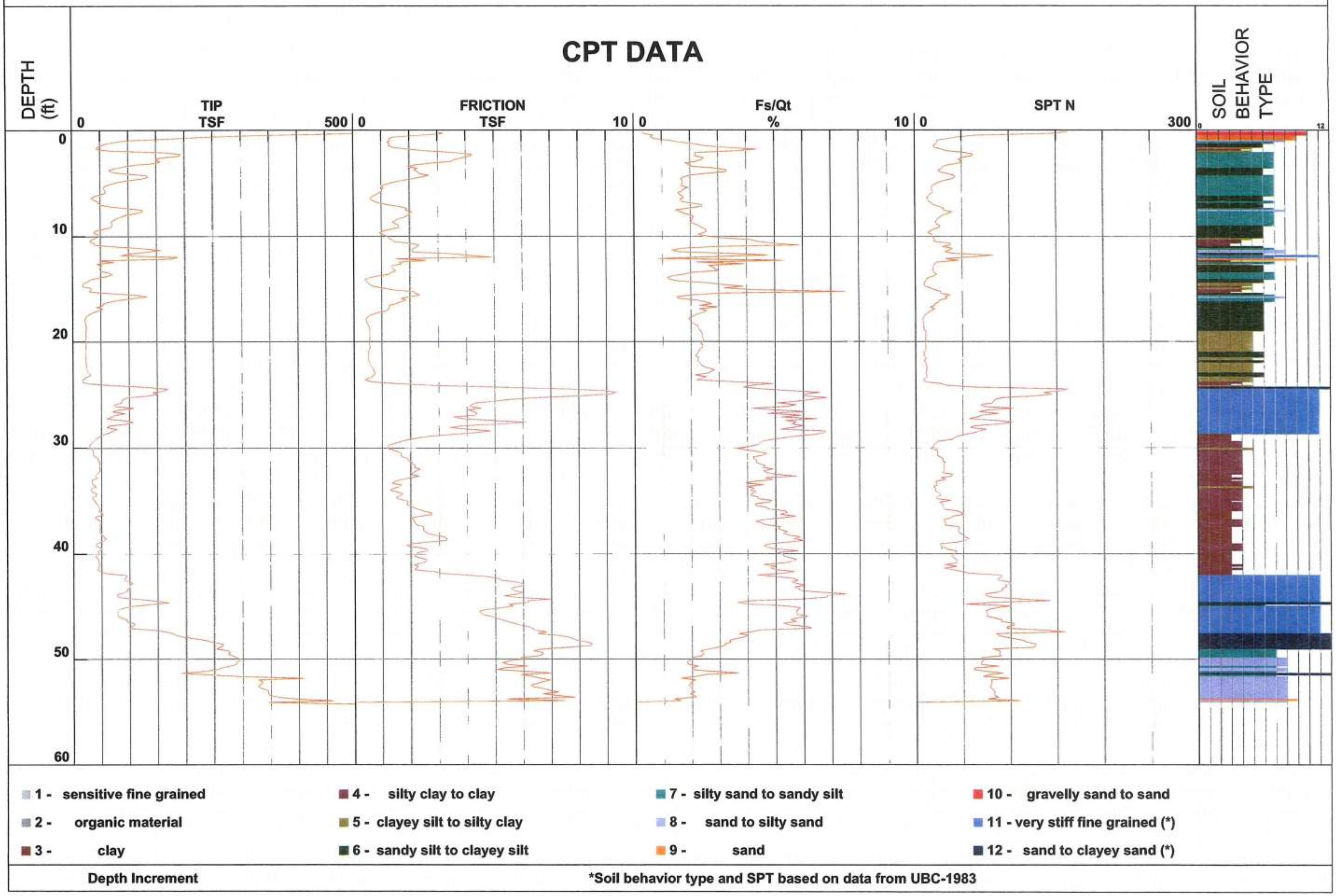
C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(503).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-02	Date and Time	12/20/2007 9:16:17 AM	Maximum Depth	54.30 ft
Water Table Depth	0.00 ft			Elevation	839 ft

CPT DATA

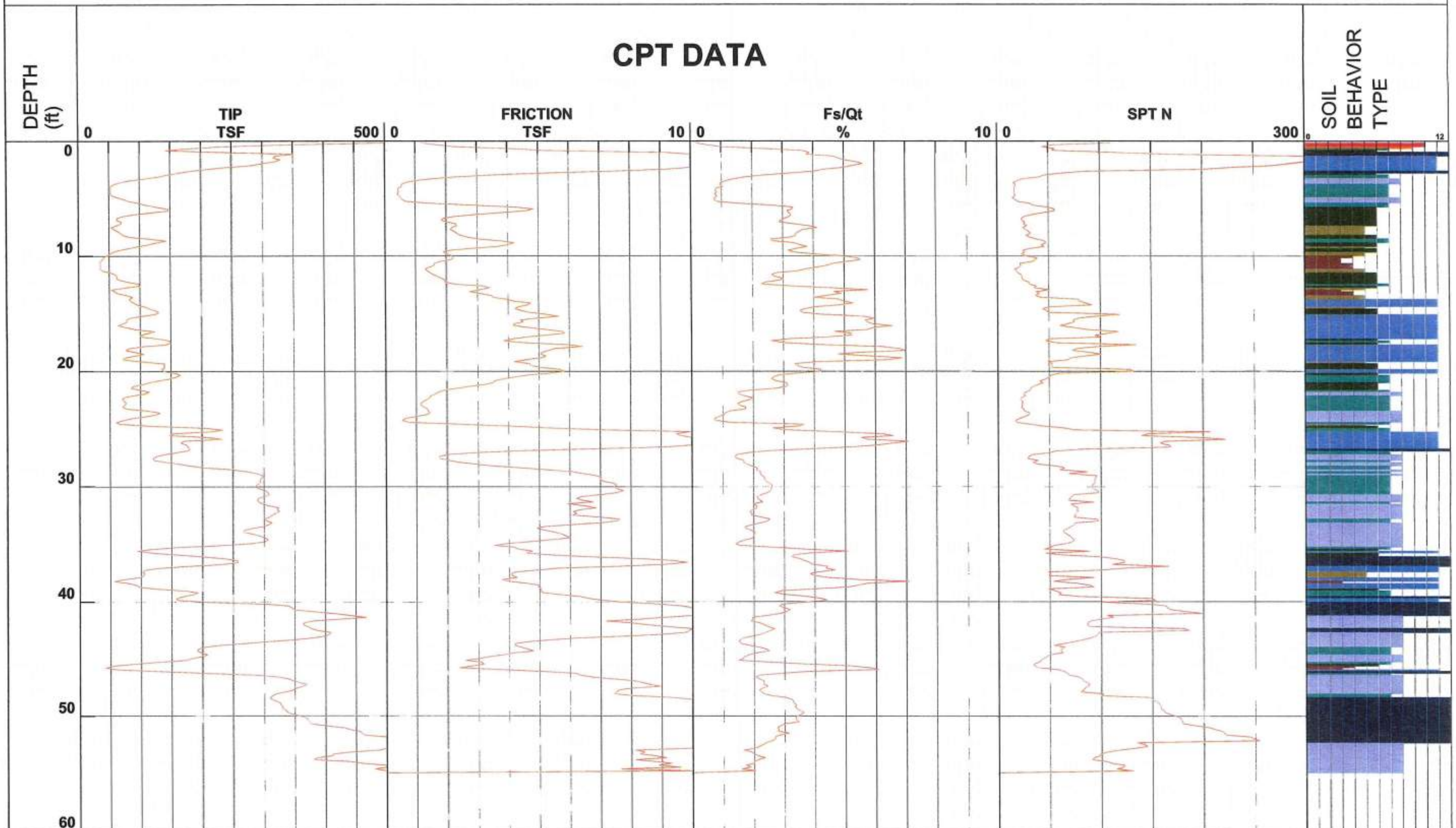


C.H.J. Inc

Middle Earth Geo Testing Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(504).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-03	Date and Time	12/20/2007 10:07:56 AM	Maximum Depth	55.12 ft
Water Table Depth	0.00 ft			Elevation	837 ft

CPT DATA



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

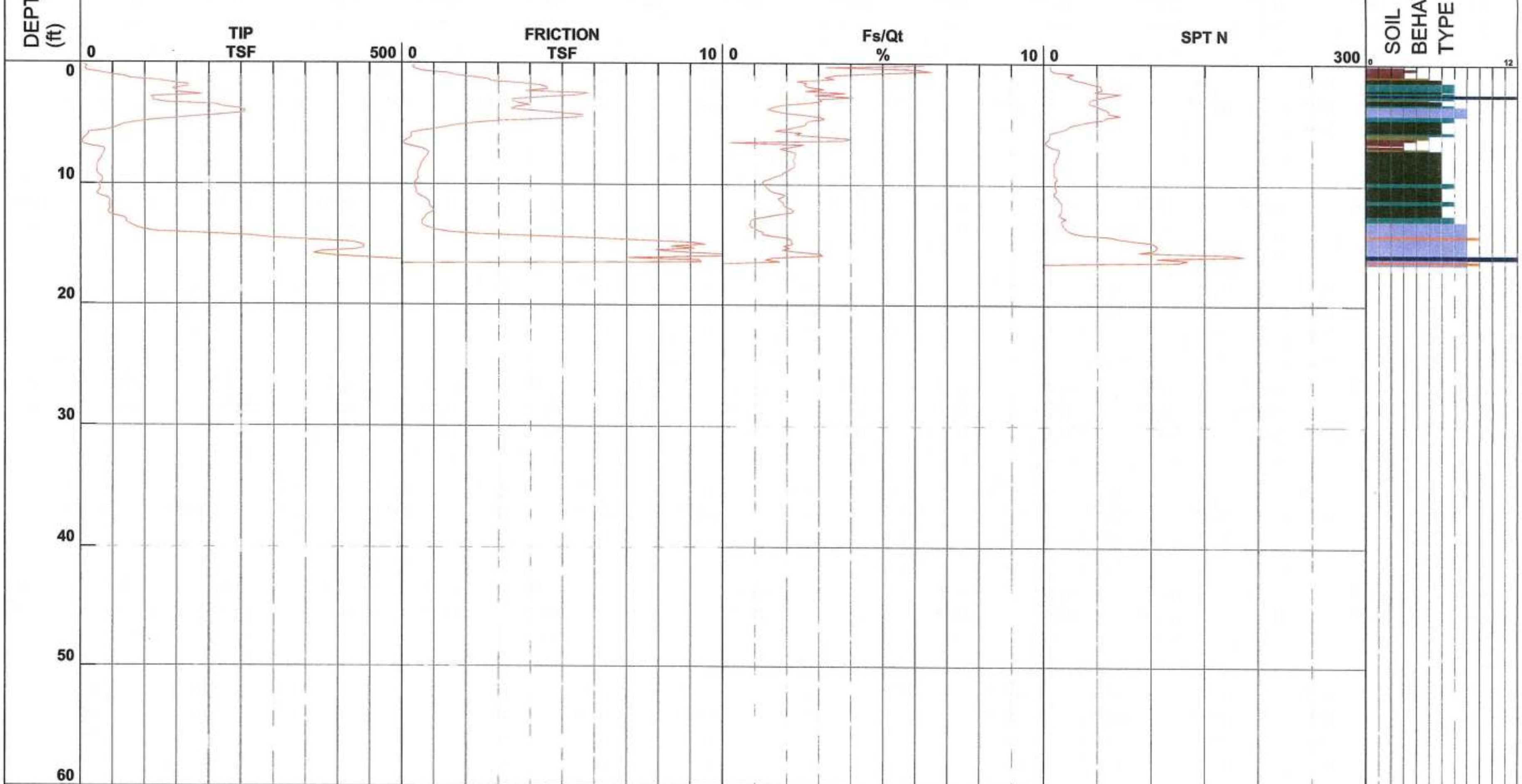
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(505).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-04	Date and Time	12/20/2007 11:43:15 AM	Maximum Depth	16.73 ft
Water Table Depth	0.00 ft			Elevation	797 ft

CPT DATA



- 1 - sensitive fine grained
- 2 - organic material
- 3 - clay
- 4 - silty clay to clay
- 5 - clayey silt to silty clay
- 6 - sandy silt to clayey silt
- 7 - silty sand to sandy silt
- 8 - sand to silty sand
- 9 - sand
- 10 - gravelly sand to sand
- 11 - very stiff fine grained (*)
- 12 - sand to clayey sand (*)

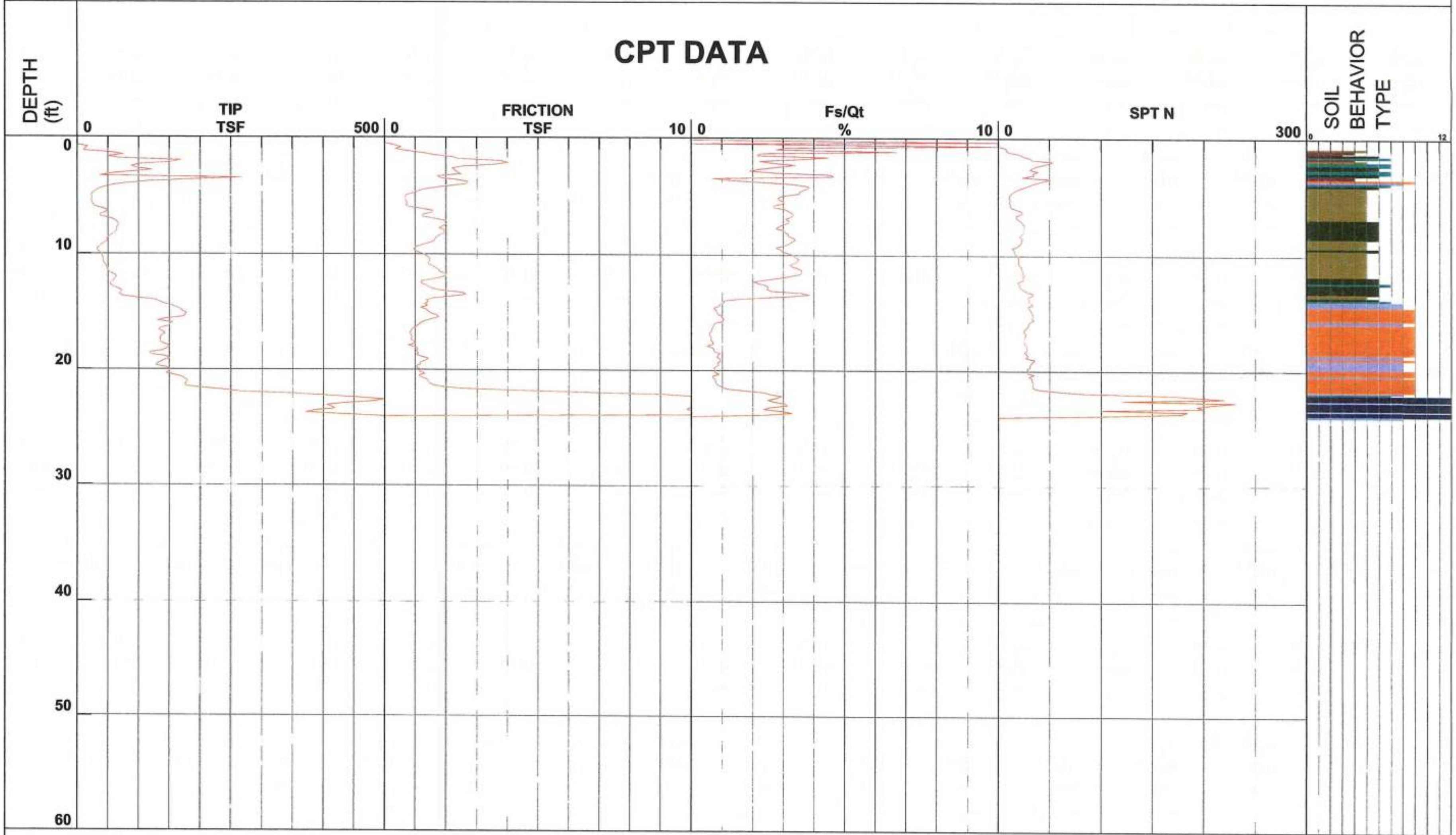
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(506).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-05	Date and Time	12/20/2007 12:28:45 PM	Maximum Depth	24.28 ft
Water Table Depth		0.00 ft		Elevation	798 ft

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

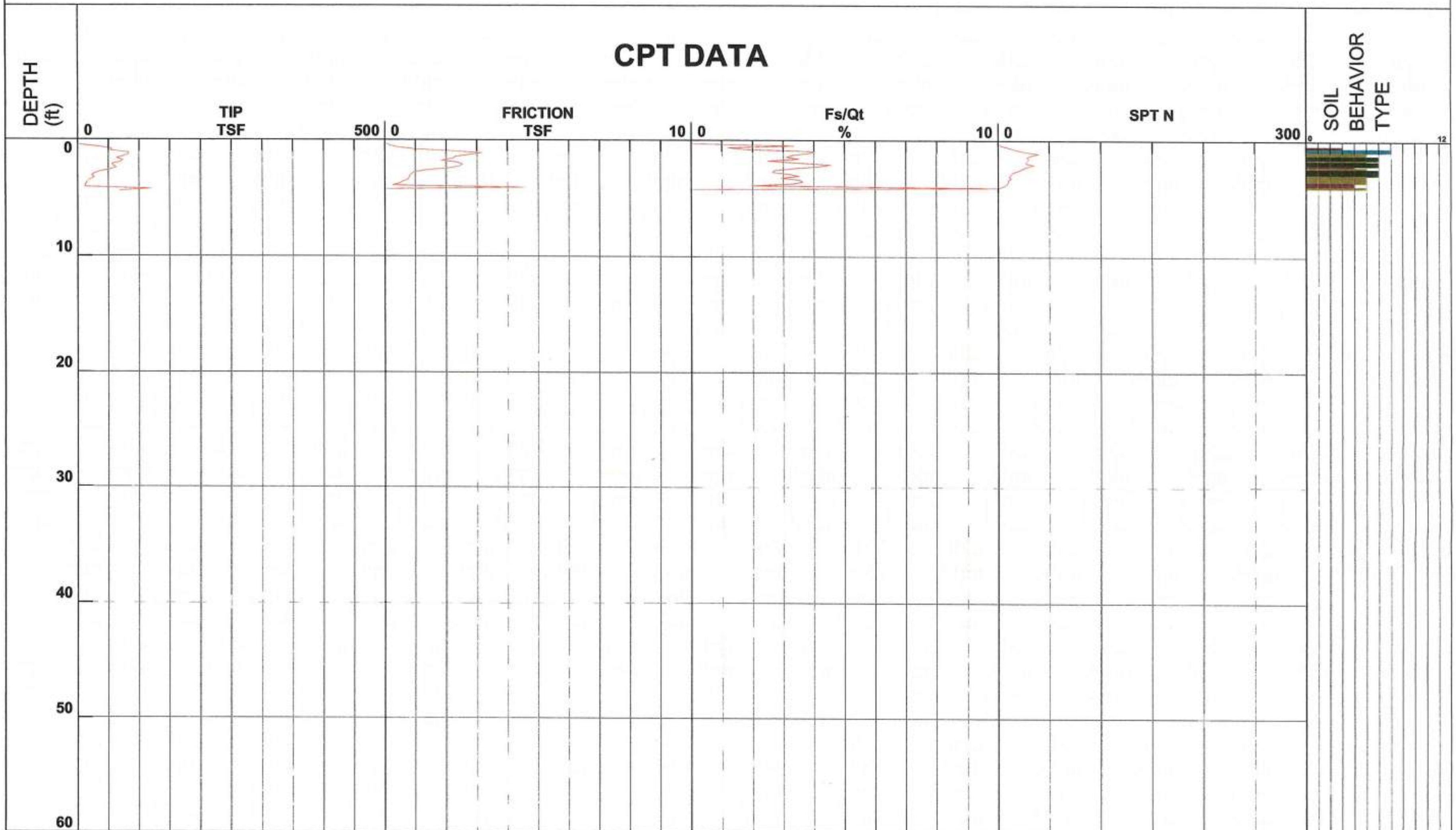
Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

C.H.J. Inc

Location	Riverside Community Hospital	Operator	ML/JH	Filename	SDF(507).cpt
Job Number	07881-3	Cone Number	DSG1047	GPS	
Hole Number	CPT-06	Date and Time	12/20/2007 1:04:18 PM	Maximum Depth	4.43 ft
Water Table Depth		0.00 ft		Elevation	797 ft

CPT DATA



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Depth Increment

*Soil behavior type and SPT based on data from UBC-1983

EXPLORATORY BORING NO. 1

Date Drilled: 10/20/12
Equipment: CME 55
Surface Elevation(ft): 793.5
Client: HCA Management Services, LP
Driving Weight / Drop: 130 lbs./30"
Logged by: VJR
Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
0		3.5" of Asphalt Concrete	Fill						
		5" of Aggregate Base							
		(SM) Silty Sand, fine to medium with coarse, with clay, brown		X	X	3 1 4	11.5		Cor., RV,SA,SE SPT
		(SM) Silty Sand, fine to medium, brown	Native		X		10.1		Cor., DS, Exp., Hydro., MDC,SA SPT, P#200
5				X		1 1 2			
		(SM) Silty Sand, fine to medium with gravel to 2", brown			X		3.1		
10				X		2 2 3			SPT, P#200
15		(SM) Silty Gravelly Sand, fine to medium with coarse and gravel to 2", brown		X		10 30 50/3"			SPT, P#200
20				X		37 50/5"			SPT, P#200
25				X		22 38 39			SPT, P#200
30				X		50 50/4"			SPT, P#200

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3
Enclosure B-1a

EXPLORATORY BORING NO. 1

Date Drilled: 10/20/12
Equipment: CME 55
Surface Elevation(ft): 793.5

Client: HCA Management Services, LP
Driving Weight / Drop: 130 lbs./30"
Logged by: VJR

Measured Depth to Water(ft): N/A

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES DRIVE	SAMPLES BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Sand, fine to coarse, with clay and gravel to 2", light brown		X		48 50/4"			SPT, P#200
		END OF BORING							
40		NO BEDROCK REFUSAL AT 37.0' FILL TO 3.0', SLIGHT CAVING NO GROUNDWATER							
45									
50									
55									
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3 Enclosure B-1b

EXPLORATORY BORING NO. 2

Date Drilled: 10/24/12
Equipment: CME75
Surface Elevation(ft): 792.5

Client: HCA Management Services, LP
Driving Weight / Drop: 130 lbs./30"
Logged by: JMc

Measured Depth to Water(ft): 37.5

DEPTH (ft)	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
	6" of Asphalt Concrete	Fill						
	5" of Aggregate Base							
	(SM) Silty Sand, fine to medium, few clay and gravel to 1/2", brown			X		10.5		Cor.,RV, SA,SE
	(SM) Silty Sand, fine with medium, brown	Native		X		8.2		Cor., DS, Exp., Hydro., MDC, SA
5								
			X		3 4 4			SPT, P#200
	(SP-SM) Sand with silt, fine to medium with coarse, brown			X		4.9		
10								
			X		2 3 4			SPT, P#200
	(SP-SM) Sand, fine to coarse with silt, brown							
15								
			X		20 30 27			SPT, P#200
	(SM) Silty Gravelly Sand, fine to medium with coarse, gravel to 1", brown							
20								
			X		32 27 27			SPT, P#200
25								
			X		39 50/5"			SPT, P#200
30								
			X		50/5"			SPT, P#200

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3 Enclosure B-2a

EXPLORATORY BORING NO. 2

Date Drilled: 10/24/12

Equipment: CME75

Surface Elevation(ft): 792.5

Client: HCA Management Services, LP

Driving Weight / Drop: 130 lbs./30"

Logged by: JMc

Measured Depth to Water(ft): 37.5

DEPTH (ft)	GRAPHIC LOG	VISUAL CLASSIFICATION	REMARKS	SAMPLES: DRIVE	SAMPLES: BULK	UNCORRECTED BLOWS/6 IN.	FIELD MOISTURE (%)	DRY UNIT WT. (pcf)	LAB/FIELD TESTS
		(SM) Silty Gravelly Sand, fine to medium with coarse, gravel to 1", brown							
			▼	X		50/3"			SPT, P#200
40									
				X		50			SPT, P#200
45									
				X		41 50/4"			SPT, P#200
50									
				X		50/4"			SPT, P#200
		END OF BORING							
55		NO BEDROCK NO REFUSAL FILL TO 3.5' NO CAVING GROUNDWATER AT 37.5'							
60									
65									

BORING LOG - NO EQUIV & BLOW PER 6 IN 12735-3.GPJ CHJ.GDT 11/21/12

C.H.J.

MEDICAL OFFICE BUILDING
RIVERSIDE COMMUNITY HOSPITAL

Job No. 12735-3 Enclosure B-2b

B12SOIL_CRANDALL(DECIMAL_ELE) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130001 RIVERSIDE COMMUITY HOSP\3.2 ALL FIELD NOTES\130001.GPJ 2/28/13

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

BORING 1

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 796**

Elevation scale (ft): 795, 790, 785, 780, 775, 770, 765, 760
Depth scale (ft): 5, 10, 15, 20, 25, 30, 35, 40

"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)
	11.3	93	7
	24.6	92	12
7			
	4.3	104	17
17			
	7.7	125	93/11"
78			
	7.9	120	53/6"
64			
	15.5	120	50/5"
55/6"			
	17.3	113	66/5"

4" thick Asphalt Concrete over 3" thick Base Course

ML — SANDY SILT - medium stiff, moist, yellowish brown and olive yellow, some fine to coarse sand, some mica

Becomes olive brown to olive yellow, (68% passing No. 200 sieve)

SW-SM — WELL-GRADED SAND with SILT - medium dense, moist, olive yellow to yellowish brown, fine to coarse grained, some fine gravel (up to ½ inch in size), layers of Poorly Graded Sand

Becomes very dense, some fine gravel (up to ¾ inch in size)

Cobbles (up to 8 inches in size)

Becomes fine to medium grained

SW-SM — WELL-GRADED SAND with SILT and GRAVEL - very dense, wet, olive yellow, fine to coarse grained, fine gravel (up to ¾ inch in size)

Increasing coarse sand and fine gravel

Cobble (up to 10 inches in size)

Granitic rock and cobbles (up to 6 inches in size)

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

amec

LOG OF BORING
Project: 4953-13-0001 Figure: A-1.1a

BORING 1 (Continued)

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 796**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.		DESCRIPTION
755		52/6"					SM	SILTY SAND - very dense, wet, light brown, fine to medium grained, granitic rock fragments
							SW	WELL-GRADED SAND with GRAVEL - very dense, wet, light brown, fine to coarse grained, some cobbles (up to 5 inches in size)
								Cobbles (up to 5 inches in size)
	45							
750			--	--	73/6"			Sample not recovered, 4-inch cobble
		50/5"						
	50							Layers of Poorly Graded Sand
745								END OF BORING AT 50 FEET
740	55							
735	60							
730	65							
725	70							
720	75							
	80							

NOTES:

Drilling mud used during drilling process. Mud removed after completion of drilling to a depth of 33 feet. Water level measured at a depth of 31.5 feet after removal of drilling mud and a depth of 31.4 feet 15 minutes later. Boring backfilled with a cement bentonite grout

*Number of blows to drive the Crandall sampler 12 inches using a 140 pound automatic hammer falling 30 inches.

** Elevation based on topographic survey included on Enclosure A-2.1 of the report dated 1/22/08 by C.H.J. Incorporated.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL(DECIMAL_ELE) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130001 RIVERSIDE COMMUITY HOSP\3.2 ALL FIELD NOTES\130001.GPJ 2/28/13

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

amec

LOG OF BORING
Project: 4953-13-0001 Figure: A-1.1b

BORING 2

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 794**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	USCS	DESCRIPTION
							4" thick Asphalt Concrete over 6" thick Base Course
						SM	SILTY SAND - loose, moist, yellowish brown, fine to coarse grained, trace fine gravel (up to ¼ inch in size)
790	5		19.0	104	11		
			14.7	111	21	SW	WELL-GRADED SAND - medium dense, moist, olive yellow to light brownish gray, fine to coarse grained, some gravel
785	10		19.8	103	50	SP	POORLY GRADED SAND - dense, moist, olive yellow to yellowish brown, fine to coarse grained, some fine gravel (up to ½ inch in size)
780		49				SP-SM	POORLY GRADED SAND with SILT - dense to very dense, moist, olive to brown, fine to medium, trace fine gravel (up to ½ inch in size)
	15		--	--	30/0"		Some cobbles, sample not recovered
775	20	78					Some fine to coarse gravel (up to ¾ inch in size)
			--	--	75/6"		Sample not recovered, 4-inch cobble
770						SW	WELL-GRADED SAND with GRAVEL - very dense, moist, olive yellow to light brownish gray, fine to coarse grained, granitic rock fragments, fine to coarse gravel (up to 2 inches in size)
	25	50/6"					Becomes olive, some silt
765			10.2	115	85		Some silty sand interbeds
	30	85					
760	35		11.0	116	53/6"		
755	40	56/6"					

(CONTINUED ON FOLLOWING FIGURE)

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL(DECIMAL_ELE) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130001 RIVERSIDE COMMUITY HOSP\3.2 ALL FIELD NOTES\130001.GPJ 2/28/13

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

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LOG OF BORING
Project: 4953-13-0001 Figure: A-1.2a

BORING 2 (Continued)

DATE DRILLED: January 11, 2013
EQUIPMENT USED: Rotary Wash
HOLE DIAMETER (in.): 5"
ELEVATION: 794**

ELEVATION (ft)	DEPTH (ft)	"N" VALUE STD.PEN.TEST	MOISTURE (% of dry wt.)	DRY DENSITY (pcf)	BLOW COUNT* (blows/ft)	SAMPLE LOC.	USCS	DESCRIPTION
							SW	Cobbles (up to 8 inches in size)
750	45		22.4	106	63/6"			
745		97/9"						Less silt, more gravel, granitic rock fragments
	50							END OF BORING AT 49½ FEET
740	55							
735	60							
730	65							
725	70							
720	75							
715	80							

NOTES:

Caving encountered below a depth of 29 feet after removal of drilling mud. Unable to measure water level. Boring backfilled with a cement bentonite grout.

THIS RECORD IS A REASONABLE INTERPRETATION OF SUBSURFACE CONDITIONS AT THE EXPLORATION LOCATION. LATITUDE AND LONGITUDE OF BORING LOCATION SHOWN ON LOGS ARE APPROXIMATE; REFER TO PLOT PLAN FOR MORE ACCURATE LOCATION INFORMATION. SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND AT OTHER TIMES MAY DIFFER. INTERFACES BETWEEN STRATA ARE APPROXIMATE. TRANSITIONS BETWEEN STRATA MAY BE GRADUAL.

B12SOIL_CRANDALL(DECIMAL_ELE) L:\70131 GEOTECH\GINTW\LIBRARY AMEC JUNE2012.GLB
P:\4953 GEOTECH\2013-PROJ\130001 RIVERSIDE COMMUITY HOSP\3.2 ALL FIELD NOTES\130001.GPJ 2/28/13

Field Tech: AR
Prepared By: LH
Checked By: LT 10/5/2012

Proposed Bed Tower Expansion
Riverside Community Hospital
Riverside, California

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LOG OF BORING
Project: 4953-13-0001 Figure: A-1.2b

APPENDIX B
LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Laboratory testing was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions and in the same locality. No warranty, express or implied, is made as to the correctness or serviceability of the test results, or the conclusions derived from these tests. Where a specific laboratory test method has been referenced, such as ASTM or Caltrans, the reference only applies to the specified laboratory test method, which has been used only as a guidance document for the general performance of the test and not as a "Test Standard". A brief test description follows.

Classification: Soils were visually classified according to the Unified Soil Classification System as established by the American Society of Civil Engineers per ASTM D2487. The soil classifications are shown on the boring logs in Appendix A.

Particle Size Analysis: Particle size analyses were performed in accordance with ASTM D422 and were used to supplement the visual soil classifications. The test results and associated soil classifications are summarized in Figures B-1.1 through B-1.12.

Atterberg Limits: ASTM D4318 was used to determine the liquid and plastic limits, and plasticity index of a selected clayey soil sample. The results are shown in selected Figures B-1.1 to B-1.12.

Expansion Index: The expansion potentials of selected soil samples were estimated in general accordance with the laboratory procedures outlined in ASTM D4829. The test results are summarized in Figure B-2, along with common criteria for evaluating the expansion potential.

pH and Resistivity: To assess the potential for reactivity with buried metals, selected soil samples were tested for pH and minimum saturated resistivity using Caltrans test method 643. The corrosivity test results are summarized in Figure B-3.

Sulfate Content: To assess the potential for reactivity with concrete, selected soil samples were tested for water soluble sulfate. The sulfate was extracted from the soil under vacuum using a 10:1 (water to dry soil) dilution ratio, and then tested for water soluble sulfate using ASTM D516. These test results are also shown in Figure B-3, along with criteria for evaluating soluble sulfate content.

Chloride Content: Soil samples were also tested for water soluble chloride. The chloride was extracted from the soil under vacuum using the 10:1 (water to dry soil) dilution ratio described above. The extracted solutions were then tested for water soluble chloride using a calibrated ion specific electronic probe. These test results are also shown in Figure B-3.

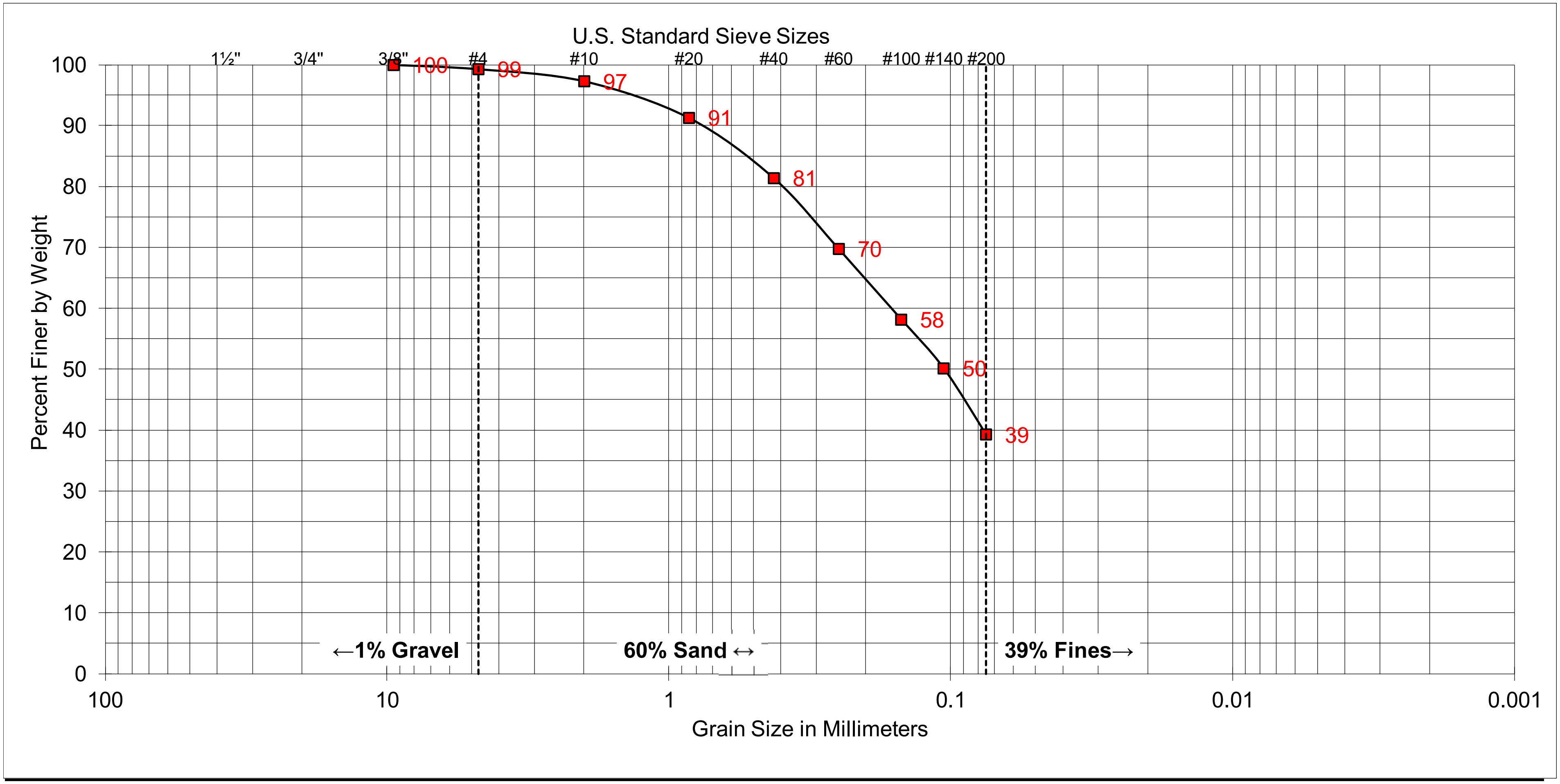
APPENDIX B

LABORATORY TESTING (Continued)

Consolidation: The one-dimensional consolidation properties of selected samples were evaluated in general accordance with ASTM D2435. The samples were inundated with water under a nominal seating load, allowed to swell, and then subjected to controlled stress increments while restrained laterally and drained axially. The test results are presented in Figures B-4.1 and B-4.2.

Direct Shear: The shear strengths of selected materials were assessed using direct shear testing conducted on relatively undisturbed soil samples in general accordance with ASTM D3080. The shear test results are shown in Figures B-5.1 to B-5.4. The tests are summarized in Figure B-5.5.

R-Value: R-Value tests were performed on selected samples of the subgrade soils collected from the site in general accordance with CTM 301. The test results are shown in Figure B-6.1 and B-6.2.



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-1
SAMPLE DEPTH:	0' - 5'

UNIFIED SOIL CLASSIFICATION: SM

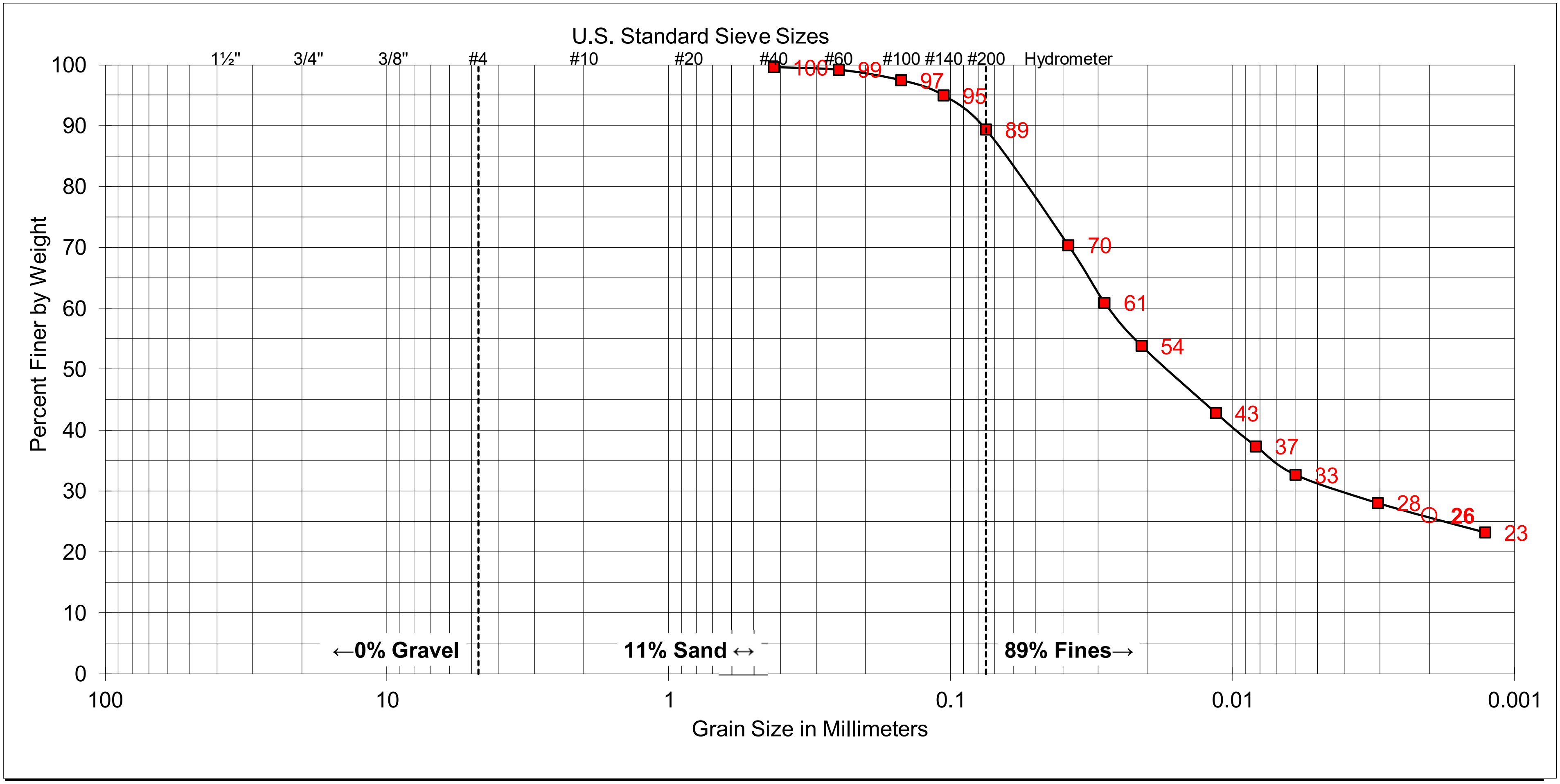
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.1



GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE	
EXPLORATION ID:	B-1
SAMPLE DEPTH:	20' - 21½'

UNIFIED SOIL CLASSIFICATION: CL

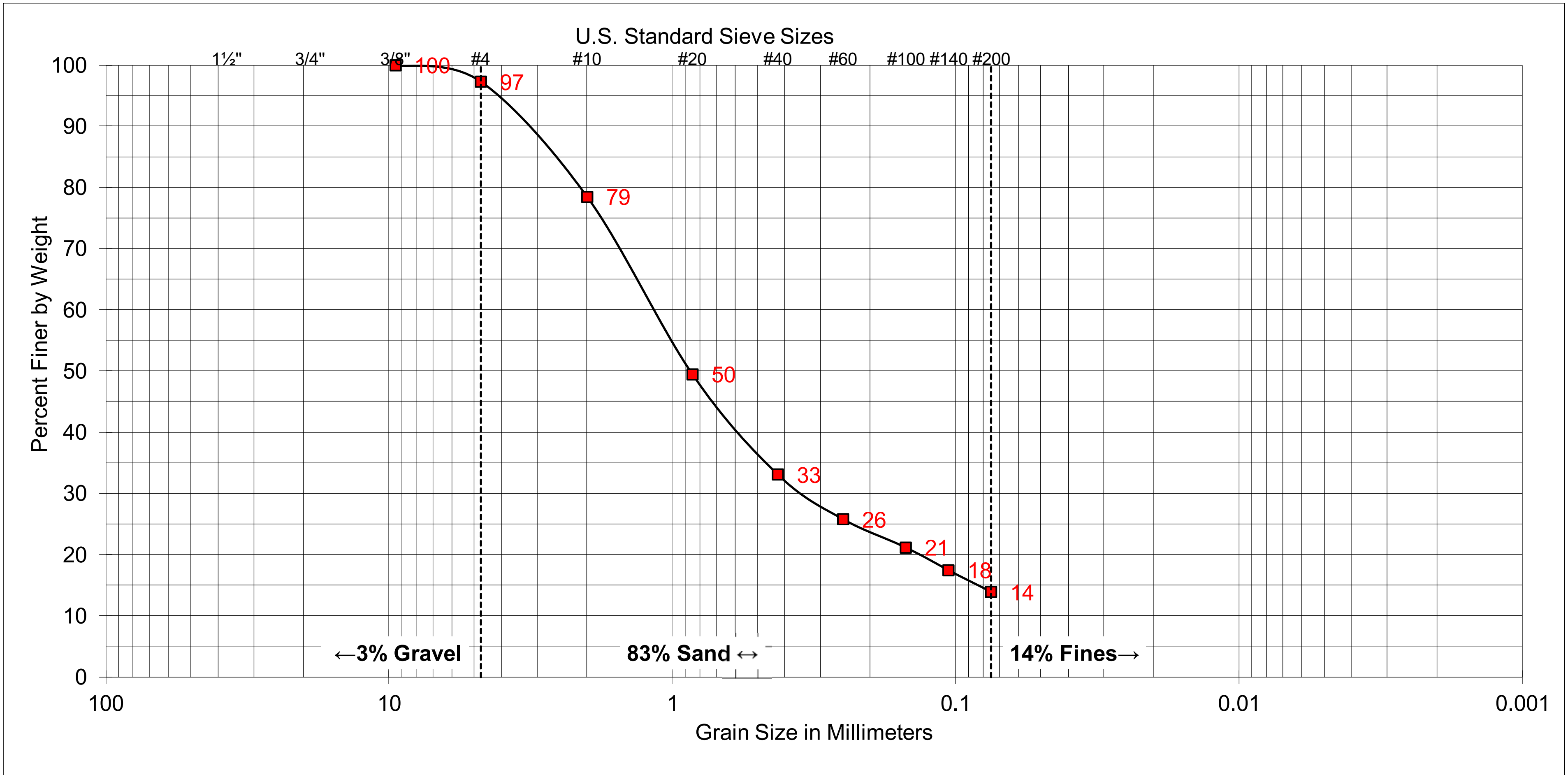
DESCRIPTION: LEAN CLAY

ATTERBERG LIMITS	
LIQUID LIMIT:	37
PLASTIC LIMIT:	19
PLASTICITY INDEX:	18

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.2



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-2
SAMPLE DEPTH:	10' - 11½'

