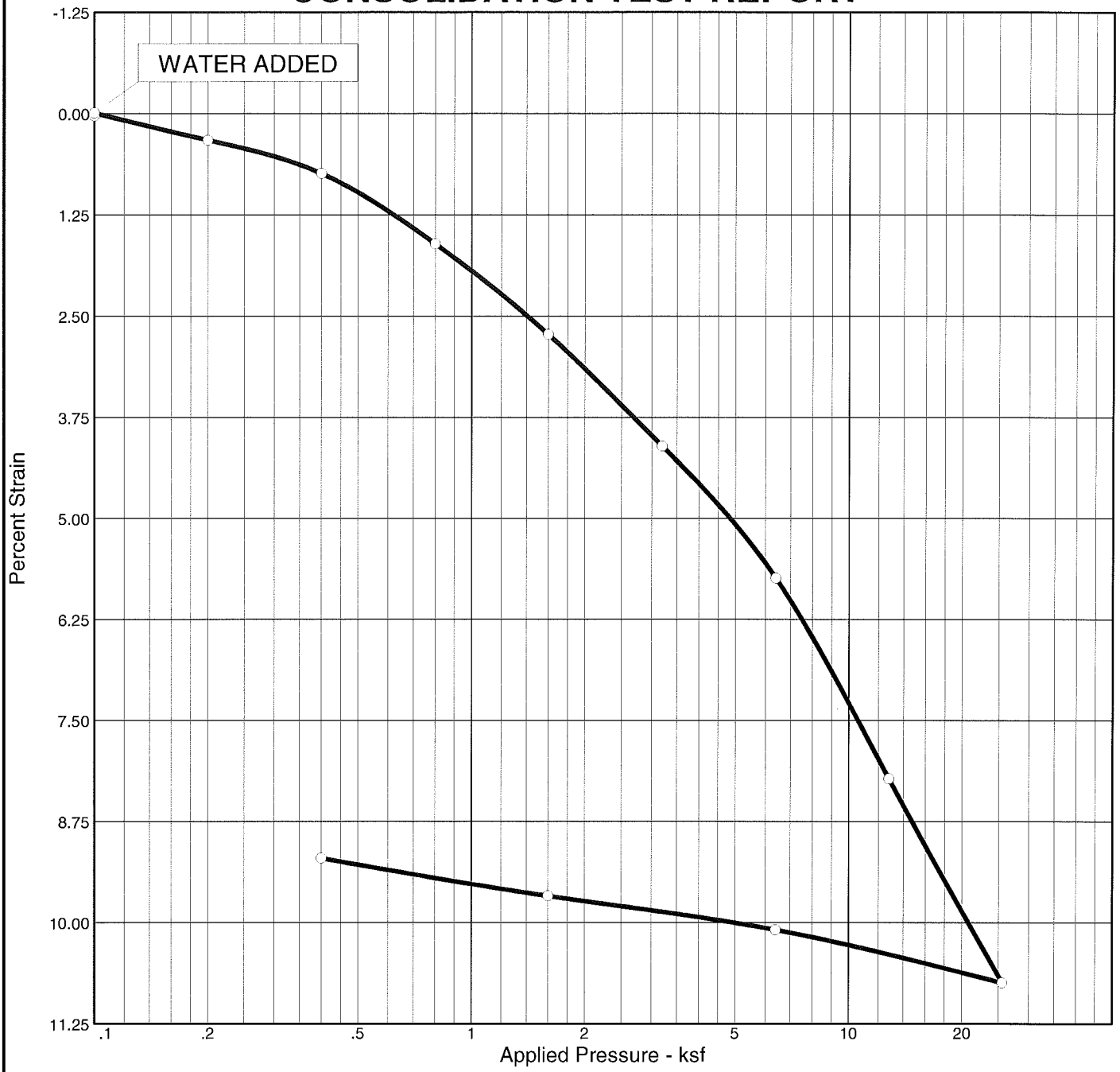
SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

10-066.00

CONSOLIDATION TEST REPORT



Natural		Dry Dens.	LL	PI	Sp.	Overburden	P_c	C_c	C_s	Swell Press.	Swell	e_o
Sat.	Moist.	(pcf)			Gr.	(ksf)	(ksf)			(ksf)	%	
99.2 %	22.7 %	104.2			2.70		2.11	0.14	0.01	0.11		0.618

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-21 #3

Remarks:

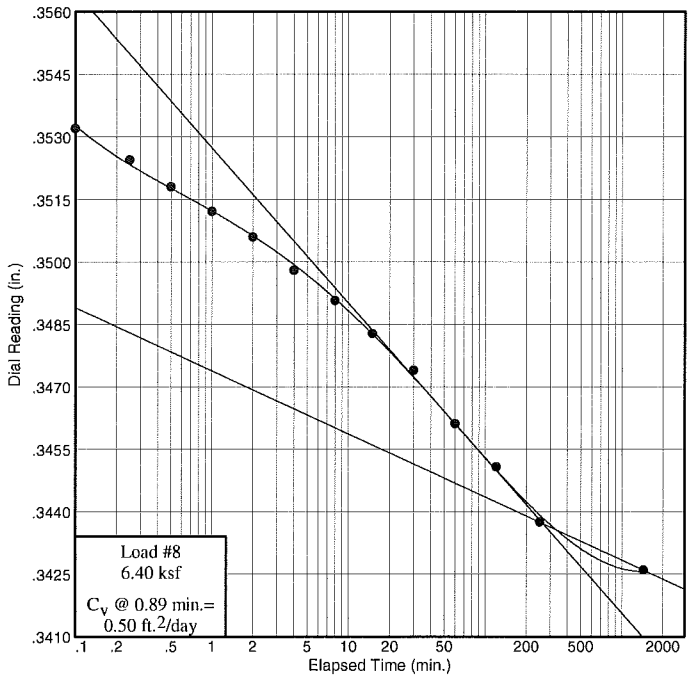
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-21 #3

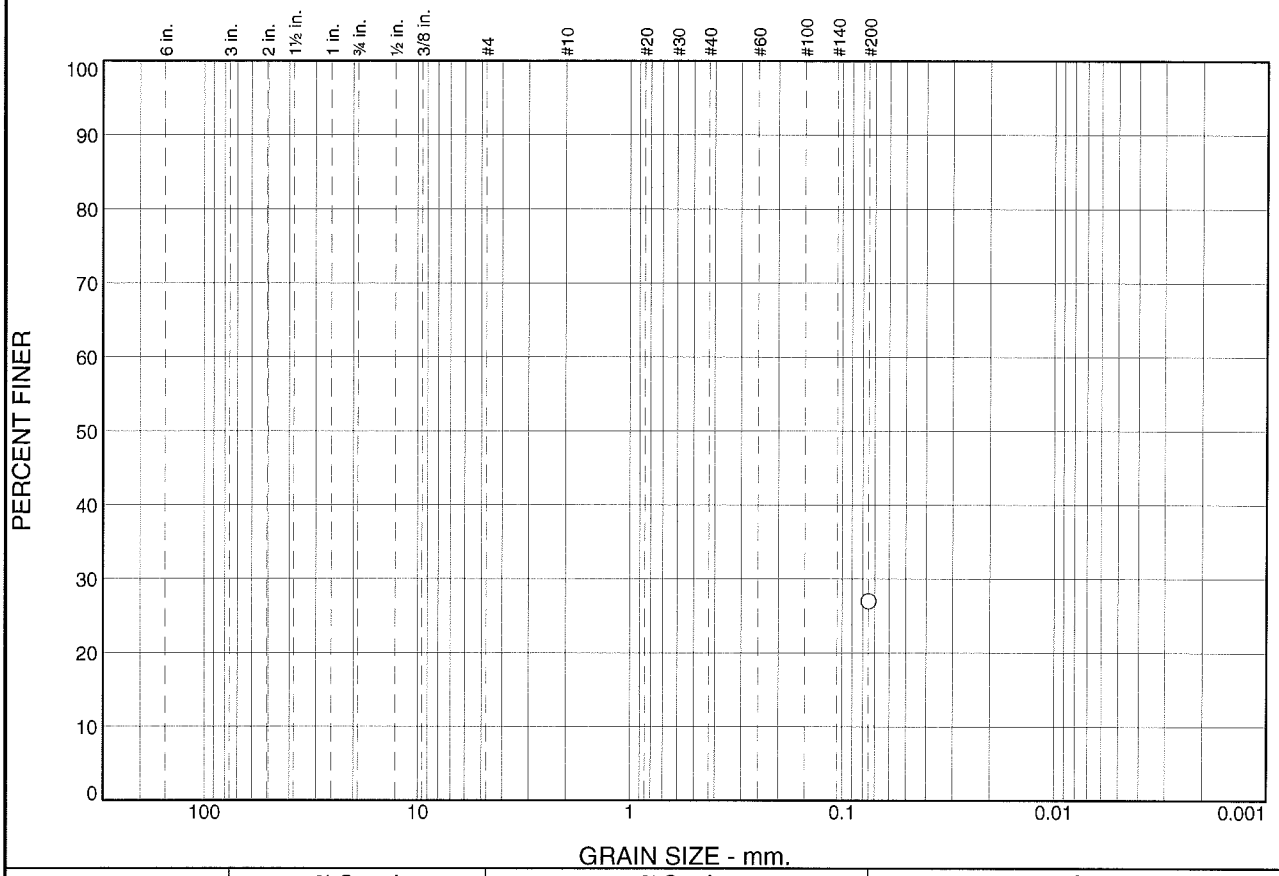


SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						27.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	27.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

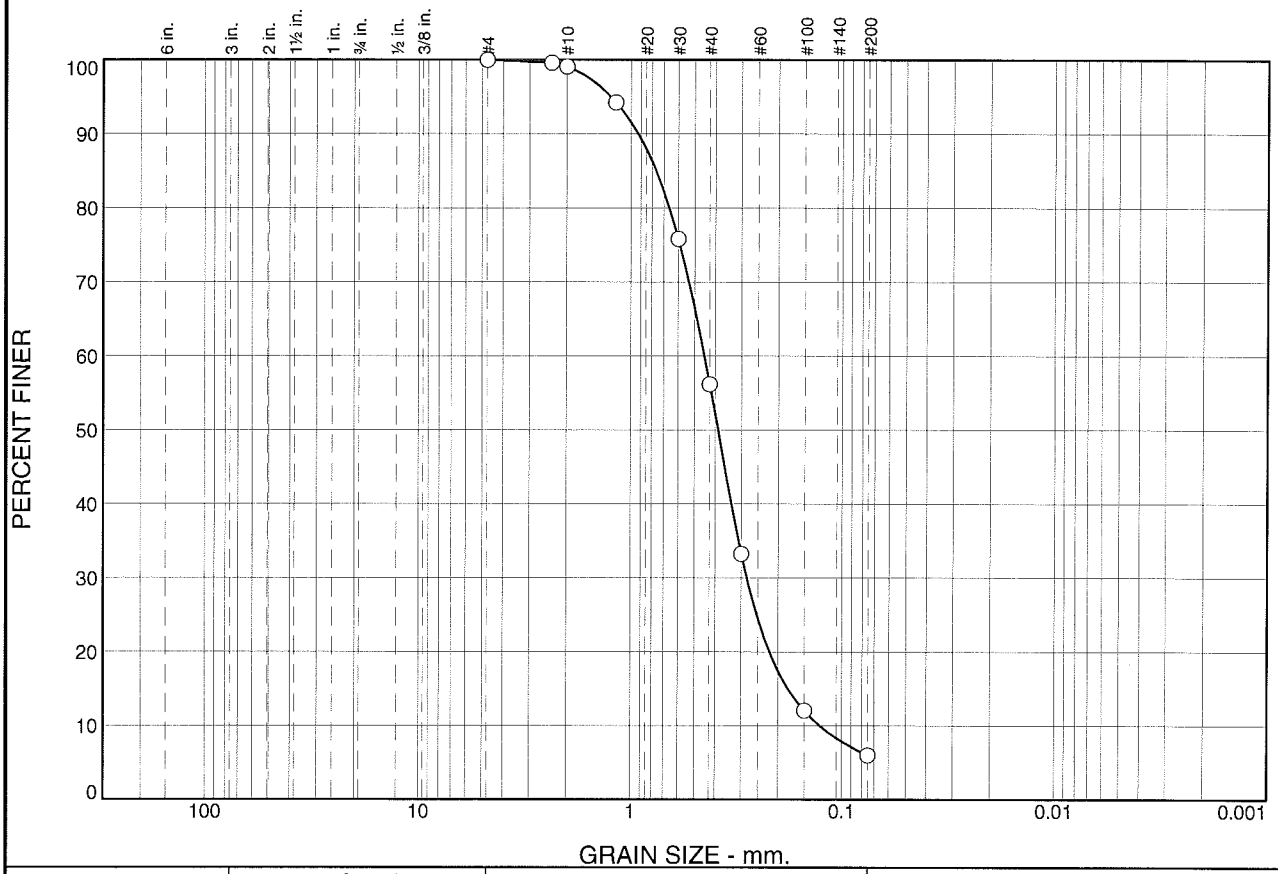
Location: B-21 #4
Sample Number: S32210 **Depth:** 5.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.9	42.9	50.2	6.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.6		
#10	99.1		
#16	94.3		
#30	75.8		
#40	56.2		
#50	33.3		
#100	12.0		
#200	6.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.9266 D_{85}= 0.7639 D_{60}= 0.4505
D_{50}= 0.3879 D_{30}= 0.2823 D_{15}= 0.1796
D_{10}= 0.1266 C_u= 3.56 C_c= 1.40

Classification

USCS= AASHTO=

Remarks

friable particles

Location: B-21 #11
Sample Number: S32213 **Depth:** 35.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-22 #3	5'9"	115.8	89.0	30.1
B-22 #5	15'3"	128.3	105.5	21.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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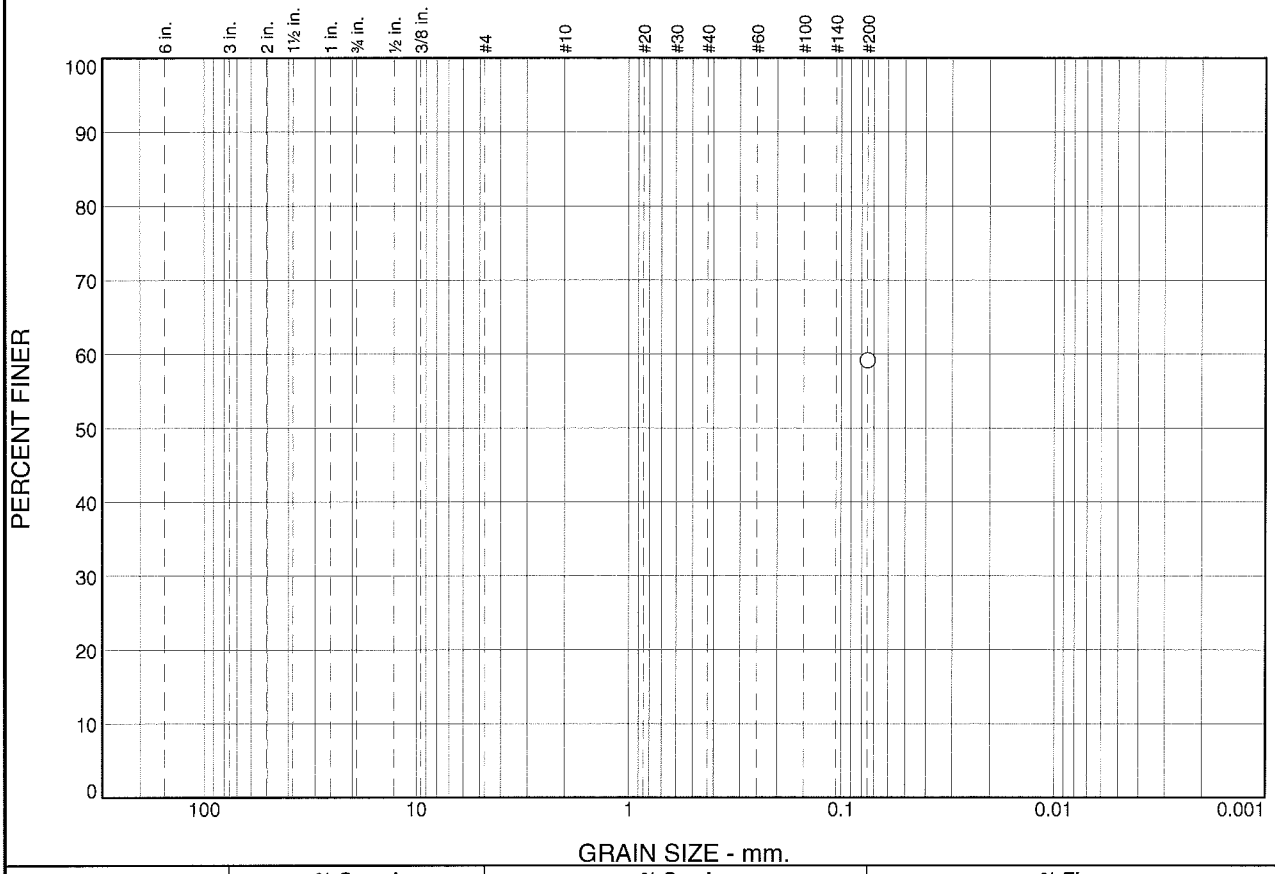
Phone: (916) 939-3460 FAX: (916) 939-3507

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-22 #4
Sample Number: S32215 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-23 #6	16	122.0	93.6	30.4
B-23 #8	25.5	116.1	89.7	29.5

Note: Catcher grooves on sample B-23 #8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

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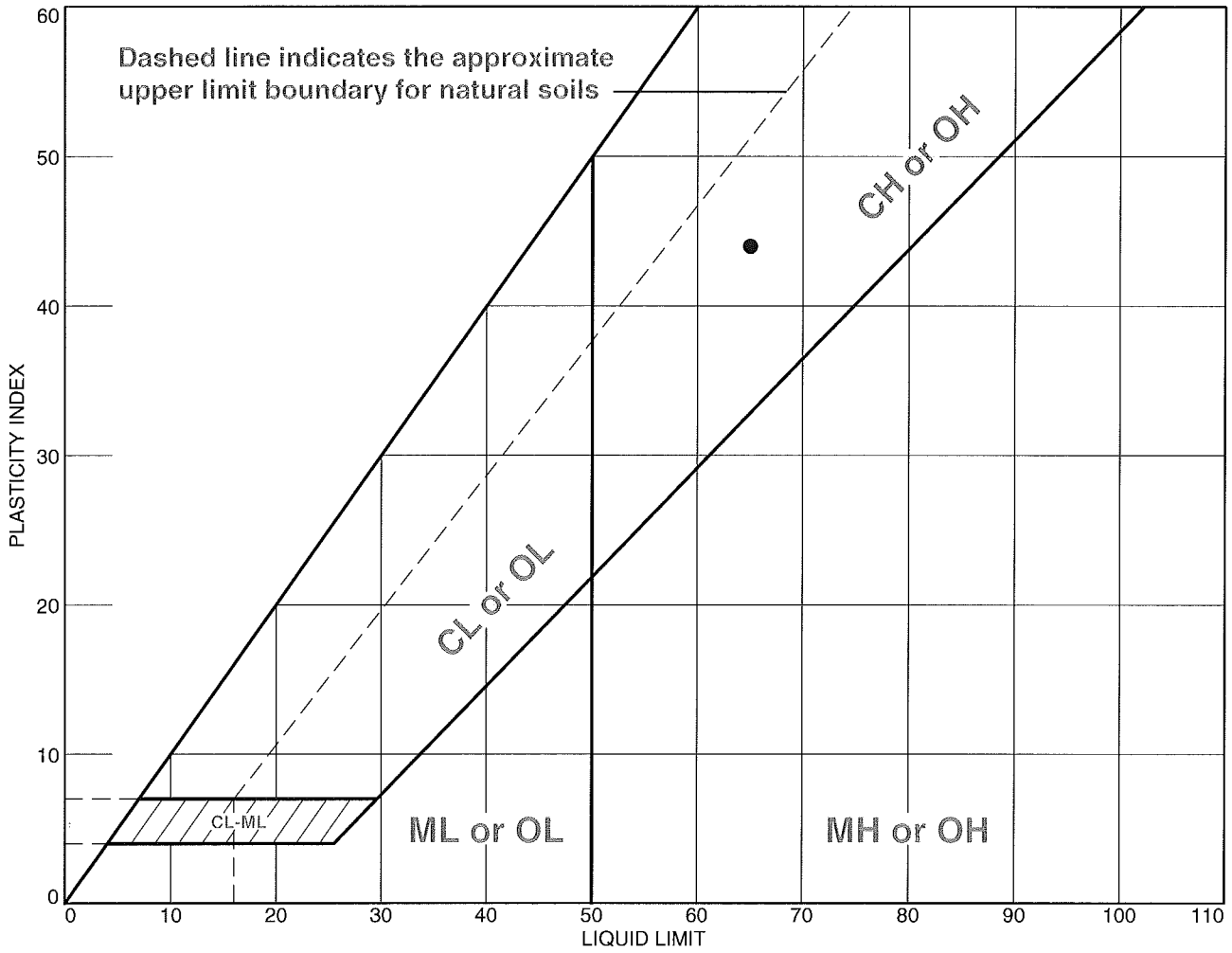
Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		65	21	44			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-23 #1 **Depth:** 0 **Sample Number:** S32217

Remarks:

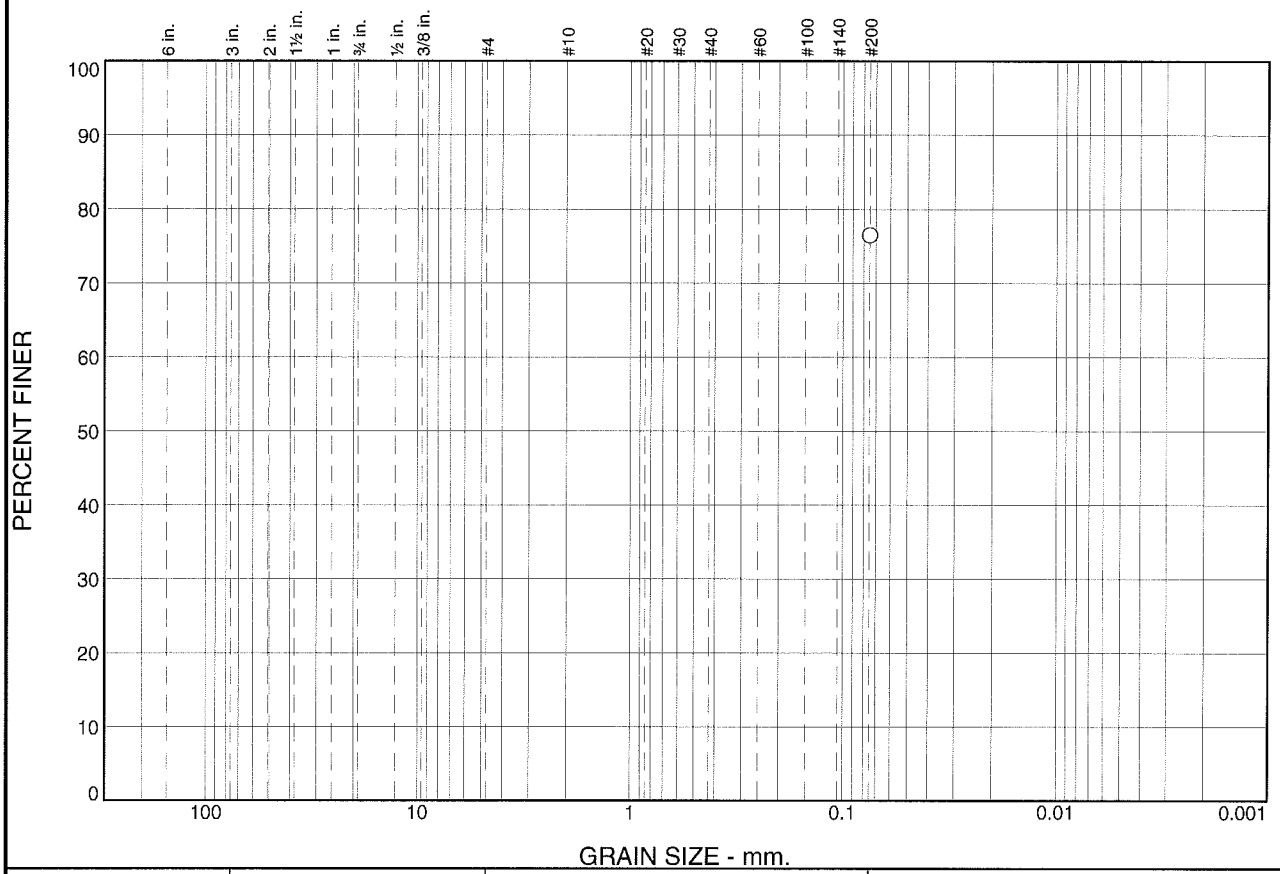
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	76.5		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-23 #2
Sample Number: S32218 **Depth:** 5'4" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-23 #2 | Sample Depth, ft.: 5'4" | Lab No.: S32218

Visual Description: N/A | Sample Type:

Remarks:

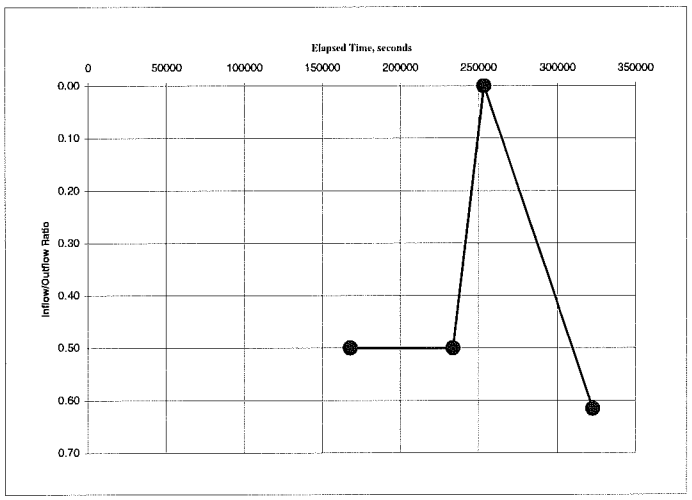
TEST RESULTS

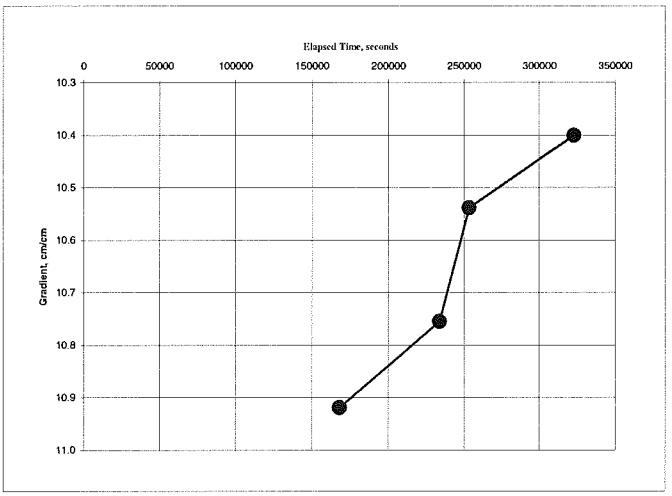
Permeability, cm/sec.: 1.40E-08 | **Average Hydraulic Gradient: 10.7**

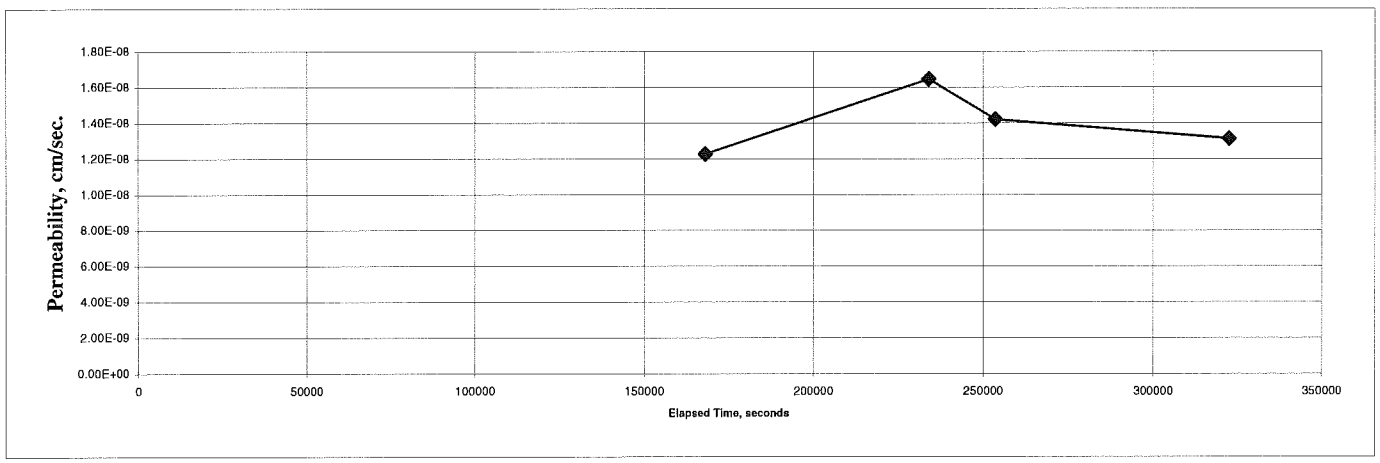
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.62	Specimen Height, cm:	7.62
Specimen Diameter, cm:	5.79	Specimen Diameter, cm:	5.79
Dry Unit Weight, pcf:	83.9	Dry Unit Weight, pcf:	82.5
Moisture Content, %	37.5	Moisture Content, %	40.7
Specific Gravity, Assumed	2.70		
Percent Saturation:	100.6		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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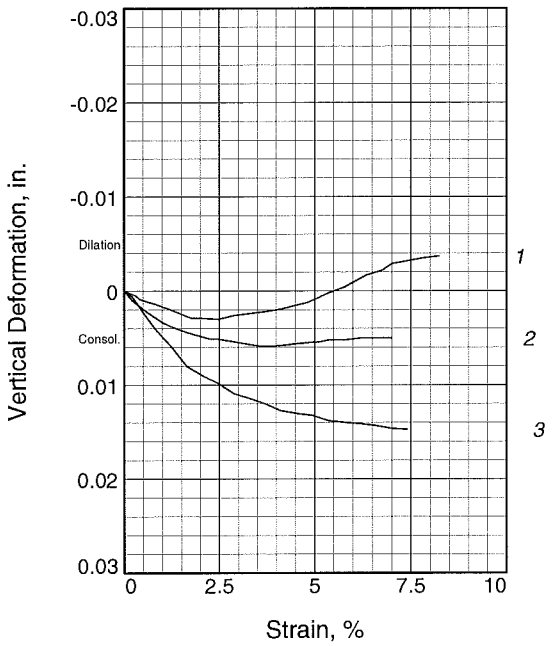
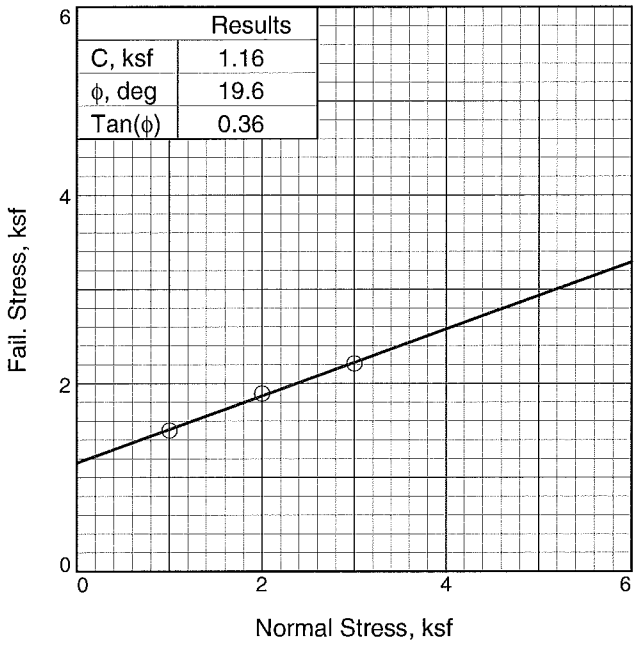
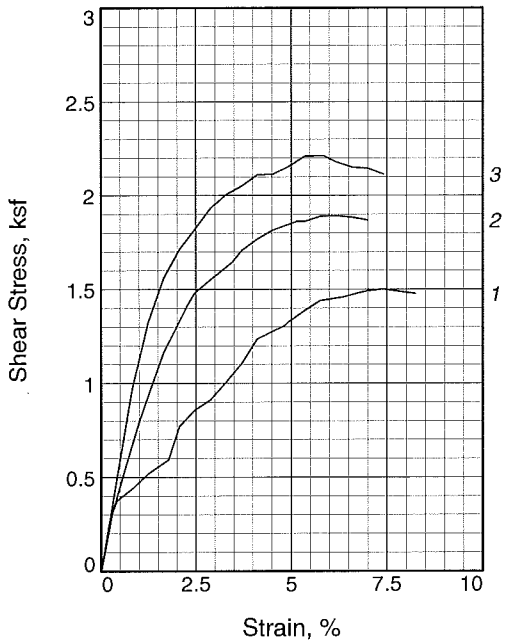
Biggs-West Gridley Canal Improvements







Sample No.		1	2	3
Initial	Water Content, %	28.8	29.9	30.8
	Dry Density, pcf	87.4	86.2	86.0
	Saturation, %	83.6	84.5	86.5
	Void Ratio	0.9285	0.9561	0.9598
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	31.6	32.5	32.9
	Dry Density, pcf	90.9	89.8	89.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.8543	0.8765	0.8869
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.96	0.96	0.96
Normal Stress, ksf		1.00	2.00	3.00
Fail. Stress, ksf		1.50	1.89	2.21
Strain, %		7.4	6.2	5.8
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Undisturbed
Description:

Specific Gravity= 2.70
Remarks:

Figure _____

Client: Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-23 #3
Sample Number: S32219 **Depth:** 5'10"
Proj. No.: 11-236 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw **Checked By:** mpw

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-24 #4	15.5	117.4	92.1	27.6
B-24 #5	20			27.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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GEOTECHNICAL AND MATERIALS TESTING SERVICES

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Phone: (916) 939-3460 FAX: (916) 939-3507

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

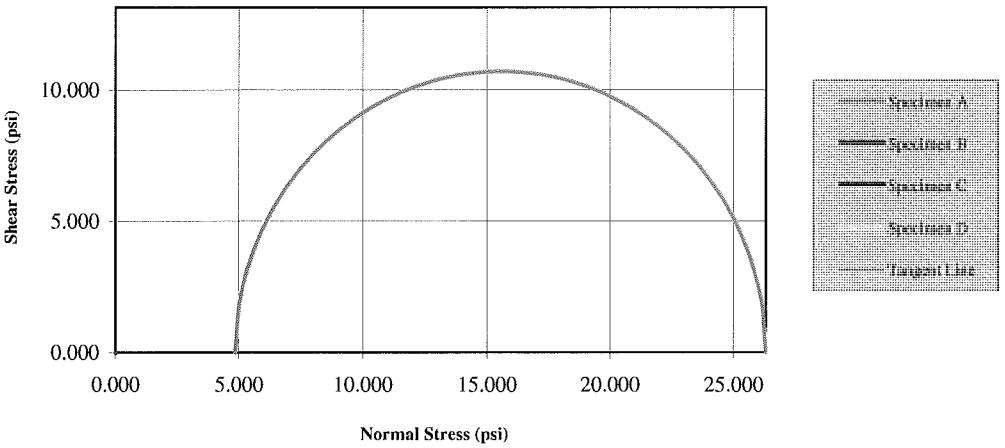
Date: 09/14/11

Checked By: MN

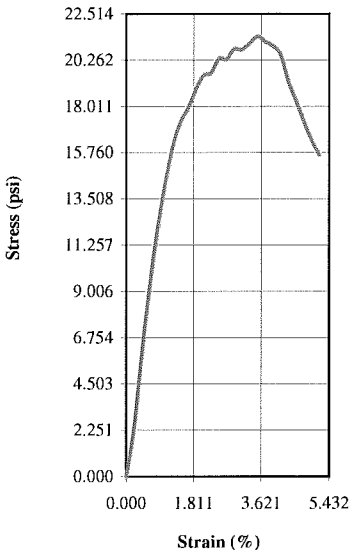
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve



Before Test	Specimen A	B	C	D
Water Content (%)	32.10	0.00	0.00	0.00
Dry Density (pcf)	83.69	0.00	0.00	0.00
Saturation (%)	87.10	0.00	0.00	0.00
Void Ratio	0.98	0.00	0.00	0.00
Diameter (in)	2.350	0.000	0.000	0.000
Height (in)	4.920	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	32.38	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	21.442	0.000	0.000	0.000
Axial Strain @ Failure (%)	3.518	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	26.3	0.0	0.0	0.0
σ3 (psi)	4.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	10.7	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-24, #2 @ 6.0'
Client:	SAGE	Sample Number:	S32222
Remarks:			

PINHOLE DISPERSION TEST RESULTS

SAMPLE PARAMETERS AT TESTING

Wet Unit Weight, pcf :	118.9
Dry Unit Weight, pcf :	88.7
Moisture Content, % :	34.4

HYDRAULIC PARAMETERS AND OBSERVATIONS AT COMPLETION OF TEST

Hydraulic Head, in. :	7	Flow Rate, ml / second :	2.4

Length of Test, min.:	5

Description Of Flow Hole At End of Test :	> 1.5 mm

Note: Flow hole was 1 mm at start of test.

