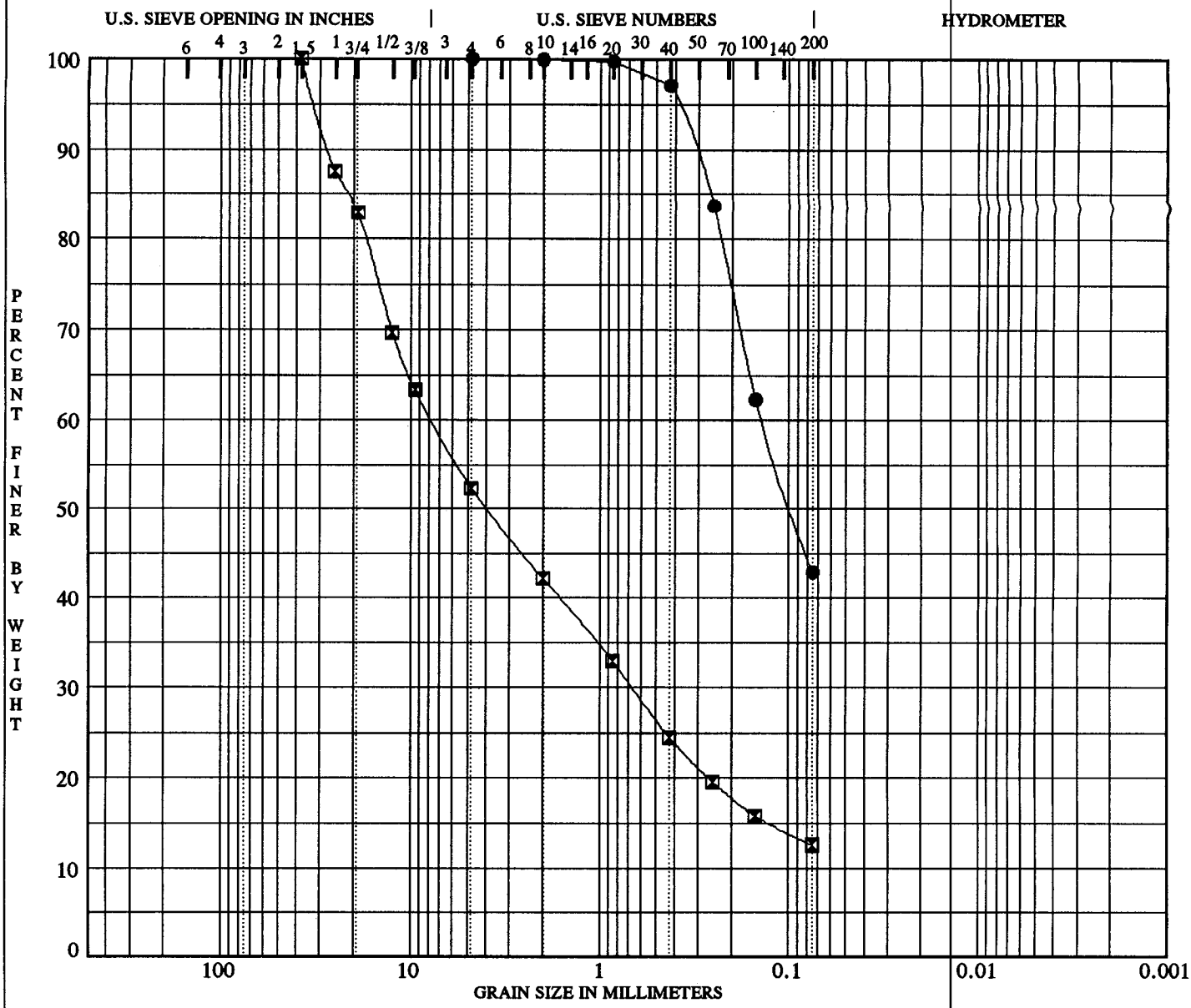


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-2	at 7.0	Dark Brown Silty Sand (SM)	22					
⊠	B-2	at 14.0	Brown Sandy Gravel w/ Silt (GM)	9					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-2	at 7.0	4.75	0.14			0.0	57.1	42.9	
⊠	B-2	at 14.0	38.10	7.68	0.669		47.7	39.7	12.6	

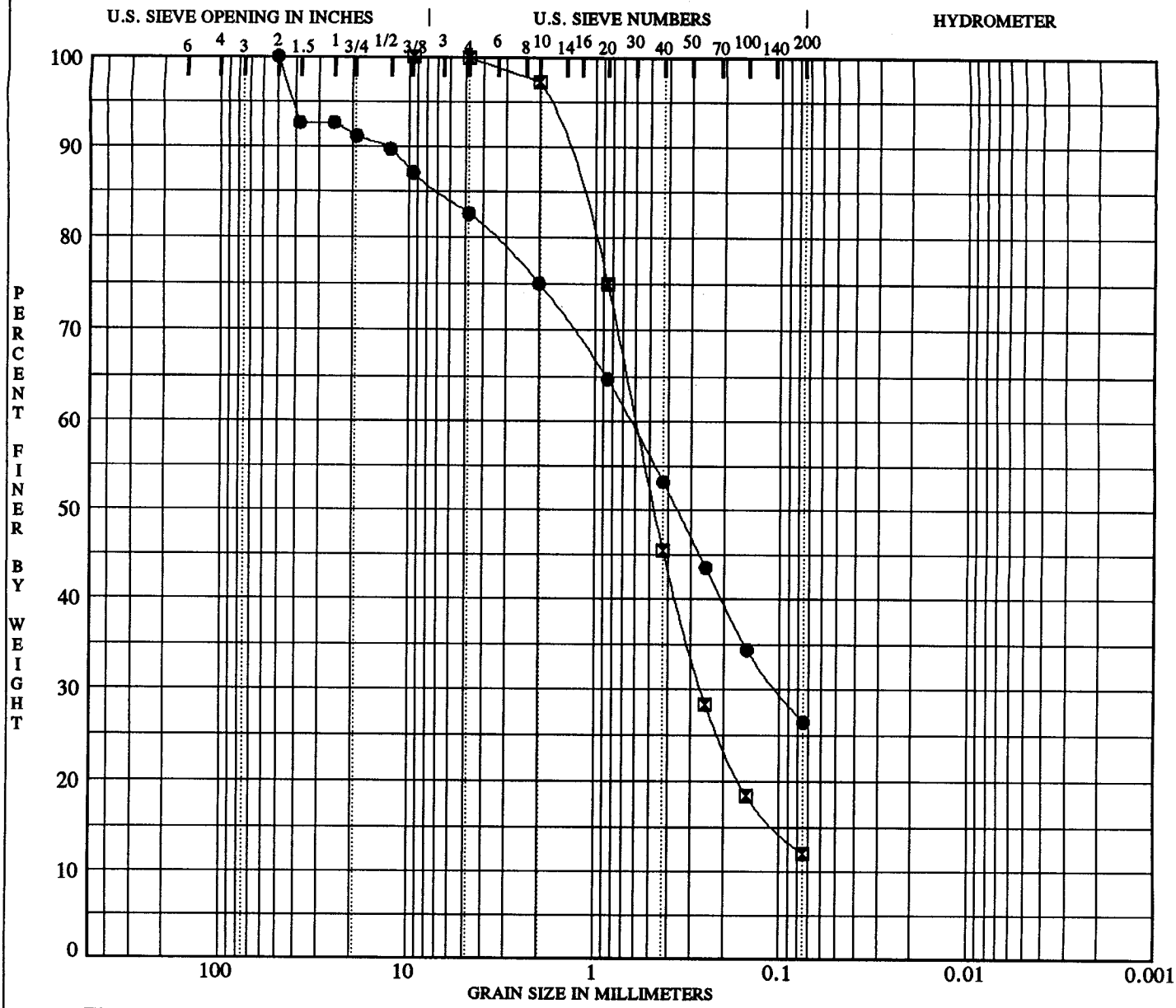
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C1

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-4	at 3.0	Dark Brown Gravelly Silty Sand (SM)	6					
⊠	B-4	at 17.0	Gray Brown Silty Sand (SM)					1.66	8.5

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-4	at 3.0	50.00	0.64	0.103		17.4	56.2	26.4	
⊠	B-4	at 17.0	9.50	0.60	0.264		0.1	87.9	12.0	

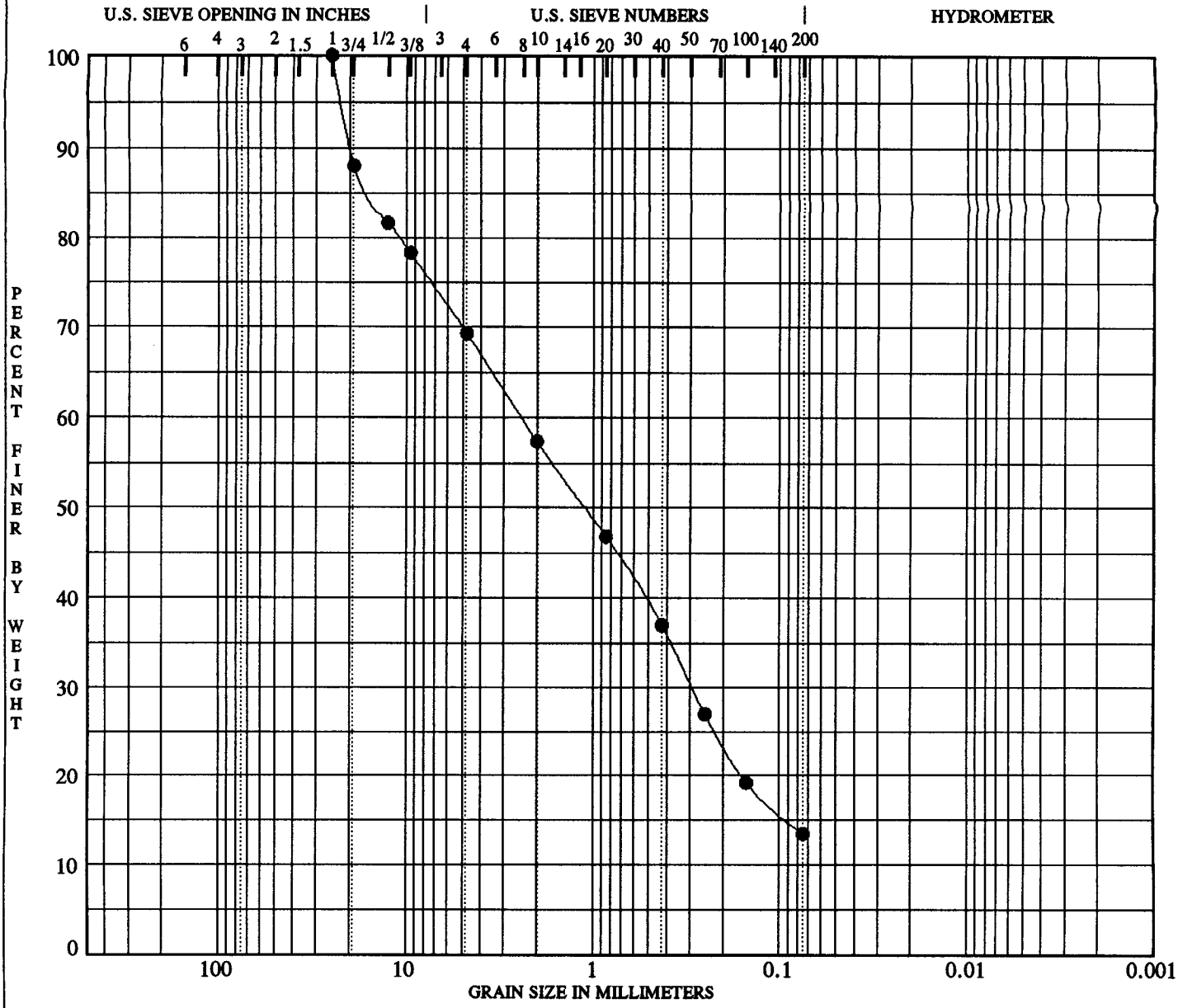
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C2

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-6	at 2.5	Brown/Orange Brown Gravelly Sand w/ Clay	8					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-6	at 2.5	25.00	2.42	0.293		30.7	55.9	13.4	

KLEINFELDER

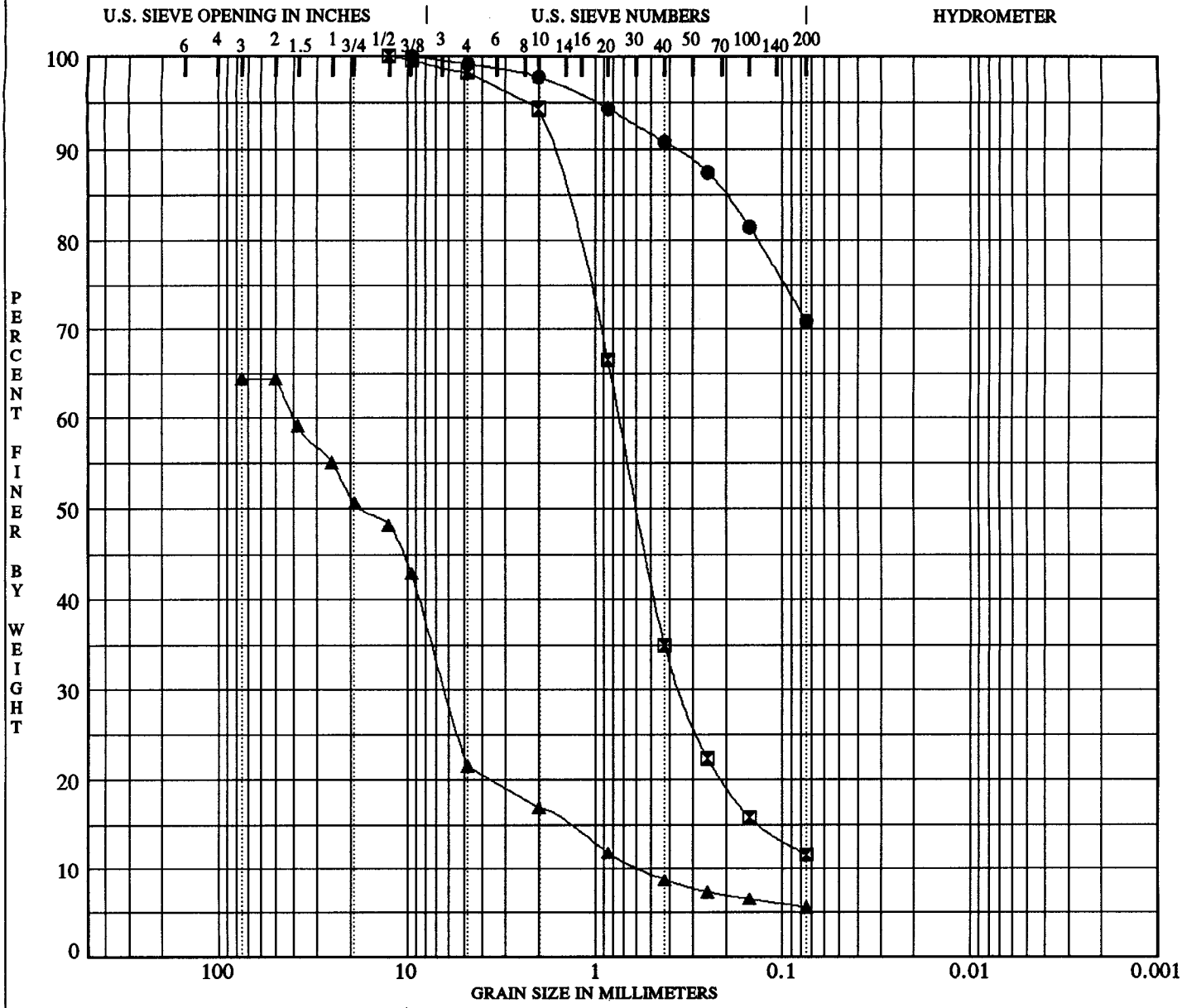
PROJECT NUMBER: 30-1307-10.001

RENO RAILROAD CORRIDOR
RENO, NEVADA

GRAIN SIZE ANALYSES

PLATE

C3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-7	at 1.0	Brown Sandy Clay (CL)	20	39	14	25		
⊠	B-7	at 9.0	Brown Clayey Sand (SC)	6				2.31	10.5
▲	B-7	at 27.0	Olive Brown Sandy Gravel w/ Clay (GP/GC)						

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-7	at 1.0	9.50				0.9	28.2	70.9	
⊠	B-7	at 9.0	12.50	0.74	0.345		1.8	86.6	11.6	
▲	B-7	at 27.0		39.90	6.255	0.5684	42.9	15.9	5.6	

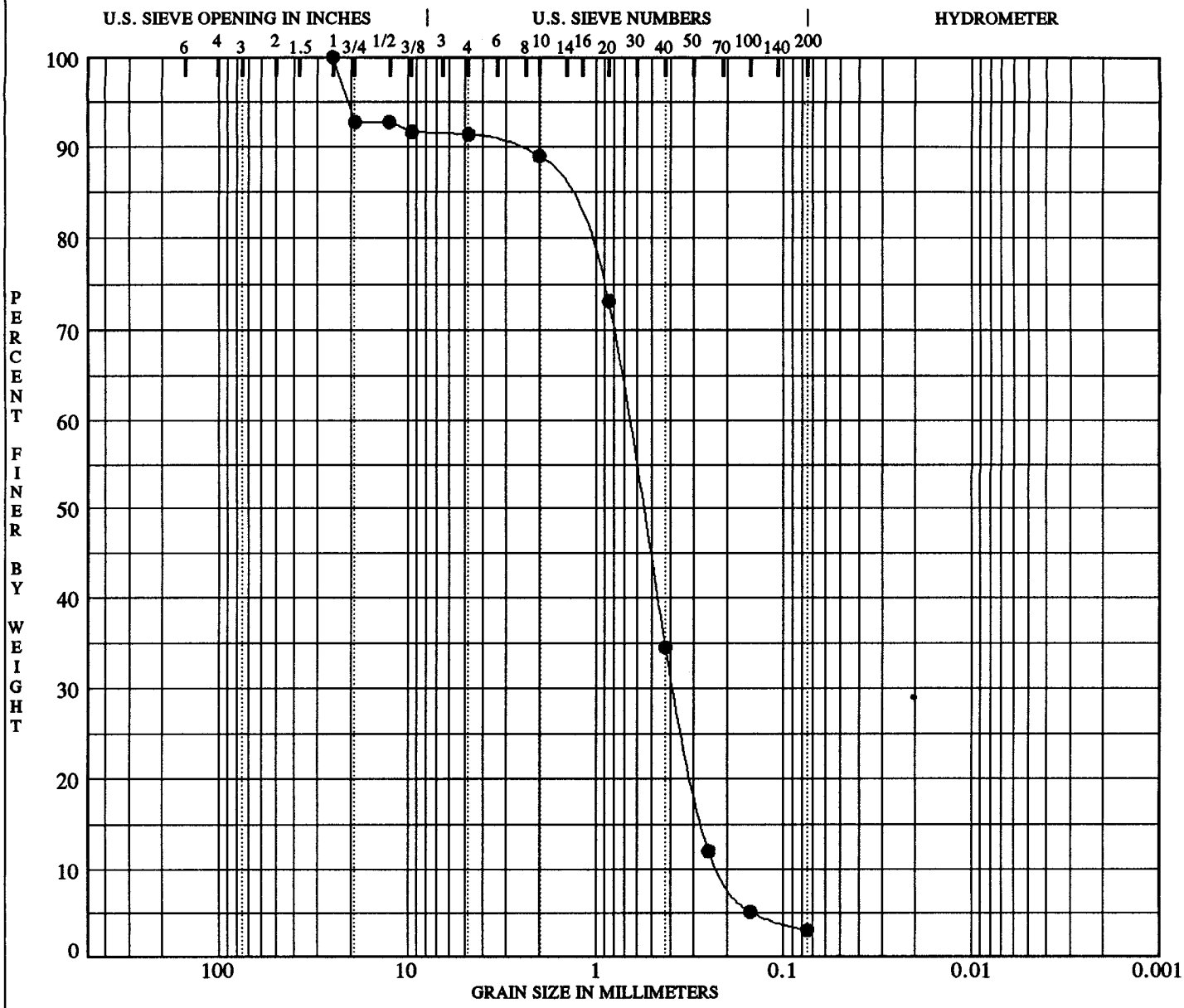
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C4

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-8	at 7.0	Brown Sand (SP)	4				1.01	3.1

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-8	at 7.0	25.00	0.67	0.382	0.2151	8.7	88.2	3.1	