UNIFIED SOIL CLASSIFICATION: SM

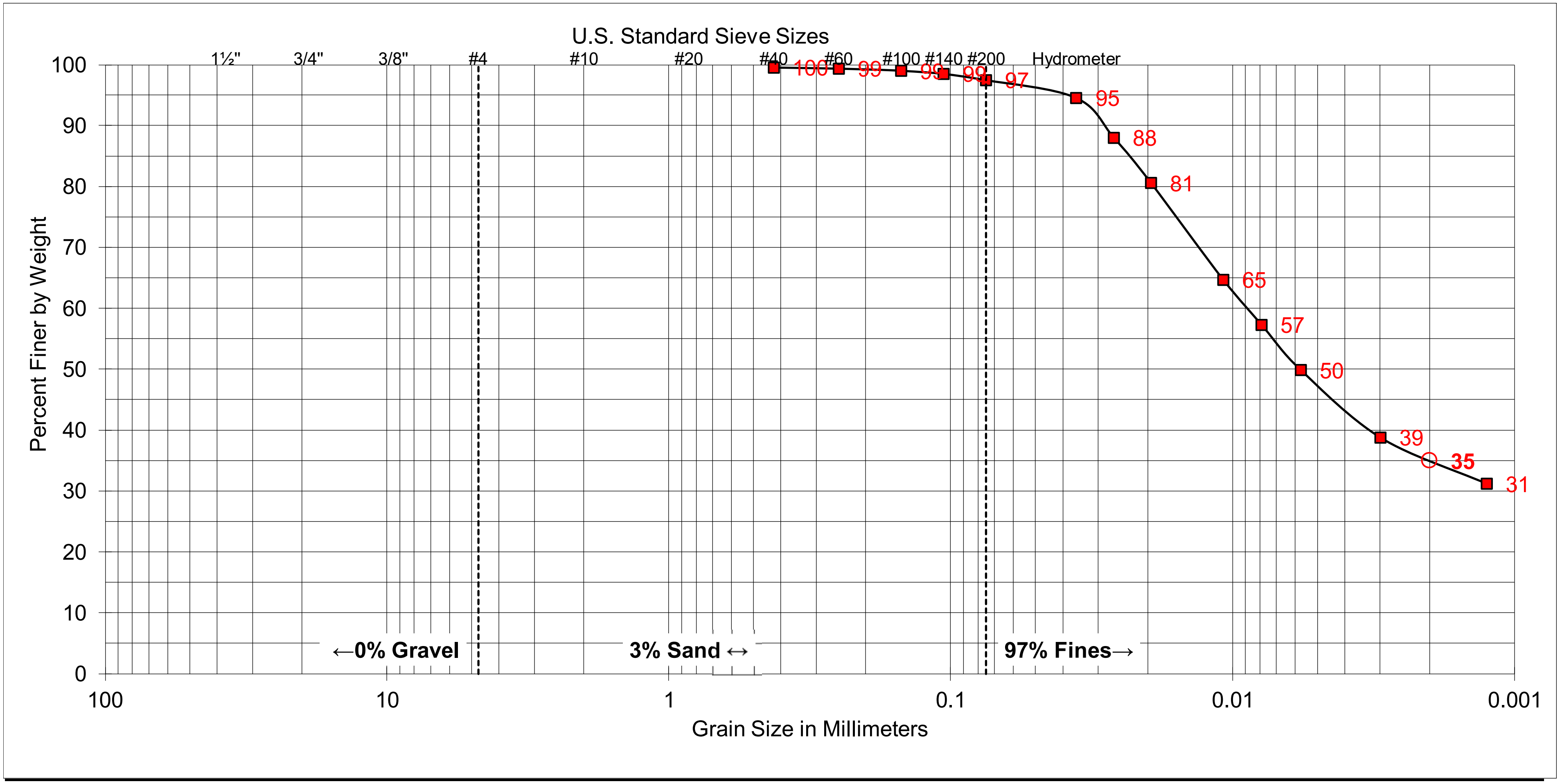
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.3



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
GRAVEL		SAND			

SAMPLE	
EXPLORATION ID:	B-2
SAMPLE DEPTH:	20' - 21½'

UNIFIED SOIL CLASSIFICATION: CL

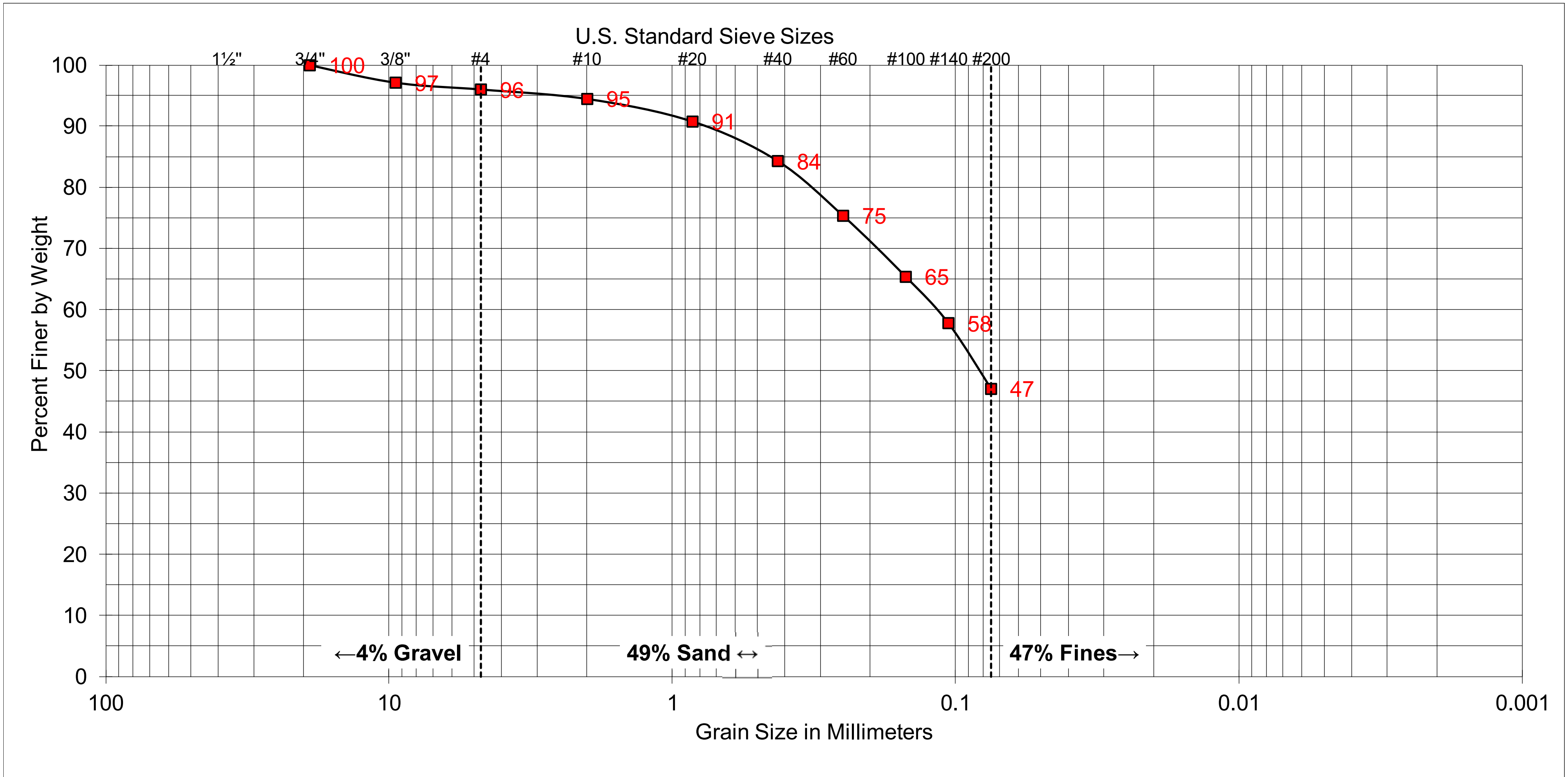
DESCRIPTION: LEAN CLAY

ATTERBERG LIMITS	
LIQUID LIMIT:	46
PLASTIC LIMIT:	22
PLASTICITY INDEX:	24

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.4



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-3
SAMPLE DEPTH:	½' - 5'

UNIFIED SOIL CLASSIFICATION: SM

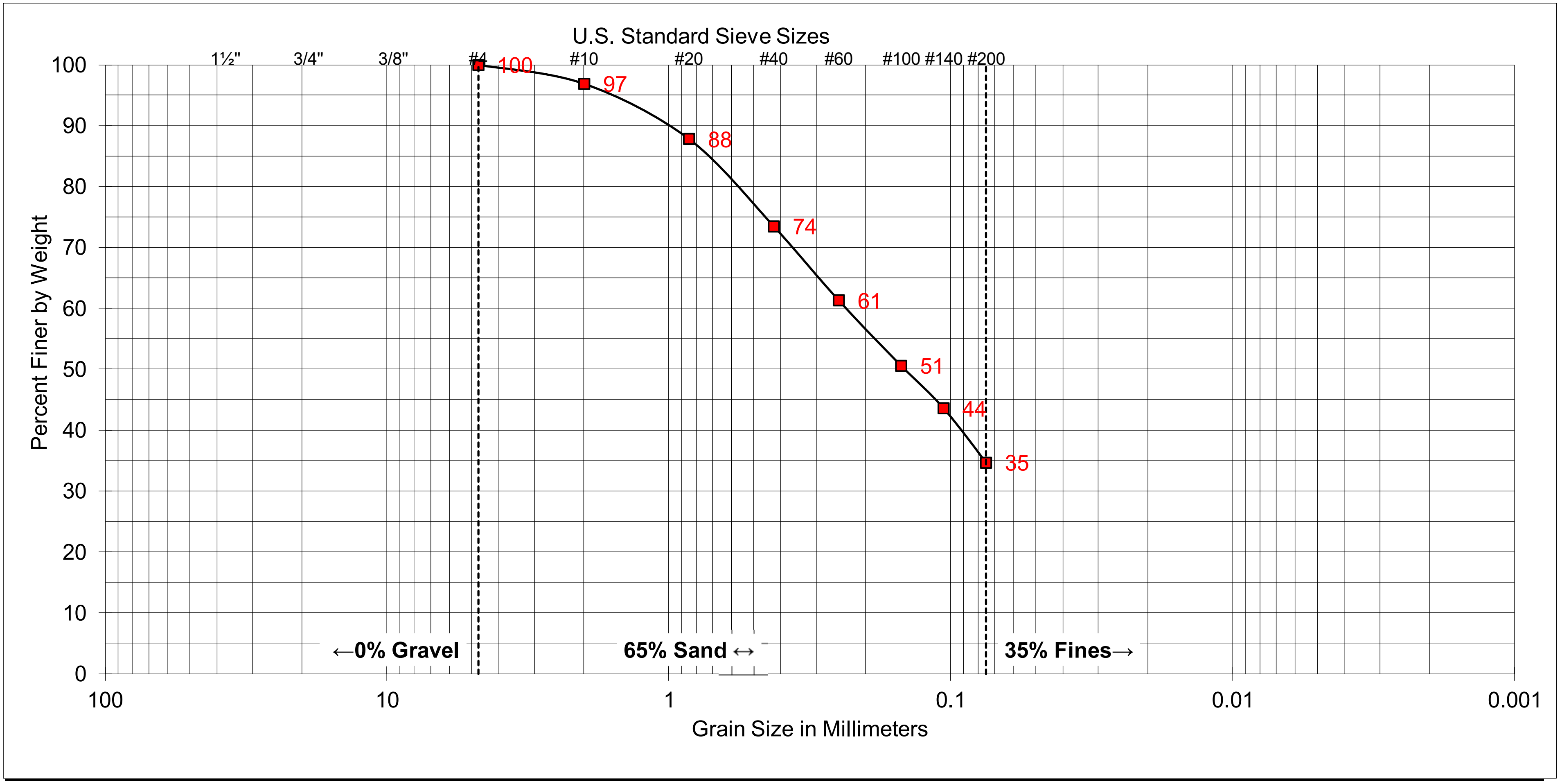
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.5



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-4
SAMPLE DEPTH:	5' - 6½'

UNIFIED SOIL CLASSIFICATION: SM

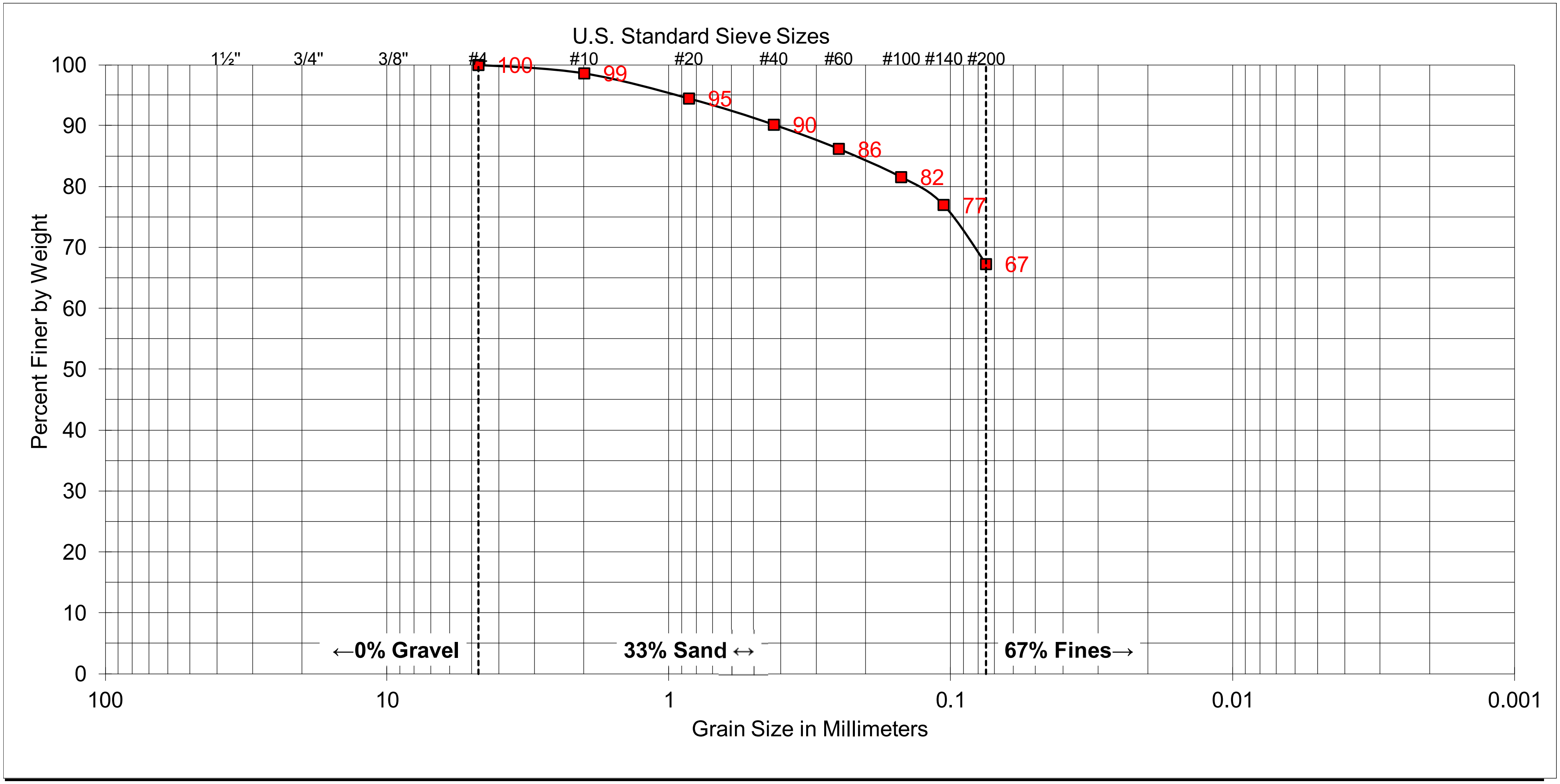
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.6



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
GRAVEL		SAND			

SAMPLE	
EXPLORATION ID:	B-5
SAMPLE DEPTH:	5' - 6½'

UNIFIED SOIL CLASSIFICATION: ML

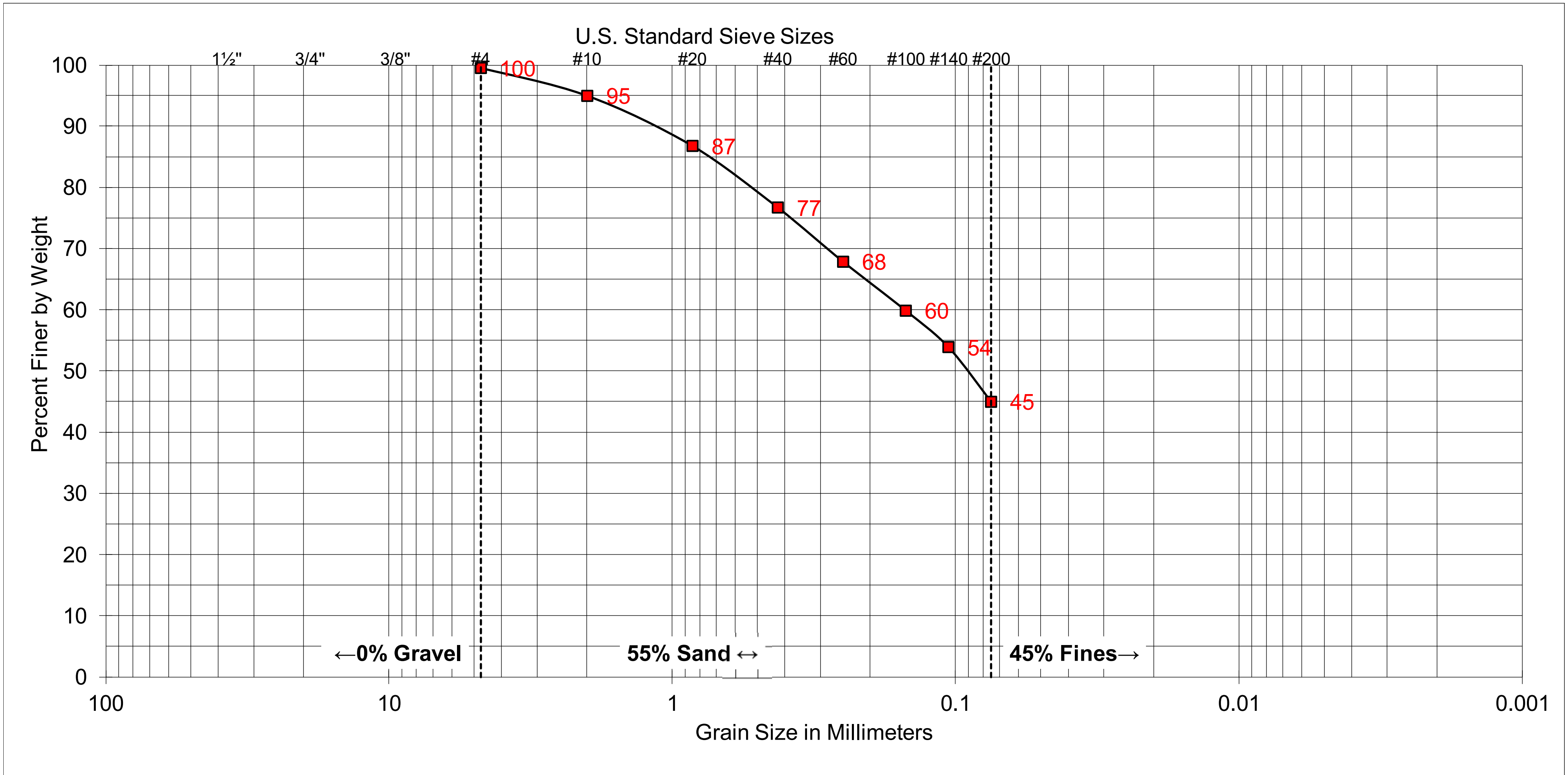
DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.7



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-6
SAMPLE DEPTH:	½' - 5'

UNIFIED SOIL CLASSIFICATION: SC

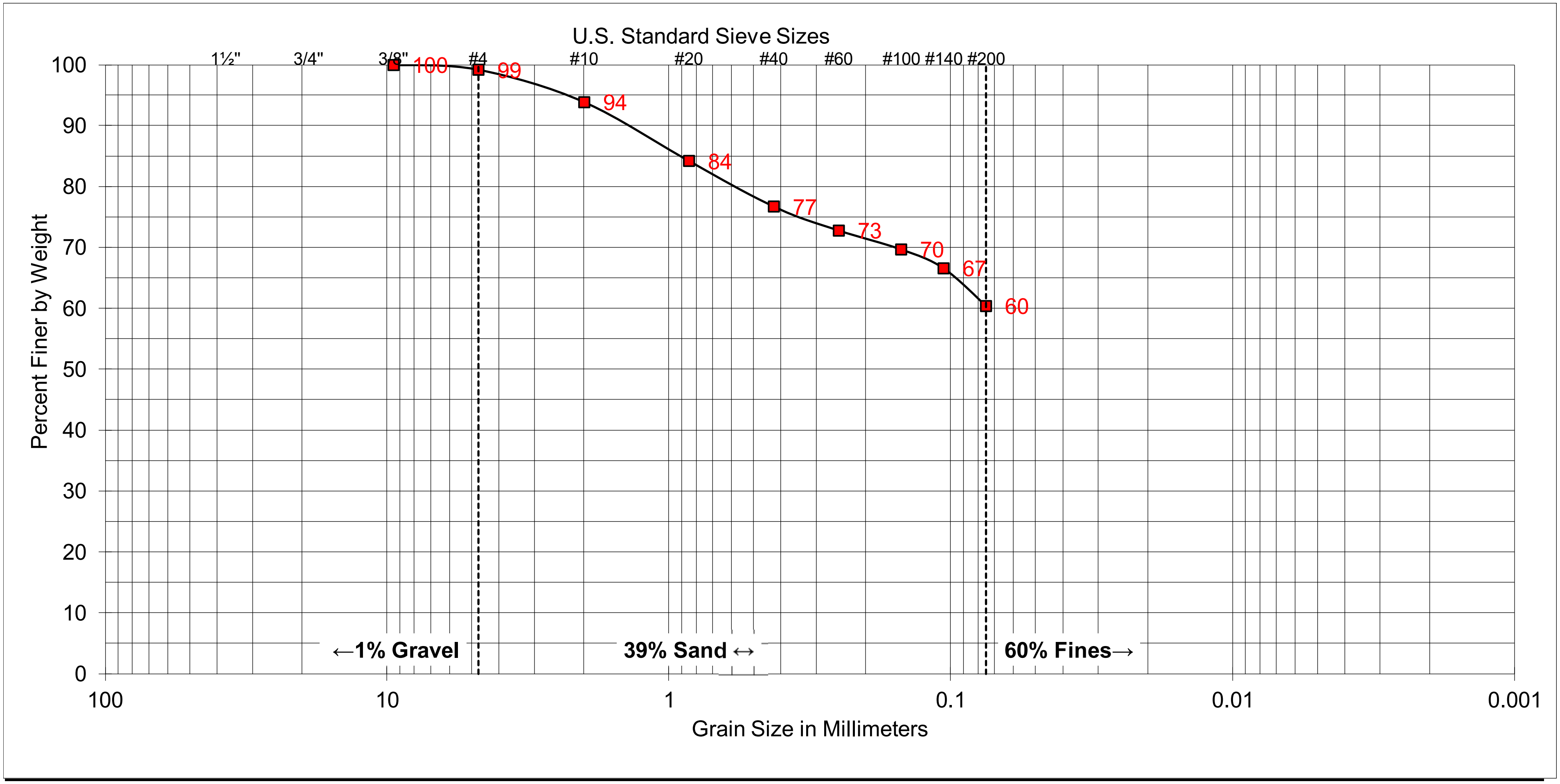
DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.8



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
EXPLORATION ID:	B-7
SAMPLE DEPTH:	10' - 11½'

UNIFIED SOIL CLASSIFICATION: ML

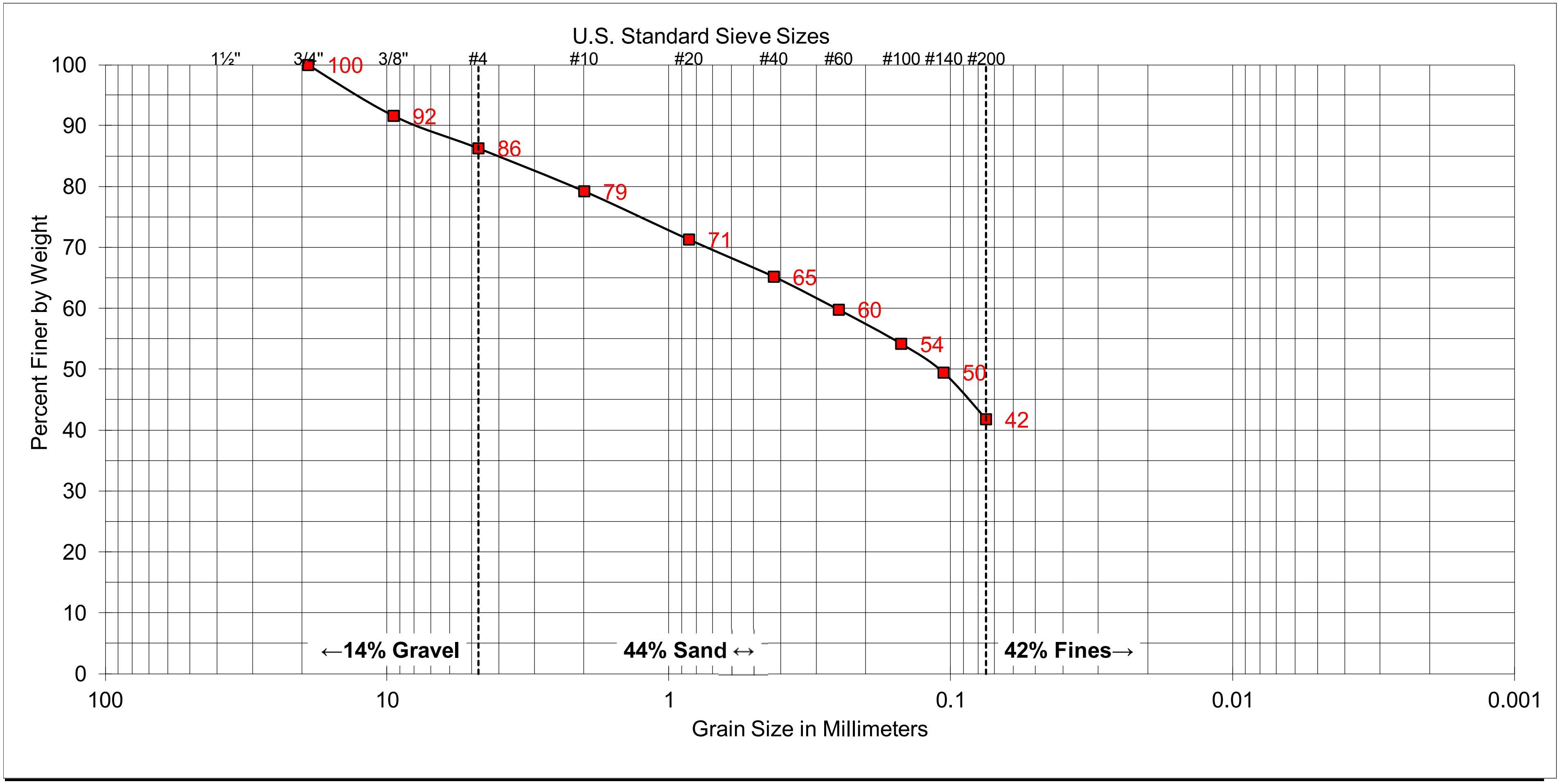
DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.9



GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE	
EXPLORATION ID:	B-8
SAMPLE DEPTH:	0' - 5'

UNIFIED SOIL CLASSIFICATION: SM

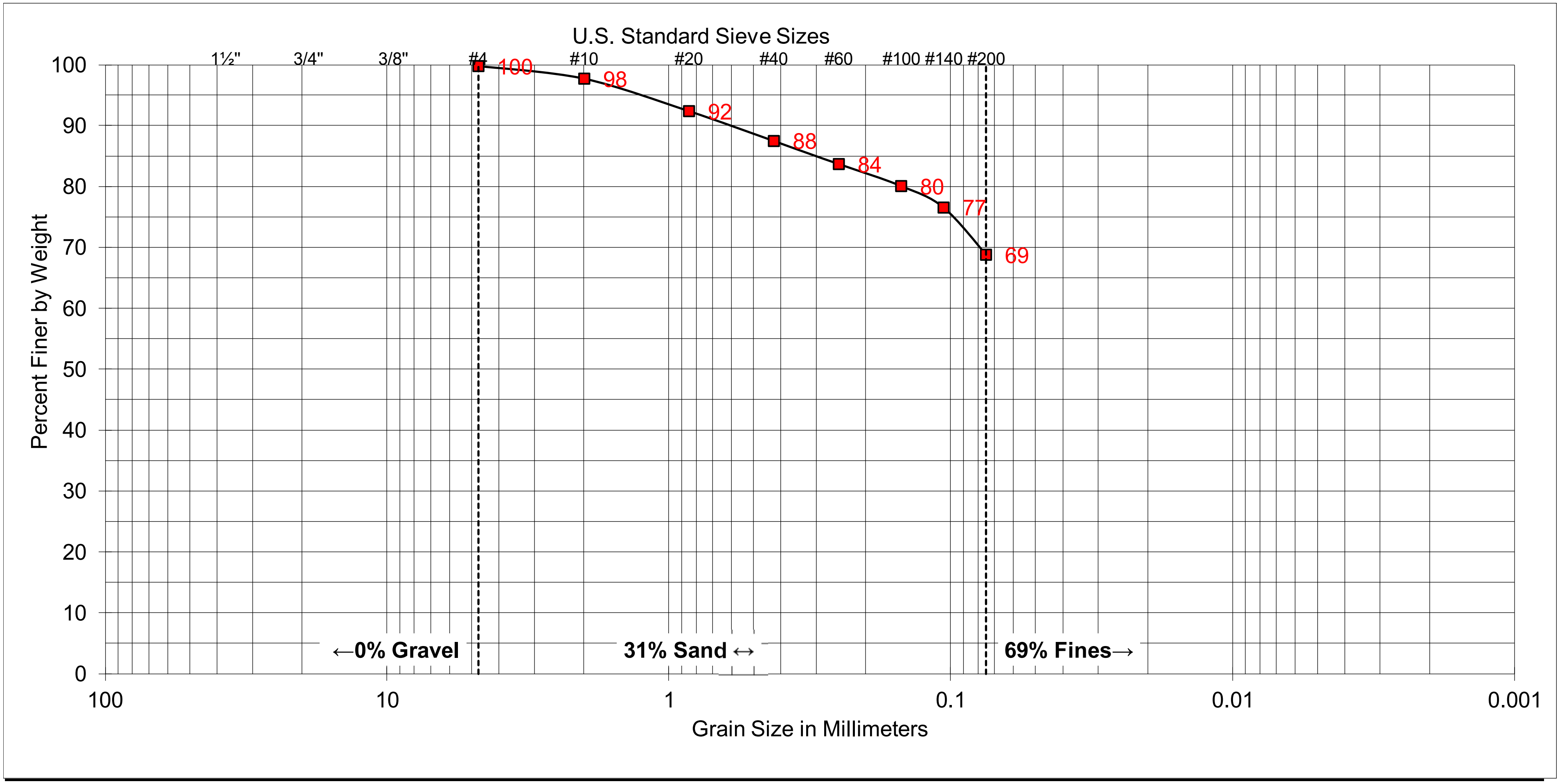
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.10



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
GRAVEL		SAND			

SAMPLE	
EXPLORATION ID:	B-9
SAMPLE DEPTH:	10' - 11½'

UNIFIED SOIL CLASSIFICATION: ML

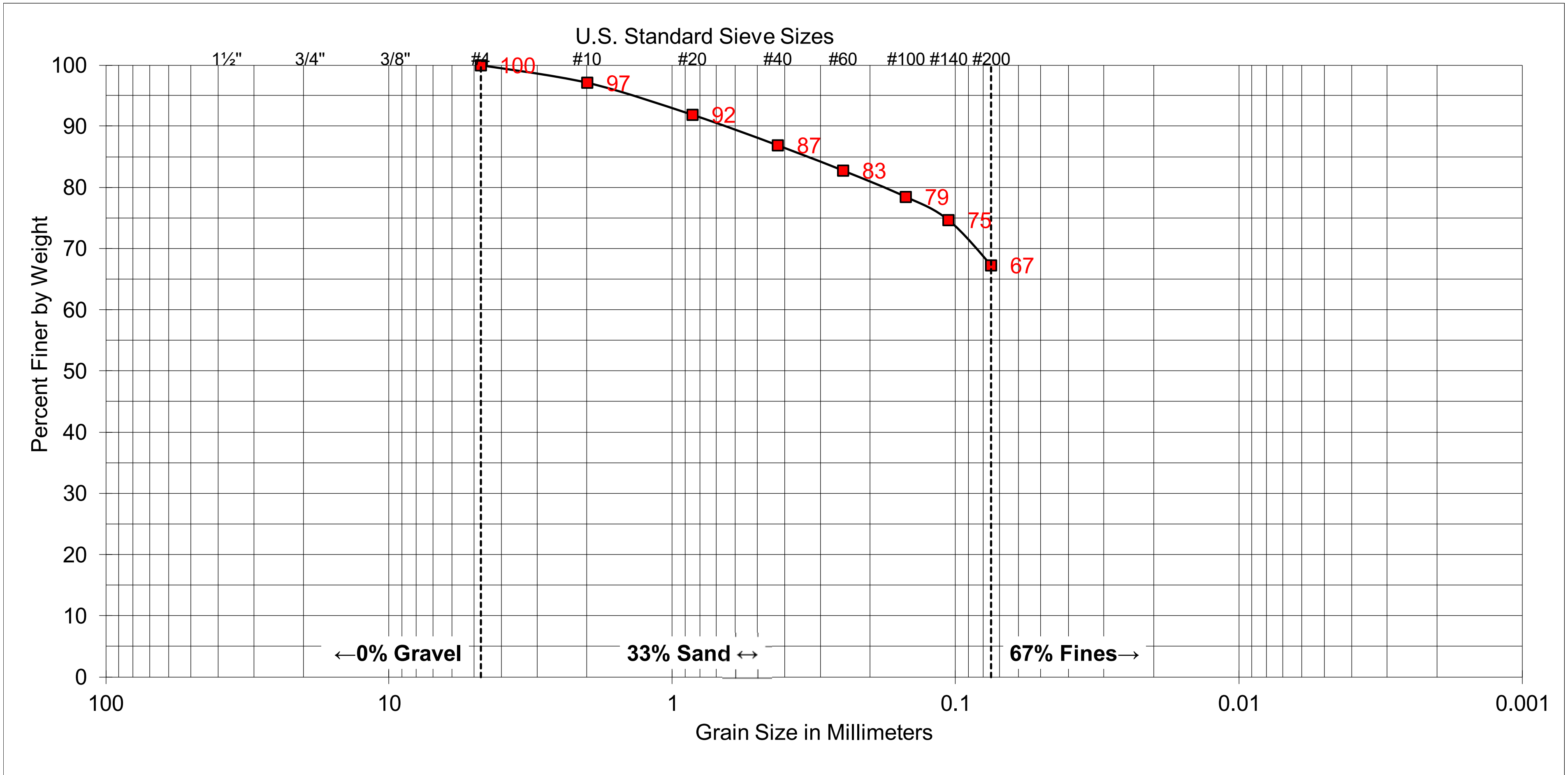
DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.11



GRAVEL		SAND			SILT AND CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE	
EXPLORATION ID:	B-10
SAMPLE DEPTH:	1' - 5'

UNIFIED SOIL CLASSIFICATION: ML

DESCRIPTION: SANDY SILT

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 24-0011
Project No. SD809
FIGURE B-1.12

EXPANSION TEST RESULTS
(ASTM D4829)

SAMPLE ID	DESCRIPTION	EXPANSION INDEX
B-3 @ ½' – 5'	**Fill**: Yellowish brown silty sand (SM).	0
B-6 @ ½' – 5'	**Fill**: Dark yellowish brown silty sand (SM).	1
B-8 @ 0' – 5'	**Fill**: Brown silty sand (SM).	0
B-10 @ 1' – 5'	**Fill**: Yellowish brown sandy silt (ML).	1

EXPANSION INDEX	POTENTIAL EXPANSION
0 to 20	Very low
21 to 50	Low
51 to 90	Medium
91 to 130	High
Above 130	Very High

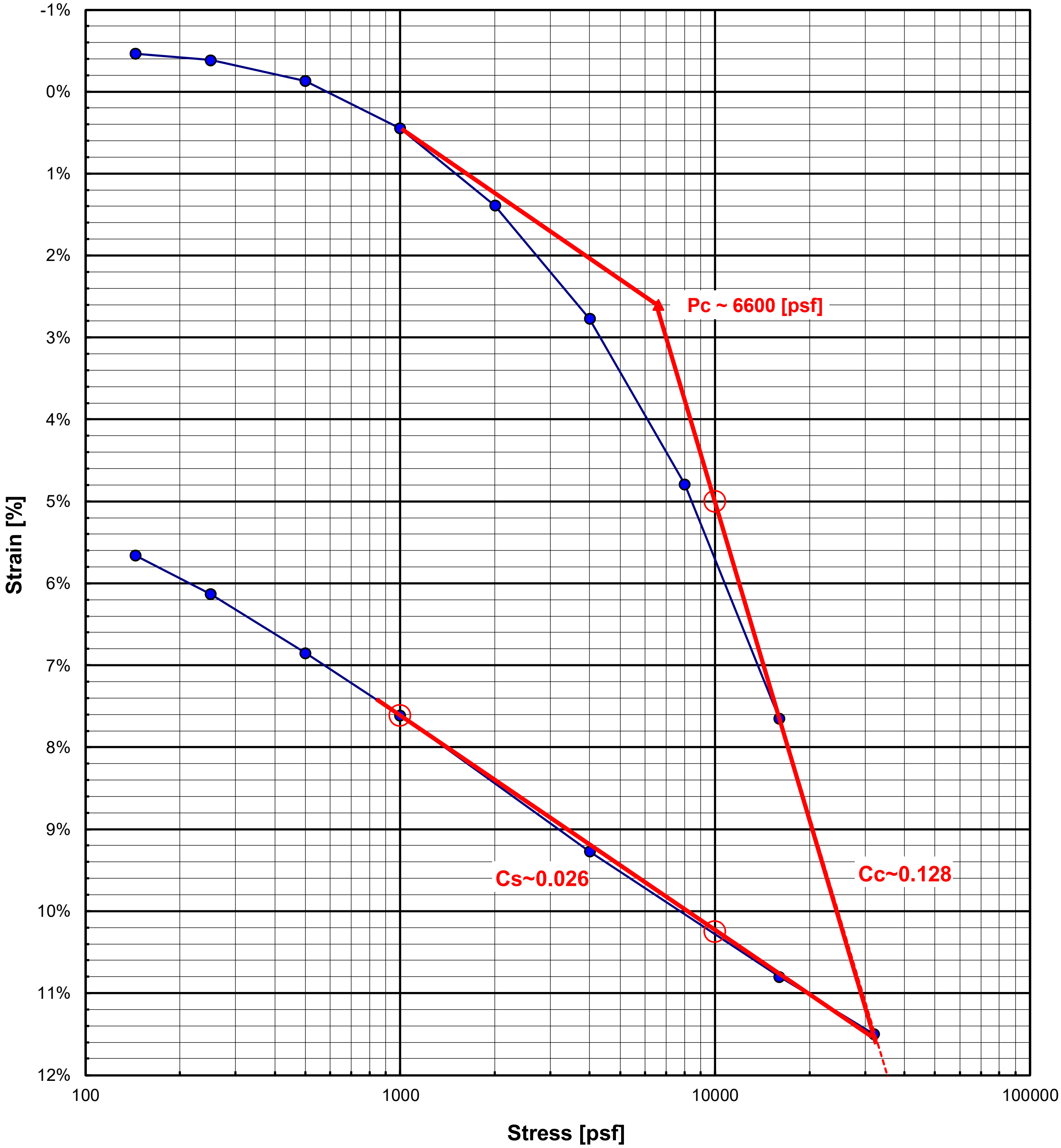
CORROSIVITY TEST RESULTS
(ASTM D516)

SAMPLE ID	pH	RESISTIVITY [OHM-CM]	SULFATE CONTENT [%]	CHLORIDE CONTENT [%]
B-3 @ ½' – 5'	7.7	4,230	< 0.01	< 0.01
B-6 @ ½' – 5'	8.4	3,220	< 0.01	< 0.01
B-8 @ 0' – 5'	8.2	3,610	< 0.01	< 0.01
B-10 @ 1' – 5'	7.7	2,460	< 0.01	< 0.01

SULFATE CONTENT [%]	SULFATE EXPOSURE	CEMENT TYPE
0.00 to 0.10	Negligible	-
0.10 to 0.20	Moderate	II, IP(MS), IS(MS)
0.20 to 2.00	Severe	V
Above 2.00	Very Severe	V plus pozzolan

SOIL RESISTIVITY [OHM-CM]	GENERAL DEGREE OF CORROSIVITY TO FERROUS METALS
0 to 1,000	Very Corrosive
1,000 to 2,000	Corrosive
2,000 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
Above 10,000	Slightly Corrosive

CHLORIDE (Cl) CONTENT [%]	GENERAL DEGREE OF CORROSIVITY TO METALS
0.00 to 0.03	Negligible
0.03 to 0.15	Corrosive
Above 0.15	Severely Corrosive