Turbidity Description at End of Test :	Barely visible

DISPERSIVE CLASSIFICATION :	ND3

Test Method: ASTM D4647 Method: C

SAMPLE IDENTIFICATION: B-24 #2 SAMPLE DEPTH, ft.: 5.5-6

SAMPLE DESCRIPTION:

REMARKS: Ran at as received moisture and density

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements

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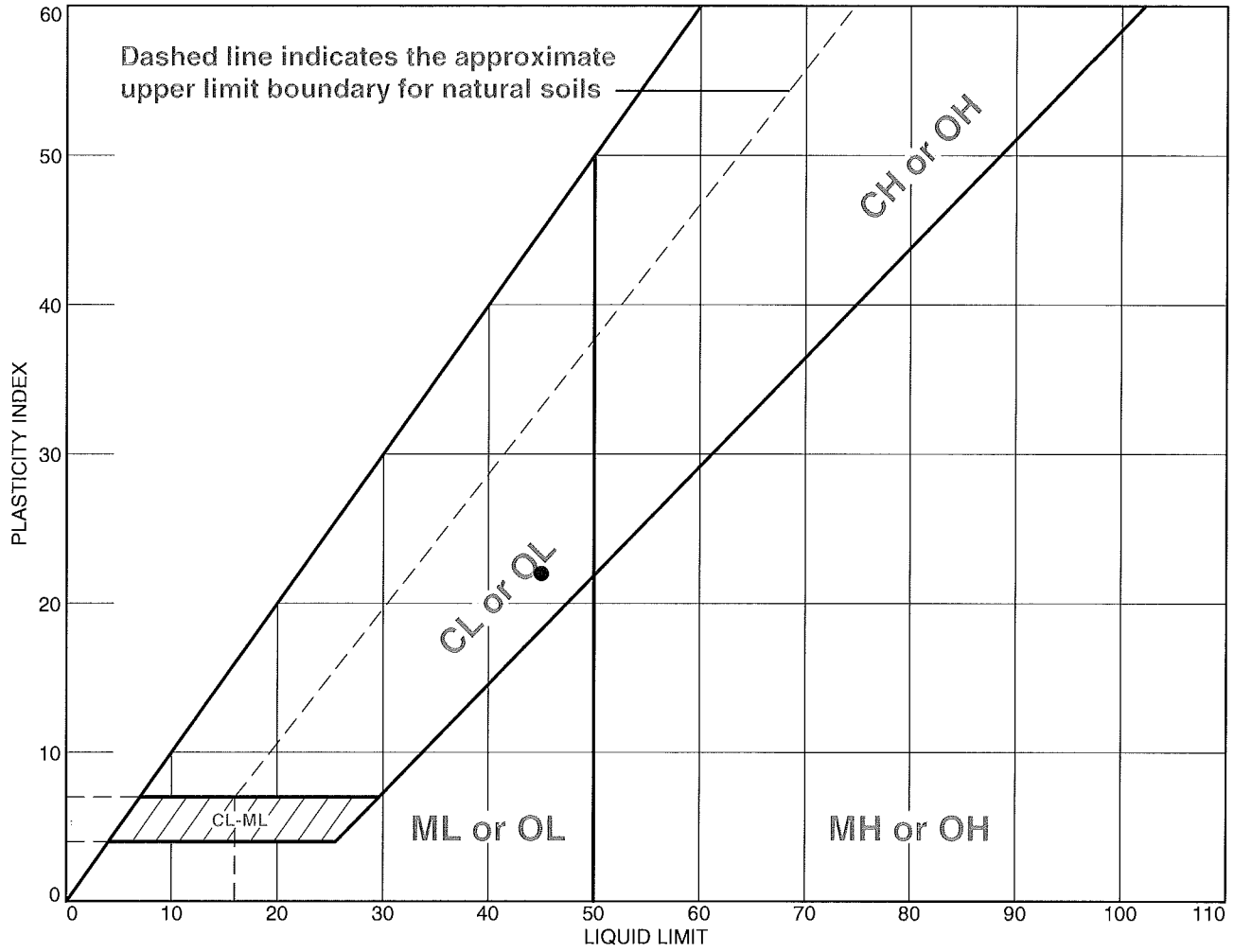
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		45	23	22			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-24 #3 **Depth:** 10.0 **Sample Number:** S32223

Remarks:

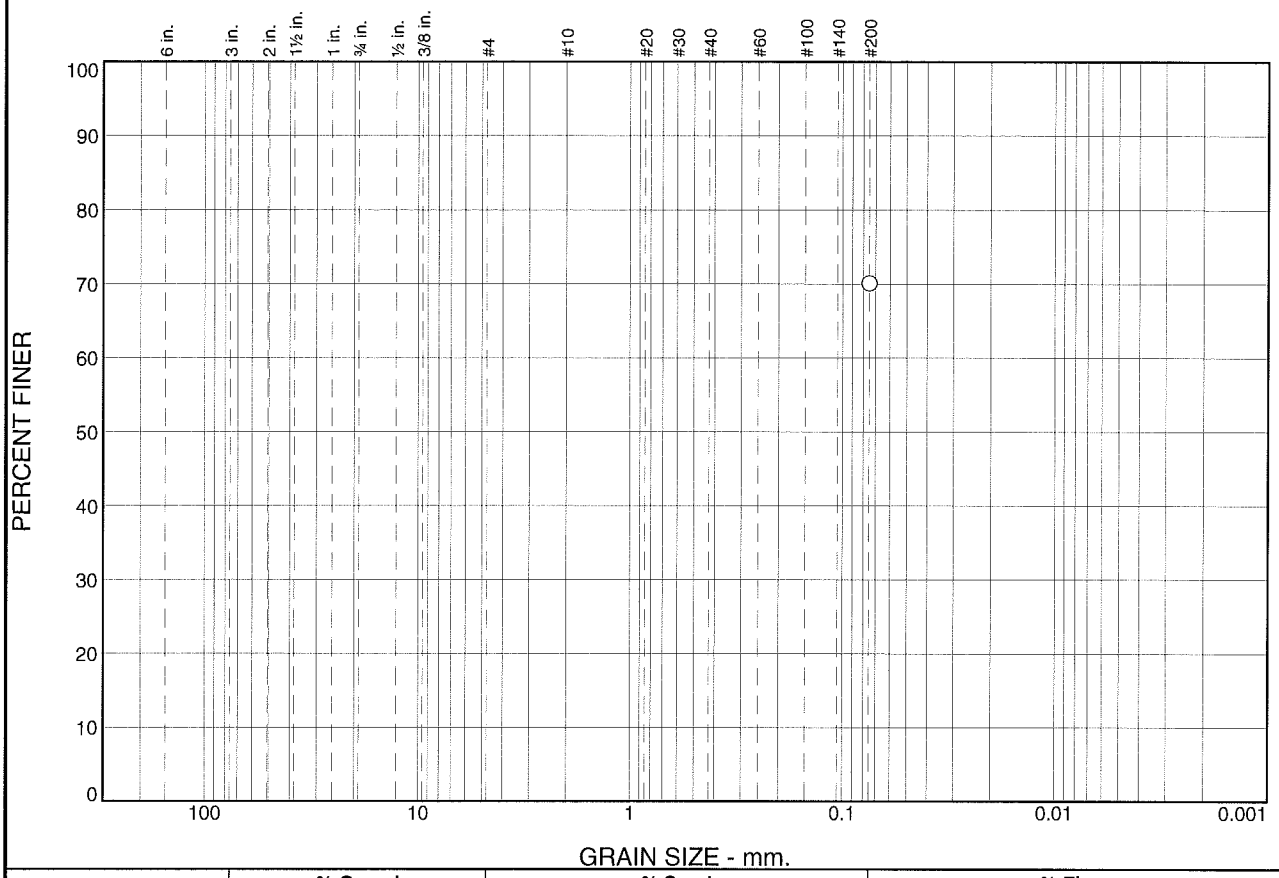
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ef **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						70.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	70.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-24 #5
Sample Number: S32225 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-25 #2	5.5	106.6	81.9	30.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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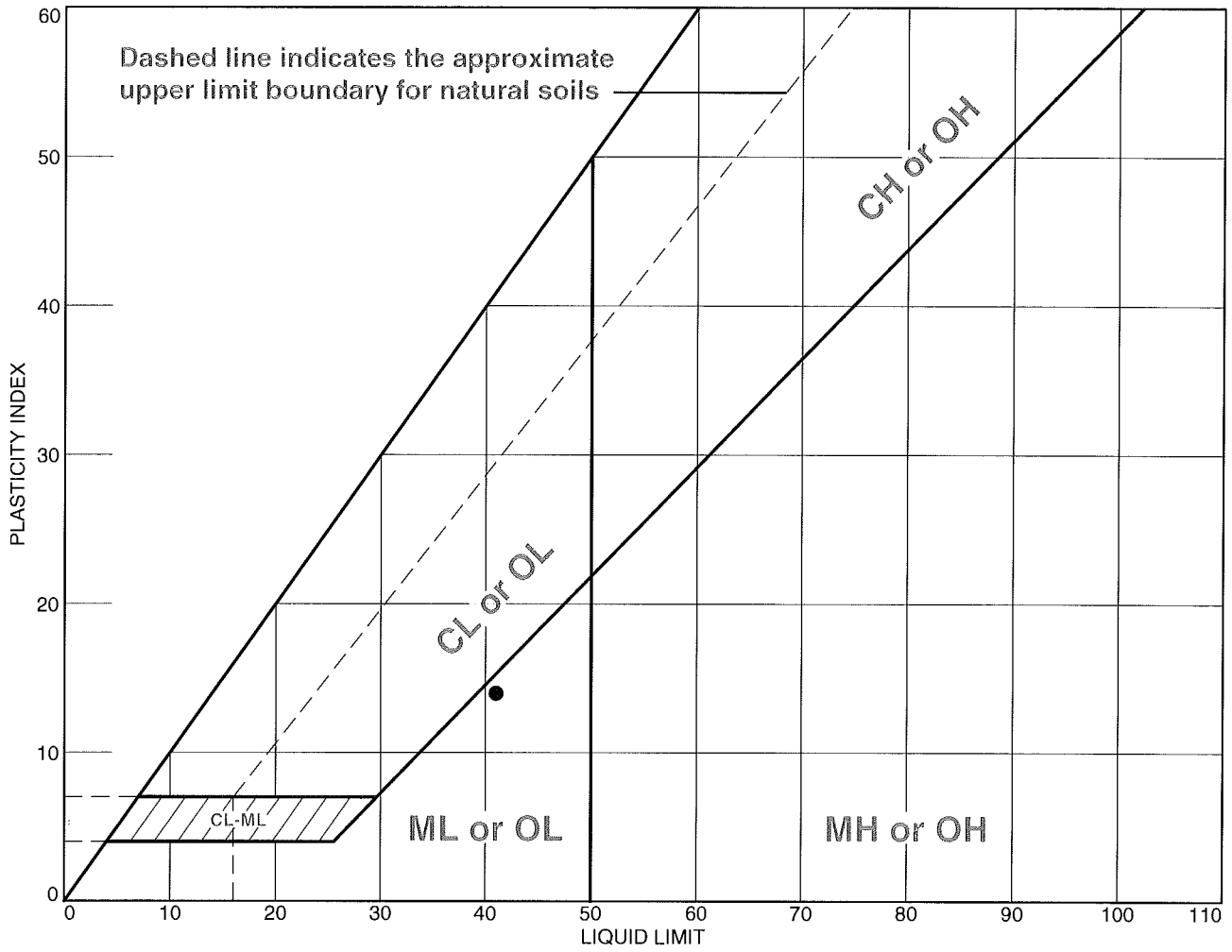
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		41	27	14			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-25 #3 **Depth:** 10.0 **Sample Number:** S32227

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ef **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-25 #4 | Sample Depth, ft.: 15.5 | Lab No.: S32228

Visual Description: N/A | Sample Type:

Remarks:

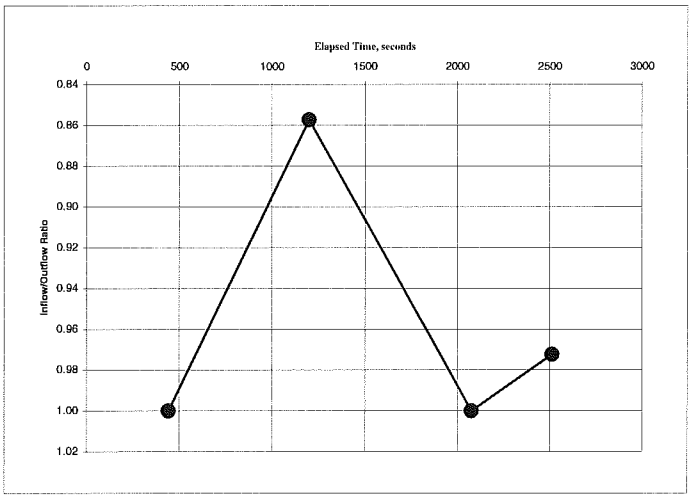
TEST RESULTS

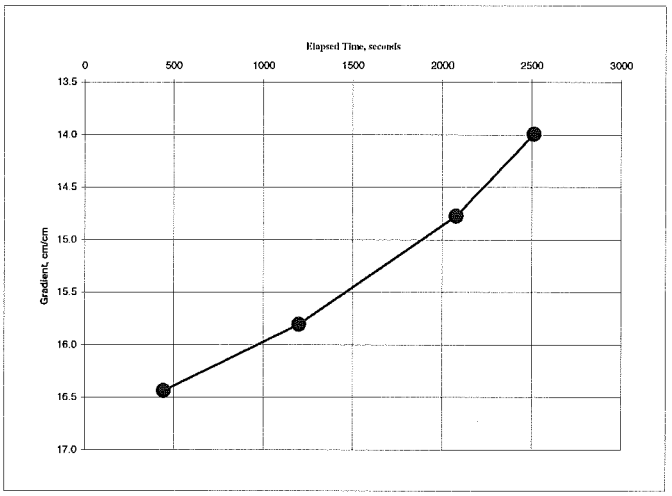
Permeability, cm/sec.: 2.77E-06 | **Average Hydraulic Gradient: 15.3**

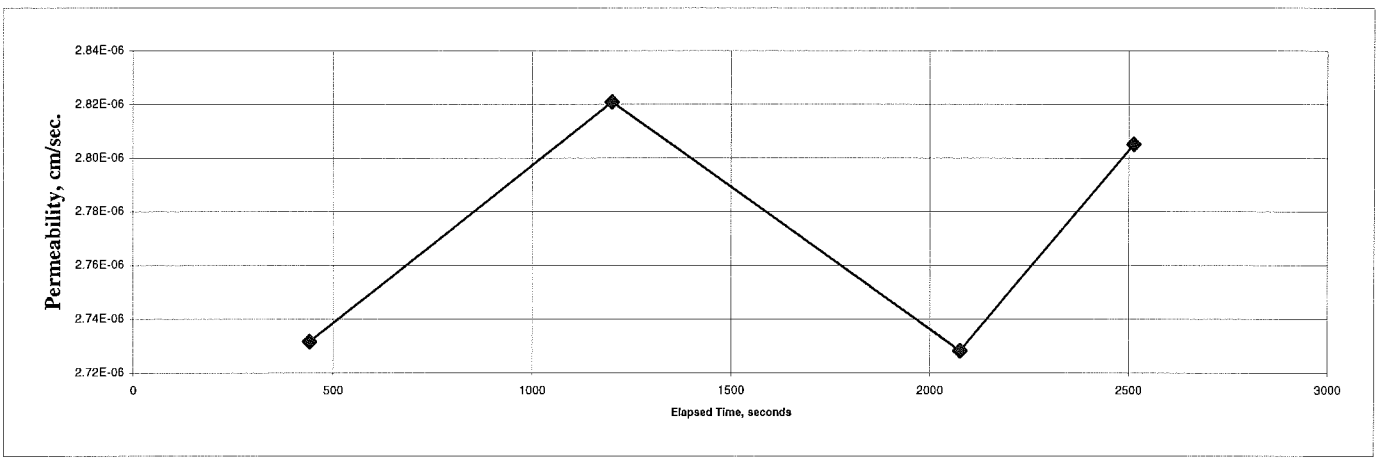
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.11	Specimen Height, cm:	7.04
Specimen Diameter, cm:	5.97	Specimen Diameter, cm:	5.97
Dry Unit Weight, pcf:	102.2	Dry Unit Weight, pcf:	100.9
Moisture Content, %	24.0	Moisture Content, %	30.4
Specific Gravity, Assumed	2.70		
Percent Saturation:	99.4		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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Biggs-West Gridley Canal Improvements

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-26 #6	15'9"	119.5	93.0	28.6
B-26 #10	26	119.8	92.7	29.3

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

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Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

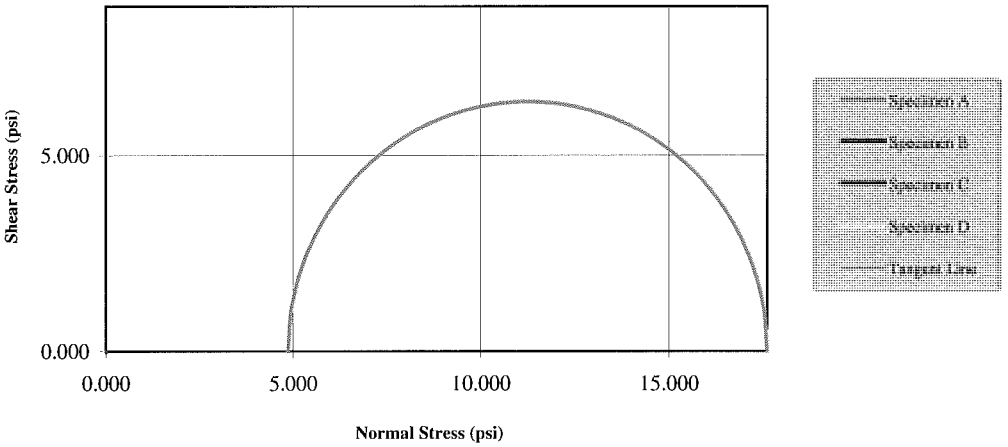
Date: 09/14/11

Checked By: MN

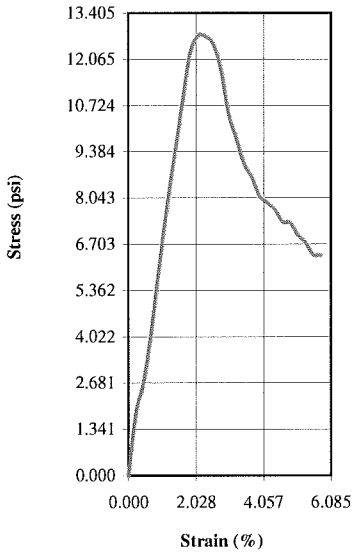
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

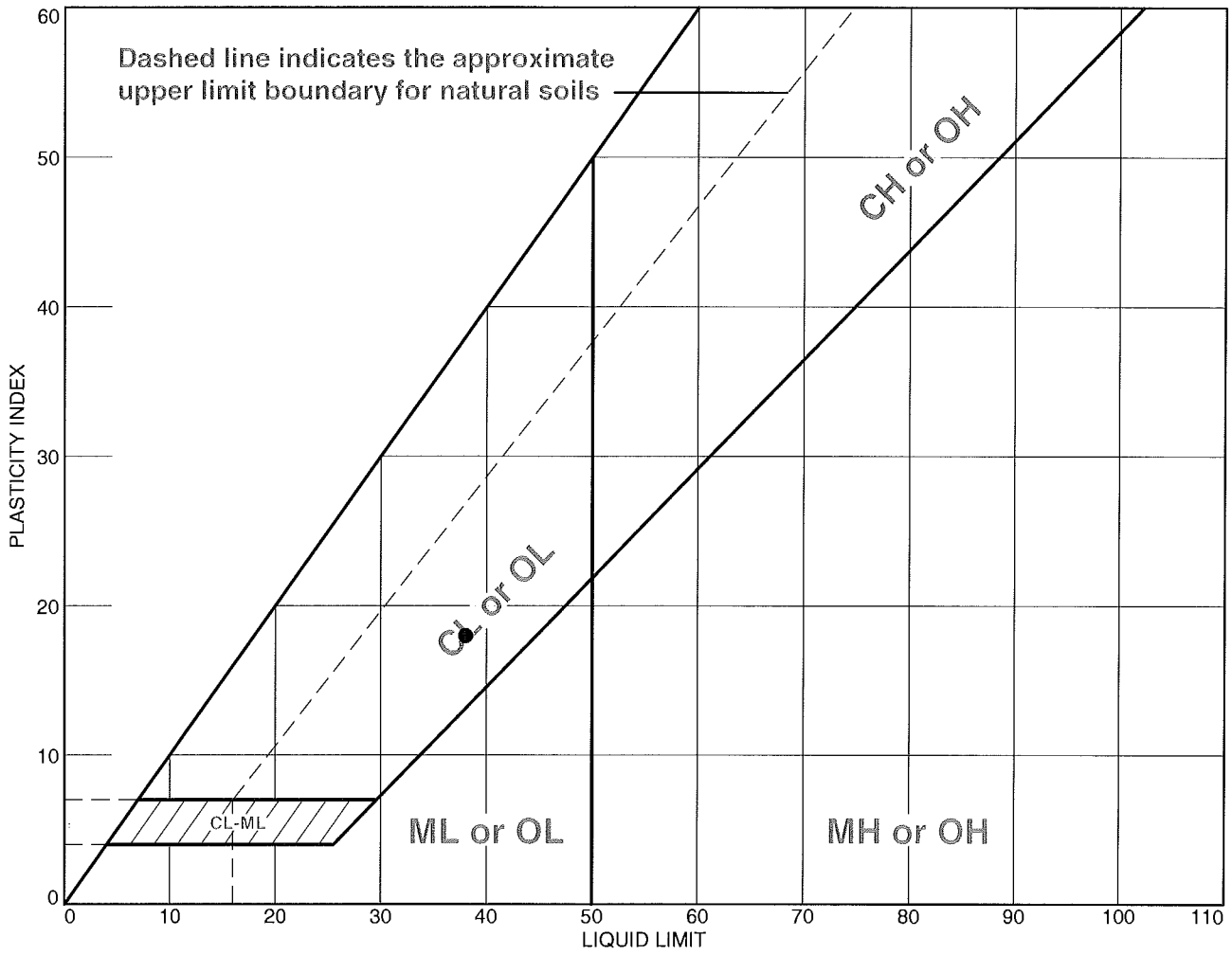


Before Test	Specimen A	B	C	D
Water Content (%)	24.60	0.00	0.00	0.00
Dry Density (pcf)	99.86	0.00	0.00	0.00
Saturation (%)	99.27	0.00	0.00	0.00
Void Ratio	0.66	0.00	0.00	0.00
Diameter (in)	2.390	0.000	0.000	0.000
Height (in)	4.400	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	24.25	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	12.767	0.000	0.000	0.000
Axial Strain @ Failure (%)	2.083	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	17.6	0.0	0.0	0.0
σ3 (psi)	4.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	6.4	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-26, #3 @ 6.0'
Client:	SAGE	Sample Number:	S32229
Remarks:			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		38	20	18			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-26 #4 **Depth:** 10.0 **Sample Number:** S32230

Remarks:

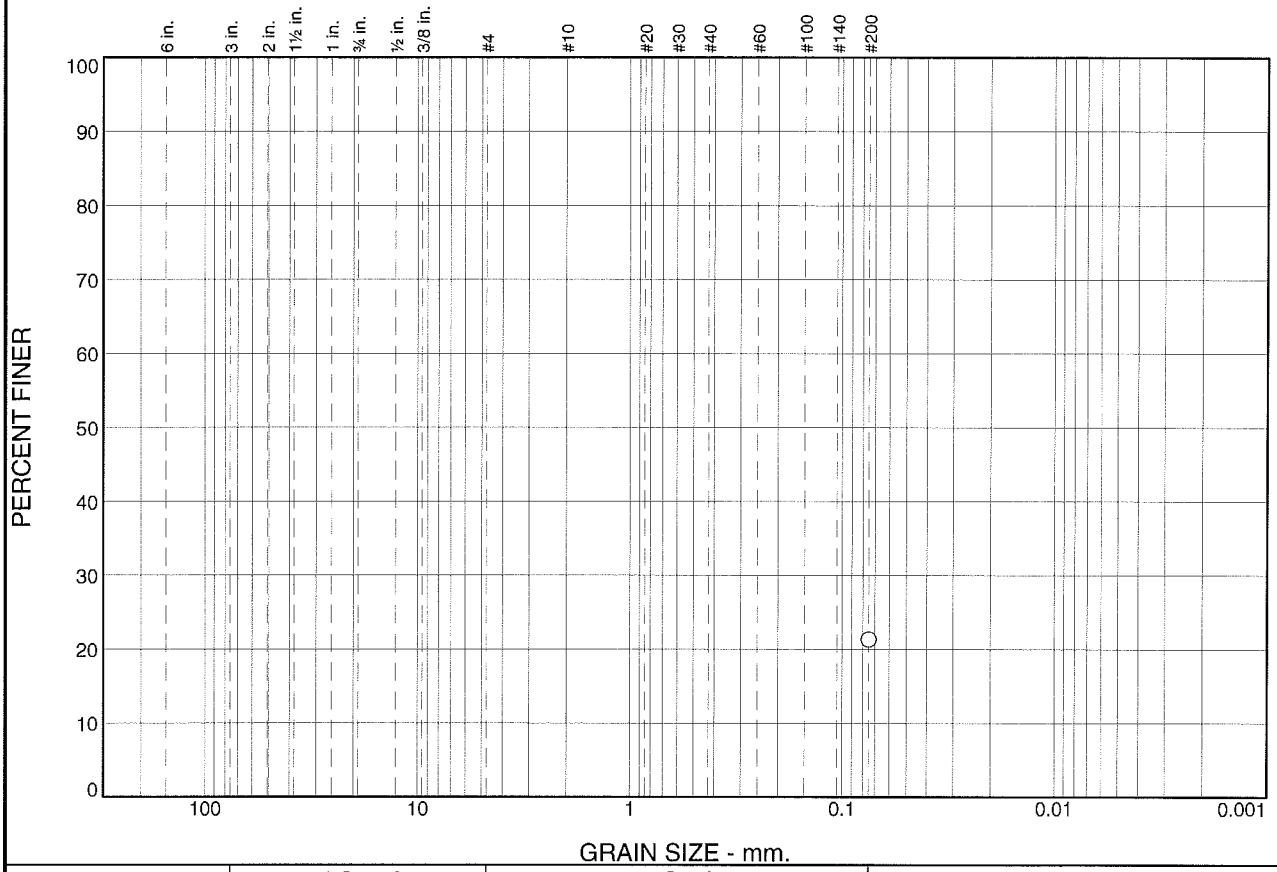
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						21.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	21.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

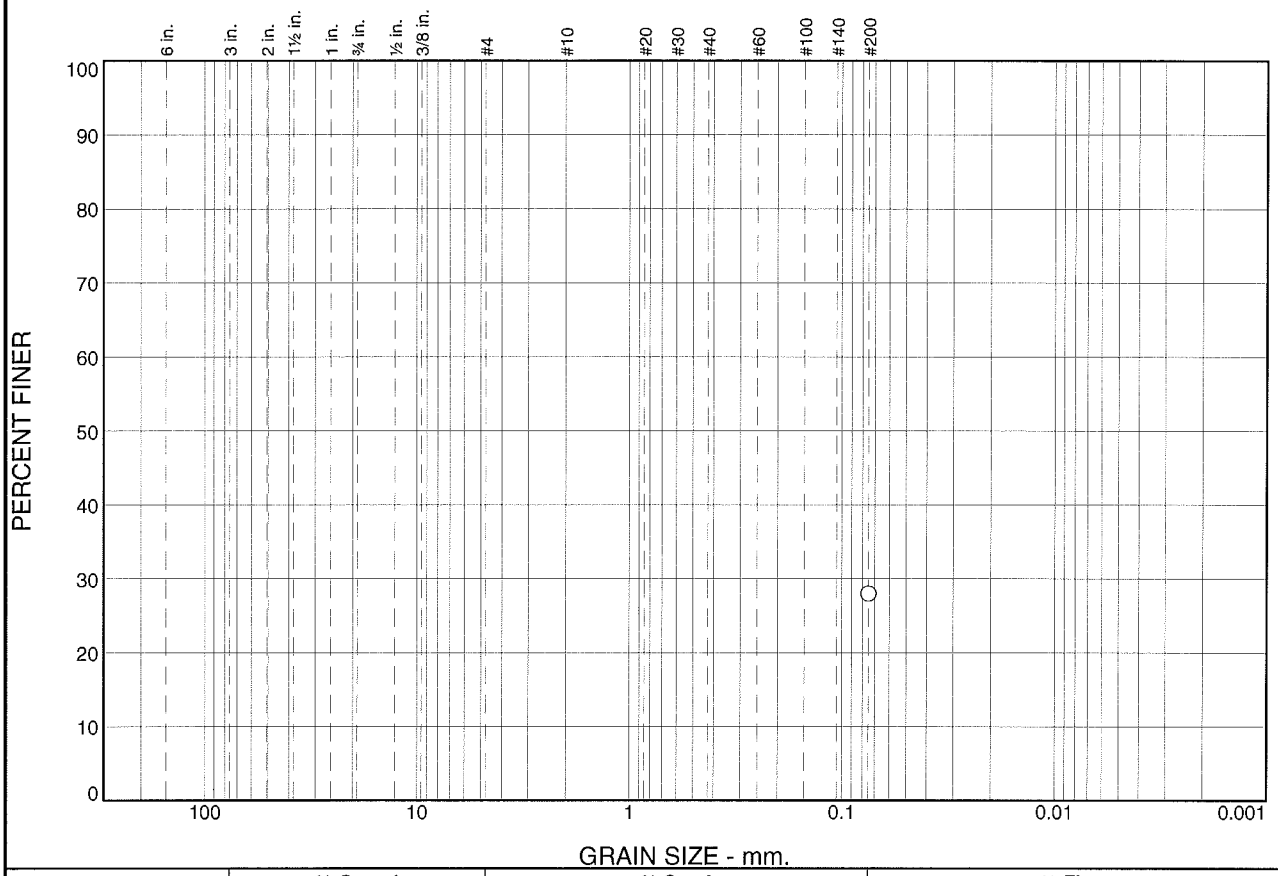
Location: B-26 #5
Sample Number: S32231 **Depth:** 15'3" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						28.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	28.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-26 #6
Sample Number: S32232 **Depth:** 15'9" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-27 #5	15.5	126.2	97.1	30.0

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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GEOTECHNICAL AND MATERIALS TESTING SERVICES

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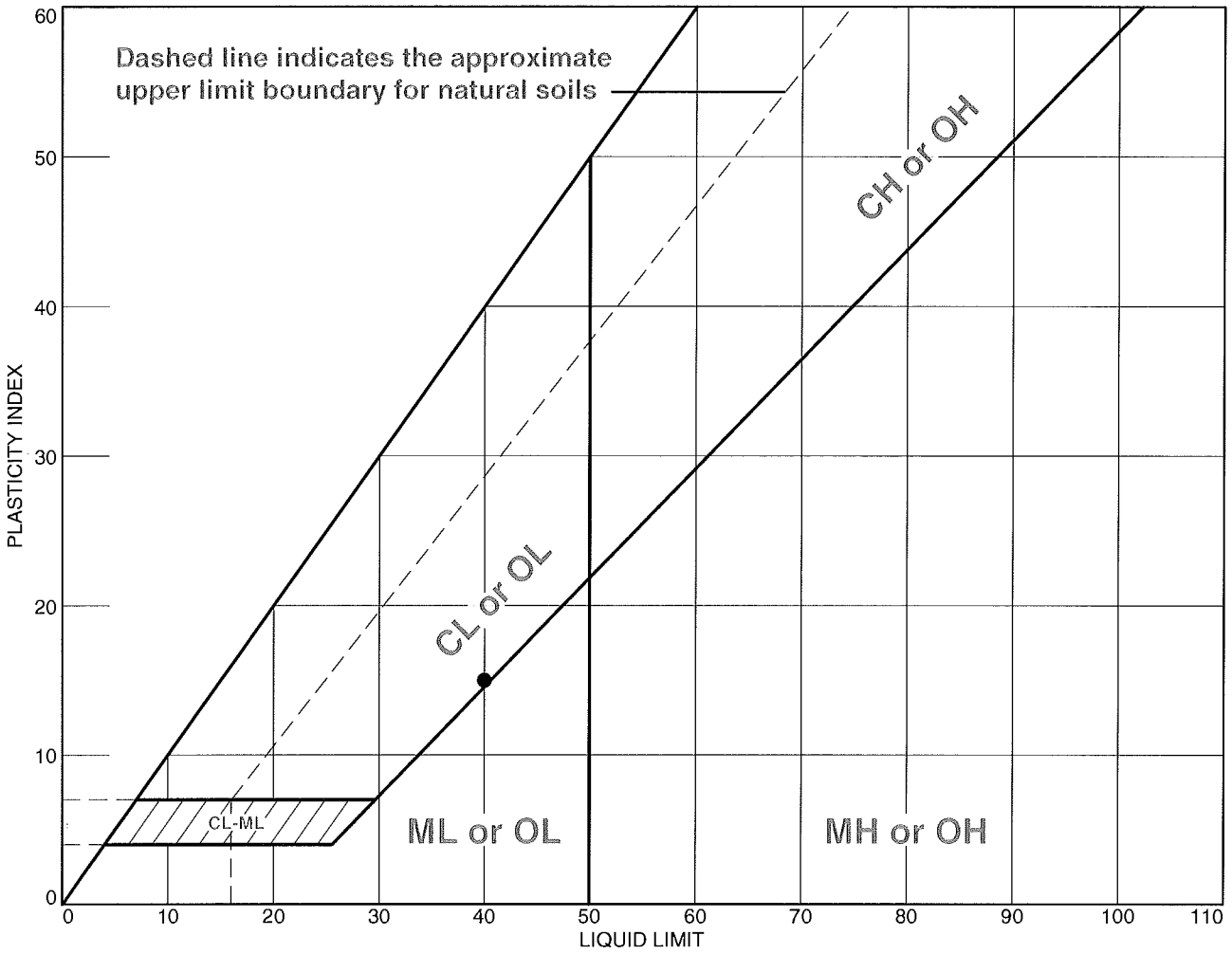
Phone: (916) 939-3460 FAX: (916) 939-3507

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		40	25	15			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-27 #3 **Depth:** 5'4" **Sample Number:** S32234

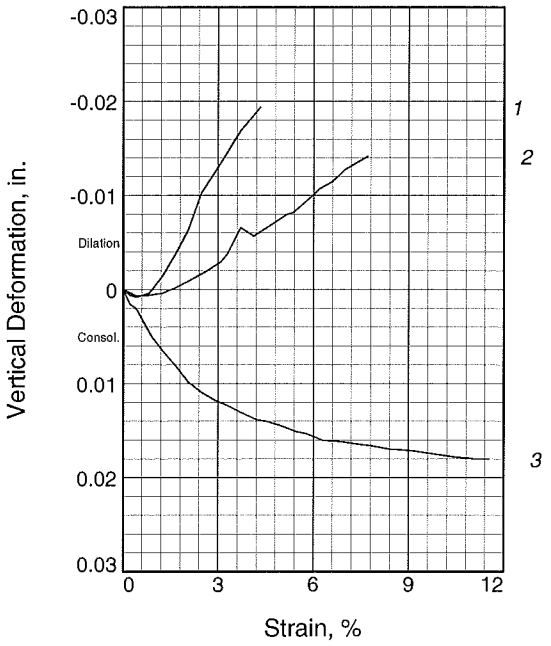
Remarks:

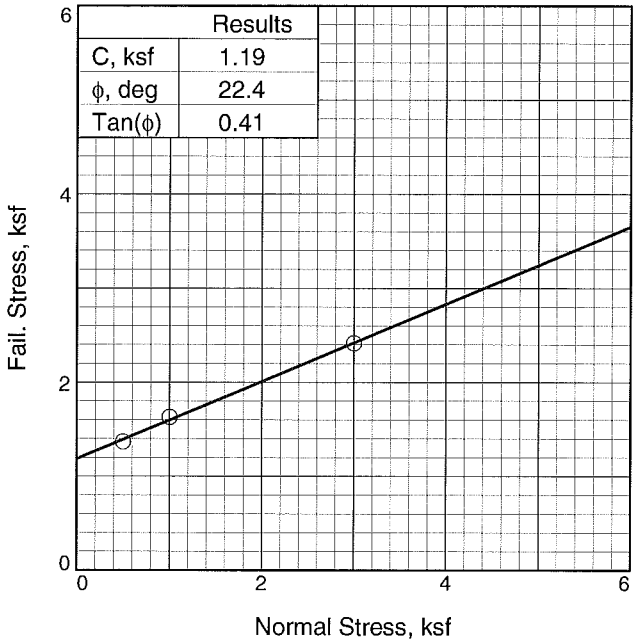
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

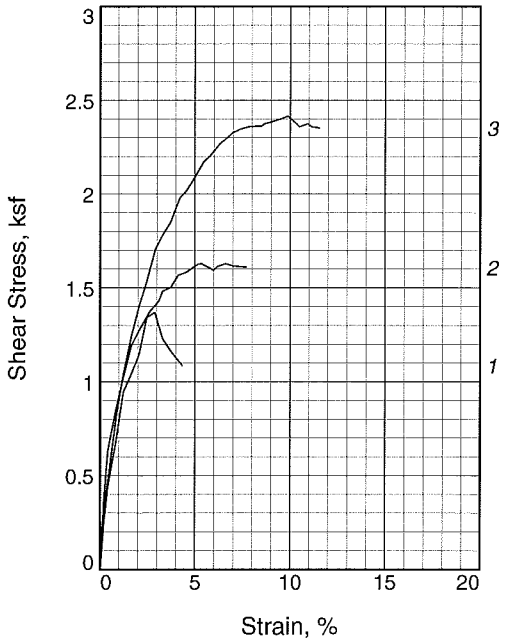
Figure

Tested By: stu **Checked By:** mn





Results	
C, ksf	1.19
ϕ, deg	22.4
Tan(ϕ)	0.41



Sample No.		1	2	3
Initial	Water Content, %	26.3	27.5	24.0
	Dry Density, pcf	95.9	91.8	100.6
	Saturation, %	93.7	88.8	95.8
	Void Ratio	0.7583	0.8354	0.6763
	Diameter, in.	2.43	2.43	2.43
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	27.1	28.9	20.9
	Dry Density, pcf	97.3	94.6	107.8
	Saturation, %	100.0	99.9	99.9
	Void Ratio	0.7323	0.7811	0.5639
	Diameter, in.	2.43	2.43	2.43
	Height, in.	0.99	0.97	0.93
Normal Stress, ksf		0.50	1.00	3.00
Fail. Stress, ksf		1.37	1.63	2.42
Strain, %		2.9	5.3	9.9
Ult. Stress, ksf				
Strain, %				
Strain rate, in./min.		0.03	0.03	0.03

Sample Type: Undisturbed
Description:

LL= 40 **PL=** 25 **PI=** 15
Specific Gravity= 2.70
Remarks:

Figure _____

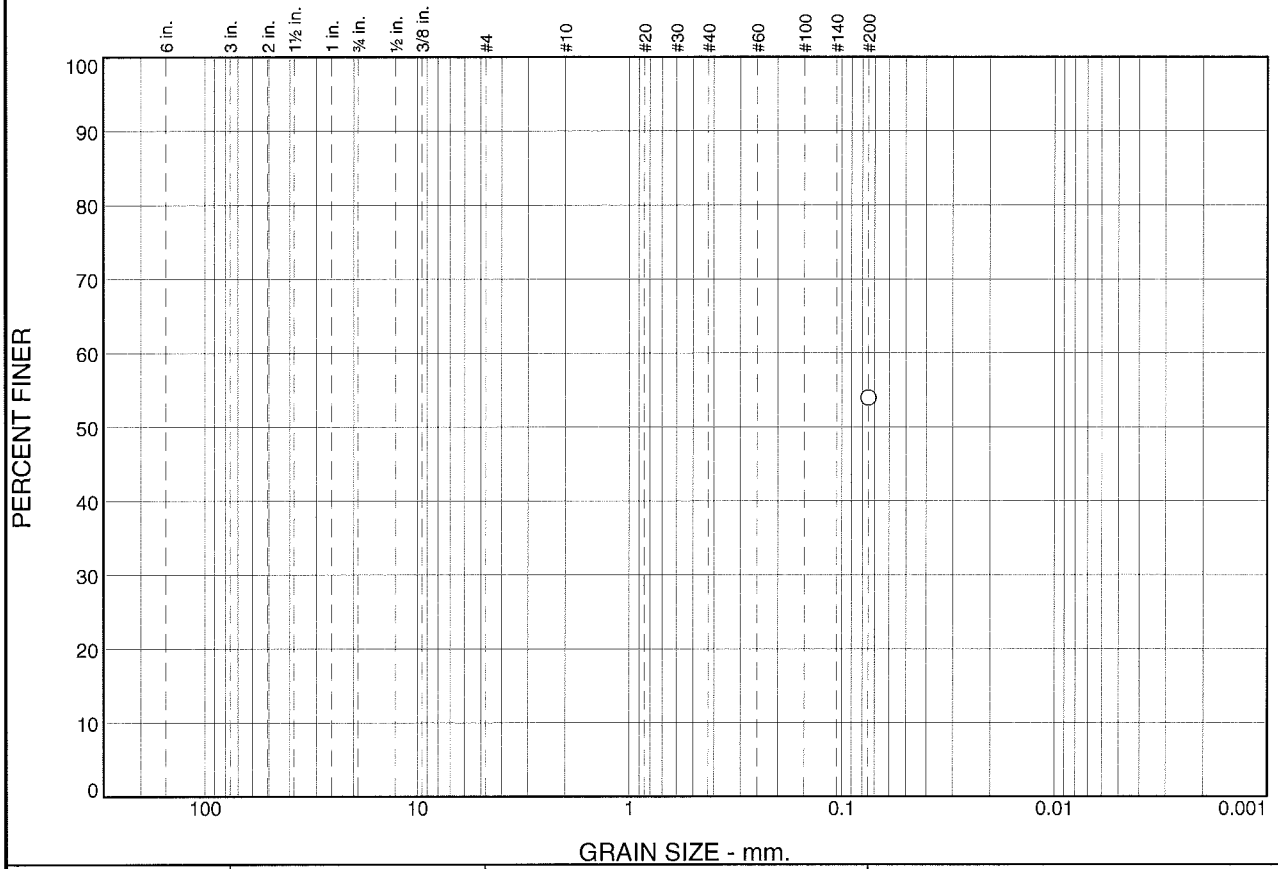
Client: Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-27 #3
Sample Number: S32234 **Depth:** 5'4"
Proj. No.: 11-236 **Date Sampled:**

DIRECT SHEAR TEST REPORT
SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Tested By: mw **Checked By:** mpw

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						54.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	54.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

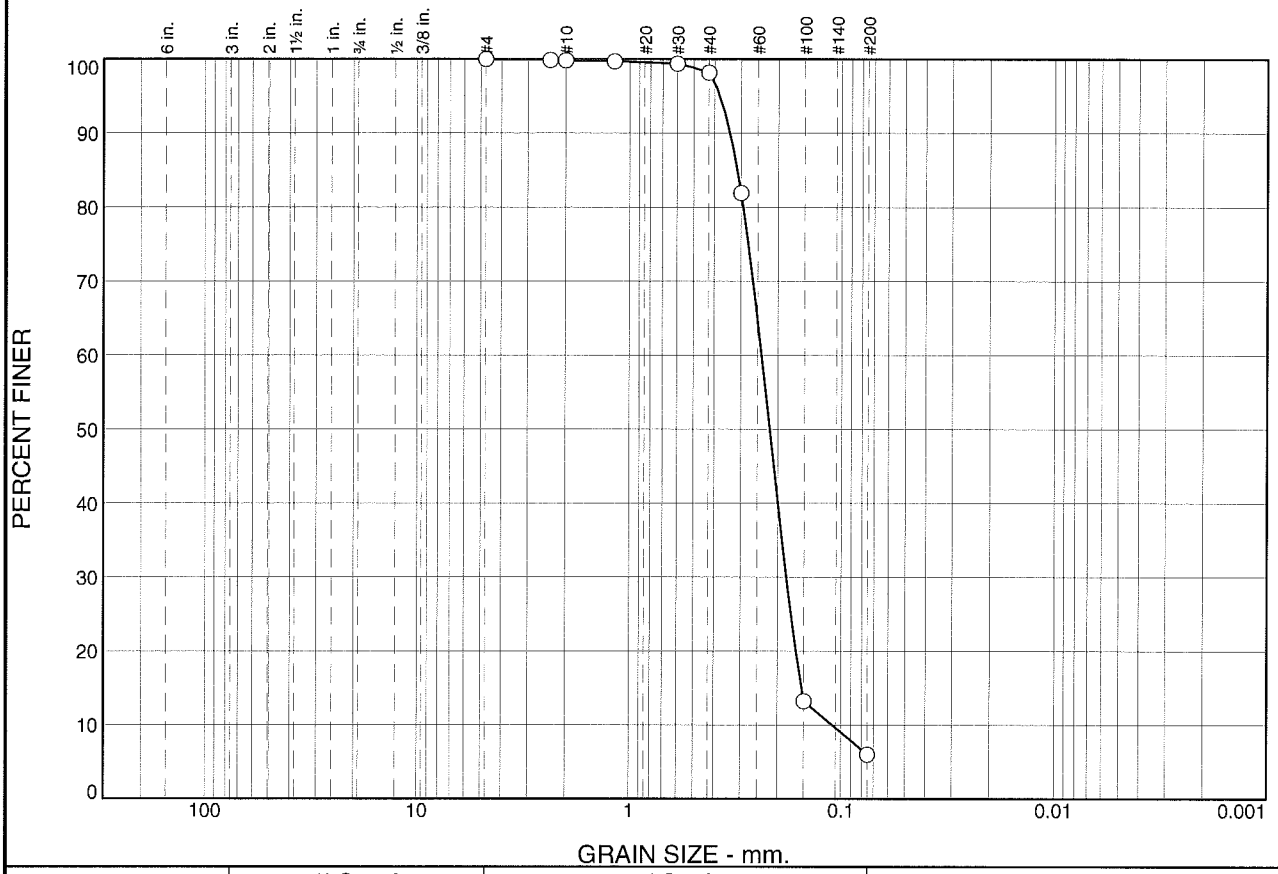
Location: B-27 #5
Sample Number: S32235 **Depth:** 15.5 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	1.6	92.2	6.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#10	99.8		
#16	99.7		
#30	99.4		
#40	98.2		
#50	81.9		
#100	13.2		
#200	6.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3385 D_{85}= 0.3126 D_{60}= 0.2393
D_{50}= 0.2188 D_{30}= 0.1821 D_{15}= 0.1538
D_{10}= 0.1099 C_u= 2.18 C_c= 1.26

Classification

USCS= AASHTO=

Remarks

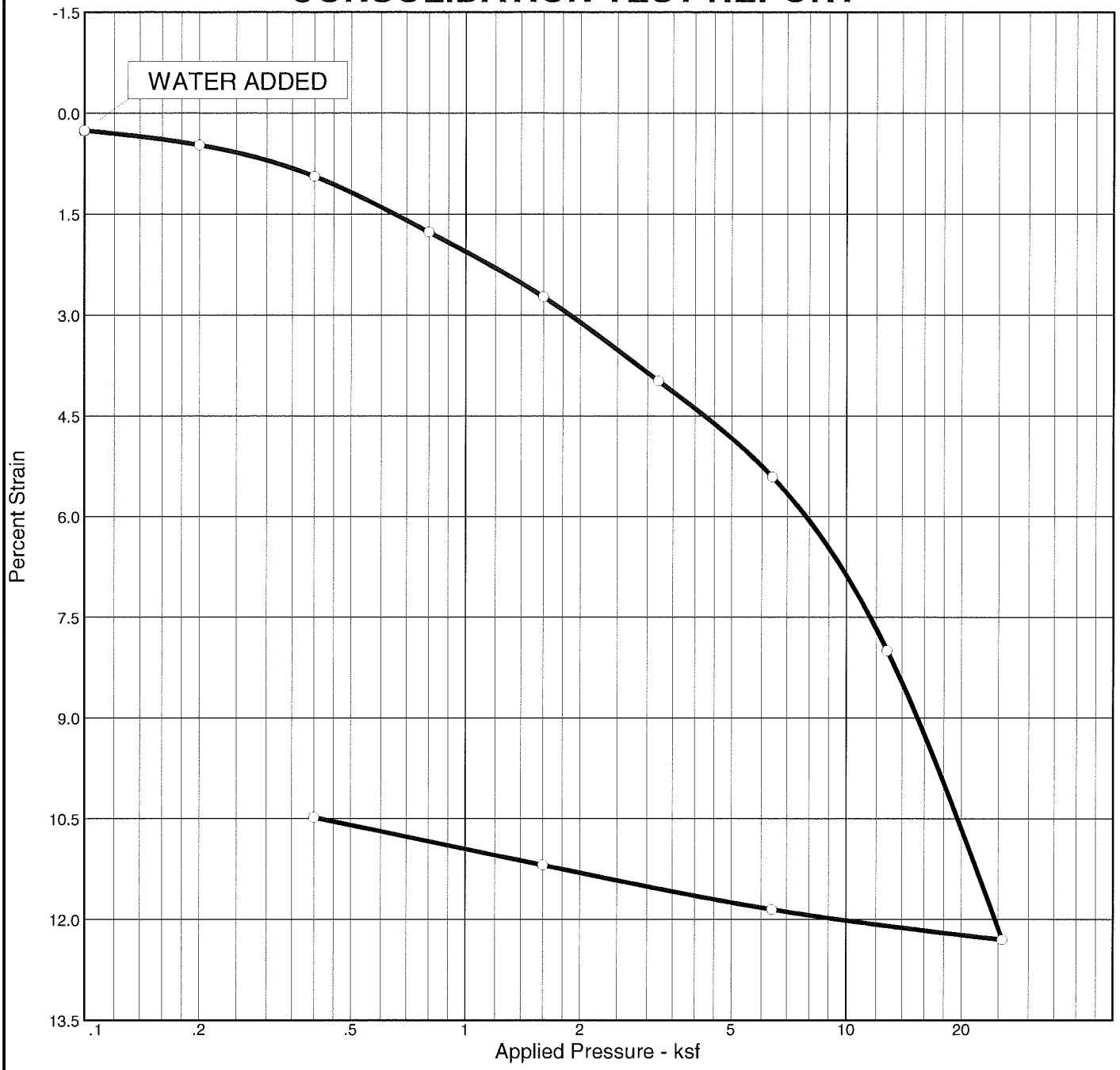
Location: B-27 #7
Sample Number: S32236 **Depth:** 20.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens.	LL	PI	Sp.	Overburden	P_c	C_c	C_s	Swell Press.	Swell	e_o
Sat.	Moist.	(pcf)			Gr.	(ksf)	(ksf)			(ksf)	%	
98.7 %	31.5 %	90.6			2.70		5.23	0.27	0.02	0.11		0.860

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-27 #10

Remarks:

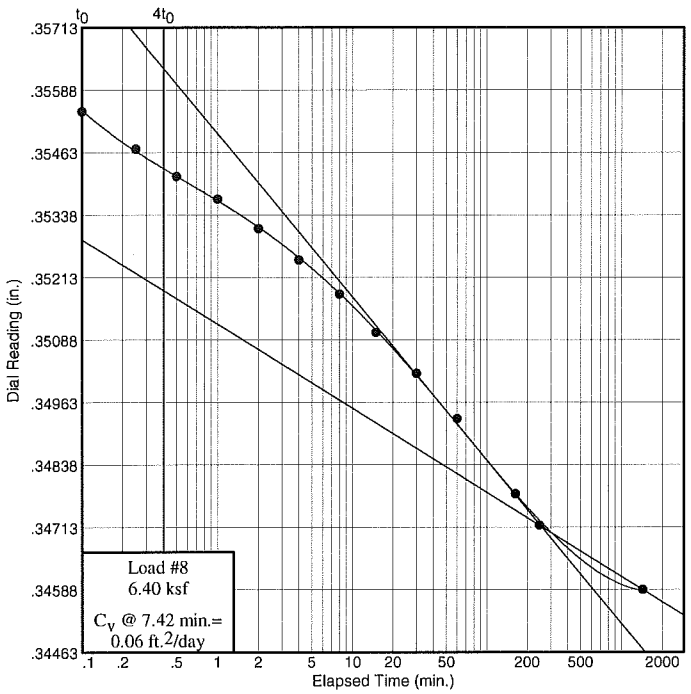
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-27 #10



SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-28 #1	0			13.3
B-28 #3	5'4"	120.6	90.8	32.9
B-28 #5	15	124.8	96.9	28.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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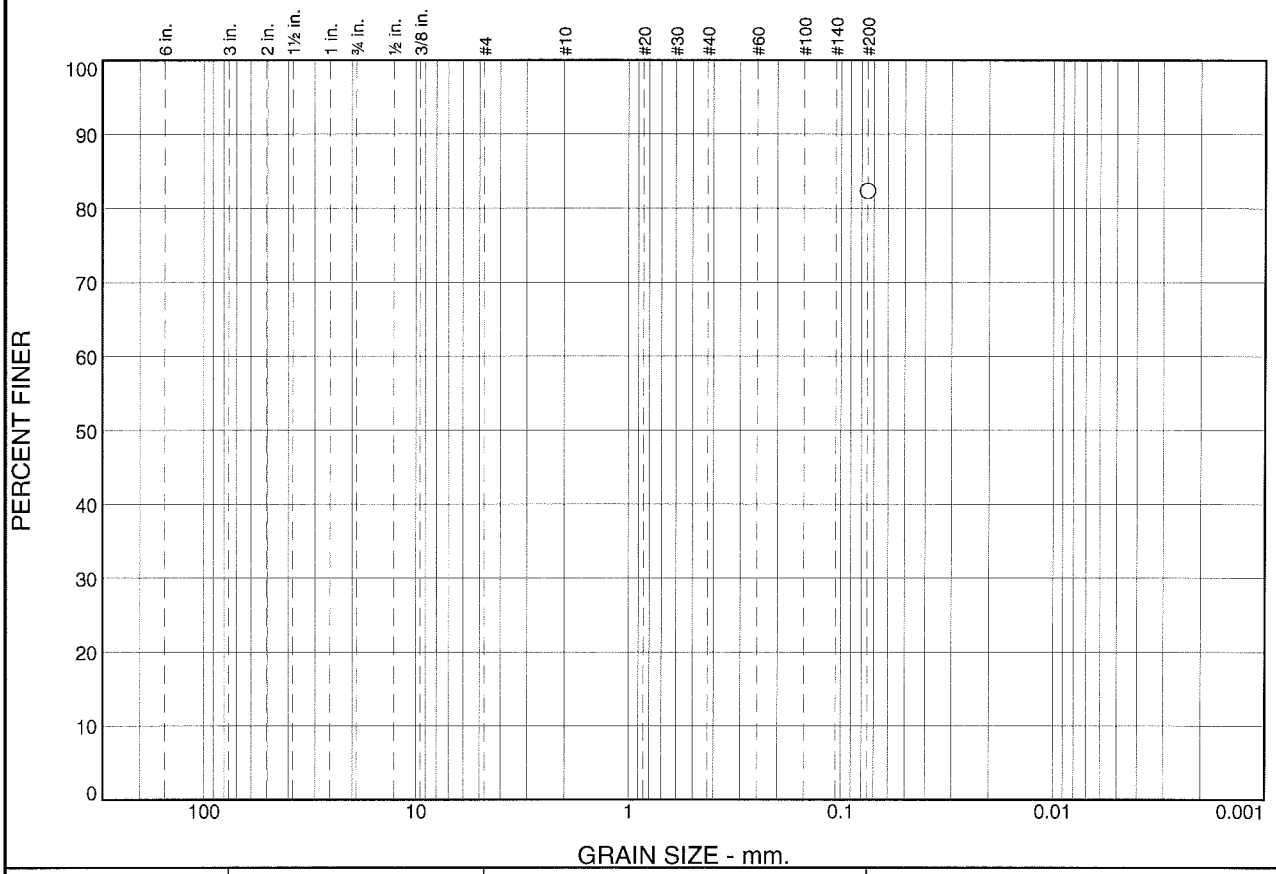
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

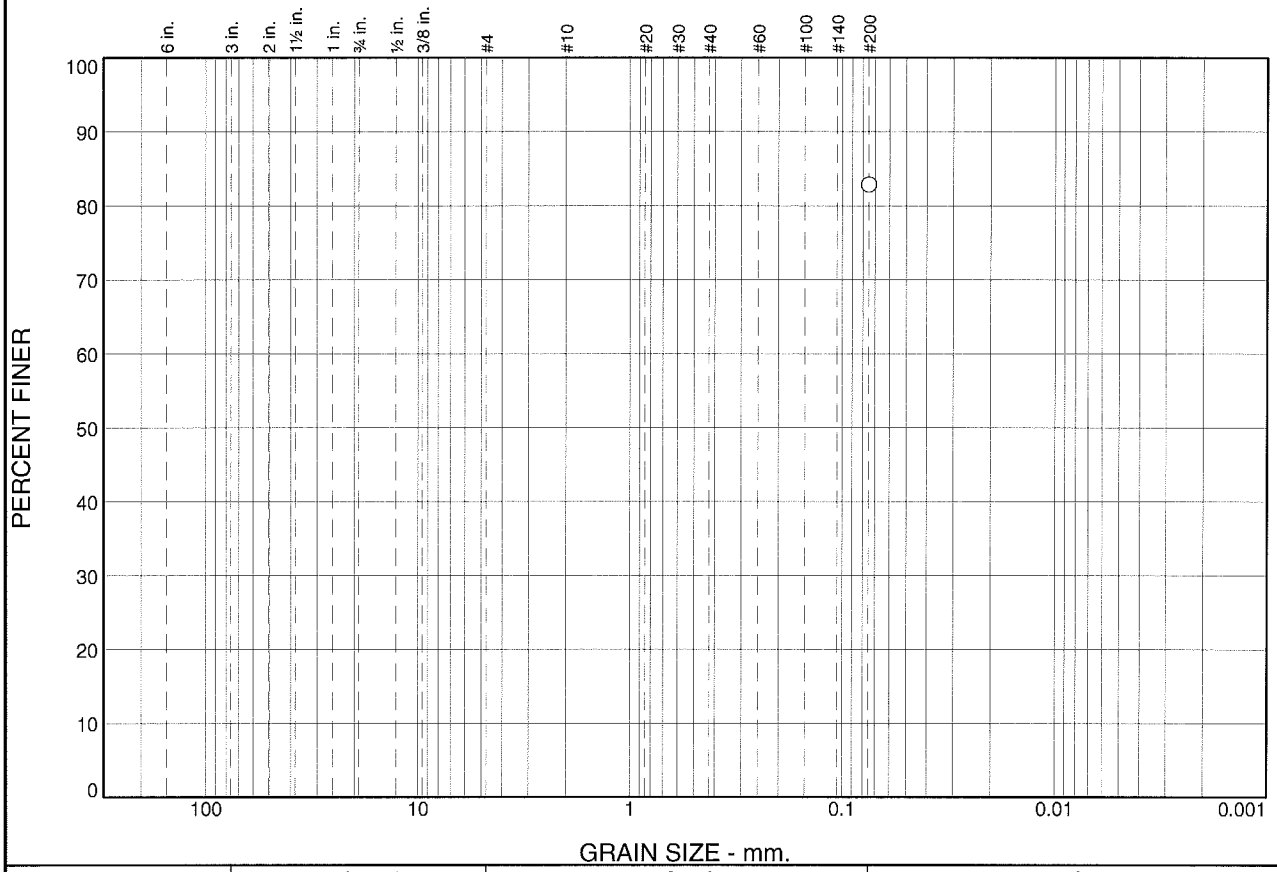
Location: B-28 #4
Sample Number: S32240 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

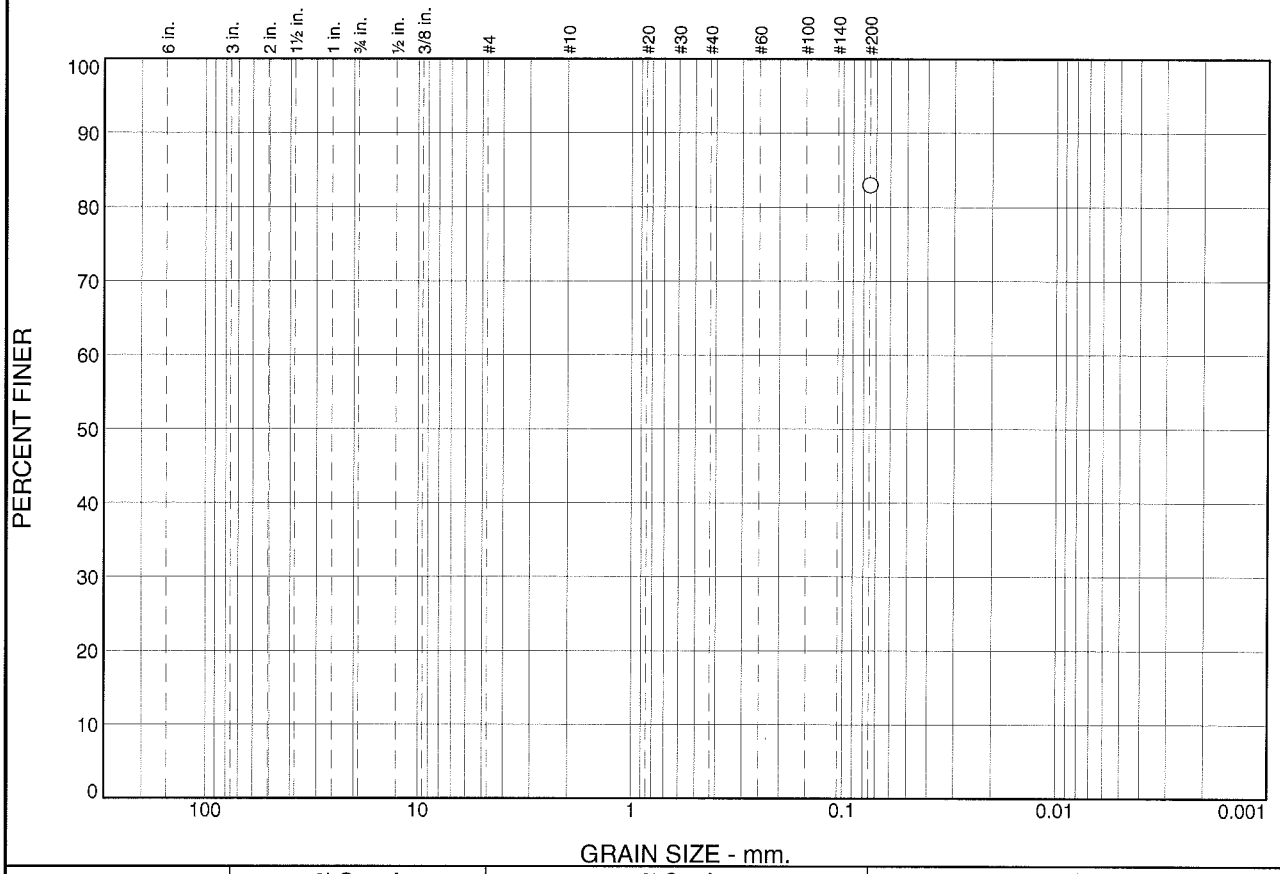
Location: B-28 #8
Sample Number: S32242 **Depth:** 25'3" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						83.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	83.0		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-28 #10
Sample Number: S32243 **Depth:** 30.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-29 #8	25.5	115.4	86.6	33.3

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

10-066.00

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

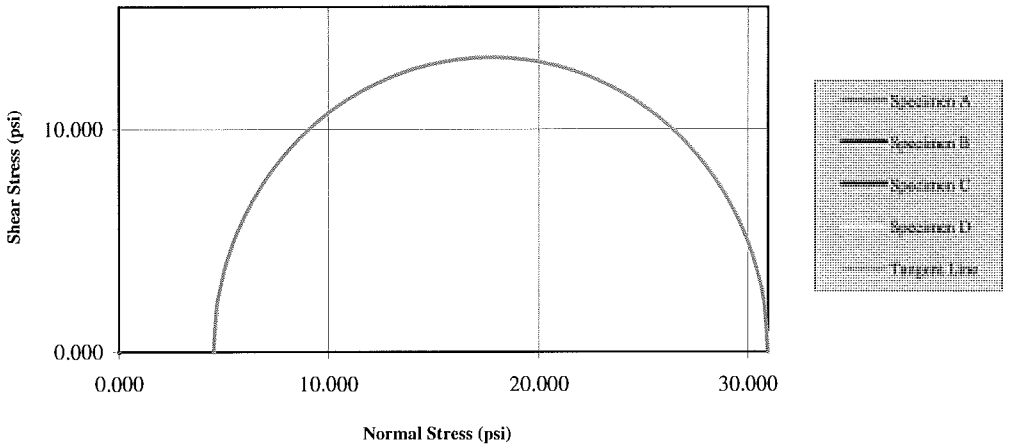
Date: 09/14/11

Checked By: MN

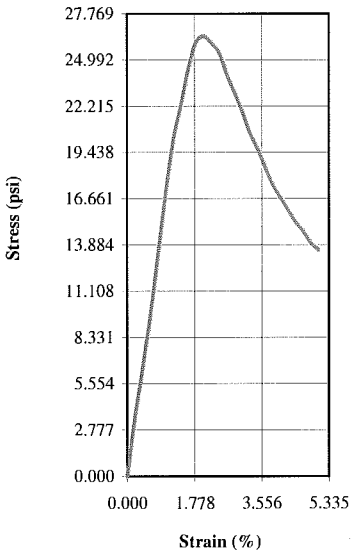
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

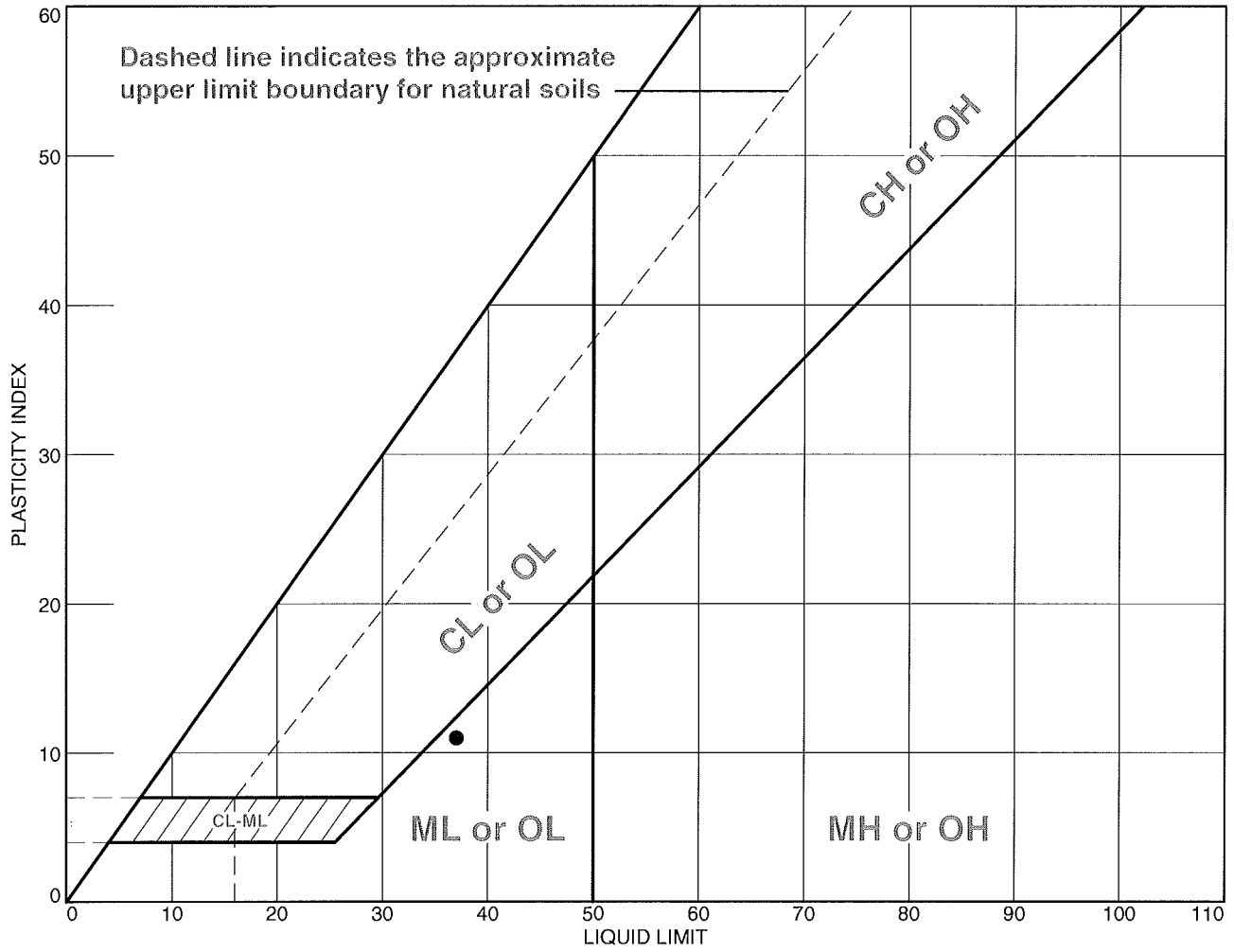


Before Test	Specimen A	B	C	D
Water Content (%)	26.50	0.00	0.00	0.00
Dry Density (pcf)	94.85	0.00	0.00	0.00
Saturation (%)	94.37	0.00	0.00	0.00
Void Ratio	0.74	0.00	0.00	0.00
Diameter (in)	2.390	0.000	0.000	0.000
Height (in)	5.010	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	26.82	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	26.446	0.000	0.000	0.000
Axial Strain @ Failure (%)	2.032	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.5	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	31.0	0.0	0.0	0.0
σ3 (psi)	4.5	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	13.2	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-29, #3 @ 5'8"
Client:	SAGE	Sample Number:	S32244
Remarks:			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		37	26	11		56.4	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-29 #4 **Depth:** 10.0 **Sample Number:** S32245

Remarks:

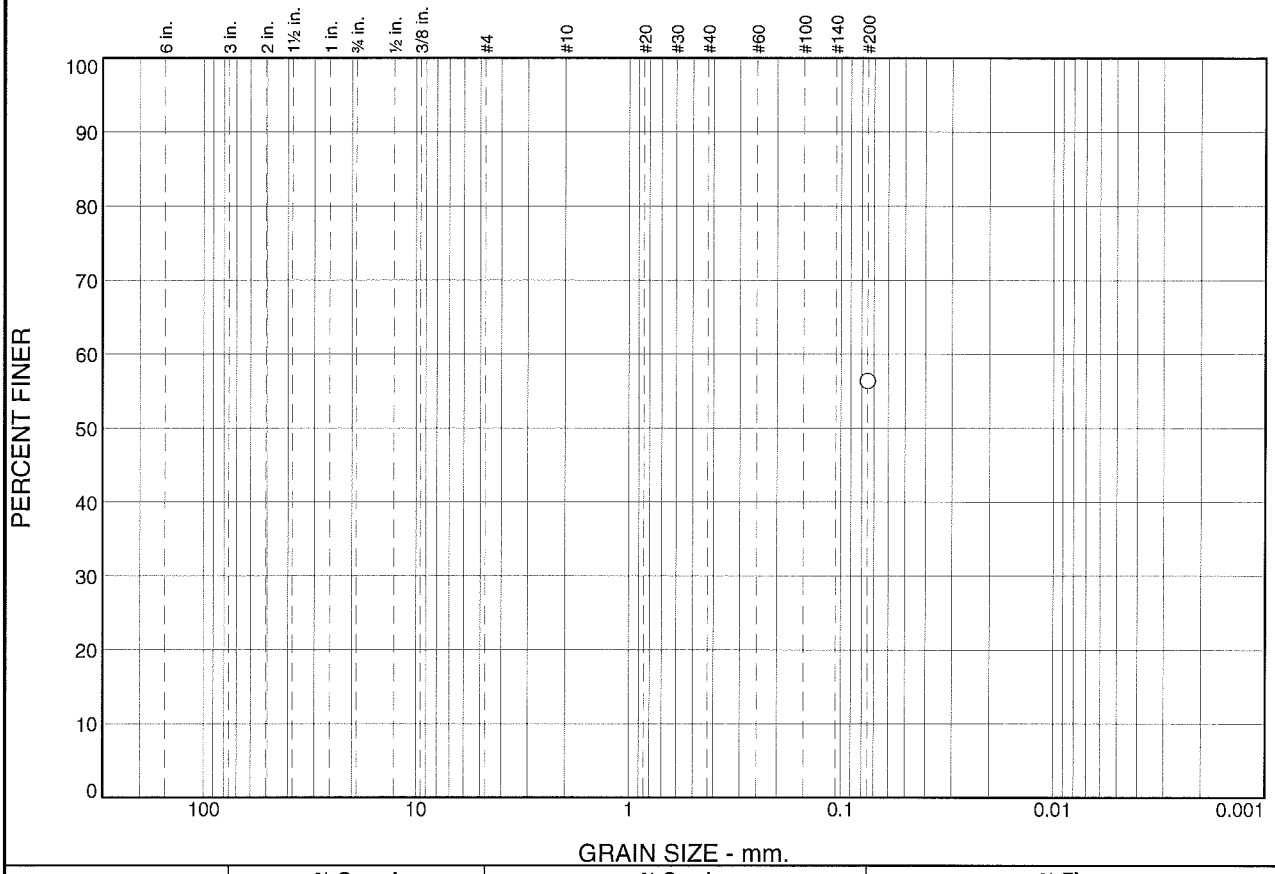
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	56.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= 26 LL= 37 PI= 11

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-29 #4
Sample Number: S32245 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

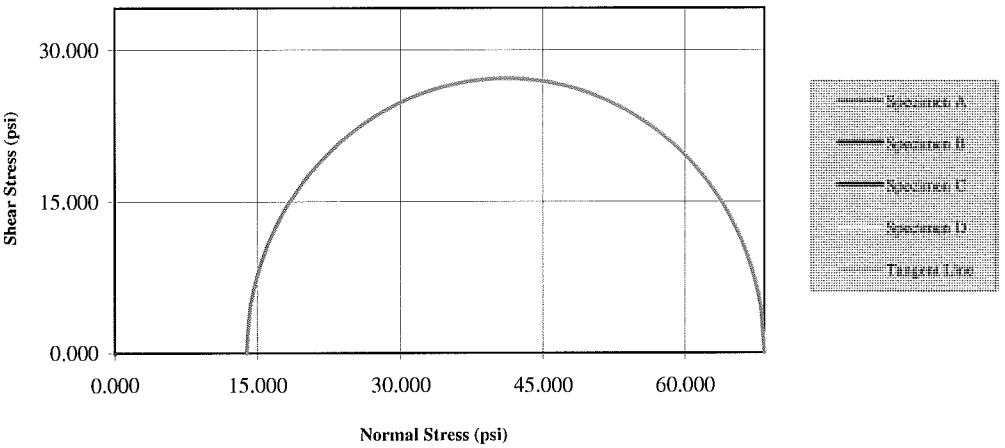
Date: 09/14/11

Checked By: MN

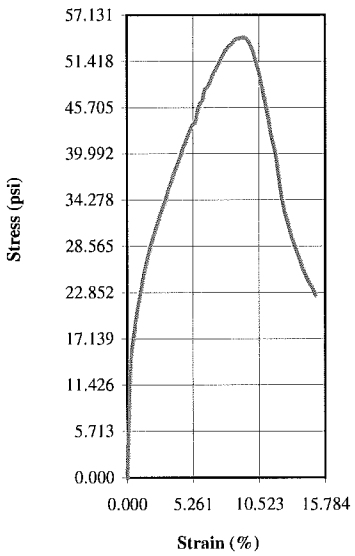
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve



Before Test	Specimen A	B	C	D
Water Content (%)	16.20	0.00	0.00	0.00
Dry Density (pcf)	115.49	0.00	0.00	0.00
Saturation (%)	99.27	0.00	0.00	0.00
Void Ratio	0.43	0.00	0.00	0.00
Diameter (in)	2.360	0.000	0.000	0.000
Height (in)	5.230	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	16.09	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	54.410	0.000	0.000	0.000
Axial Strain @ Failure (%)	9.344	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	13.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	68.3	0.0	0.0	0.0
σ3 (psi)	13.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	27.2	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-29, #6 @ 15'11"
Client:	SAGE	Sample Number:	S32246
Remarks:			

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-30 #5	15			29.4
B-30 #8	25.5	116.4	92.7	25.6