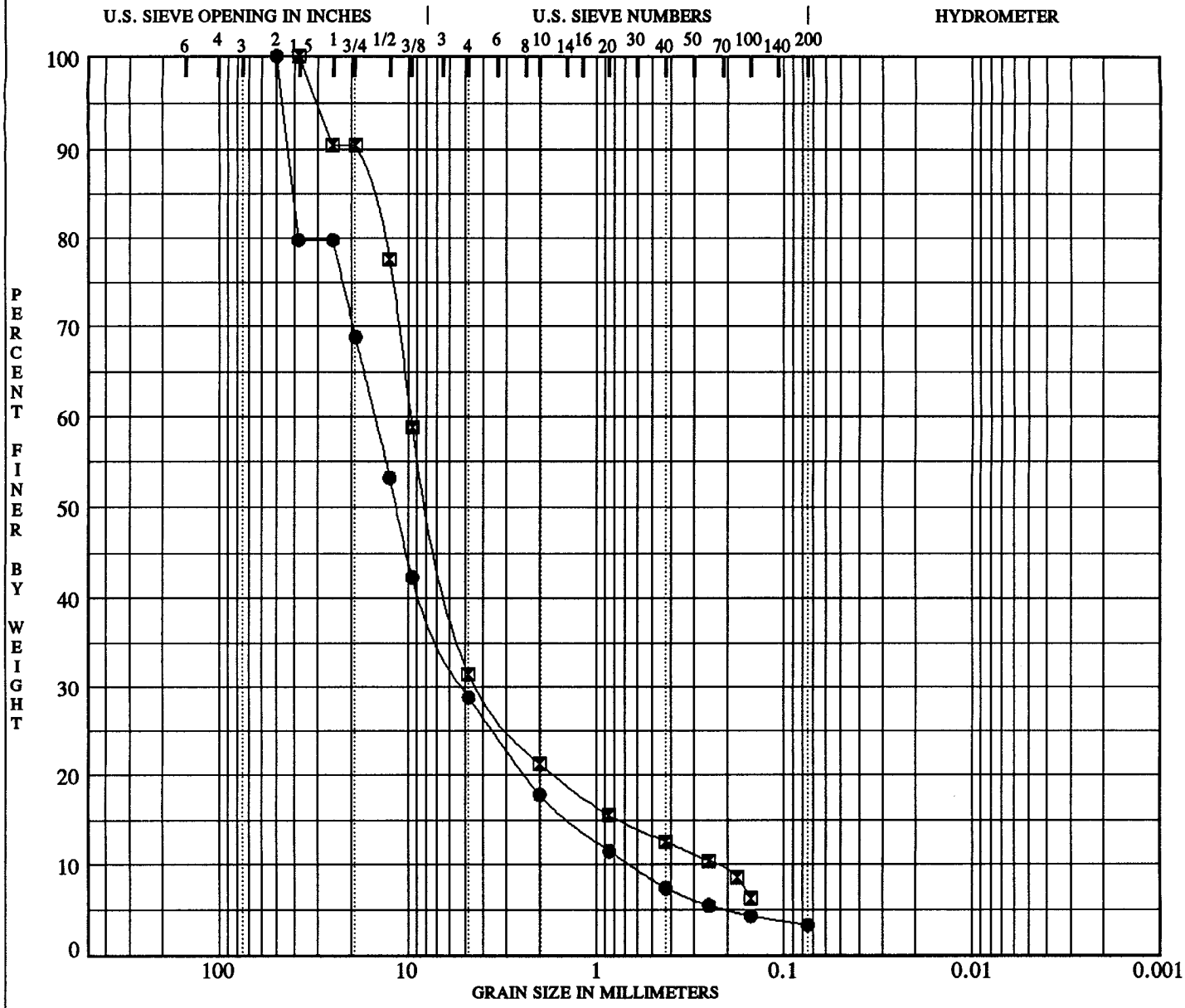
KLEINFELDER

PROJECT NUMBER: 30-1307-10.001

RENO RAILROAD CORRIDOR
RENO, NEVADA

GRAIN SIZE ANALYSES

PLATE
C5



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-9	at 18.0	Gray Sandy Gravel (GW)	3				2.58	22.7
⊠	B-9	at 28.0	Brown Sandy Gravel w/Silt (GP/GM)	2					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-9	at 18.0	50.00	15.00	5.052	0.6596	71.2	25.4	3.4	
⊠	B-9	at 28.0	38.10	9.67	4.188	0.2325	68.5			

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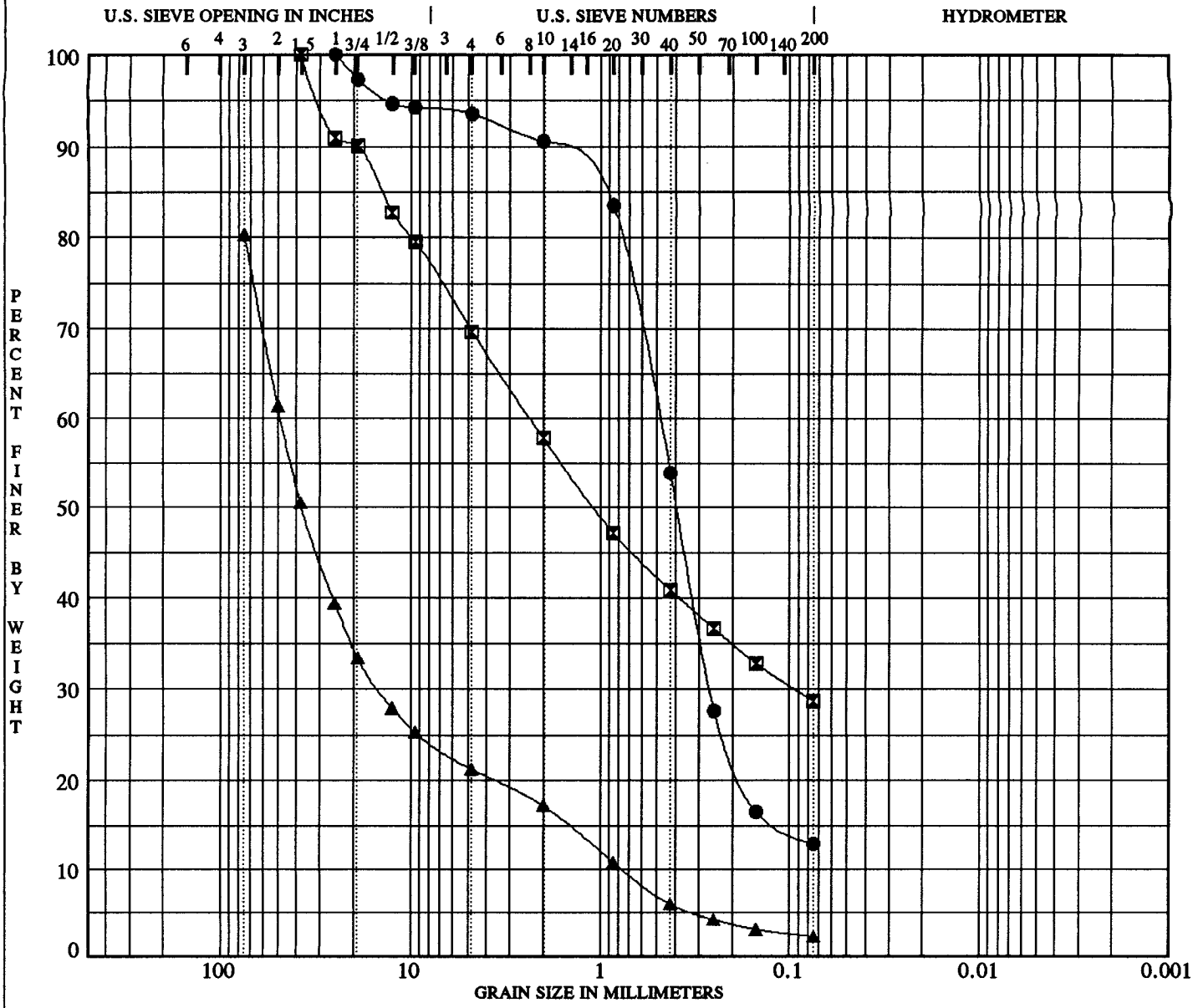
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C6

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-10	at 10.0	Yellow Brown Silty Sand w/ Gravel (SM)	9					
⊠	B-10	at 23.0	Orange Brown Silty Gravelly Sand (SM)						
▲	B-10	at 28.0	Gray Brown Sandy Gravel and Cobbles (GP)						

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-10	at 10.0	25.00	0.49	0.262		6.5	80.6	12.9	
⊠	B-10	at 23.0	38.10	2.35	0.093		30.3	41.0	28.7	
▲	B-10	at 28.0		48.28	14.670	0.7573	59.1	18.9	2.3	

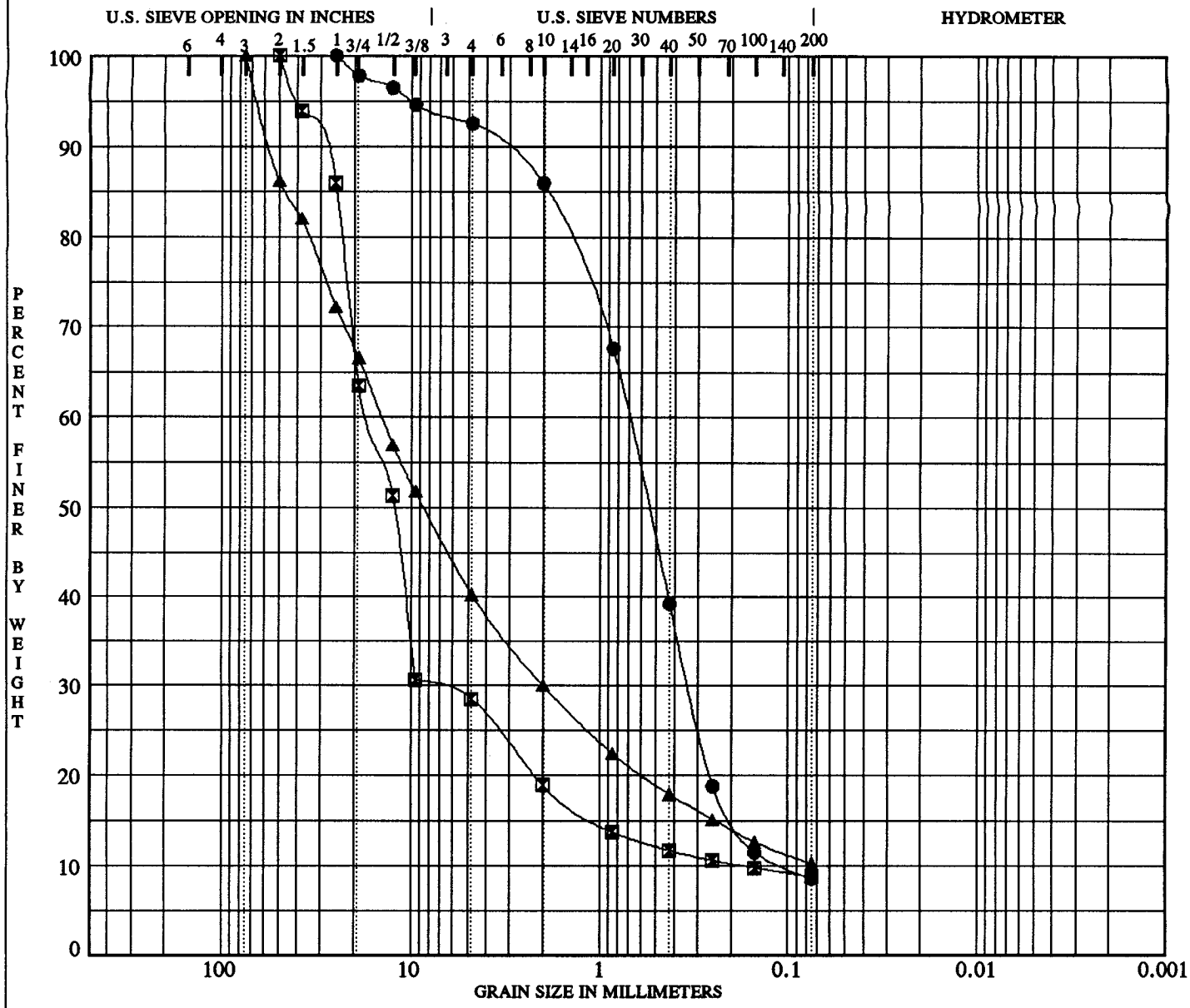
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C7

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-11	at 8.0	Brown Silty Sand w/ Gravel (SP/SM)	7				1.51	6.7
⊠	B-11	at 20.0	Brown Sandy Gravel w/ Clay (GC/GP)	6				21.15	98.9
▲	B-11	at 24.0	Gray Brown Sandy Gravel w/ Silt (GM/GP)	5				4.00	204.1

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-11	at 8.0	25.00	0.71	0.335	0.1048	7.5	83.9	8.6	
⊠	B-11	at 20.0	50.00	16.85	7.793	0.1704	71.5	19.7	8.8	
▲	B-11	at 24.0	75.00	14.29	2.000		59.8	29.9	10.3	

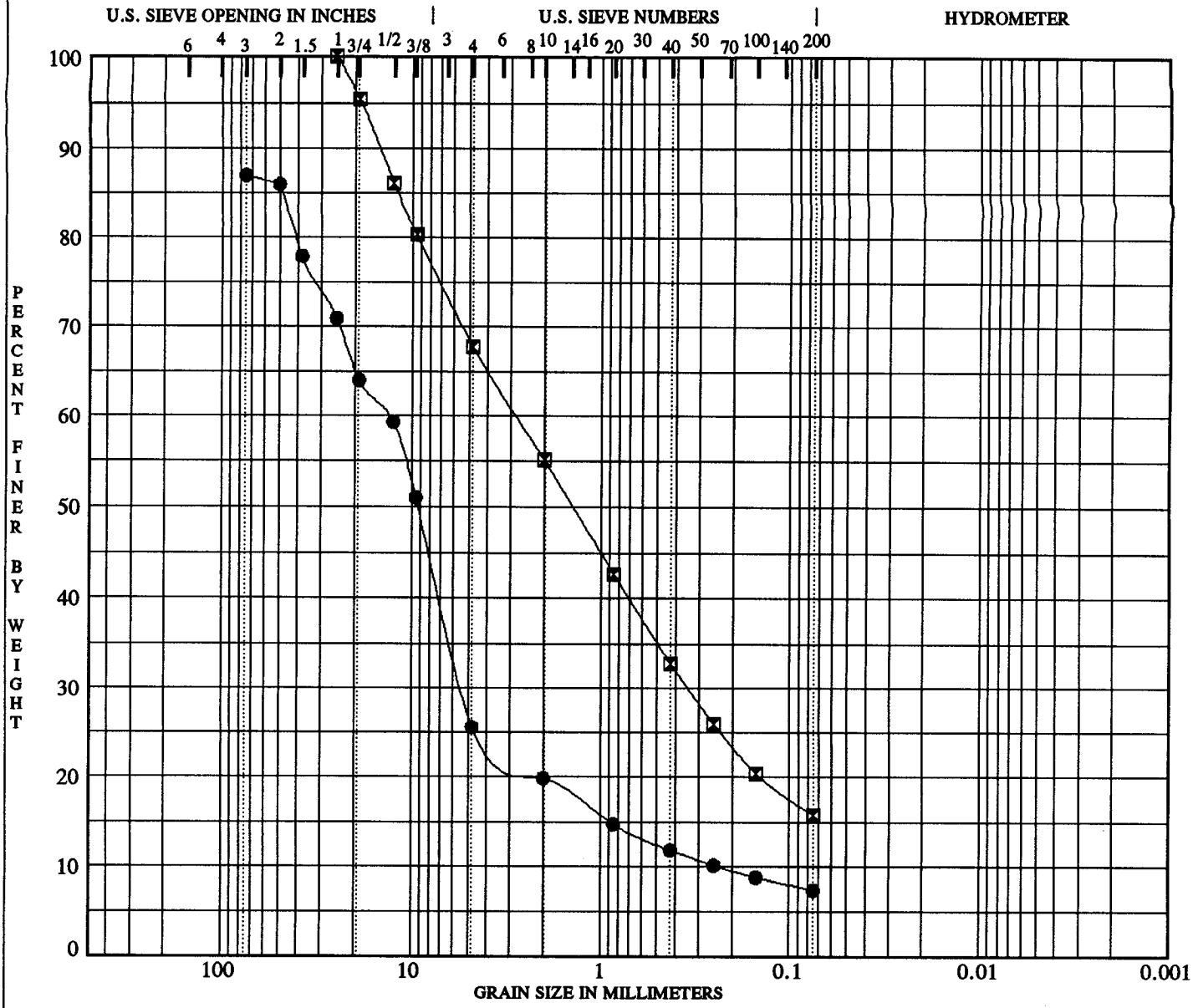
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C8

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-12	at 28.0	Brown Sandy Gravel w/ Clay (GP/GC)	9					
⊠	B-12	at 39.0	Brown Clayey Sand (SC)	16					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-12	at 28.0		13.30	5.368	0.2404	61.4	18.1	7.4	
⊠	B-12	at 39.0	25.00	2.80	0.343		32.3	51.9	15.8	

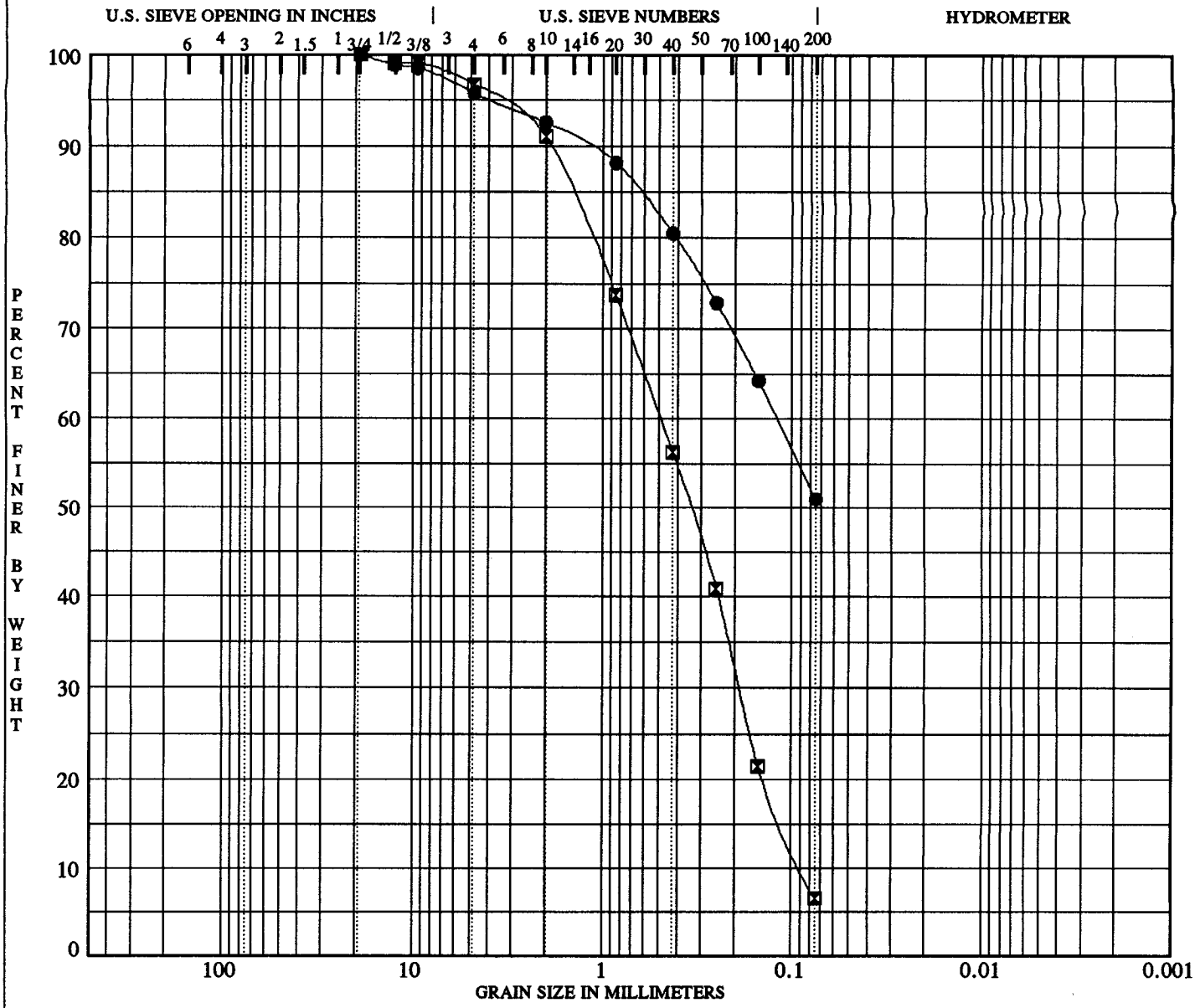
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C9