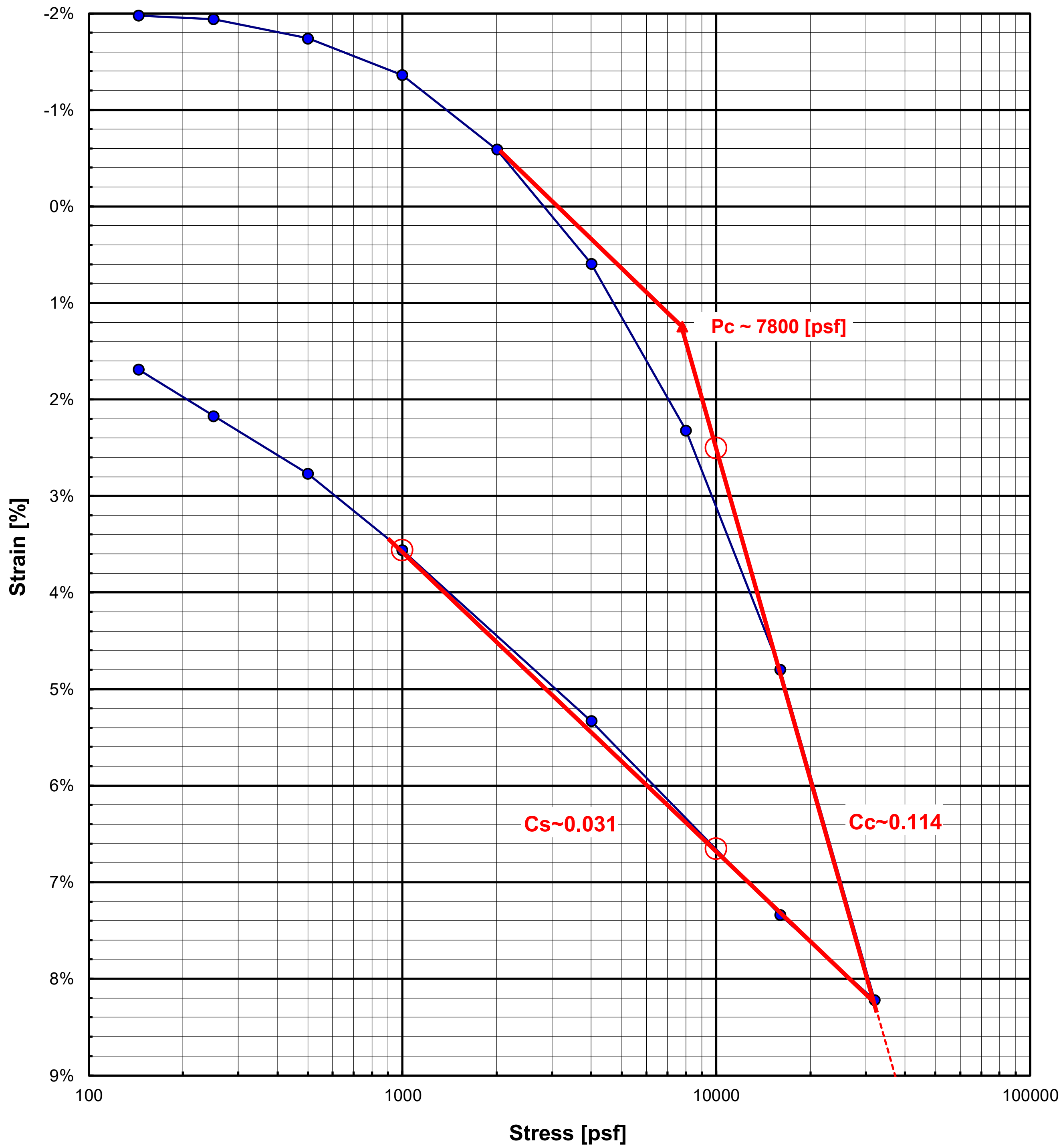
Sample:		Results			Initial	Final	
B-1 @ 20' - 21½'	Po:	2507	[psf]	Height:	1.0000	0.9434	[in]
(Water added at seating load)	Pc:	6600	[psf]	Dry Density:	102.4	108.5	[pcf]
Description:	OCR:	2.6		Void Ratio (e):	0.676	0.574	
Yellow brown lean clay (CL)	Cc:	0.214		Water Content:	22.4	21.0	[%]
(Estimated field curve in RED)	Cs:	0.044		Saturation:	91	100	[%]

Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiplied by 1.68 (or 1+e)

GROUP DELTA

CONSOLIDATION RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-4.1



Sample:

B-2 @ 20' - 21½'

(Water added at seating load)

Description:

Dark yellow brown lean clay (CL)

(Estimated field curve in RED)

	Results	
Po:	2587	[psf]
Pc:	7800	[psf]
OCR:	3.0	
Cc:	0.195	
Cs:	0.053	

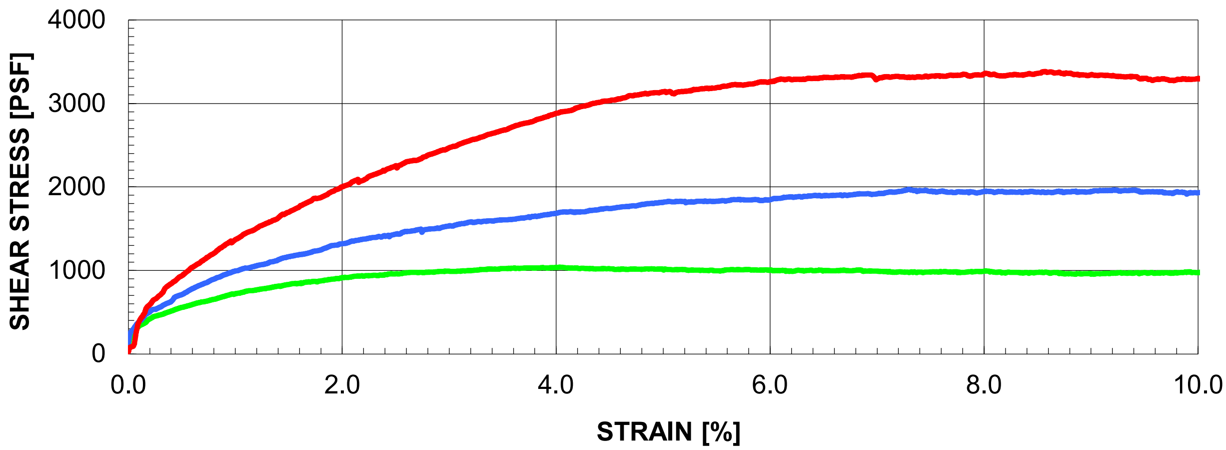
	Initial	Final	
Height:	1.0000	0.9831	[in]
Dry Density:	105.6	107.4	[pcf]
Void Ratio (e):	0.710	0.648	
Water Content:	22.6	22.9	[%]
Saturation:	90	100	[%]

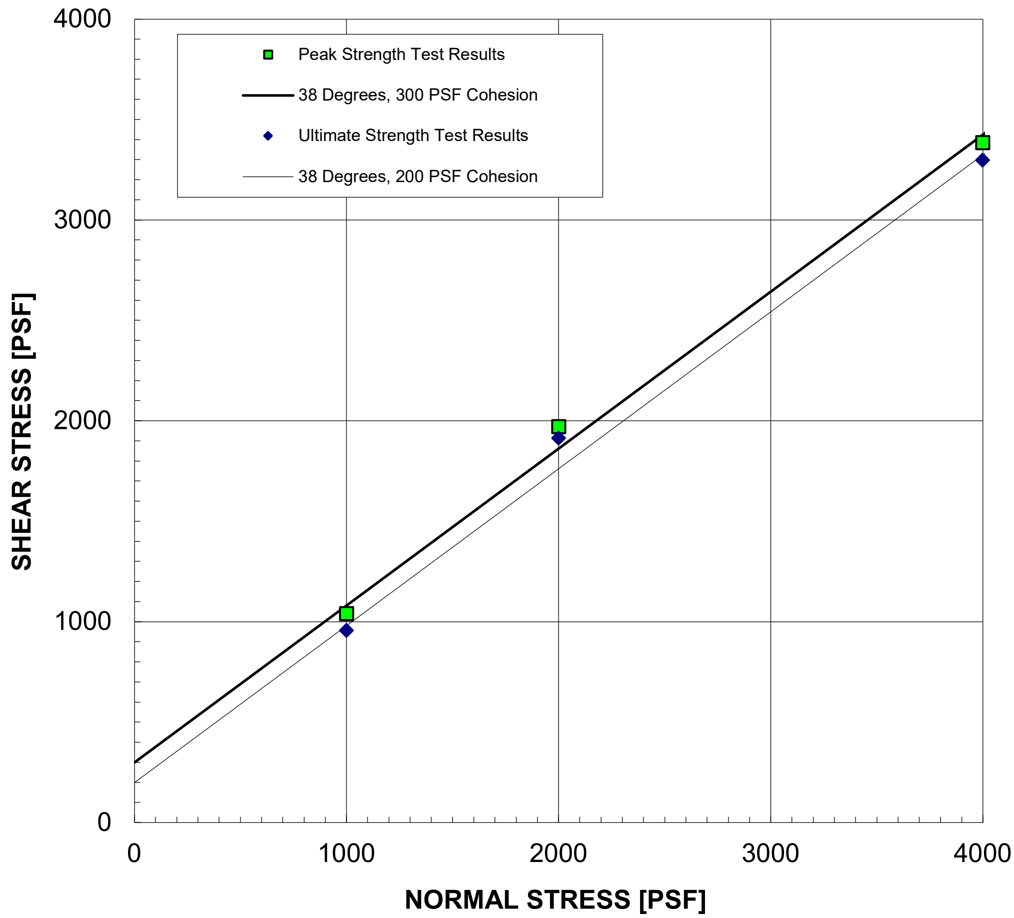
Note: To find the traditional compression (Cc) and swell (Cs) indices, the values in strain domain were multiplied by 1.71 (or 1+e)

GROUP DELTA

CONSOLIDATION RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-4.2





SAMPLE: B-2 @ 10' - 11½'

Young Alluvium (Qya):
Dark yellowish brown silty sand (SM)

STRAIN RATE: 0.0030 IN/MIN
(Sample was consolidated and drained)

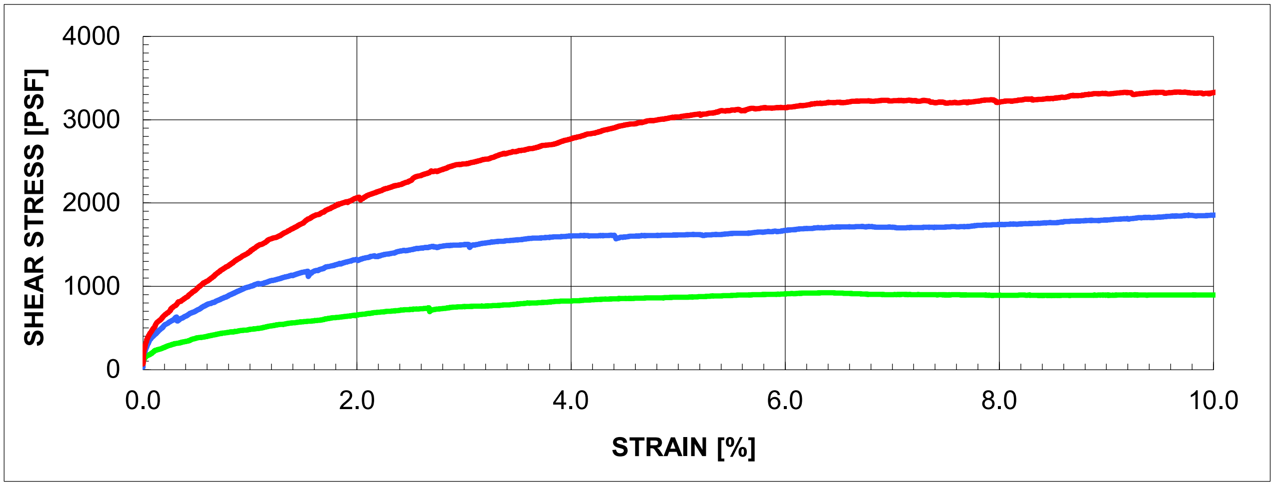
	PEAK	ULTIMATE
ϕ'	38 °	38 °
C'	300 PSF	200 PSF

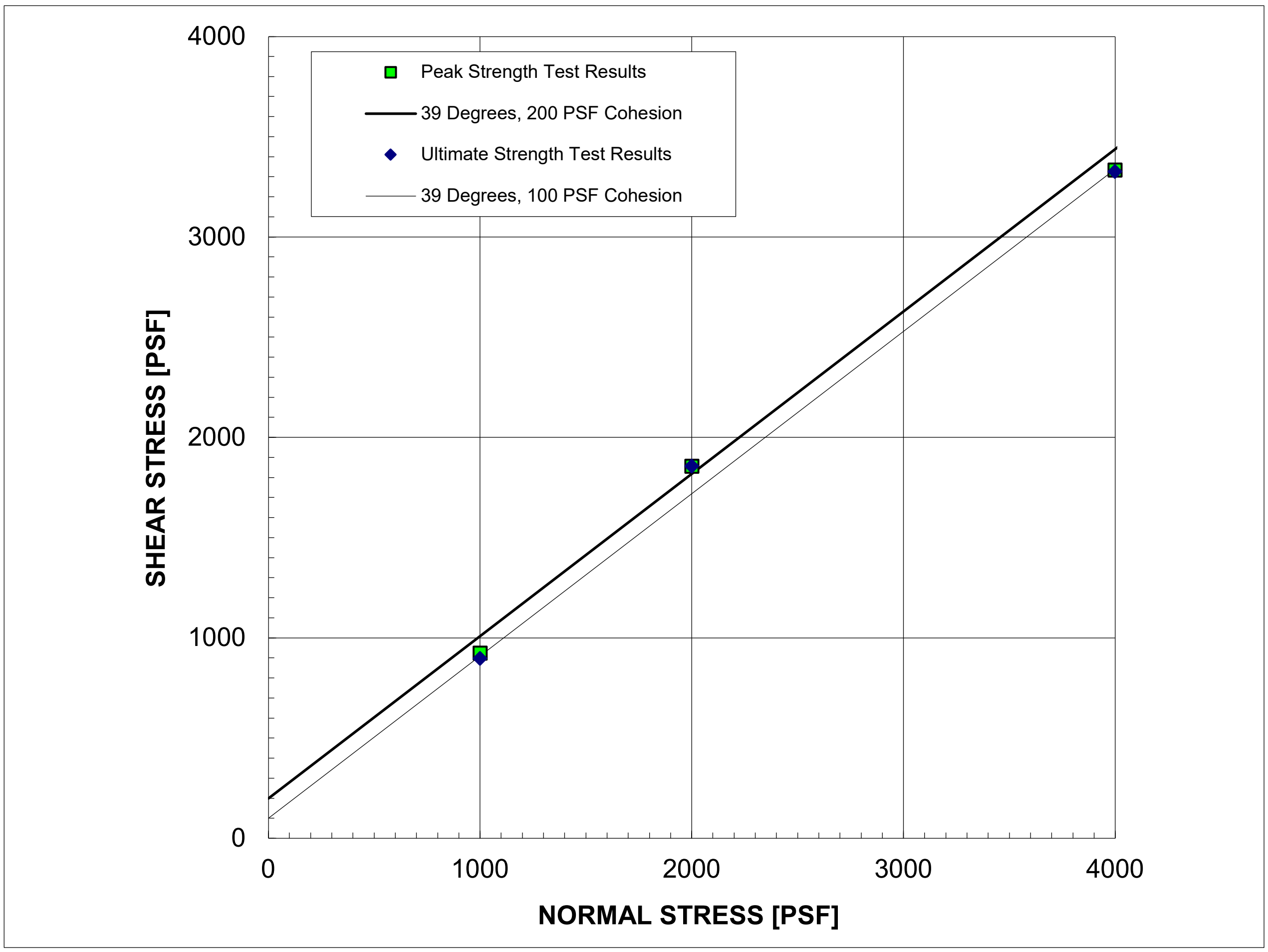
	IN-SITU	AS-TESTED
γ_d	108.6 PCF	108.6 PCF
w_c	3.2 %	15.4 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.1





SAMPLE: B-4 @ 5' - 6½'

Young Alluvium (Qya):
Yellowish brown silty sand (SM)

STRAIN RATE: 0.0030 IN/MIN

(Sample was consolidated and drained)

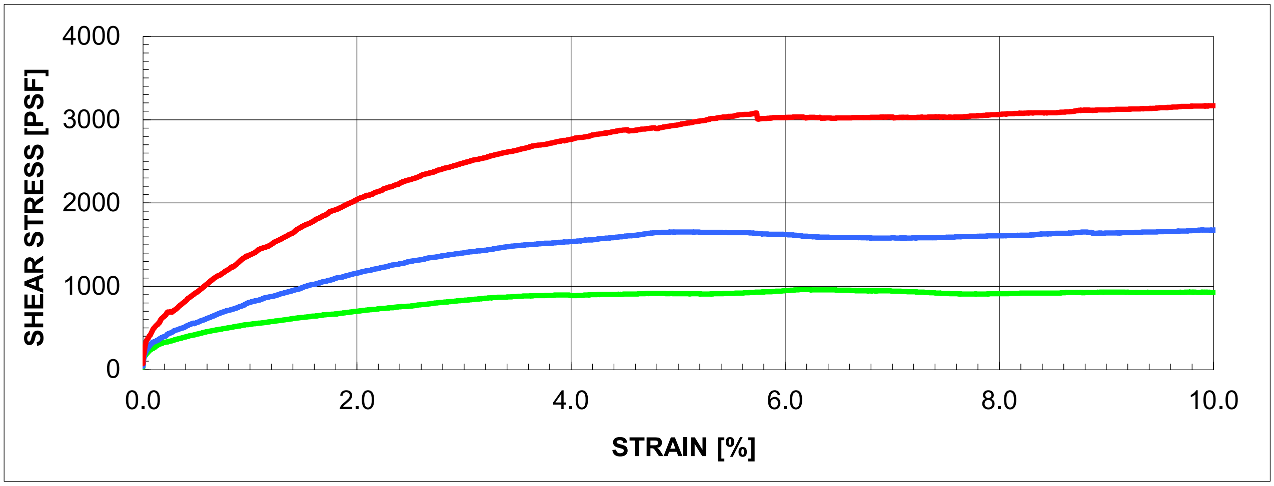
	PEAK	ULTIMATE
ϕ'	39 °	39 °
C'	200 PSF	100 PSF

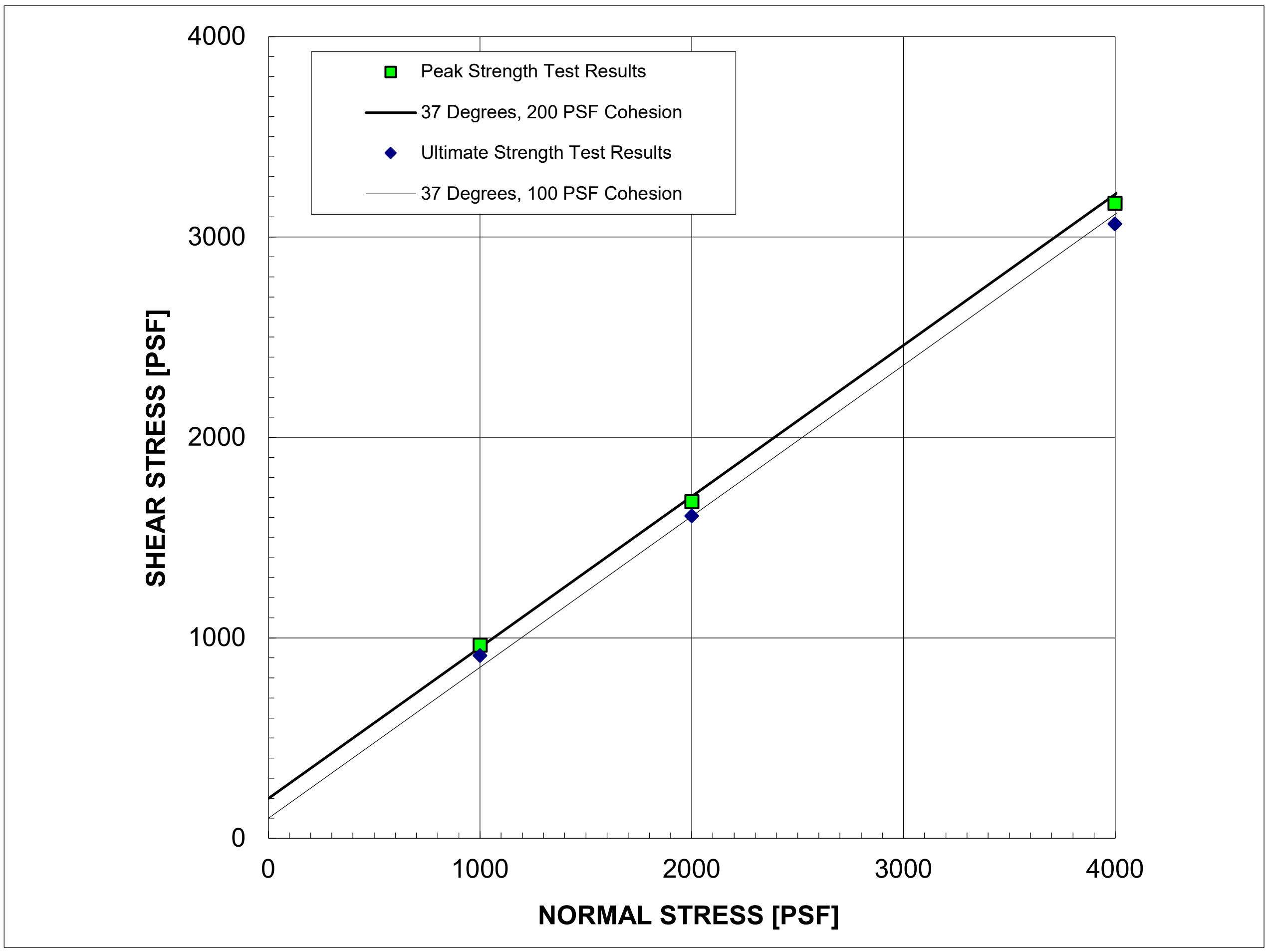
	IN-SITU	AS-TESTED
γ_d	112.3 PCF	112.3 PCF
w_c	9.4 %	15.7 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.2





SAMPLE: B-10 @ 10' - 11½'

Artificial Fill (Qya):
Yellowish brown silty sand (SM)

STRAIN RATE: 0.0030 IN/MIN
(Sample was consolidated and drained)

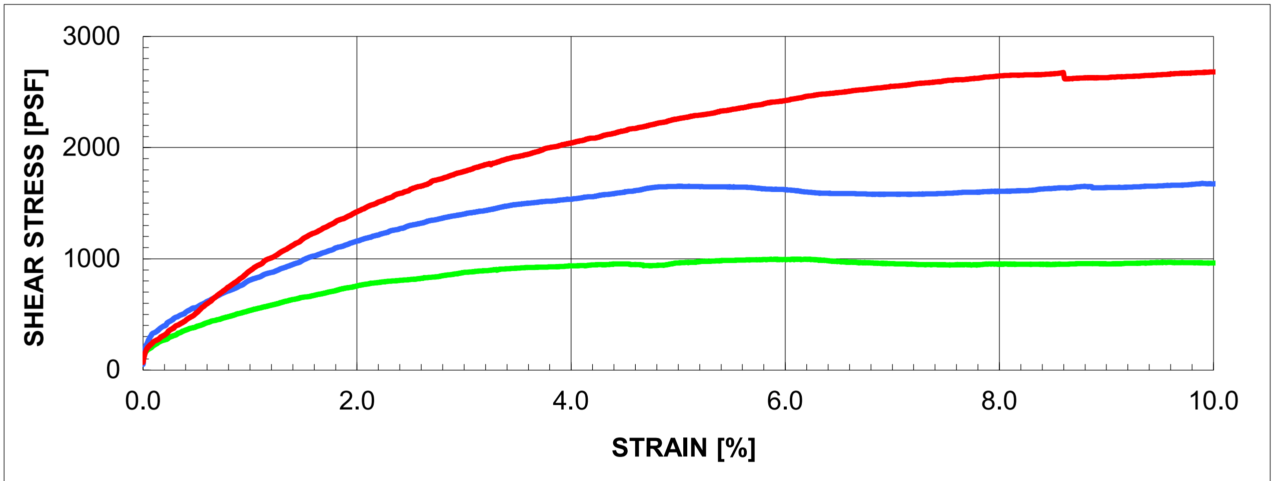
	PEAK	ULTIMATE
ϕ'	37 °	37 °
C'	200 PSF	100 PSF

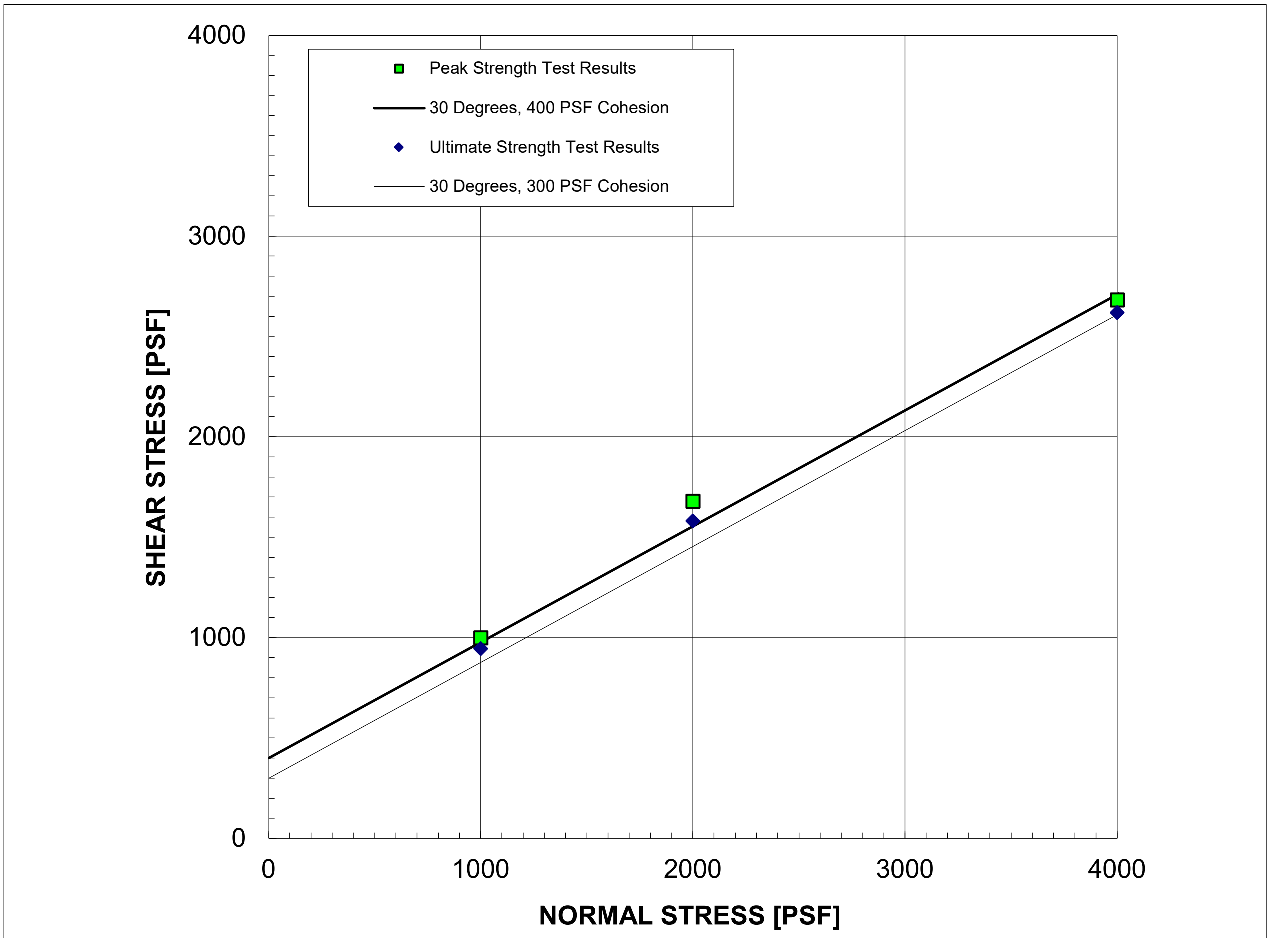
	IN-SITU	AS-TESTED
γ_d	98.5 PCF	98.5 PCF
w_c	5.8 %	26.3 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.3





SAMPLE: B-10 @ 20' - 21½'

Artificial Fill (Qya):
Brownish yellow sandy silt (ML)

	PEAK	ULTIMATE
ϕ'	30 °	30 °
C'	400 PSF	300 PSF

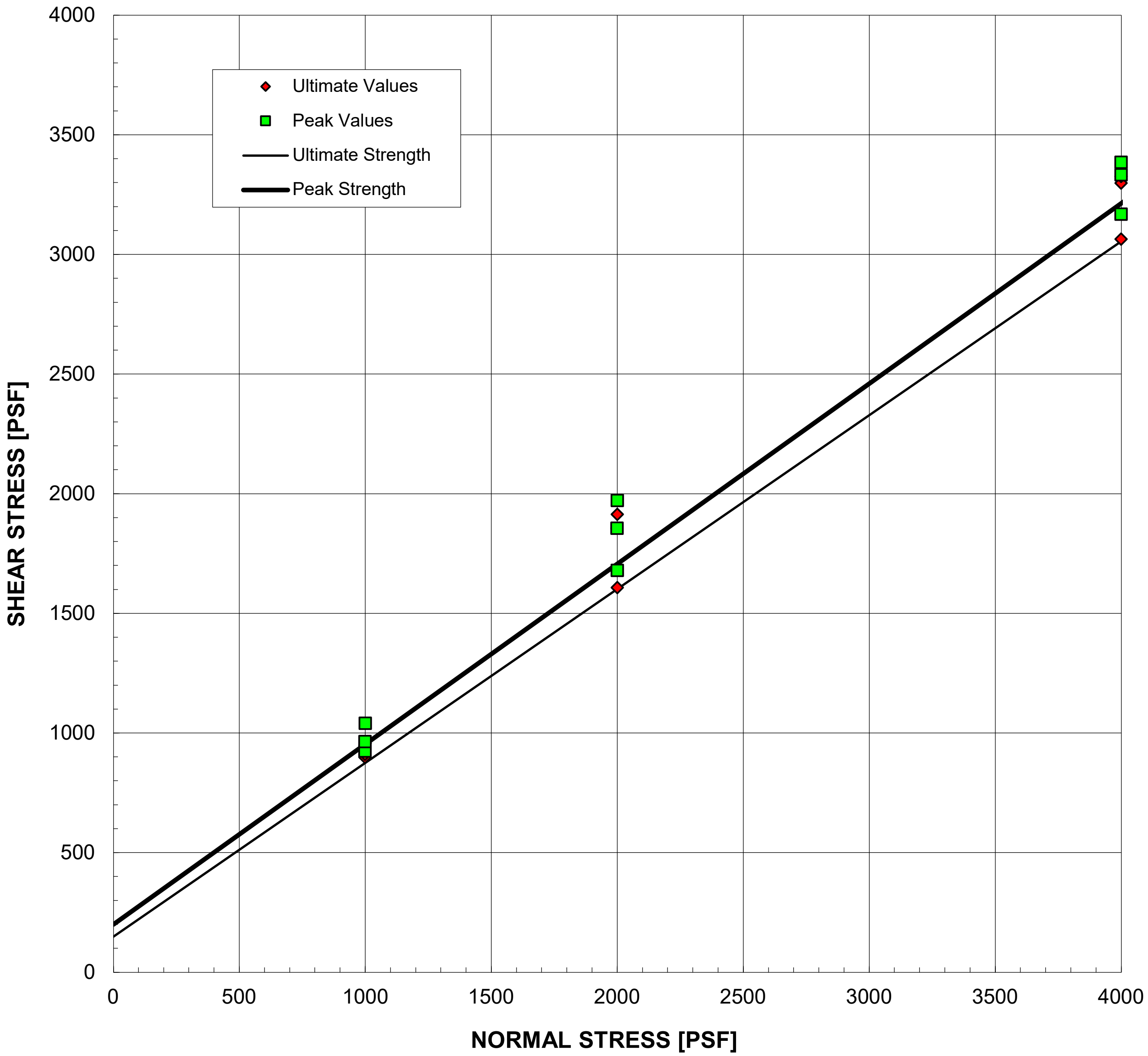
STRAIN RATE: 0.0002 IN/MIN
(Sample was consolidated and drained)

	IN-SITU	AS-TESTED
γ_d	98.5 PCF	98.5 PCF
w_c	11.2 %	26.3 %

GROUP DELTA

DIRECT SHEAR TEST RESULTS

Document No. 24-0011
Project No. SD809
FIGURE B-5.4



DESCRIPTION

A summary of direct shear tests conducted on samples of the sandy fill and alluvium collected from the Garage and Tower sites at the Riverside Community Hospital.

	PEAK ESTIMATE	ULTIMATE ESTIMATE
ϕ'	37 °	36 °
C'	200 PSF	150 PSF

GROUP DELTA

DIRECT SHEAR TEST SUMMARY

Document No. 24-0011
Project No. SD809
FIGURE B-5.5

SAMPLE NO.: B-6 **SAMPLE DATE:** 4/3/24

SAMPLE LOCATION: ½' - 5' **TEST DATE:** 4/12/24

SAMPLE DESCRIPTION: Dark yellowish brown clayey sand (SC)

LABORATORY TEST DATA

	TEST SPECIMEN	**1**	**2**	**3**	**4**	**5**	
A	COMPACTOR PRESSURE	350	350	350			[PSI]
B	INITIAL MOISTURE	2.5	2.5	2.5			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	75	85	102			[ML]
E	WATER ADDED (D*(100+B)/C)	6.4	7.3	8.7			[%]
F	COMPACTION MOISTURE (B+E)	8.9	9.8	11.2			[%]
G	MOLD WEIGHT	2009.7	2016.1	2009.1			[G]
H	TOTAL BRIQUETTE WEIGHT	3083.5	3170.7	3160.9			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1073.8	1154.6	1151.8			[G]
J	BRIQUETTE HEIGHT	2.38	2.43	2.55			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	125.5	131.2	123.1			[PCF]
L	EXUDATION LOAD	7490	5459	3109			[LB]
M	EXUDATION PRESSURE (L/12.54)	597	435	248			[PSI]
N	STABILOMETER AT 1000 LBS	14	20	39			[PSI]
O	STABILOMETER AT 2000 LBS	24	33	73			[PSI]
P	DISPLACEMENT FOR 100 PSI	4.33	5.04	6.93			[Turns]
Q	R VALUE BY STABILOMETER	77	66	30			
R	CORRECTED R-VALUE (See Fig. 14)	75	64	30			
S	EXPANSION DIAL READING	0.0016	0.0007	0.0002			[IN]
T	EXPANSION PRESSURE (S*43,300)	69	30	9			[PSF]
U	COVER BY STABILOMETER	0.23	0.34	0.65			[FT]
V	COVER BY EXPANSION	0.53	0.23	0.07			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.72
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	40
R-VALUE BY EXPANSION:	68
R-VALUE AT EQUILIBRIUM:	40

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

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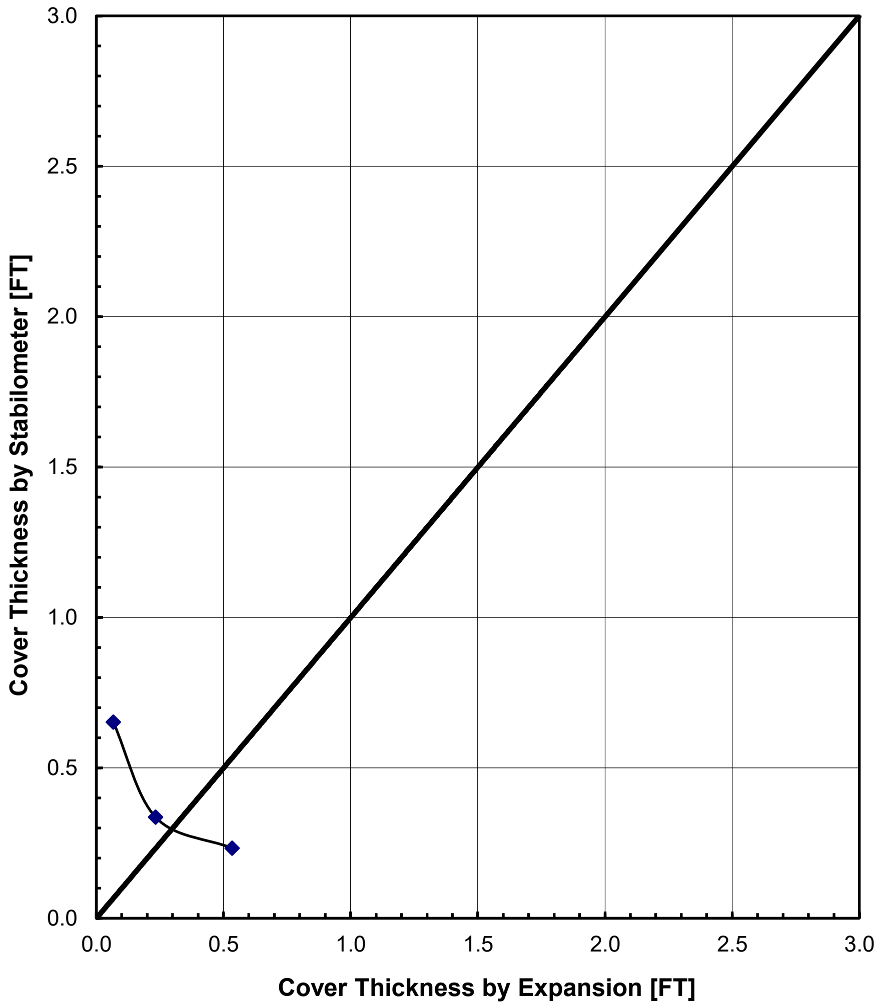
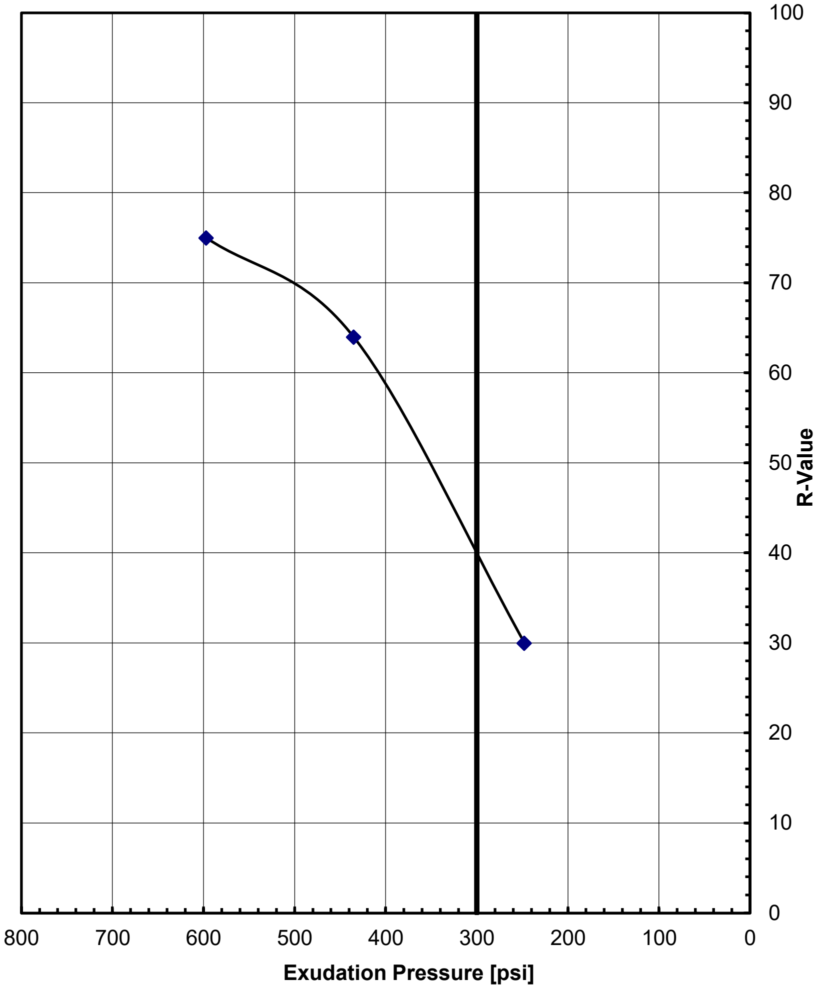
R-VALUE TEST RESULTS
CT301

Document No. 24-0011
Project No. SD809
FIGURE B-6.1a

Sample: B-6 @ ½' - 5'

R-Value at Equilibrium: 40





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COVER AND EXUDATION CHARTS

Document No. 24-0011
Project No. SD809
FIGURE B-6.1b

SAMPLE NO.: B-8 **SAMPLE DATE:** 4/1/24
SAMPLE LOCATION: 0' - 5' **TEST DATE:** 4/12/24
SAMPLE DESCRIPTION: Dark yellowish brown silty sand (SM)

LABORATORY TEST DATA

	TEST SPECIMEN	**1**	**2**	**3**	**4**	**5**	
A	COMPACTOR PRESSURE	290	250	210			[PSI]
B	INITIAL MOISTURE	2.2	2.2	2.2			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	90	100	105			[ML]
E	WATER ADDED (D*(100+B)/C)	7.7	8.5	8.9			[%]
F	COMPACTION MOISTURE (B+E)	9.9	10.7	11.1			[%]
G	MOLD WEIGHT	2004.8	2007.6	2074.3			[G]
H	TOTAL BRIQUETTE WEIGHT	3155.6	3197.7	3202.9			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1150.8	1190.1	1128.6			[G]
J	BRIQUETTE HEIGHT	2.57	2.62	2.53			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	123.5	124.3	121.6			[PCF]
L	EXUDATION LOAD	4172	3211	2450			[LB]
M	EXUDATION PRESSURE (L/12.54)	333	256	195			[PSI]
N	STABILOMETER AT 1000 LBS	39	45	46			[PSI]
O	STABILOMETER AT 2000 LBS	76	96	97			[PSI]
P	DISPLACEMENT FOR 100 PSI	6.55	6.74	7.18			[Turns]
Q	R VALUE BY STABILOMETER	30	20	18			
R	CORRECTED R-VALUE (See Fig. 14)	31	22	18			
S	EXPANSION DIAL READING	0.0000	0.0000	0.0000			[IN]
T	EXPANSION PRESSURE (S*43,300)	0	0	0			[PSF]
U	COVER BY STABILOMETER	0.70	0.79	0.83			[FT]
V	COVER BY EXPANSION	0.00	0.00	0.00			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.58
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	27
R-VALUE BY EXPANSION:	100
R-VALUE AT EQUILIBRIUM:	27

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

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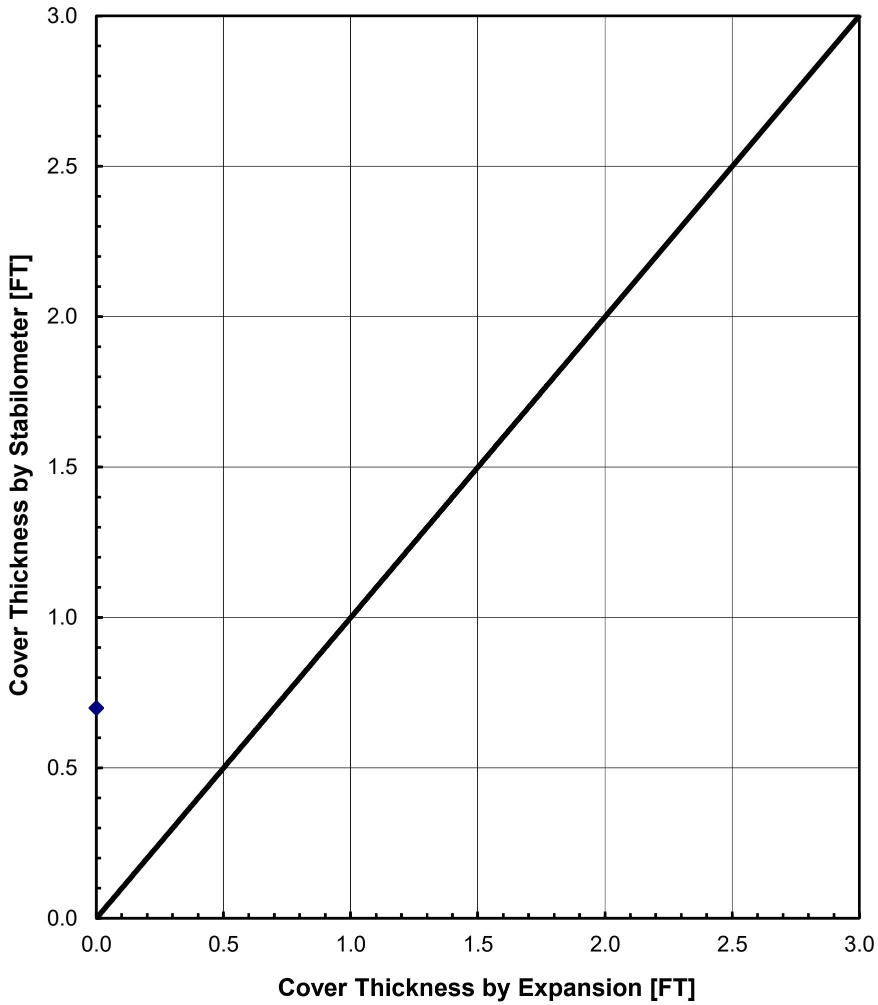
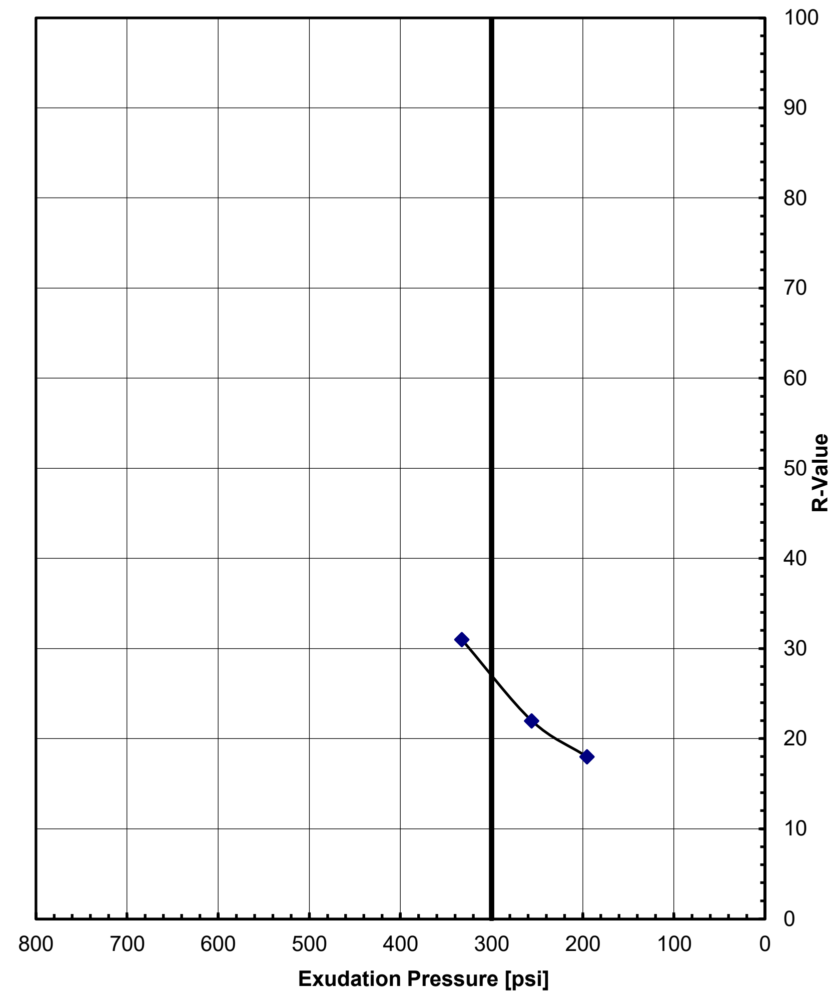
R-VALUE TEST RESULTS
CT301

Document No. 24-0011
Project No. SD809
FIGURE B-6.2a

Sample: B-8 @ 0' - 5'

R-Value at Equilibrium: 27





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COVER AND EXUDATION CHARTS

Document No. 24-0011
Project No. SD809
FIGURE B-6.2b

APPENDIX C
LIQUEFACTION ANALYSIS

APPENDIX C

LIQUEFACTION ANALYSES

Liquefaction analyses were performed using the data gathered from the CPT soundings. The results are summarized in the following Figures C-1 to C-5. The analyses were based on the procedures originally developed by Seed and Idriss, and were conducted in general accordance with the recommended procedures for liquefaction analyses described in Section C4.4 of ASCE 61-14 (ASCE, 2014). The tip resistance (q_t) was normalized for overburden pressure and corrected for fines content (Youd et al., 2001). The fines correction was based on the Soil Behavior Type Index Ic (Robertson, 2010).