Note: Sample B-30 #8 - Catcher grooves

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

SIERRA TESTING LABORATORIES, INC.
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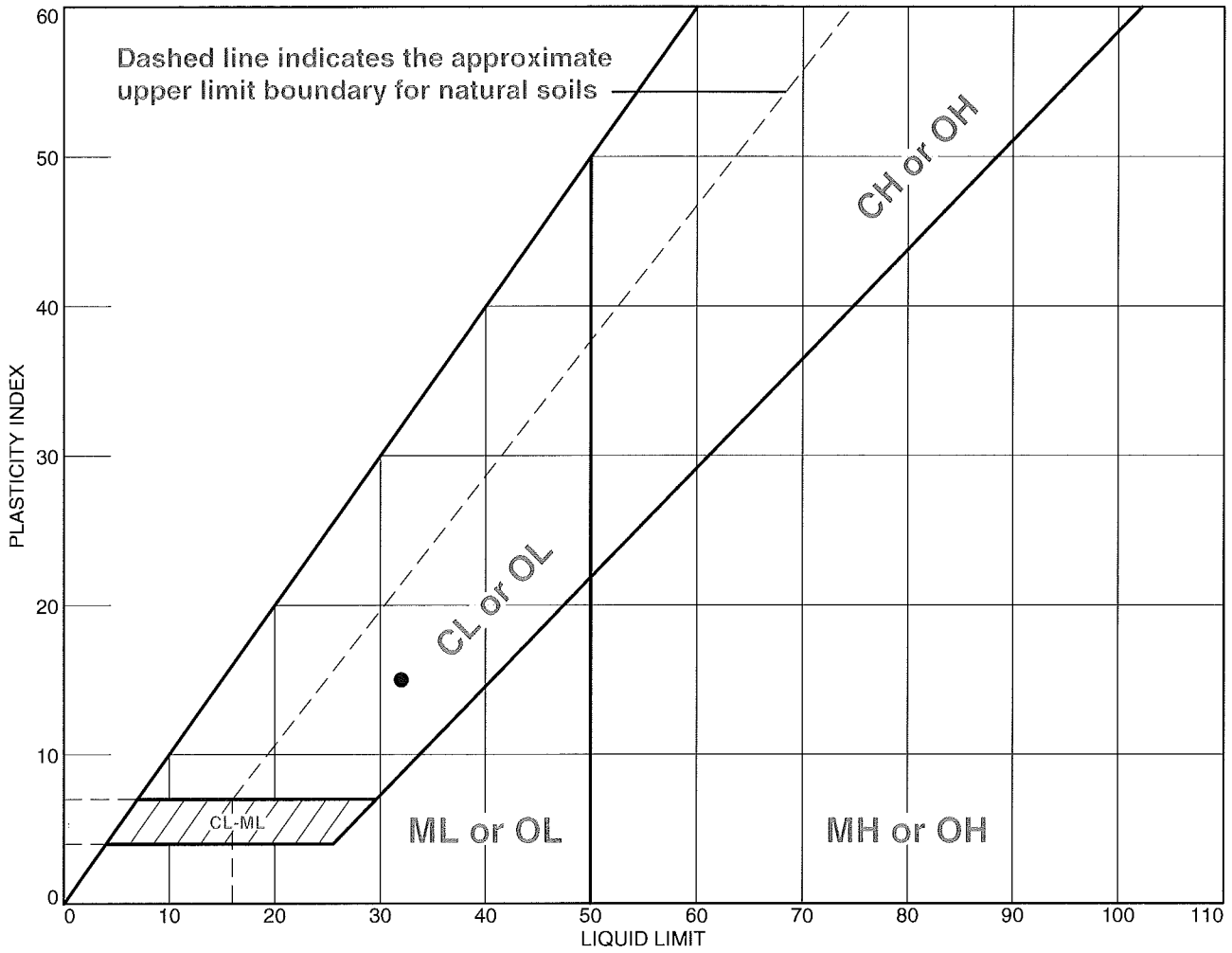
Phone: (916) 939-3460 FAX: (916) 939-3507

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	sandy lean clay	32	17	15	85.8	60.4	CL

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-30 #1 **Depth:** 0 **Sample Number:** S32248

Remarks:

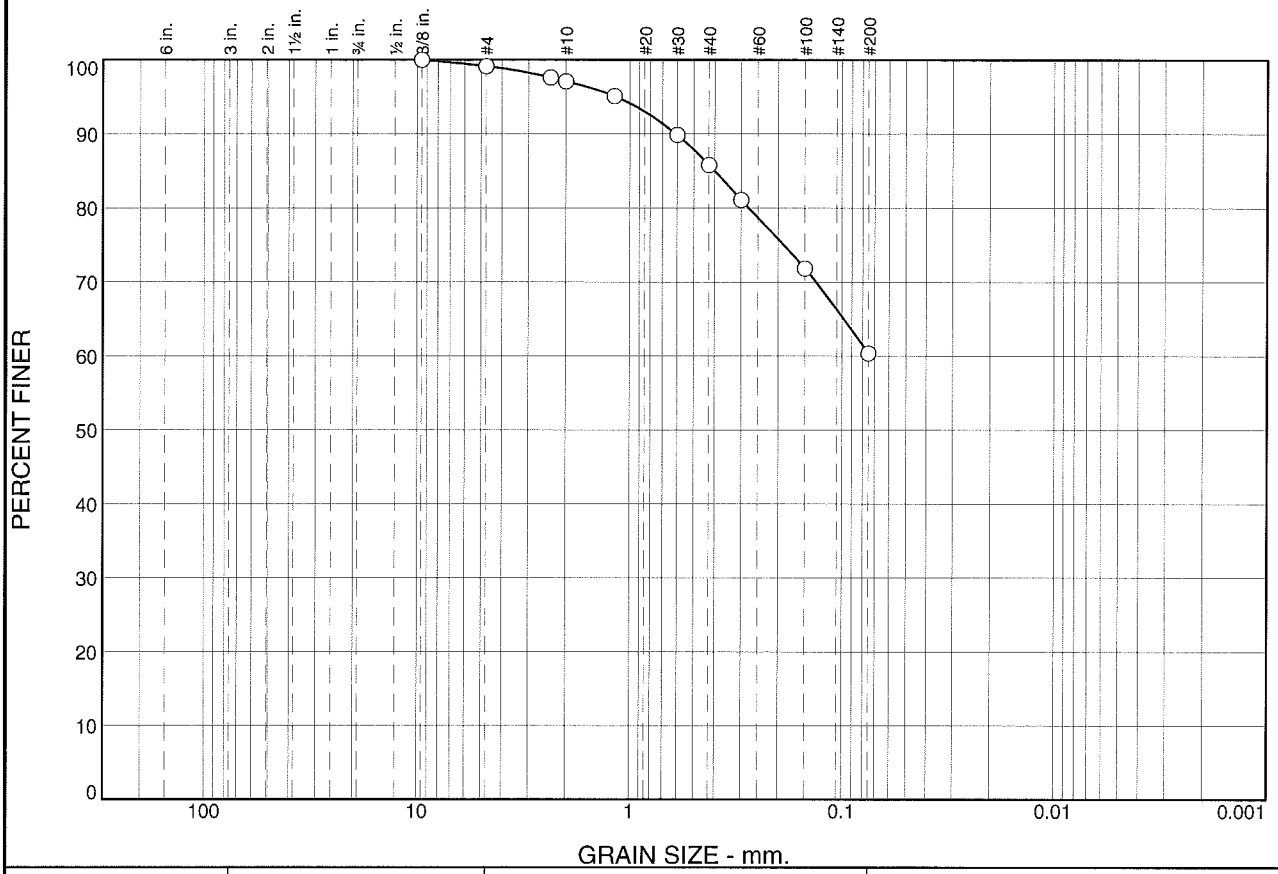
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.8	2.1	11.3	25.4	60.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 Inch	100.0		
#4	99.2		
#8	97.6		
#10	97.1		
#16	95.1		
#30	89.9		
#40	85.8		
#50	81.1		
#100	71.8		
#200	60.4		

* (no specification provided)

Material Description

sandy lean clay

Atterberg Limits

PL= 17 LL= 32 PI= 15

Coefficients

D_{90}= 0.6069 D_{85}= 0.3990 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

friable particles

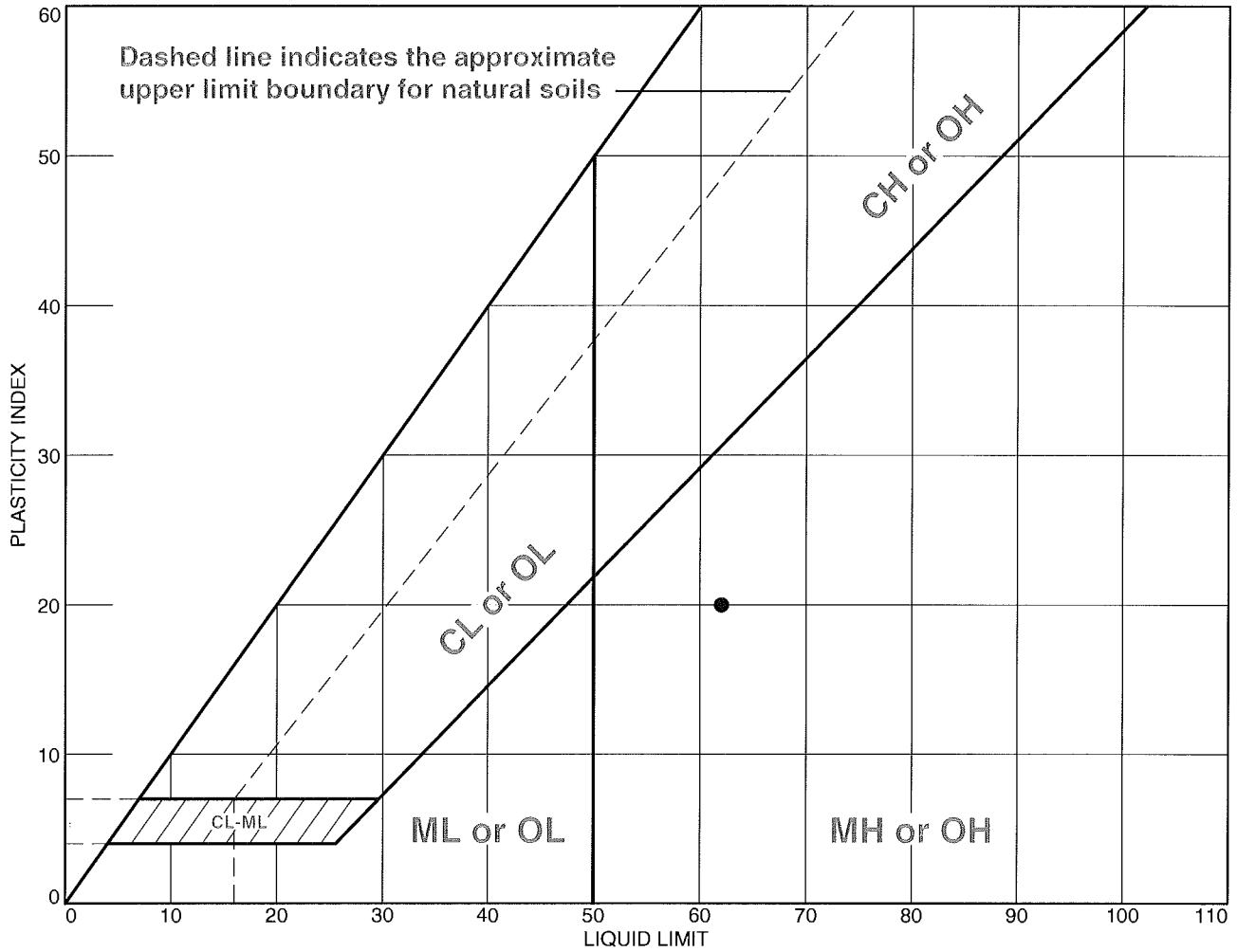
Location: B-30 #1
Sample Number: S32248 **Depth:** 0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		62	42	20			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-30 #4 **Depth:** 11.5 **Sample Number:** S32249

Remarks:

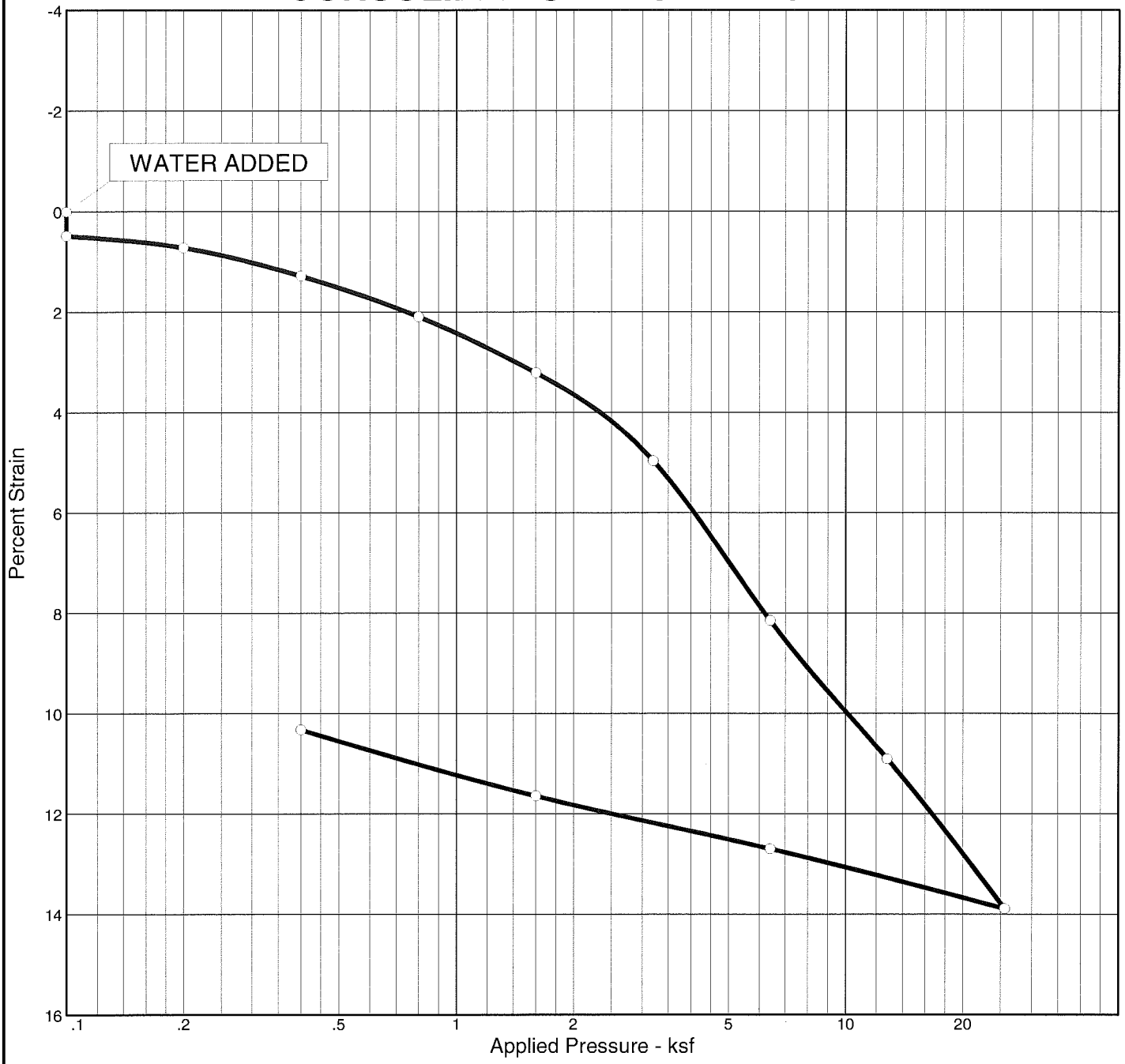
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
91.0 %	31.7 %	86.9	62	20	2.70		1.61	0.19	0.04		0.5	0.939

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-30 #4

Remarks:

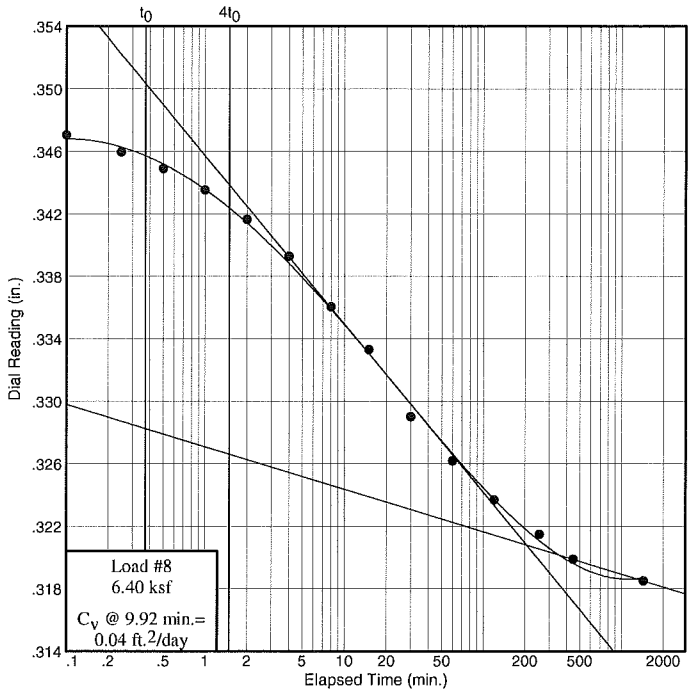
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-30 #4



SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-31 #3	5'9"	117.6	90.1	30.6

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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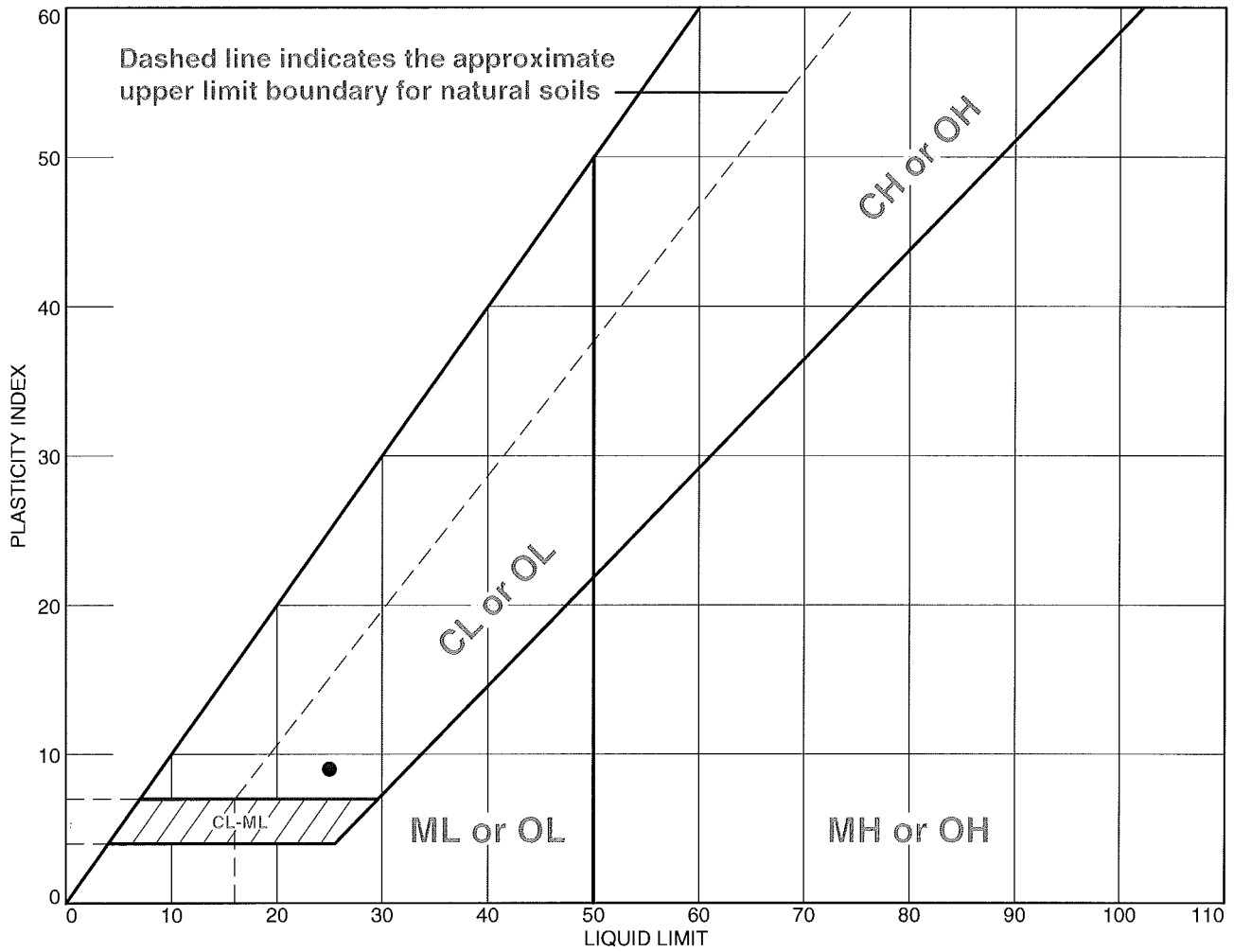
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	sandy lean clay	25	16	9	95.0	60.6	CL

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-31 #5 **Depth:** 15.0 **Sample Number:** S32253

Remarks:

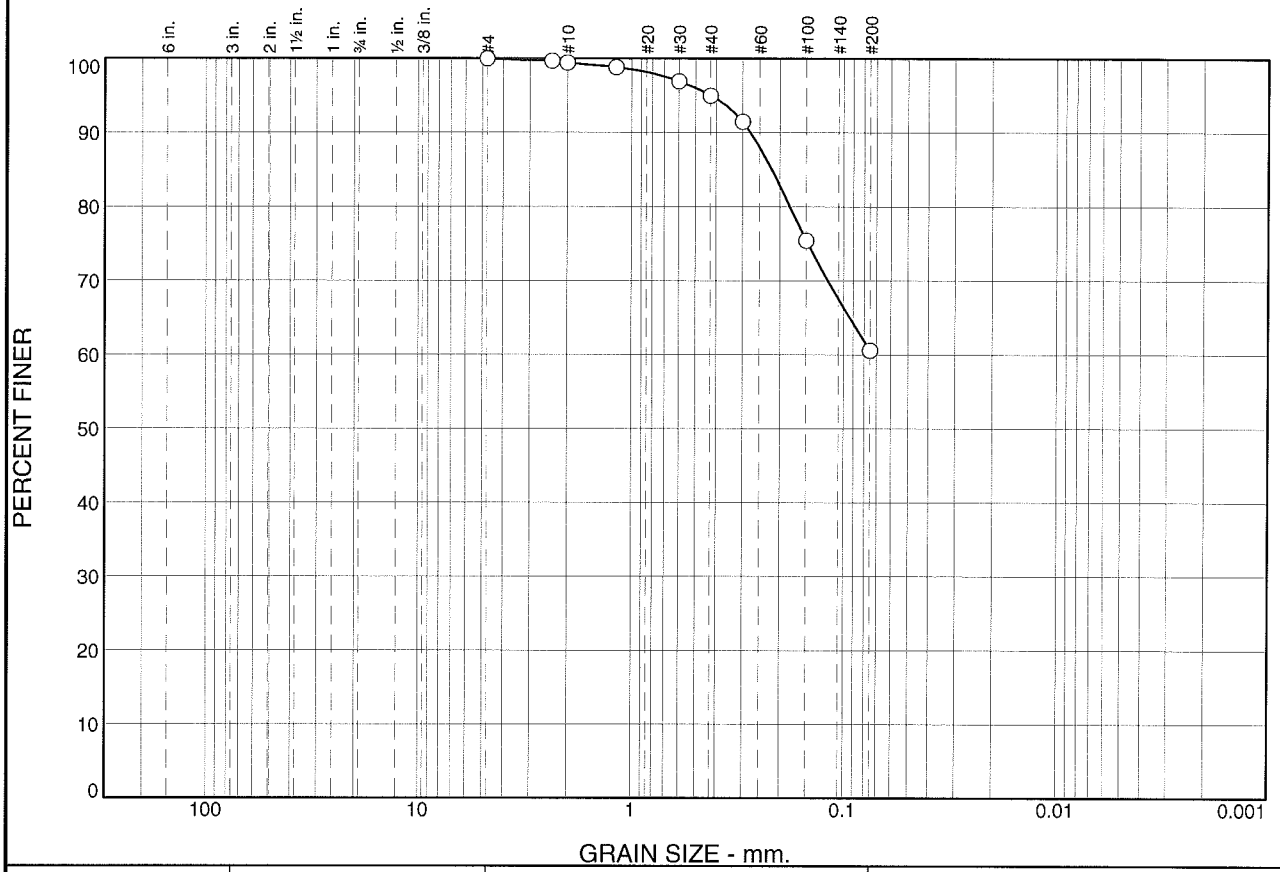
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	4.5	34.4	60.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.7		
#10	99.5		
#16	98.9		
#30	96.9		
#40	95.0		
#50	91.5		
#100	75.4		
#200	60.6		

* (no specification provided)

Material Description

sandy lean clay

Atterberg Limits

PL= 16 LL= 25 PI= 9

Coefficients

D_{90}= 0.2752 D_{85}= 0.2187 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(3)

Remarks

Location: B-31 #5
Sample Number: S32253 **Depth:** 15.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-31 #6 | Sample Depth, ft.: 15.5 | Lab No.: S32254

Visual Description: N/A | Sample Type:

Remarks:

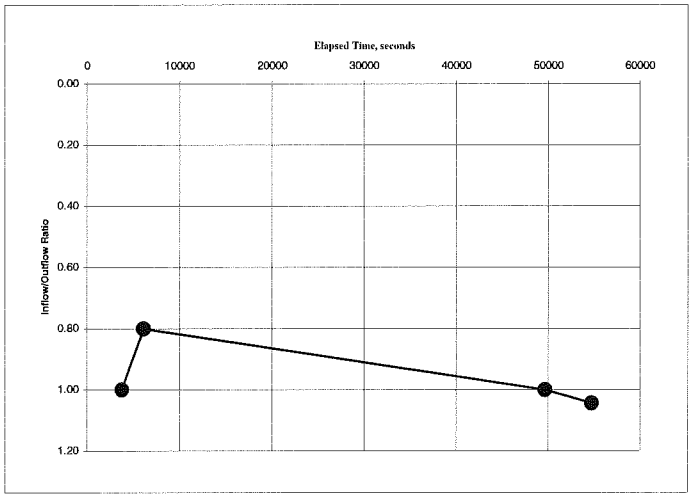
TEST RESULTS

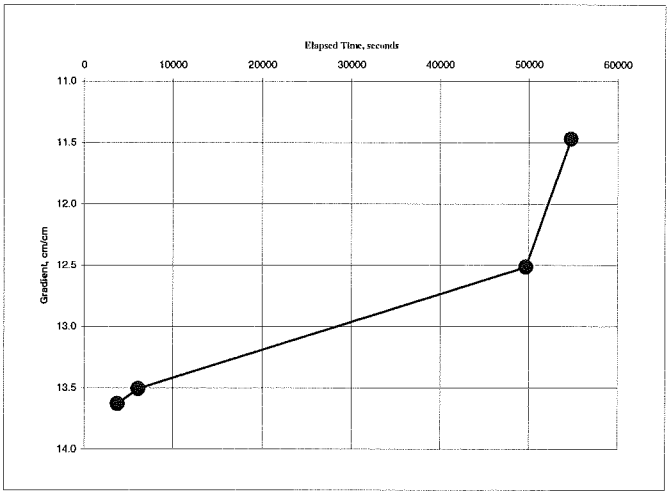
Permeability, cm/sec.: 1.30E-07 | **Average Hydraulic Gradient: 12.8**

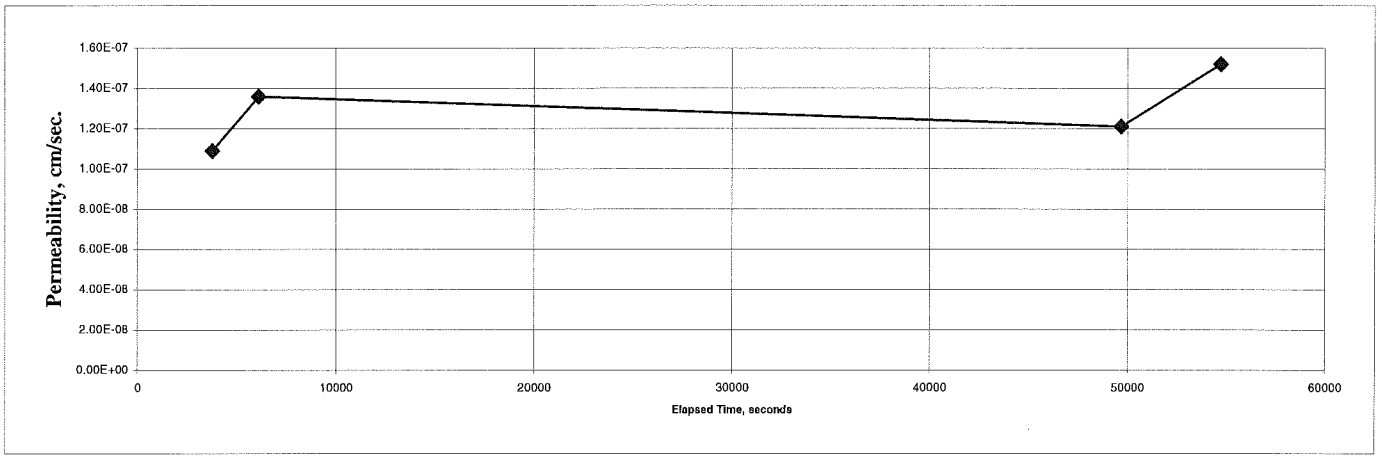
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.62	Specimen Height, cm:	7.62
Specimen Diameter, cm:	6.10	Specimen Diameter, cm:	6.10
Dry Unit Weight, pcf:	111.2	Dry Unit Weight, pcf:	108.4
Moisture Content, %	18.6	Moisture Content, %	21.8
Specific Gravity, Assumed	2.70		
Percent Saturation:	96.7		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-32 #1	0			24.2
B-32 #4	10			29.5
B-32 #6	15'5"	118.0	87.9	34.2

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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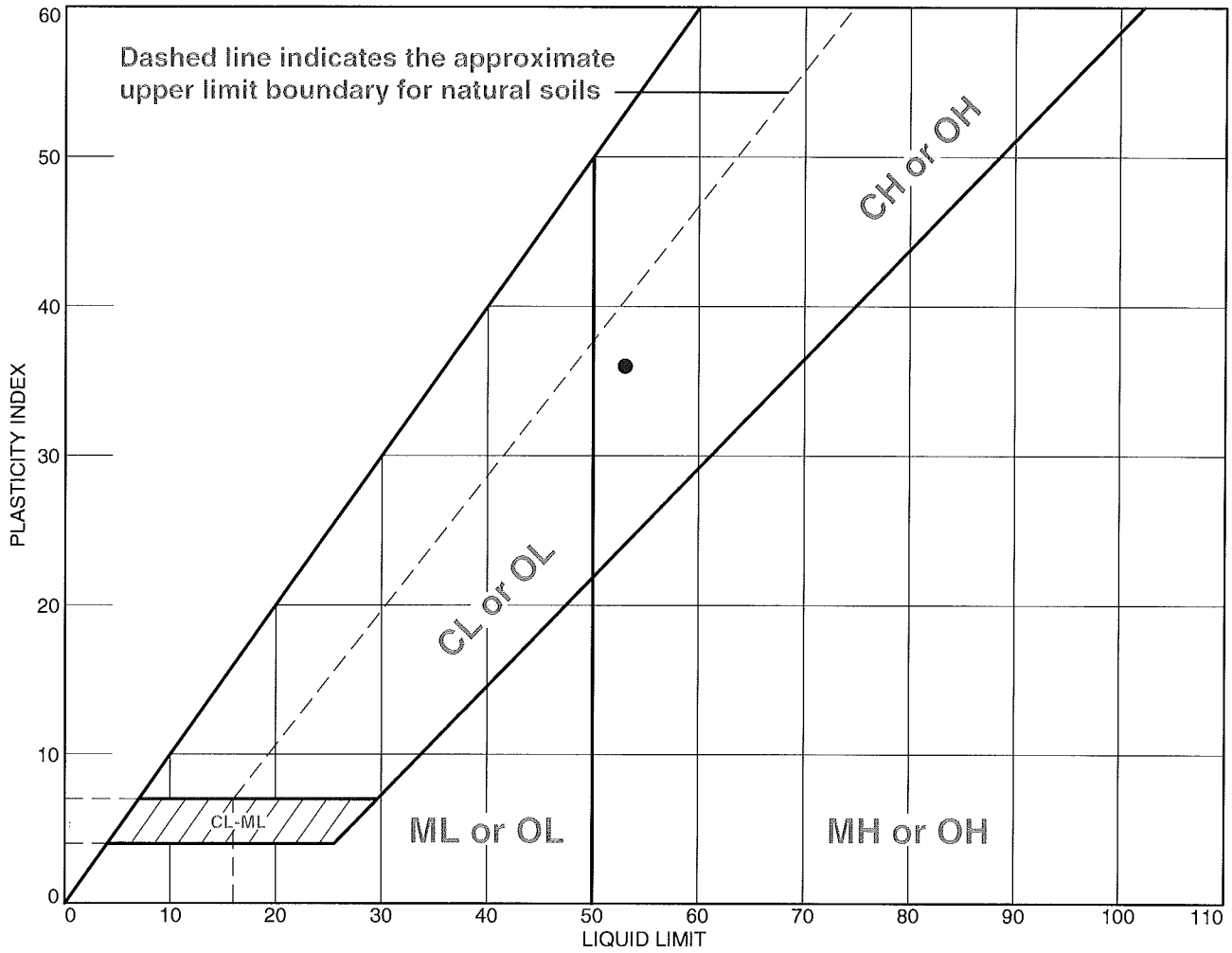
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		53	17	36			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-32 #2 **Depth:** 5.5 **Sample Number:** S32256

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

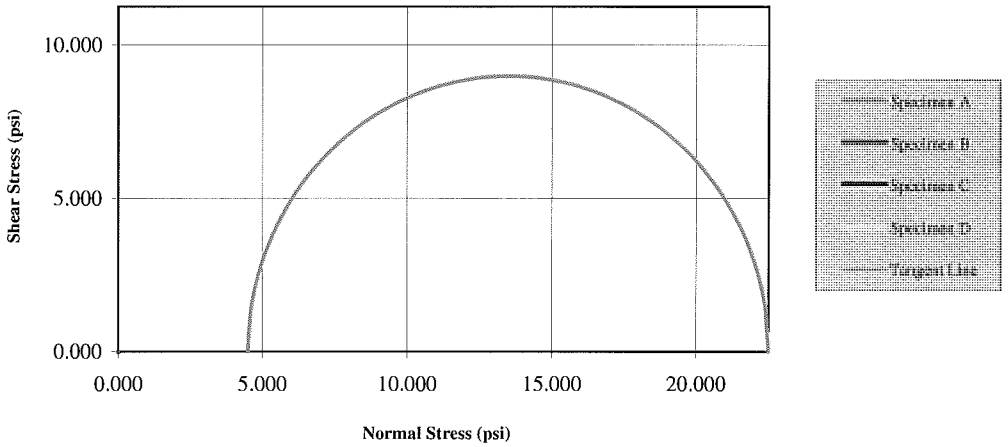
Date: 09/14/11

Checked By: MN

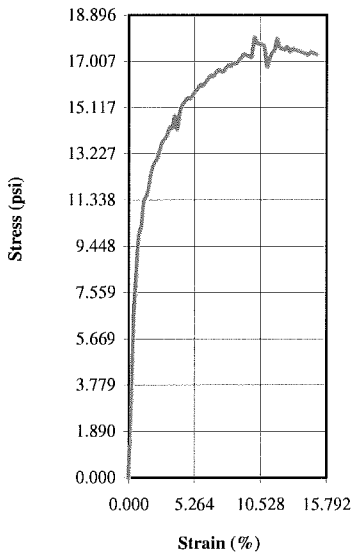
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

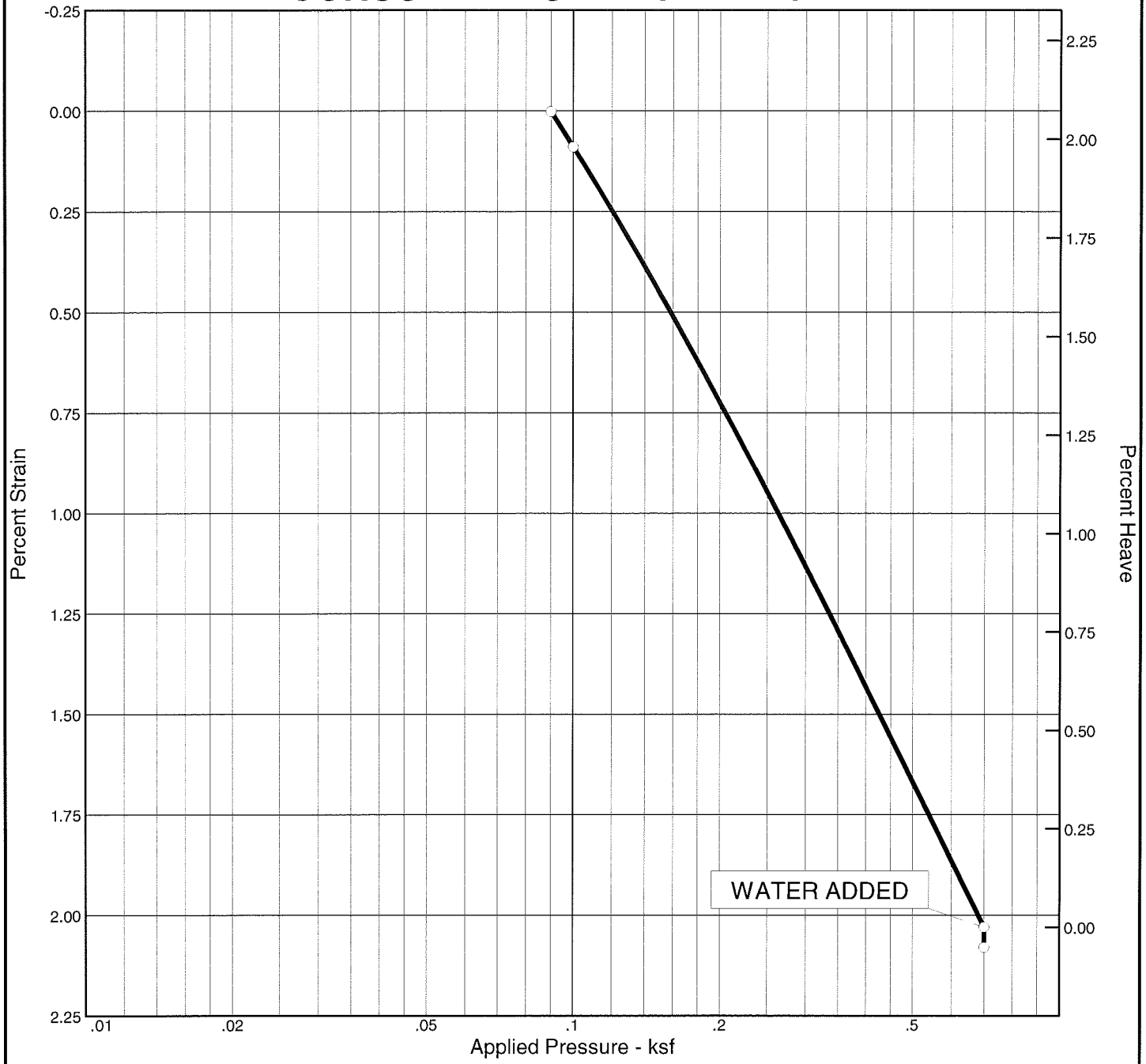


Before Test	Specimen A	B	C	D
Water Content (%)	23.40	0.00	0.00	0.00
Dry Density (pcf)	101.57	0.00	0.00	0.00
Saturation (%)	98.62	0.00	0.00	0.00
Void Ratio	0.63	0.00	0.00	0.00
Diameter (in)	2.380	0.000	0.000	0.000
Height (in)	4.980	0.000	0.000	0.000
Liquid Limit	53.0			
Plastic Limit	17.0			
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	24.27	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	17.997	0.000	0.000	0.000
Axial Strain @ Failure (%)	10.018	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.5	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	22.5	0.0	0.0	0.0
σ3 (psi)	4.5	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	9.0	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Imp.		
Project Number:	11-236	Job Number:	11-066.00
Location:		Boring Number:	B-32, #2 @ 5.5'
Client:	SAGE	Sample Number:	S32256
Remarks:			