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-14	at 2.0	Brown Sandy Gravelly Clay (CL Fill)	8	38	15	23		
⊠	B-14	at 38.5	Gray Silty Sand w/ trace Gravel (SP/SM)					0.81	5.6

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-14	at 2.0	19.00	0.12			4.3	44.7	51.0	
⊠	B-14	at 38.5	19.00	0.49	0.188	0.0879	3.3	90.1	6.6	

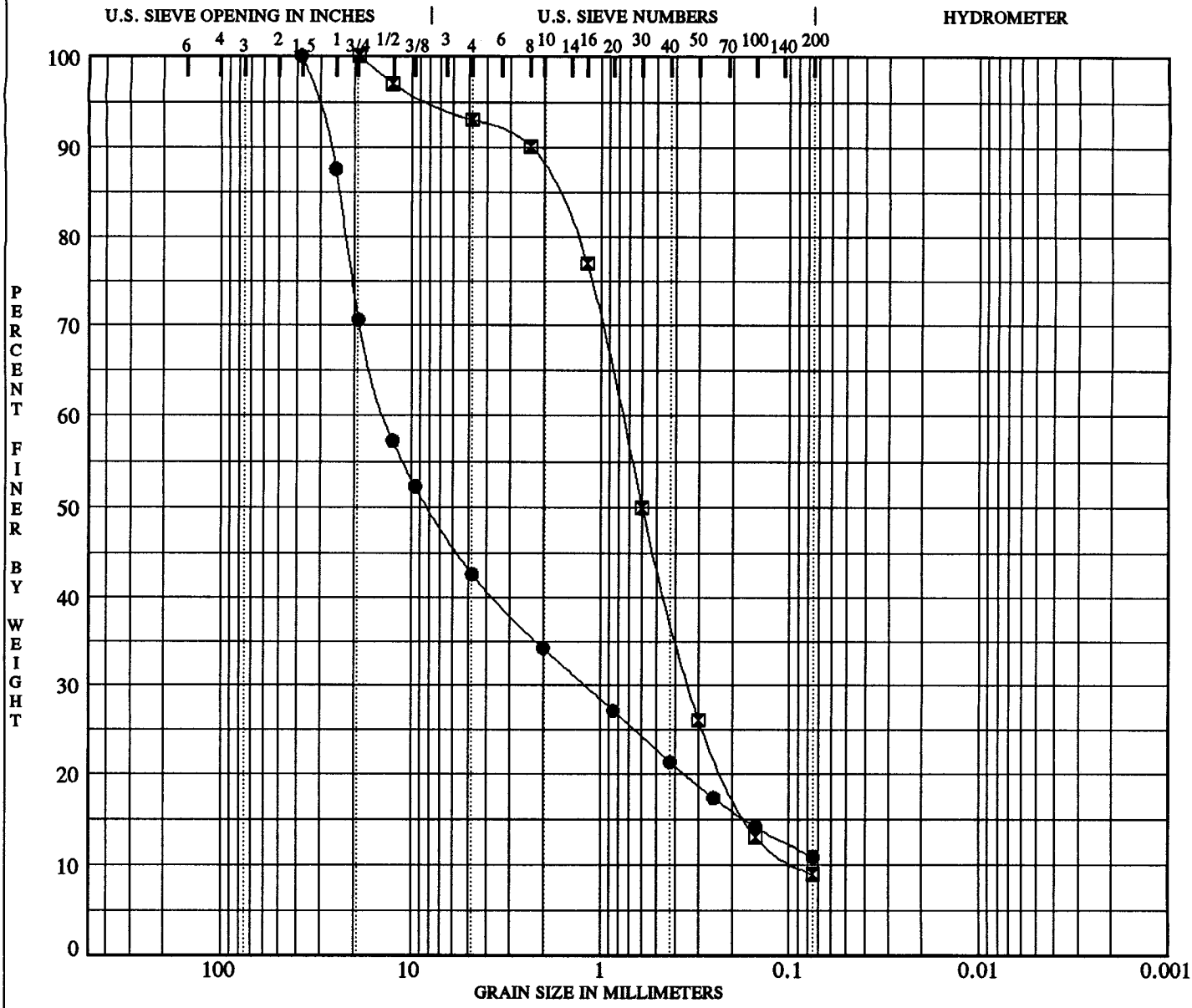
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C10

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-15	at 40.0	Brown Gray Sandy Gravel w/Silt (GM)					1.52	194.9
⊠	B-15	at 55.0	Dk. Brown Silty Sand (SW/SM)	18				1.65	8.6

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-15	at 40.0	38.10	13.64	1.206		57.4	31.7	10.9	
⊠	B-15	at 55.0	19.00	0.77	0.337	0.0892	7.0	84.0	9.0	

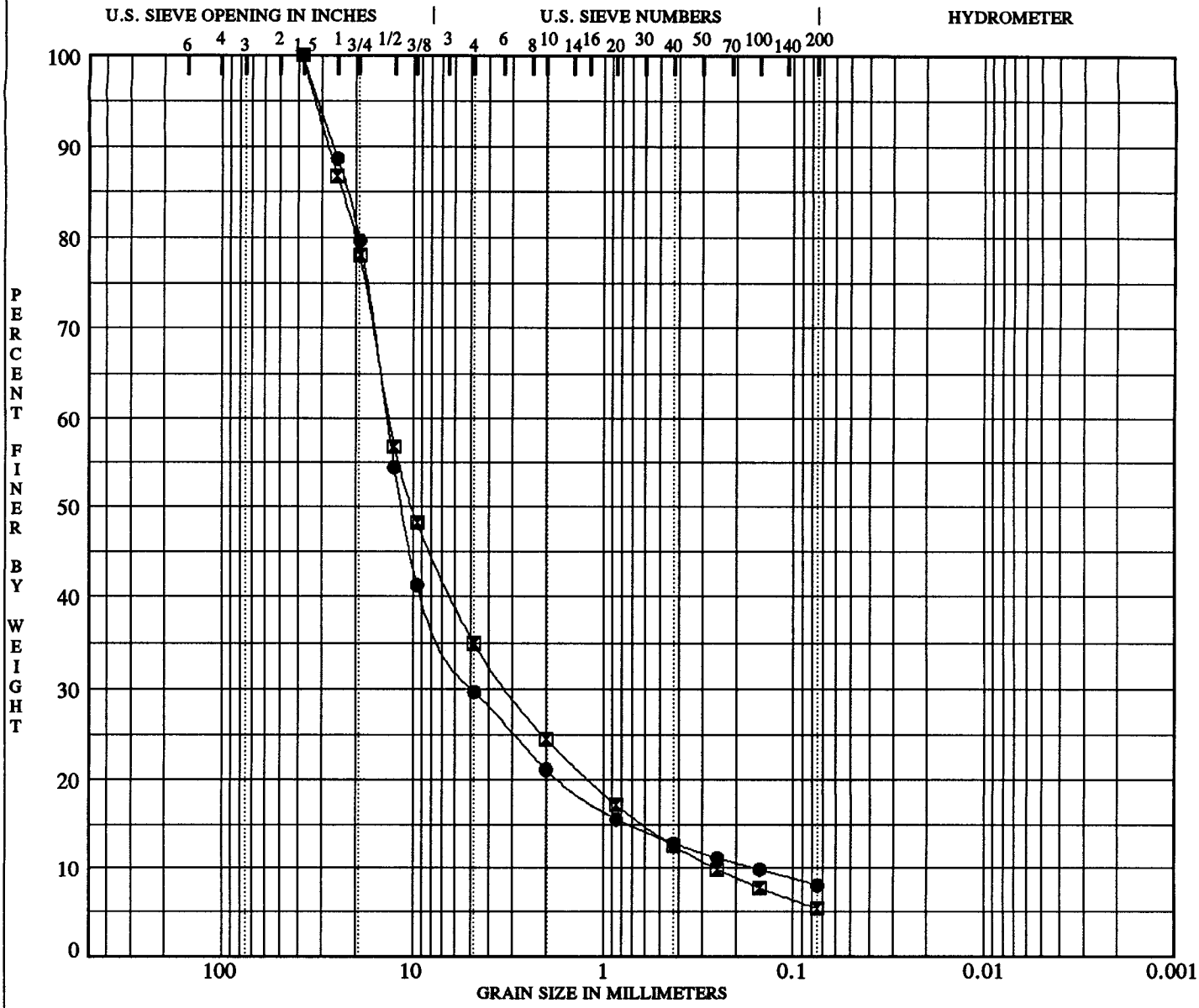
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C11

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-16	at 16.5	Brown Sandy Gravel w/Silt (GM)					10.51	84.5
⊠	B-16	at 38.5	Brown Sandy Gravel (GW)	12				2.89	51.2

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-16	at 16.5	38.10	13.71	4.837	0.1623	70.3	21.7	8.0	
⊠	B-16	at 38.5	38.10	13.31	3.160	0.2600	65.1	29.5	5.4	

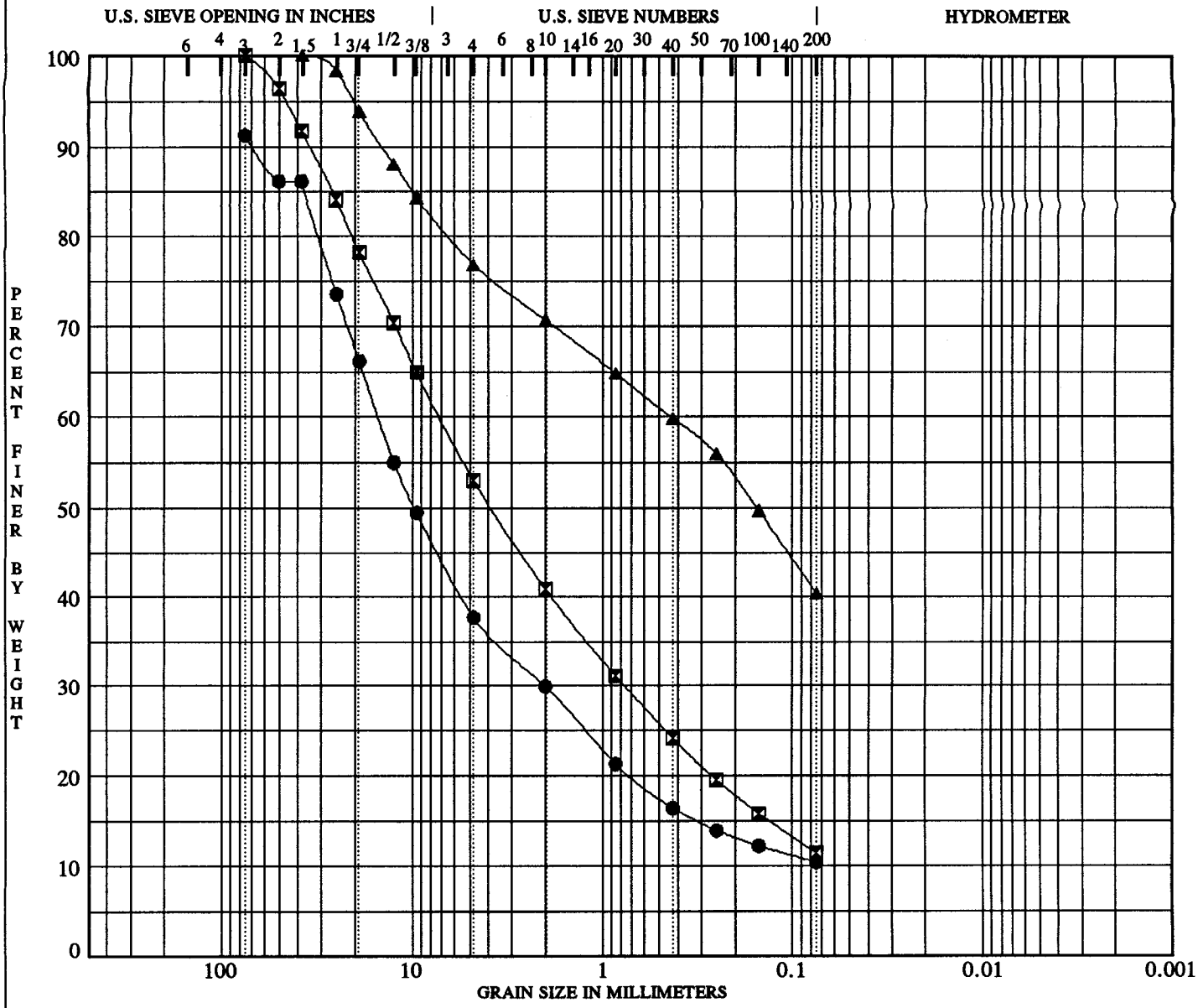
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C12

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-17	at 22.0	Gray Brown Sandy Gravel w/ Clay (GC/GP)						
⊠	B-17	at 32.0	Gray Brown Clayey Sandy Gravel (GC/GP)	13				1.16	102.0
▲	B-17	at 42.0	Brown Gravelly Clayey Sand (SC)	20					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-17	at 22.0		15.07	2.022		53.5	27.3	10.4	
⊠	B-17	at 32.0	75.00	7.14	0.762		47.0	41.6	11.4	
▲	B-17	at 42.0	38.10	0.44			23.2	36.4	40.4	

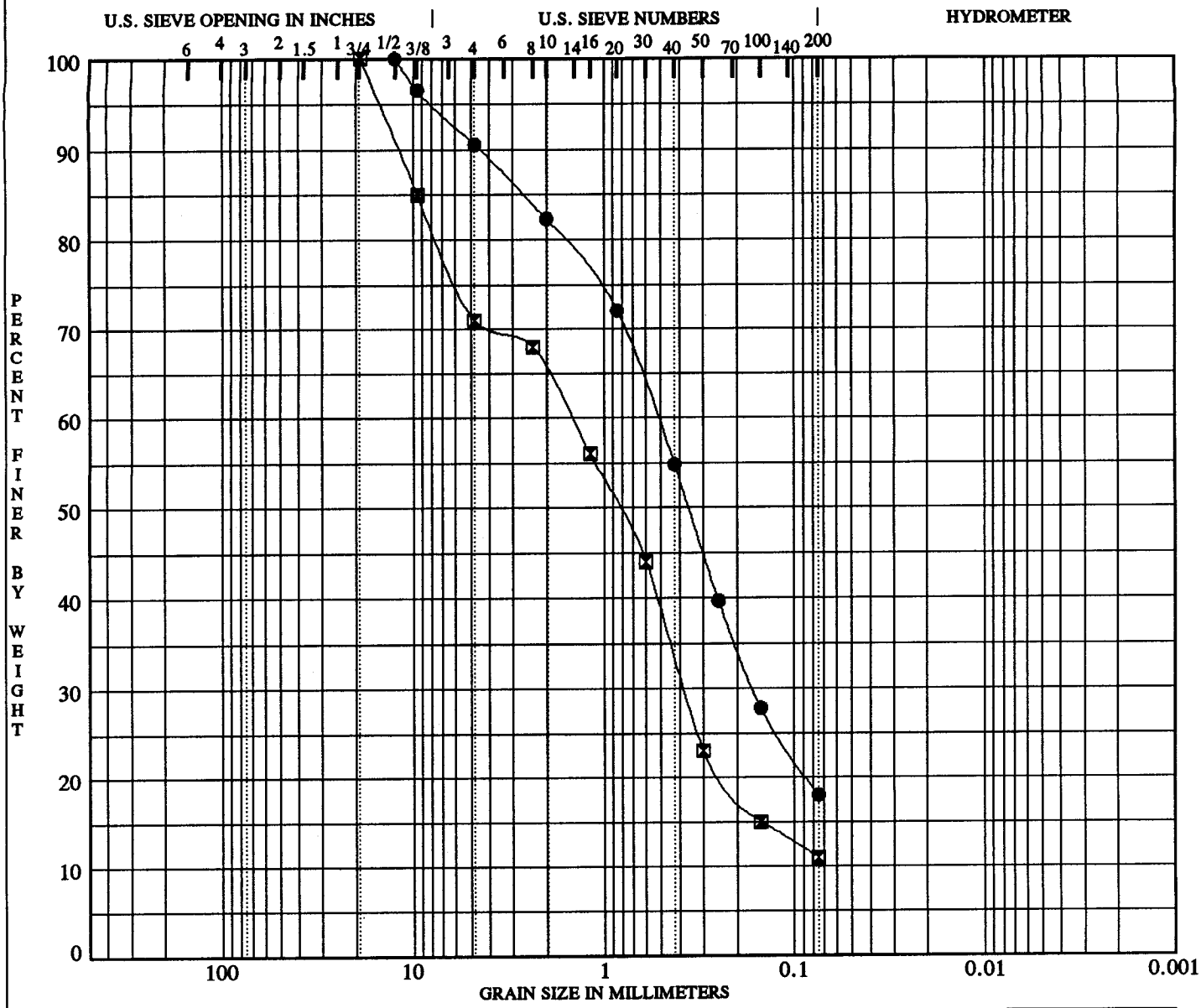
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C13

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-18	at 20.0	Brown Silty Sand w/Some Gravel (SM)						
⊠	B-18	at 40.0	Lt. Brown Silty Sandy Gravel (GM/GP)					1.37	21.2
			(Sieve on Matrix)						

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-18	at 20.0	12.50	0.52	0.165		9.5	72.5	18.0	
⊠	B-18	at 40.0	19.00	1.49	0.378		29.0	60.0	11.0	

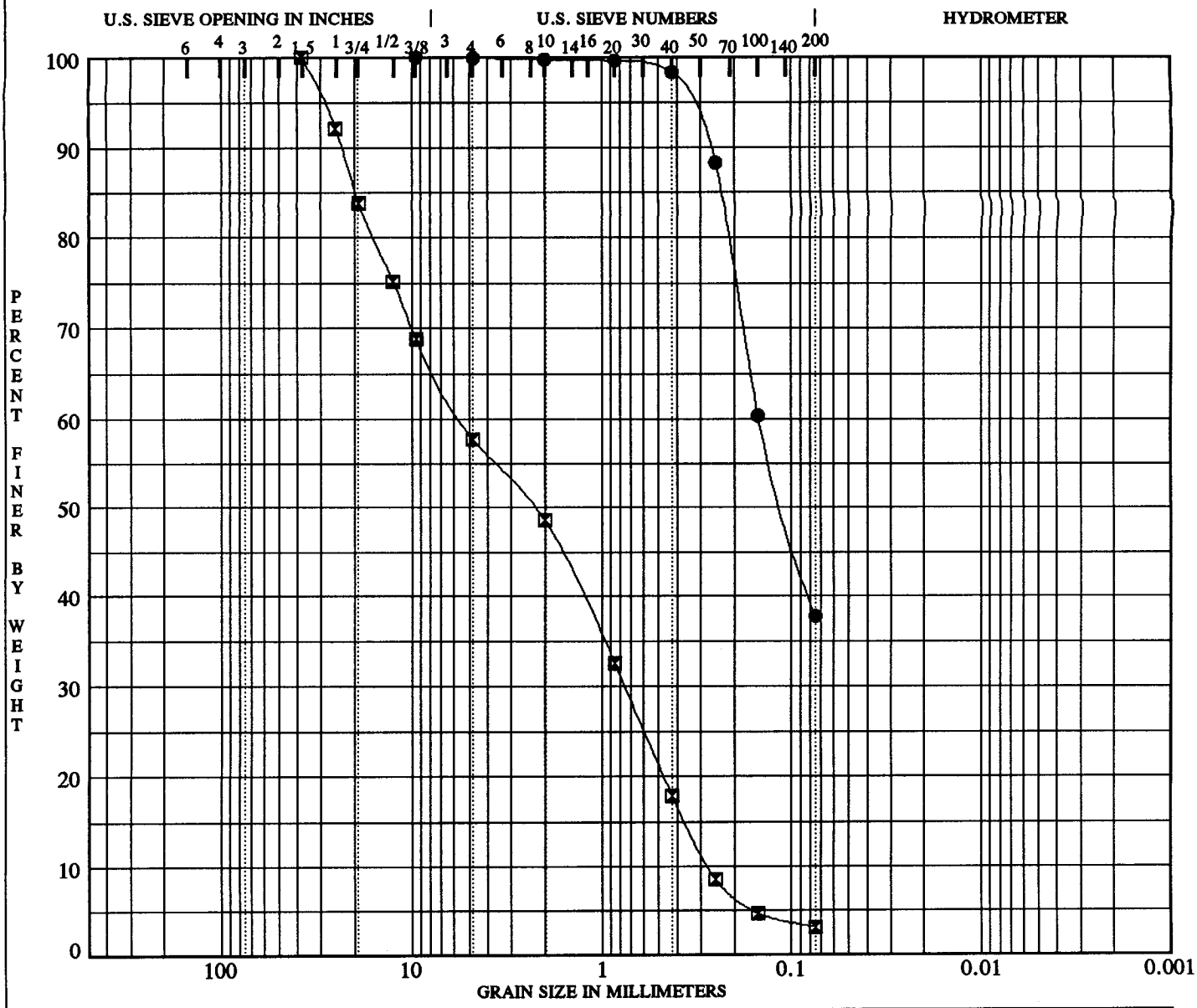
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C14