For each CPT sounding, the uncorrected Cone Resistance, Normalized Cone Resistance, the Soil Behavior Type (SBT), Factor of Safety against liquefaction, and estimated vertical settlement are plotted versus depth. A high groundwater elevation corresponding to a depth of 25-feet below grade was assumed for the analyses based on available historic data from the site vicinity as well as the groundwater levels we encountered during our recent subsurface explorations. The seismic demand used for the liquefaction analyses was equal to the Maximum Considered Earthquake Geometric Mean acceleration adjusted for site effects (PGA_M) for both the Garage and Tower sites of 0.615g, based on the requirements of Section 11.8.3 of ASCE 7-16 for a Seismic Design Category D. A Maximum Considered Earthquake Magnitude of M_w 8.1 was also used for these analyses, corresponding to a large earthquake occurring on the San Bernardino segment of the San Jacinto fault zone roughly 13 km southwest of the site.

The vertical settlement plots for each CPT sounding show the estimated range of dynamic settlement resulting from a moment Magnitude of M_w 8.1 and seismic demand equal to the PGA_M acceleration. At depths where the seismically induced shear stress exceeds the stress required to cause liquefaction, the Factor of Safety is less than 1.0, and seismic settlement may occur. Fine-grained soils with an Ic value greater than 2.6 are considered too clayey to liquefy, and granular soils with a normalized tip resistance greater than 160 are considered too dense to liquefy. Only soils that are both loose enough and sandy enough to liquefy contribute to the post-liquefaction settlement. Dry sand settlement above groundwater accounted for most of the estimated seismic settlement (Pradel, 1998). We assumed that a 10-foot-deep over-excavation below grade would be conducted for the new Tower pad, and that the new Garage basement excavation would also extend approximately 10-feet below existing grades.

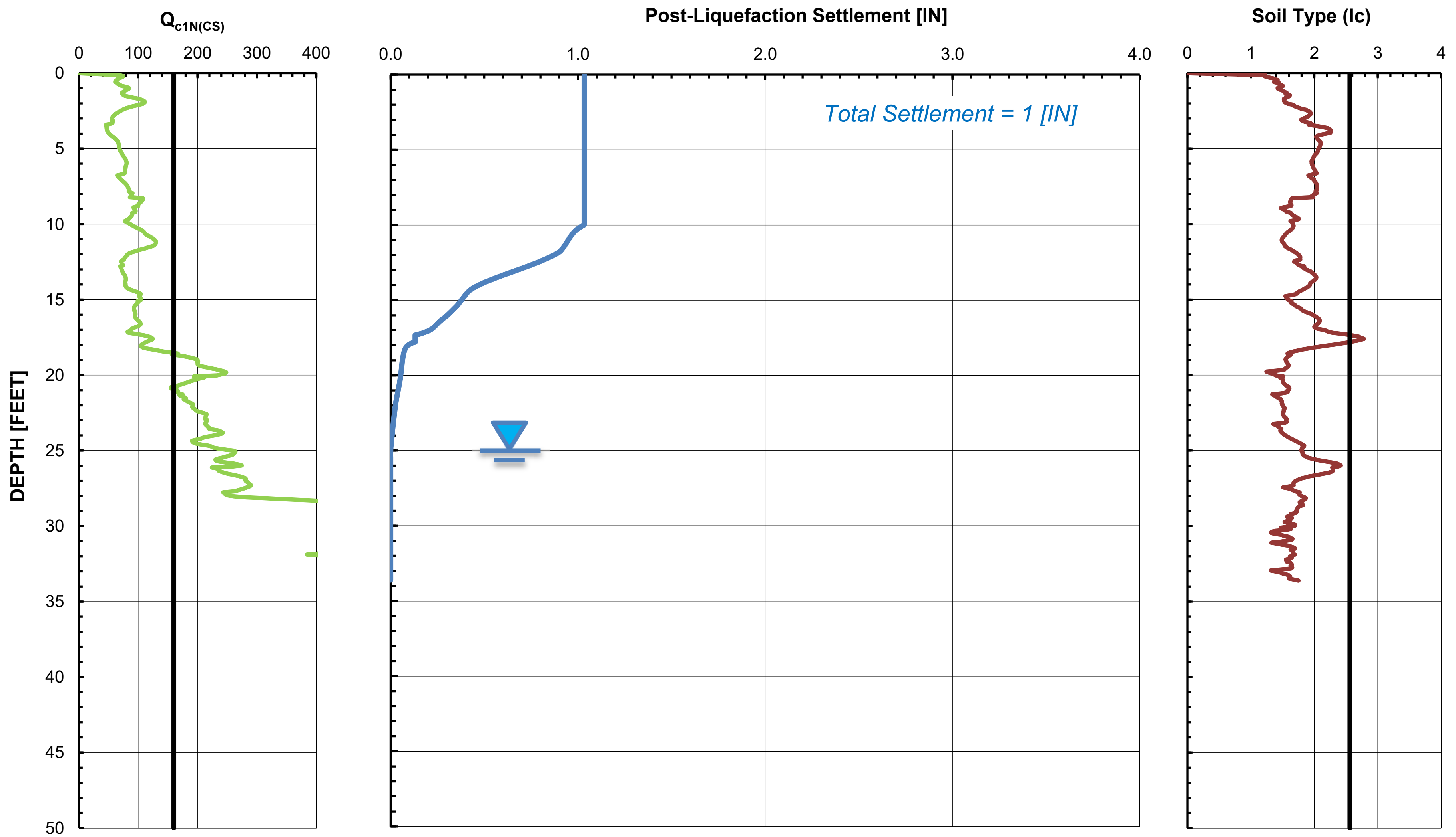
Each of the CPT analyses were conducted using three different assumptions. In the first figure for each CPT sounding (Case A), a spreadsheet was used to estimate seismic settlement with no data averaging. These analyses were then compared to results from a commercially available program CLiq V3.3.1.14, with the CPT data averaged across 3 depth increments (Case B), and with a thin layer correction applied (Case C).

APPENDIX C

LIQUEFACTION ANALYSES (Continued)

The results of the parametric liquefaction analyses are tabulated below, along with the average settlement from the three different methods. The analyses indicate that the total seismic settlement may range from less than ½ inch to slightly more than 3 inches across the site. According to state guidelines, a differential settlement equal to one-half of the total settlement may be conservatively assumed for structural design (SCEC, 1999). Therefore, we estimate a differential settlement from the combined effects of seismic compaction of dry soil above groundwater and post-liquefaction settlement below groundwater of up to approximately 1½ inches across a distance of 40 feet.

Exploration No.	A) Settlement (Raw CPT Data)	B) Settlement (Data Averaging)	C) Settlement (Thin Layer)	Average Settlement	Figure No.
CPT-1	1.0 Inches	0.7 Inches	0.7 Inches	**0.8 Inches**	C-1
CPT-2	1.8 Inches	1.3 Inches	1.3 Inches	**1.5 Inches**	C-2
CPT-3	0.0 Inches	0.0 Inches	0.0 Inches	**0.0 Inches**	C-3
CPT-4	3.4 Inches	3.1 Inches	3.1 Inches	**3.2 Inches**	C-4
CPT-5	0.4 Inches	0.9 Inches	0.8 Inches	**0.7 Inches**	C-5



GROUP DELTA

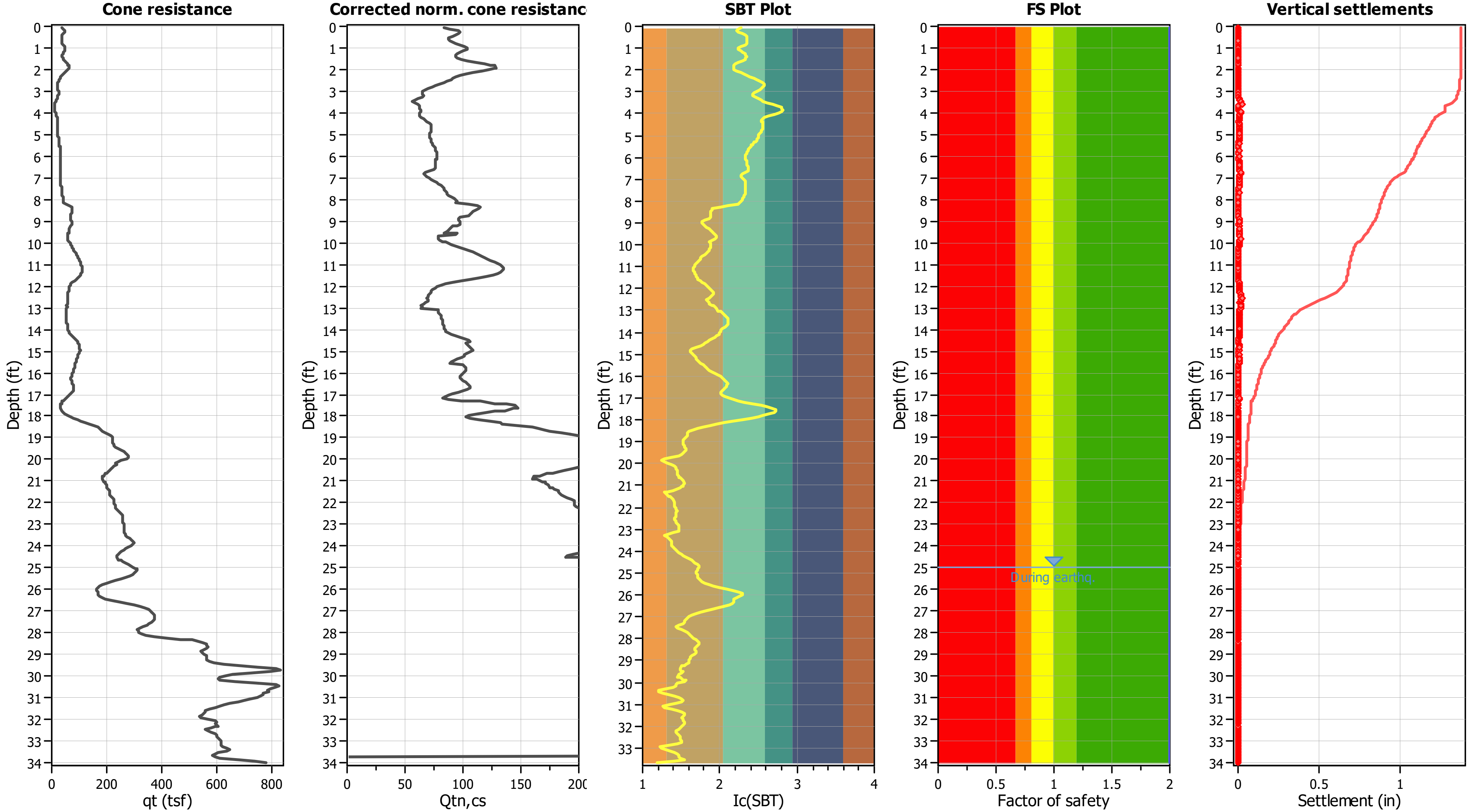
DYNAMIC SETTLEMENT (CPT-1)
(Seismic Demand ~ 0.615g)

Document No. 24-0011
Project No. SD809
FIGURE C-1a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: Riverside Community Hospital
Location: Southeast of 14th Street and Brockton Avenue

CPT-1
Total depth: 33.99 ft



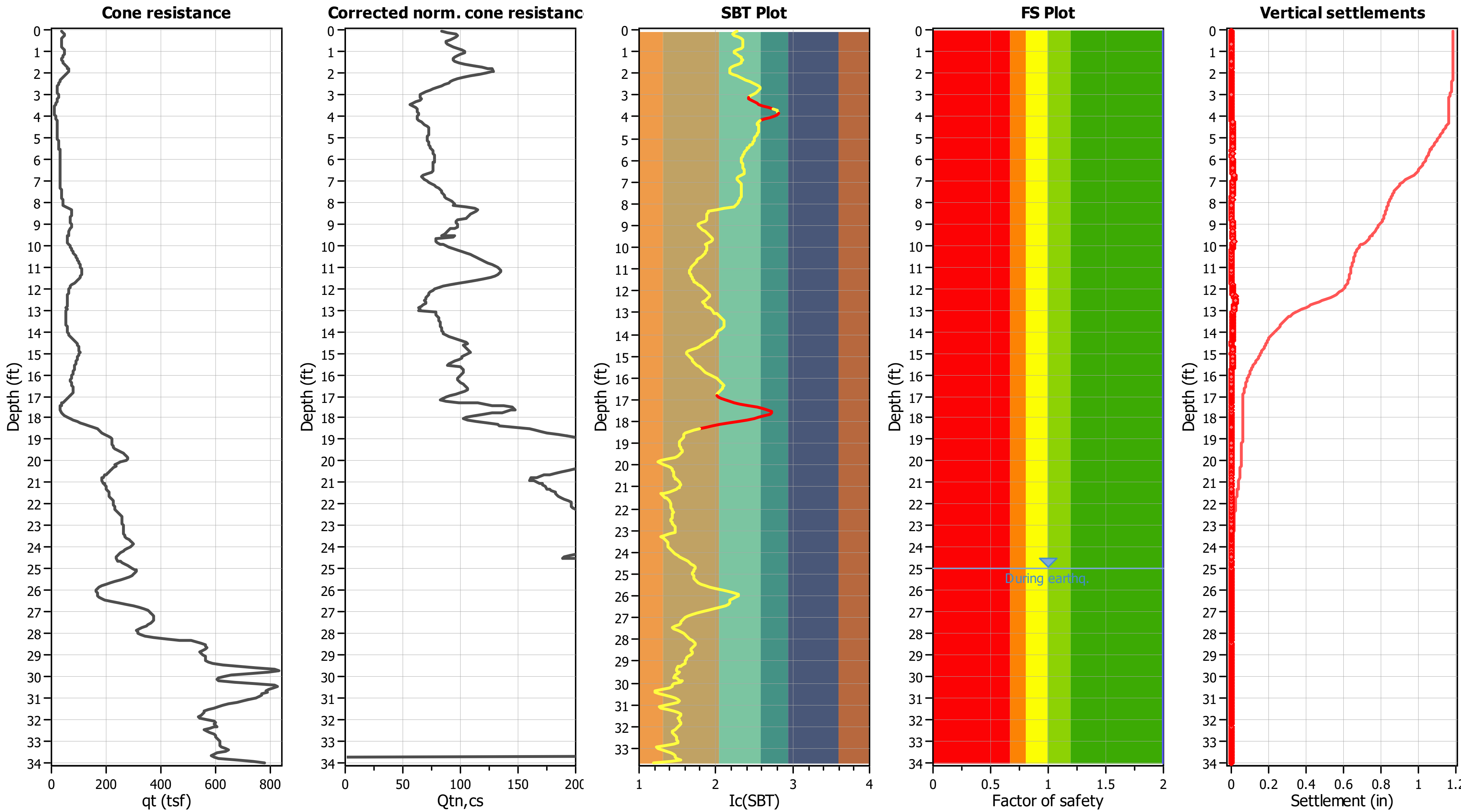
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

FIGURE C-1b

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

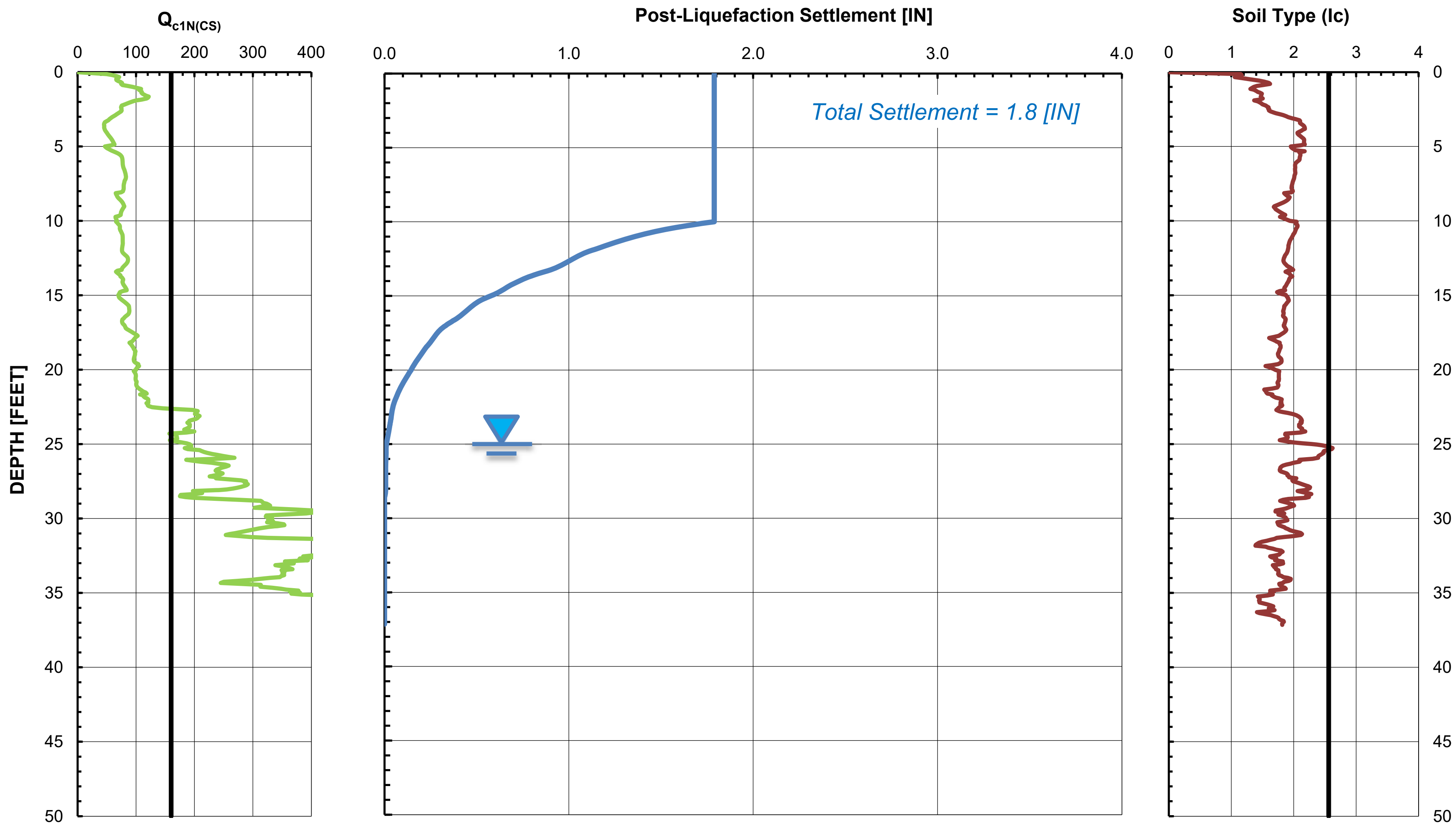
Project: Riverside Community Hospital
Location: Southeast of 14th Street and Brockton Avenue

CPT-1
Total depth: 33.99 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

FIGURE C-1c



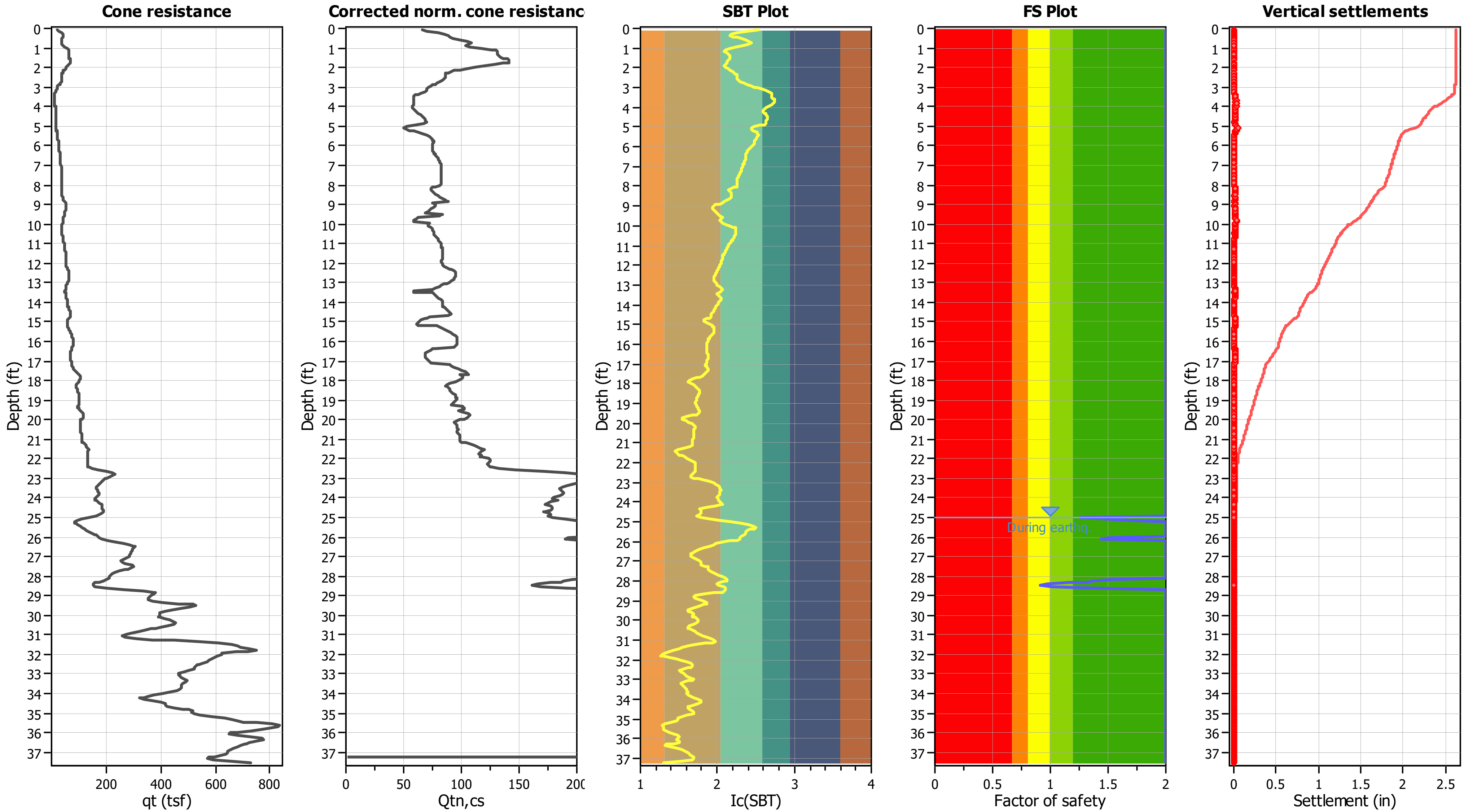
GROUP DELTA

DYNAMIC SETTLEMENT (CPT-2)
(Seismic Demand ~ 0.615g)

Document No. 24-0011
Project No. SD809
FIGURE C-2a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital** | **CPT-2**
Location: **Southeast of 14th Street and Brockton Avenue** | Total depth: 37.54 ft

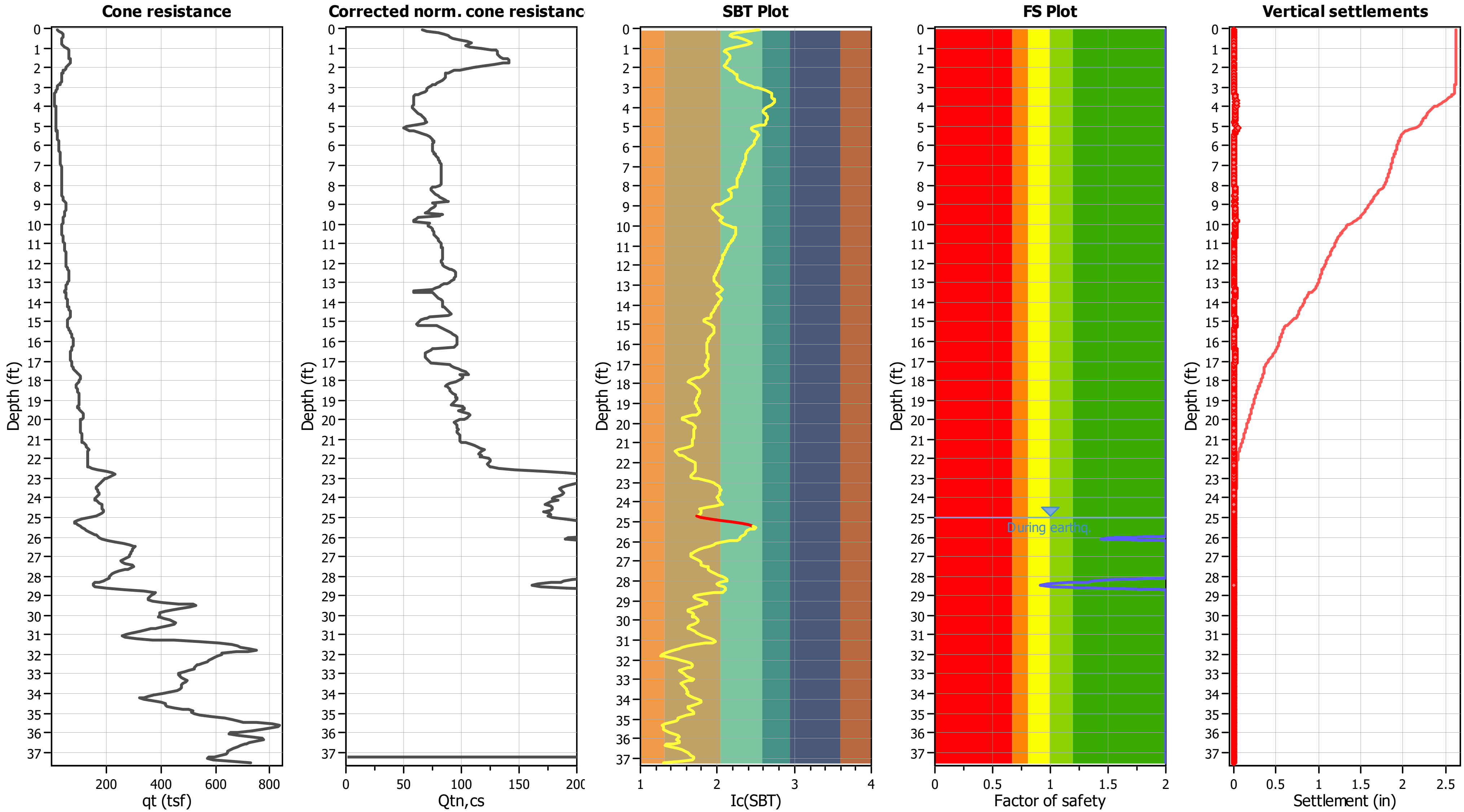


Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

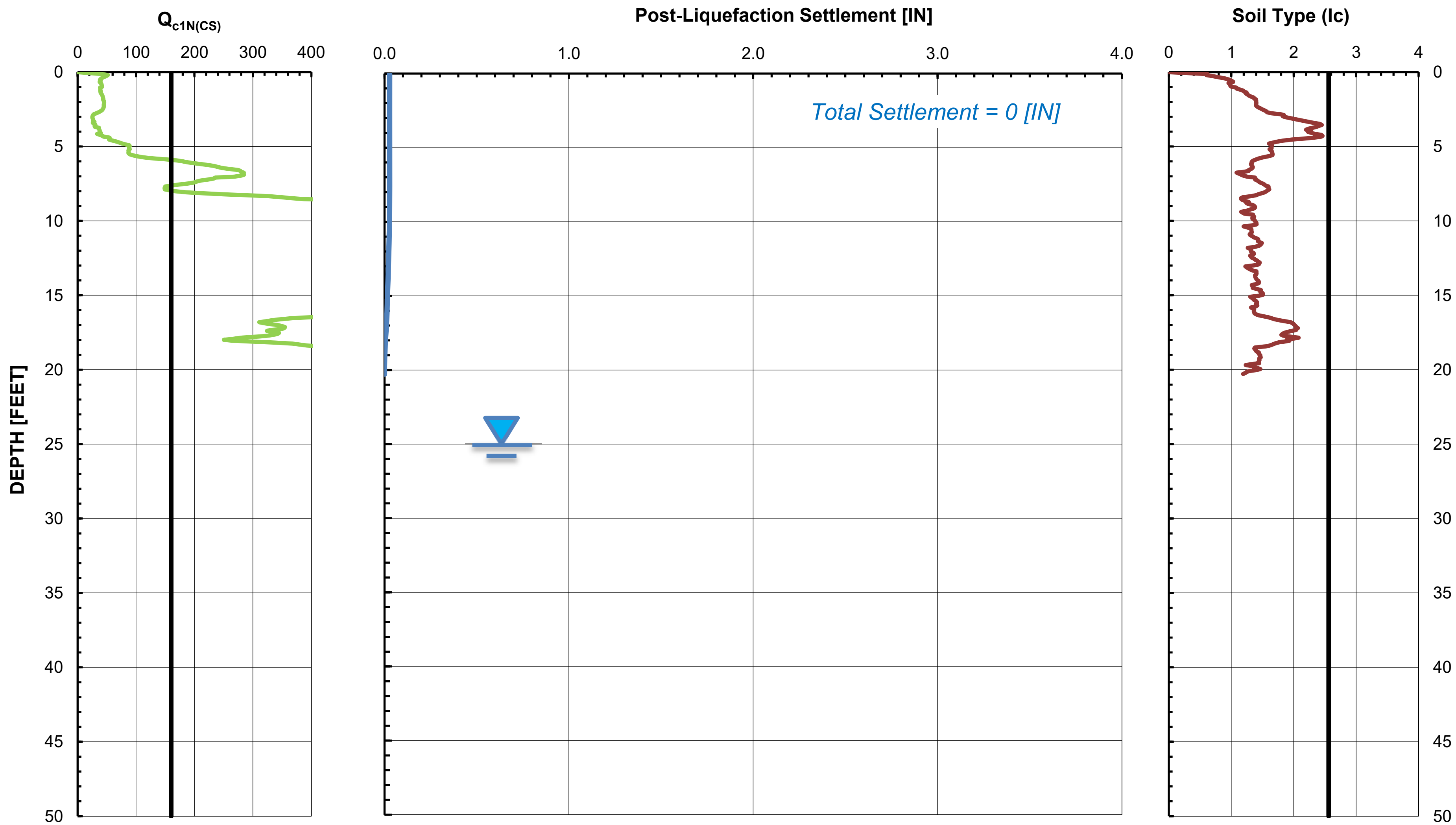
CPT-2
Total depth: 37.54 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

CLiq v.3.3.1.14 - CPTU data presentation & interpretation software - Report created on: 10/16/2024, 3:37:50 PM
Project file: N:\Projects\SD\SD800\SD809 HCA, Riverside Hospital Investigation\9. Reports\24-0011\Appendix A\CPT\SD809 Liquefaction.clq

FIGURE C-2c



GROUP DELTA

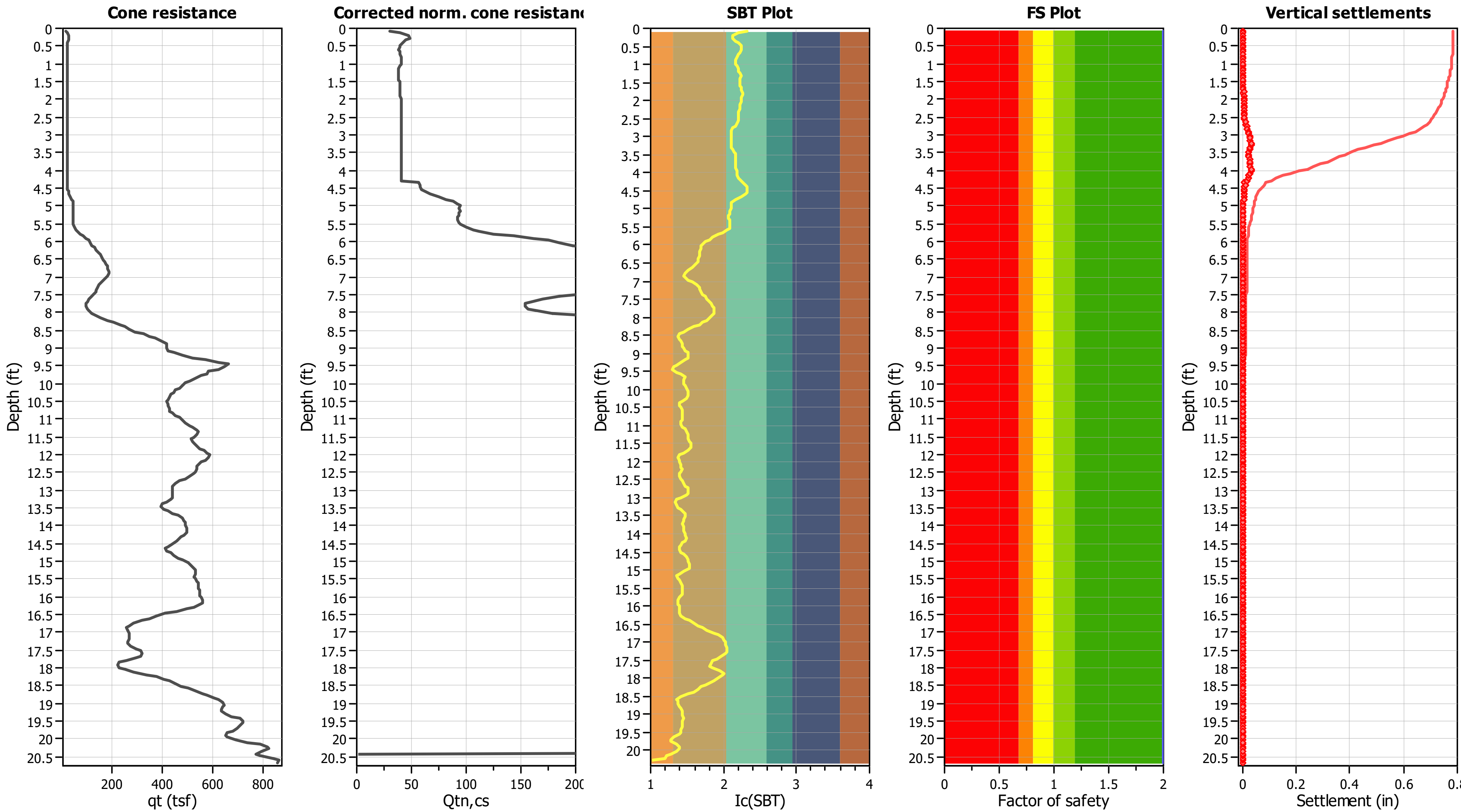
DYNAMIC SETTLEMENT (CPT-3)
(Seismic Demand ~ 0.615g)

Document No. 24-0011
Project No. SD809
FIGURE C-3a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-3
Total depth: 20.67 ft

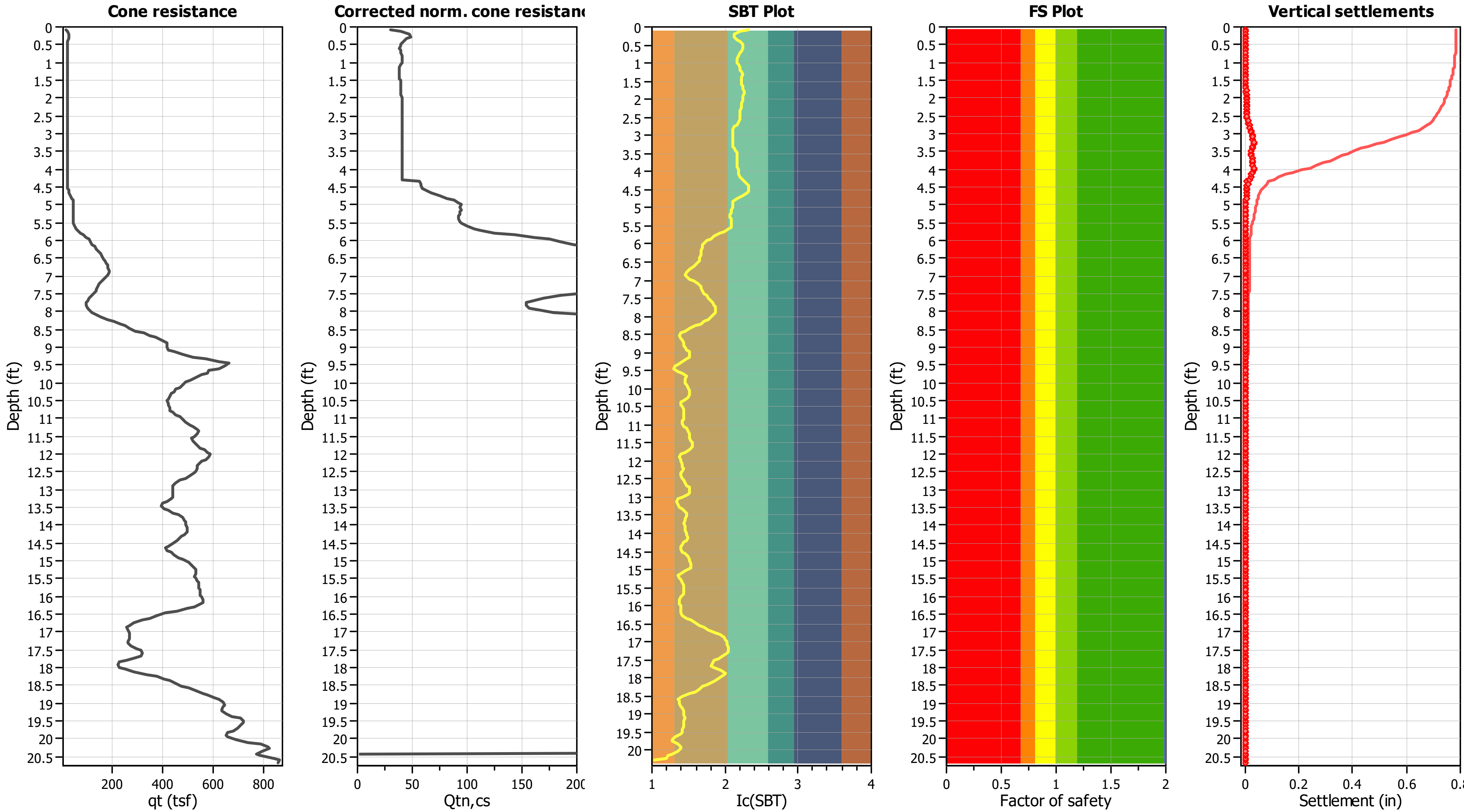


Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

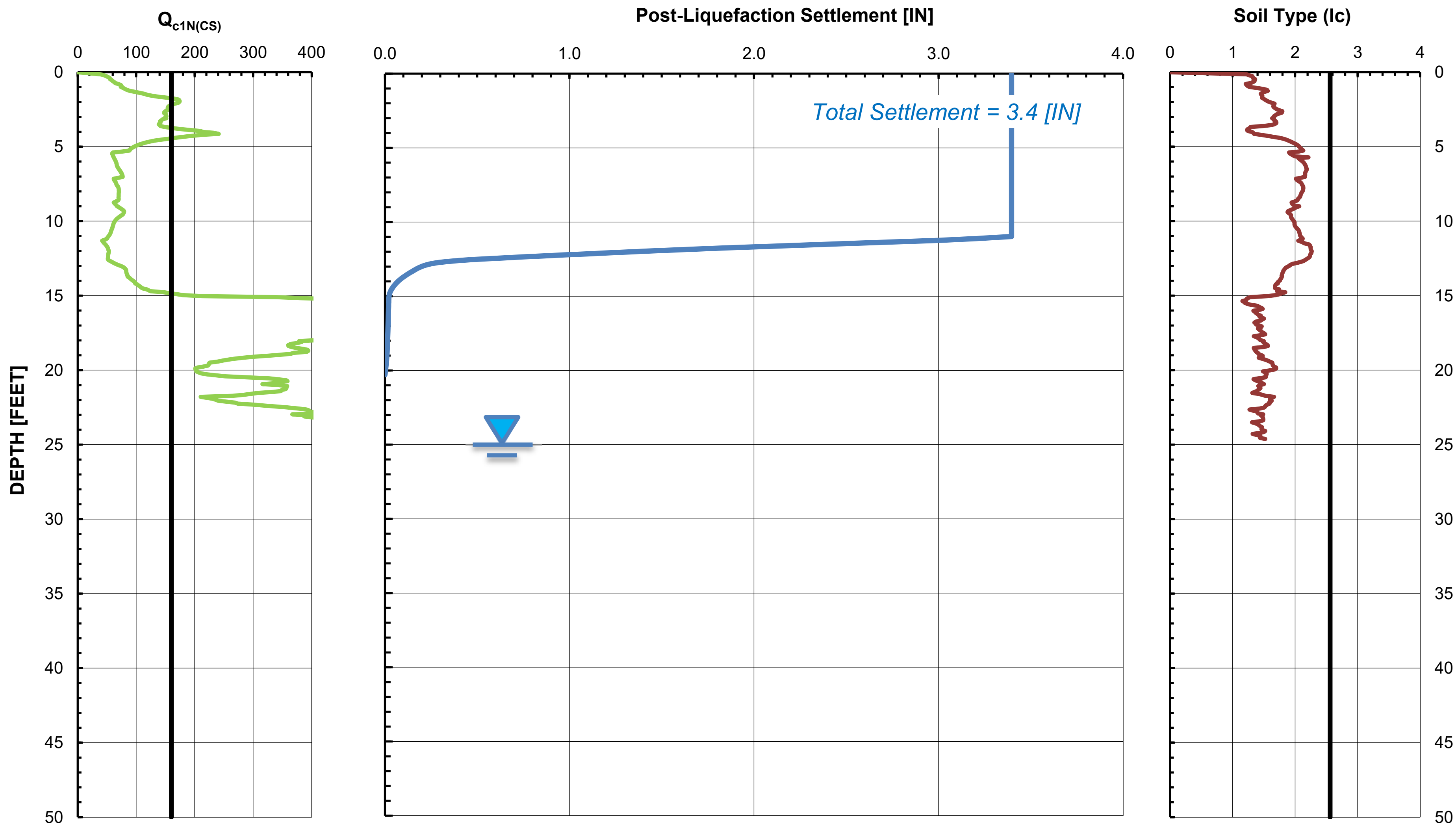
Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-3
Total depth: 20.67 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