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (ksf)	C_c	Initial Void Ratio
Saturation	Moisture							
95.5 %	25.9 %	97.3			2.70	11.48	0.00	0.733

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-32 #3

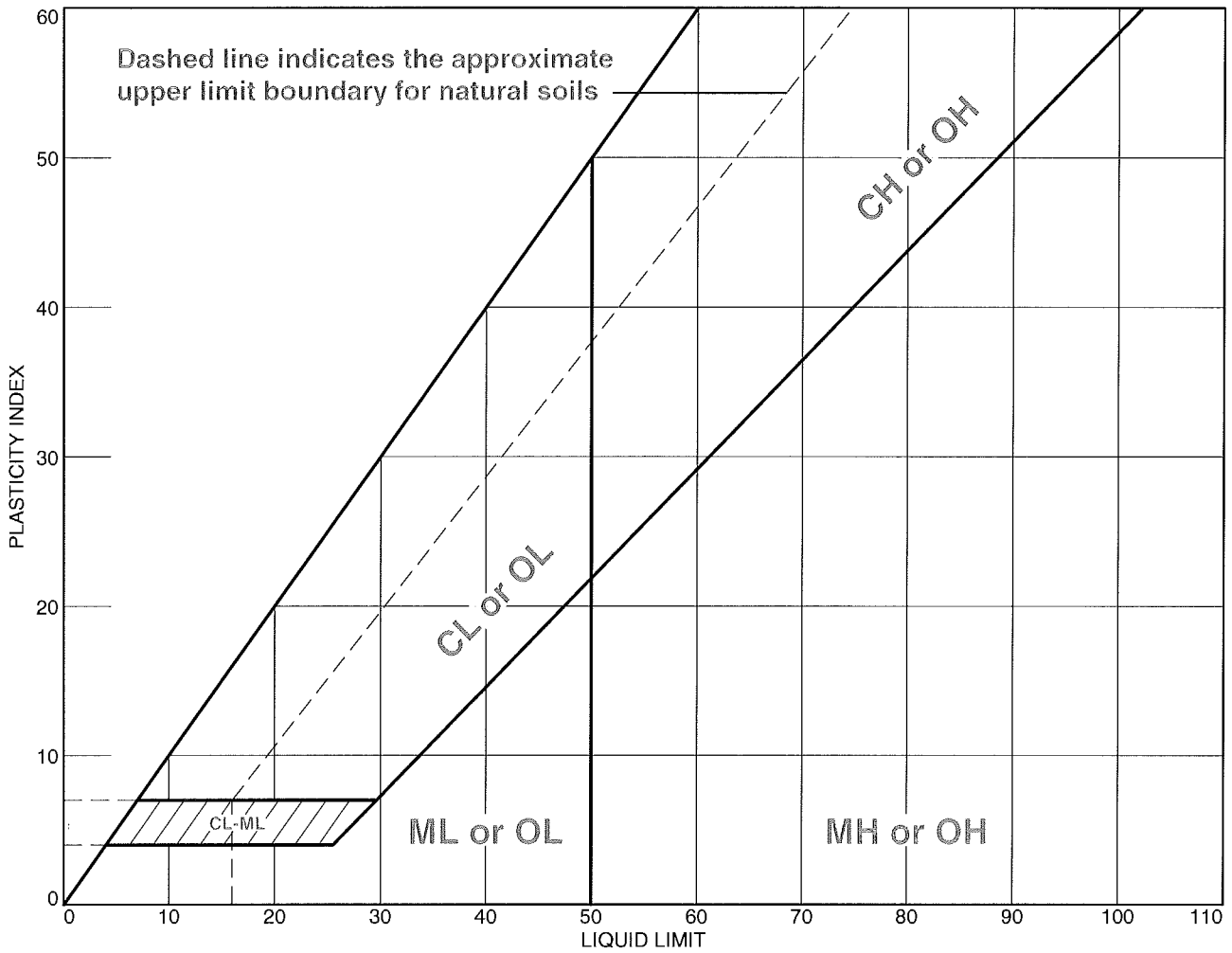
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		NV	NP	NP			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-32 #4 **Depth:** 10.0 **Sample Number:** S32258

Remarks:

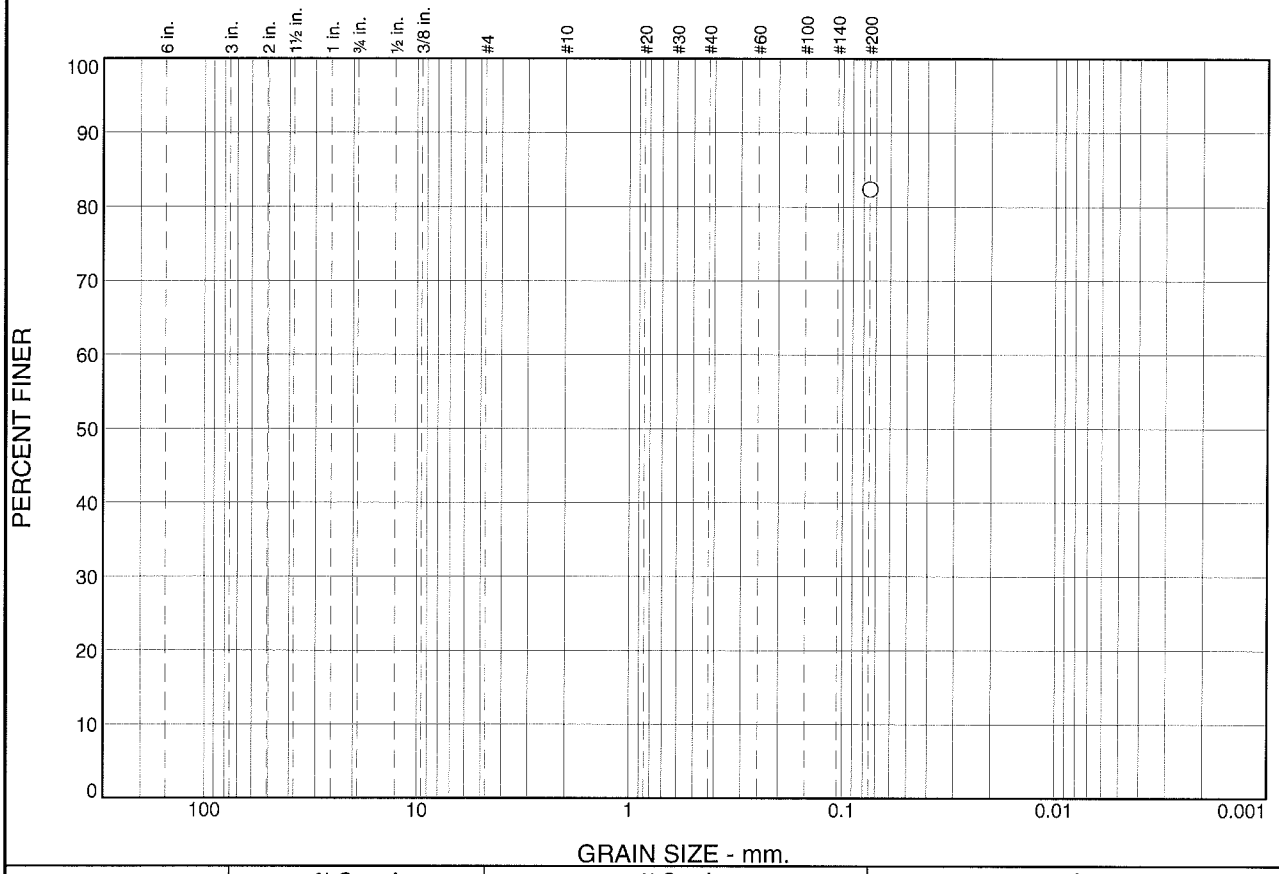
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						82.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	82.4		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-32 #6
Sample Number: S32259 **Depth:** 15'5" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-33 #7	20	117.6	91.5	28.5
B-33 #10	30'9"	132.4	110.3	20.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

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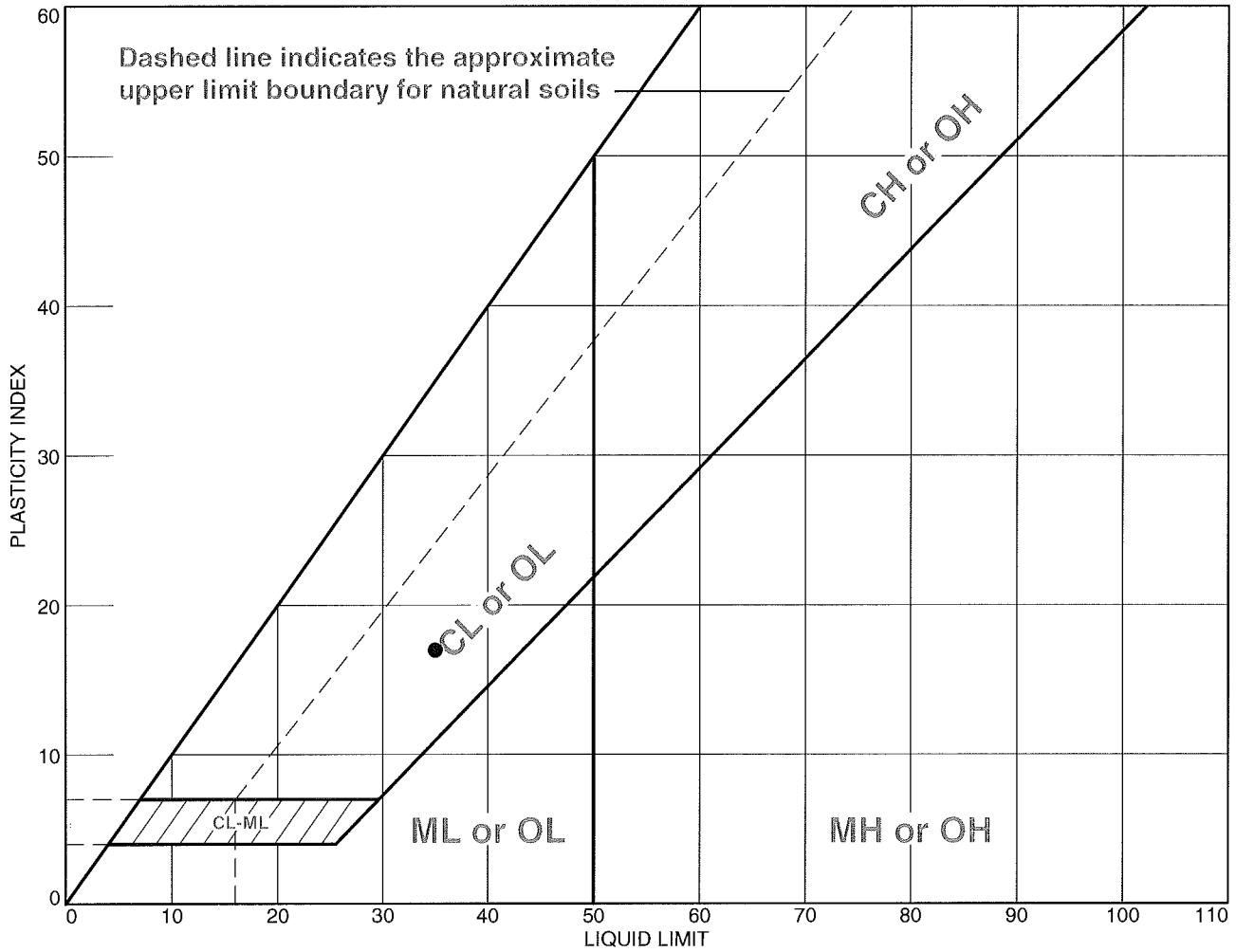
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		35	18	17			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements

10-066.00

● **Location:** B-33 #1 **Depth:** 0 **Sample Number:** S32260

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: pr **Checked By:** mn

CONSOLIDATION TEST REPORT

MATERIAL DESCRIPTION	USCS	AASHTO

LL	PI	Sp. Gr.	Overburden (ksf)	Dry Dens. (pcf)		Moisture		Saturation		Void Ratio		P_c (ksf)	C_c
				Init.	Final	Init.	Final	Init.	Final	Init.	Final		
		2.70		87.6		31.9 %	29.9 %	93.1 %	91.7 %	0.925	0.881		

Preparation Process:	D2435 Method	C_r	Swell Press. (ksf)	Swell %
Condition of Test:				

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering,

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-33 #2

Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Checked By:

Title:

Figure

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

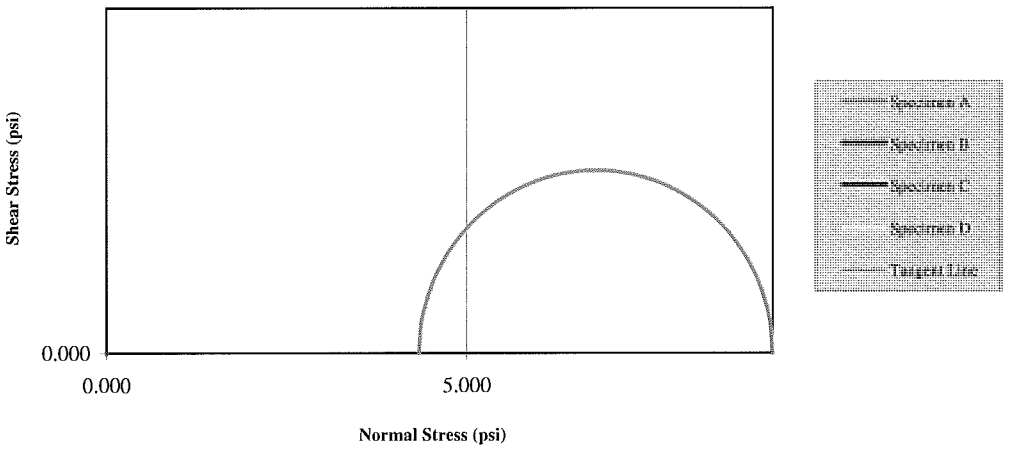
Date: 09/14/11

Checked By: MN

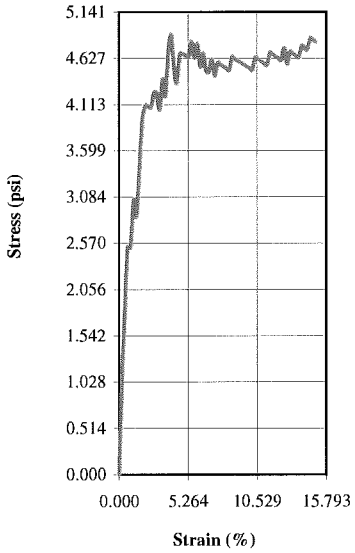
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

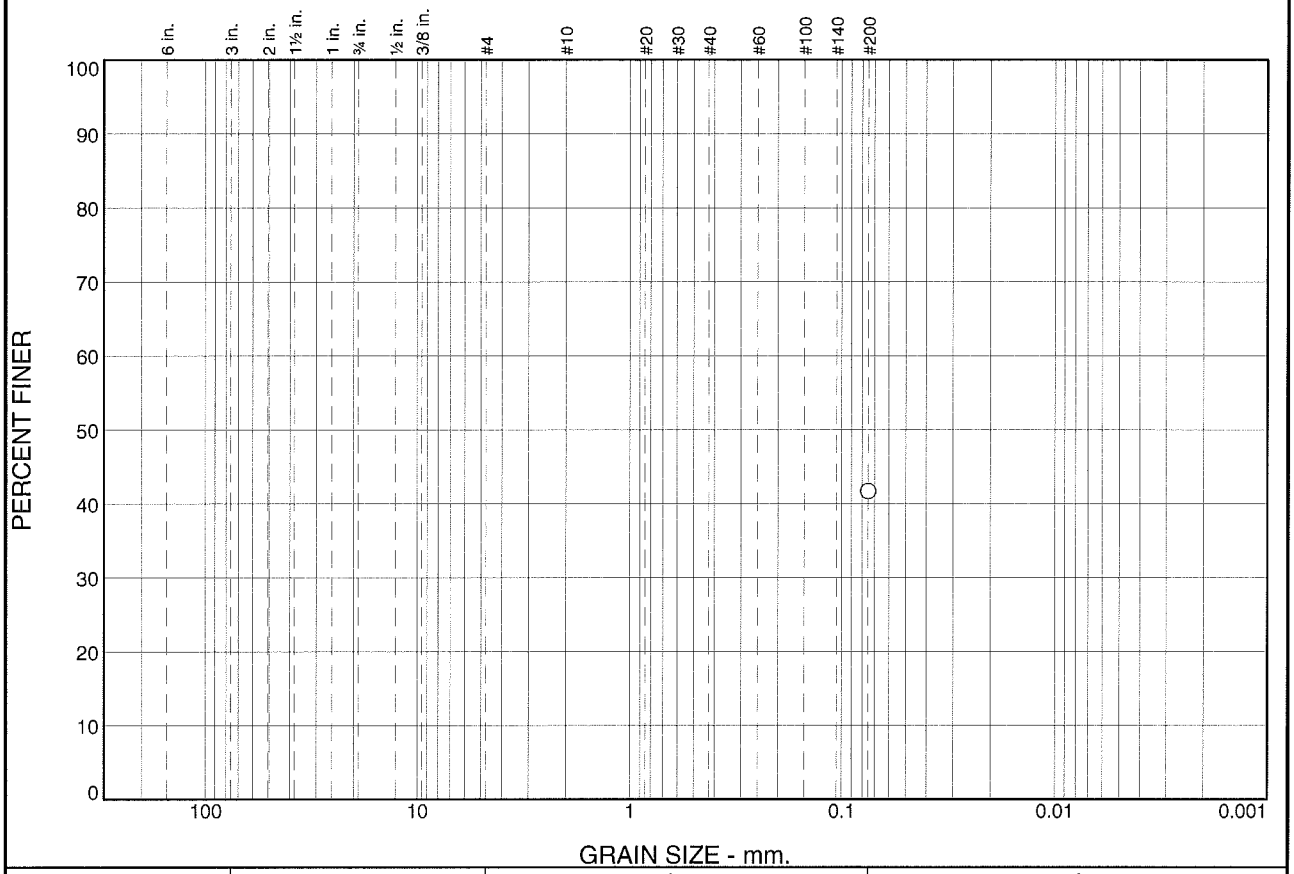


Before Test	Specimen A	B	C	D
Water Content (%)	36.70	0.00	0.00	0.00
Dry Density (pcf)	83.82	0.00	0.00	0.00
Saturation (%)	99.88	0.00	0.00	0.00
Void Ratio	0.97	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	4.600	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	36.68	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	4.896	0.000	0.000	0.000
Axial Strain @ Failure (%)	3.984	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.3	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	9.2	0.0	0.0	0.0
σ3 (psi)	4.3	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	2.4	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-33, #3 @ 5.5'
Client:	SAGE	Sample Number:	S32262
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						41.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	41.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

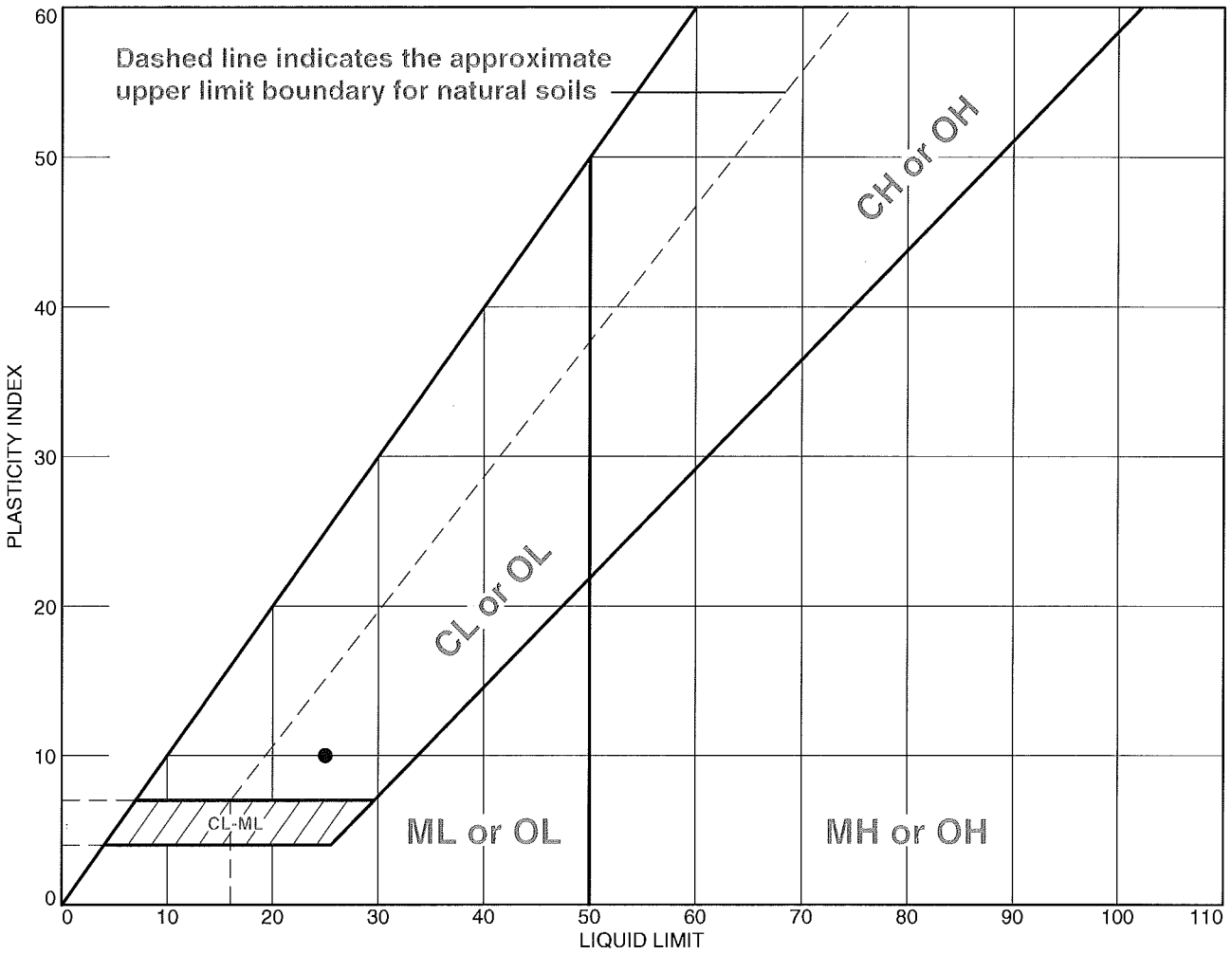
Location: B-33 #10
Sample Number: S32264 **Depth:** 30'9" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		25	15	10		59.6	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-33 #16 **Depth:** 50.0 **Sample Number:** S32265

Remarks:

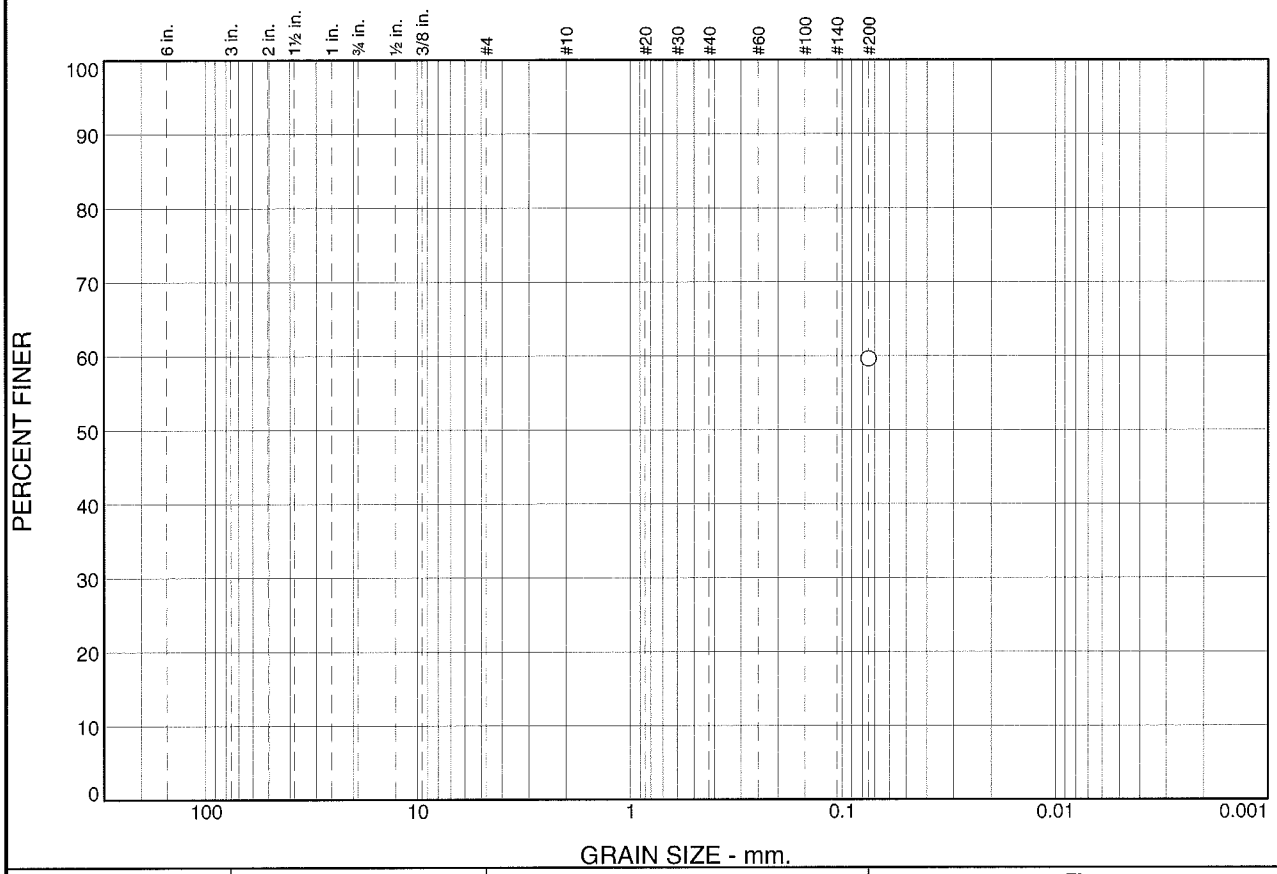
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ef **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						59.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.6		

* (no specification provided)

Material Description

Atterberg Limits

PL= 15 LL= 25 PI= 10

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-33 #16
Sample Number: S32265 **Depth:** 50.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-34 #1	0			10.6
B-34 #7	16	132.6	110.5	20.0

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

Biggs-West Gridley Canal Improvements

10-066.00

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

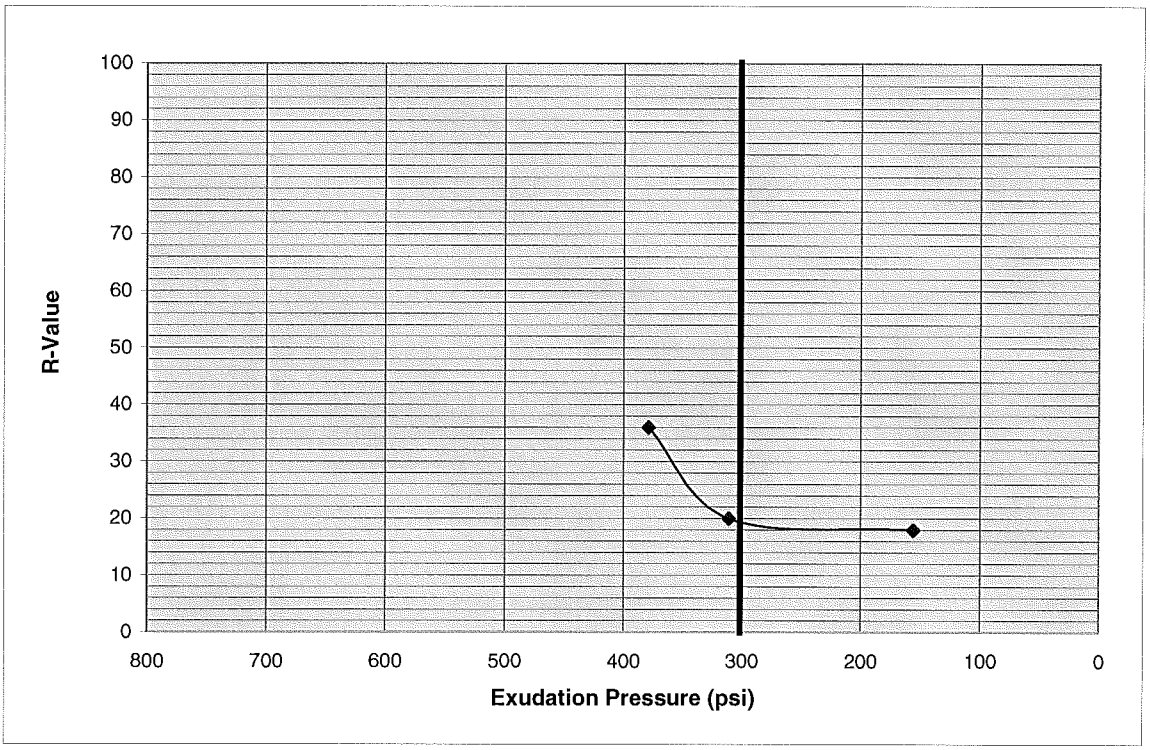
5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Resistance Value

Test Procedure: CAL 301

Client Project:	Biggs-West Gridley Canal Improvements
STL Project Number:	11-236
Client Project Number:	10-066.00
Sample Number:	B-34 #2 @ 0-5' (S32201)
Sample Received Date:	8/25/2011
Material Description:	VISUAL: Brown silty clay



Specimen Number:	*1*	*2*	*3*	
Moisture at Test (%)	**15.2**	**15.9**	**16.9**	
Dry Unit Weight at Test (pcf)	**117.7**	**115.7**	**112.2**	
Expansion Pressure (psf)	**179**	**100**	**31**	
Exudation Pressure (psi)	**379**	**311**	**156**	
Resistance Value	**36**	**20**	**18**	
Resistance Value at 300 psi exudation pressure			**19**	

NOTE:

5040 Robert J. Mathews Parkway, El Dorado Hills, CA ph: 916-939-3460 fax: 916-939-3507

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

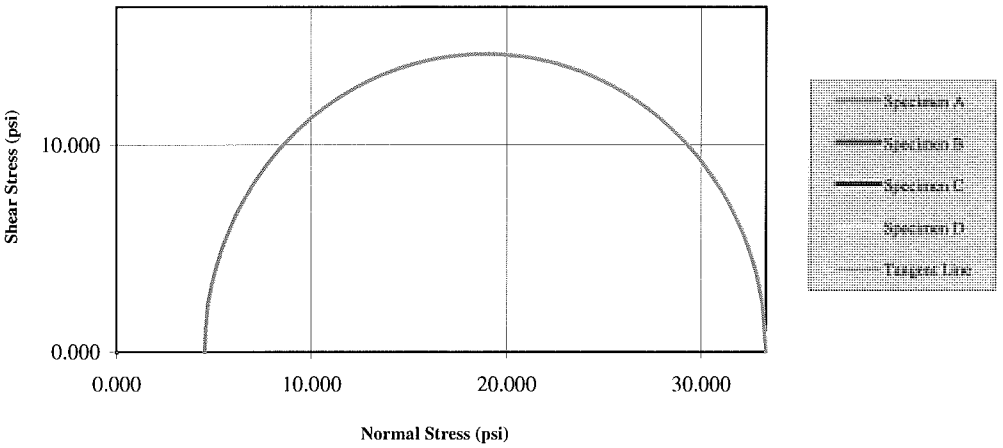
Date: 09/14/11

Checked By: MN

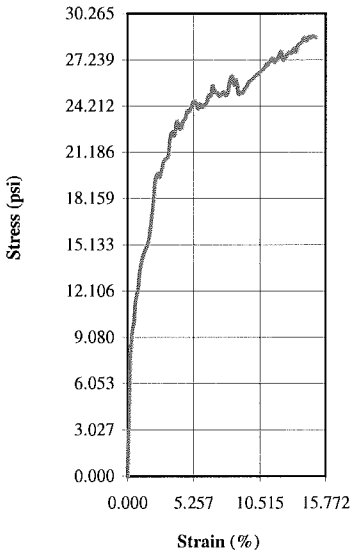
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

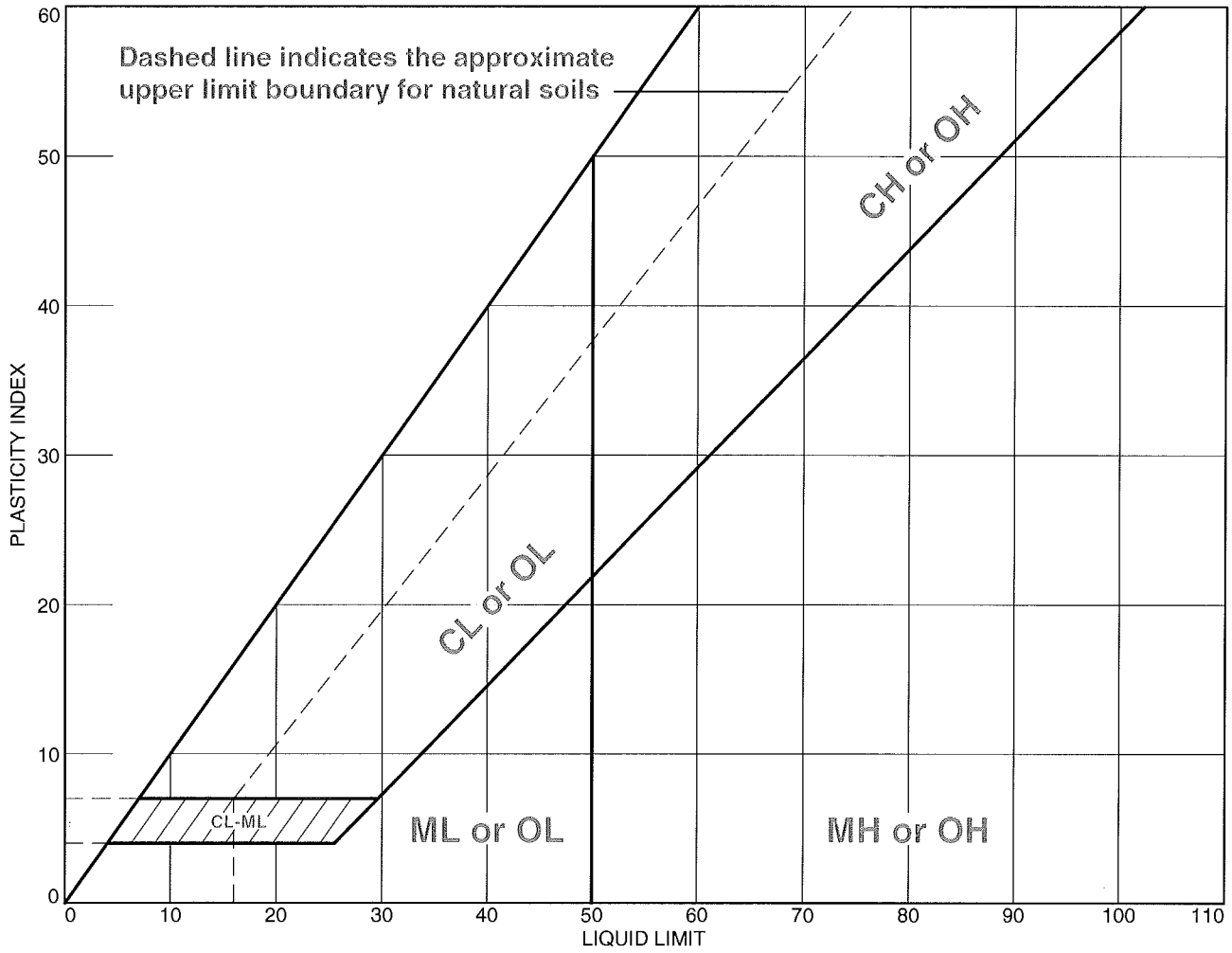


Before Test	Specimen A	B	C	D
Water Content (%)	18.90	0.00	0.00	0.00
Dry Density (pcf)	110.19	0.00	0.00	0.00
Saturation (%)	99.89	0.00	0.00	0.00
Void Ratio	0.50	0.00	0.00	0.00
Diameter (in)	2.330	0.000	0.000	0.000
Height (in)	6.000	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	18.76	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	28.824	0.000	0.000	0.000
Axial Strain @ Failure (%)	14.756	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.5	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	33.3	0.0	0.0	0.0
σ3 (psi)	4.5	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	14.4	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-34, #3 @ 5'5"
Client:	SAGE	Sample Number:	S32268
Remarks:			

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		NV	NP	NP			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-34 #5 **Depth:** 10.0 **Sample Number:** S32269

Remarks:

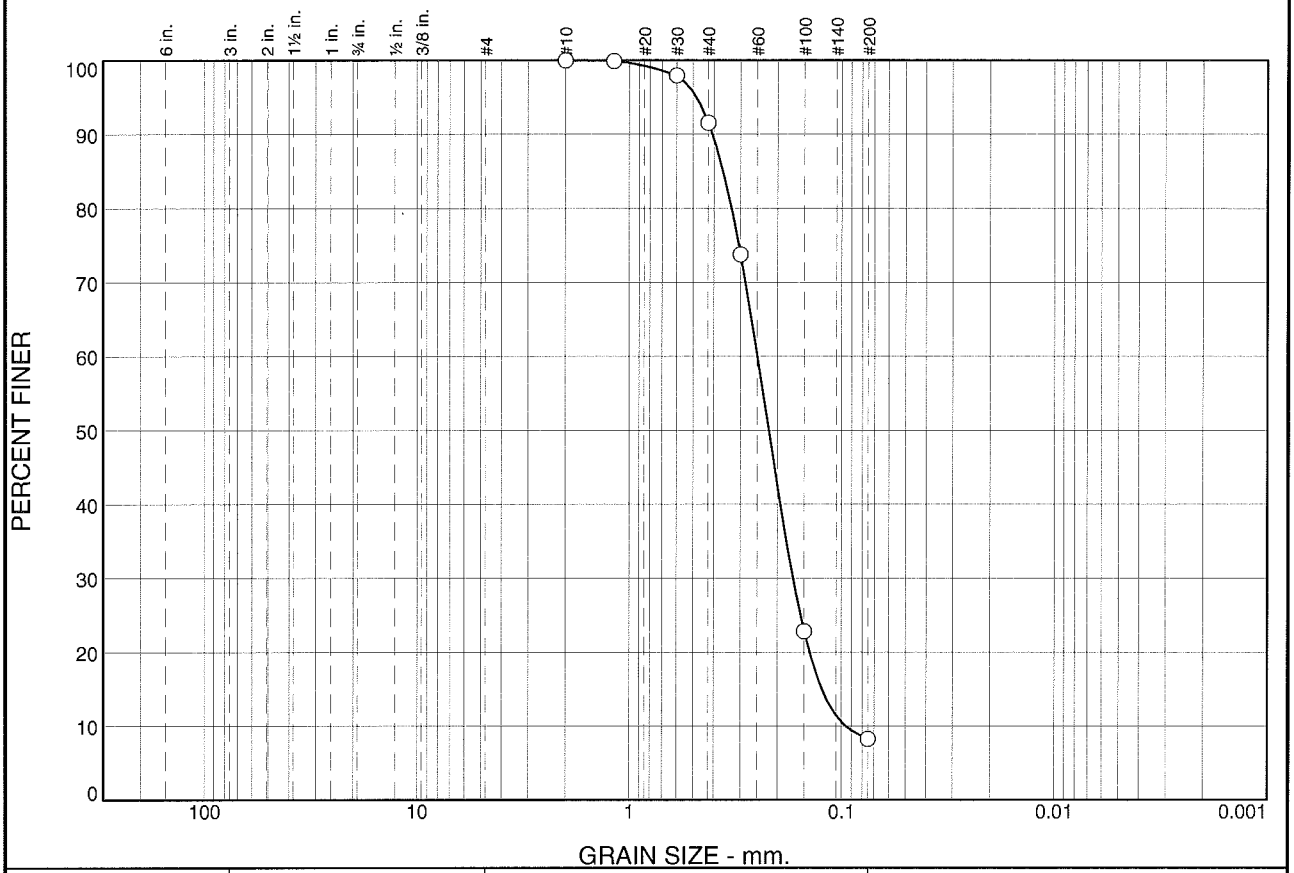
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: stu **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	8.4	83.3	8.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#16	99.9		
#30	98.0		
#40	91.6		
#50	73.8		
#100	22.8		
#200	8.3		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4063 D_{85}= 0.3625 D_{60}= 0.2494
D_{50}= 0.2203 D_{30}= 0.1690 D_{15}= 0.1236
D_{10}= 0.0954 C_u= 2.61 C_c= 1.20

Classification

USCS= AASHTO=

Remarks

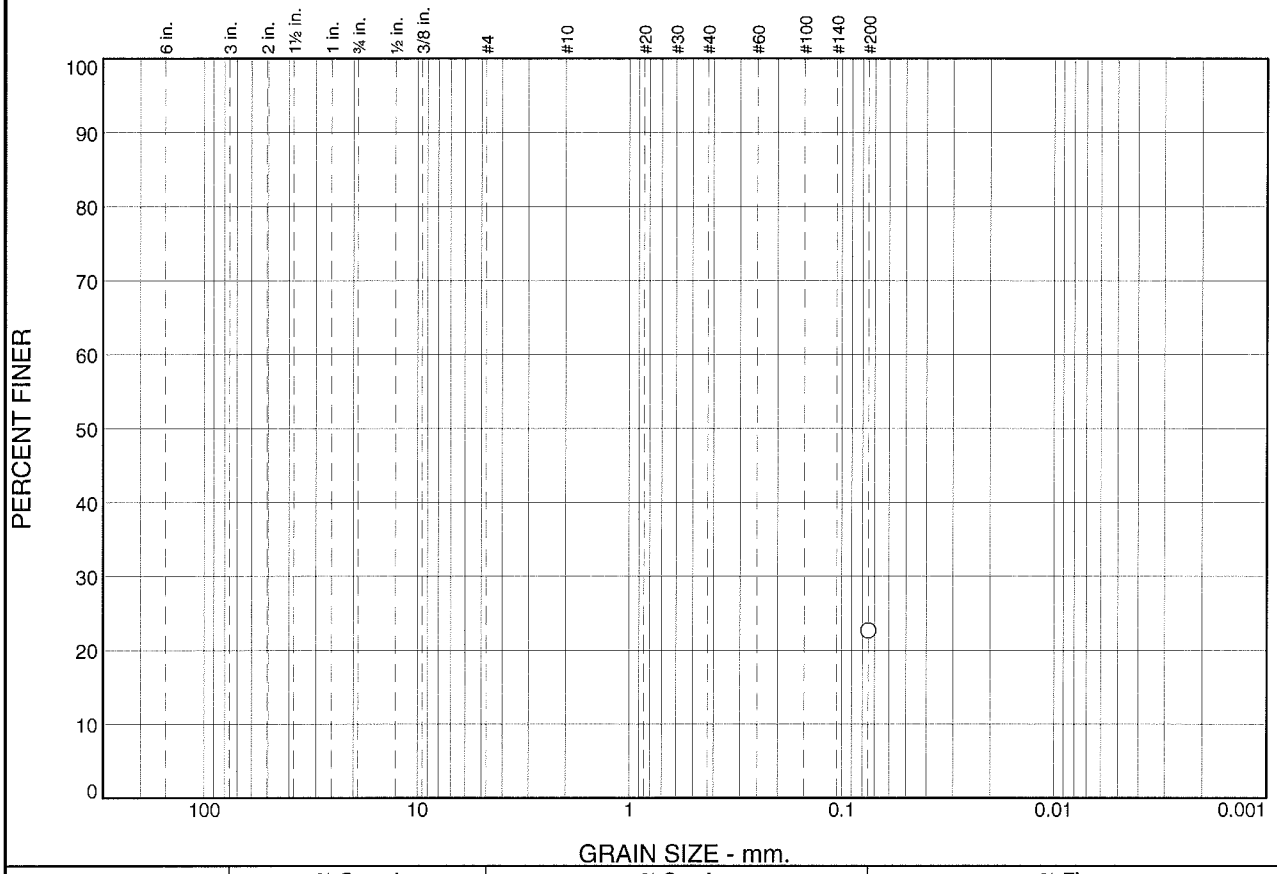
Location: B-34 #7
Sample Number: S32270 **Depth:** 16.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						22.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	22.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-34 #12
Sample Number: S32271 **Depth:** 35.5 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-38 #2	5.5	110.9	81.3	36.4
B-38 #4	10			36.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

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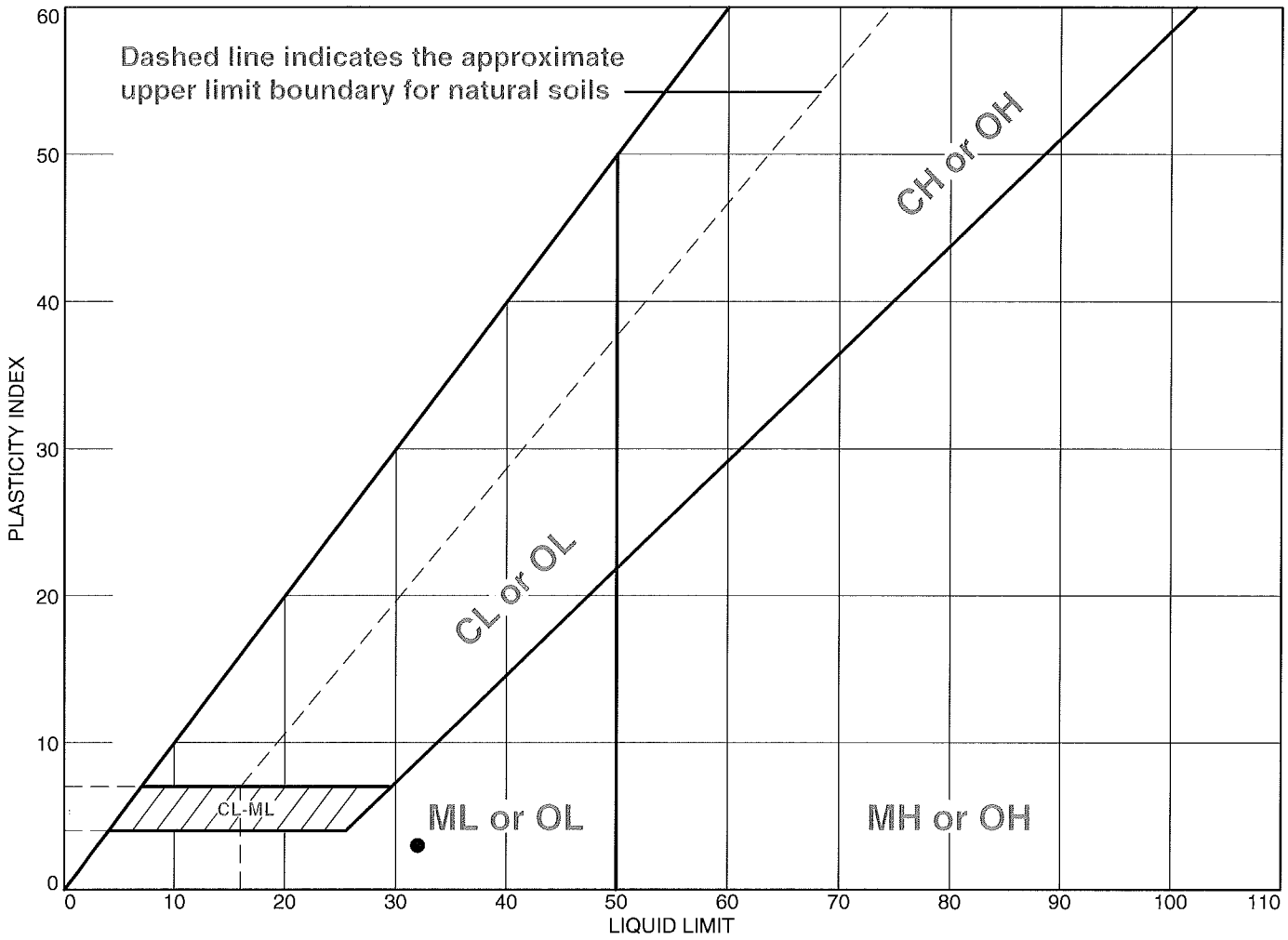
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		32	29	3			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-38 #2 **Depth:** 5.5 **Sample Number:** S32272

Remarks:

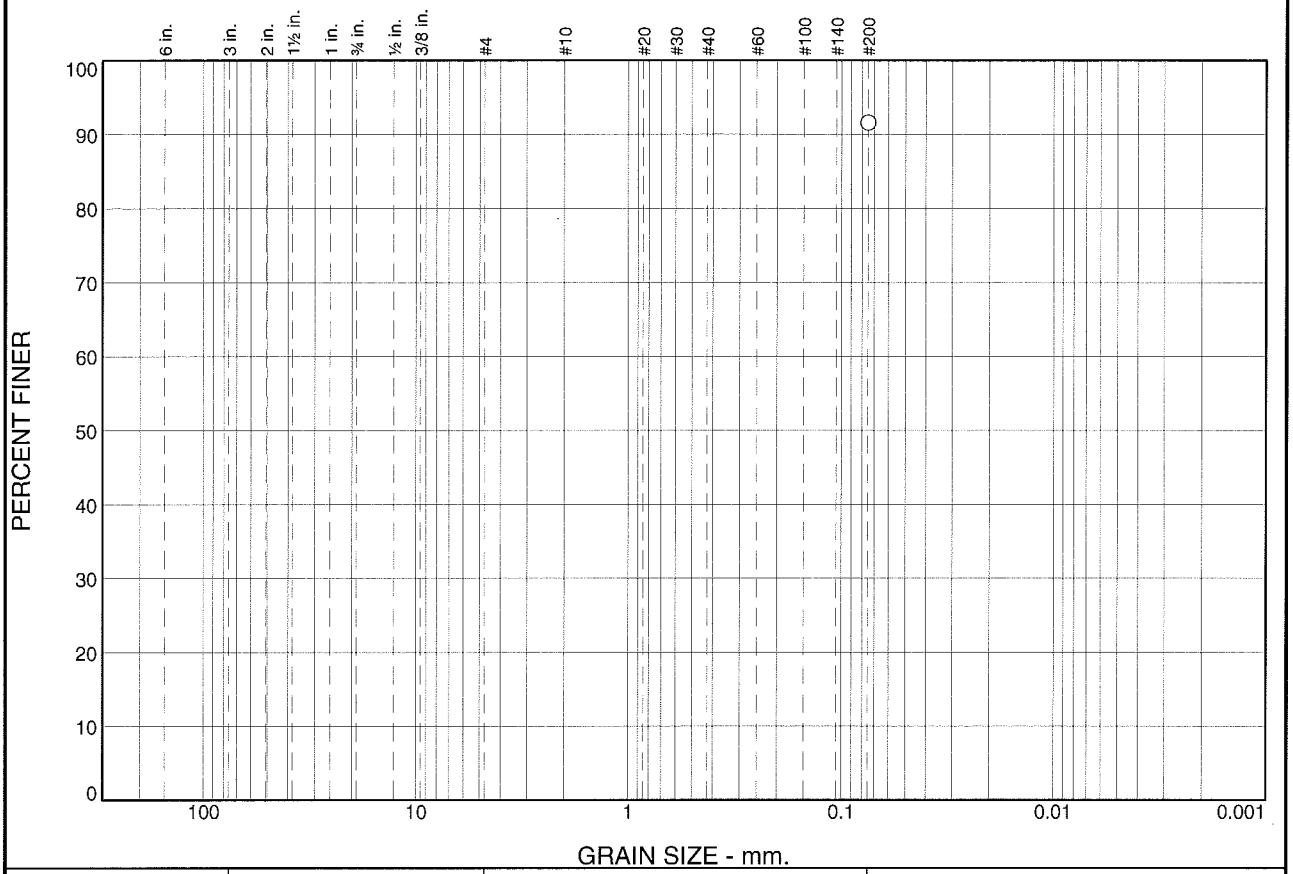
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: ef **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						91.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	91.6		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-38 #3
Sample Number: S32273 **Depth:** 6.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: B-38 #3 | Sample Depth, ft.: 60 | Lab No.: S32273

Visual Description: N/A | Sample Type:

Remarks:

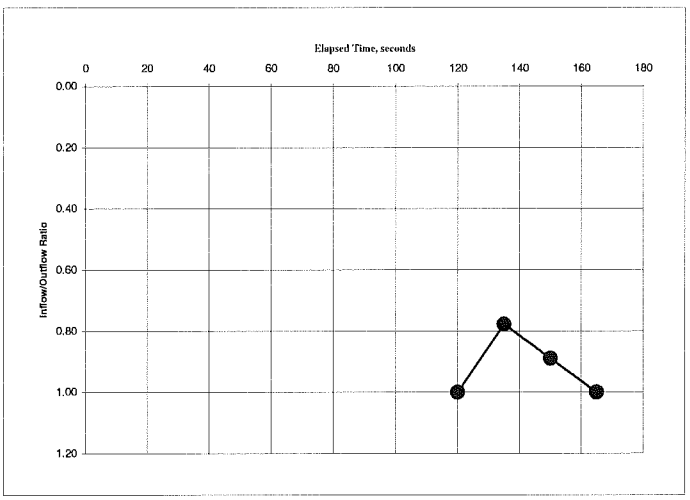
TEST RESULTS

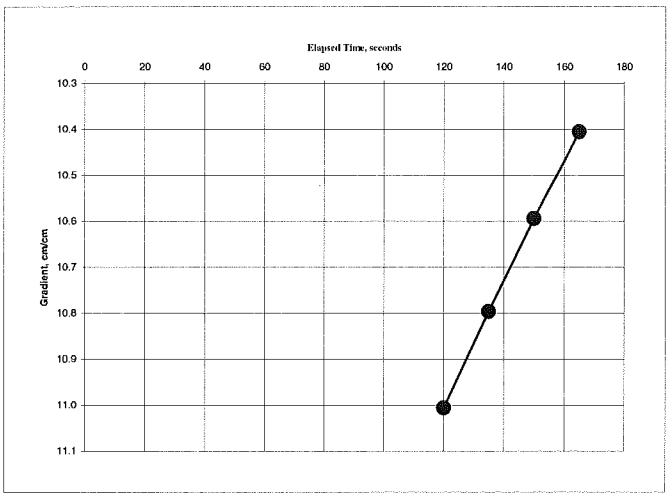
Permeability, cm/sec.: 4.56E-05 | **Average Hydraulic Gradient: 10.7**

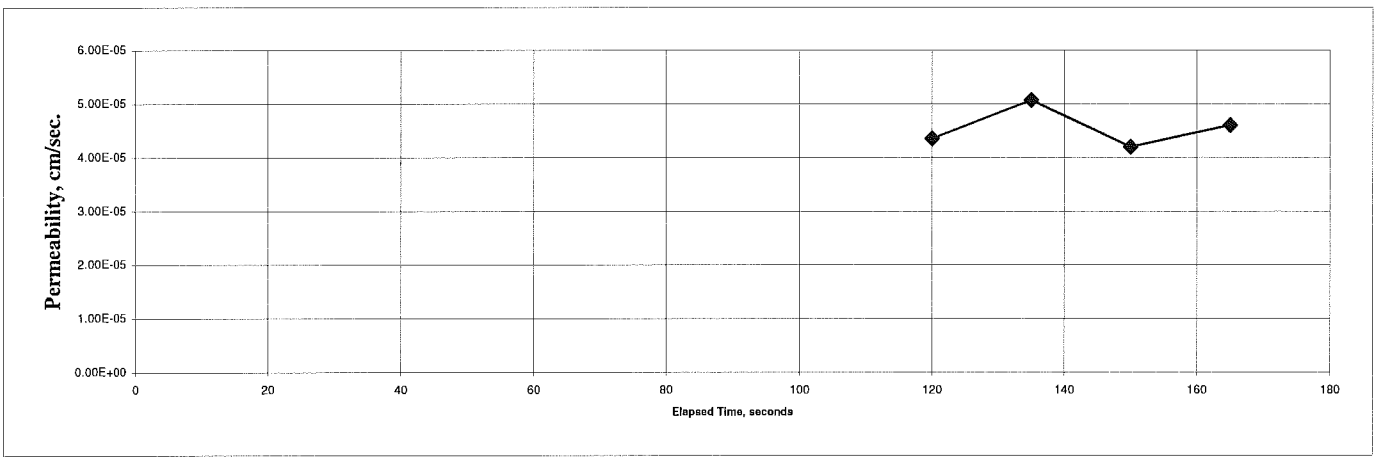
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.24	Specimen Height, cm:	7.16
Specimen Diameter, cm:	6.10	Specimen Diameter, cm:	6.10
Dry Unit Weight, pcf:	83.4	Dry Unit Weight, pcf:	83.7
Moisture Content, %	37.6	Moisture Content, %	38.9
Specific Gravity, Assumed	2.70		
Percent Saturation:	99.2		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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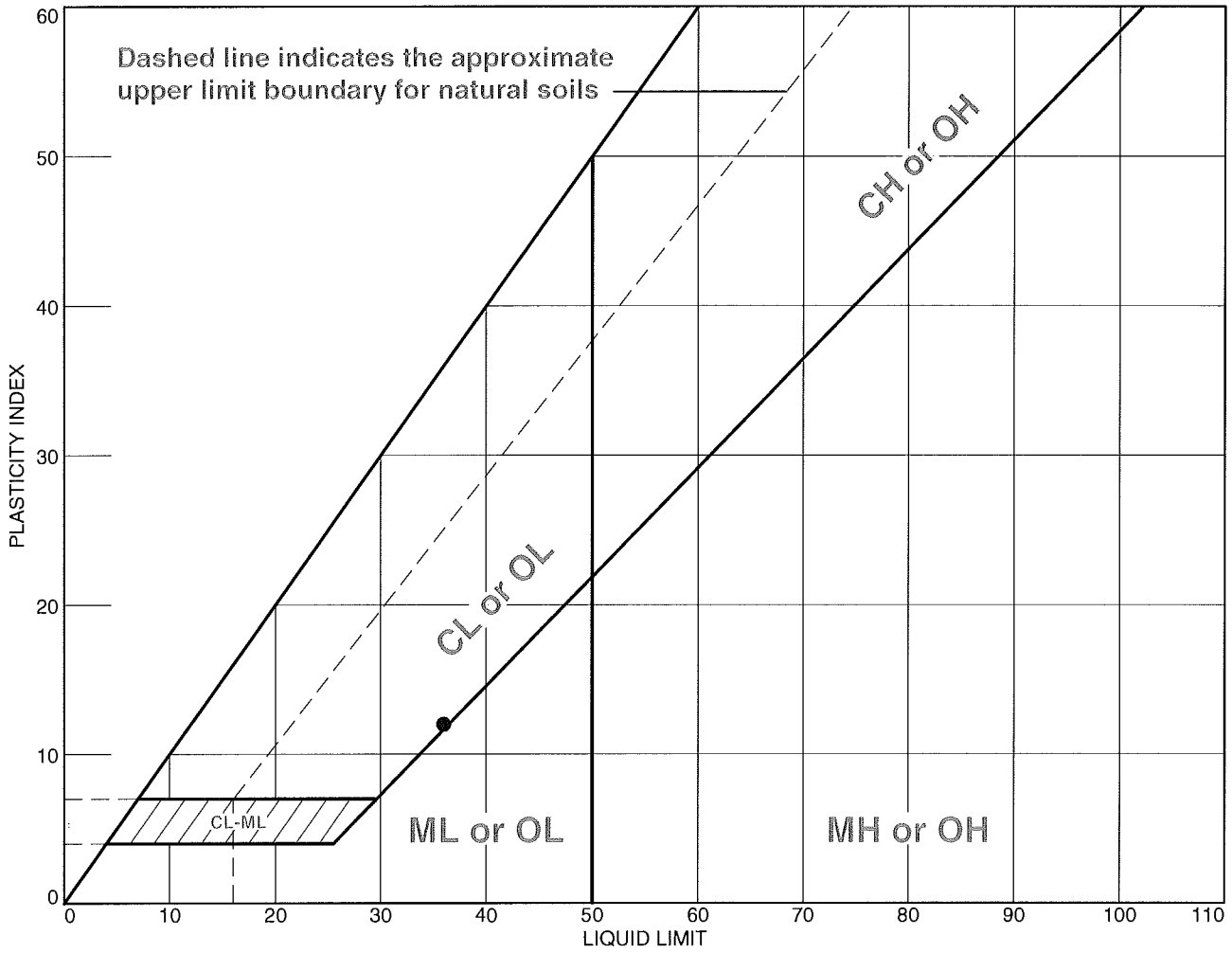
Biggs-West Gridley Canal Improvements

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		36	24	12		91.1	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-38 #4 **Depth:** 10.0 **Sample Number:** S32274

Remarks:

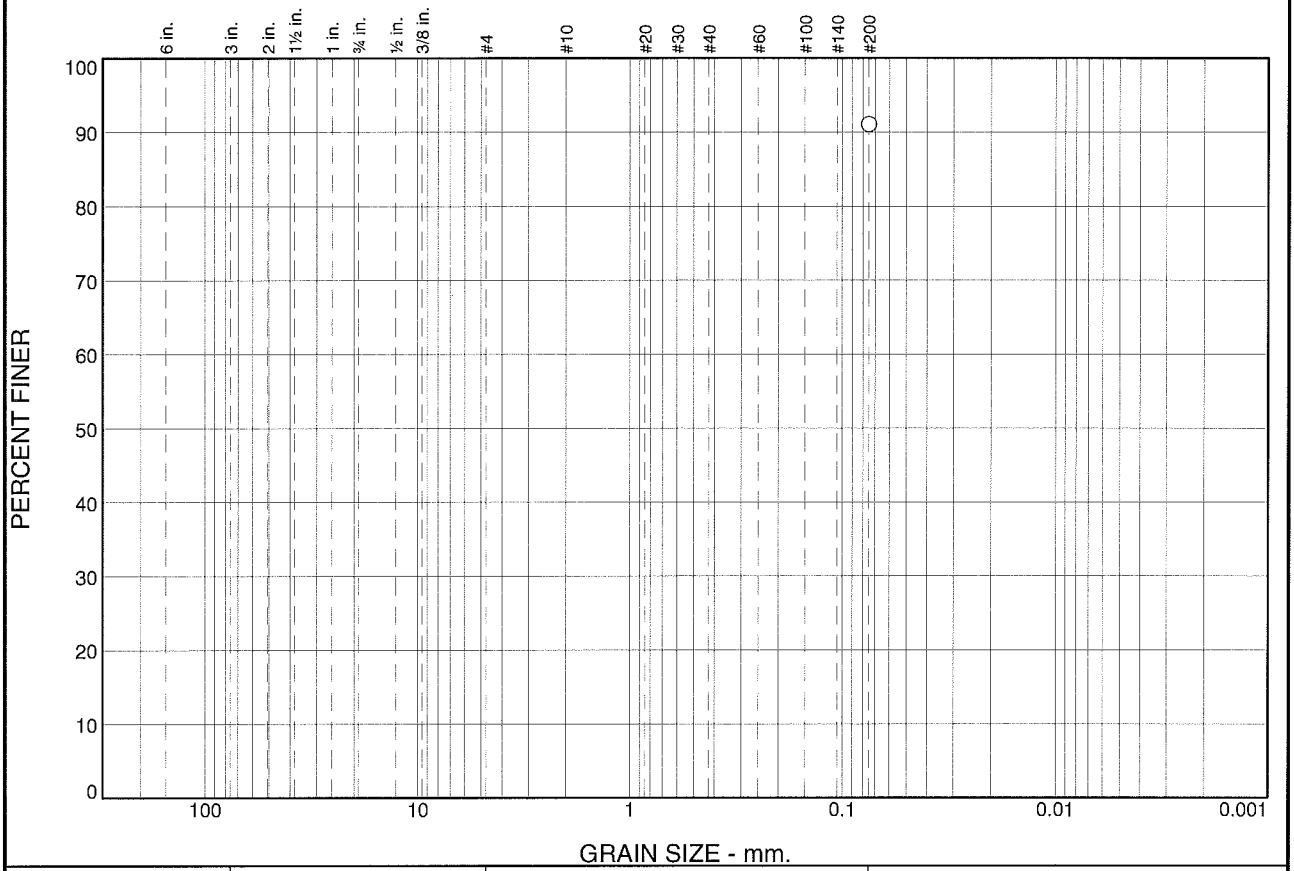
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						91.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	91.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= 24 LL= 36 PI= 12

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-38 #4
Sample Number: S32274 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

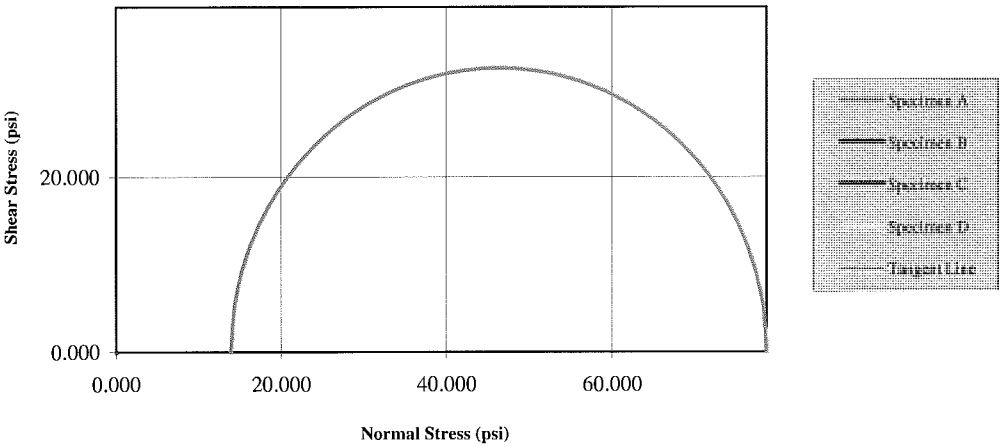
Date: 09/14/11

Checked By: MN

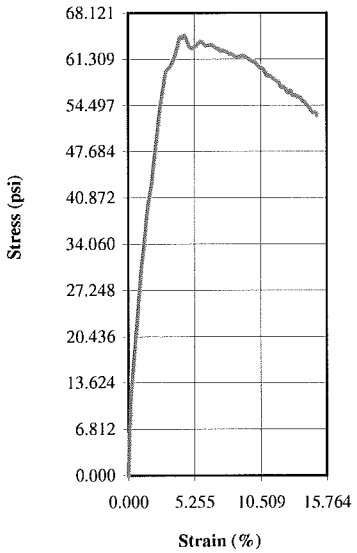
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve



Before Test	Specimen A	B	C	D
Water Content (%)	36.30	0.00	0.00	0.00
Dry Density (pcf)	82.07	0.00	0.00	0.00
Saturation (%)	94.70	0.00	0.00	0.00
Void Ratio	1.02	0.00	0.00	0.00
Diameter (in)	2.400	0.000	0.000	0.000
Height (in)	5.440	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	35.90	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	64.877	0.000	0.000	0.000
Axial Strain @ Failure (%)	4.492	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	13.9	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	78.8	0.0	0.0	0.0
σ3 (psi)	13.9	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	32.4	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improv.		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-38, #6 @ 15'9"
Client:	SAGE	Sample Number:	S32275
Remarks:			

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-39 #6	15'1"	128.9	120.7	6.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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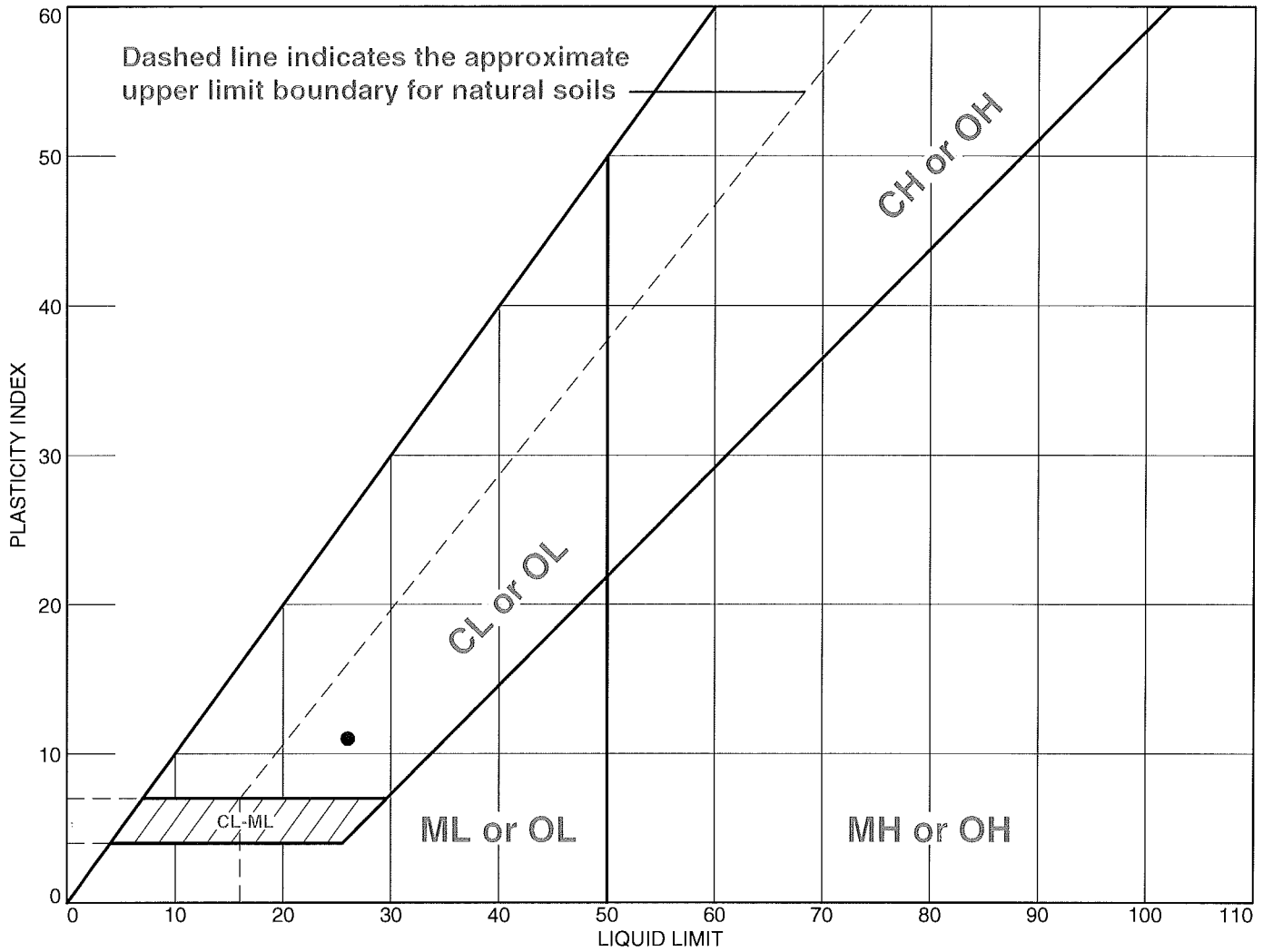
Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		26	15	11			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-39 #2 **Depth:** 5.5' **Sample Number:** S32156

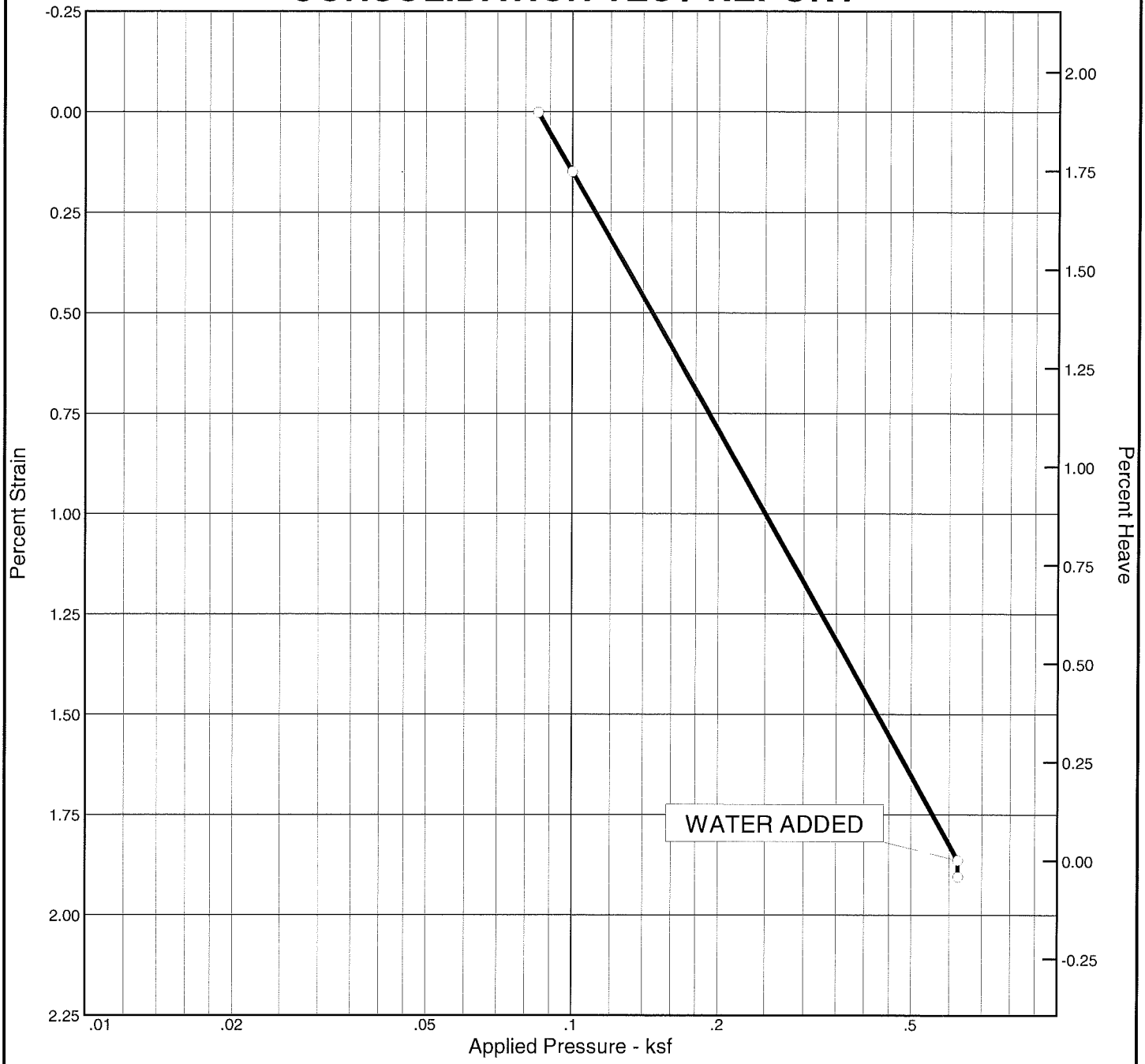
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	P_c (ksf)	C_c	Initial Void Ratio
Saturation	Moisture							
93.4 %	34.0 %	84.9	26	11	2.7	4.62	0.00	0.984