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-19	at 20.0	Brown Silty Sand w/ Gravel & Cobbles (SM)	24					
⊠	B-19	at 38.5	Brown Gravelly Sand (SP)					0.38	20.1

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-19	at 20.0	9.50	0.15			0.1	62.2	37.7	
⊠	B-19	at 38.5	38.10	5.48	0.756	0.2723	42.3	54.5	3.2	

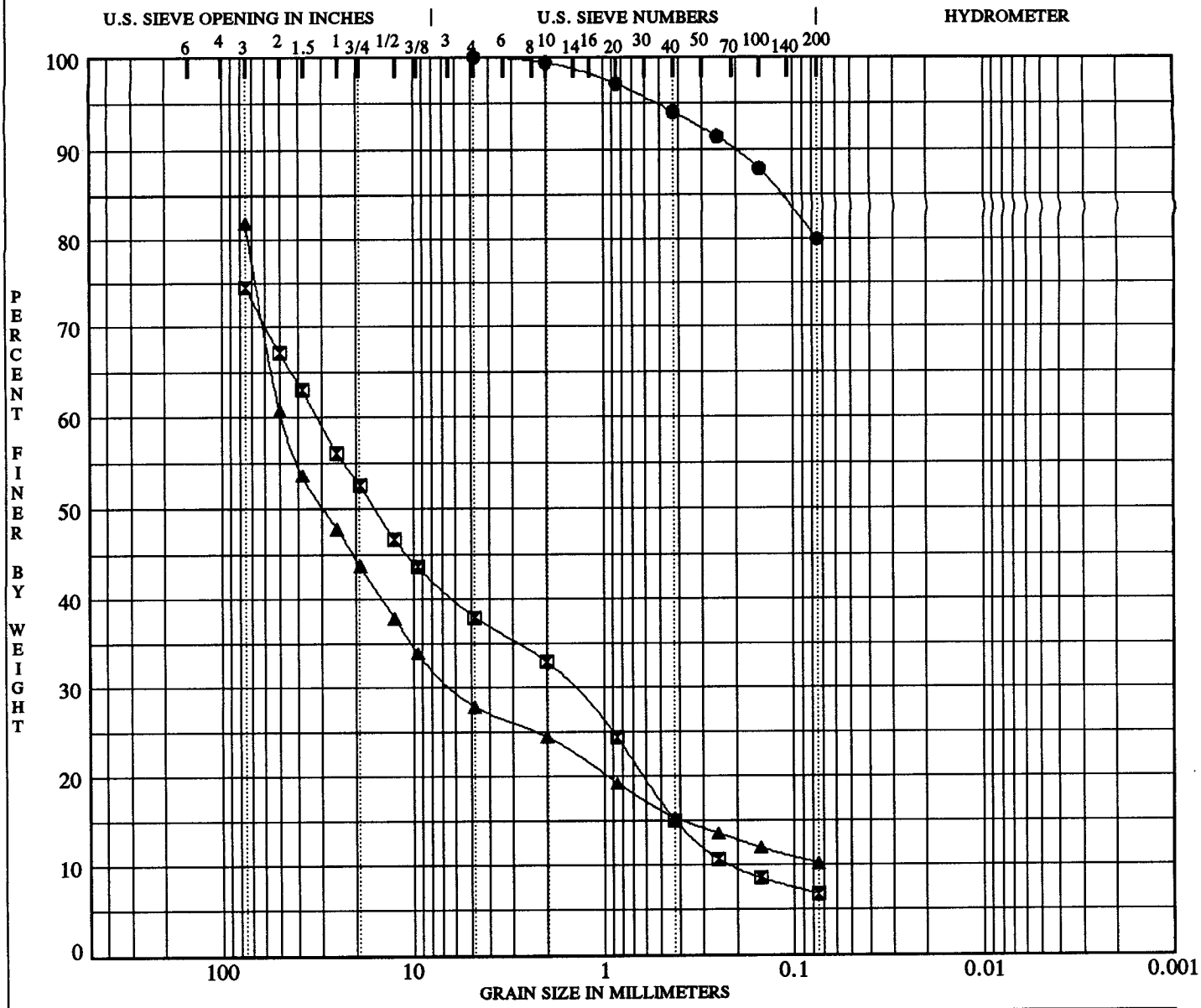
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C15

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-20	at 4.0	Orange Brown Sandy Clay (CL)	20	45	17	28		
⊠	B-20	at 18.0	Olive Brown Sandy Gravel w/ Silt (GP/GM)	6					
▲	B-20	at 28.0	Brown Clayey Sandy Gravel (GC/GP)	8					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-20	at 4.0	4.75				0.0	20.0	80.0	
⊠	B-20	at 18.0		31.81	1.499	0.2161	36.6	31.1	6.8	
▲	B-20	at 28.0		48.68	6.099		54.1	17.6	10.2	

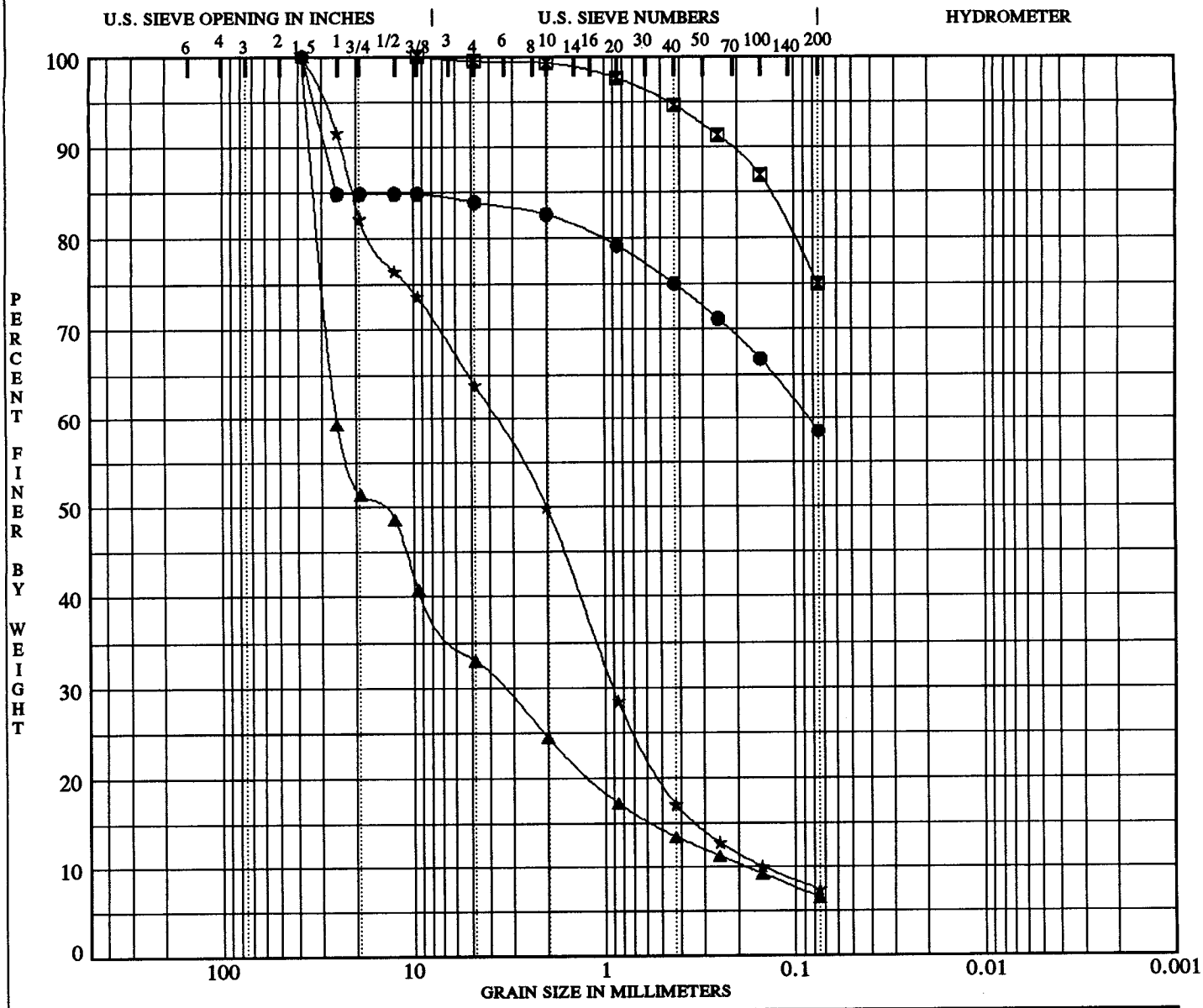
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C16

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-21	at 2.0	Brown Sandy Clay (CL)		40	17	23		
⊠	B-21	at 4.0	Olive Brown Silty Clay w/Some Sand (CL-CH)	20					
▲	B-21	at 20.0	Olive Gray Sandy Gravel w/some clay (GP-GC)					2.64	136.9
★	B-21	at 30.0	Brown Gray Gravelly Sand w/Trace Clay (SW)	12				1.45	25.0

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-21	at 2.0	38.10	0.09			16.1	25.4	58.5	
⊠	B-21	at 4.0	9.50				0.5	24.6	74.9	
▲	B-21	at 20.0	38.10	25.18	3.500	0.1840	67.0	26.5	6.5	
★	B-21	at 30.0	38.10	3.75	0.903	0.1500	36.2	56.4	7.4	

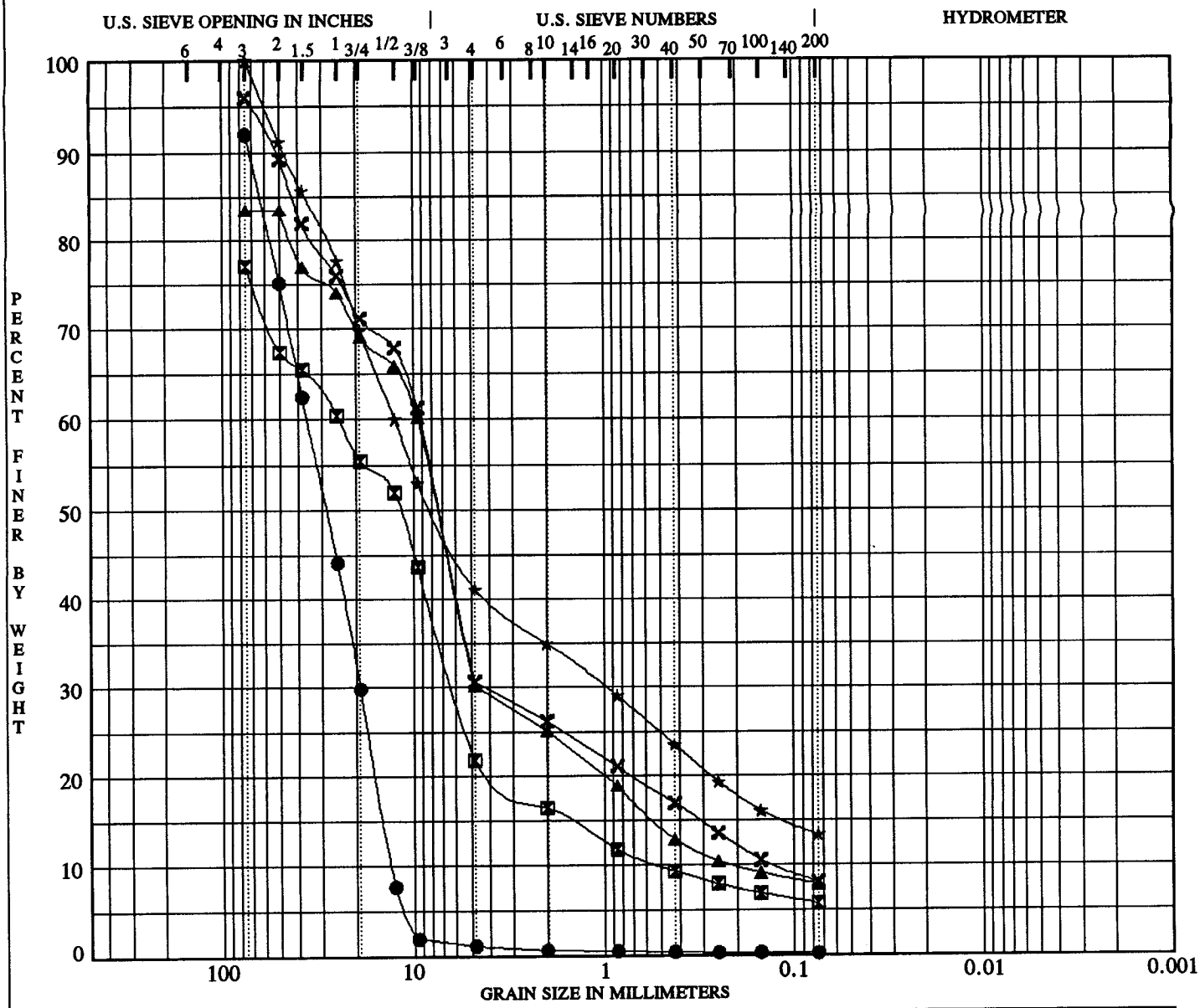
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C17

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-22	at 8.0	Gray/Black Gravel (GP)						
⊠	B-22	at 23.0	Olive Brown Sandy Gravel w/ Clay (GP/GC)	9	24	16	9		
▲	B-22	at 48.0	Gray Brown Sandy Gravel w/ Clay (GC/GP)	15					
★	B-22	at 60.0	Olive Brown Clayey Sandy Gravel (GC)						
✕	B-22	at 79.0	Olive Brown Sandy Gravel w/ Clay (GC/GP)		25	17	8		

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-22	at 8.0		36.05	19.070	13.0600	90.7	0.9	0.3	
⊠	B-22	at 23.0		24.46	6.165	0.5202	55.2	16.0	5.8	
▲	B-22	at 48.0		9.46	4.669	0.2136	53.4	22.2	7.9	
★	B-22	at 60.0	75.00	12.50	0.983		58.9	27.8	13.3	
✕	B-22	at 79.0		9.25	4.233	0.1298	65.3	22.5	8.1	

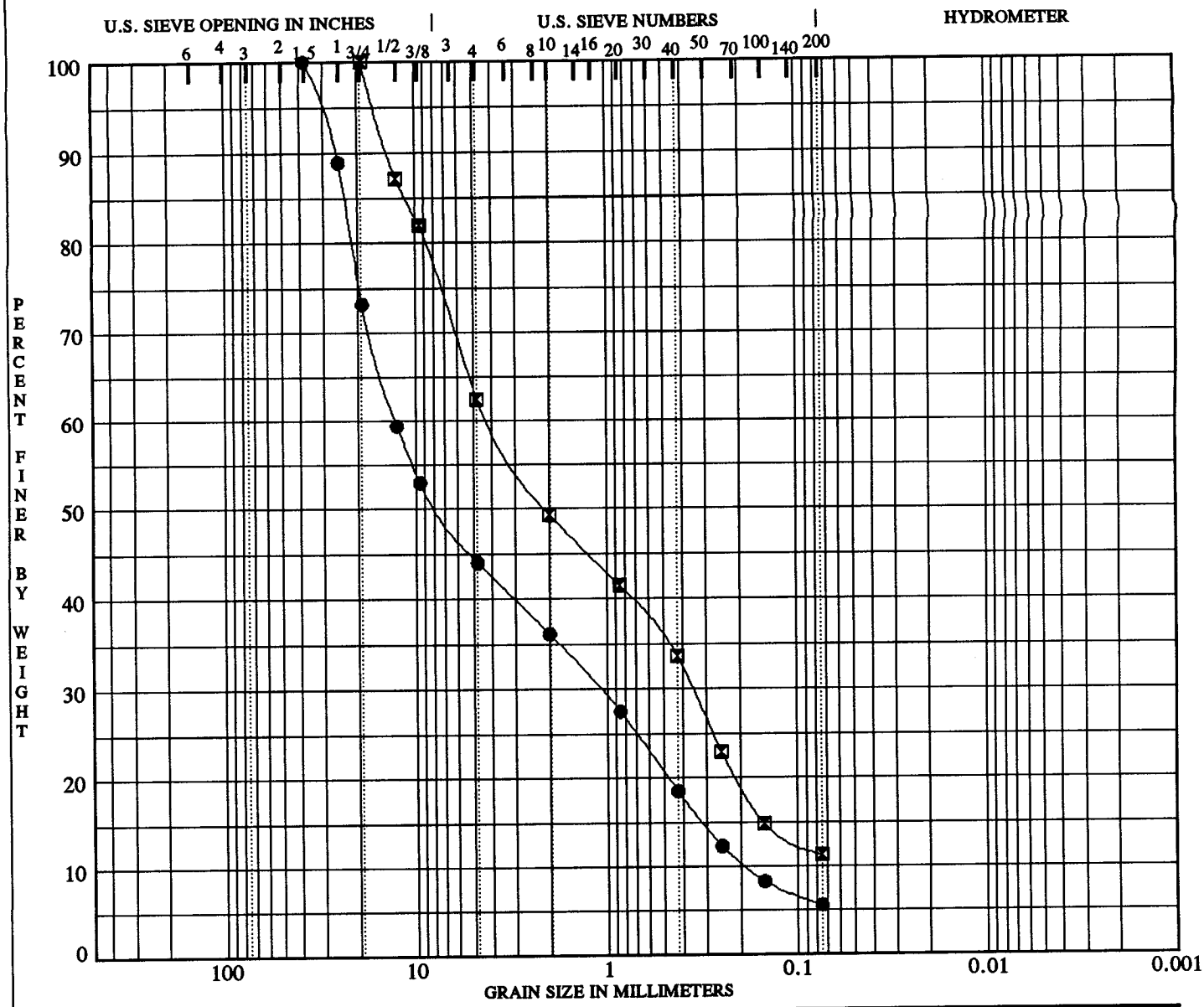
KLEINFELDER

RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C18

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-25	at 86.0	Dk. Brown Gray Sandy Gravel (GP)	10				0.50	68.3
⊠	B-25	at 106.0	Brown Gravelly Sand w/Silt (SP)	18				0.45	57.9

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-25	at 86.0	38.10	12.73	1.090	0.1864	56.0	38.4	5.6	
⊠	B-25	at 106.0	19.00	4.05	0.356		37.6	51.1	11.3	