FIGURE C-3c



GROUP DELTA

DYNAMIC SETTLEMENT (CPT-4)
(Seismic Demand ~ 0.615g)

Document No. 24-0011
Project No. SD809
FIGURE C-4a

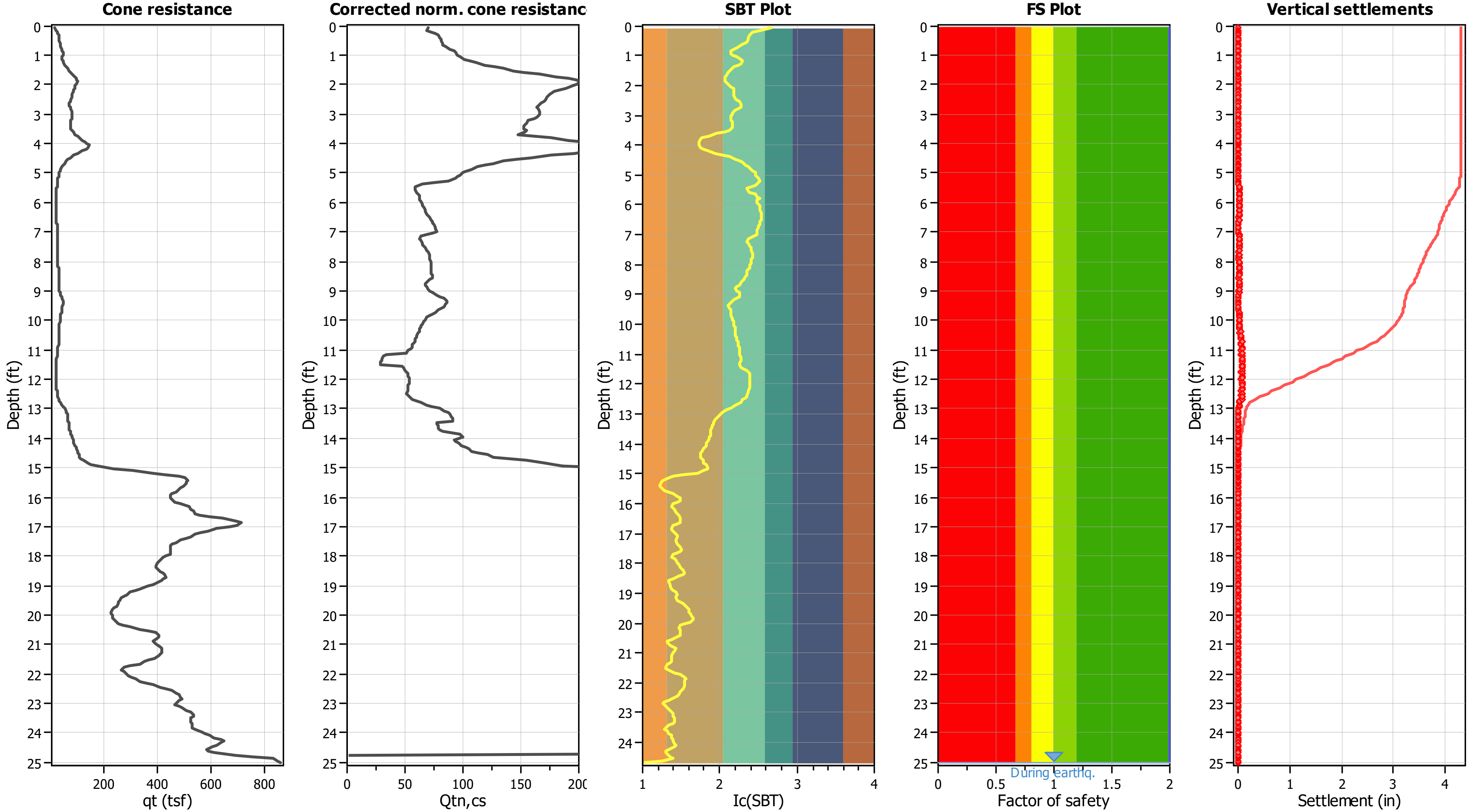
Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**

Location: **Southeast of 14th Street and Brockton Avenue**

CPT-4

Total depth: 25.01 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

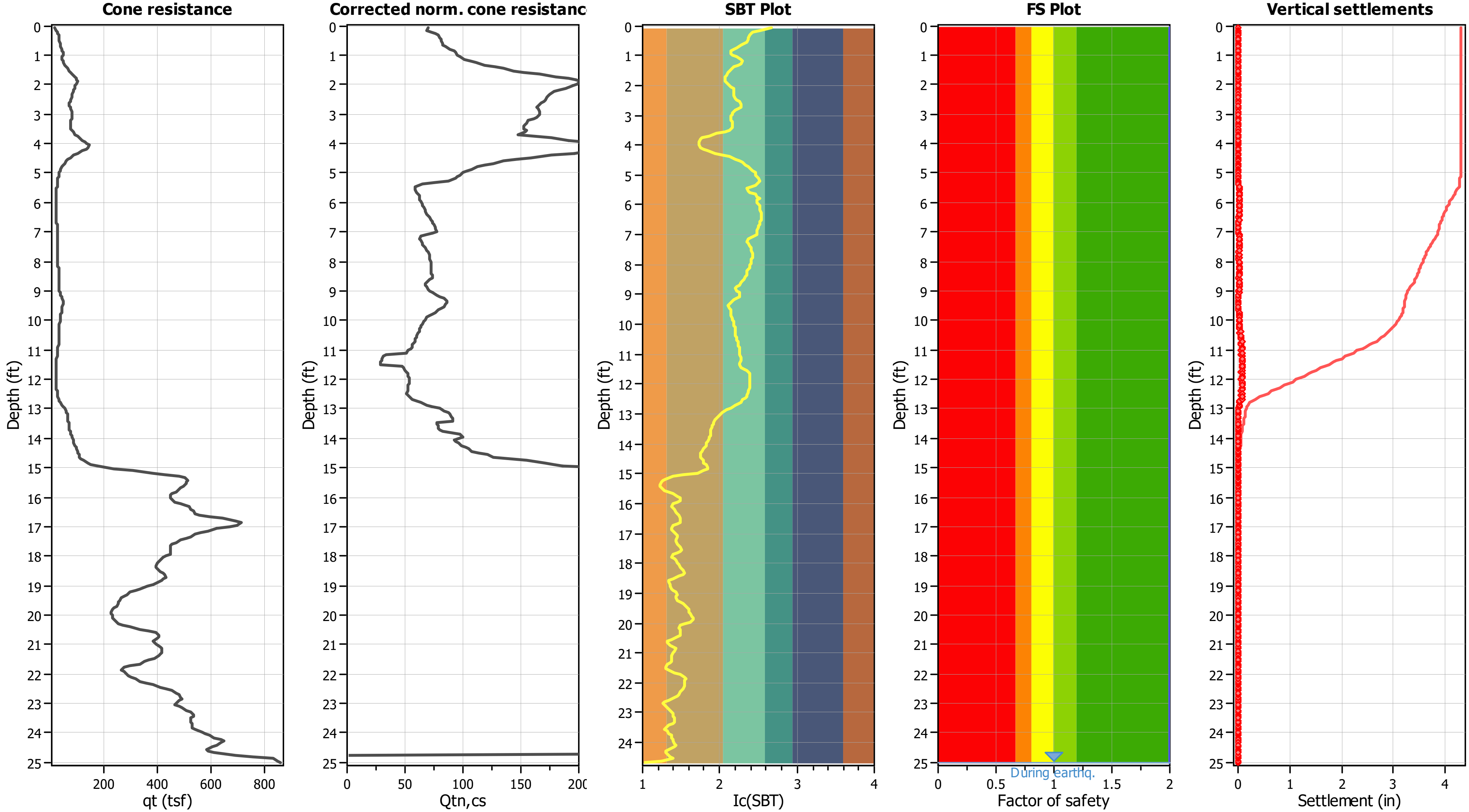
Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**

Location: **Southeast of 14th Street and Brockton Avenue**

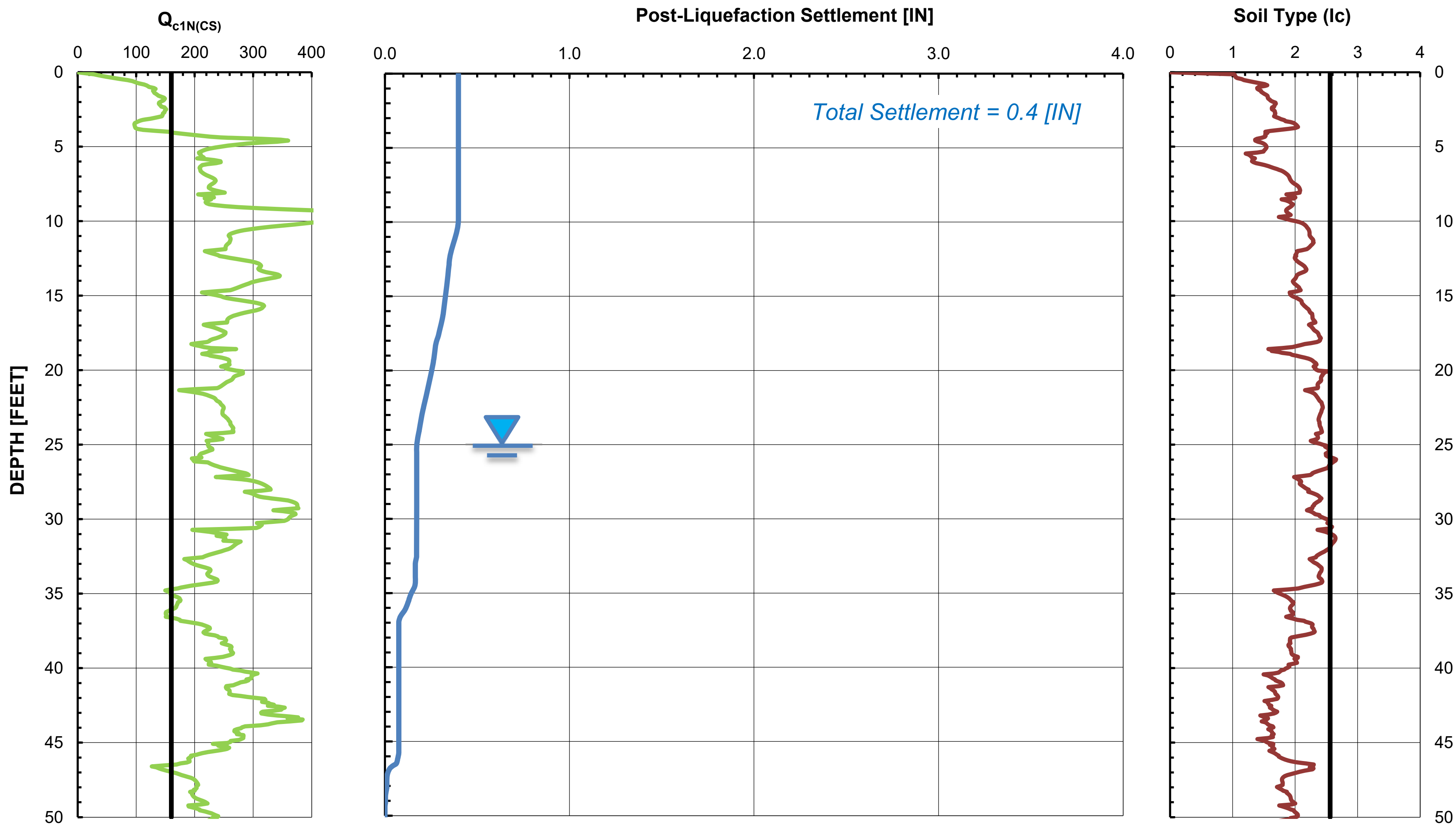
CPT-4

Total depth: 25.01 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

FIGURE C-4c



GROUP DELTA

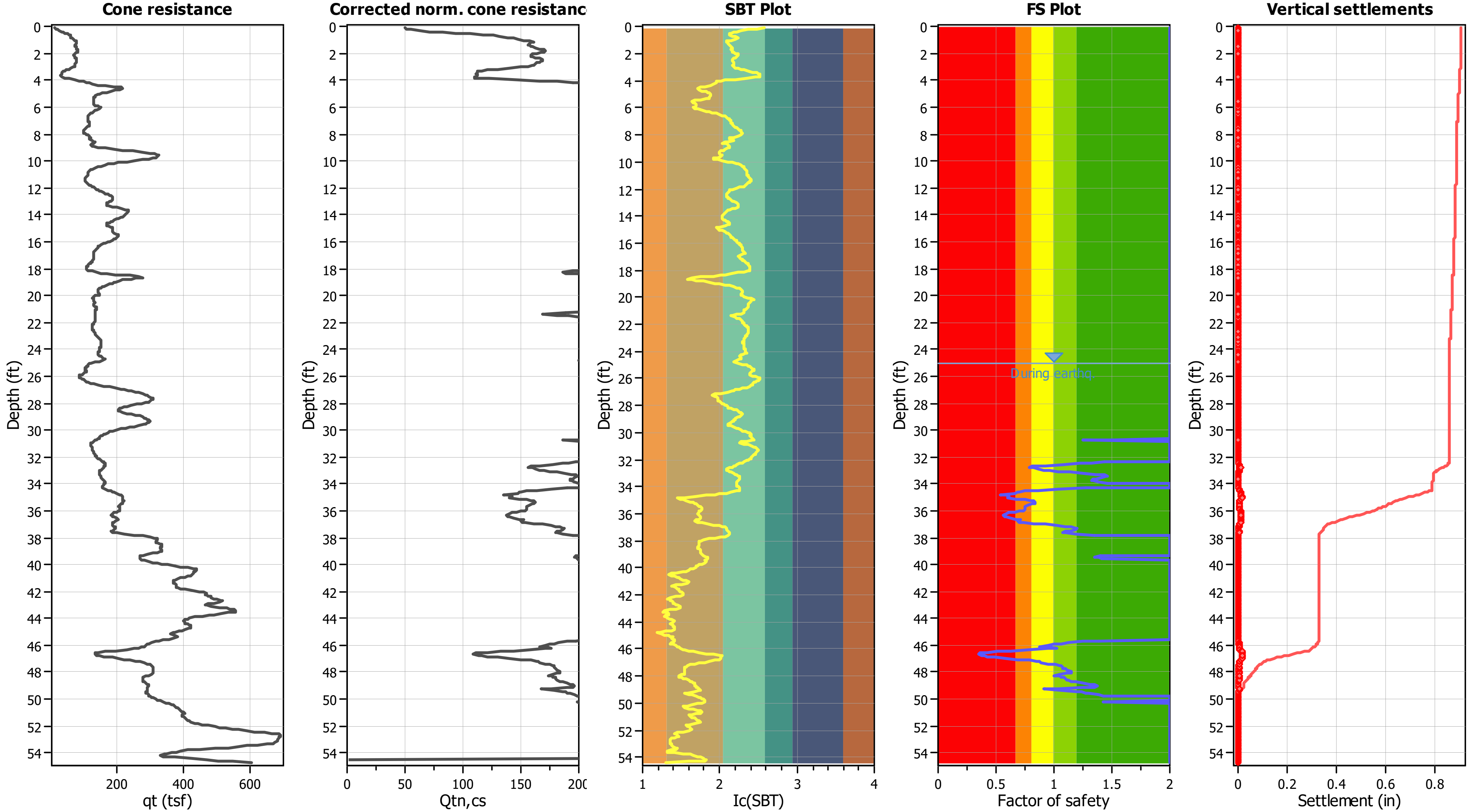
DYNAMIC SETTLEMENT (CPT-5)
(Seismic Demand ~ 0.615g)

Document No. 24-0011
Project No. SD809
FIGURE C-5a

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-5
Total depth: 54.73 ft



Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

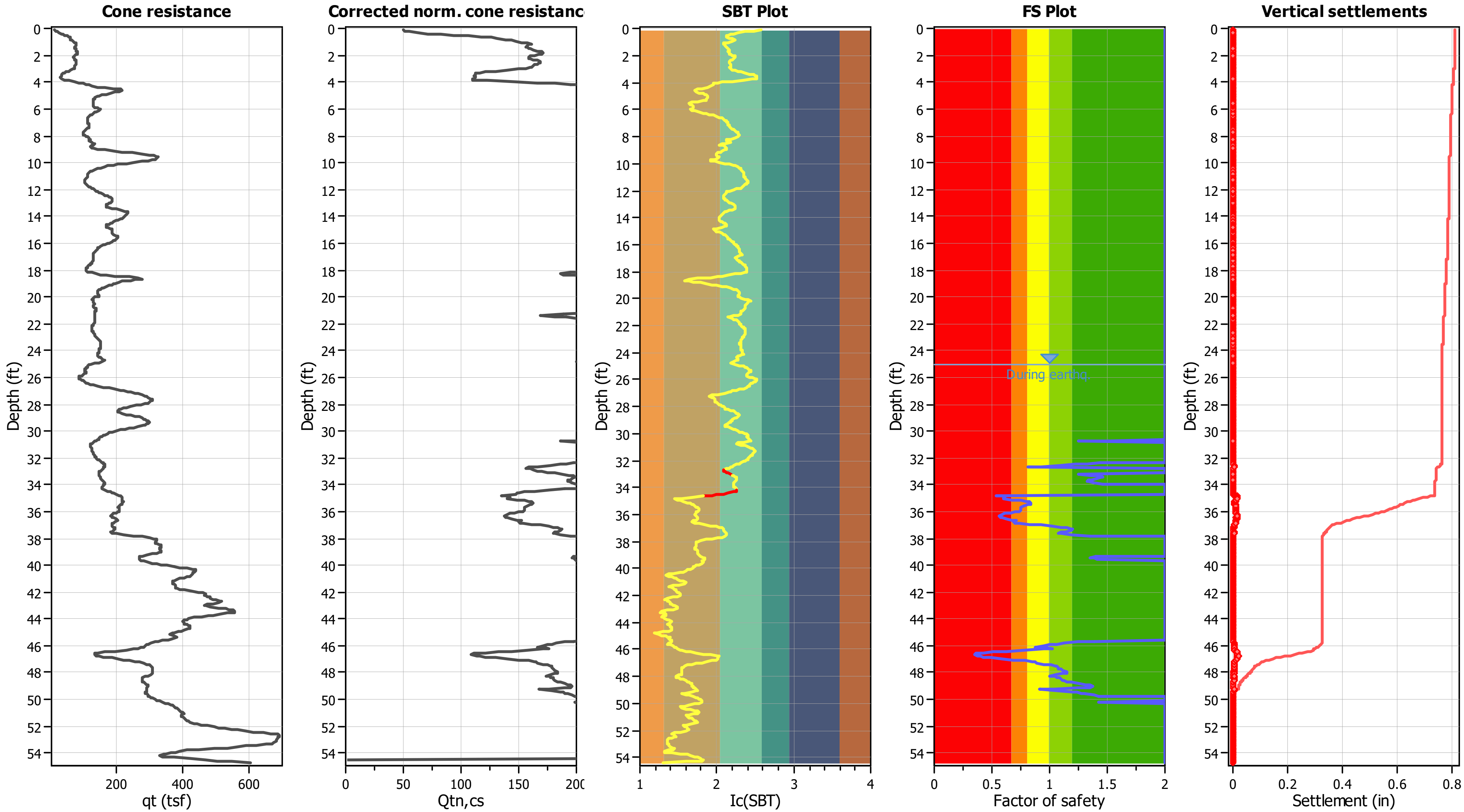
CLiq v.3.3.1.14 - CPTU data presentation & interpretation software - Report created on: 10/16/2024, 3:43:53 PM
PR-2024-001701 (GPA, SPA, RZ, DR) Exhibit 13 - EIR Addendum and appedices
Project file: N:\Projects\SD\SD800\SD809 HCA, Riverside Hospital Investigation\9. Reports\24-0011\Appendix A\CPT\SD809 Liquefaction.clq

FIGURE C-5b

Group Delta Consultants
9245 Activity Road, Suite 103
San Diego, California 92126
http://www.GroupDelta.com

Project: **Riverside Community Hospital**
Location: **Southeast of 14th Street and Brockton Avenue**

CPT-5
Total depth: 54.73 ft



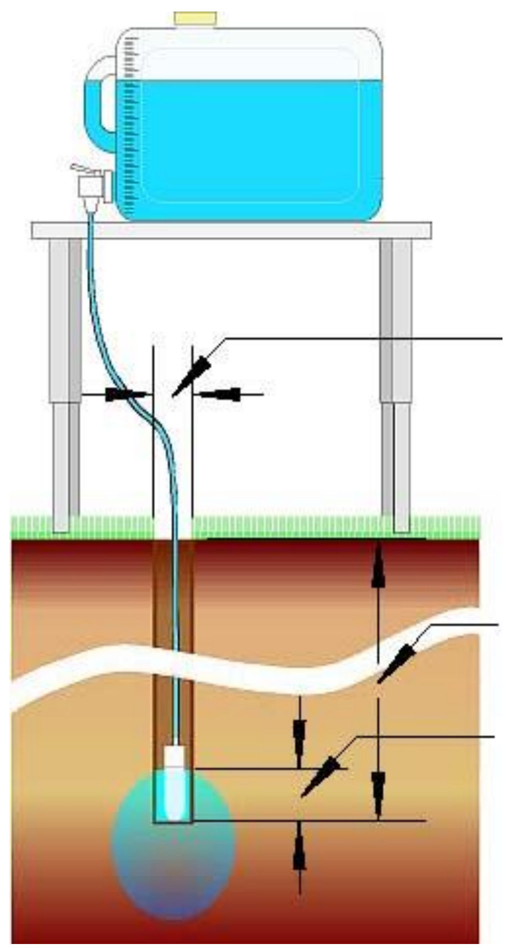
Analysis method:	NCEER (1998)	G.W.T. (in-situ):	30.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	25.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	8.10	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.61	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

APPENDIX D
INFILTRATION ASSESSMENT

APPENDIX D

INFILTRATION ASSESSMENT

We understand that various detention basins, swales or pervious pavements will be incorporated into the development to help promote on-site infiltration. To aid in BMP design, the vertical infiltration rates were estimated at the six test locations provided in the RFP. The standard borehole percolation test method was used. The test configuration is depicted schematically below. The borehole percolation test method requires filling the borehole repeatedly to maintain a relatively constant water head throughout the test duration, while measuring the volume of water the percolates into the ground at specific time intervals. The approximate infiltration test locations are shown on the Exploration Plan, Figure 3A. The test results are presented in detail in the attached Figures D-1.1a through D-6.2b.



Per the County of Riverside BMP Design Manual, the borehole percolation test may be used for both planning level screening and BMP design purposes. Per the standards of practice, the percolation tests should be conducted at approximately the same depth and the same material as the base of the proposed storm water BMP. The Storm Water Manual also requires that two infiltration tests be conducted within 50-feet of each proposed BMP. We conducted two infiltration tests at each of the 6 BMP locations shown on the overall site Exploration Plan, Figure 3A.

The field infiltration tests were conducted in general accordance with the County of Riverside requirements. The borehole infiltration test wells were drilled to depths ranging from 3 to 8 feet below the ground surface. Prior to testing, each well was presoaked with water and allowed to drain. Water was then infiltrated into the soil with flow measurements taken at selected time intervals. Each infiltration test was continued until a relatively constant infiltration rate was attained for 60 minutes.

The field testing indicated preliminary factored infiltration rates that ranged widely from 0.02 to 1.32 inches per hour as shown in Figures D-1.1a through D-6.2b. A Factor of Safety of 2.0 is recommended for BMP design. Note that a factored infiltration rate above 0.50 inches per hour is commonly considered the minimum rate for effective "Full Infiltration" measures. An infiltration rate less than 0.05 inches per hour is commonly considered a "No Infiltration" condition.

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-1A
Drilling Method: Hand Auger

Date Drilled: 4/2/2024
Date Tested: 4/3/2024
Tested By: CRJ/DMG
Temperature: 75 F

Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 5.3 ft
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
25	2.0	80	3.53	3.73	19.4	10.1*r	2.4	1.4	42.9	1.85
26	2.0	82	3.73	3.92	17.1	8.7*r	2.3	1.4	40.8	1.98
27	2.0	84	3.92	4.08	15.0	7.4*r	1.9	1.1	34.3	1.89
28	2.0	86	4.08	4.23	13.1	6.3*r	1.8	1.1	32.2	2.01
29	2.0	88	4.23	4.33	11.6	5.3*r	1.2	0.7	21.5	1.50
30	2.0	90	4.33	4.44	10.4	4.6*r	1.3	0.8	23.6	1.83
31	2.0	92	4.44	4.54	9.1	3.8*r	1.2	0.7	21.5	1.88
32	2.0	94	2.75	3.09	28.0	15.4*r	4.1	2.4	72.9	2.21
33	2.0	96	3.09	3.35	24.4	13.1*r	3.1	1.9	55.8	1.93
34	2.0	98	3.35	3.57	21.5	11.3*r	2.6	1.6	47.2	1.85
35	2.0	100	3.57	3.76	19.0	9.8*r	2.3	1.4	40.8	1.79
36	2.0	102	3.76	3.93	16.9	8.5*r	2.0	1.2	36.5	1.80
37	2.0	104	3.93	4.07	15.0	7.3*r	1.7	1.0	30.0	1.66
38	2.0	106	4.07	4.18	13.5	6.4*r	1.3	0.8	23.6	1.44
39	2.0	108	4.18	4.31	12.1	5.6*r	1.6	0.9	27.9	1.89
40	2.0	110	4.31	4.42	10.6	4.7*r	1.3	0.8	23.6	1.80
41	2.0	112	4.42	4.51	9.4	4*r	1.1	0.6	19.3	1.64
42	2.0	114	2.85	3.15	27.0	14.7*r	3.6	2.1	64.4	2.02
43	2.0	116	3.15	3.38	23.8	12.7*r	2.8	1.6	49.3	1.75
44	2.0	118	3.38	3.59	21.2	11.1*r	2.5	1.5	45.1	1.79
45	2.0	120	3.59	3.73	19.1	9.7*r	1.7	1.0	30.0	1.32
46	2.0	122	3.73	3.89	17.3	8.7*r	1.9	1.1	34.3	1.65
47	2.0	124	3.89	4.01	15.6	7.6*r	1.4	0.9	25.7	1.37
48	2.0	126	4.01	4.14	14.1	6.8*r	1.6	0.9	27.9	1.63
49	2.0	128	4.14	4.24	12.7	5.9*r	1.2	0.7	21.5	1.38
50	2.0	130	4.24	4.34	11.5	5.2*r	1.2	0.7	21.5	1.51
51	2.0	132	4.34	4.44	10.3	4.5*r	1.2	0.7	21.5	1.68
52	2.0	134	4.44	4.52	9.2	3.8*r	1.0	0.6	17.2	1.48
53	3.0	137	2.81	3.17	27.1	15*r	4.3	2.6	51.5	1.61
54	2.0	139	3.17	3.34	23.9	12.5*r	2.0	1.2	36.5	1.29
55	2.0	141	3.34	3.50	22.0	11.4*r	1.9	1.1	34.3	1.32
56	2.0	143	3.50	3.65	20.1	10.3*r	1.8	1.1	32.2	1.34
57	2.0	145	3.65	3.80	18.3	9.3*r	1.8	1.1	32.2	1.47
58	2.0	147	3.80	3.90	16.8	8.2*r	1.2	0.7	21.5	1.06
59	2.0	149	3.90	4.02	15.5	7.5*r	1.4	0.9	25.7	1.38
60	2.0	151	4.02	4.14	14.0	6.7*r	1.4	0.9	25.7	1.51

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

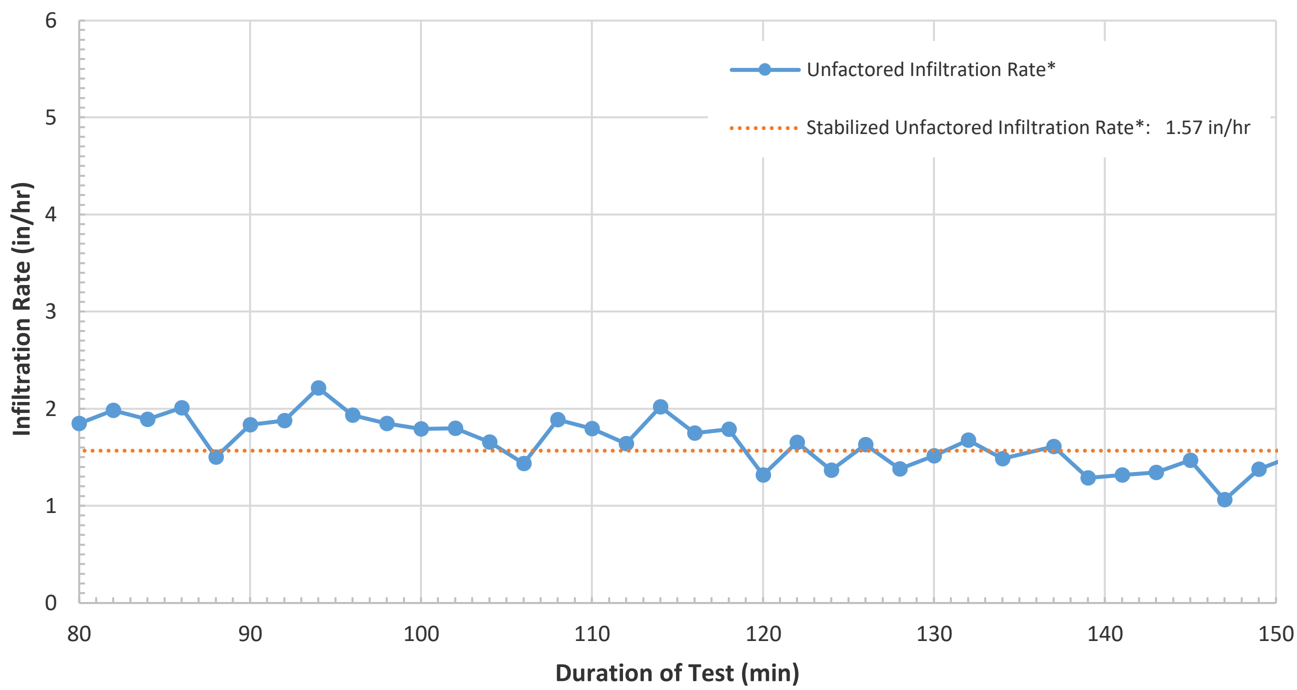
Stabilized, Unfactored Infiltration Rate*: 1.57 inch/hour

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-1A INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-1.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-1A	**Tested By:**	CRJ/DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	75 F	**Test Depth:**	3½ to 4½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.64 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.82

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 75 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-1A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-1.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/2/2024
Borehole Radius (*r): 2 in.

Project Number: SD809
Date Tested: 4/3/2024
Casing Diameter: 2 in.

Test Hole Number: I-1B
Tested By: DMG
Depth of Hole: 5.2 ft

Drilling Method: Hand Auger
Temperature: 77 F
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
25	2.0	70	4.25	4.40	10.1	4.6*r	1.8	1.1	32.2	2.56
26	2.0	72	4.40	4.55	8.3	3.6*r	1.8	1.1	32.2	3.06
27	2.0	74	2.96	3.45	23.6	13.4*r	5.9	3.5	105.1	3.76
28	2.0	76	3.45	3.76	18.8	10.1*r	3.7	2.2	66.5	2.96
29	2.0	78	3.76	4.02	15.4	8*r	3.1	1.9	55.8	3.01
30	2.0	80	4.02	4.31	12.1	6.2*r	3.5	2.1	62.2	4.21
31	2.0	82	4.25	4.38	10.3	4.6*r	1.6	0.9	27.9	2.19
32	2.0	84	2.76	3.28	25.8	14.8*r	6.2	3.7	111.6	3.66
33	2.0	86	3.28	3.61	20.7	11.2*r	4.0	2.4	70.8	2.87
34	2.0	88	3.61	3.83	17.4	9*r	2.6	1.6	47.2	2.26
35	2.0	90	3.83	4.07	14.6	7.5*r	2.9	1.7	51.5	2.90
36	2.0	92	4.07	4.24	12.2	5.8*r	2.0	1.2	36.5	2.44
37	2.0	94	4.24	4.38	10.3	4.7*r	1.7	1.0	30.0	2.35
38	2.0	96	4.38	4.51	8.7	3.7*r	1.6	0.9	27.9	2.55
39	2.0	98	2.74	3.14	26.8	14.9*r	4.8	2.9	85.8	2.72
40	2.0	100	3.14	3.52	22.1	12.2*r	4.6	2.7	81.5	3.11
41	2.0	102	3.52	3.77	18.3	9.6*r	3.0	1.8	53.6	2.45
42	2.0	104	3.77	4.01	15.4	7.9*r	2.9	1.7	51.5	2.77
43	2.0	106	4.01	4.15	13.1	6.2*r	1.7	1.0	30.0	1.88
44	2.0	108	4.15	4.33	11.2	5.3*r	2.2	1.3	38.6	2.81
45	2.0	110	4.33	4.46	9.3	4*r	1.6	0.9	27.9	2.40
46	2.0	112	2.76	3.23	26.1	14.8*r	5.6	3.4	100.8	3.27
47	2.0	114	3.23	3.61	21.0	11.6*r	4.5	2.7	80.7	3.22
48	2.0	116	3.61	3.87	17.2	9*r	3.1	1.9	55.8	2.71
49	2.0	118	3.87	4.09	14.3	7.2*r	2.6	1.6	47.2	2.72
50	2.0	120	4.09	4.24	12.1	5.7*r	1.8	1.1	32.2	2.18
51	2.0	122	4.24	4.38	10.3	4.7*r	1.7	1.0	30.0	2.35
52	2.0	124	4.38	4.56	8.4	3.7*r	2.2	1.3	38.6	3.64
53	2.0	126	2.83	3.24	25.6	14.3*r	4.9	2.9	88.0	2.90
54	2.0	128	3.24	3.56	21.2	11.5*r	3.8	2.3	68.6	2.72
55	2.0	130	3.56	3.83	17.7	9.3*r	3.2	1.9	57.9	2.73
56	2.0	132	3.83	3.97	15.2	7.5*r	1.7	1.0	30.0	1.63
57	2.0	134	3.97	4.15	13.3	6.5*r	2.2	1.3	38.6	2.38
58	2.0	136	4.15	4.32	11.2	5.3*r	2.0	1.2	36.5	2.64
59	2.0	138	4.32	4.44	9.5	4.1*r	1.4	0.9	25.7	2.18
60	2.0	140	2.76	3.15	26.6	14.8*r	4.7	2.8	83.7	2.67

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

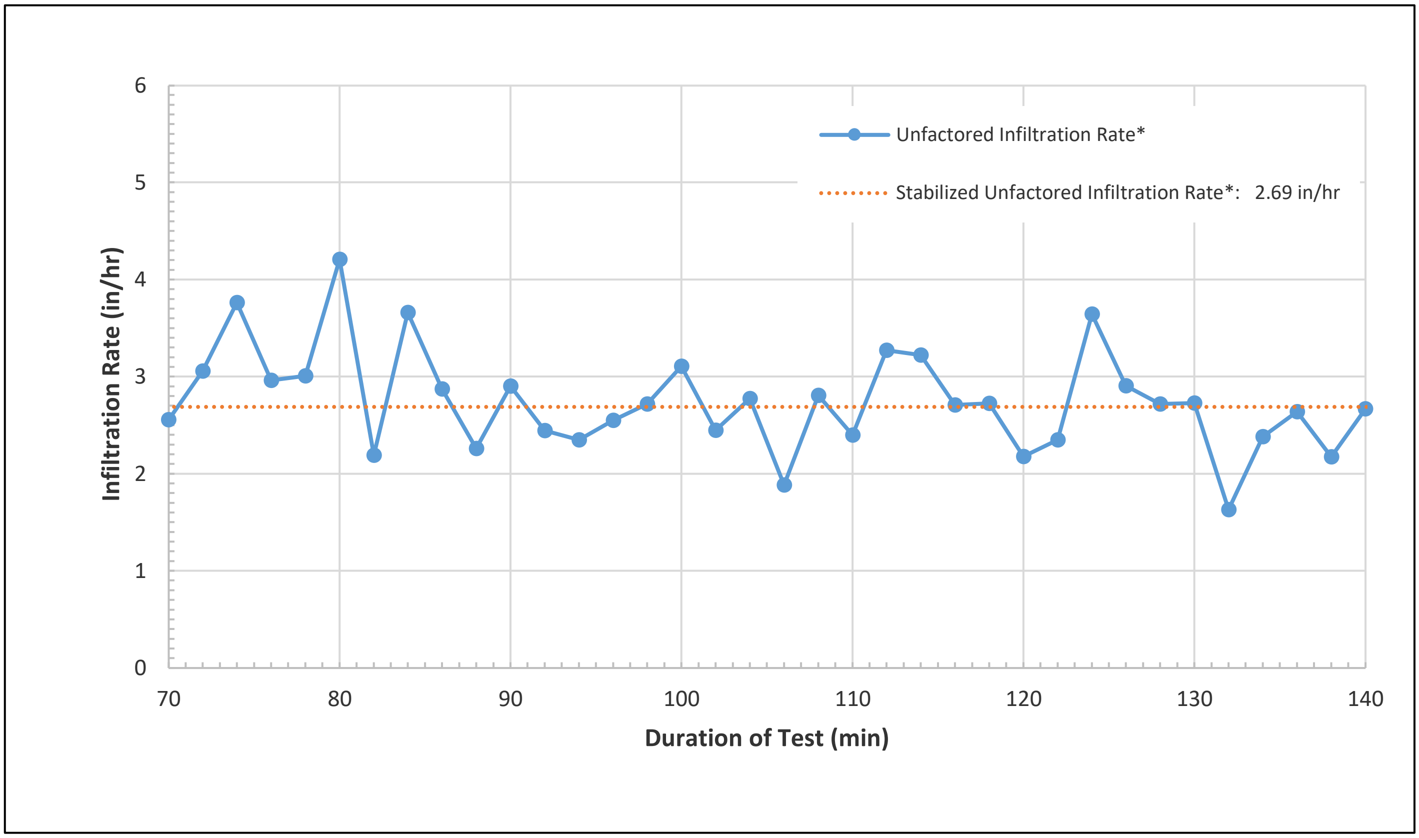
Stabilized, Unfactored Infiltration Rate*: 2.69 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-1B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-1.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-1B	**Tested By:**	DMG	**Depth of Hole:**	5.2 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	77 F	**Test Depth:**	3½ to 4½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 1.08 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.8

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 77 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-1B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-1.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-2A
Drilling Method: Hollow Stem Auger

Date Drilled: 4/1/2024
Date Tested: 4/4/2024
Tested By: DMG
Temperature: 65 F

Borehole Radius (*r): 4 in.
Casing Diameter: 4 in.
Depth of Hole: 8.0 ft
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
6	1.0	6	6.50	6.88	15.8	4*r	4.6	2.5	150.5	16.9
7	1.0	7	6.88	7.11	12.1	2.9*r	2.8	1.5	91.1	12.9
8	1.0	8	7.11	7.53	8.2	2.2*r	5.0	2.8	166.3	32.6
9	1.0	9	3.78	4.34	47.3	12.2*r	6.7	3.7	221.8	8.99
10	1.0	10	4.34	4.68	41.9	10.5*r	4.1	2.2	134.6	6.13
11	1.0	11	4.68	4.93	38.4	9.5*r	3.0	1.7	99.0	4.90
12	1.0	12	5.22	5.62	31.0	7.9*r	4.8	2.6	158.4	9.60
13	1.0	13	5.62	6.21	25.1	6.7*r	7.1	3.9	233.6	17.27
14	1.0	14	6.21	6.40	20.4	4.9*r	2.3	1.3	75.2	6.72
15	2.0	16	3.72	4.37	47.5	12.4*r	7.8	4.3	128.7	5.20
16	2.0	18	4.37	4.41	43.4	10.4*r	0.5	0.3	7.9	0.35
17	2.0	20	4.41	4.65	41.7	10.3*r	2.9	1.6	47.5	2.18
18	2.0	22	4.65	4.78	39.5	9.6*r	1.6	0.9	25.7	1.24
19	2.0	24	4.78	4.97	37.5	9.2*r	2.3	1.3	37.6	1.90
20	2.0	26	4.97	5.13	35.4	8.6*r	1.9	1.1	31.7	1.69
21	2.0	28	5.13	5.61	31.6	8.1*r	5.8	3.2	95.0	5.66
22	2.0	30	5.61	6.13	25.6	6.7*r	6.2	3.4	103.0	7.46
23	2.0	32	6.13	6.33	21.3	5.1*r	2.4	1.3	39.6	3.40
24	5.0	37	3.79	4.37	47.1	12.1*r	7.0	3.8	45.9	1.87
25	5.0	42	4.37	4.76	41.3	10.4*r	4.7	2.6	30.9	1.43
26	5.0	47	4.76	5.13	36.7	9.2*r	4.4	2.4	29.3	1.51
27	5.0	52	5.13	6.19	28.1	8.1*r	12.7	7.0	84.0	5.57
28	5.0	57	3.83	4.37	46.8	12*r	6.5	3.6	42.8	1.75
29	5.0	62	4.37	4.76	41.3	10.4*r	4.7	2.6	30.9	1.43
30	5.0	67	4.76	5.17	36.5	9.2*r	4.9	2.7	32.5	1.69
31	5.0	72	5.17	6.29	27.3	8*r	13.4	7.4	88.7	6.06
32	5.0	77	3.97	4.50	45.2	11.6*r	6.4	3.5	42.0	1.78
33	5.0	82	4.50	4.90	39.6	10*r	4.8	2.6	31.7	1.52
34	5.0	87	4.90	5.70	32.4	8.8*r	9.6	5.3	63.4	3.68
35	5.0	92	5.70	6.55	22.5	6.4*r	10.2	5.6	67.3	5.49
36	5.0	97	4.05	4.56	44.4	11.4*r	6.1	3.4	40.4	1.74
37	5.0	102	4.56	4.96	38.9	9.8*r	4.8	2.6	31.7	1.55
38	5.0	107	4.96	6.01	30.2	8.6*r	12.6	6.9	83.2	5.16
39	5.0	112	6.01	6.51	20.9	5.5*r	6.0	3.3	39.6	3.46
40	5.0	117	4.05	4.52	44.6	11.4*r	5.6	3.1	37.2	1.60
41	5.0	122	4.52	4.88	39.6	10*r	4.3	2.4	28.5	1.37

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 2.92 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-2A
INFILTRATION RATE