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-39 #2

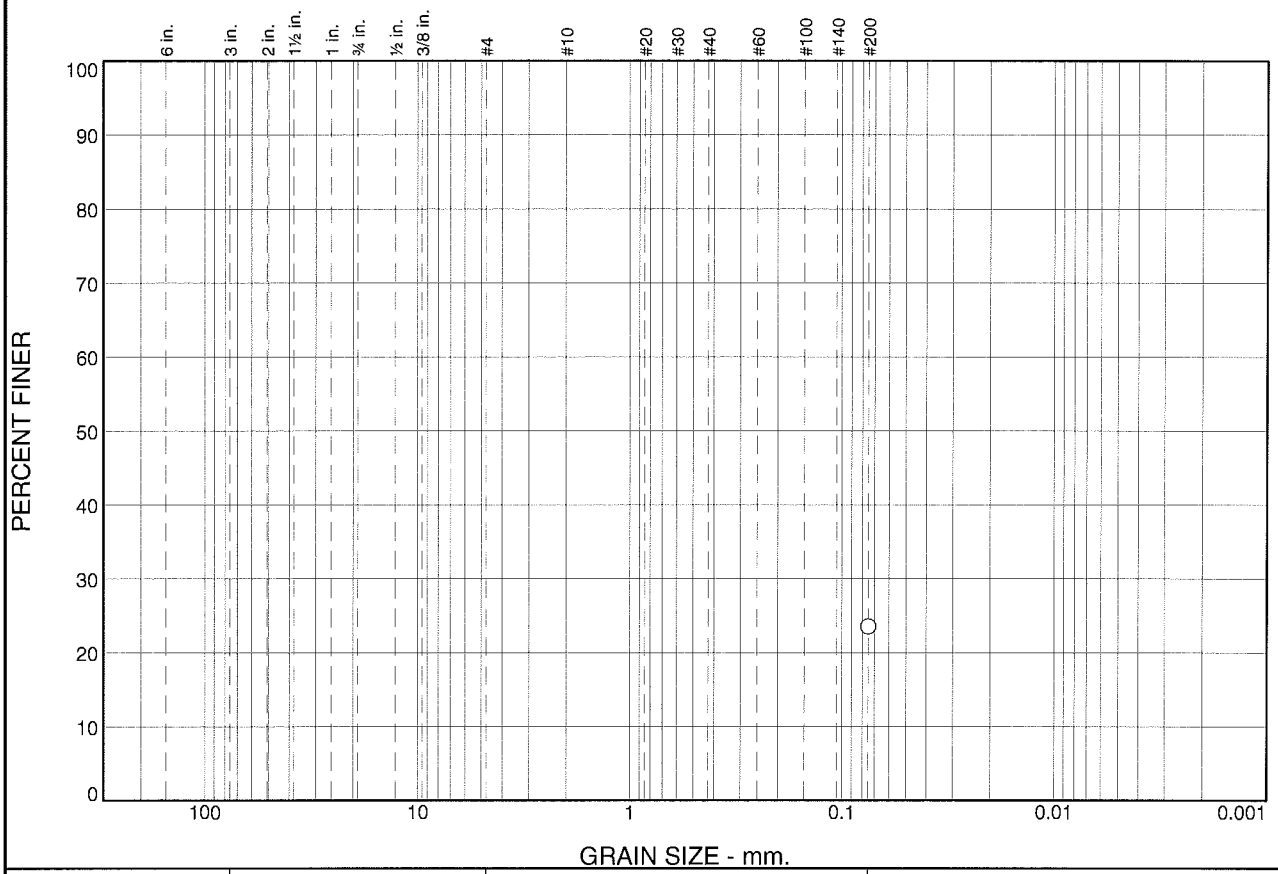
Remarks:

SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						23.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	23.6		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

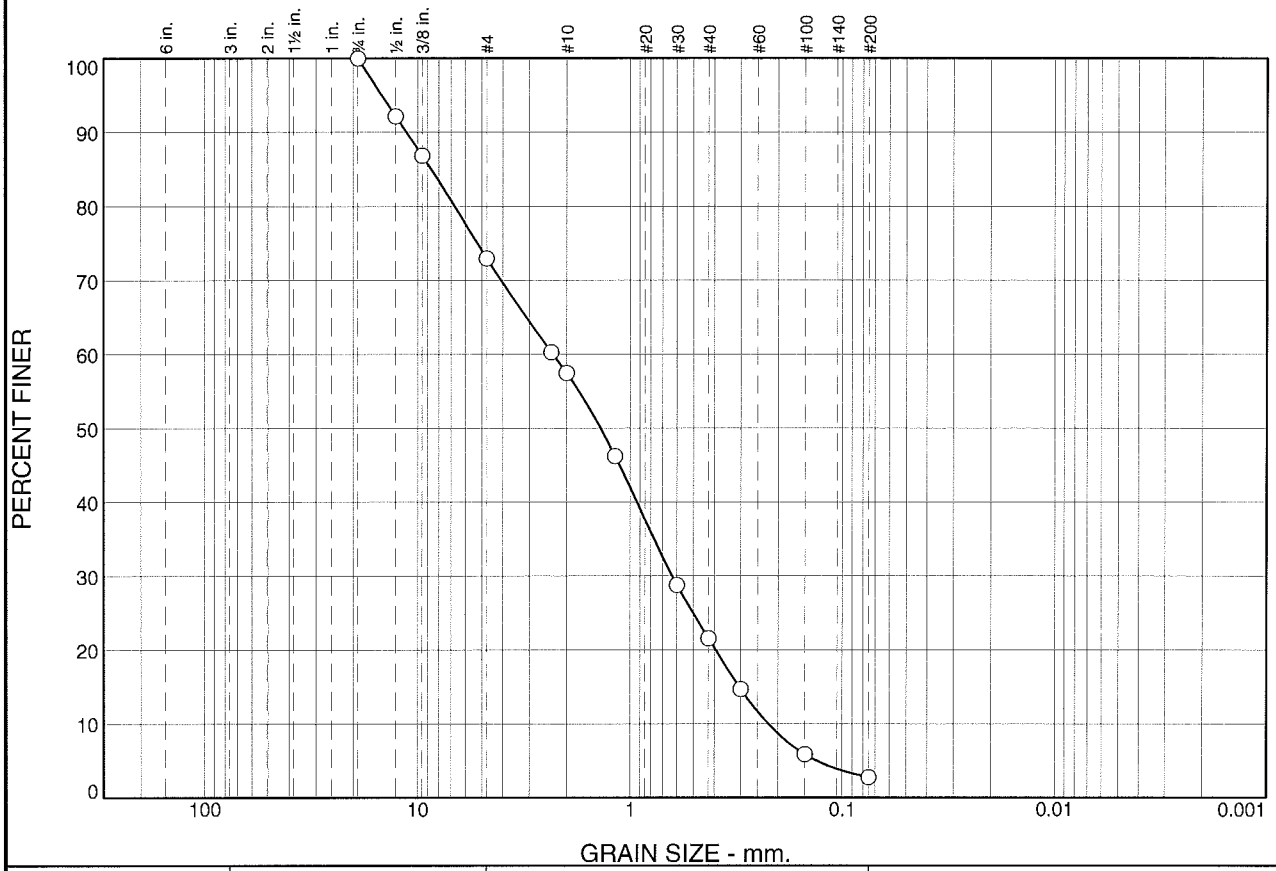
Location: B-39 #4
Sample Number: S32277 **Depth:** 10.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	27.0	15.5	35.9	18.8	2.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 Inch	100.0		
1/2 Inch	92.2		
3/8 Inch	86.9		
#4	73.0		
#8	60.3		
#10	57.5		
#16	46.2		
#30	28.8		
#40	21.6		
#50	14.7		
#100	5.9		
#200	2.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.2796 D_{85}= 8.6474 D_{60}= 2.3179
D_{50}= 1.3822 D_{30}= 0.6308 D_{15}= 0.3052
D_{10}= 0.2224 C_u= 10.42 C_c= 0.77

Classification

USCS= SP AASHTO=

Remarks

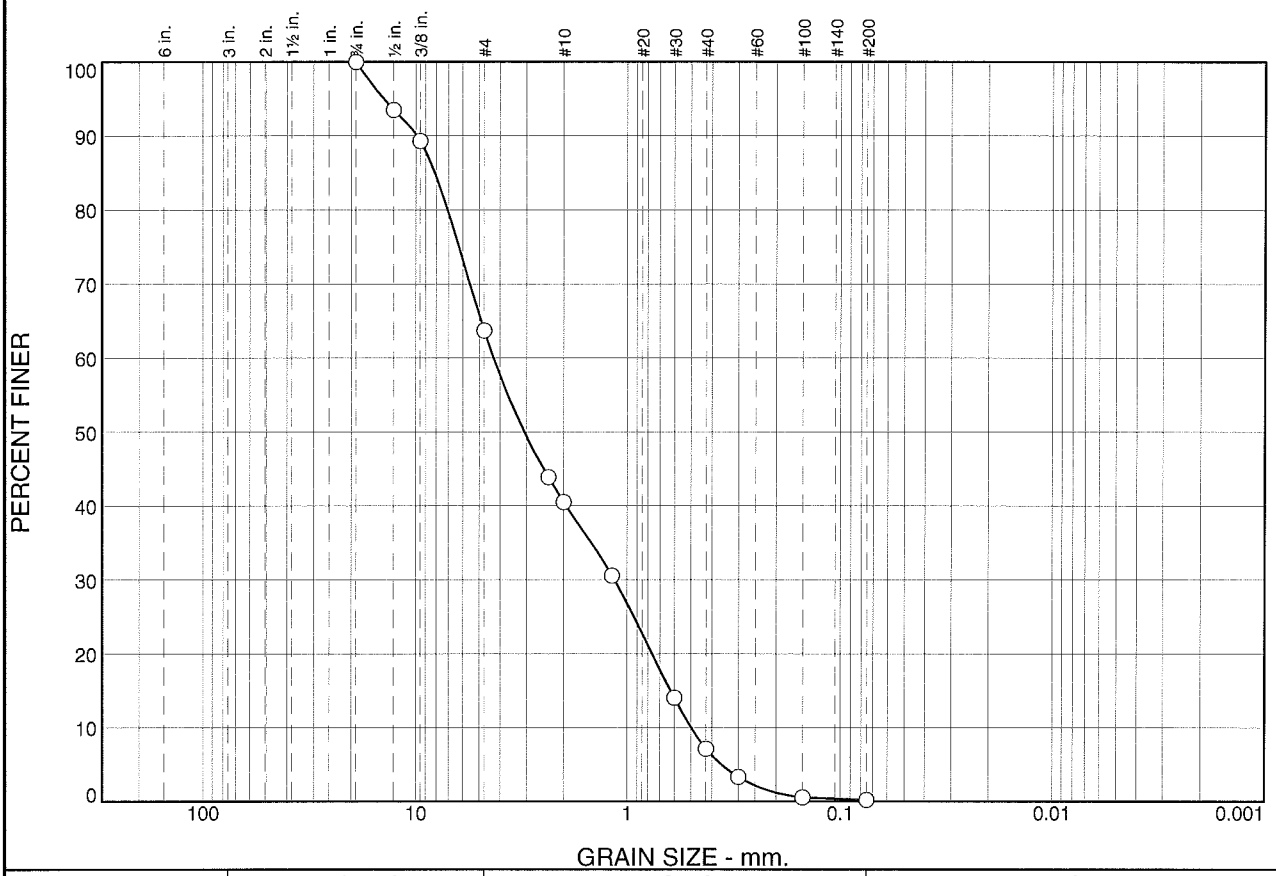
Location: B-39 #5
Sample Number: S32278 **Depth:** 11'3" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	36.3	23.1	33.5	6.9	0.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 Inch	100.0		
1/2 Inch	93.5		
3/8 Inch	89.3		
#4	63.7		
#8	43.9		
#10	40.6		
#16	30.6		
#30	14.0		
#40	7.1		
#50	3.3		
#100	0.6		
#200	0.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.8455 D_{85}= 8.1322 D_{60}= 4.2894
D_{50}= 3.0690 D_{30}= 1.1493 D_{15}= 0.6246
D_{10}= 0.4989 C_u= 8.60 C_c= 0.62

Classification

USCS= SP AASHTO=

Remarks

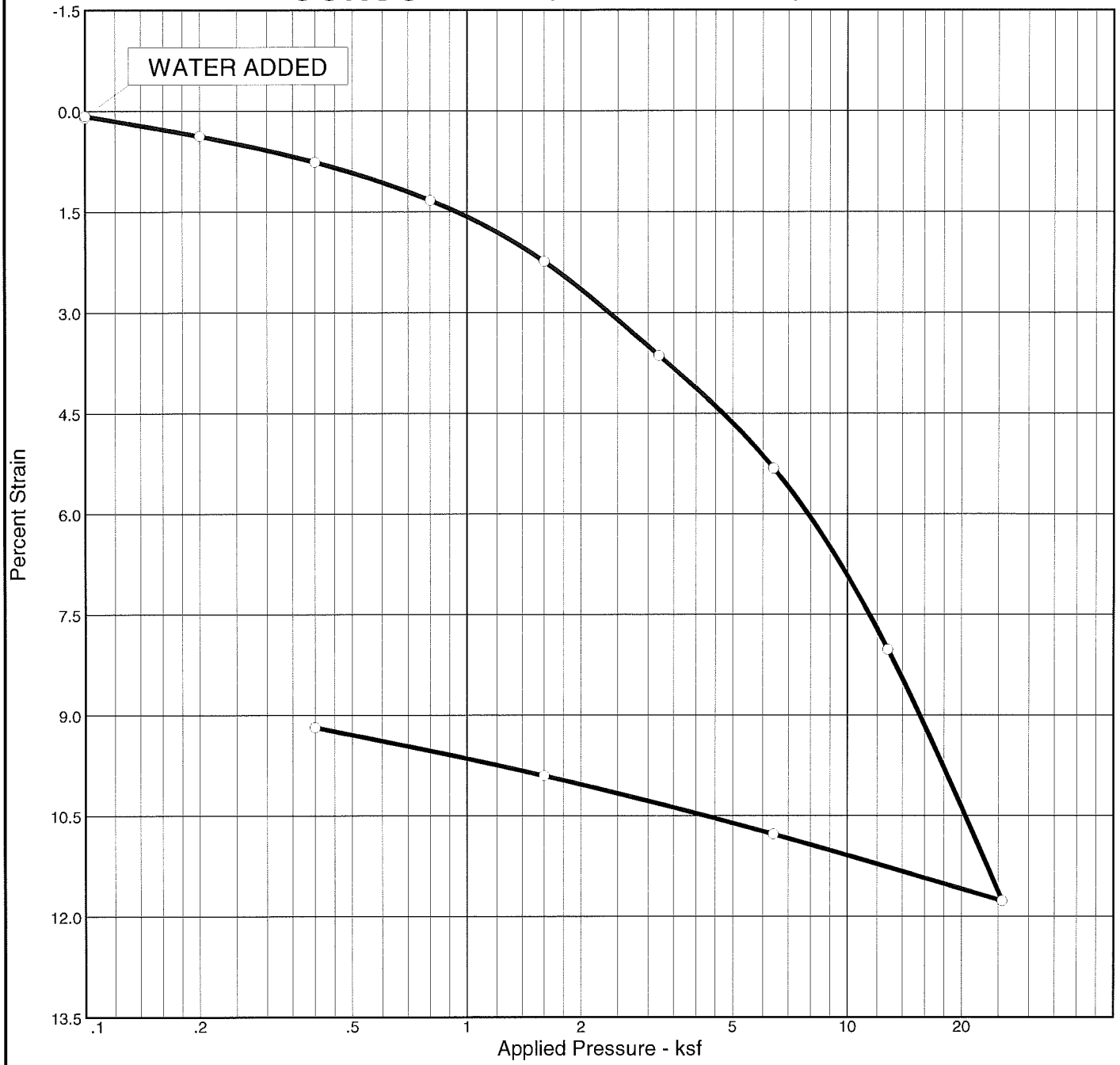
Location: B-39 #6
Sample Number: S32279 **Depth:** 15'1" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
98.5 %	27.5 %	96.0			2.70		8.66	0.22	0.03	0.11		0.755

MATERIAL DESCRIPTION	USCS	AASHTO

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

Location: B-39 #10

Remarks:

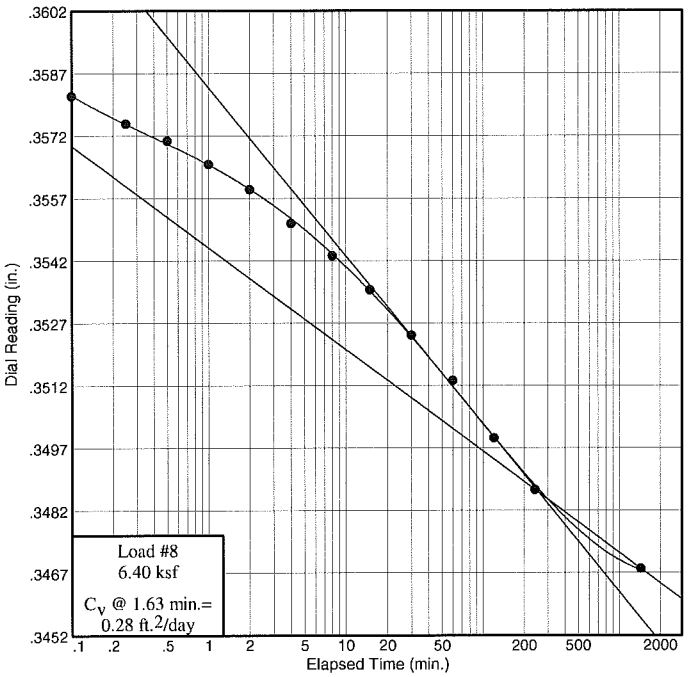
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Dial Reading vs. Time

Project No.: 11-236
Project: Biggs-West Gridley Canal Improvements
10-066.00
Location: B-39 #10

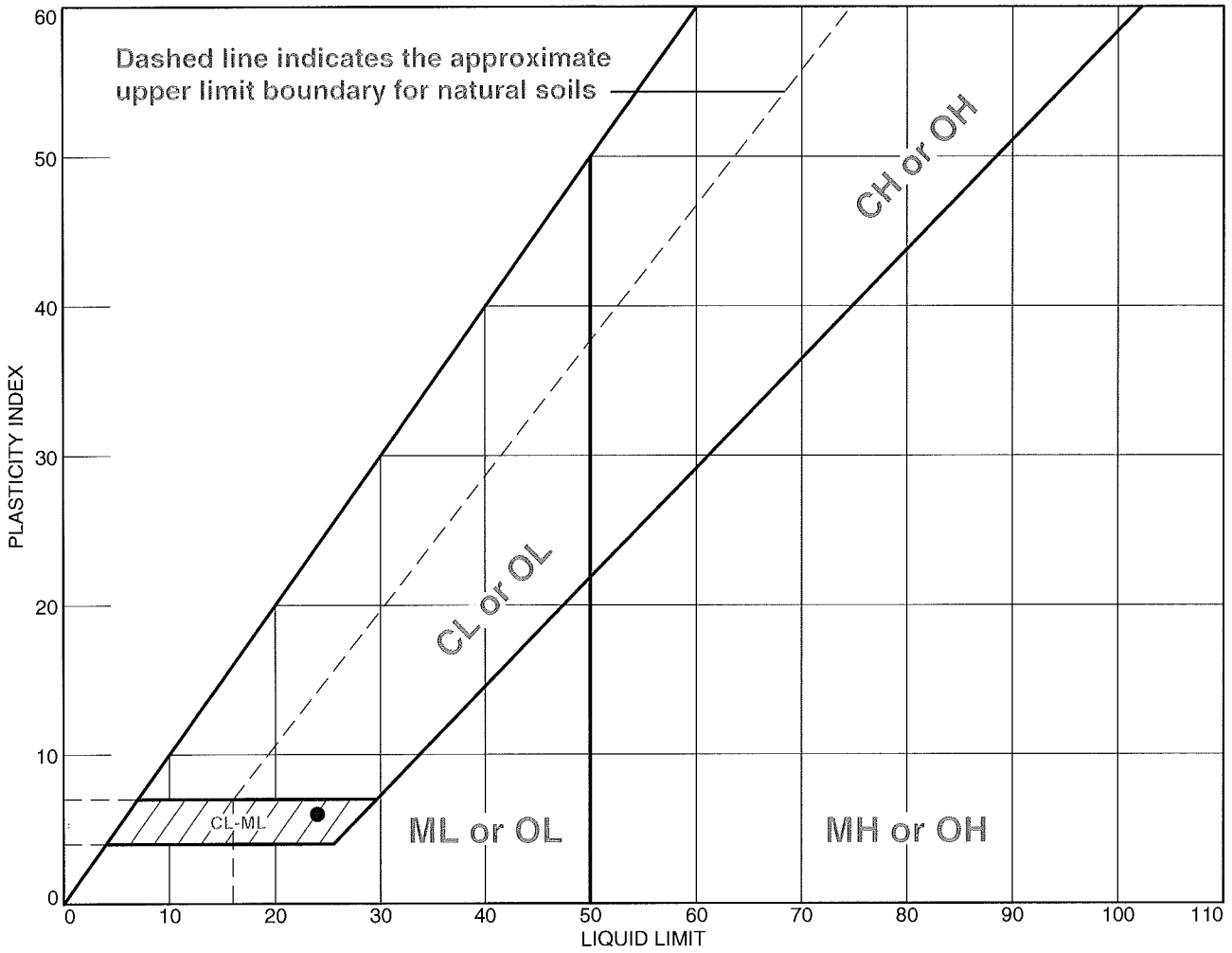


SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		24	18	6		55.8	

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** B-39 #13 **Depth:** 31.0 **Sample Number:** S32281

Remarks:

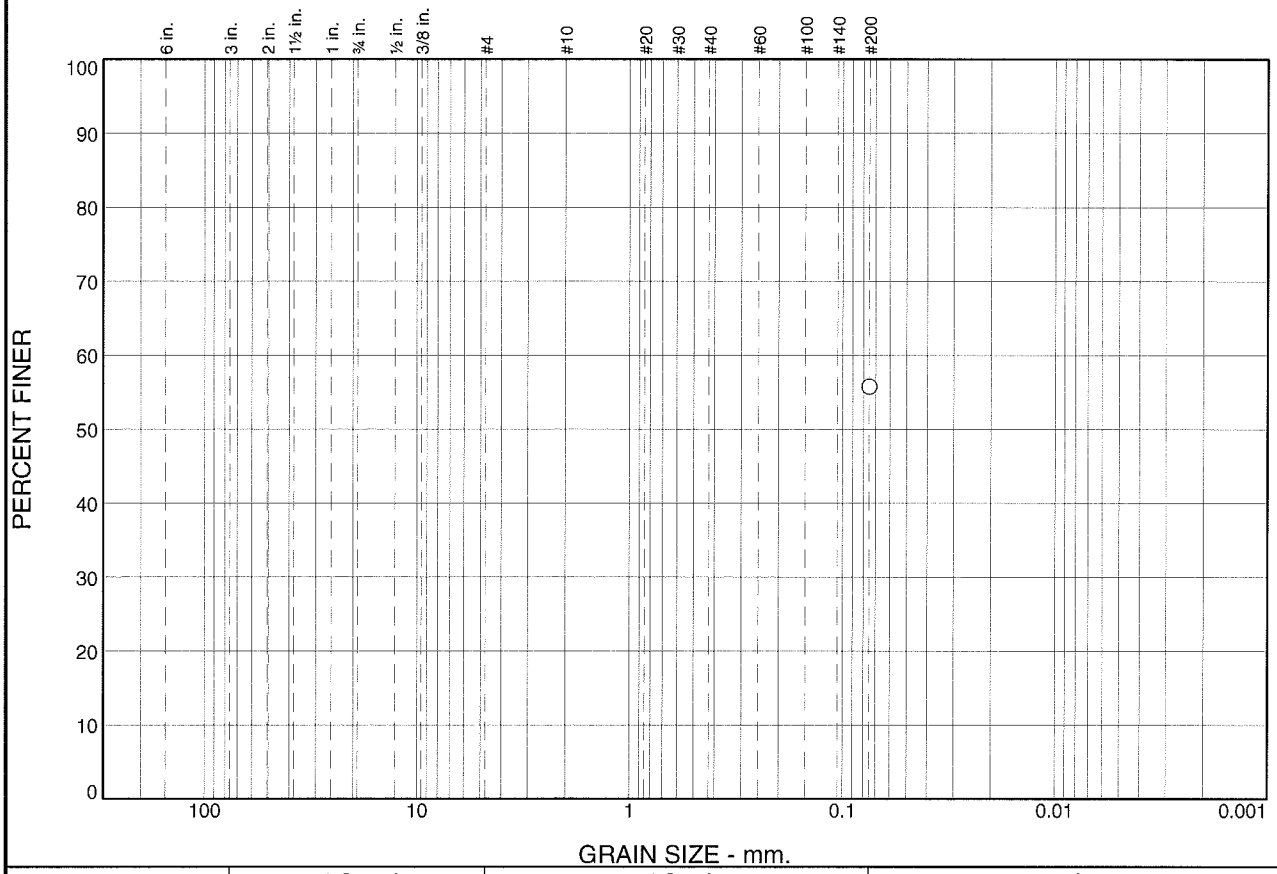
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						55.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	55.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= 18 LL= 24 PI= 6

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-39 #13
Sample Number: S32281 **Depth:** 31.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
B-40 #7	15	122.1	92.9	31.4
B-40 #10	25	122.3	93.9	30.2

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011

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Biggs-West Gridley Canal Improvements

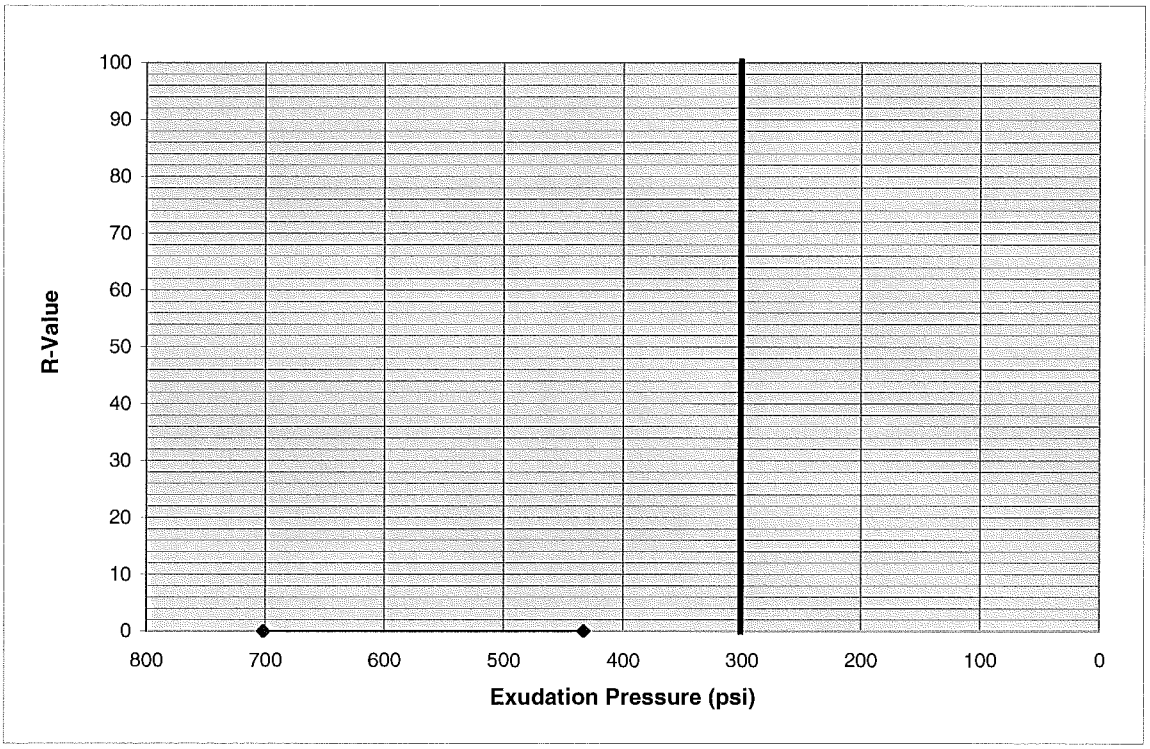
10-066.00

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Resistance Value

Test Procedure: CAL 301

Client Project:	Biggs-West Gridley Canal Improvements
STL Project Number:	11-236
Client Project Number:	10-066.00
Sample Number:	B-40 #2 @ 0-5' (S32282)
Sample Received Date:	8/25/2011
Material Description:	VISUAL: Black Clay



Specimen Number:	*1*	*2*	*3*	
Moisture at Test (%)	21.1	23.1	24.7	
Dry Unit Weight at Test (pcf)	105.7	100.8	98.1	
Expansion Pressure (psf)	152	95		
Exudation Pressure (psi)	702	433		
Resistance Value	N/A	N/A	Sample Extruded	
Resistance Value at 300 psi exudation pressure			<5	

NOTE:

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Sierra Testing Laboratories, Inc.

Unconsolidated Undrained Triaxial Test (ASTM D2850)

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

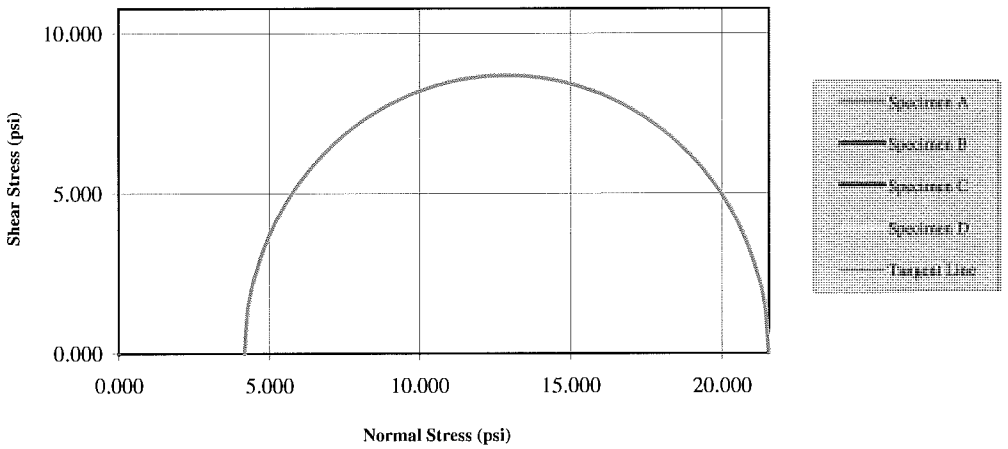
Date: 09/14/11

Checked By: MN

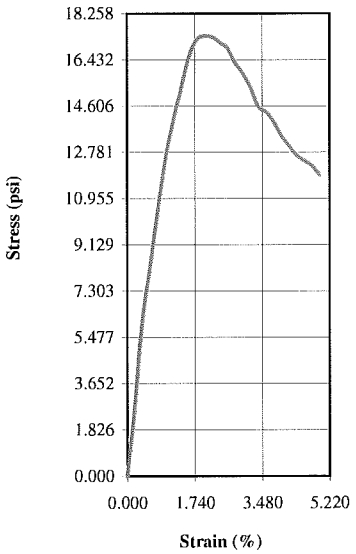
Date: 13-Sep

Tested By: JS

Mohr Circles



Stress-Strain Curve

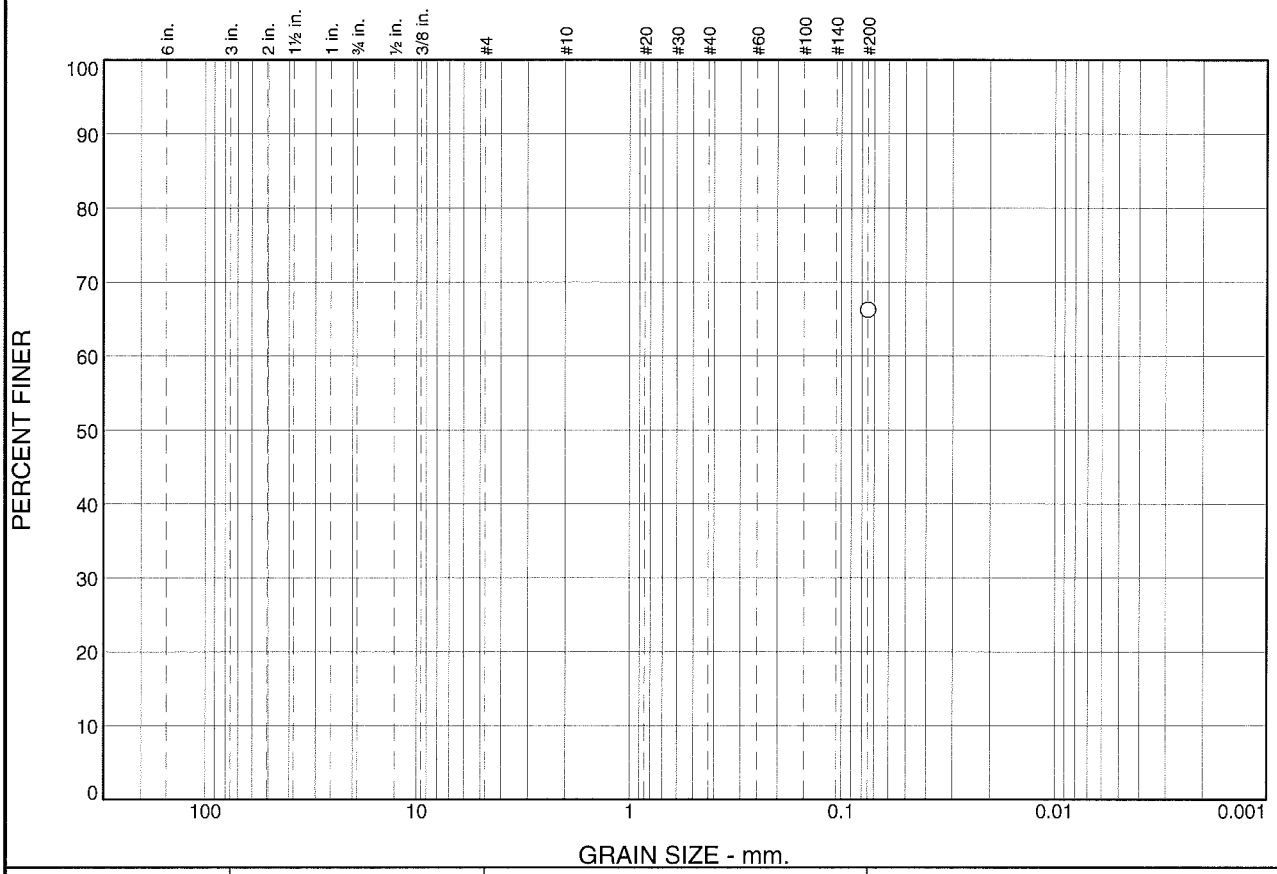


Before Test	Specimen A	B	C	D
Water Content (%)	30.80	0.00	0.00	0.00
Dry Density (pcf)	90.77	0.00	0.00	0.00
Saturation (%)	99.22	0.00	0.00	0.00
Void Ratio	0.82	0.00	0.00	0.00
Diameter (in)	2.370	0.000	0.000	0.000
Height (in)	5.120	0.000	0.000	0.000
Liquid Limit				
Plastic Limit				
Specific Gravity	2.650			
After Test	**A**	**B**	**C**	**D**
Water Content (%)	30.27	0.00	0.00	0.00
Test Data	**A**	**B**	**C**	**D**
Strain Rate (in/min)	0.05	0.00	0.00	0.00
Peak Deviator Stress (psi)	17.389	0.000	0.000	0.000
Axial Strain @ Failure (%)	1.989	0.000	0.000	0.000
	Cell Pressure			
Cell (psi)	4.2	0.0	0.0	0.0
Back (psi)	n/a	n/a	n/a	n/a
	Principle Stresses at Failure			
σ1 (psi)	21.6	0.0	0.0	0.0
σ3 (psi)	4.2	0.0	0.0	0.0

Mohr-Coulomb Strength Parameters		Sample Description
C (psi)	8.7	
Friction Angle Ø	0.00	

Project Information			
Project Name:	Biggs-West Gridley Canal Improvements		
Project Number:	11-236	Job Number:	10-066.00
Location:		Boring Number:	B-40, #3 @ 5'3"
Client:	SAGE	Sample Number:	S32283
Remarks:			

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						66.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	66.3		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

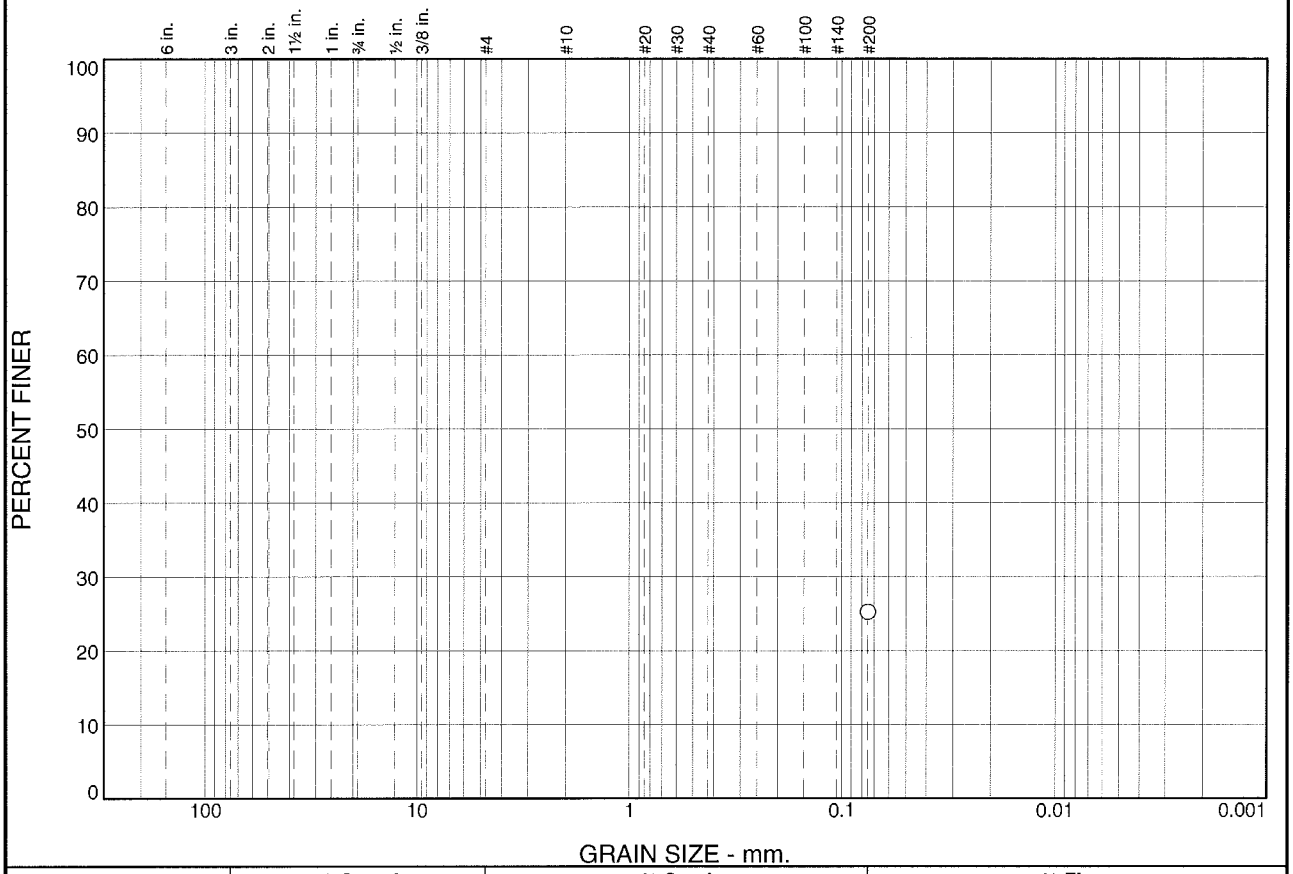
Location: B-40 #7
Sample Number: S32284 **Depth:** 15.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						25.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	25.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: B-40 #12
Sample Number: S32286 **Depth:** 30.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
TRA2 #1	3			18.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: **11-236** August 25, 2011