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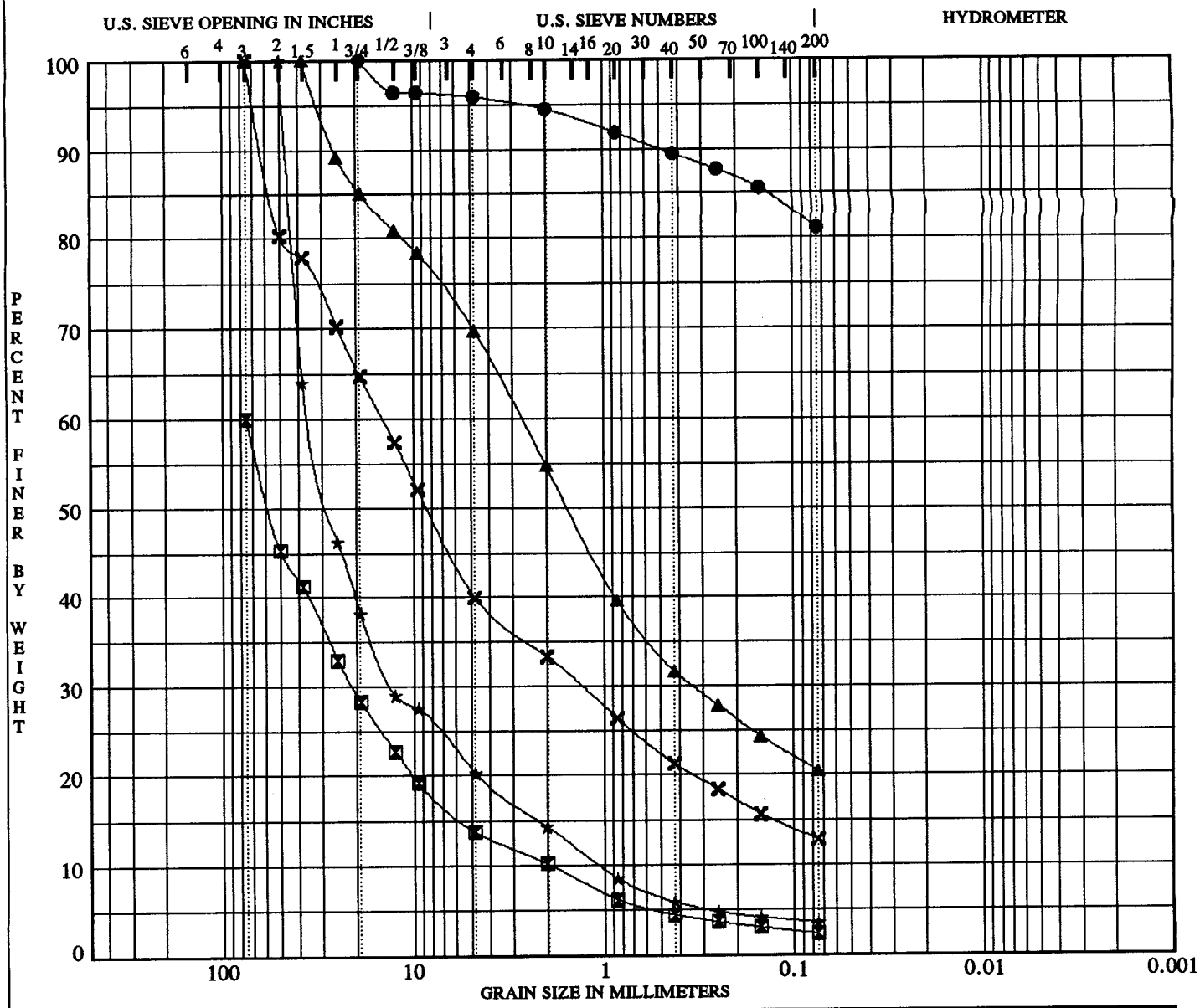
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C19

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-26	at 3.0	Dark Brown Sandy Clay (CH)	23					
⊠	B-26	at 7.0	Gray Sandy Gravel & Cobbles (GP)						
▲	B-26	at 30.0	Brown Clayey Gravelly Sand (SC)						
★	B-26	at 33.0	Gray Sandy Gravel (GP)	6				4.66	32.7
✕	B-26	at 71.0	Gray Brown Clayey Sandy Gravel (GC)						

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-26	at 3.0	19.00				4.1	14.8	81.1	
⊠	B-26	at 7.0		75.00	21.030	1.9160	46.3	11.3	2.4	
▲	B-26	at 30.0	38.10	2.72	0.340		30.3	49.3	20.4	
★	B-26	at 33.0	50.00	34.64	13.090	1.0610	79.8	16.6	3.6	
✕	B-26	at 71.0	75.00	14.51	1.328		60.1	27.1	12.8	

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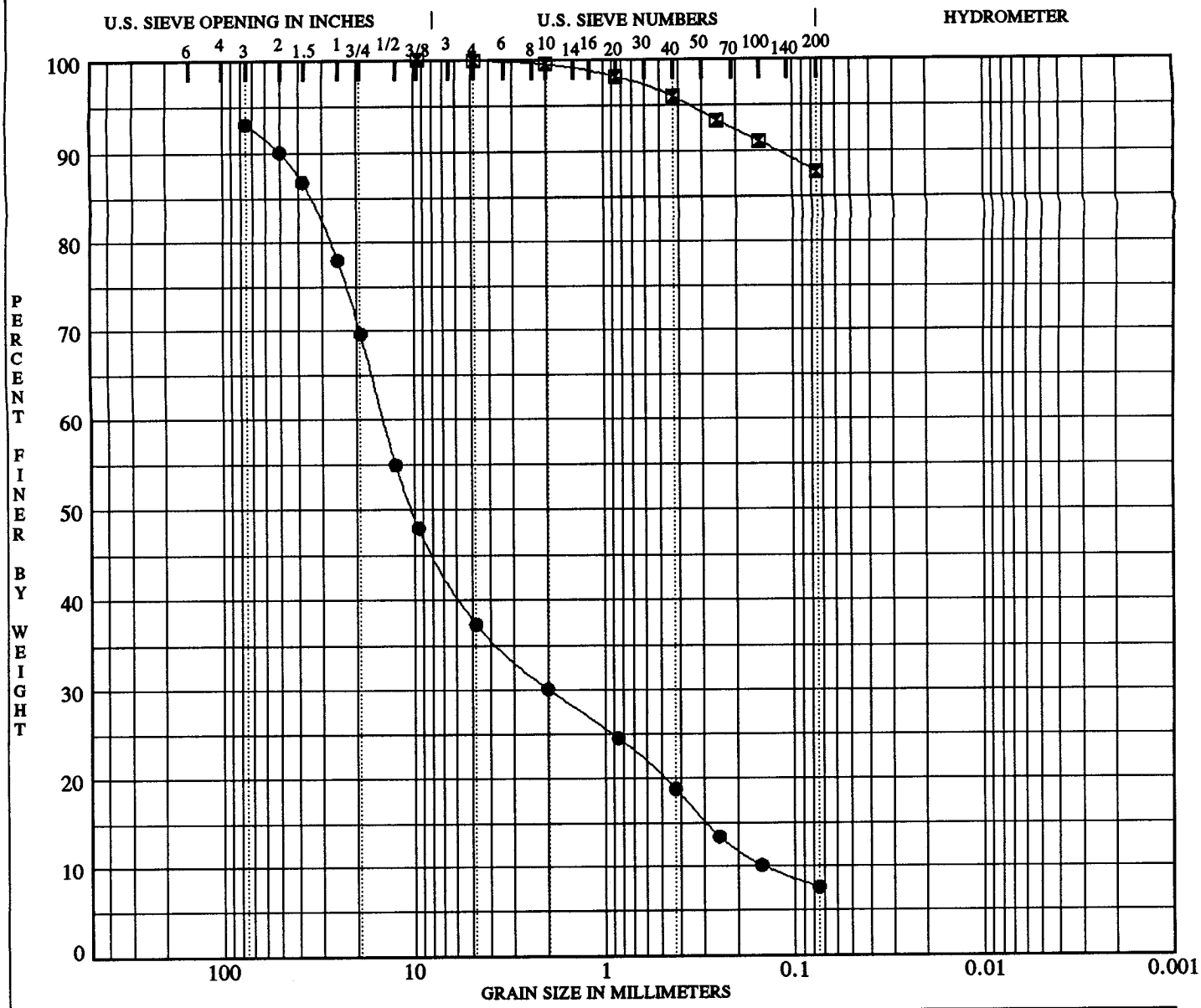
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C20

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-26	at 88.0	Brown Sandy Gravel w/ Silt (GP/GM)						
⊠	B-26	at 99.0	Olive Brown Sandy Clay (CL)	31	47	20	27		

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-26	at 88.0		14.45	1.970	0.1459	55.8	29.7	7.6	
⊠	B-26	at 99.0	9.50				0.1	12.3	87.6	

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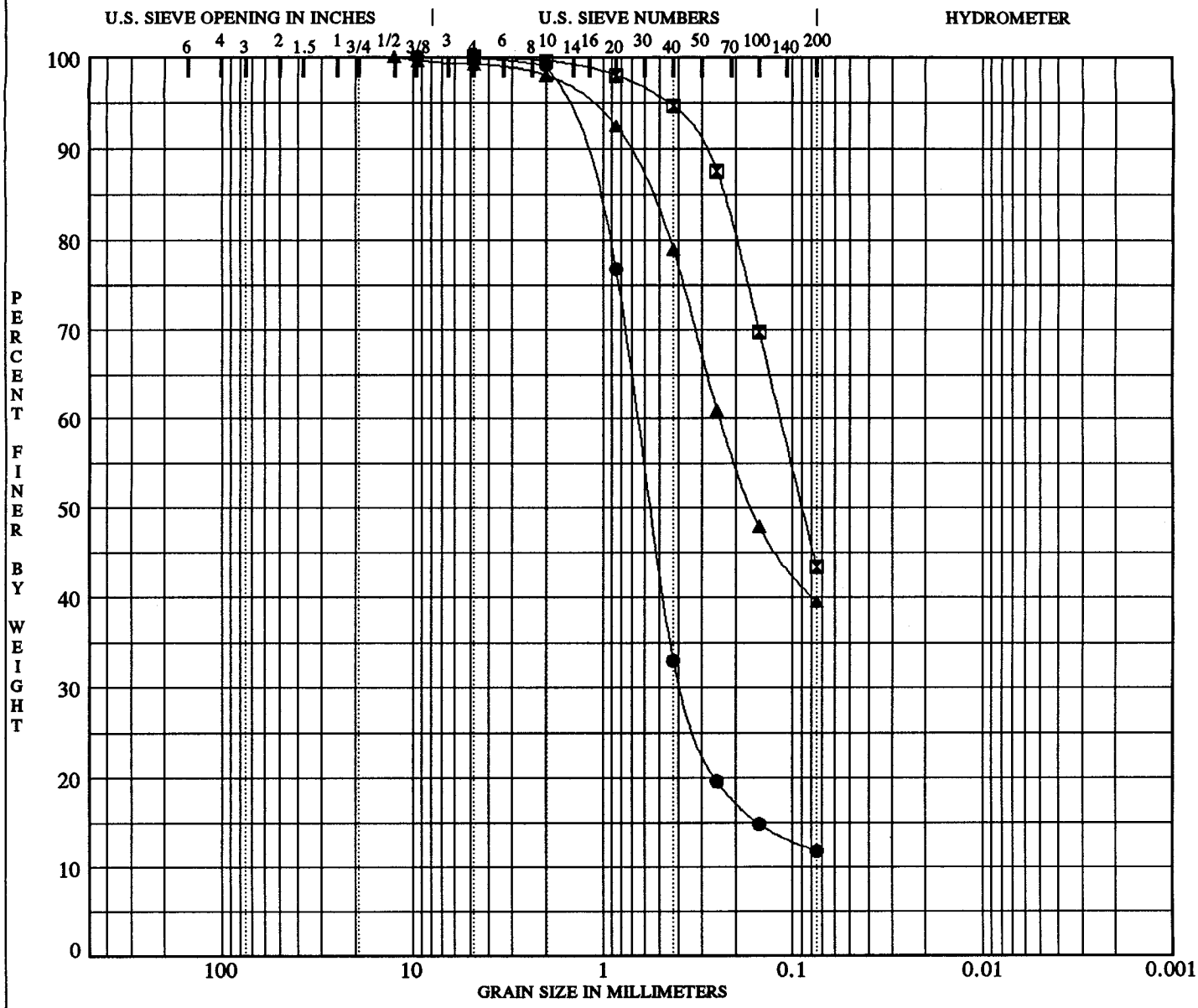
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C21

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-27	at 23.5	Brown Silty Sand (SM)					3.12	9.3
⊠	B-27	at 32.5	Lt. Brown Very Silty Sand (SM)	27	31	25	6		
▲	B-27	at 41.0	Lt. Brown Very Clayey Sand w/ trace Gravel (SC)	23					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-27	at 23.5	9.50	0.65	0.377		0.1	88.1	11.8	
⊠	B-27	at 32.5	4.75	0.12			0.0	56.6	43.4	
▲	B-27	at 41.0	12.50	0.24			0.8	59.7	39.5	

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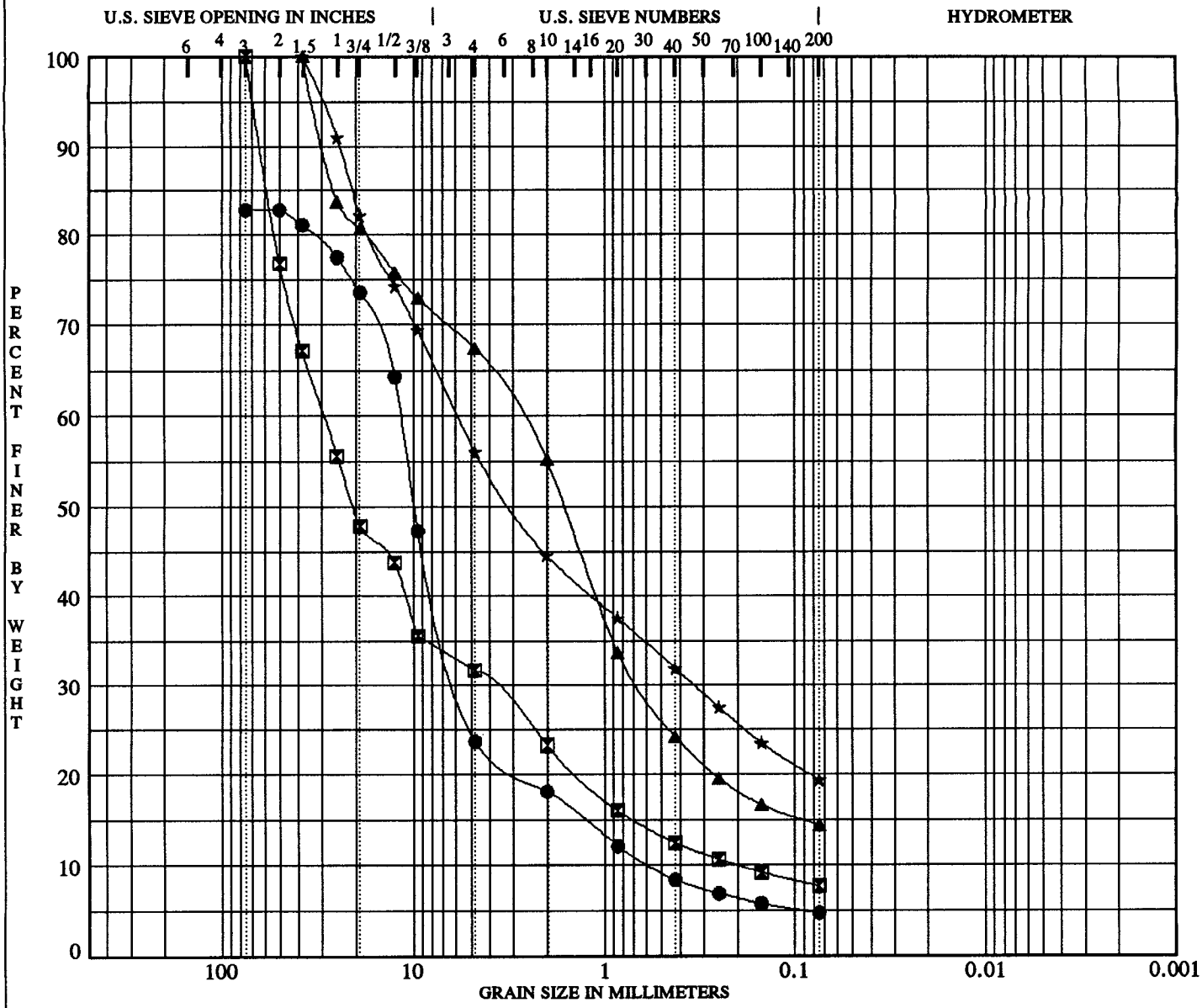
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C22

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-29	at 8.0	Olive Brown Sandy Gravel (GP)	5					
⊠	B-29	at 18.0	Olive Brown Sandy Gravel w/ Clay (GC/GP)	5				2.71	146.2
▲	B-29	at 27.0	Dark Brown Gravelly Sand w/ Clay (GC)	8					
★	B-29	at 36.0	Brown Clayey Sandy Gravel (GC)	14	29	16	13		

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-29	at 8.0		11.66	5.728	0.5735	59.2	18.8	4.8	
⊠	B-29	at 18.0	75.00	29.37	3.995	0.2008	68.3	24.0	7.7	
▲	B-29	at 27.0	38.10	2.81	0.651		32.6	53.0	14.4	
★	B-29	at 36.0	38.10	5.84	0.340		44.0	36.6	19.4	

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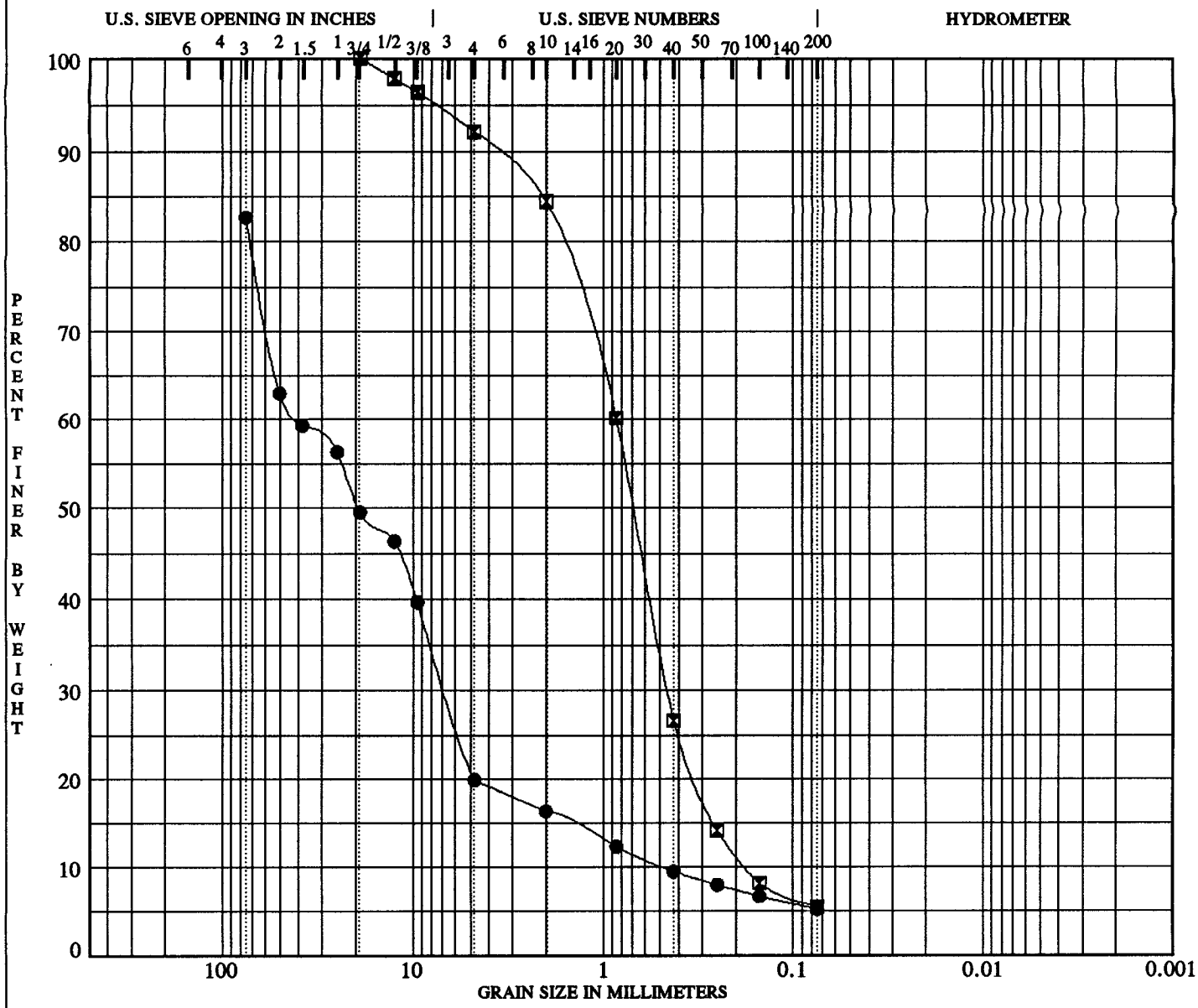
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C23

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-30	at 11.0	Olive Sandy Gravel (GP)	7					
⊠	B-30	at 20.0	Olive Grey Gravelly Sand w/ Silt (SP/SM)	12				1.40	4.8

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-30	at 11.0		40.17	6.765	0.4810	62.8	14.6	5.3	
⊠	B-30	at 20.0	19.00	0.85	0.456	0.1753	7.9	86.5	5.6	