GROUP DELTA

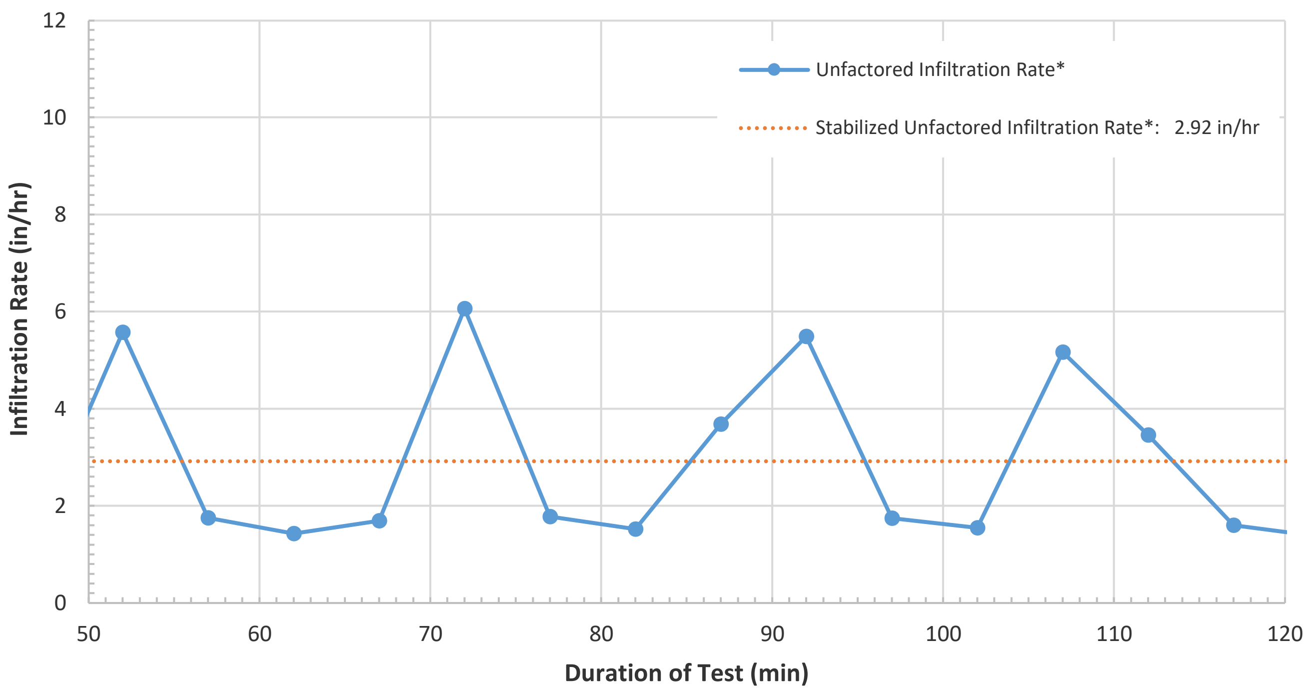
PROJECT NUMBER **SD809**

FIGURE NUMBER **D-2.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/1/2024	**Borehole Radius (*r):**	4 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	4 in.
Test Hole Number:	I-2A	**Tested By:**	DMG	**Depth of Hole:**	8.0 ft
Drilling Method:	Hollow Stem Auger	**Temperature[3]:**	65 F	**Test Depth:**	7½ to 8½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 1.36 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.93

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 65 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	BOREHOLE PERCOLATION TEST I-2A INFILTRATION RATE	PROJECT NUMBER SD809	FIGURE NUMBER D-2.1b

GROUP DELTA

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/1/2024
Borehole Radius (*r): 4 in.
Project Number: SD809
Date Tested: 4/4/2024
Casing Diameter: 4 in.
Test Hole Number: I-2B
Tested By: DMG
Depth of Hole: 8.0 ft
Drilling Method: Hollow Stem Auger
Temperature: 60 F
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
1	1.0	1	4.19	4.77	42.3	10.9*r	7.0	3.8	229.7	10.4
2	1.0	2	4.77	5.65	33.5	9.2*r	10.6	5.8	348.5	19.6
8	2.0	4	3.69	4.21	48.6	12.4*r	6.2	3.4	103.0	4.07
9	2.0	6	4.21	4.57	43.4	10.9*r	4.3	2.4	71.3	3.14
10	2.0	8	4.57	5.13	37.8	9.8*r	6.7	3.7	110.9	5.57
11	2.0	10	5.13	5.65	31.4	8.1*r	6.2	3.4	103.0	6.17
12	2.0	12	5.65	5.98	26.3	6.6*r	4.0	2.2	65.3	4.62
13	2.0	14	5.98	6.21	22.9	5.6*r	2.8	1.5	45.5	3.66
14	5.0	19	3.67	4.42	47.5	12.5*r	9.0	5.0	59.4	2.40
15	5.0	24	4.42	5.51	36.5	10.3*r	13.1	7.2	86.3	4.49
16	5.0	29	5.51	6.03	26.8	7*r	6.2	3.4	41.2	2.86
17	5.0	34	6.03	6.47	21.0	5.4*r	5.3	2.9	34.8	3.03
18	5.0	39	3.66	4.32	48.2	12.5*r	7.9	4.4	52.3	2.08
19	5.0	44	4.32	5.19	39.0	10.6*r	10.4	5.7	68.9	3.36
20	5.0	49	5.19	5.83	29.9	7.9*r	7.7	4.2	50.7	3.18
21	5.0	54	5.83	6.25	23.6	6*r	5.0	2.8	33.3	2.60
22	5.0	59	3.77	4.31	47.6	12.2*r	6.5	3.6	42.8	1.73
23	5.0	64	4.31	5.09	39.6	10.6*r	9.4	5.1	61.8	2.97
24	5.0	69	5.09	5.81	30.6	8.2*r	8.6	4.8	57.0	3.49
25	5.0	74	5.81	6.22	23.9	6.1*r	4.9	2.7	32.5	2.51
26	5.0	79	3.88	4.34	46.7	11.9*r	5.5	3.0	36.4	1.50
27	5.0	84	4.34	5.06	39.6	10.5*r	8.6	4.8	57.0	2.74
28	5.0	89	5.06	5.72	31.4	8.3*r	7.9	4.4	52.3	3.13
29	5.0	94	5.72	6.14	24.9	6.4*r	5.0	2.8	33.3	2.48
30	5.0	99	6.14	6.43	20.6	5.1*r	3.5	1.9	23.0	2.03

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 2.63 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-2B
INFILTRATION RATE

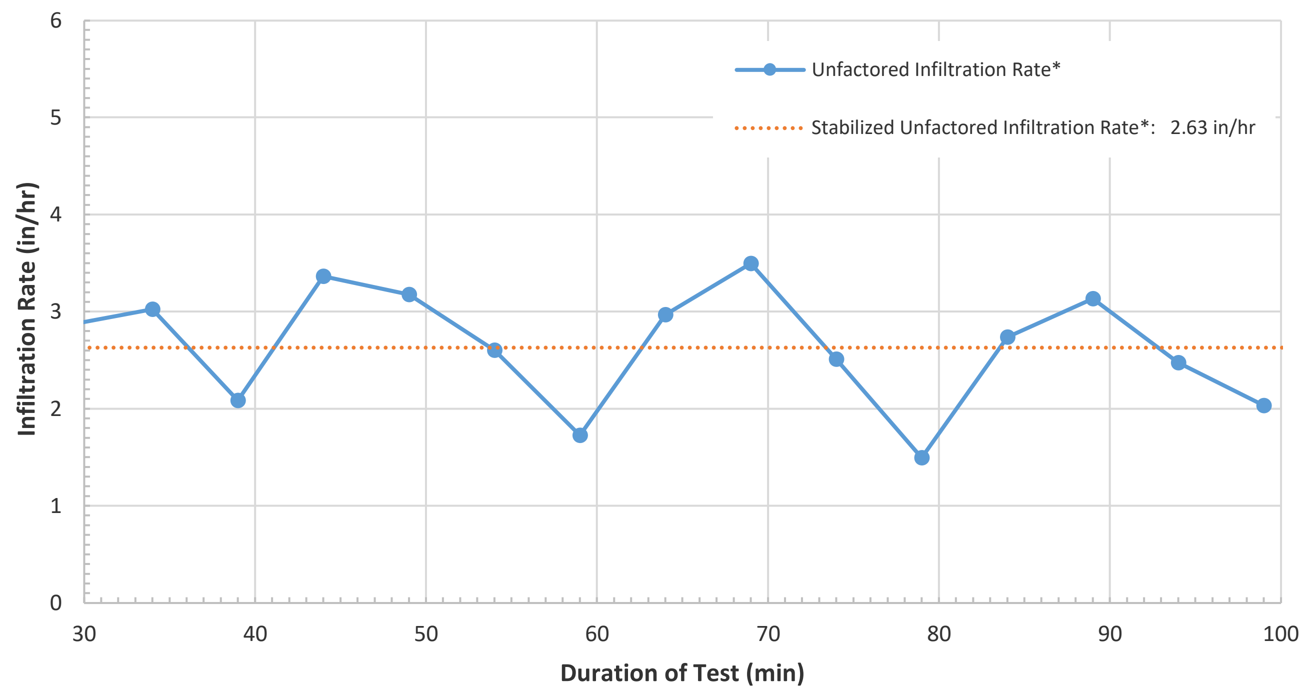
GROUP DELTA

PROJECT NUMBER: **SD809**
FIGURE NUMBER: **D-2.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/1/2024	**Borehole Radius (*r):**	4 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	4 in.
Test Hole Number:	I-2B	**Tested By:**	DMG	**Depth of Hole:**	8.0 ft
Drilling Method:	Hollow Stem Auger	**Temperature[3]:**	60 F	**Test Depth:**	7½ to 8½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 1.32 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 1

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 60 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-2B** **INFILTRATION RATE**	PROJECT NUMBER **SD809**	FIGURE NUMBER **D-2.2b**

GROUP DELTA

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/3/2024
Borehole Radius (*r): 2 in.

Project Number: SD809
Date Tested: 4/4/2024
Casing Diameter: 2 in.

Test Hole Number: I-3A
Tested By: DMG
Depth of Hole: 5.3 ft

Drilling Method: Hand Auger
Temperature: 70 F
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
1	24.0	24	1.80	2.30	38.4	22*r	6.0	3.6	8.9	0.20
2	25.0	49	2.30	2.75	32.7	18.5*r	5.4	3.2	7.7	0.20
3	10.0	59	2.75	2.94	28.9	15.5*r	2.3	1.4	8.2	0.24
4	10.0	69	2.94	3.06	27.0	14.1*r	1.4	0.9	5.1	0.16
5	10.0	79	3.06	3.24	25.2	13.3*r	2.2	1.3	7.7	0.26
6	10.0	89	3.24	3.38	23.3	12.1*r	1.7	1.0	6.0	0.22
7	10.0	99	3.38	3.44	22.1	11.1*r	0.7	0.4	2.6	0.10
8	10.0	109	3.44	3.55	21.1	10.7*r	1.3	0.8	4.7	0.19
9	10.0	119	3.55	3.68	19.7	10*r	1.6	0.9	5.6	0.24
10	10.0	129	3.68	3.74	18.5	9.1*r	0.7	0.4	2.6	0.12

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

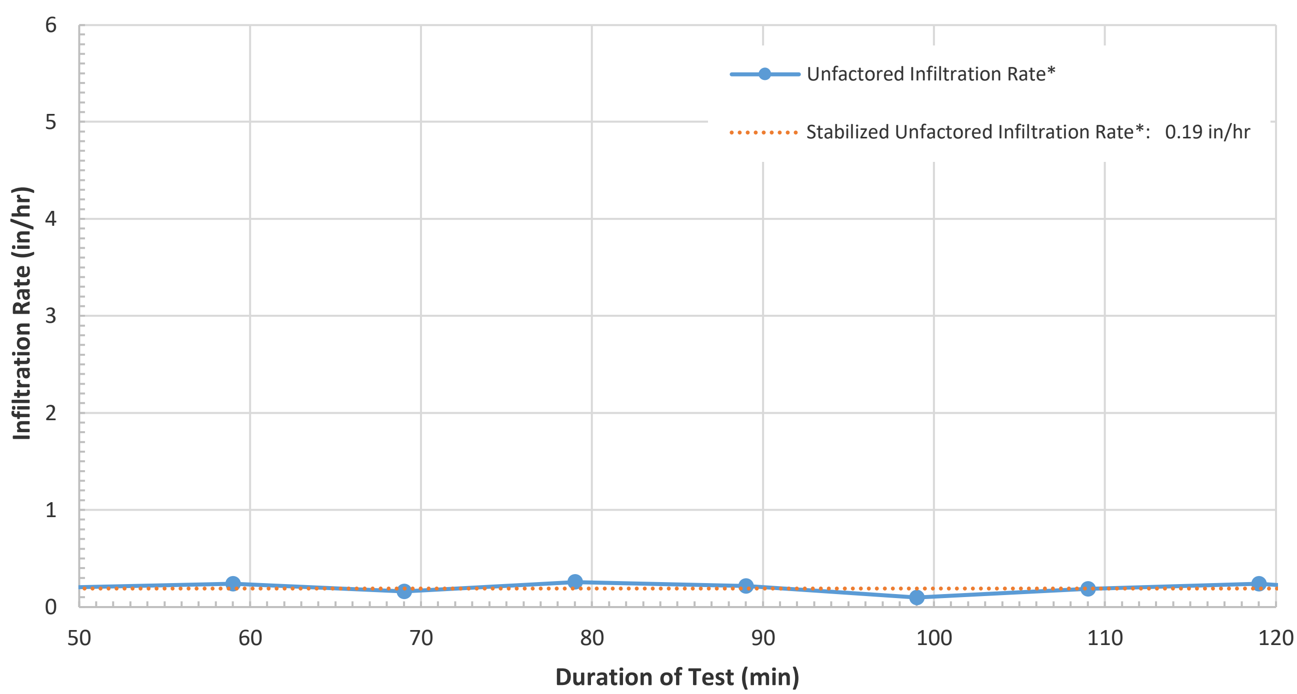
Stabilized, Unfactored Infiltration Rate*: 0.19 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-3A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-3.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/3/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-3A	**Tested By:**	DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	2½ to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.08 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.
1: Rate Factored by Factor of Safety and Temperature Correction Factor.
2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).
3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-3A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-3.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-3B
Drilling Method: Hand Auger

Date Drilled: 4/3/2024
Date Tested: 4/4/2024
Tested By: DMG
Temperature: 70 F

Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 5.3 ft
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
1	25.0	25	2.98	3.03	27.0	13.9*r	0.6	0.4	0.9	0.03
2	25.0	50	3.03	3.15	26.0	13.5*r	1.4	0.9	2.1	0.07
3	10.0	60	3.15	3.17	25.1	12.7*r	0.2	0.1	0.9	0.03
4	10.0	70	3.17	3.21	24.8	12.6*r	0.5	0.3	1.7	0.06
5	10.0	80	3.21	3.22	24.5	12.3*r	0.1	0.1	0.4	0.01
6	10.0	90	3.22	3.26	24.2	12.2*r	0.5	0.3	1.7	0.06
7	10.0	100	3.26	3.27	23.9	12*r	0.1	0.1	0.4	0.02
8	10.0	110	3.27	3.28	23.7	11.9*r	0.1	0.1	0.4	0.02
9	10.0	120	3.28	3.30	23.6	11.8*r	0.2	0.1	0.9	0.03
10	10.0	130	3.30	3.34	23.2	11.7*r	0.5	0.3	1.7	0.06

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 0.04 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-3B
INFILTRATION RATE

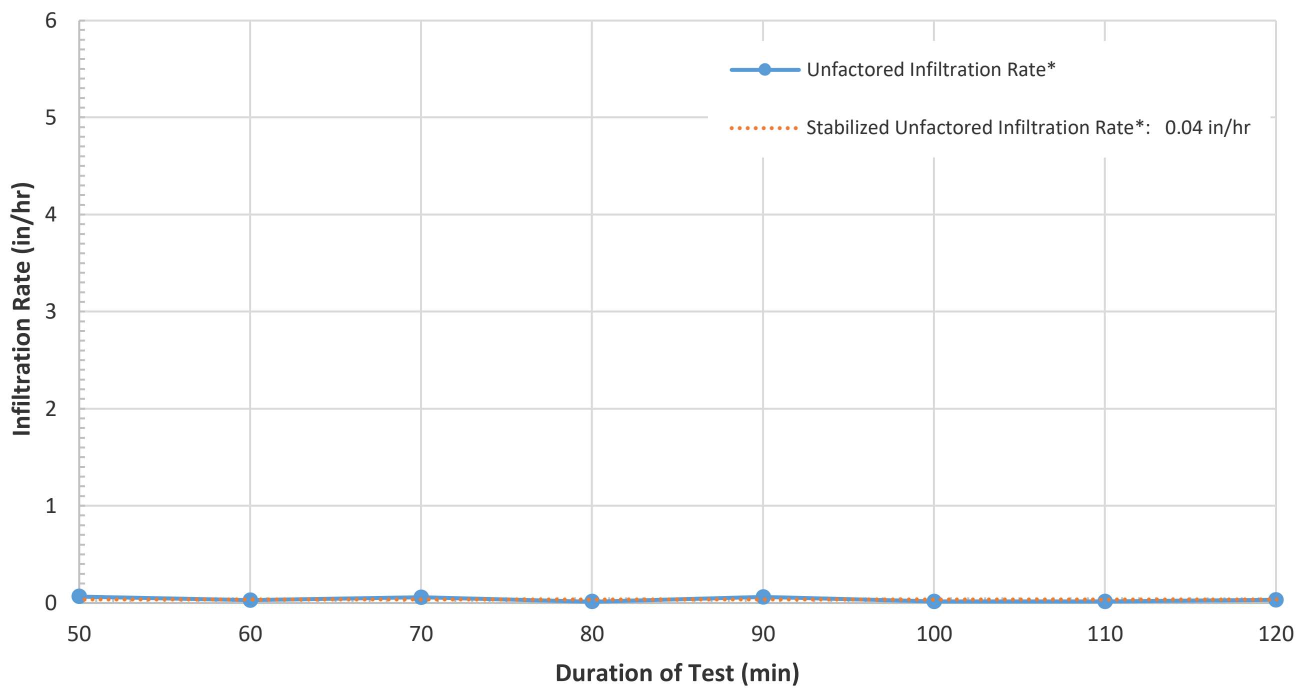
GROUP DELTA

PROJECT NUMBER: **SD809**
FIGURE NUMBER: **D-3.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/3/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/4/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-3B	**Tested By:**	DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	3 to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.02 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.
1: Rate Factored by Factor of Safety and Temperature Correction Factor.
2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).
3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	**BOREHOLE PERCOLATION TEST I-3B INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-3.2b**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-4A	**Tested By:**	JWJ	**Depth of Hole:**	4.8 ft
Drilling Method:	Hand Auger	**Temperature:**	70 F	**Gravel Base Thickness:**	3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	23.0	23	0.85	1.35	43.8	25*r	6.0	3.6	9.3	0.18
2	24.0	47	1.35	1.85	37.8	21.6*r	6.0	3.6	8.9	0.20
3	10.0	57	2.29	2.40	28.9	15.2*r	1.3	0.8	4.7	0.14
4	10.0	67	2.40	2.58	27.1	14.4*r	2.2	1.3	7.7	0.24
5	10.0	77	2.58	2.74	25.1	13.2*r	1.9	1.1	6.9	0.23
6	10.0	87	2.58	2.72	25.2	13.2*r	1.7	1.0	6.0	0.20
7	10.0	97	2.56	2.67	25.6	13.3*r	1.3	0.8	4.7	0.16
8	10.0	107	2.55	2.67	25.7	13.4*r	1.4	0.9	5.1	0.17
9	10.0	117	2.52	2.64	26.0	13.6*r	1.4	0.9	5.1	0.17
10	10.0	127	2.54	2.67	25.7	13.4*r	1.6	0.9	5.6	0.18
11	10.0	137	2.50	2.66	26.0	13.7*r	1.9	1.1	6.9	0.22
12	10.0	147	2.55	2.68	25.6	13.4*r	1.6	0.9	5.6	0.18
13	10.0	157	2.53	2.64	26.0	13.5*r	1.3	0.8	4.7	0.15
14	10.0	167	2.53	2.66	25.9	13.5*r	1.6	0.9	5.6	0.18

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

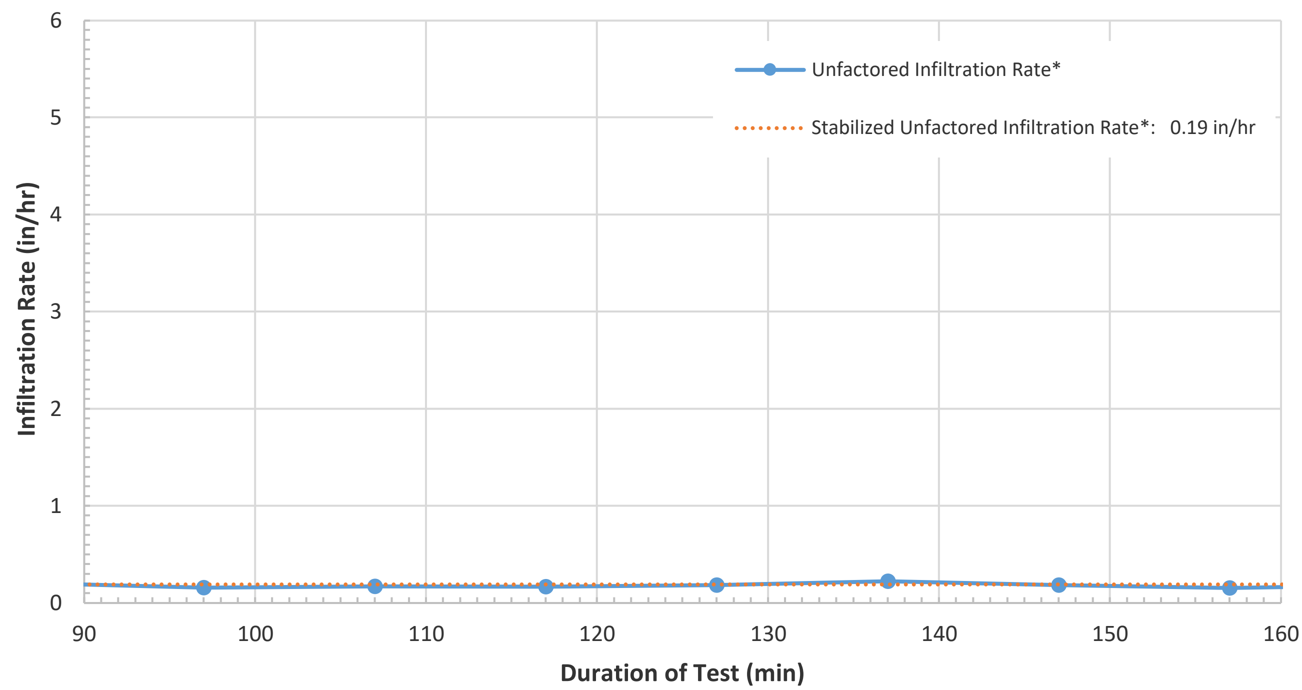
Stabilized, Unfactored Infiltration Rate*: 0.19 inch/hour

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-4A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-4.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-4A	**Tested By:**	JWJ	**Depth of Hole:**	4.8 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	2½ to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.08 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.
1: Rate Factored by Factor of Safety and Temperature Correction Factor.
2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).
3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction Riverside Community Hospital Riverside, California	BOREHOLE PERCOLATION TEST I-4A INFILTRATION RATE	GROUP DELTA PROJECT NUMBER: SD809 FIGURE NUMBER: D-4.1b

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/2/2024
Borehole Radius (*r): 2 in.
Project Number: SD809
Date Tested: 4/3/2024
Casing Diameter: 2 in.
Test Hole Number: I-4B
Tested By: JWJ
Depth of Hole: 5.0 ft
Drilling Method: Hand Auger
Temperature: 70 F
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
1	6.0	6	0.97	1.47	45.4	26.5*r	6.0	3.6	35.8	0.68
2	6.0	12	1.07	1.62	43.9	25.8*r	6.6	3.9	39.3	0.77
3	10.0	22	2.47	3.02	27.1	16.2*r	6.6	3.9	23.6	0.74
4	10.0	32	2.72	3.11	25.1	14.5*r	4.7	2.8	16.7	0.56
5	10.0	42	2.62	2.98	26.4	15.2*r	4.3	2.6	15.4	0.49
6	10.0	52	2.64	3.01	26.1	15.1*r	4.4	2.6	15.9	0.51
7	10.0	62	2.52	2.87	27.7	15.9*r	4.2	2.5	15.0	0.46
8	10.0	72	2.73	3.17	24.6	14.4*r	5.3	3.1	18.9	0.65
9	10.0	82	2.77	3.17	24.4	14.2*r	4.8	2.9	17.2	0.59
10	10.0	92	2.78	3.21	24.1	14.1*r	5.2	3.1	18.4	0.65
11	10.0	102	2.58	2.87	27.3	15.5*r	3.5	2.1	12.4	0.39
12	10.0	112	2.69	3.09	25.4	14.7*r	4.8	2.9	17.2	0.57
13	10.0	122	2.67	2.97	26.2	14.9*r	3.6	2.1	12.9	0.42
14	10.0	132	2.71	3.10	25.2	14.6*r	4.7	2.8	16.7	0.56

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 0.54 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-4B
INFILTRATION RATE

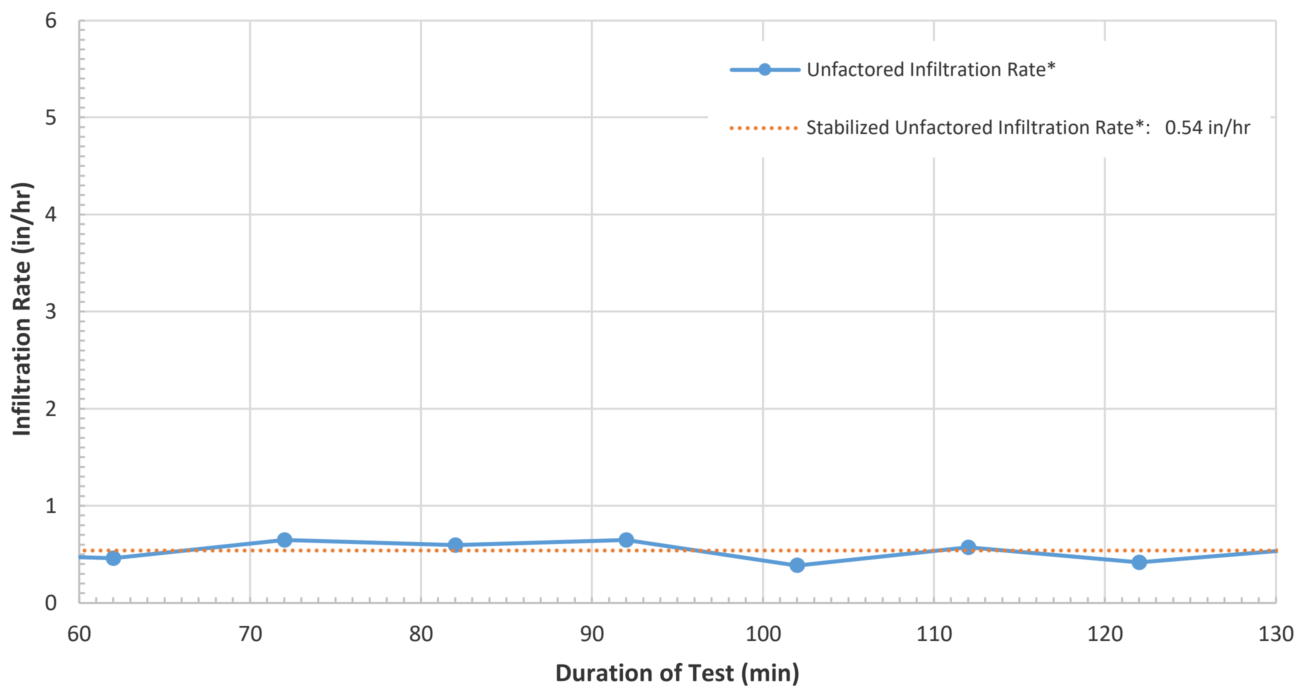
GROUP DELTA

PROJECT NUMBER	FIGURE NUMBER
SD809	D-4.2a

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-4B	**Tested By:**	JWJ	**Depth of Hole:**	5.0 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	70 F	**Test Depth:**	2½ to 3½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.23 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.87

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.
1: Rate Factored by Factor of Safety and Temperature Correction Factor.
2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).
3: Factor based on as-tested water temperature of 70 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-4B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-4.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-5A
Drilling Method: Hand Auger

Date Drilled: 4/2/2024
Date Tested: 4/5/2024
Tested By: JWJ
Temperature: 64 F

Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 3.1 ft
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
1	10.0	10	1.38	1.42	20.2	10.5*r	0.5	0.3	1.7	0.07
2	10.0	20	1.42	1.52	19.4	10.3*r	1.2	0.7	4.3	0.19
3	10.0	30	1.52	1.58	18.4	9.6*r	0.7	0.4	2.6	0.12
4	10.0	40	1.53	1.55	18.5	9.5*r	0.2	0.1	0.9	0.04
5	10.0	50	1.55	1.60	18.1	9.4*r	0.6	0.4	2.1	0.10
6	10.0	60	1.50	1.53	18.8	9.7*r	0.4	0.2	1.3	0.06
7	10.0	70	1.53	1.58	18.3	9.5*r	0.6	0.4	2.1	0.10
8	10.0	80	1.48	1.50	19.1	9.9*r	0.2	0.1	0.9	0.04
9	10.0	90	1.50	1.53	18.8	9.7*r	0.4	0.2	1.3	0.06
10	10.0	100	1.53	1.59	18.3	9.5*r	0.7	0.4	2.6	0.12
11	10.0	110	1.50	1.52	18.9	9.7*r	0.2	0.1	0.9	0.04
12	10.0	120	1.52	1.57	18.5	9.6*r	0.6	0.4	2.1	0.10

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 0.08 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-5A
INFILTRATION RATE

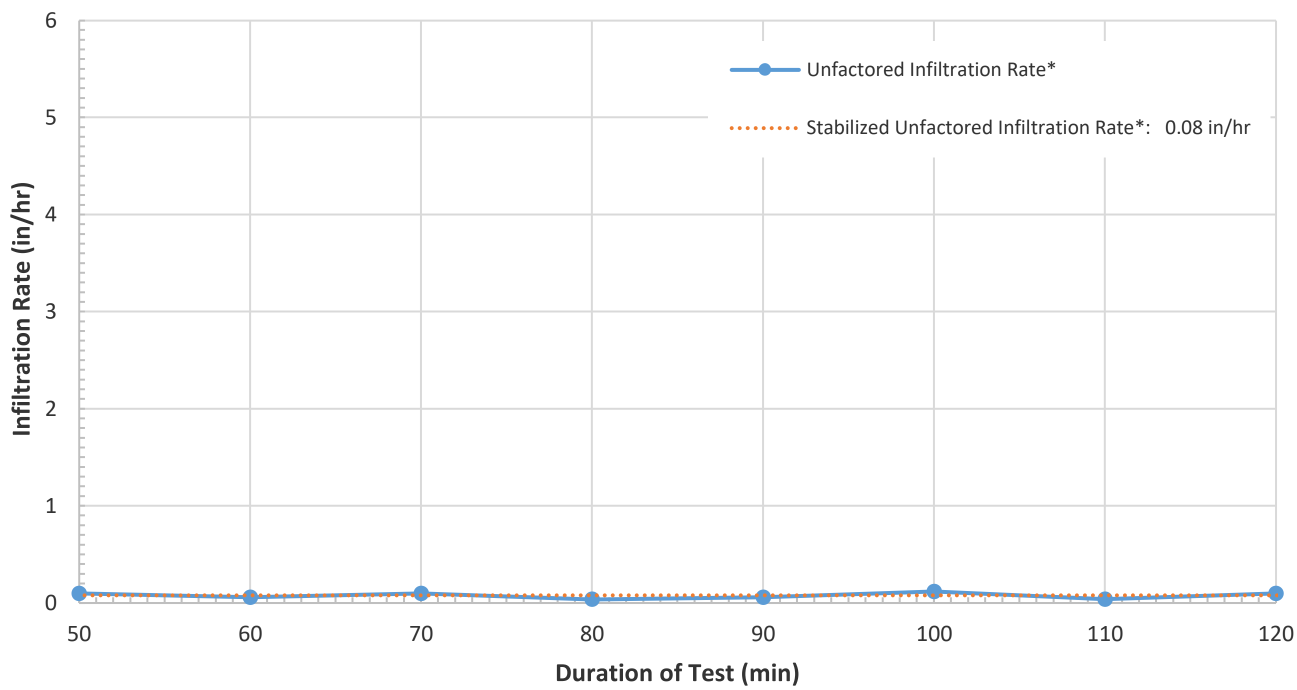
GROUP DELTA

PROJECT NUMBER: **SD809**
FIGURE NUMBER: **D-5.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/5/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-5A	**Tested By:**	JWJ	**Depth of Hole:**	3.1 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	64 F	**Test Depth:**	2 to 3 ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.04 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.95

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 64 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-5A** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-5.1b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/2/2024
Borehole Radius (*r): 2 in.
Project Number: SD809
Date Tested: 4/5/2024
Casing Diameter: 2 in.
Test Hole Number: I-5B
Tested By: JWJ
Depth of Hole: 3.0 ft
Drilling Method: Hand Auger
Temperature: 64 F
Gravel Base Thickness: 3 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	ΔH_c	$\Delta H_c/\Delta t$	I_t
1	10.0	10	0.93	0.94	24.7	12.5*r	0.1	0.1	0.4	0.01
2	10.0	20	0.94	0.96	24.6	12.4*r	0.2	0.1	0.9	0.03
3	10.0	30	0.96	0.97	24.4	12.3*r	0.1	0.1	0.4	0.01
4	10.0	40	0.97	0.99	24.2	12.2*r	0.2	0.1	0.9	0.03
5	10.0	50	0.99	1.02	23.9	12*r	0.4	0.2	1.3	0.05
6	10.0	60	1.02	1.05	23.5	11.8*r	0.4	0.2	1.3	0.05
7	10.0	70	1.05	1.07	23.2	11.6*r	0.2	0.1	0.9	0.03
8	10.0	80	0.97	0.99	24.2	12.2*r	0.2	0.1	0.9	0.03
9	10.0	90	0.99	1.01	24.0	12*r	0.2	0.1	0.9	0.03
10	10.0	100	1.00	1.02	23.8	12*r	0.2	0.1	0.9	0.03
11	10.0	110	1.02	1.04	23.6	11.8*r	0.2	0.1	0.9	0.03
12	10.0	120	1.04	1.06	23.4	11.7*r	0.2	0.1	0.9	0.03

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 0.03 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-5B
INFILTRATION RATE

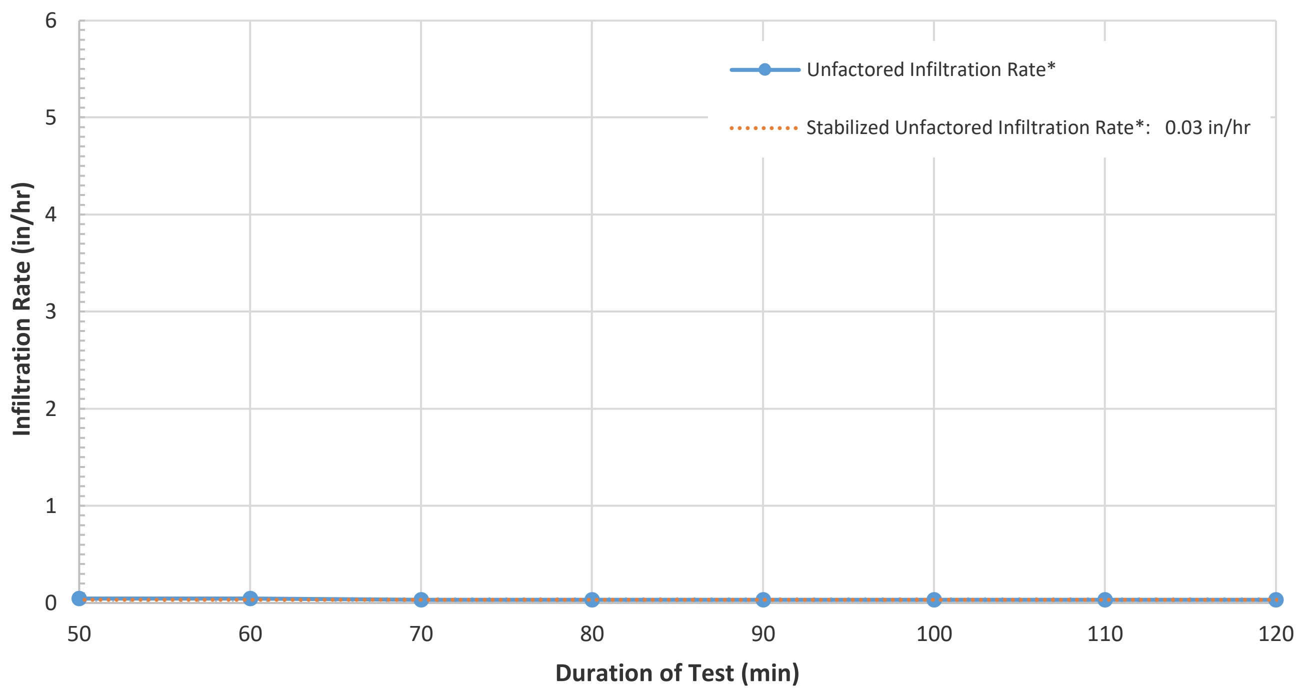
GROUP DELTA

PROJECT NUMBER: **SD809**
FIGURE NUMBER: **D-5.2a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/5/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-5B	**Tested By:**	JWJ	**Depth of Hole:**	3.0 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	64 F	**Test Depth:**	2 to 3 ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.02 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.95

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.
1: Rate Factored by Factor of Safety and Temperature Correction Factor.
2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).
3: Factor based on as-tested water temperature of 64 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-5B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-5.2b**

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Project Number: SD809
Test Hole Number: I-6A
Drilling Method: Hand Auger

Date Drilled: 4/2/2024
Date Tested: 4/3/2024
Tested By: DMG
Temperature: 71 F

Borehole Radius (*r): 2 in.
Casing Diameter: 2 in.
Depth of Hole: 5.2 ft
Gravel Base Thickness: 2 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
10	2.0	23	3.35	3.66	19.9	11.3*r	3.7	2.2	66.5	2.80
11	2.0	25	3.66	3.93	16.5	9.2*r	3.2	1.9	57.9	2.92
12	2.0	27	3.93	4.12	13.7	7.3*r	2.3	1.4	40.8	2.45
13	2.0	29	4.12	4.27	11.7	6*r	1.8	1.1	32.2	2.25
14	2.0	31	2.60	2.96	28.6	16.5*r	4.3	2.6	77.2	2.29
15	2.0	33	2.96	3.32	24.3	14*r	4.3	2.6	77.2	2.68
16	2.0	35	3.32	3.59	20.5	11.5*r	3.2	1.9	57.9	2.37
17	2.0	37	3.59	3.86	17.3	9.7*r	3.2	1.9	57.9	2.79
18	2.0	39	3.86	4.04	14.6	7.8*r	2.2	1.3	38.6	2.18
19	2.0	41	4.04	4.20	12.6	6.6*r	1.9	1.1	34.3	2.24
20	2.0	43	2.88	3.24	25.3	14.5*r	4.3	2.6	77.2	2.58
21	2.0	45	3.24	3.49	21.6	12.1*r	3.0	1.8	53.6	2.09
22	2.0	47	3.49	3.70	18.9	10.4*r	2.5	1.5	45.1	2.00
23	2.0	49	3.70	3.87	16.6	8.9*r	2.0	1.2	36.5	1.83
24	2.0	51	3.87	4.04	14.5	7.7*r	2.0	1.2	36.5	2.07
25	2.0	53	4.04	4.17	12.7	6.6*r	1.6	0.9	27.9	1.79
26	2.0	55	4.17	4.29	11.2	5.7*r	1.4	0.9	25.7	1.86
27	2.0	57	2.80	3.20	26.0	15.1*r	4.8	2.9	85.8	2.79
28	2.0	59	3.20	3.42	22.3	12.3*r	2.6	1.6	47.2	1.78
29	2.0	61	3.42	3.64	19.6	10.8*r	2.6	1.6	47.2	2.01
30	2.0	63	3.64	3.81	17.3	9.3*r	2.0	1.2	36.5	1.76
31	2.0	65	3.81	3.95	15.4	8.2*r	1.7	1.0	30.0	1.61
32	2.0	67	3.95	4.13	13.5	7.2*r	2.2	1.3	38.6	2.35
33	2.0	69	4.13	4.22	11.9	6*r	1.1	0.6	19.3	1.32
34	2.0	71	4.22	4.35	10.6	5.3*r	1.6	0.9	27.9	2.13
35	5.0	76	2.85	3.48	24.0	14.7*r	7.6	4.5	54.1	1.90
36	5.0	81	3.48	3.85	18.0	10.4*r	4.4	2.6	31.8	1.47
37	5.0	86	3.85	4.18	13.8	7.9*r	4.0	2.4	28.3	1.69
38	5.0	91	4.18	4.41	10.5	5.6*r	2.8	1.6	19.7	1.52
39	5.0	96	2.74	3.36	25.4	15.5*r	7.4	4.4	53.2	1.77
40	5.0	101	3.36	3.79	19.1	11.2*r	5.2	3.1	36.9	1.62
41	5.0	106	3.79	4.09	14.7	8.3*r	3.6	2.1	25.7	1.44
42	5.0	111	4.09	4.35	11.4	6.2*r	3.1	1.9	22.3	1.60
43	5.0	116	2.87	3.42	24.3	14.6*r	6.6	3.9	47.2	1.64
44	5.0	121	3.42	3.83	18.5	10.8*r	4.9	2.9	35.2	1.59
45	5.0	126	3.83	4.11	14.4	8*r	3.4	2.0	24.0	1.38

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

Stabilized, Unfactored Infiltration Rate*: 1.60 inch/hour

HCA Design and Construction
Riverside Community Hospital
Riverside, California

BOREHOLE PERCOLATION TEST I-6A
INFILTRATION RATE

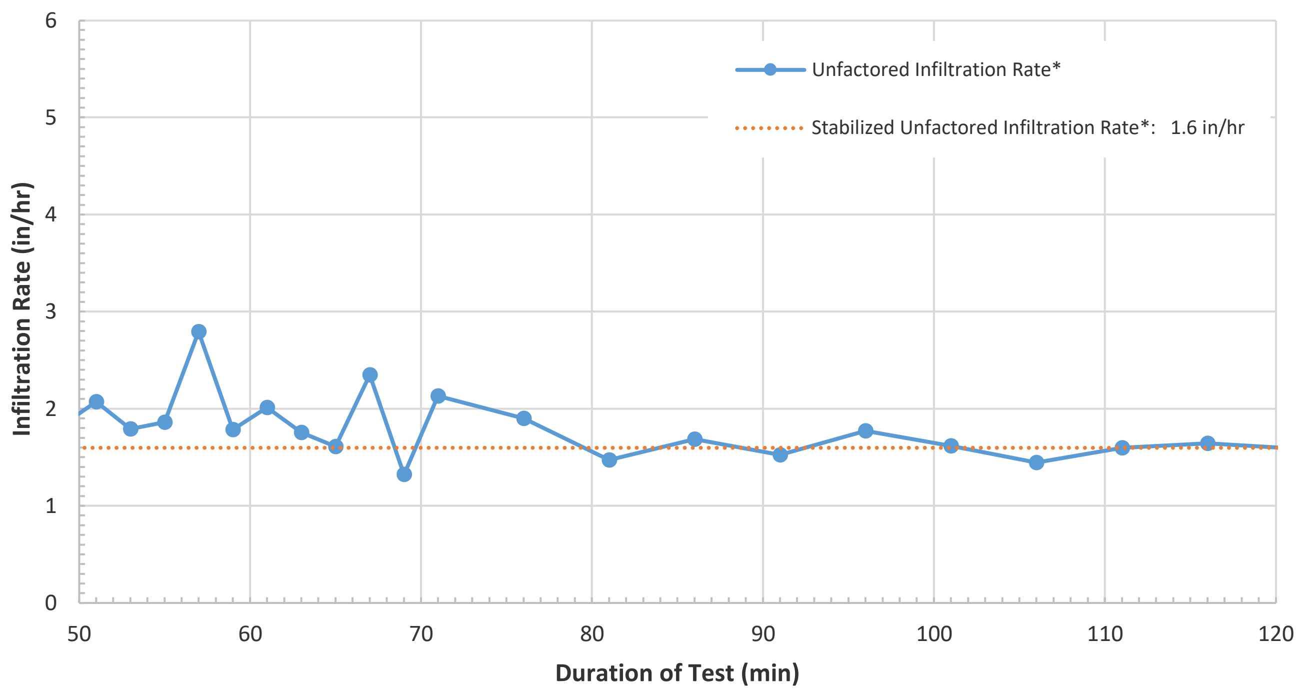
GROUP DELTA

PROJECT NUMBER: **SD809**
FIGURE NUMBER: **D-6.1a**

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-6A	**Tested By:**	DMG	**Depth of Hole:**	5.2 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	71 F	**Test Depth:**	7½ to 8½ ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.69 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.86

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 71 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-6A** **INFILTRATION RATE**	PROJECT NUMBER **SD809**	FIGURE NUMBER **D-6.1b**

GROUP DELTA

BOREHOLE PERCOLATION TEST

Project Name: Riverside Hospital
Date Drilled: 4/2/2024
Borehole Radius (*r): 2 in.