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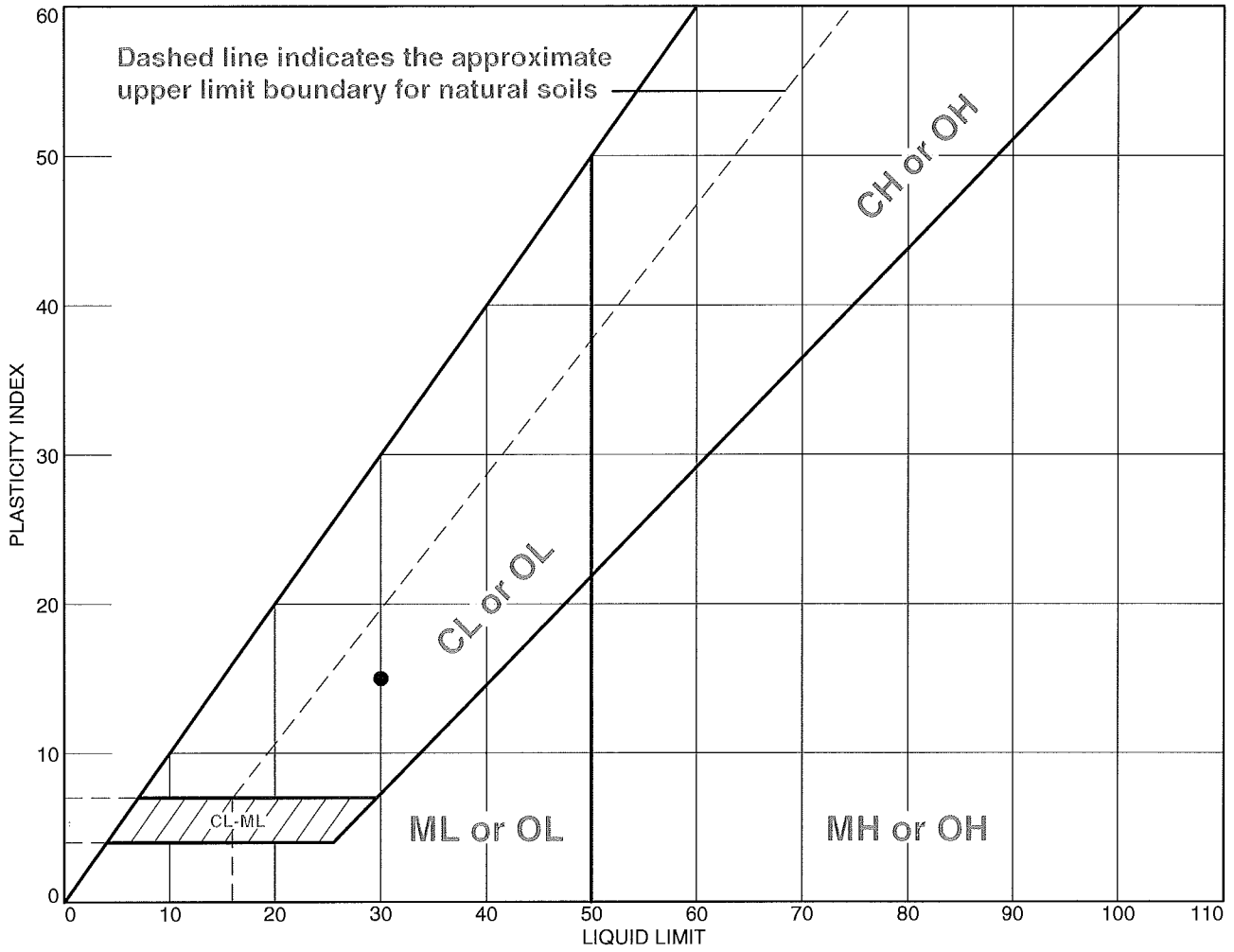
Biggs-West Gridley Canal Improvements

10-066.00

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		30	15	15			

Project No. 11-236 **Client:** Sanders & Associates Geostructural Engineering, Inc

Project: Biggs-West Gridley Canal Improvements
10-066.00

● **Location:** TRA2 #1 **Depth:** 3.0 **Sample Number:** S32287

Remarks:

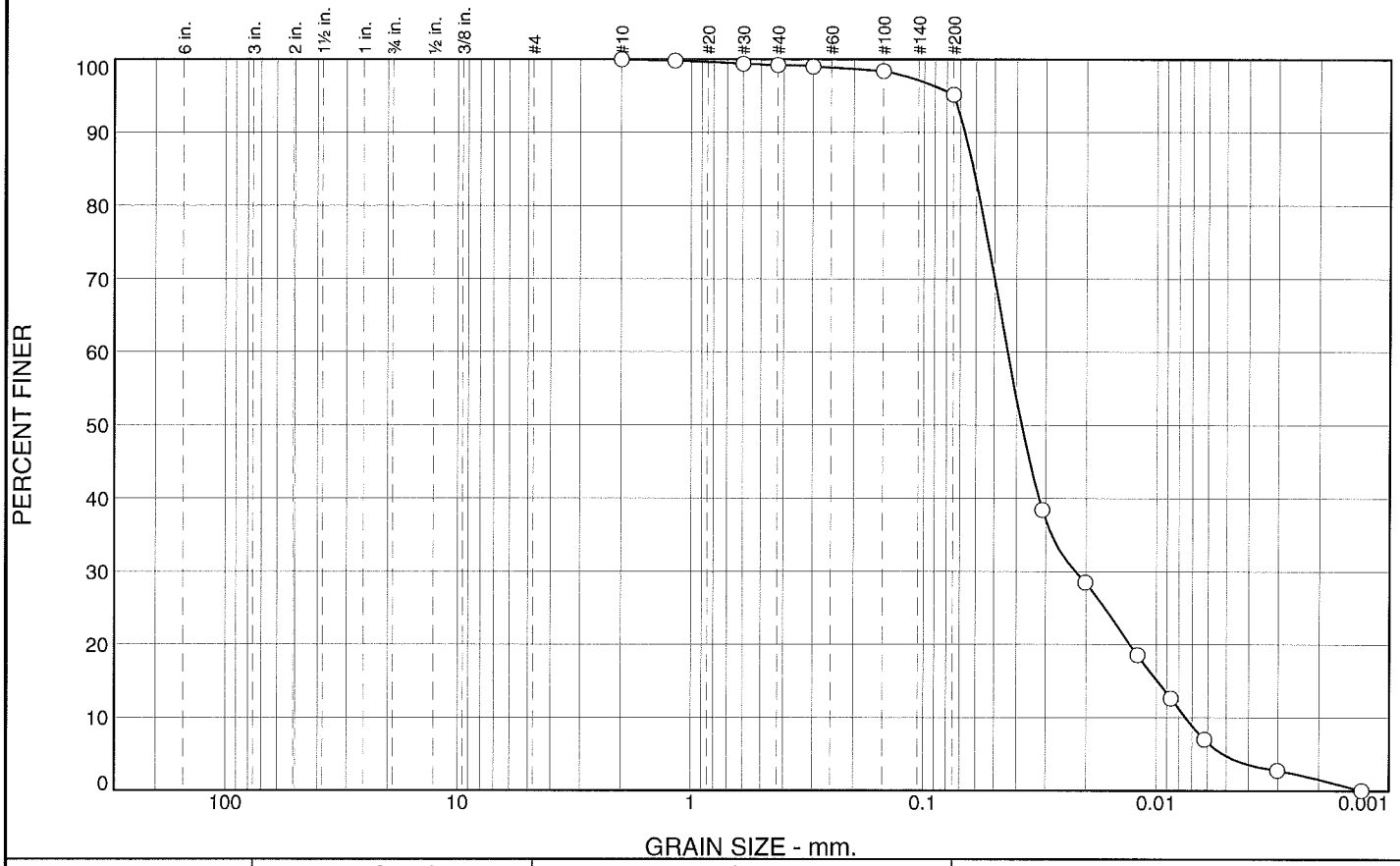
SIERRA TESTING LABS, INC.

El Dorado Hills, CA

Figure

Tested By: rh **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.8	4.0	90.4	4.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#16	99.8		
#30	99.4		
#40	99.2		
#50	99.0		
#100	98.4		
#200	95.2		
0.0310 mm.	38.5		
0.0202 mm.	28.5		
0.0121 mm.	18.6		
0.0087 mm.	12.7		
0.0062 mm.	7.0		
0.0030 mm.	2.8		
0.0013 mm.	0.0		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0671 D_{85}= 0.0617 D_{60}= 0.0437
D_{50}= 0.0380 D_{30}= 0.0223 D_{15}= 0.0099
D_{10}= 0.0075 C_u= 5.85 C_c= 1.52

Classification

USCS= AASHTO=

Remarks

F.M.=0.03

Location: TRA2 #2
Sample Number: S32288 **Depth:** 7'2" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements 10-066.00
Project No: 11-236 **Figure**

Tested By: ns/jm/pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: TRA2 #3 | Sample Depth, ft.: 7'8" | Lab No.: S32289

Visual Description: N/A | Sample Type:

Remarks:

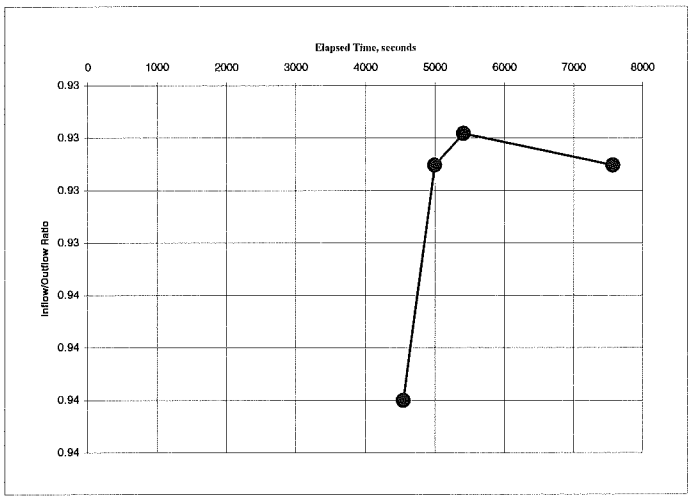
TEST RESULTS

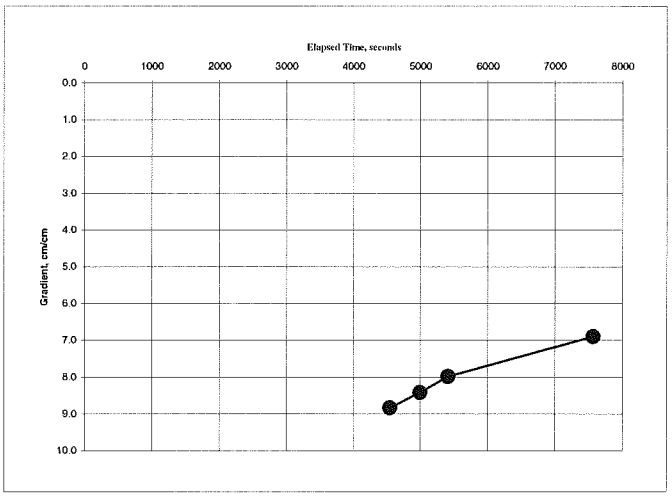
Permeability, cm/sec.: 3.61E-06 | **Average Hydraulic Gradient: 8.0**

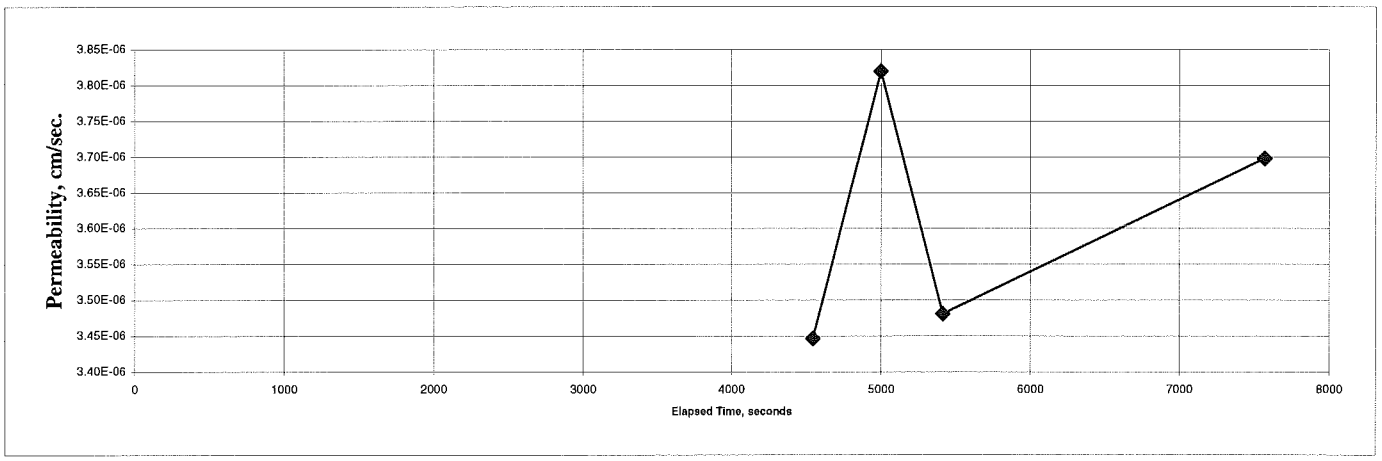
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.11	Specimen Height, cm:	7.11
Specimen Diameter, cm:	6.10	Specimen Diameter, cm:	6.10
Dry Unit Weight, pcf:	87.4	Dry Unit Weight, pcf:	82.2
Moisture Content, %	34.1	Moisture Content, %	41.5
Specific Gravity, Assumed	2.70		
Percent Saturation:	98.7		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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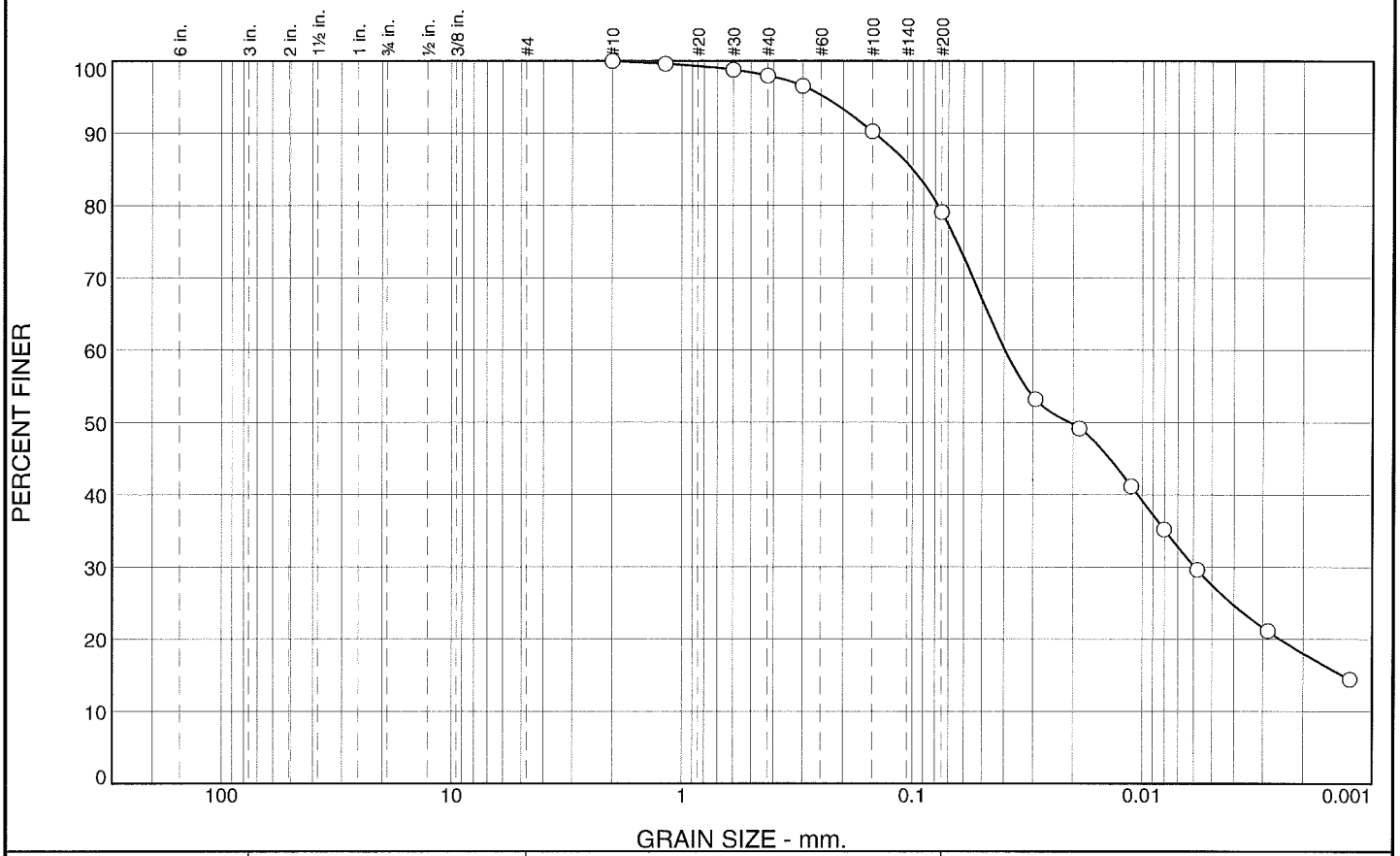
Biggs-West Gridley Canal Improvements

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.0	18.9	51.6	27.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#16	99.6		
#30	98.8		
#40	98.0		
#50	96.6		
#100	90.3		
#200	79.1		
0.0293 mm.	53.2		
0.0188 mm.	49.2		
0.0112 mm.	41.2		
0.0080 mm.	35.2		
0.0058 mm.	29.6		
0.0029 mm.	21.2		
0.0013 mm.	14.5		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1465 D_{85}= 0.1003 D_{60}= 0.0396
D_{50}= 0.0207 D_{30}= 0.0059 D_{15}= 0.0013
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

F.M.=0.15

Location: TRA4 #2
Sample Number: S32290 **Depth:** 7'2" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: ns/jm/pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: TRA4 #3 | Sample Depth, ft.: 7'8" | Lab No.: S32291

Visual Description: N/A | Sample Type:

Remarks:

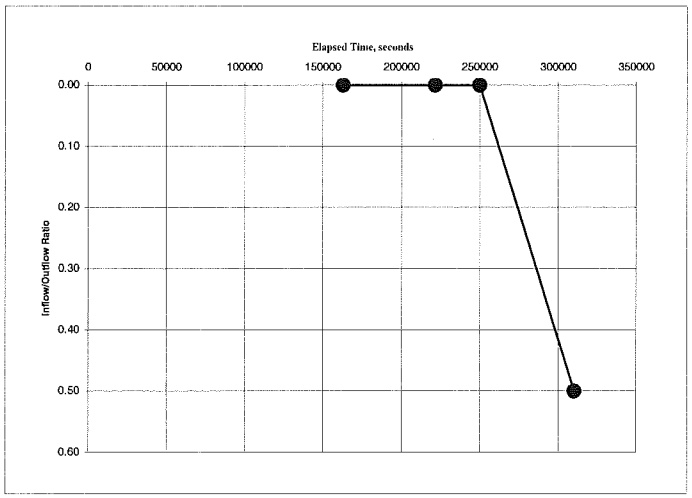
TEST RESULTS

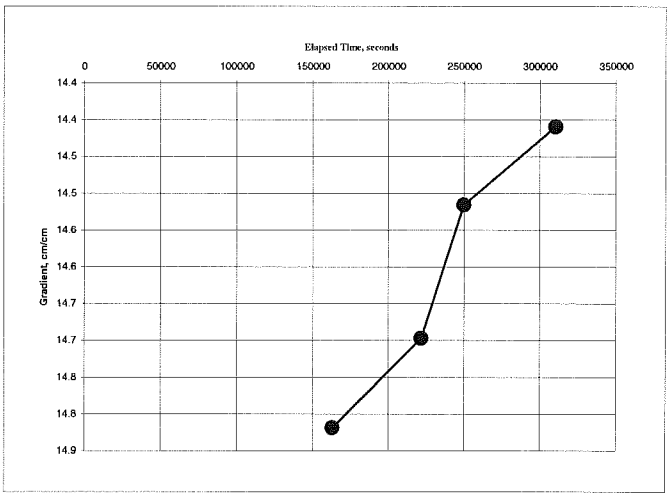
Permeability, cm/sec.: 7.27E-09 | **Average Hydraulic Gradient: 14.6**

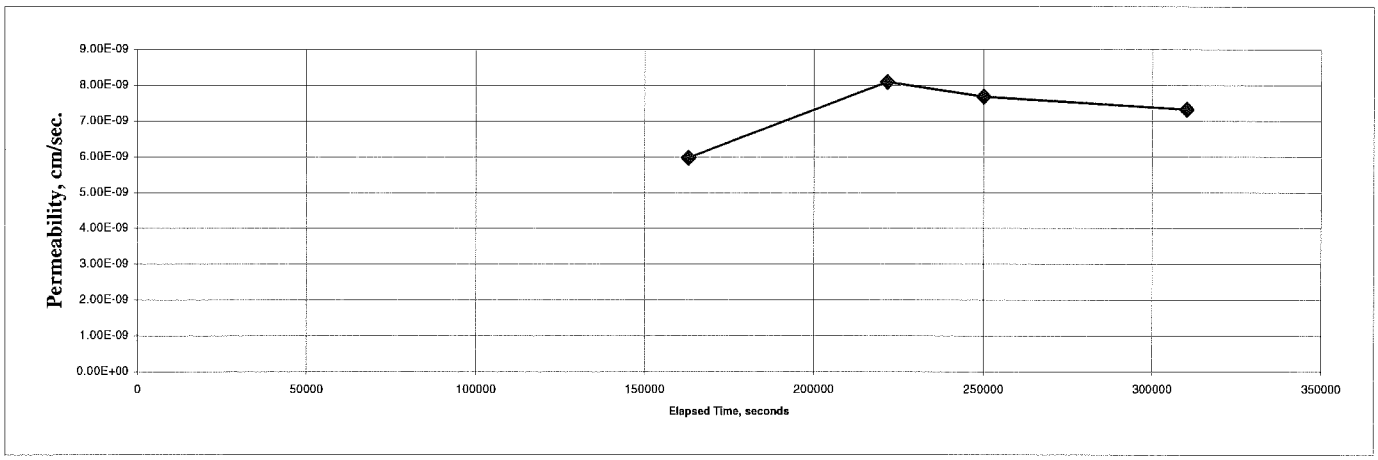
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.81	Specimen Height, cm:	6.60
Specimen Diameter, cm:	5.66	Specimen Diameter, cm:	5.66
Dry Unit Weight, pcf:	115.5	Dry Unit Weight, pcf:	122.0
Moisture Content, %	16.5	Moisture Content, %	21.7
Specific Gravity, Assumed	2.70		
Percent Saturation:	97.5		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

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Biggs-West Gridley Canal Improvements

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
TRA6 #1	3			23.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	11-236	August 25, 2011	Biggs-West Gridley Canal Improvements
			10-066.00

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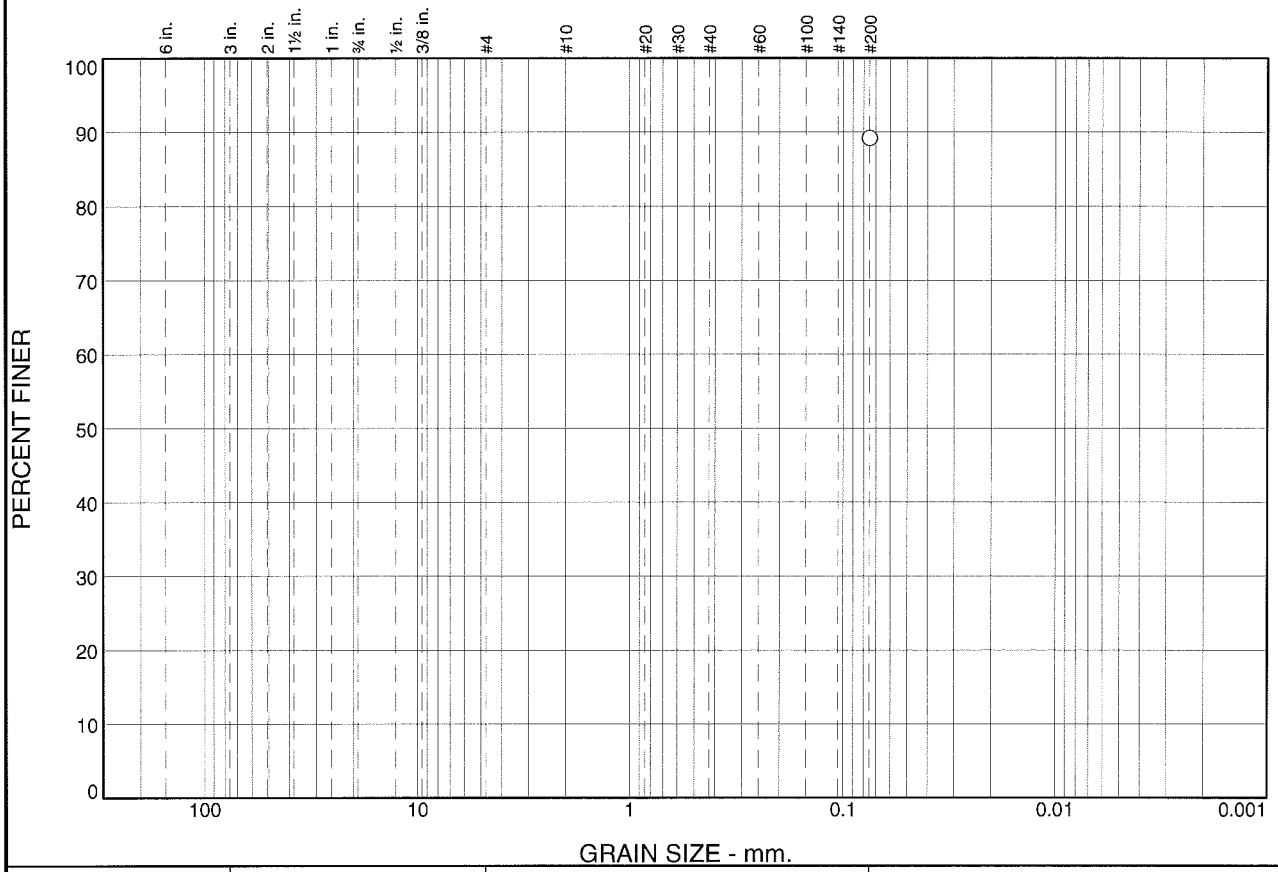
Phone: (916) 939-3460 FAX: (916) 939-3507

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						89.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	89.2		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

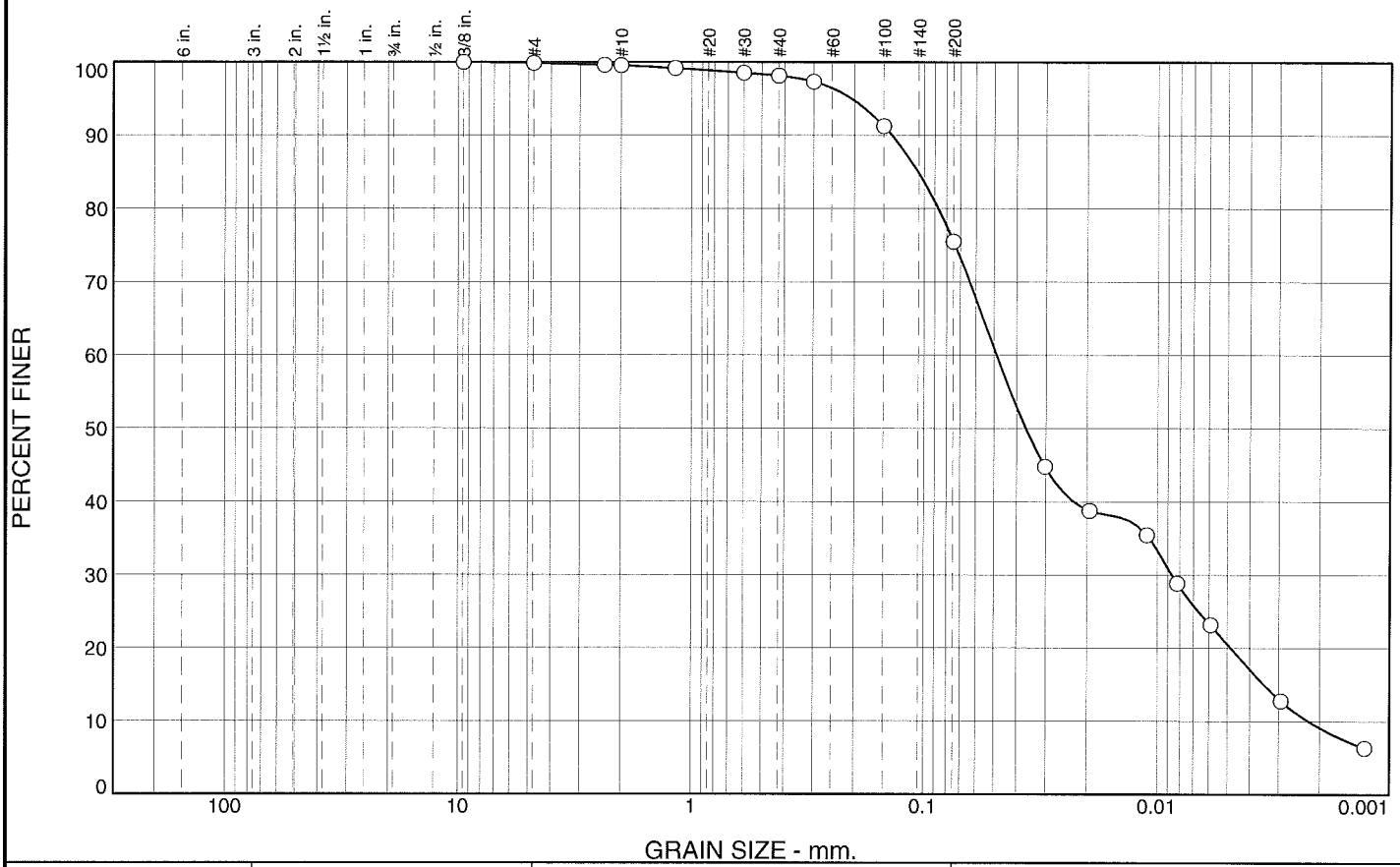
Location: TRA6 #1
Sample Number: S32292 **Depth:** 3.0 **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements
10-066.00
Project No: 11-236 **Figure**

Tested By: pr **Checked By:** mn

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.4	1.4	22.6	54.9	20.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8 Inch	100.0		
#4	99.9		
#8	99.6		
#10	99.5		
#16	99.1		
#30	98.5		
#40	98.1		
#50	97.3		
#100	91.3		
#200	75.5		
0.0303 mm.	44.8		
0.0195 mm.	38.8		
0.0111 mm.	35.5		
0.0082 mm.	28.9		
0.0059 mm.	23.2		
0.0029 mm.	12.8		
0.0013 mm.	6.3		

* (no specification provided)

Soil Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1382 D_{85}= 0.1065 D_{60}= 0.0487
D_{50}= 0.0365 D_{30}= 0.0087 D_{15}= 0.0035
D_{10}= 0.0022 C_u= 21.84 C_c= 0.69

Classification

USCS= AASHTO=

Remarks

F.M.=0.14

Location: TRA6 #2
Sample Number: S32293 **Depth:** 7'3" **Date:** 8/25/11

SIERRA TESTING LABS, INC.
El Dorado Hills, CA

Client: Sanders & Associates Geostructural Engineering, Inc
Project: Biggs-West Gridley Canal Improvements 10-066.00
Project No: 11-236 **Figure**

Tested By: ns/jm/pr **Checked By:** mn

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: TRA6 #3 | Sample Depth, ft.: 7'9" | Lab No.: S32294

Visual Description: N/A | Sample Type:

Remarks:

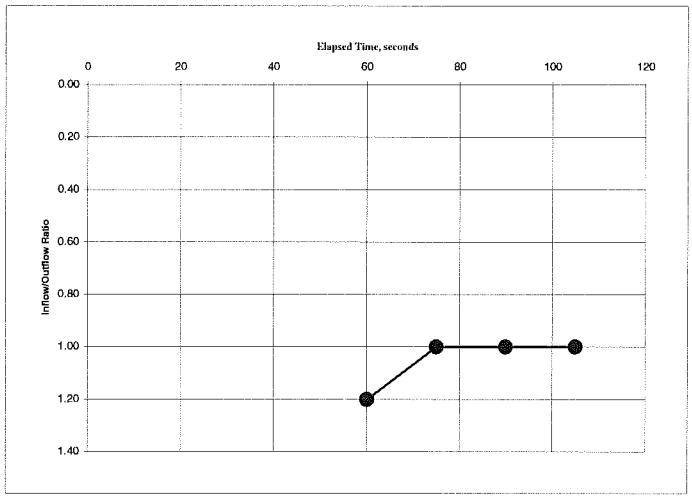
TEST RESULTS

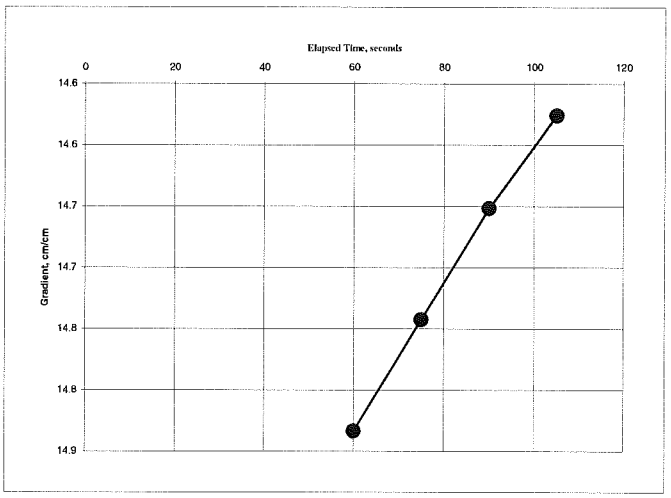
Permeability, cm/sec.: 1.16E-05 | **Average Hydraulic Gradient: 14.7**

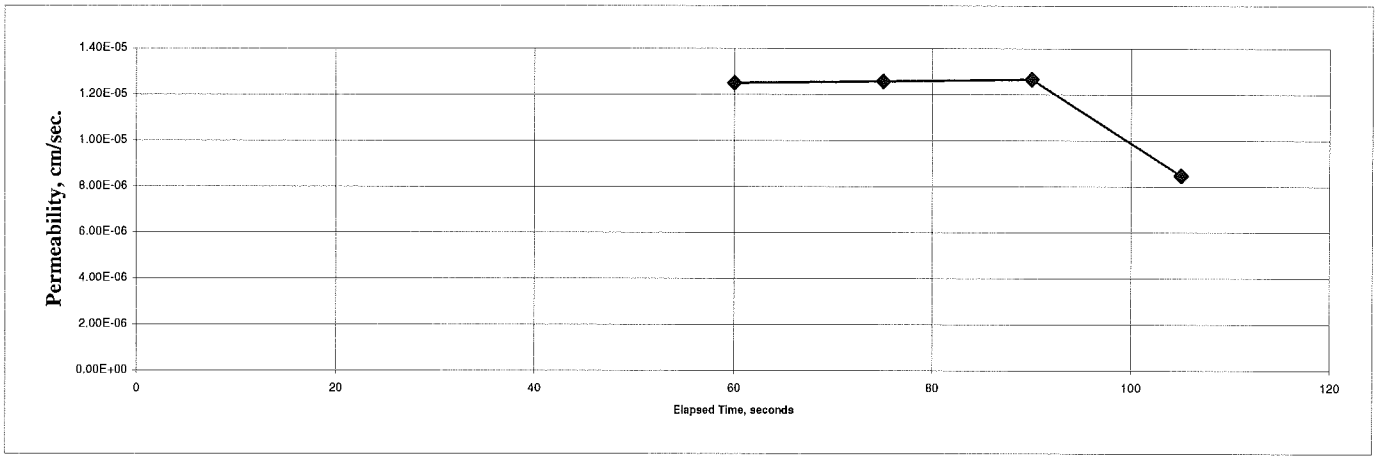
Effective Cell Pressure, psi: 10 | "B" Coefficient:

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.86	Specimen Height, cm:	6.60
Specimen Diameter, cm:	6.05	Specimen Diameter, cm:	6.05
Dry Unit Weight, pcf:	89.3	Dry Unit Weight, pcf:	92.3
Moisture Content, %	32.8	Moisture Content, %	36.4
Specific Gravity, Assumed	2.70		
Percent Saturation:	99.4		







Test Method: ASTM D5084 Method C

PROJECT NUMBER:	11-236	August 25, 2011

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762
Phone: (916) 939-3460 FAX: (916) 939-3507

Biggs-West Gridley Canal Improvements

Sunland Analytical

11353 Pyrites Way, Suite 4
Rancho Cordova, CA 95670
(916) 852-8557

Date Reported 08/31/2011
Date Submitted 08/26/2011

To: Tom Sell
Sanders & Assoc. Geostructural Eng.
4180 Douglas Blvd. Ste #100
Granite Bay, Ca 95746

From: Gene Oliphant, Ph.D.
General Manager

The following is the report of analysis requested on SUN Order 60888.
Your purchase order number is .
Thank you for your business.

SUN #	Sample Describ	Sample #	Chloride as ppm Cl /Dry Wt.	Sulfate as ppm SO4 /Dry Wt.
124895	10-066.00/W.GRIDLEY	B2-1 @ 5'	27.2	9.7
124896	10-066.00/W.GRIDLEY	B-7-3 @ 6'	92.1	19.7
124897	10-066.00/W.GRIDLEY	B-11-1 @ 0-0.5'	49.7	24.4
124898	10-066.00/W.GRIDLEY	B-16-1 @ 0-0.5'	50.0	35.1
124899	10-066.00/W.GRIDLEY	B-22-2 @ 3"-5'	24.8	68.1
124900	10-066.00/W.GRIDLEY	B-27-2 @ 5'	182.9	30.6
124901	10-066.00/W.GRIDLEY	B-31-4 @ 10'	11.3	0.9
124902	10-066.00/W.GRIDLEY	B-38-1 @ 0-0.5'	35.4	44.2

Methods: Sulfate-Cal Trans #417, Chloride-Cal Trans #422