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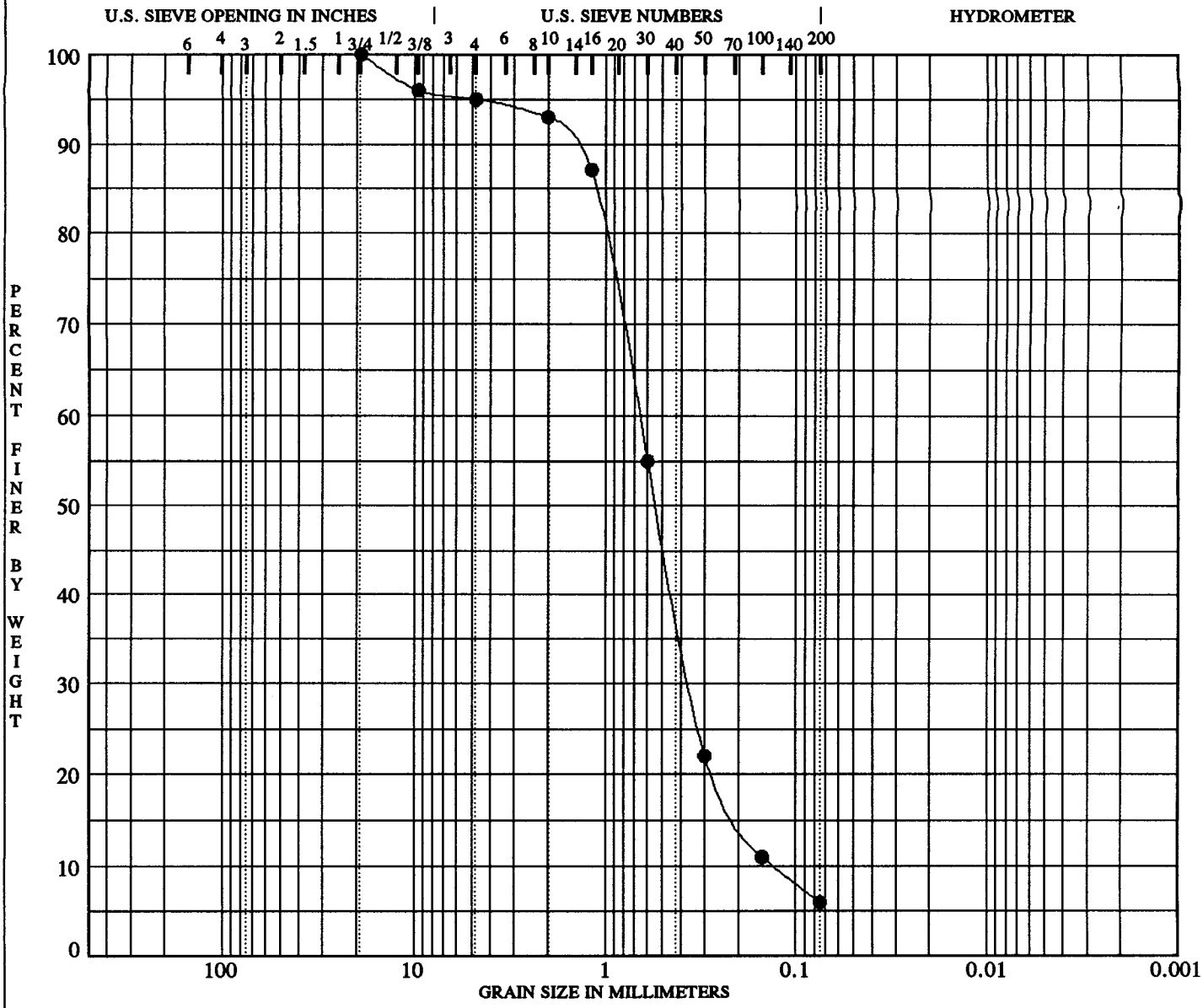
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C24

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	B-32	at 15.0	Brown Sand (SP)					1.45	5.1

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-32	at 15.0	19.00	0.67	0.355	0.1306	5.0	89.0	6.0	

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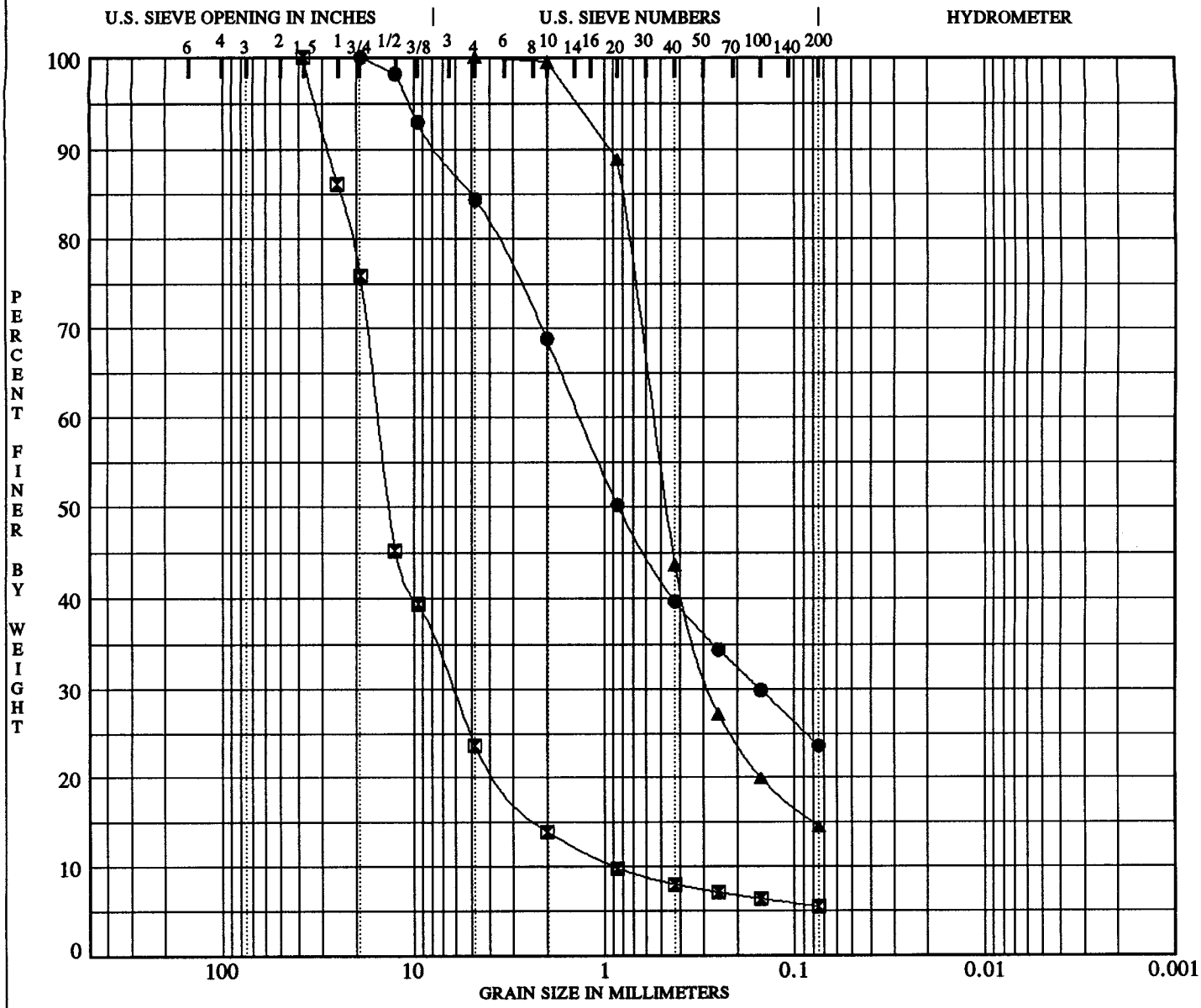
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C25

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	P-1	at 2.0	Black Silty Sandy Gravel (GM),Sieve on matrix	17					
⊠	P-1	at 12.0	Gray Sandy Gravel (GP/GM)	4				2.92	17.3
▲	P-1	at 40.0	Brown Silty Sand (SM)	23					

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-1	at 2.0	19.00	1.33	0.152		15.6	60.8	23.6	
⊠	P-1	at 12.0	38.10	15.30	6.290	0.8862	76.4	18.1	5.5	
▲	P-1	at 40.0	4.75	0.55	0.274		0.0	85.5	14.5	

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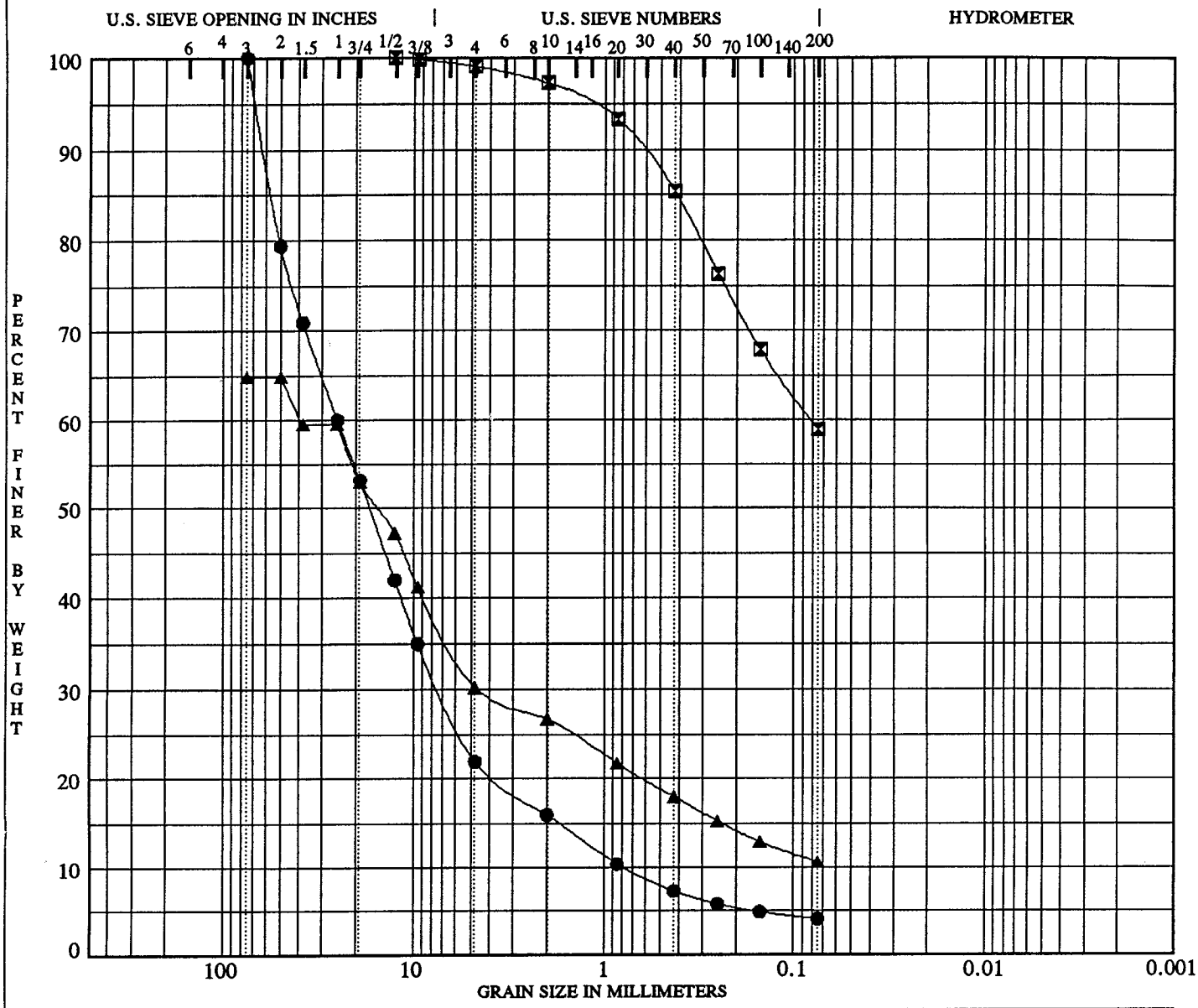
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C26

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	P-3	at 12.0	Brown Sandy Gravel w/ Silt (GP)	3				2.74	32.2
⊠	P-3	at 24.0	Olive Brown Sandy Clay (CL)	30					
▲	P-3	at 34.0	Brown Clayey Sandy Gravel (GC/GP)	21	38	20	18		

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	P-3	at 12.0	75.00	25.00	7.292	0.7773	78.1	17.8	4.1	
⊠	P-3	at 24.0	12.50	0.08			1.0	40.1	58.9	
▲	P-3	at 34.0		39.09	4.521		69.8	19.6	10.6	

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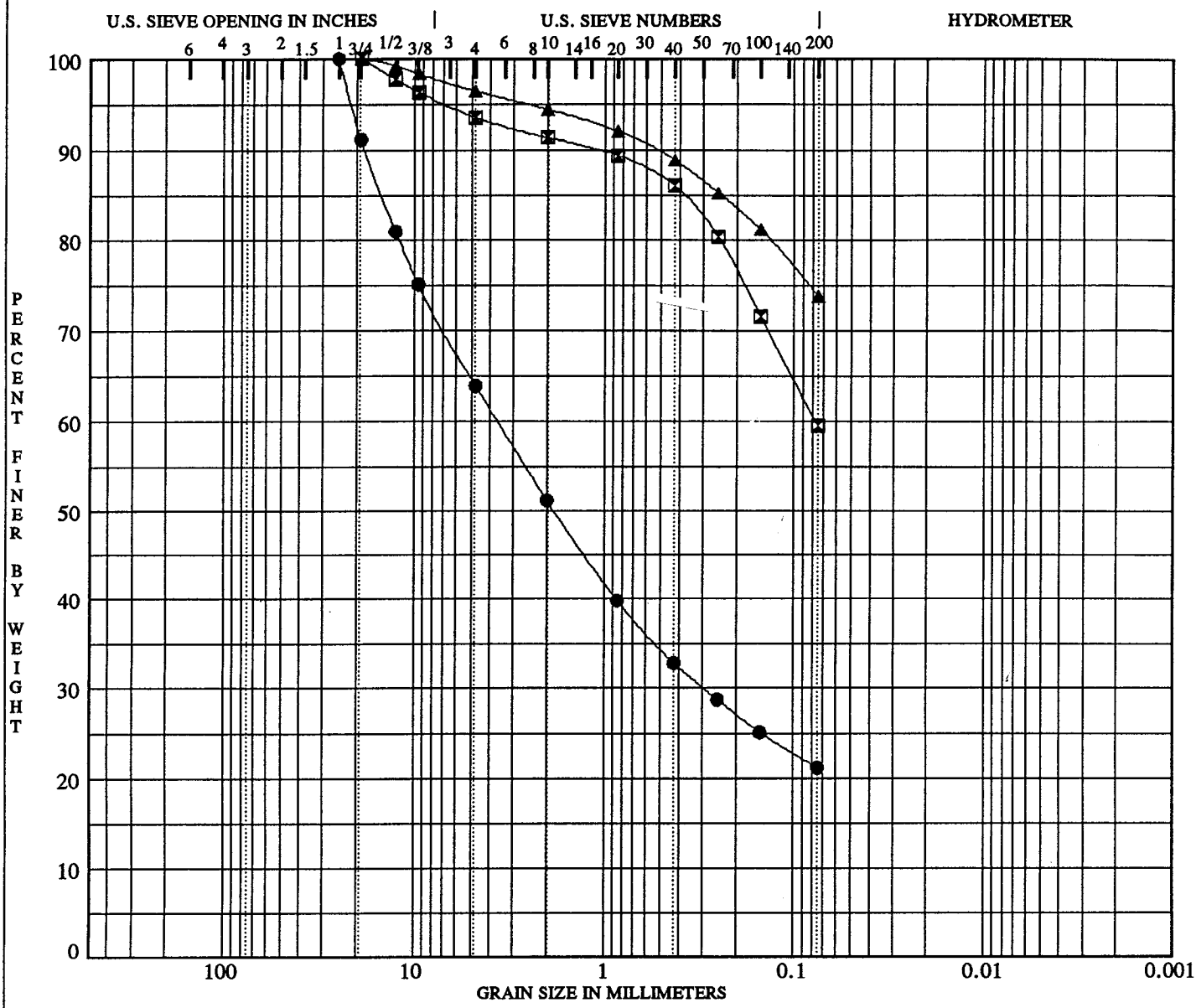
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C27

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	LG-1	at 20.0	Red Gray Sand & Gravel w/Clay (GC)						
⊠	LG-1	at 34.0	Red Brown Sandy Clay w/Some Gravel (CL)						
▲	LG-1	at 44.5	Brown Sandy Clay w/Gravel (CL)						

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	LG-1	at 20.0	25.00	3.64	0.296		36.1	42.7	21.2	
⊠	LG-1	at 34.0	19.00	0.08			6.5	34.0	59.5	
▲	LG-1	at 44.5	19.00				3.6	22.6	73.8	

NOTE: Results shown for LG1 at 20 FT are not representative of coarse fraction; estimated 30 to 40% cobbles and boulders.

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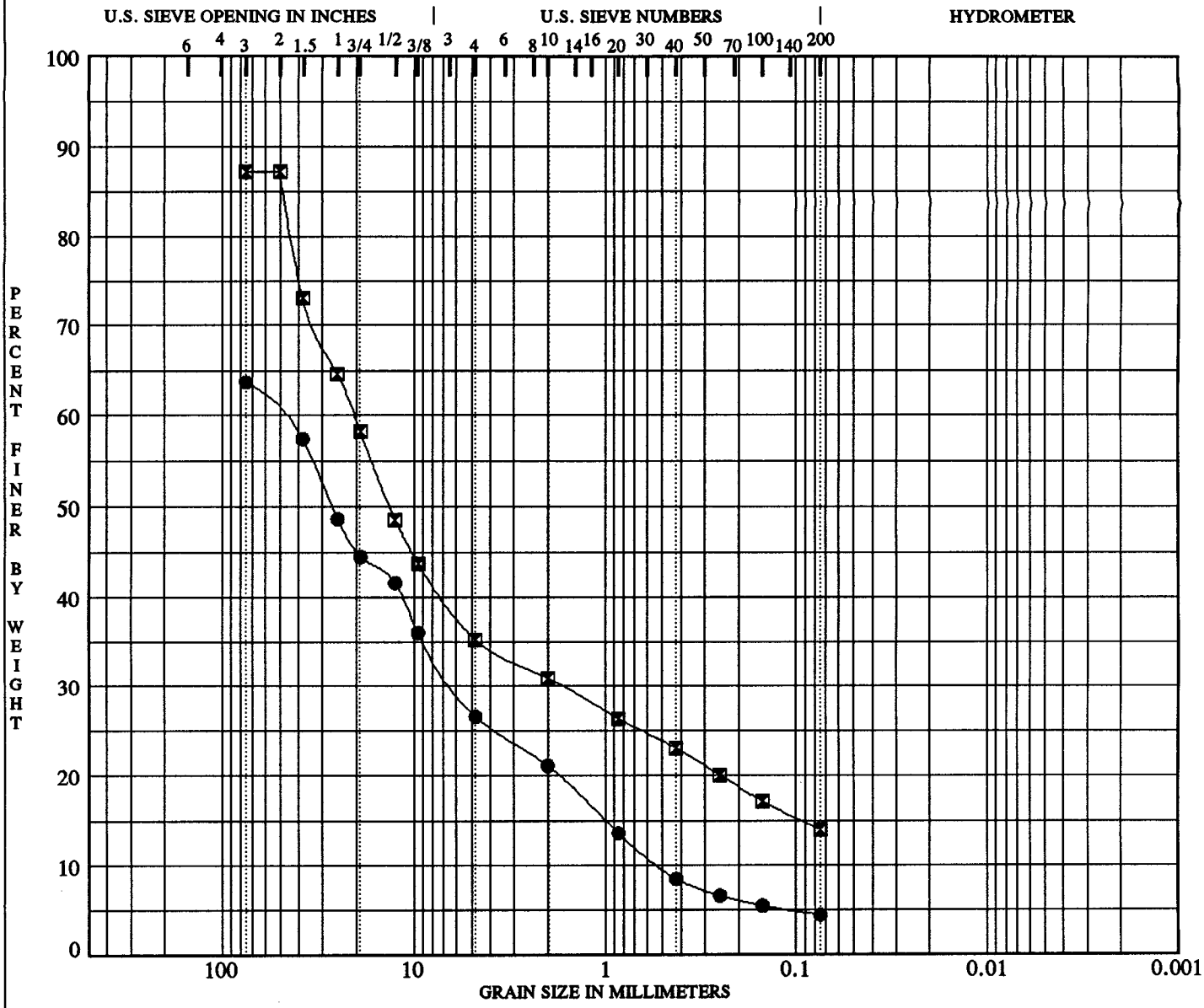
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C28