Project Number: SD809
Date Tested: 4/3/2024
Casing Diameter: 2 in.

Test Hole Number: I-6B
Tested By: DMG
Depth of Hole: 5.3 ft

Drilling Method: Hand Auger
Temperature: 72 F
Gravel Base Thickness: 4 in.

DATA SHEET

Reading Number	Time Interval (min.)	Cumulative Time (min.)	Initial Depth to Water (ft.)	Final Depth to Water (ft.)	Avg. Height of Water above Gravel Base (in.)		Measured Drop in Water Level (in.)	Corrected Drop in Water Level[1] (in.)	Corrected Percolation Rate[1] (in./hour)	Unfactored Infiltration Rate* (in./hour)
	Δt	T	[from ground surface]		H_{avg}	H_{int}	ΔH	$ΔH_c$	$ΔH_c/Δt$	I_t
6	2.0	15	4.02	4.27	14.3	6.7*r	3.0	1.8	53.6	3.09
7	2.0	17	4.27	4.46	11.7	5*r	2.3	1.4	40.8	2.85
8	2.0	19	2.90	3.31	26.8	14.4*r	4.9	2.9	88.0	2.78
9	2.0	21	3.31	3.62	22.5	11.6*r	3.7	2.2	66.5	2.49
10	2.0	23	3.62	3.91	18.9	9.5*r	3.5	2.1	62.2	2.76
11	2.0	25	3.91	4.13	15.8	7.5*r	2.6	1.6	47.2	2.48
12	2.0	27	4.13	4.38	13.0	6*r	3.0	1.8	53.6	3.39
13	2.0	29	4.38	4.57	10.3	4.3*r	2.3	1.4	40.8	3.18
14	2.0	31	3.08	3.55	24.3	13.2*r	5.6	3.4	100.8	3.51
15	2.0	33	3.55	3.78	20.1	10*r	2.8	1.6	49.3	2.06
16	2.0	35	3.78	4.07	16.9	8.4*r	3.5	2.1	62.2	3.06
17	2.0	37	4.07	4.26	14.1	6.4*r	2.3	1.4	40.8	2.39
18	2.0	39	4.26	4.43	11.9	5.1*r	2.0	1.2	36.5	2.50
19	2.0	41	3.04	3.42	25.3	13.5*r	4.6	2.7	81.5	2.73
20	2.0	43	3.42	3.70	21.3	10.9*r	3.4	2.0	60.1	2.37
21	2.0	45	3.70	3.93	18.3	8.9*r	2.8	1.6	49.3	2.26
22	2.0	47	3.93	4.12	15.7	7.4*r	2.3	1.4	40.8	2.15
23	2.0	49	4.12	4.31	13.5	6.1*r	2.3	1.4	40.8	2.49
24	2.0	51	2.87	3.23	27.4	14.6*r	4.3	2.6	77.2	2.39
25	2.0	53	3.23	3.55	23.4	12.2*r	3.8	2.3	68.6	2.48
26	2.0	55	3.55	3.79	20.0	10*r	2.9	1.7	51.5	2.16
27	5.0	60	3.79	4.29	15.6	8.3*r	6.0	3.6	42.9	2.28
28	5.0	65	4.29	4.66	10.3	4.9*r	4.4	2.6	31.8	2.48
29	5.0	70	2.96	3.70	24.1	14*r	8.9	5.3	63.5	2.23
30	5.0	75	3.70	4.18	16.8	8.9*r	5.8	3.4	41.2	2.04
31	5.0	80	4.18	4.55	11.7	5.6*r	4.4	2.6	31.8	2.22
32	5.0	85	2.92	3.64	24.7	14.3*r	8.6	5.1	61.8	2.12
33	5.0	90	3.64	4.10	17.6	9.3*r	5.5	3.3	39.5	1.87
34	5.0	95	4.10	4.47	12.6	6.2*r	4.4	2.6	31.8	2.06
35	5.0	100	2.94	3.62	24.7	14.1*r	8.2	4.9	58.4	2.00
36	5.0	105	3.62	4.08	17.8	9.5*r	5.5	3.3	39.5	1.85
37	5.0	110	4.08	4.43	13.0	6.3*r	4.2	2.5	30.0	1.90
38	5.0	120	2.92	3.62	24.8	14.3*r	8.4	5.0	60.1	2.05
39	5.0	125	3.62	4.08	17.8	9.5*r	5.5	3.3	39.5	1.85
40	5.0	130	4.08	4.39	13.2	6.3*r	3.7	2.2	26.6	1.65

1: Porosity of gravel assumed to be 0.4 to correct drop in water.
*Porchet method used to convert percolation rate to infiltration rate.

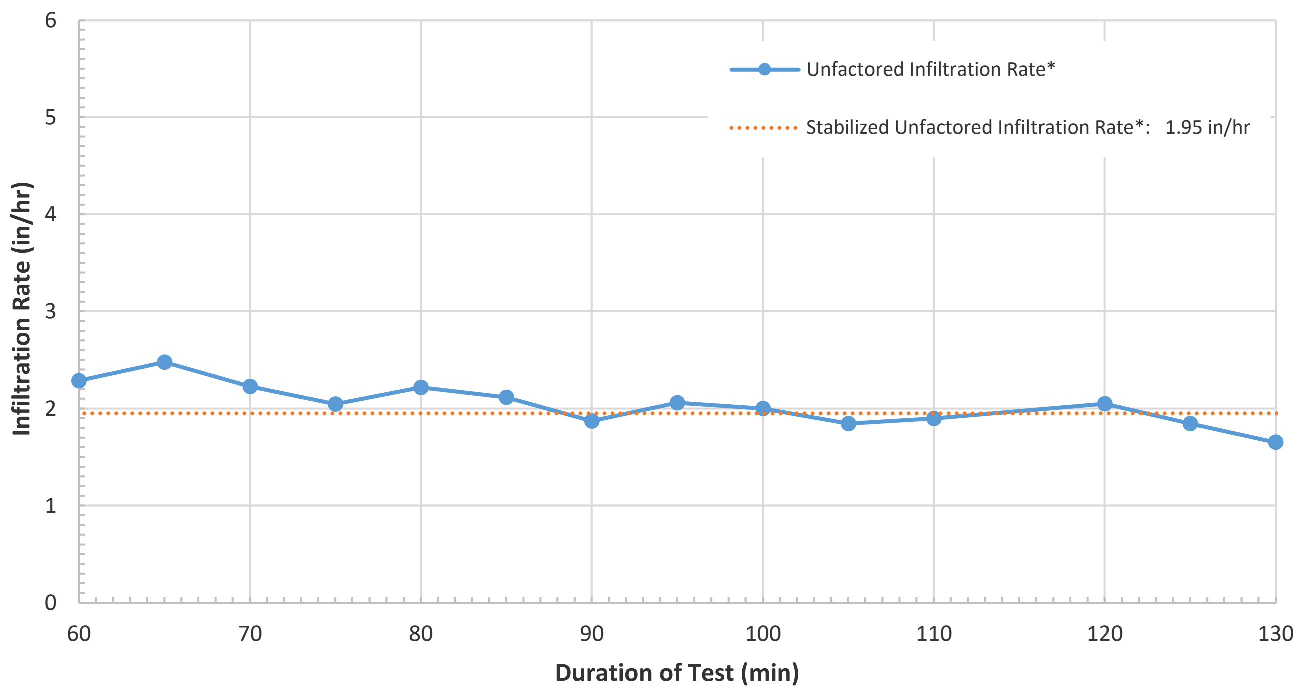
Stabilized, Unfactored Infiltration Rate*: 1.95 inch/hour

HCA Design and Construction Riverside Community Hospital Riverside, California	BOREHOLE PERCOLATION TEST I-6B INFILTRATION RATE	GROUP DELTA PROJECT NUMBER: SD809	FIGURE NUMBER: D-6.2a

BOREHOLE PERCOLATION TEST

Project Name:	Riverside Hospital	**Date Drilled:**	4/2/2024	**Borehole Radius (*r):**	2 in.
Project Number:	SD809	**Date Tested:**	4/3/2024	**Casing Diameter:**	2 in.
Test Hole Number:	I-6B	**Tested By:**	DMG	**Depth of Hole:**	5.3 ft
Drilling Method:	Hand Auger	**Temperature[3]:**	72 F	**Test Depth:**	3 to 4 ft

UNFACTORED INFILTRATION RATES* DURING TEST



Preliminary Factored Infiltration Rate[1]: 0.83 in/hr

Feasibility Screening Factor of Safety, F.S.[2]: 2.0

Temperature Correction Factor[2,3]: 0.85

Factored Infiltration Rate[2]	Design Condition[2]
Below 0.05	No Infiltration
0.05 to 0.50	Partial Infiltration
Above 0.50	Full Infiltration

*Porchet method used to convert percolation rate to infiltration rate.

1: Rate Factored by Factor of Safety and Temperature Correction Factor.

2: Reference: Riverside Design Handbook for Low Impact Developmnet BMP (2011).

3: Factor based on as-tested water temperature of 72 F and rainfall temperature of 60 F.

HCA Design and Construction **Riverside Community Hospital** **Riverside, California**	**BOREHOLE PERCOLATION TEST I-6B** **INFILTRATION RATE**	GROUP DELTA PROJECT NUMBER **SD809**	FIGURE NUMBER **D-6.2b**

APPENDIX E
SITE-SPECIFIC SEISMIC HAZARD EVALUATION

APPENDIX B

SITE-SPECIFIC SEISMIC HAZARD EVALUATION

E.1 INTRODUCTION

This section presents the results of the site-specific seismic hazard analysis per the 2022 California Building Code (CBC) and ASCE 7-16 (ASCE/SEI 7-16) for the project site. The subsurface soil conditions used in this study were obtained from our field exploration program including, hollow stem auger borings and seismic cone penetration tests (CPT), as well as prior downhole geophysical testing performed at the site to determine shear wave velocities.

Horizontal Acceleration Response Spectra (ARS) for 5-percent damping were developed for the Risk-Targeted Maximum Considered Earthquake (MCE_R) as defined in Chapter 21.2 of ASCE 7-16. We performed both probabilistic and deterministic seismic hazard analyses. Site-specific probabilistic seismic hazard analyses were performed using the computer program OpenSHA (Field, 2003), with the seismic source model from the Uniform California Earthquake Rupture Forecast (UCERF3) Version 3 (Field et al, 2013). Development of the horizontal ARS was also performed using the ground motion models for the Next Generation Attenuation (NGA) – West 2 research project. The site coordinates used in our seismic hazard analyses are summarized below:

Garage: 33.9776 (latitude), -117.3834 (longitude)

Tower: 33.9765 (latitude), -117.3825 (longitude)

E.2 SEISMIC SETTING

The Riverside Community Hospital site is located in an area with high seismic activity. The approximate locations of nearby active faults are shown on the Regional Fault Map, Figure 5A. Table E-1 below lists the active faults that are closest to the site, and summarizes the Fault Type, Maximum Magnitude (Mw) and Site-To-Source Rupture Distance (R_{rup}). Note that the fault models we used generally follow UCERF3, which is the seismic source model developed by the Working Group on California Earthquake Probabilities (WGCEP) in 2013. The UCERF3 model was subsequently adopted by the 2014 U.S. National Seismic Hazard Mapping Program (NSHM) to develop probabilistic seismic hazard maps (Petersen et al., 2014).

The maximum magnitudes and scenarios adopted for our analyses are generally consistent with the published Building Seismic Safety Council 2014 Event Set, the adopted deterministic ruptures used for the 2014 USGS NSHM (BSSC, 2015). For multi-segment faults such as the Elsinore, San Jacinto, and San Andreas faults, where different earthquake scenarios are considered, the model producing the largest magnitude was reported in Table E-1 along with the combined segments.

Table E-1. Significant Active Faults Near the Site

Fault	Fault Type	Maximum Magnitude M_W	Site-to-Source Distance R_{rup} (km)
San Jacinto (San Bernardino + San Jacinto Valley + Anza + Stepovers Combined + Coyote Creek + Borrego + Superstition Mountain)	Strike-Slip	7.8	13.0
Fontana (seismicity)	Strike-Slip (1)	6.8	14.4
Elsinore (Whittier + Glen Ivy + Temecula + Stepovers Combined + Julian + Coyote Mountains)	Strike-Slip	7.8	23.8
San Andreas (Parkfield + Cholame + Carrizo + Big Bend + North Mojave + South Mojave + North San Bernardino + South San Bernardino + San Gorgonio Pass - Garnet Hill + Coachella)	Strike-Slip	8.2	23.9
Chino (Alt 1 / Alt 2)	Strike-Slip	6.6 / 6.8 (2)	24.2 / 23.9
Cucamonga	Thrust	6.9	22.7
San Jose	Strike-Slip	6.7	32.1

Notes: (1) Faulting in Fontana was previously considered undetermined as it is based on seismicity. However, the latest edition of the recently released NSHM (2023) now considers this fault to be strike-slip.
(2) Magnitudes presented are for the Chino fault alternatives (Alt 1 / Alt 2) respectively.

As shown in Table E-1, the closest known active seismic sources to the site include the San Jacinto fault zone and the San Andreas fault zone. These are some of the most active fault zones in California and are capable of producing some of the largest earthquakes. The closest active faults are discussed in more detail below.

The San Jacinto fault zone is located about 13.0 kilometers (km) northeast of the site. The San Jacinto fault zone is a right-lateral strike slip fault with a total length of about 210 km, extending from San Bernardino down south to Superstition Mountain. The northern end of the fault connects with the San Andreas fault zone. This fault is believed to be capable of producing earthquakes with a maximum moment magnitude (M_W) of 7.8 when all of the fault segments rupture in combination from San Bernardino to Superstition Mountain. The San Jacinto fault has a typical recurrence interval for ground rupture of 100 to 300 years.

The Fontana fault has recently been identified based on frequent micro-seismicity in the area. It was not included in the 2008 edition of the NSHM but was added in 2014. Although initially the fault mechanism was not well understood, it is currently believed to be a strike-slip fault capable of producing earthquakes with magnitudes up to 6.8. According to UCERF3, this fault is *"likely a structure that actively transfers slip from the San Jacinto to the San Andreas."* (Field, 2013).

The San Andreas fault zone is a right-lateral strike slip fault system that extends a total length of 315 miles (1,200 km) throughout California. This fault system forms the boundary between the Pacific Plate and the North American Plate. The Southern San Andreas section of the fault system extends from Parkfield down to its termination at the Salton Sea, with a length of 550 km. The Southern San Andreas section is estimated to be capable of producing earthquakes with a maximum magnitude (M_W) of 8.2. In the area of Redlands and Yucaipa, the structure of the San Andreas fault becomes very complex due to interaction with other faults over the millennia, resulting in fractured segments and discontinuous branches. Recurrence intervals between ground-rupturing earthquakes vary on the San Andreas fault system depending on location. Near Los Angeles, this interval is estimated to be 175 to 200 years (USGS, 2017).

E.2 HISTORIC SIESMICITY

There have been numerous moderate to large earthquakes located near the subject site over the last few centuries. A historical earthquake search was performed using the Advanced National Seismic System (ANSS) Comprehensive Earthquake Catalog (USGS, 2023). This search included earthquakes with magnitudes of 5.0 or higher and epicentral distances within 100 km of the center of the project site. The results are summarized below.

Time Period (1700 to April 2024)	324 years
Maximum Magnitude	Mw ~ 7.5
Number of Earthquakes with both Mw > 5.0 and R_{RUP} < 100 km	71

The earthquakes with epicenters closest to the site include the 1923 M_W 6.2 south San Bernardino earthquake which was located about 16.9 kilometers to the northeast of the site in the Santa Ana River, the 1858 M_W 6.0 earthquake north of San Bernardino, the 1990 M_W 5.5 Upland earthquake northwest of the site, and the 2008 M_W 5.4 Chino Hill earthquake west of the site. These earthquake epicenters are shown on the Regional Fault Map, Figure 5A. Other large earthquakes within 100 km of the site include the 1812 M_W 7.5 Wrightwood earthquake on the San Andreas fault northwest of the site, the 1992 M_W 7.3 Landers earthquake northeast of the site, and the 1899 M_W 6.7 San Jacinto earthquake southeast of the site.

E.3 SITE CHARACTERIZATION

In developing site-specific ground motions, the characteristics of the soils underlying the site are an important input to evaluate the site response. In particular, the average shear wave velocity in the upper 30 meters (Vs_{30}) is a necessary parameter to perform seismic hazard analyses. Group Delta engaged a subcontractor to advance seismic CPT soundings at the project site to obtain shear wave velocity in the upper 30 meters or 100 feet. Three seismic CPTs were performed across the site, two within the proposed Garage site (CPT-1 and CPT-2), and one within the proposed Tower site (CPT-5). The CPT locations are shown on the Exploration Plans, Figures 3B and 3C.

In addition to the current measurements of shear wave velocity, prior geophysical studies at the site were reviewed and used to supplement the current measurements and data, particularly with respect to the shear wave velocity of the very dense Old Alluvium. All explorations at the site encountered refusal shallower than 100 feet in depth due to very dense granular soils in the Old Alluvium (N_{60}>30). The available data form the prior investigations was used to extrapolate shear wave velocity to depths of 100 feet to develop the Vs_{30} values for use our analyses (CHJ, 2008).

Based on the available data, including boring logs and soil samples, the shear wave velocity values were plotted based on their corresponding geology (i.e. existing fill, Young Alluvium, and Old Alluvium). Shear wave velocity measurements with depth are presented in Figure E-1 with respect to both exploration ID and interpreted geology. Within the Young Alluvium, the measured shear wave velocity values were generally between about 480 and 850 feet per second (ft/s), with a trend of low values near the surface, and increasing values with depth. The prior downhole geophysical study did interpret very low shear waves within the upper 5 feet. However, this measurement was taken prior to remedial grading. The existing fill soils have relatively high shear wave velocities ranging from about 760 to over 1,800 ft/s.

Below the surficial fill and Young Alluvium, the dense to very dense granular soils designated as Old Alluvium were observed to have much higher shear wave velocity values varying from about 1100 to over 2,500 ft/s (CHJ, 2008). Several measurements from our current seismic CPTs, as well as the prior downhole study all indicate that once embedded 10 to 15 feet in the Old Alluvium, the shear wave velocity values are generally 1,940 ft/s or greater. The deepest geophysical study at the site extended nearly 70 feet below grade and indicated shear wave velocities of 2,560 ft/s below a depth of 42 feet. Based on a review of all of the data, Vs_{30} values for the proposed Garage and Tower sites were developed by extrapolating the Old Alluvium to a depth of 100 feet using a conservative lower bound of 1,940 ft/s for the Old Alluvium below refusal depth.

Based on the shear velocity profile measurements, the average shear wave velocity in the upper 100 feet (Vs_{30}) ranged from about 1,389 ft/s to 1,393 ft/s for CPT-1 and CPT-2, respectively. Therefore, a value of 1,390 ft/s or 424 meters per second [m/s] was adopted for the proposed Garage site. Based on CPT-5, a Vs_{30} value of 1,598 ft/s or 487 m/s was adopted for the proposed Tower site. Both sites classify as Site Class C per ASCE 7-16.

E.4 GROUND MOTION PREDICTION EQUATIONS

Site-specific ground motions are influenced by type of faulting, magnitude of characteristic earthquakes, and local soil conditions. Many ground motion models, also referred to as Ground Motion Prediction Equations (GMPEs) have been developed to estimate the variation of spectral acceleration with earthquake magnitude and source-to-site distance, among other parameters. The Pacific Earthquake Engineering Research (PEER) coordinated a large multidisciplinary project entitled “NGA (Next Generation Attenuation)-West 2 Research Project” (Bozorgnia et al., 2014), referred to as NGA-West2.

In NGA-West2, five teams developed and presented horizontal ground motion models for shallow crustal earthquakes in active tectonic regions including Western North America. These teams were Abrahamson et al. (2014), Boore et al. (2014), Campbell and Bozorgnia (2014), Choiu and Youngs (2014), and Idriss (2014). All of the GMPEs were used in our analyses. However, as the Idriss (2014) model is only applicable to Vs_{30} values over 450 m/s, it was used only for the Tower site. Where all five models were used, weights of 0.22 were assigned to all models but Idriss which was assigned a weight of 0.12. Where four were used, equal weight (0.25) was assigned.

The NGA-West2 relationships use measured values of shear wave velocity ($V_{S,30}$) as input. As previously discussed, we adopted an average Vs_{30} of 424 m/s at the proposed Garage and 487 m/s at the proposed Tower site to represent the underlying soil conditions. In addition, some of the ground motion models require input for $Z_{1.0}$ (defined as the depth in meters to a shear wave velocity of 1 km/s) and $Z_{2.5}$ (defined as the depth in km to a shear wave velocity of 2.5 km/s). These two parameters are used to capture the basin effect on site response. The SCEC Community Velocity Model (CVM) Version 4 was reviewed for selection of $Z_{1.0}$ and $Z_{2.5}$ values. A $Z_{1.0}$ value of 150 m and a $Z_{2.5}$ of 0.35 km were selected.

E.5 PROBABILISTIC SEISMIC HAZARD ANALYSES

Site-specific Probabilistic Seismic Hazard Analyses (PSHA) were performed using the computer program OpenSHA (Fields, 2003), with the UCERF3 seismic source model and the updated NGA-West2 ground motion models. Uniform hazard horizontal ARS were developed up to a period of 10 seconds. The 5-percent damping hazard spectra are presented in Figures E-2a and E-2b.

Supplementary probabilistic seismic hazard analyses were performed using the USGS Unified Hazard Tool (https://earthquake.usgs.gov/hazards/interactive/) for comparison to the OpenSHA analyses. These analyses were performed using the dynamic version of the Conterminous U.S. 2014v4.2.0 at available spectral periods with the Site Class C/D option (Vs_{30} of 360 m/s) and the Site Class C boundary (Vs_{30} of 537 m/s). Results of these supplementary analyses show good agreement with the OpenSHA analyses.

The site-specific probabilistic MCE_R was developed in accordance with ASCE 7-16 Section 21.2.1, for the maximum horizontal component and adjusted for targeted risk of 1-percent probability of collapse in 50 years. The median (RotD50) ground motion was adjusted to the maximum rotated component of ground motion (RotD100) using maximum direction factors recommended by Shahi and Baker (2014). The second adjustment modifies the spectra from a 2-percent probability of exceedance in 50 years to a targeted risk of 1-percent probability of collapse in 50 years, which is performed using Method 1 of ASCE 7-16 (Section 21.2.1), using the risk coefficients C_{RS} and C_{R1}. The risk coefficients (per ASCE 7-16) were obtained using the Structural Engineers Association of California (SEAOC) and Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps website application (SEAOC/OSHPD, 2019). Risk coefficients C_{RS} of 0.941 and C_{R1} of 0.914 were used. The probabilistic MCE_R ARS for the site are shown in Figures E-2a and E-2b.

E.6 DETERMINISTIC SEISMIC HAZARD ANALYSIS

Site-specific Deterministic Seismic Hazard Analyses (DSHA) were performed based on the characteristics of earthquake scenarios identified as predominant contributors to the regional seismic hazard. Pertinent characteristics of the earthquake scenarios include parameters such as distance from the site to the causative fault and the maximum magnitude of earthquake associated with the fault. The effects of local soil conditions (Vs_{30}) and the mechanism of faulting are accounted for in the ground motion models as well.

DSHAs were performed for four of the sources identified in Table E-1 above, the San Jacinto fault, the Fontana seismicity zone, the San Andreas fault, and the Elsinore fault. The NGA West2 GMMs were used to develop a 5-percent damped spectral ARS for each source. A plot of the DSHA results for the project site is shown in Figures E-3a and E-3b for each site. Note that the San Jacinto fault controls for spectral periods up to about 7.5 seconds, whereas the San Andreas fault begins to control seismic demand for the longer periods.

According to ASCE 7-16 Section 21.2.2, the deterministic MCE_R, which corresponds to the 84^{th} percentile 5-percent damped spectral response accelerations in the direction of maximum horizontal response at any spectral period, must not be lower than deterministic lower limit. Therefore, the 84^{th} percentile spectral values obtained from the GMPEs are used to develop the deterministic spectrum. The ground motions were adjusted to the maximum rotated component of ground motion using the ASCE 7-16 default maximum direction factors. Figures E-3a and E-3b shows the results of our DSHA along with ASCE 7-16 deterministic lower limit spectrum. The deterministic lower limit spectrum controls at the sites.

E.7 DETERMINATION OF SITE-SPECIFIC RESPONSE SPECTRA

Development of the site-specific MCE_R ARS (as defined by Chapter 21.2 of ASCE 7-16) was performed using the seismic hazard analysis procedure described in the previous sections. In accordance with ASCE 7-16 Section 21.2.3, the site-specific MCE_R acceleration response spectra are taken as the lesser of the probabilistic and deterministic MCE_R spectra. The only exception is that the site-specific MCE_R ARS may be taken directly as the probabilistic MCE_R when the peak probabilistic spectrum is less than 1.2 Fa (Section 21.2.3 of Supplement 1 to ASCE 7-16). In addition, per Section 21.3 of ASCE 7-16, the site-specific MCE_R cannot be not less than 150-percent of the 80-pecent of design spectrum determined in accordance with Section 11.4.6 of ASCE 7-16. The resulting MCE_R spectra is presented in Figures E-4a and E-4b. For the project site, the deterministic MCE_R generally governs all spectral periods, with a few limited exceptions where the 150-percent minimum spectrum controls.

The site-specific Design Earthquake spectrum is equal to two-thirds of the site-specific MCE_R spectrum. The MCE_R and the Design Earthquake spectra along with the tabulated values for the project site are presented in Figures E-5a and E-5b.

E.8 SITE-SPECIFIC DESIGN ACCELERATION PARAMETERS

The short period design spectral acceleration (S_{DS}) and 1-second period design spectral acceleration (S_{D1}) parameters were determined in accordance with ASCE 7-16 Section 21.4. The parameter S_{DS} is taken as 90-percent of the maximum spectral acceleration from the site-specific spectrum at periods between 0.2 and 5 seconds. The parameter S_{D1} is taken as the maximum of the product between period and spectral acceleration for periods from 1 to 2 seconds for sites with $V_{S,30}$ greater than or equal to 365 m/s. The parameters S_{MS} and S_{M1} shall be taken as 1.5 times S_{DS} and S_{D1} respectively. The values obtained shall not be less than 80 percent of the values determined in accordance with ASCE 7-16, Section 11.4.3 for S_{MS} and S_{M1} and Section 11.4.4 for S_{DS} and S_{D1}. Table C-2 presents the site-specific design acceleration parameters.

Maximum Considered Earthquake-Geometric Mean, MCE_G, peak ground acceleration adjusted for site effects, PGA_M, was calculated in accordance with ASCE 7-16 Section 21.5. Per ASCE 7-16 Section 21.5, PGA_M shall be taken as the lesser of the probabilistic geometric mean peak ground acceleration and the deterministic geometric mean peak ground acceleration and shall not be less than the 80% of PGA_M obtained from Equation 11.8-1 of this code. The summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses is provided in Tables E-3a and E-3b attached to this appendix.

Table E-2: Site-Specific Seismic Design Acceleration Parameters

Hazard Level	Parameter	Garage Site	Tower Site
MCE_R	PGA_M	0.600	0.611
	S_{MS}	1.620	1.620
	S_{M1}	0.896	0.790
Design Earthquake	S_{DS}	1.080	1.080
	S_{D1}	0.597	0.527

ATTACHMENTS

Tables E-3a to E-3b — Summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses

FIGURES

Figure E-1 — Shear Wave Velocity Plots
Figures E-2a to E-2b — Probabilistic MCE_R Acceleration Response Spectra
Figures E-3a to E-3b — Deterministic Acceleration Response Spectra
Figures E-4a to E-4b — ASCE 7-16 Site-Specific MCE_R Acceleration Response Spectra
Figures E-5a to E-5b — ASCE 7-16 Site-Specific Design Earthquake and Acceleration Parameters

Table E-3a: Summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses (Garage Site)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Period (sec)	Probabilistic Sa_{RotD50} (g)	$Sa_{RotD100}$ / Sa_{RotD50}	Risk Coefficient, C_R	Probabilistic MCE_R (g)	Deterministic 84-%ile MCE, $Sa_{RotD100}$ (g)	Deterministic Lower Limit MCE (g)	Deterministic MCE_R (g)	Site-Specific MCE_R (g)	2/3 Site-Specific MCE_R (g)	ASCE 7-16 Mapped Design ARS (g)	80% of Mapped Design ARS (g)	150% of 80%-Mapped Design ARS (g)	**Final Site-Specific MCE_R (g)**	**Final Design ARS (g)**
0.01	0.837	1.19	0.941	0.938	0.695	0.754	0.754	0.754	0.503	0.557	0.446	0.669	0.754	0.503
0.02	0.846	1.19	0.941	0.947	0.702	0.762	0.762	0.762	0.508	0.634	0.507	0.761	0.762	0.508
0.03	0.906	1.19	0.941	1.015	0.743	0.806	0.806	0.806	0.538	0.711	0.569	0.854	0.854	0.569
0.05	1.124	1.19	0.941	1.258	0.878	0.953	0.953	0.953	0.635	0.866	0.693	1.039	1.039	0.693
0.075	1.455	1.19	0.941	1.629	1.084	1.176	1.176	1.176	0.784	1.059	0.847	1.270	1.270	0.847
0.1	1.690	1.19	0.941	1.893	1.243	1.349	1.349	1.349	0.899	1.200	0.960	1.440	1.440	0.960
0.15	1.913	1.2	0.941	2.160	1.475	1.601	1.601	1.601	1.067	1.200	0.960	1.440	1.601	1.067
0.2	1.996	1.21	0.941	2.273	1.605	1.742	1.742	1.742	1.161	1.200	0.960	1.440	1.742	1.161
0.25	1.983	1.22	0.939	2.273	1.659	1.800	1.800	1.800	1.200	1.200	0.960	1.440	1.800	1.200
0.3	1.898	1.22	0.938	2.172	1.653	1.794	1.794	1.794	1.196	1.200	0.960	1.440	1.794	1.196
0.4	1.648	1.23	0.934	1.893	1.545	1.677	1.677	1.677	1.118	1.200	0.960	1.440	1.677	1.118
0.5	1.464	1.23	0.931	1.676	1.409	1.529	1.529	1.529	1.020	1.120	0.896	1.344	1.529	1.020
0.75	1.078	1.24	0.922	1.233	1.074	1.166	1.166	1.166	0.777	0.747	0.597	0.896	1.166	0.777
1	0.809	1.24	0.914	0.916	0.826	0.896	0.896	0.896	0.597	0.560	0.448	0.672	0.896	0.597
1.5	0.521	1.24	0.914	0.591	0.551	0.598	0.598	0.591	0.394	0.373	0.299	0.448	0.591	0.394
2	0.377	1.24	0.914	0.427	0.397	0.430	0.430	0.427	0.285	0.280	0.224	0.336	0.427	0.285
3	0.249	1.25	0.914	0.284	0.263	0.286	0.286	0.284	0.190	0.187	0.149	0.224	0.284	0.190
4	0.187	1.26	0.914	0.215	0.193	0.210	0.210	0.210	0.140	0.140	0.112	0.168	0.210	0.140
5	0.151	1.26	0.914	0.173	0.149	0.161	0.161	0.161	0.108	0.112	0.090	0.134	0.161	0.108
7.5	0.093	1.28	0.914	0.109	0.085	0.092	0.092	0.092	0.061	0.075	0.060	0.090	0.092	0.061
10	0.062	1.29	0.914	0.073	0.054	0.058	0.058	0.058	0.039	0.045	0.036	0.054	0.058	0.039

Column Descriptions

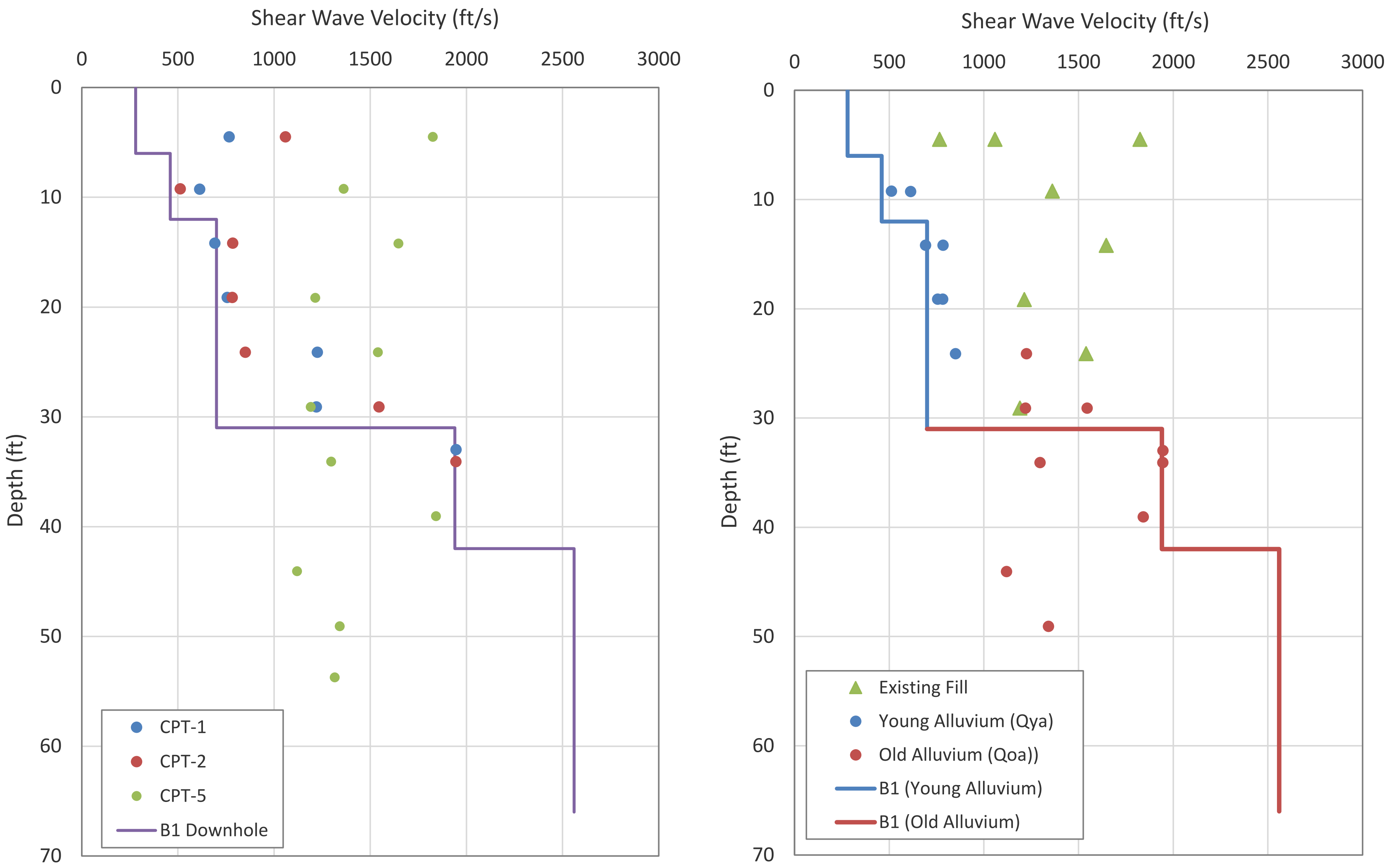
1 Spectral period
2 2% in 50 year, RotD50 Probabilistic ARS
3 Factors to adjust to Maximum Direction (Shahi & Baker, 2014)
4 Risk Coefficients Per Method 1 of ASCE 7-16 Section 21.2.1, obtained from SEAOC/OSHPD Seismic Design Maps tool (SEAOC/OSPHD, 2022).
5 Probabilistic MCE_R ARS, adjusted for maximum direction of horizontal response and targeted risk of 1% probability of collapse in 50 years (columns 2 x 3 x 4) per ASCE 7-16 Section 21.2.1
6 Upper envelop of 84-percentile, Deterministic ARS adjusted for maximum direction for all sources. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
7 Deterministic Lower Limit (Peak Sa must be at least 1.5*Fa) in accordance with Supplement 1 of ASCE 7-16. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
8 Deterministic MCE_R (greater of columns 6 and 7) per ASCE 7-16 Section 21.2.2. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
9 Site-Specific MCE_R (lesser of Deterministic $MCE_R$and Probabilistic MCE_R, or lesser of columns 5 and 8) in accordance with Section 21.2.3 of ASCE 7-16
10 2/3 of Column 9 per Equation 21.3-1 of ASCE 7-16 Section 21.3
11 Mapped Design Earthquake ARS in accordance with ASCE 7-16 Section 11.4.7 as modified by Section 21.3
12 80% of Mapped Design Earthquake ARS (lower limit check) per Section 21.4
13 150% of the 80% of Mapped Design Earthquake ARS (MCE lower limit check per ASCE 7-16 Supplement 1 Section 21.3)
14 Final Site-Specific MCE_R ARS per Section 21.2.3 (greater of columns 9 and 13)
15 Final Design Earthquake ARS per Section 21.3 (greater of columns 10 and 12)

Table E-3b: Summary of MCE_R and Design Earthquake Site-Specific Seismic Hazard Analyses (Tower Site)

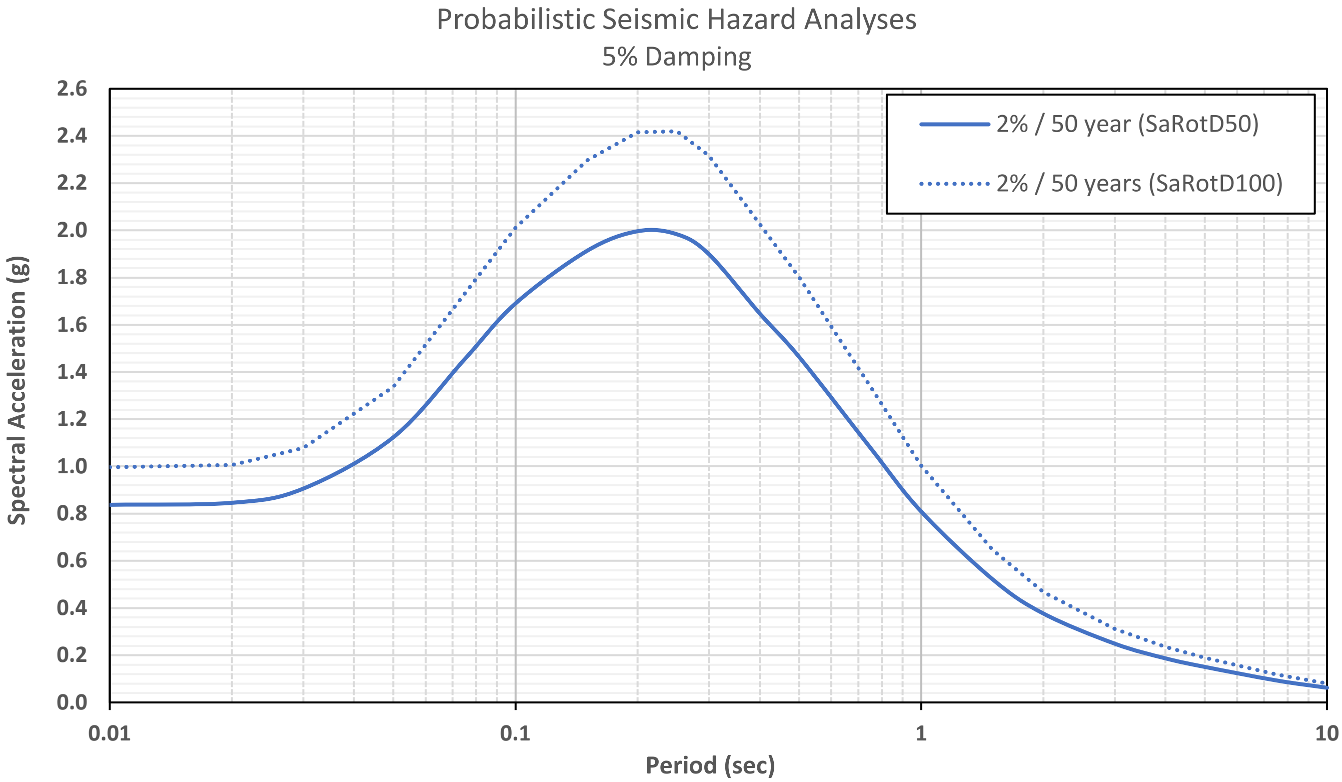
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Period (sec)	Probabilistic Sa_{RotD50} (g)	$Sa_{RotD100}$ / Sa_{RotD50}	Risk Coefficient, C_R	Probabilistic MCE_R (g)	Deterministic 84-%ile MCE, $Sa_{RotD100}$ (g)	Deterministic Lower Limit MCE (g)	Deterministic MCE_R (g)	Site-Specific MCE_R (g)	2/3 Site-Specific MCE_R (g)	ASCE 7-16 Mapped Design ARS (g)	80% of Mapped Design ARS (g)	150% of 80%-Mapped Design ARS (g)	**Final Site-Specific MCE_R (g)**	**Final Design ARS (g)**
0.01	0.822	1.19	0.941	0.921	0.727	0.784	0.784	0.784	0.523	0.557	0.446	0.669	0.784	0.523
0.02	0.833	1.19	0.941	0.932	0.738	0.796	0.796	0.796	0.530	0.634	0.507	0.761	0.796	0.530
0.03	0.899	1.19	0.941	1.007	0.792	0.854	0.854	0.854	0.569	0.711	0.569	0.854	0.854	0.569
0.05	1.134	1.19	0.941	1.270	0.933	1.006	1.006	1.006	0.670	0.866	0.693	1.039	1.039	0.693
0.075	1.478	1.19	0.941	1.655	1.169	1.261	1.261	1.261	0.840	1.059	0.847	1.270	1.270	0.847
0.1	1.711	1.19	0.941	1.916	1.344	1.449	1.449	1.449	0.966	1.200	0.960	1.440	1.449	0.966
0.15	1.922	1.2	0.941	2.170	1.579	1.702	1.702	1.702	1.135	1.200	0.960	1.440	1.702	1.135
0.2	1.979	1.21	0.941	2.254	1.665	1.796	1.796	1.796	1.197	1.200	0.960	1.440	1.796	1.197
0.25	1.936	1.22	0.939	2.218	1.669	1.800	1.800	1.800	1.200	1.200	0.960	1.440	1.800	1.200
0.3	1.790	1.22	0.938	2.047	1.585	1.709	1.709	1.709	1.139	1.200	0.960	1.440	1.709	1.139
0.4	1.547	1.23	0.934	1.777	1.442	1.555	1.555	1.555	1.036	1.200	0.960	1.440	1.555	1.036
0.5	1.358	1.23	0.931	1.555	1.292	1.393	1.393	1.393	0.929	1.120	0.896	1.344	1.393	0.929
0.75	0.994	1.24	0.922	1.136	0.951	1.025	1.025	1.025	0.684	0.747	0.597	0.896	1.025	0.684
1	0.745	1.24	0.914	0.844	0.732	0.789	0.789	0.789	0.526	0.560	0.448	0.672	0.789	0.526
1.5	0.484	1.24	0.914	0.549	0.489	0.527	0.527	0.527	0.351	0.373	0.299	0.448	0.527	0.351
2	0.352	1.24	0.914	0.399	0.358	0.386	0.386	0.386	0.257	0.280	0.224	0.336	0.386	0.257
3	0.234	1.25	0.914	0.268	0.250	0.270	0.270	0.268	0.179	0.187	0.149	0.224	0.268	0.179
4	0.178	1.26	0.914	0.205	0.189	0.203	0.203	0.203	0.136	0.140	0.112	0.168	0.203	0.136
5	0.144	1.26	0.914	0.166	0.150	0.162	0.162	0.162	0.108	0.112	0.090	0.134	0.162	0.108
7.5	0.091	1.28	0.914	0.106	0.091	0.098	0.098	0.098	0.065	0.075	0.060	0.090	0.098	0.065
10	0.061	1.29	0.914	0.072	0.058	0.063	0.063	0.063	0.042	0.045	0.036	0.054	0.063	0.042