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	LG-2	at 9.5	Brown Sandy Gravel w/Clay (GP)		26	15	10		
⊠	LG-2	at 47.5	Brown Sandy Gravel w/Clay (GC)		27	16	11		

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	LG-2	at 9.5		50.39	6.132	0.5211	37.2	22.0	4.5	
⊠	LG-2	at 47.5		20.52	1.692		51.9	21.2	14.0	

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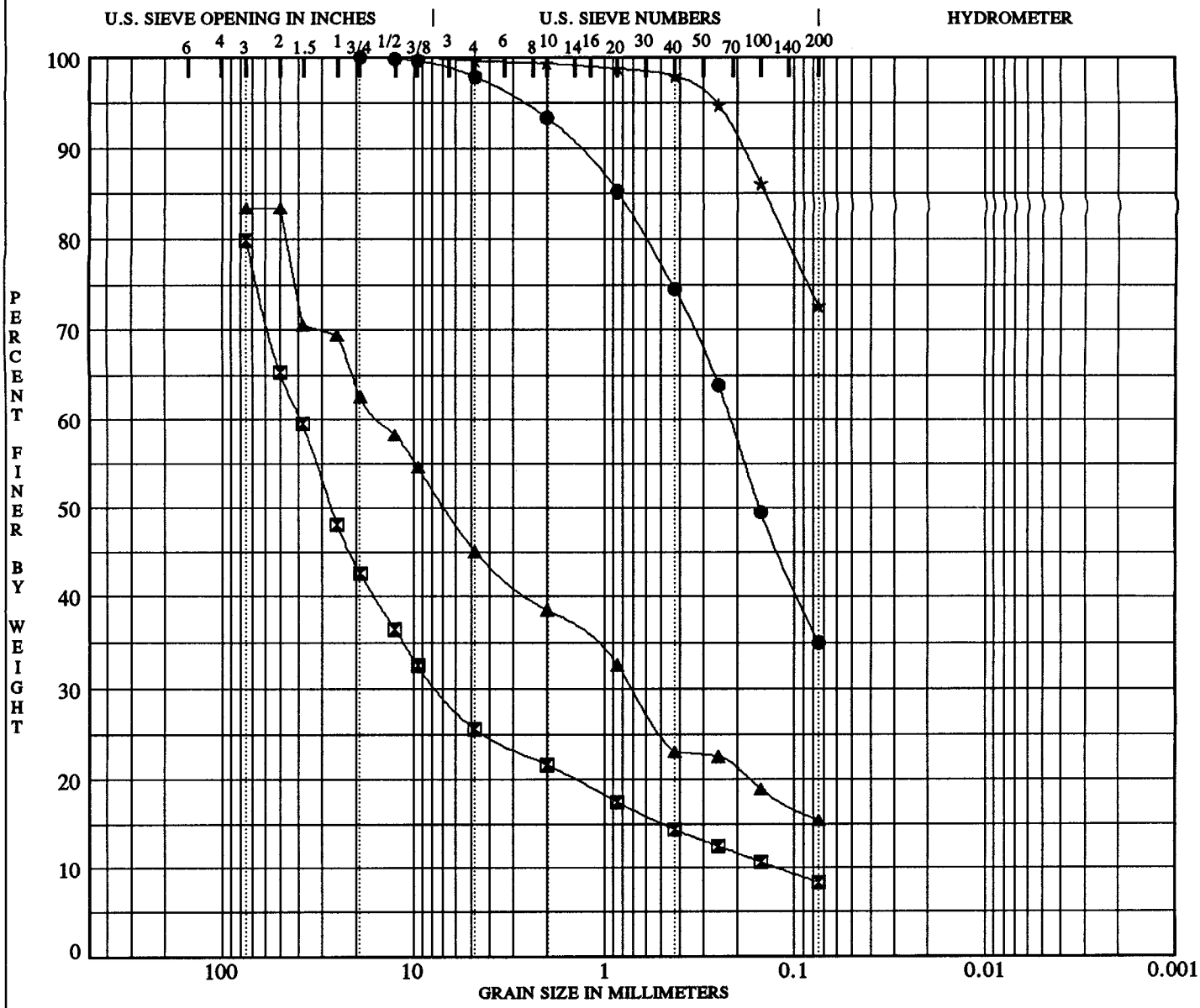
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C29

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Boring	Depth (ft.)	Description - ASTM Classification	MC%	LL	PL	PI	Cc	Cu
●	LG-3	at 9.5	Brown Silty Sand w/Some Gravel (SM)						
⊠	LG-3	at 27.5	Red Gray Sandy Gravel w/Clay (GC-GP)		32	16	16		
▲	LG-3	at 35.0	Red Gray Sandy Gravel w/Clay (GC)						
★	LG-3	at 54.0	Brown Silty Sandy Clay (CL)		46	26	19		

	Boring	Depth (ft.)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	LG-3	at 9.5	19.00	0.22			2.2	62.8	35.0	
⊠	LG-3	at 27.5		39.00	7.417	0.1252	54.4	17.2	8.3	
▲	LG-3	at 35.0		14.84	0.705		38.4	29.6	15.4	
★	LG-3	at 54.0	9.50				0.4	27.0	72.6	

KLEINFELDER

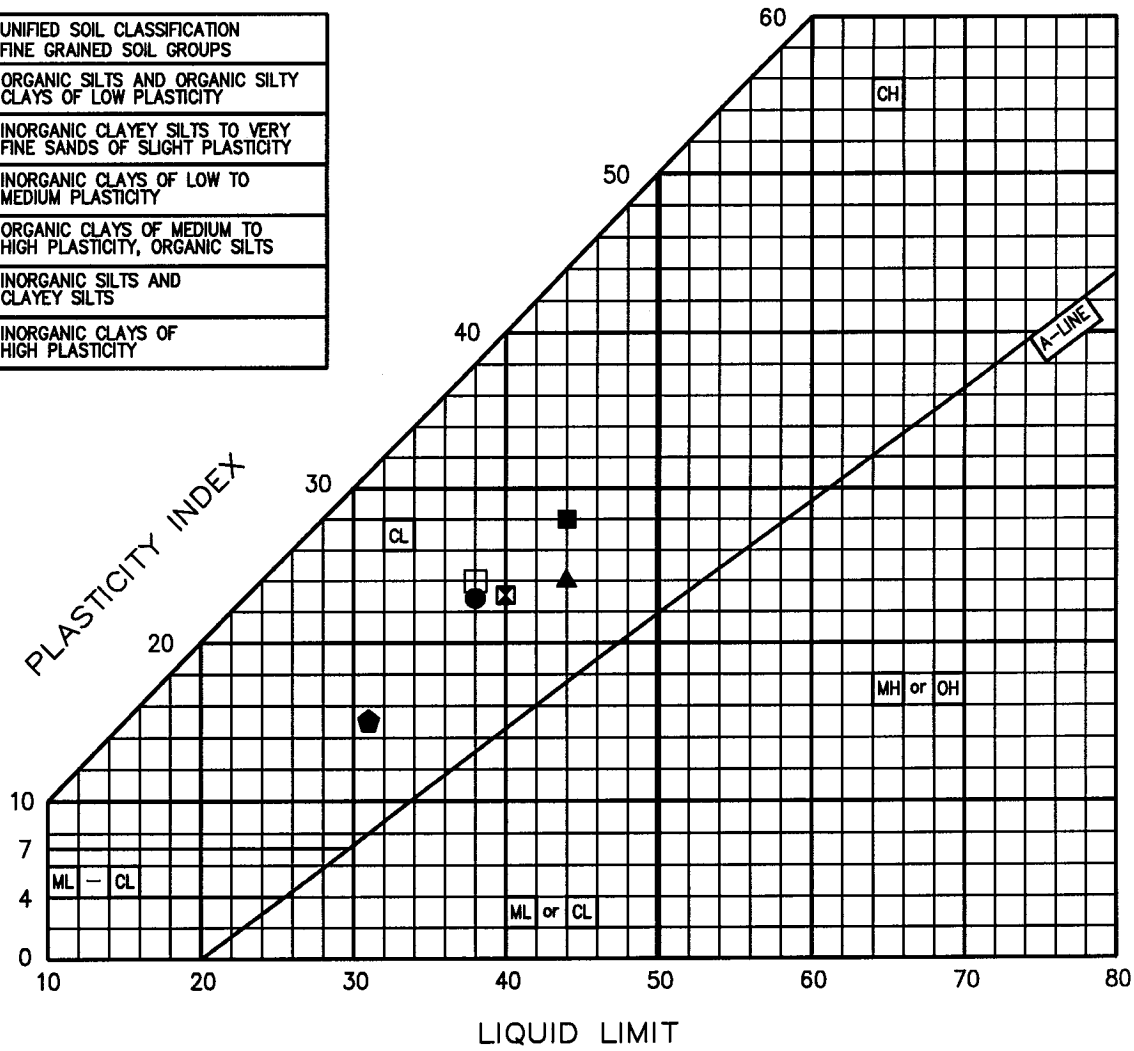
RENO RAILROAD CORRIDOR
RENO, NEVADA

PLATE
C30

PROJECT NUMBER: 30-1307-10.001

GRAIN SIZE ANALYSES

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY



TEST SYMBOL	SAMPLE NO.	SAMPLE (DEPTH)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
⊠	B–6	5 FT.	40	23	Brown Silty Clay (CL)
□	B–7	1 FT.	38	24	Brown Sandy Clay (CL)
★	B–7	17 FT.	142	90	Yellow Grey Clay (CH) (Off of Chart)
⬟	B–12	1 FT.	31	15	Brown Clayey Sand (SC)
●	B–14	1 FT.	38	23	Dark Brown Sandy Clay (CL)
▲	B–17	3 FT.	42	24	Olive Brown Clayey Sand (SC)
■	B–20	4 FT.	44	28	Orange Grey Brown Sandy Clay

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Tel. (775) 689-7800

PROJECT NO. 30–1307–10.001

RENO RAILROAD CORRIDOR

RENO, NEVADA

PLASTICITY CHART

PLATE

C31

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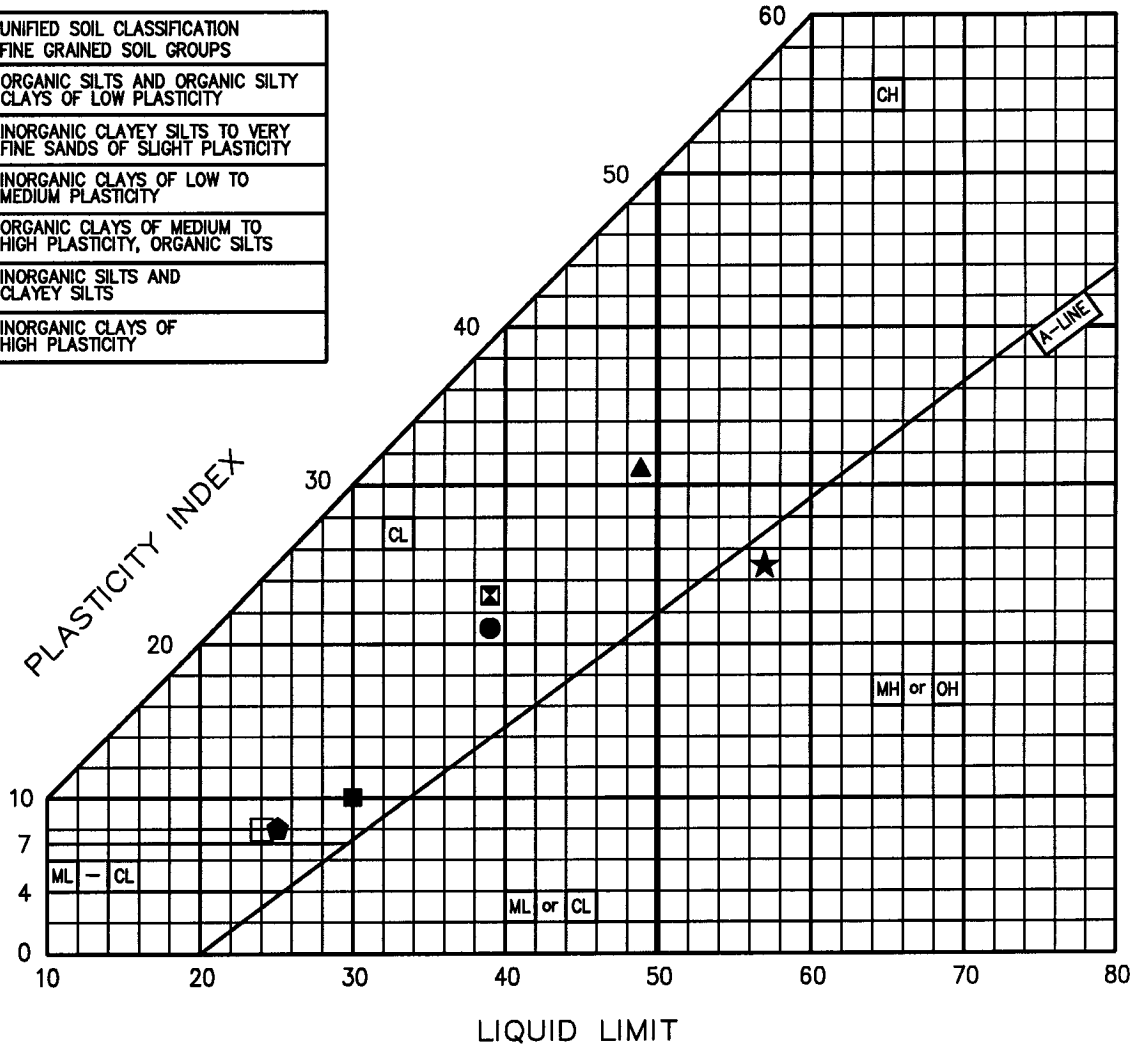
GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY



TEST SYMBOL	SAMPLE NO.	SAMPLE (DEPTH)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
⊠	B–21	2 FT.	39	23	Brown Sandy Clay (fill)
□	B–22	23 FT.	24	8	Olive Brown Clayey Sandy Gravel (GC/GP)
★	B–22	74 FT.	57	25	Olive Brown Sandy Clay (CL)
⬟	B–22	79 FT.	25	7	Olive Brown Clayey Sandy Gravel (GC/GP)
●	B–25	57.5 FT.	39	21	Light Brown Sandy Clay (CL)
▲	B–26	3 FT.	49	31	Dark Brown Sandy Clay (CH)
■	B–26	59 FT.	30	10	Brown Clayey Sand w/ Gravel (SC)

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PROJECT NO. 30–1307–10.001

RENO RAILROAD CORRIDOR

RENO, NEVADA

PLASTICITY CHART

PLATE

C32

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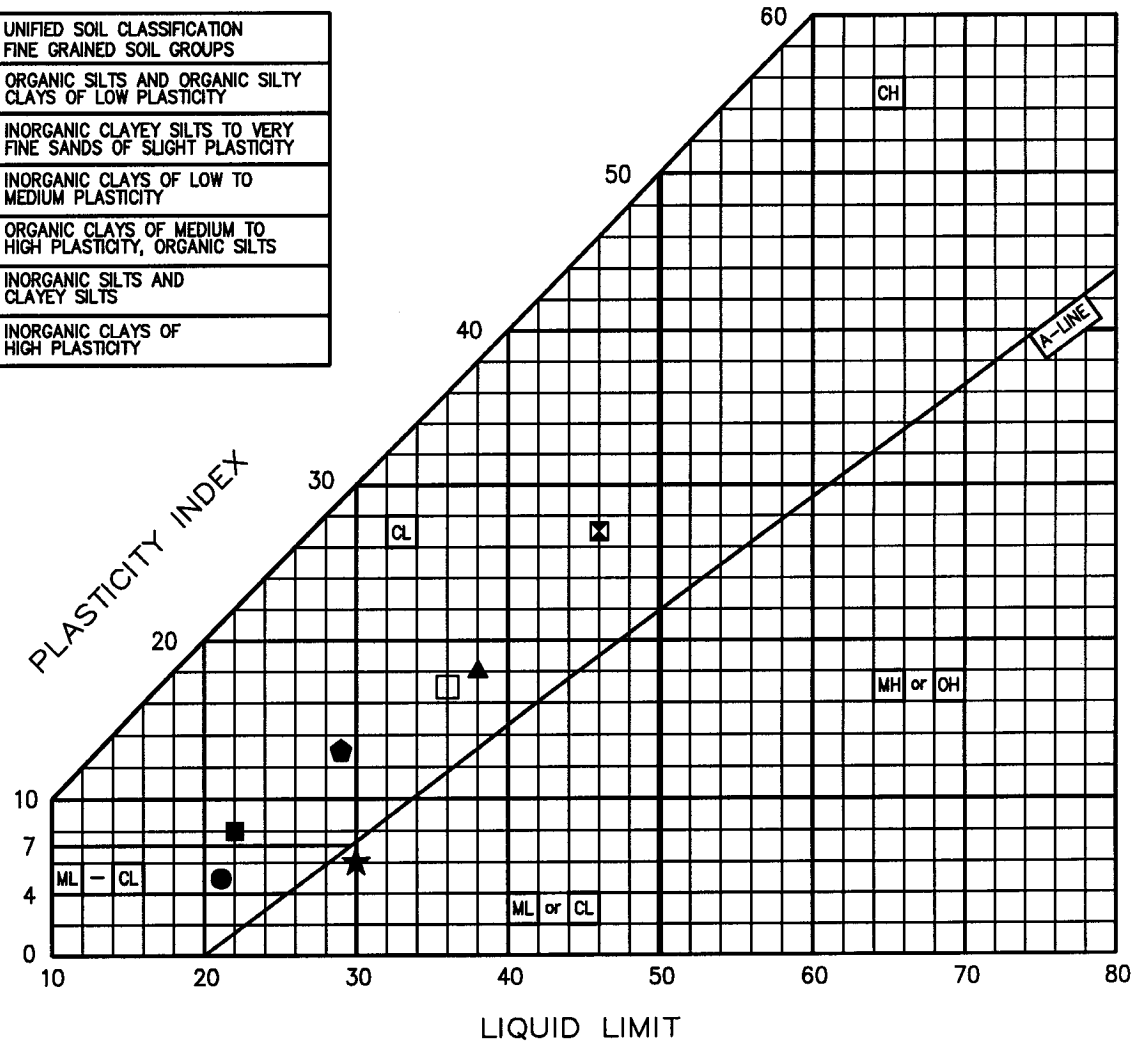
GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY



TEST SYMBOL	SAMPLE NO.	SAMPLE (DEPTH)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
⊠	B–26	99 FT.	46	27	Olive Brown Sandy Clay (CL)
□	B–26	123 FT.	36	17	Orange Brown Clay (CL)
★	B–27	32.5 FT.	30	6	Light Brown Silty Sand (SM)
⬟	B–29	36 FT.	29	13	Brown Sandy Clayey Gravel (GC)
●	B–30	11 FT.	21	5	Olive Sandy Clayey Gravel (GP)
▲	P–3	34 FT.	38	18	Brown Clayey Sandy Gravel (GC)
■	SF–8	2.5 FT.	22	8	Brown Clayey Gravel (GC)