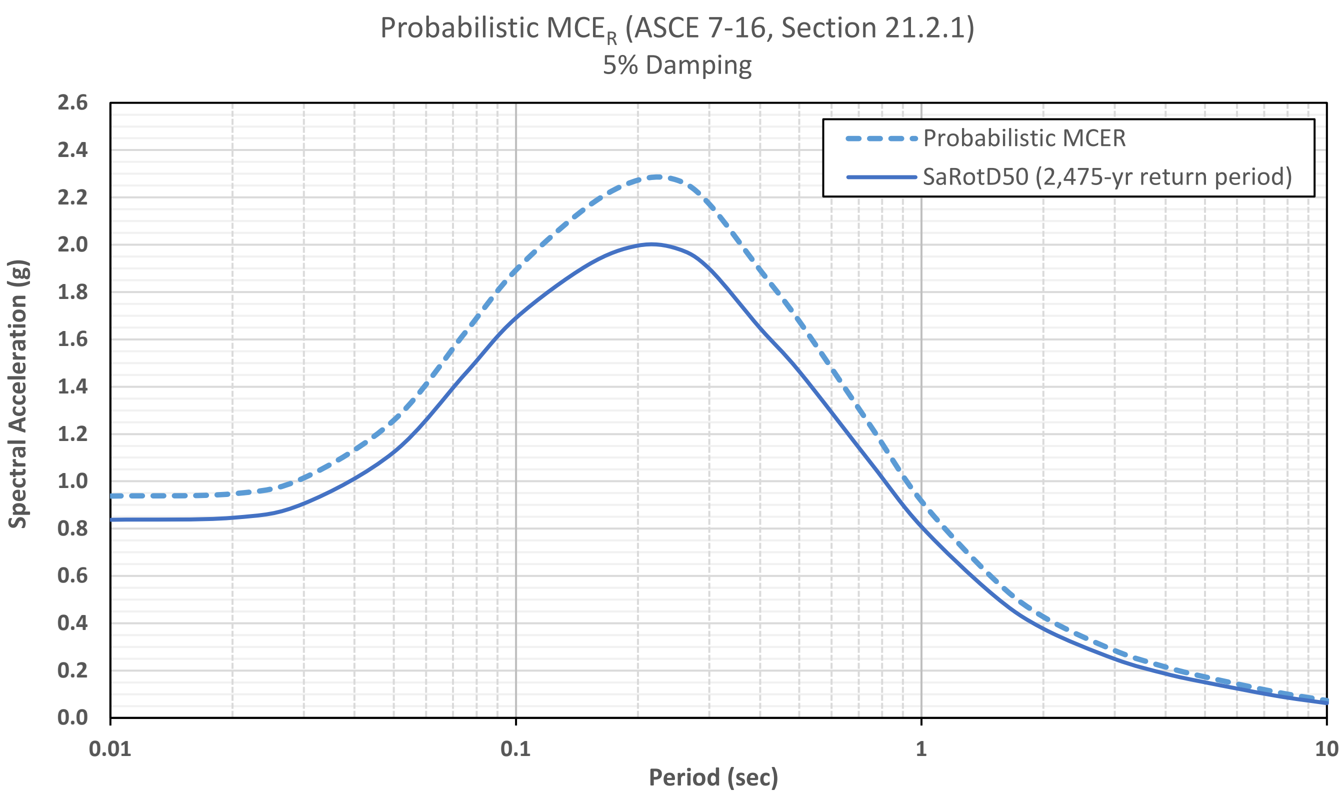
Column Descriptions

1 Spectral period
2 2% in 50 year, RotD50 Probabilistic ARS
3 Factors to adjust to Maximum Direction (Shahi & Baker, 2014)
4 Risk Coefficients Per Method 1 of ASCE 7-16 Section 21.2.1, obtained from SEAOC/OSHPD Seismic Design Maps tool (SEAOC/OSPHD, 2022).
5 Probabilistic MCE_R ARS, adjusted for maximum direction of horizontal response and targeted risk of 1% probability of collapse in 50 years (columns 2 x 3 x 4) per ASCE 7-16 Section 21.2.1
6 Upper envelop of 84-percentile, Deterministic ARS adjusted for maximum direction for all sources. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
7 Deterministic Lower Limit (Peak Sa must be at least 1.5*Fa) in accordance with Supplement 1 of ASCE 7-16. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
8 Deterministic MCE_R (greater of columns 6 and 7) per ASCE 7-16 Section 21.2.2. Not required where Peak Sa from Probabilistic MCE_R is less than 1.2Fa per ASCE 7-16 Supplement 1 Section 21.2.2
9 Site-Specific MCE_R (lesser of Deterministic $MCE_R$and Probabilistic MCE_R, or lesser of columns 5 and 8) in accordance with Section 21.2.3 of ASCE 7-16
10 2/3 of Column 9 per Equation 21.3-1 of ASCE 7-16 Section 21.3
11 Mapped Design Earthquake ARS in accordance with ASCE 7-16 Section 11.4.7 as modified by Section 21.3
12 80% of Mapped Design Earthquake ARS (lower limit check) per Section 21.4
13 150% of the 80% of Mapped Design Earthquake ARS (MCE lower limit check per ASCE 7-16 Supplement 1 Section 21.3)
14 Final Site-Specific MCE_R ARS per Section 21.2.3 (greater of columns 9 and 13)
15 Final Design Earthquake ARS per Section 21.3 (greater of columns 10 and 12)



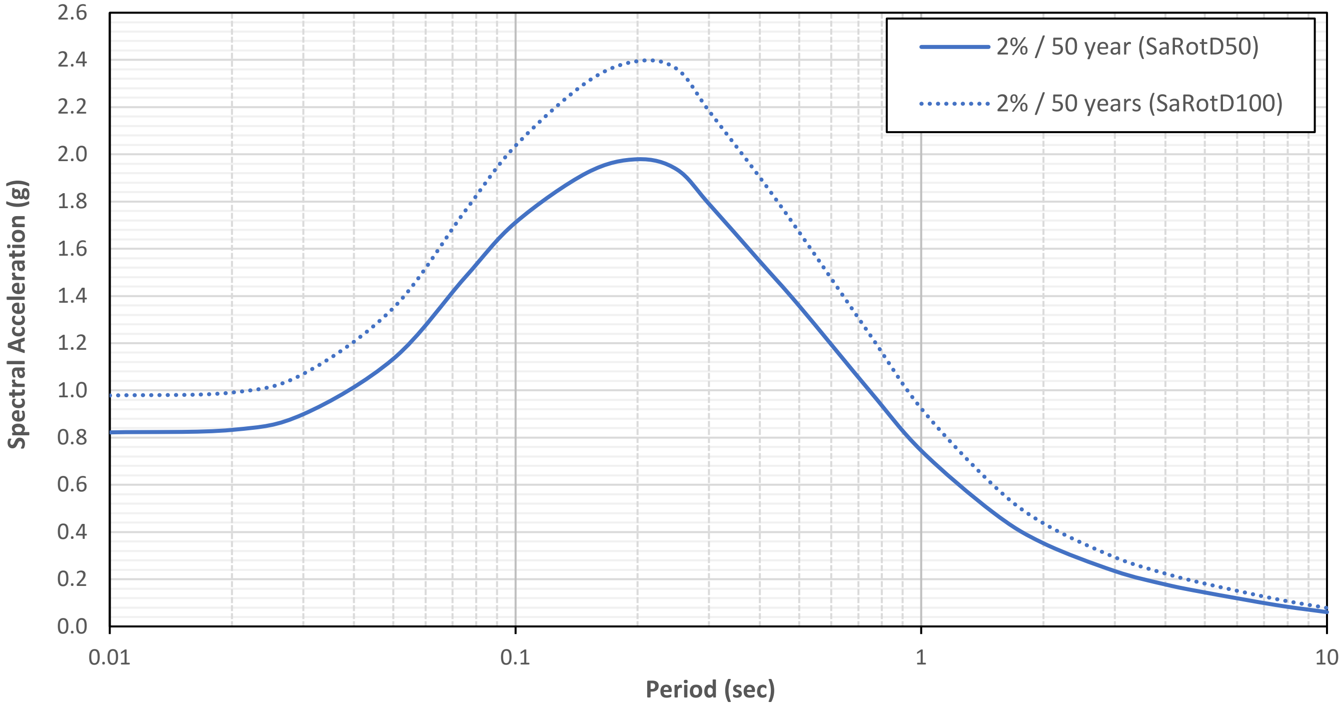
PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital **445 Magnolia Avenue, Riverside**	**Shear Wave Velocity Plots**	PROJECT NUMBER SD809	FIGURE NUMBER E-1



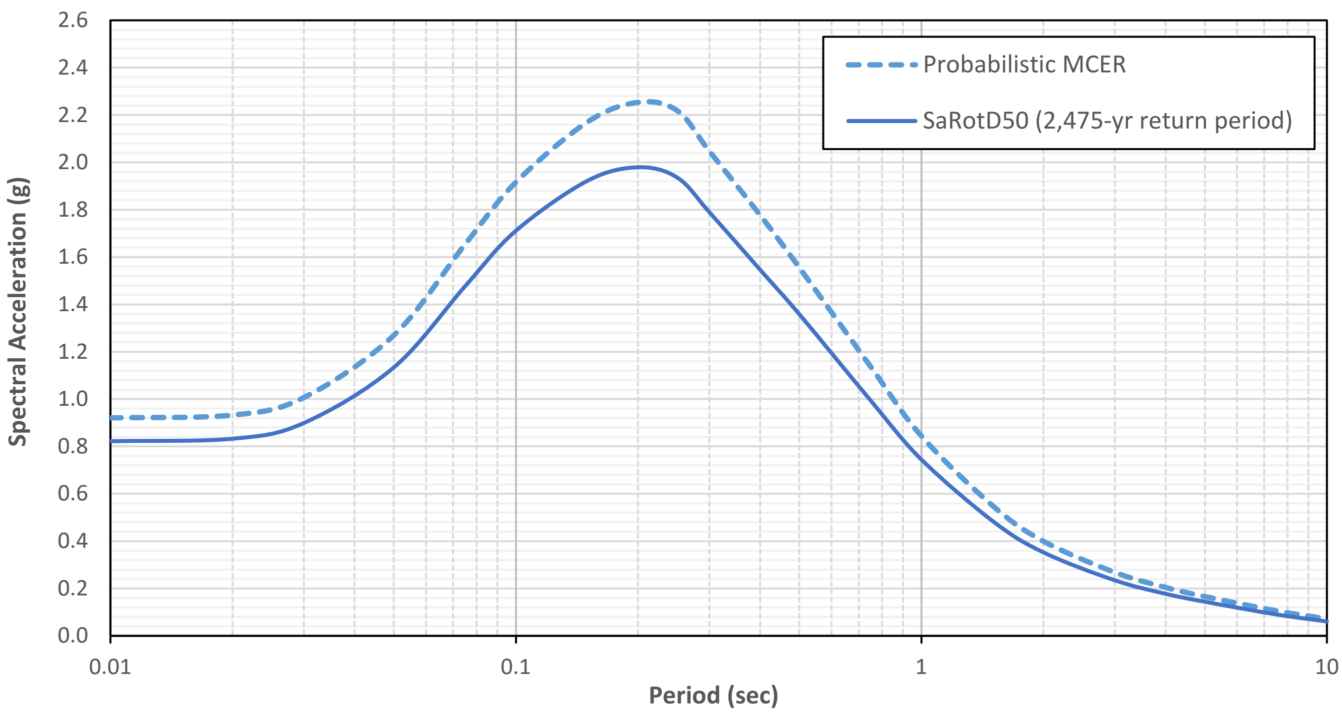


PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage 4445 Magnolia Avenue	**Probabilistic Acceleration Response Spectra**	PROJECT NUMBER: SD809	FIGURE NUMBER: E-2a

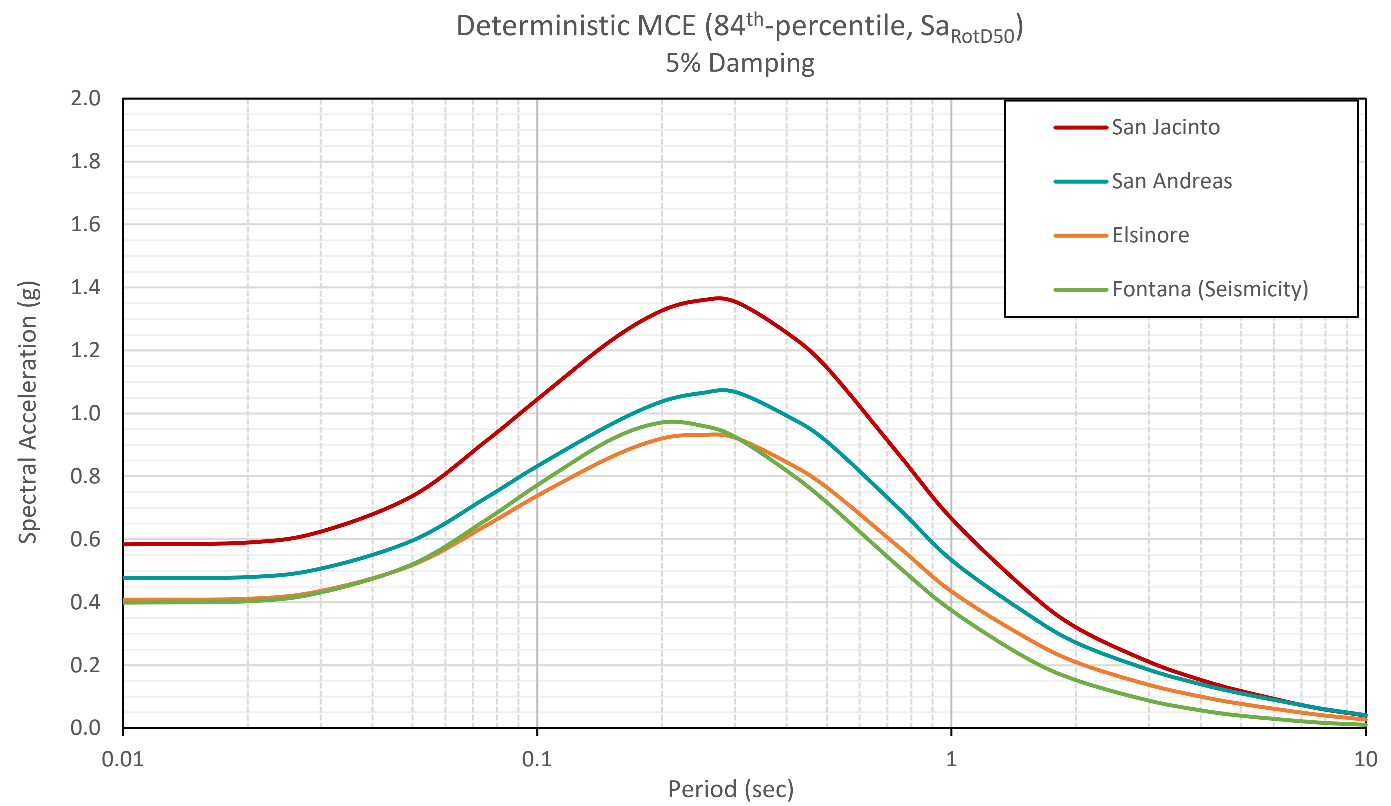
Probabilistic Seismic Hazard Analyses
5% Damping

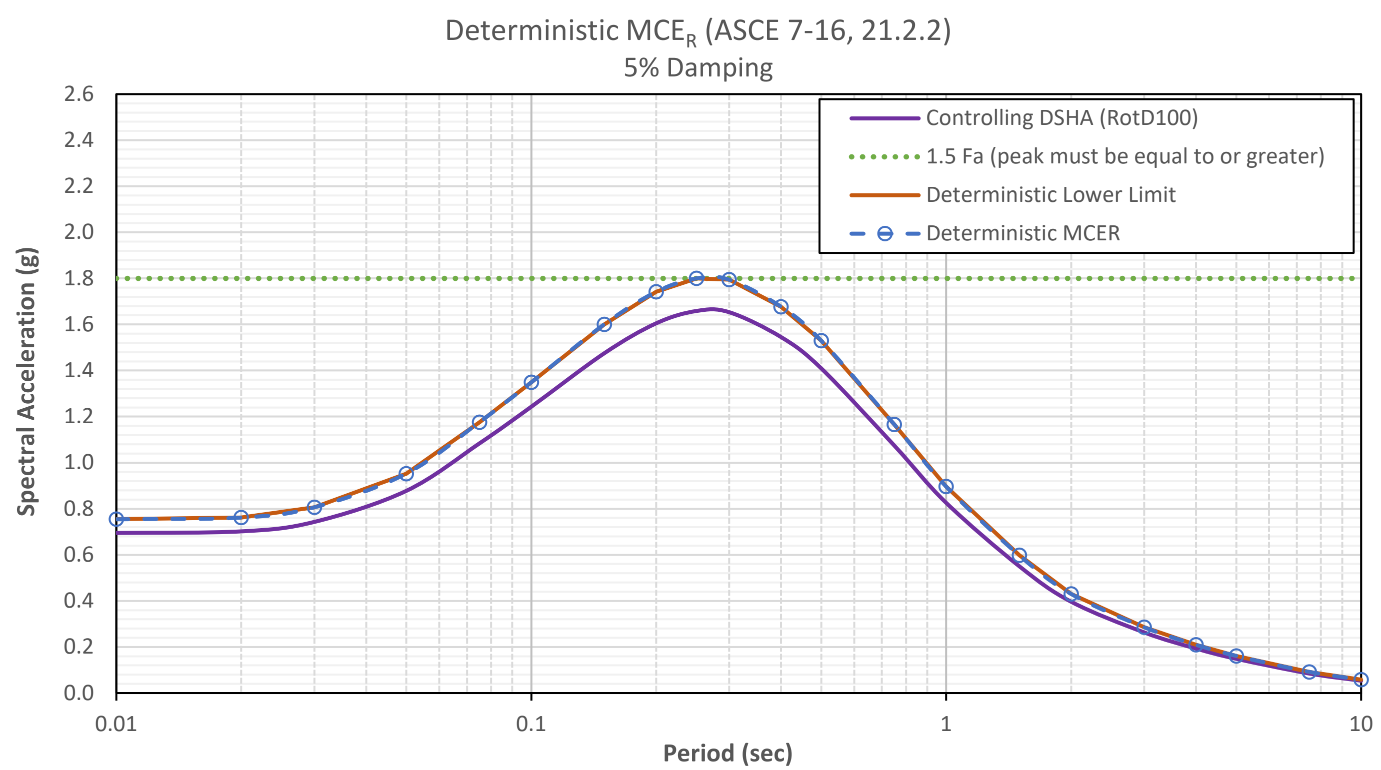


Probabilistic MCE_R (ASCE 7-16, Section 21.2.1)
5% Damping

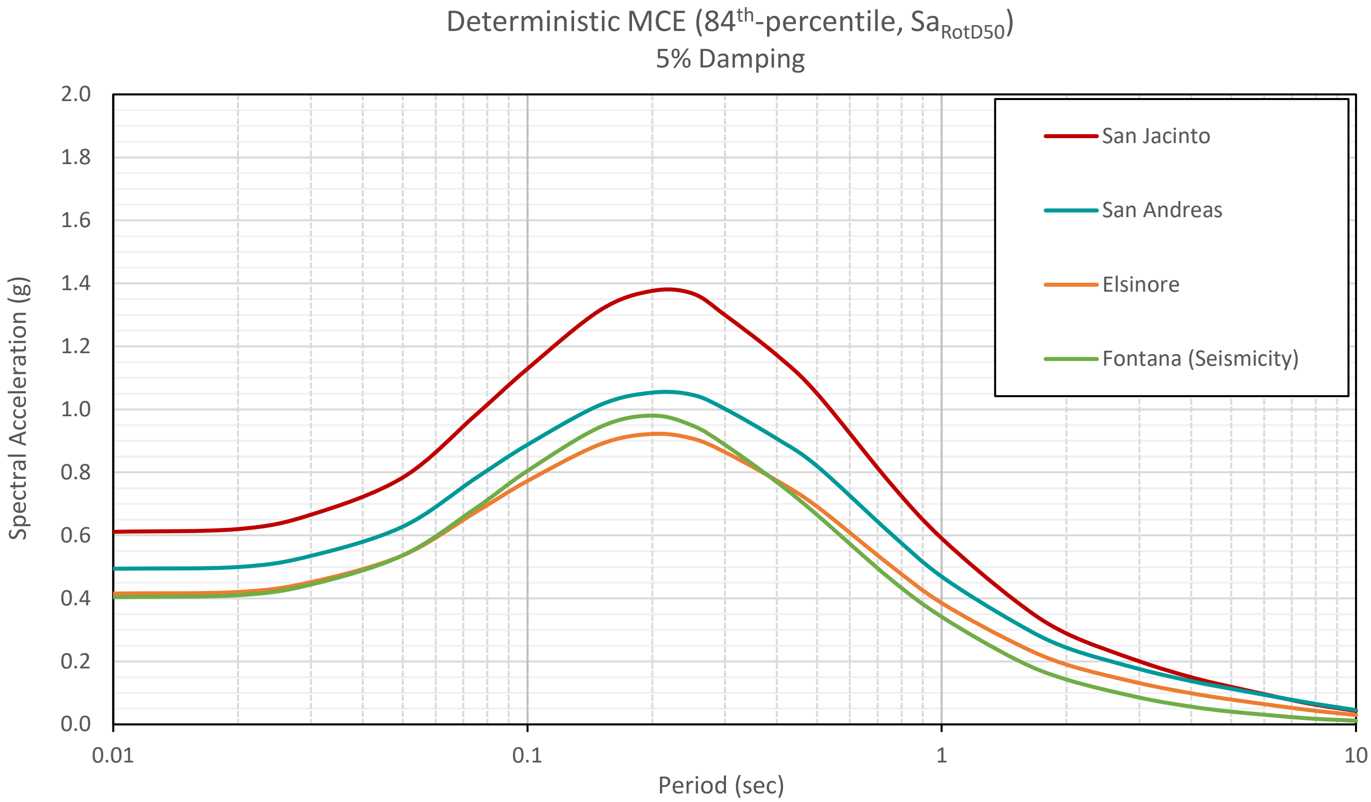


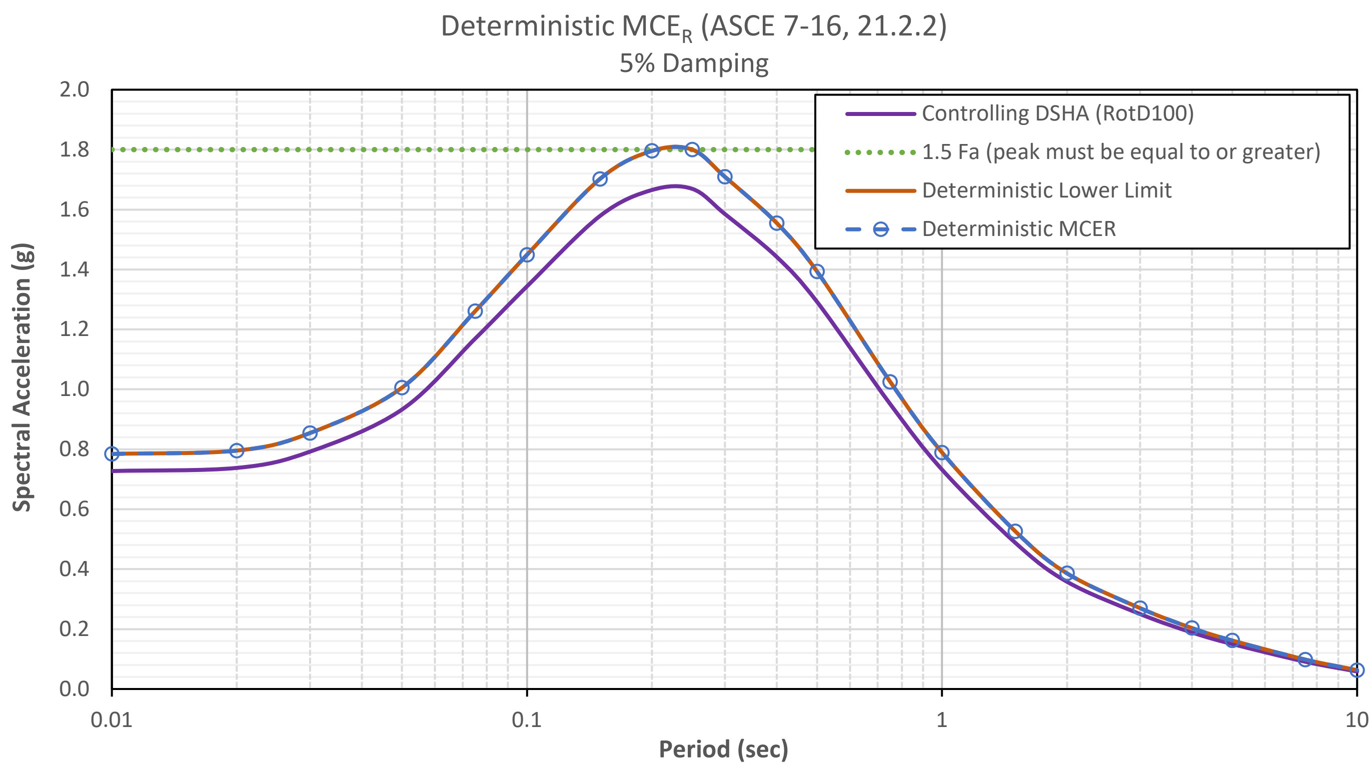
PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower **4445 Magnolia Avenue**	**Probabilistic Acceleration** **Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-2b



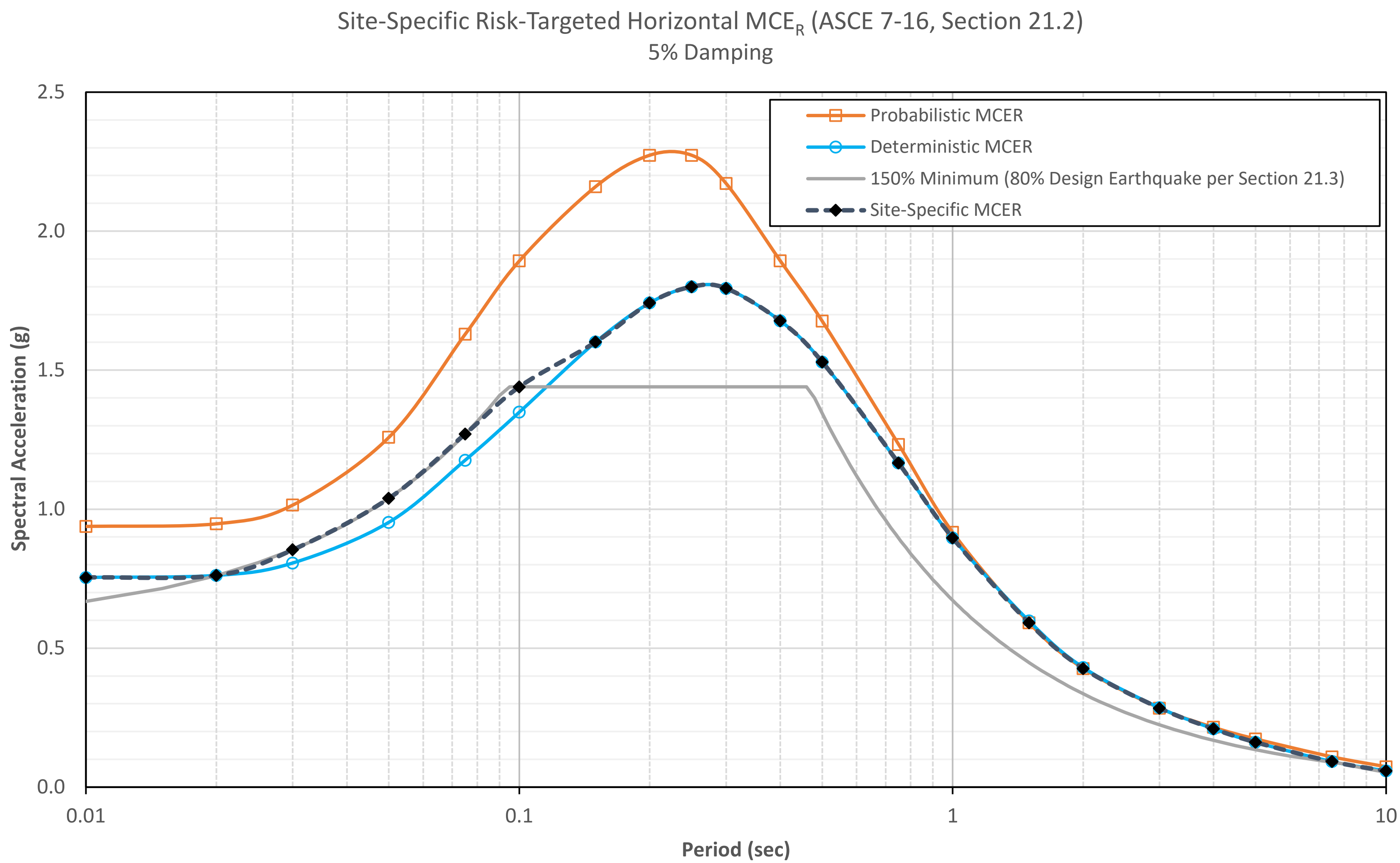


PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage **4445 Magnolia Avenue**	**Deterministic Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-3a

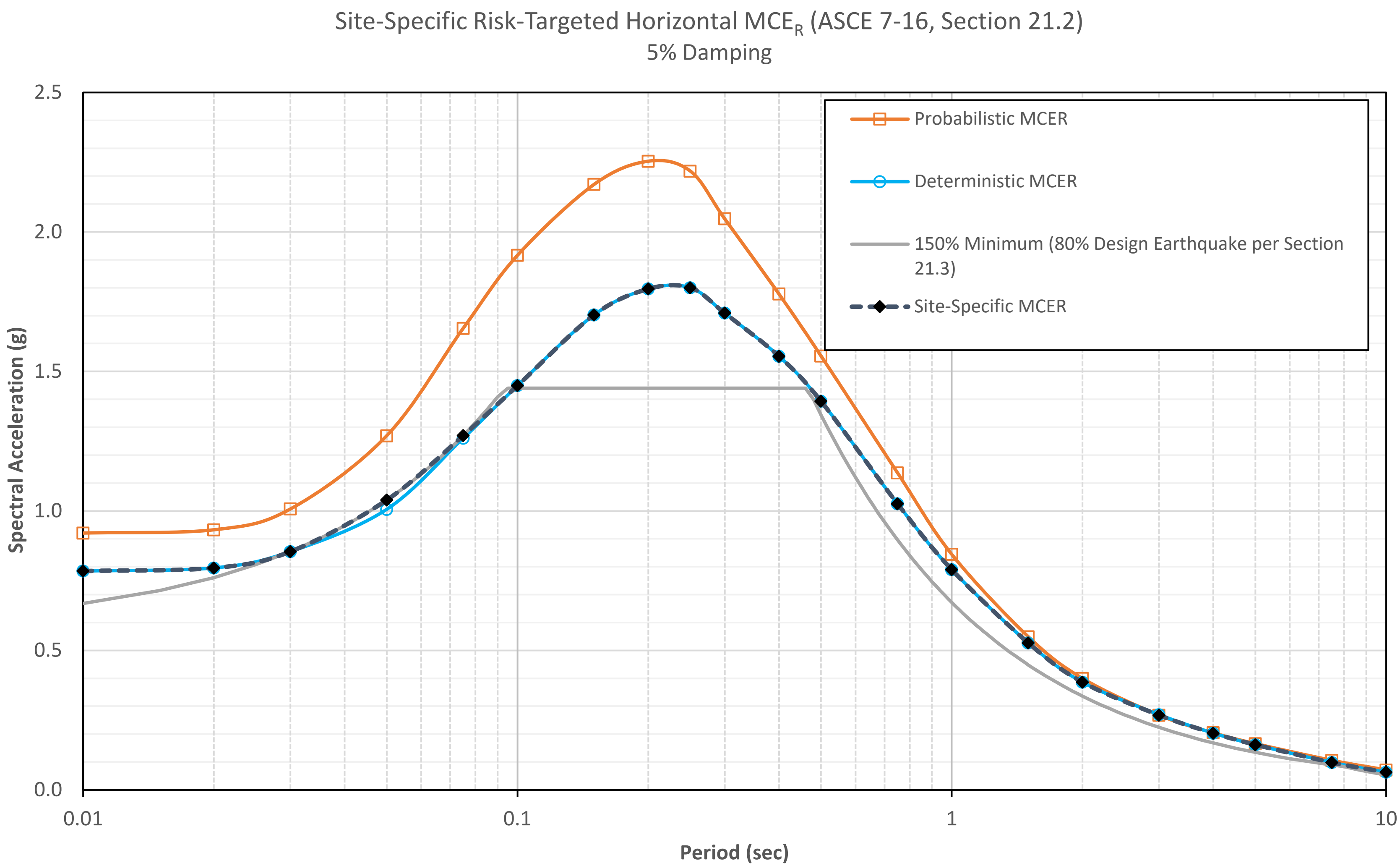




PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower 4445 Magnolia Avenue	**Deterministic Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-3b

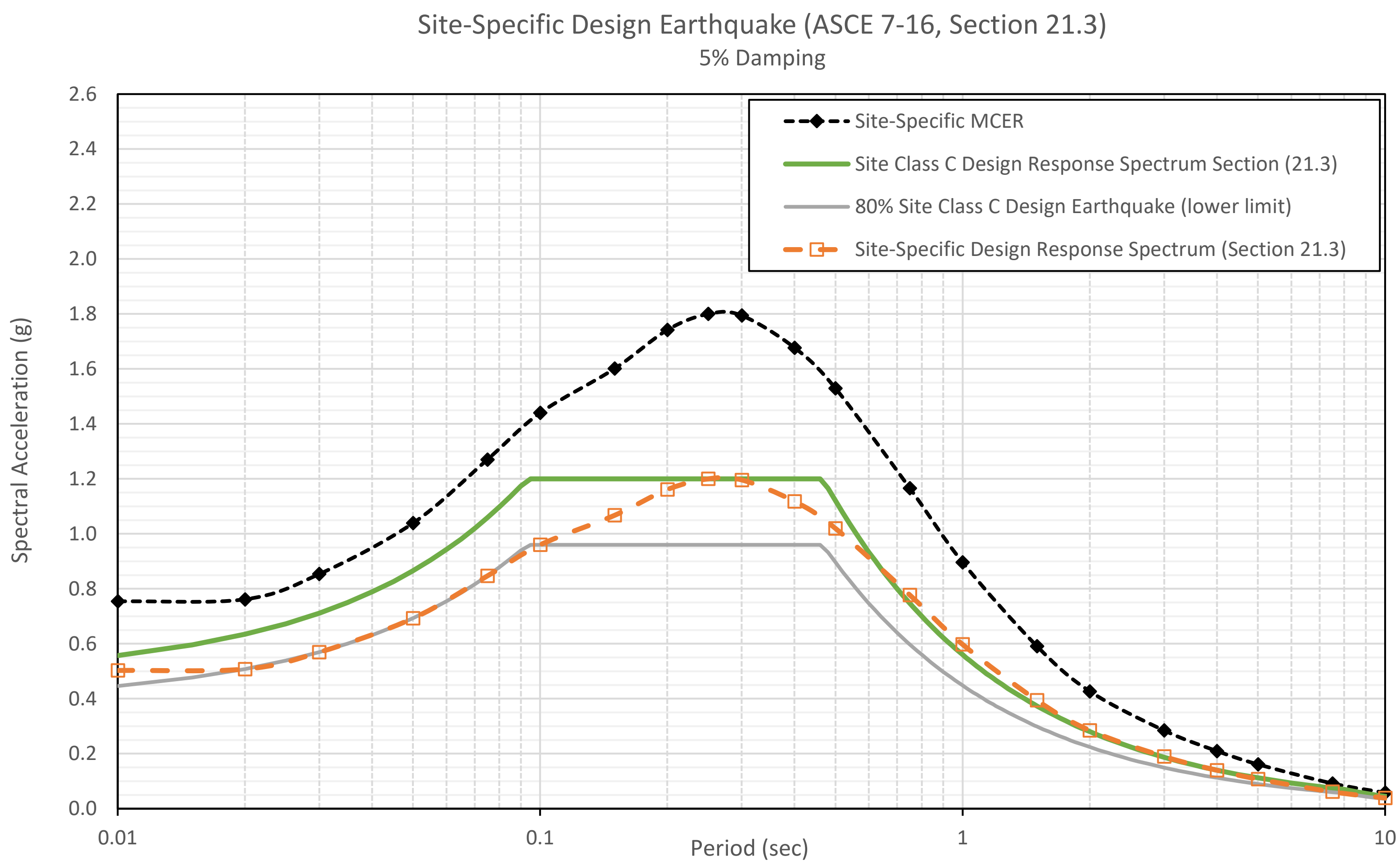


PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage **4445 Magnolia Avenue**	**ASCE 7-16 Site-Specific MCE$_R$** **Acceleration Response Spectra**	PROJECT NUMBER SD809	FIGURE NUMBER E-4a



PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower **4445 Magnolia Avenue**	**ASCE 7-16 Site-Specific MCE_R** **Acceleration Response Spectra**	PROJECT NUMBER SD756	FIGURE NUMBER E-4b

ASCE 7-16 MCE_R and Design Earthquake		
Period (sec)	Design Sa (g)	MCE_R Sa (g)
0.01	0.503	0.754
0.02	0.508	0.762
0.03	0.569	0.854
0.05	0.693	1.039
0.075	0.847	1.270
0.1	0.960	1.440
0.15	1.067	1.601
0.2	1.161	1.742
0.25	1.200	1.800
0.3	1.196	1.794
0.4	1.118	1.677
0.5	1.020	1.529
0.75	0.777	1.166
1	0.597	0.896
1.5	0.394	0.591
2	0.285	0.427
3	0.190	0.284
4	0.140	0.210
5	0.108	0.161
7.5	0.061	0.092
10	0.039	0.058



Site-Specific Design Acceleration Parameters (ASCE 7-16 Section 21.4)

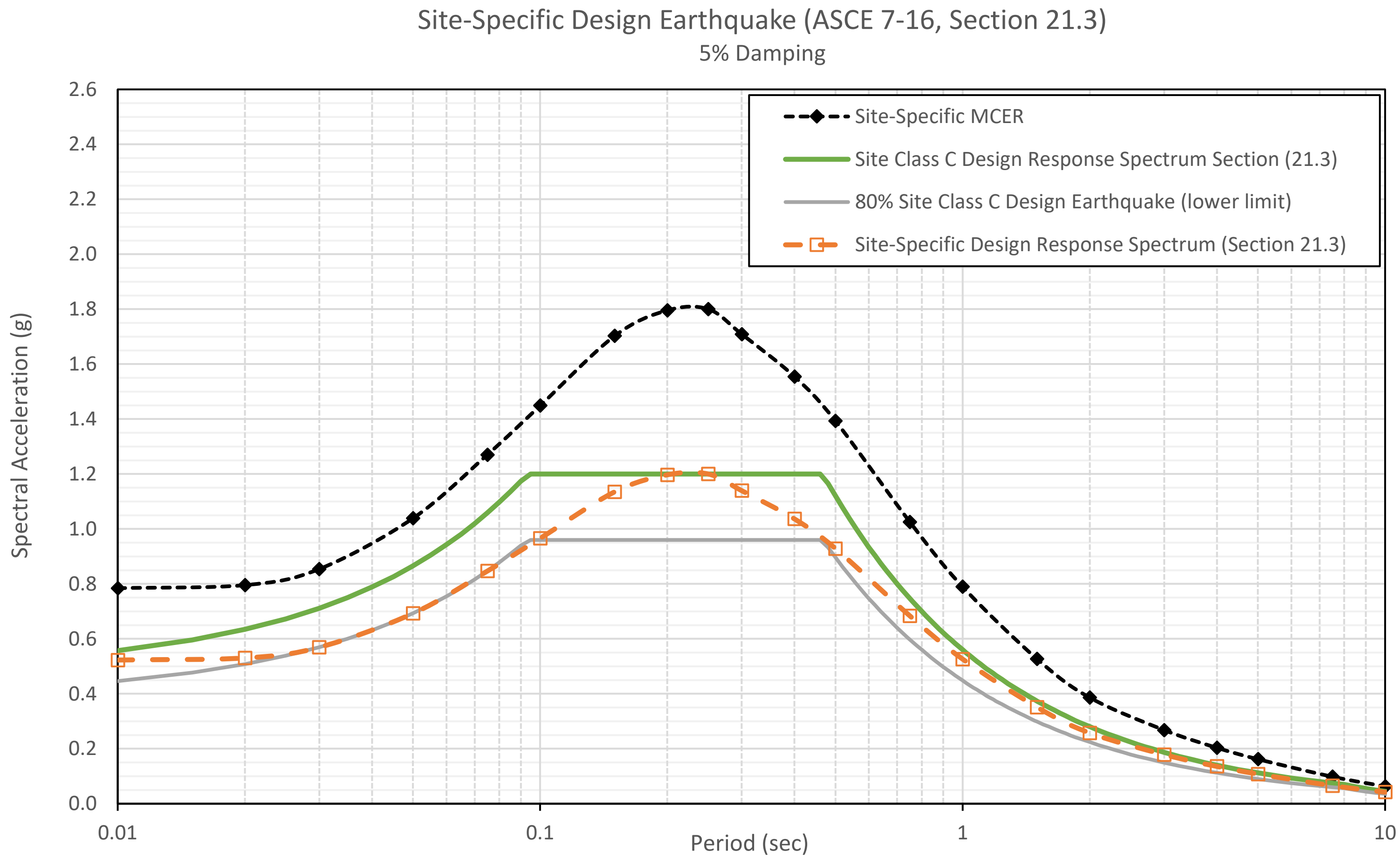
S_{DS} = 90% of the peak S_a from T =0.2 to 5 s (not less than 80% of mapped S_{DS})

S_{D1} = Peak T*S_a between periods of 1 second and 2 seconds (not less than 80% of mapped S_{D1})

S_{DS} = 1.080 **S_{D1} =** 0.597

PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Garage 4445 Magnolia Avenue	**ASCE 7-16 Site-Specific Design Earthquake and Site-Specific Design Acceleration Parameters**	PROJECT NUMBER SD809	FIGURE NUMBER E-5a

ASCE 7-16 MCE_R and Design Earthquake		
Period	Design	MCE_R
(sec)	Sa (g)	Sa (g)
0.01	0.523	0.784
0.02	0.530	0.796
0.03	0.569	0.854
0.05	0.693	1.039
0.075	0.847	1.270
0.1	0.966	1.449
0.15	1.135	1.702
0.2	1.197	1.796
0.25	1.200	1.800
0.3	1.139	1.709
0.4	1.036	1.555
0.5	0.929	1.393
0.75	0.684	1.025
1	0.526	0.789
1.5	0.351	0.527
2	0.257	0.386
3	0.179	0.268
4	0.136	0.203
5	0.108	0.162
7.5	0.065	0.098
10	0.042	0.063



Site-Specific Design Acceleration Parameters (ASCE 7-16 Section 21.4)

S_{DS} = 90% of the peak S_a from T =0.2 to 5 s (not less than 80% of mapped S_{DS})

S_{D1} = Peak T*S_a between periods of 1 second and 2 seconds (not less than 80% of mapped S_{D1})

S_{DS} = 1.080 **S_{D1} =** 0.527

PROJECT NAME	FIGURE NAME	GROUP DELTA	
Riverside Community Hospital - Tower 4445 Magnolia Avenue	**ASCE 7-16 Site-Specific Design Earthquake and Site-Specific Design Acceleration Parameters**	PROJECT NUMBER SD809	FIGURE NUMBER E-5b