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PROJECT NO. 30–1307–10.001

RENO RAILROAD CORRIDOR

RENO, NEVADA

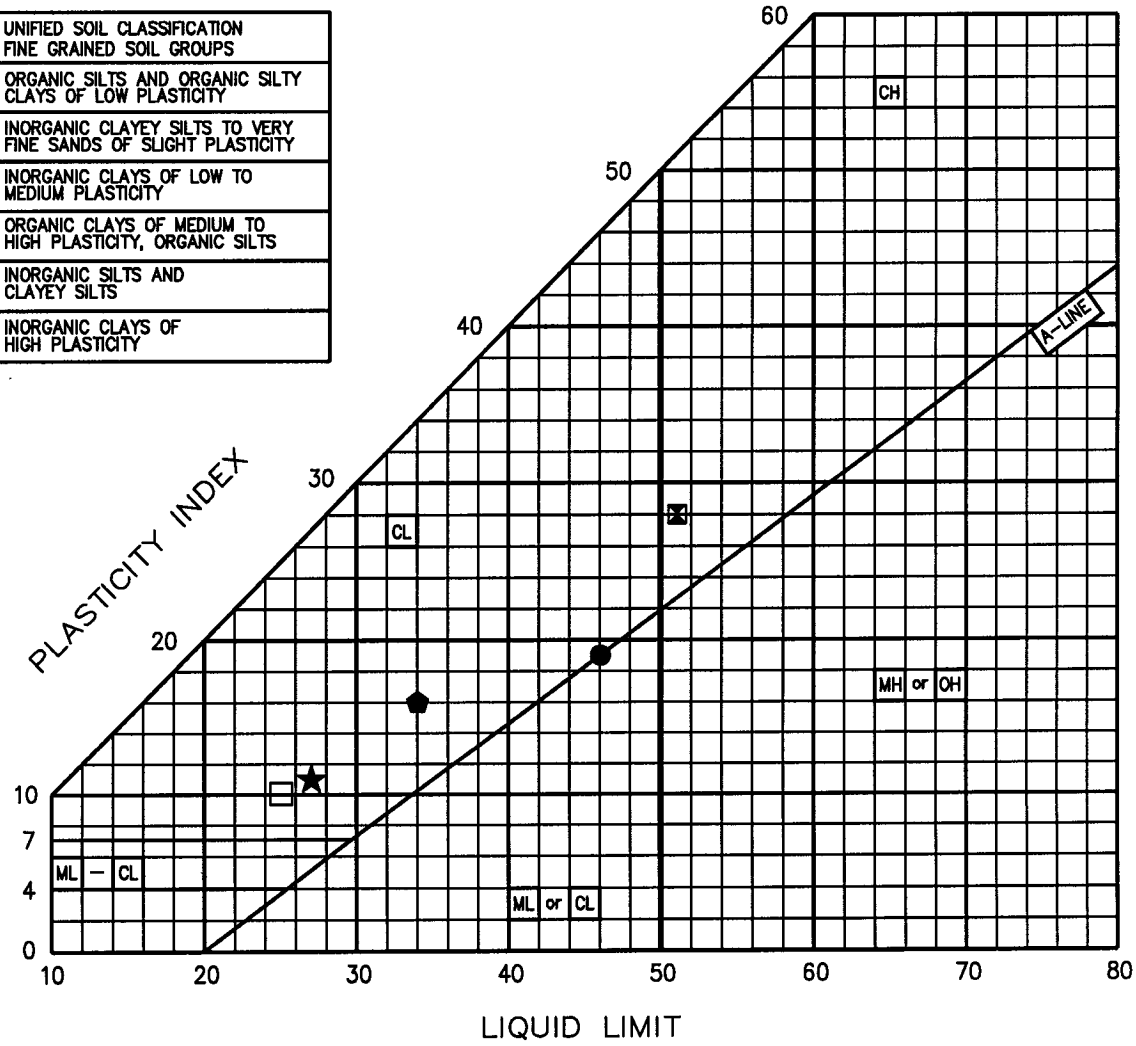
PLASTICITY CHART

PLATE

C33

CAD FILE: L:\1999\drafting\30130710\B26_SF8pi.dwg

GROUP SYMBOL	UNIFIED SOIL CLASSIFICATION FINE GRAINED SOIL GROUPS
OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
ML	INORGANIC CLAYEY SILTS TO VERY FINE SANDS OF SLIGHT PLASTICITY
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY
OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
MH	INORGANIC SILTS AND CLAYEY SILTS
CH	INORGANIC CLAYS OF HIGH PLASTICITY



TEST SYMBOL	SAMPLE NO.	SAMPLE (DEPTH)	LIQUID LIMIT	PLASTICITY INDEX	CLASSIFICATION
⊠	LG–1	34 FT.	51	28	Red Brown Clay (CH)
□	LG–2	9.5 FT.	25	10	Brown Sandy Gravel with Trace Clay (GP)
★	LG–2	47.5 FT.	27	11	Brown Clayey Sandy Gravel (GC)
⬟	LG–3	27.5 FT.	32	16	Red Grey Sandy Gravel with Some Clay (GC/GP)
●	LG–3	54 FT.	46	19	Brown Silty Sandy Clay (CL)

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RENO RAILROAD CORRIDOR

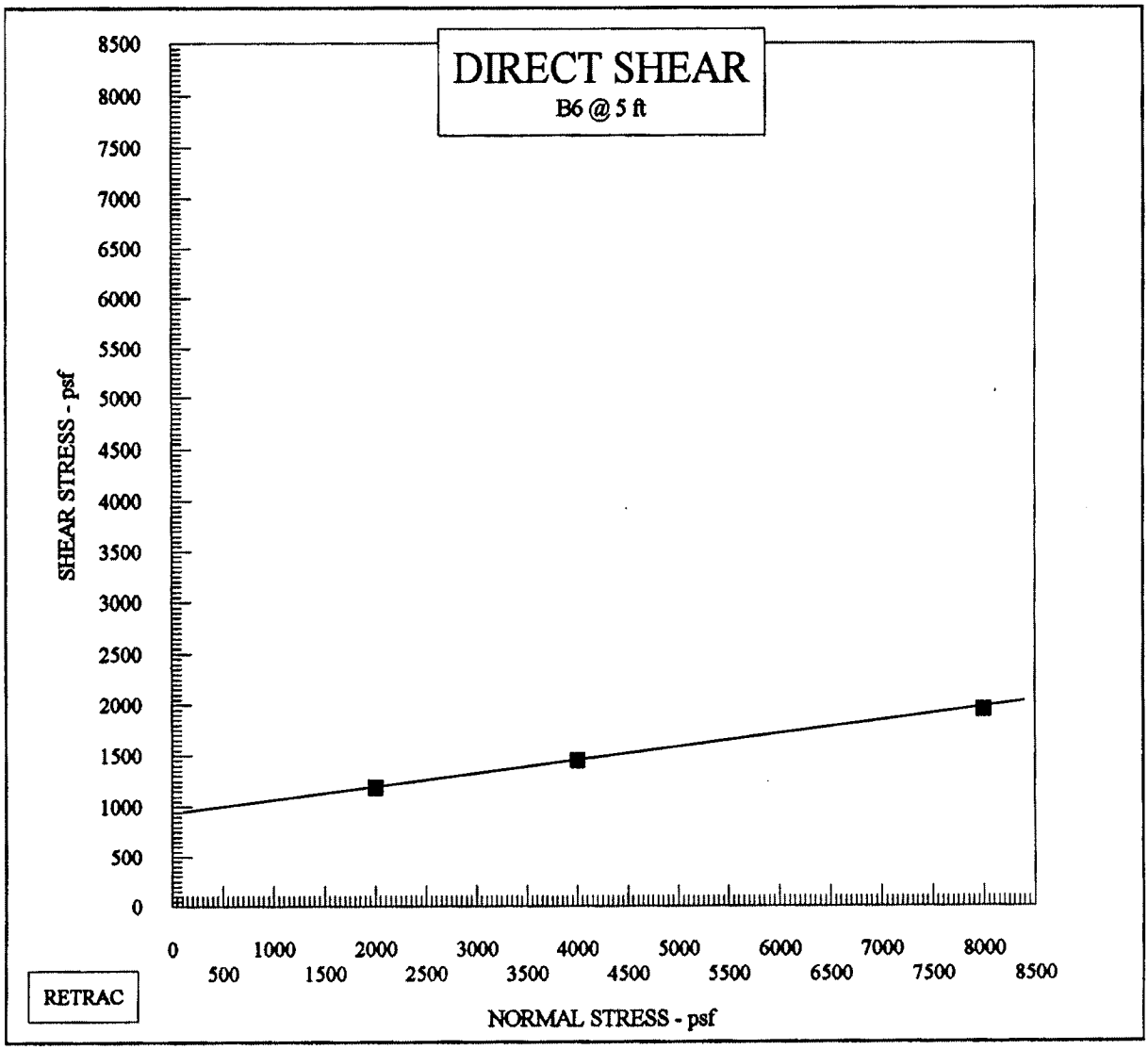
RENO, NEVADA

PLASTICITY CHART

PLATE

C34

CAD FILE: L:\1999\drafting\30130710\LG1_LG3pi.dwg



TEST TYPE	CD/WET/STAGED		
BORING NO	B6		
DEPTH - ft	5		
SOIL DESCRIPTION	Brown Sandy Silty Clay (CL)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			104.4
FINAL DRY DENSITY - pcf			104.4
INITIAL WATER CONTENT - %			20.0
FINAL WATER CONTENT - %			22.2
NORMAL STRESS - psf	2000	4000	8000
MAXIMUM STRESS - psf	1189	1452	1950

FRICTION ANGLE - deg	7
COHESION - psf	900

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RENO RAILROAD CORRIDOR

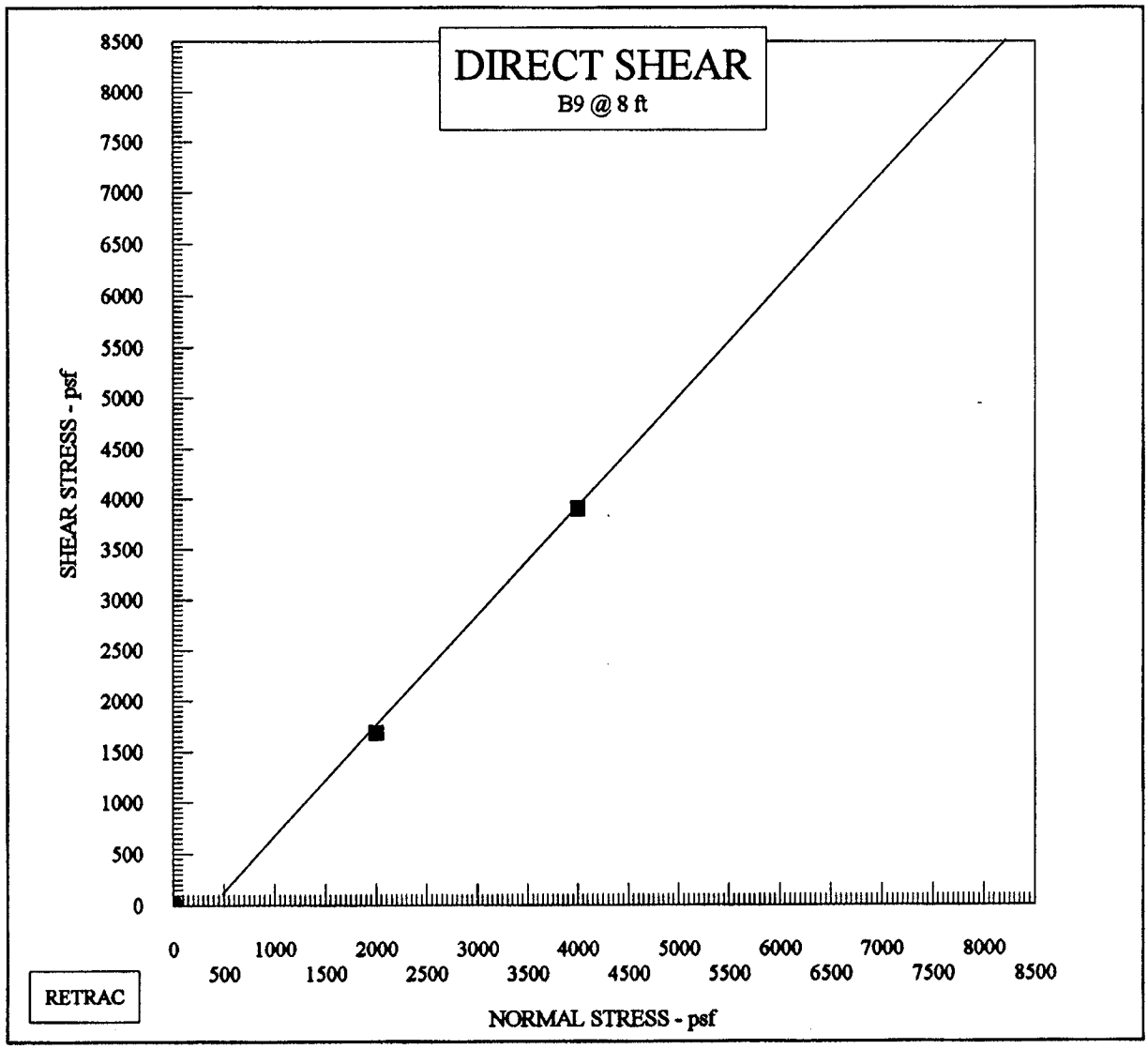
RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C35

CAD FILE: L:\1999\DRAFTING\30130710\directshear.dwg



TEST TYPE	CD/WET/STAGED		
BORING NO	B9		
DEPTH - ft	8		
SOIL DESCRIPTION	Gray Brown Sandy Gravel (GP)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			
FINAL DRY DENSITY - pcf			89.0
INITIAL WATER CONTENT - %			9.6
FINAL WATER CONTENT - %			14.9
NORMAL STRESS - psf	2000	4000	
MAXIMUM STRESS - psf	1688	3905	

FRICTION ANGLE - deg	43
COHESION - psf	0

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RENO RAILROAD CORRIDOR

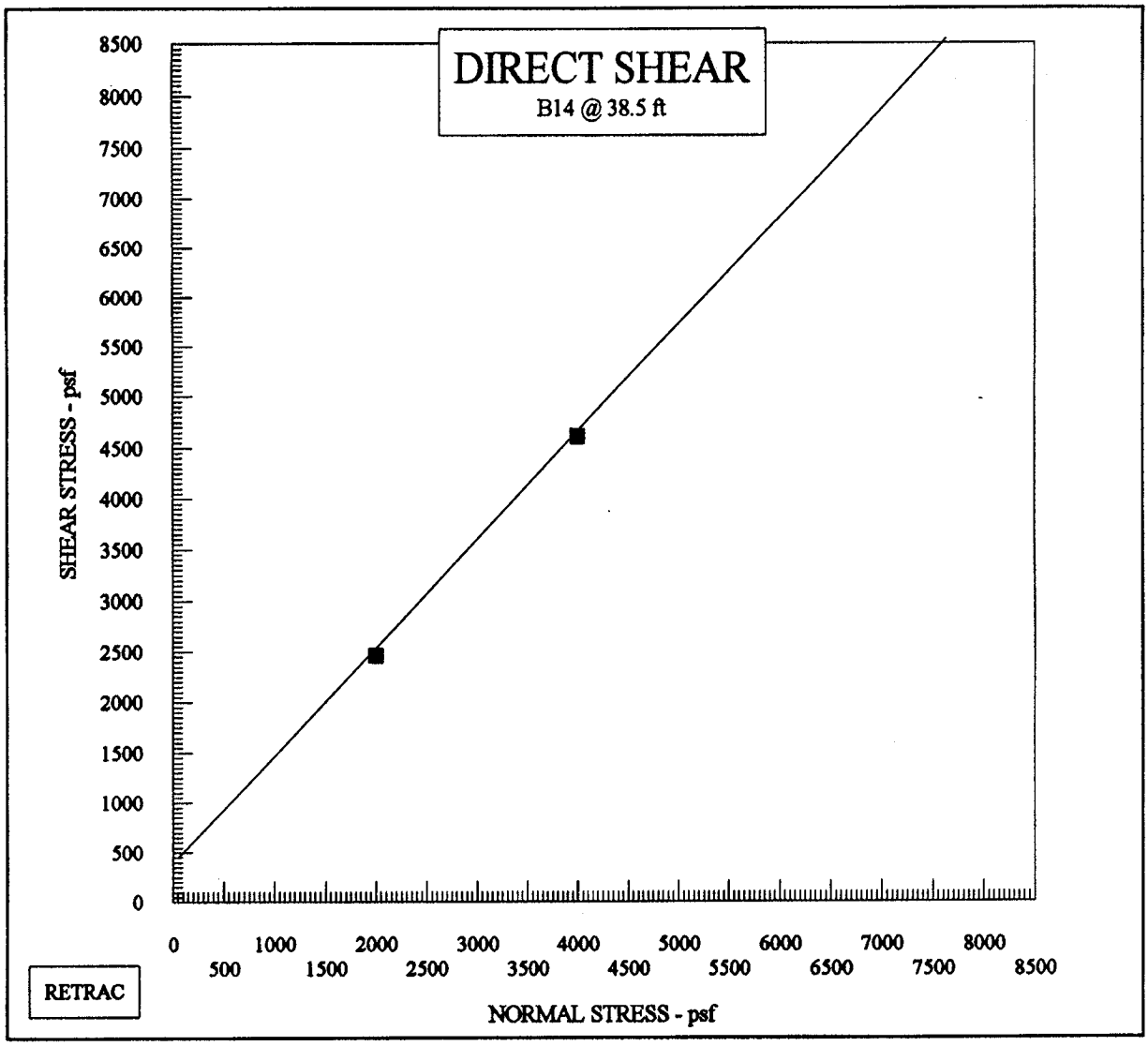
RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C36

CAD FILE: L:\1999\DRAFTING\30130710\directshear.dwg



TEST TYPE	CD/WET/STAGED		
BORING NO	B14		
DEPTH - ft	38.5		
SOIL DESCRIPTION	Gray Silty Gravelly Sand (SP/SM)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			
FINAL DRY DENSITY - pcf			112.0
INITIAL WATER CONTENT - %			7.6
FINAL WATER CONTENT - %			14.2
NORMAL STRESS - psf	2000	4000	8000
MAXIMUM STRESS - psf	2463	4612	9224

FRICTION ANGLE - deg	49
COHESION - psf	160

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RENO RAILROAD CORRIDOR

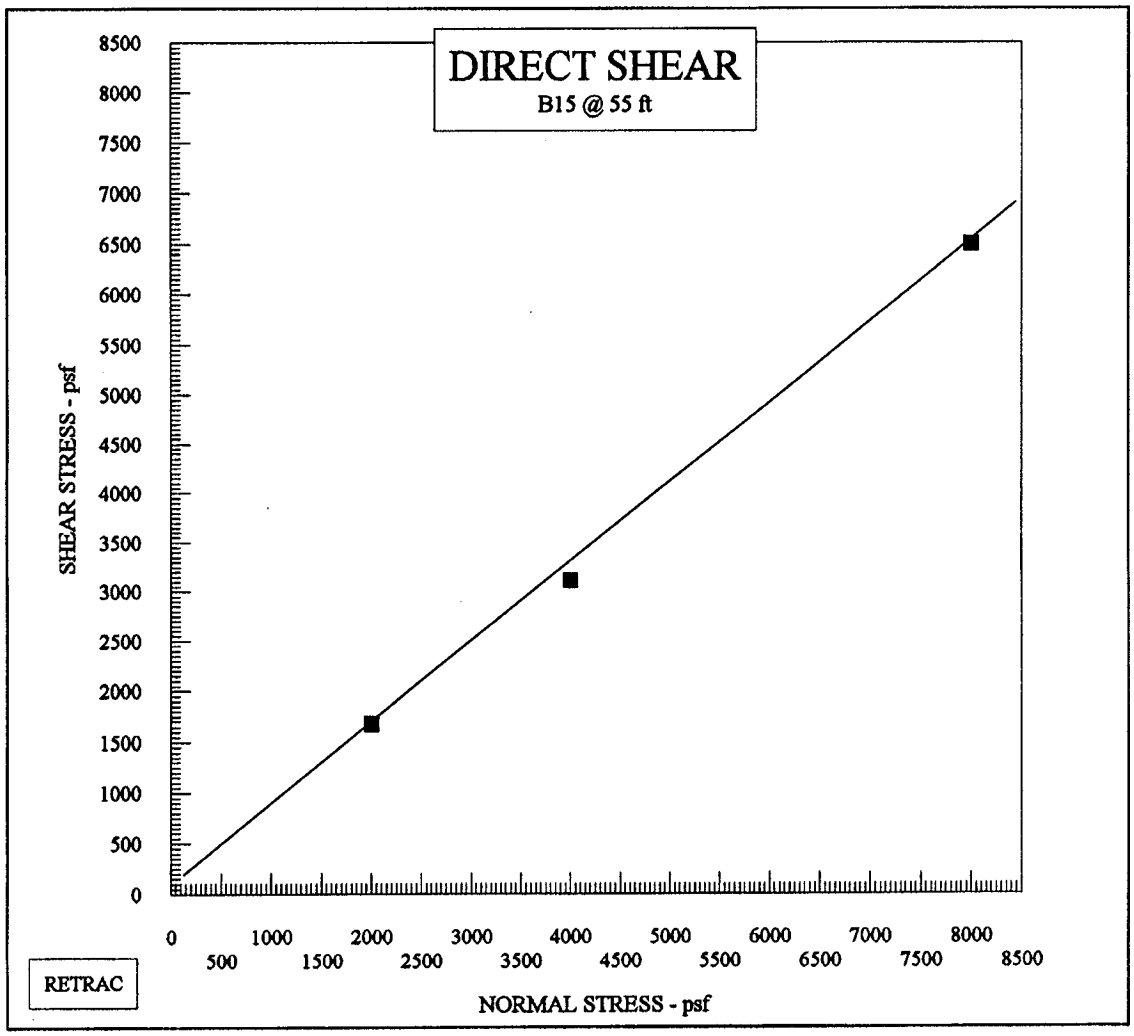
RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C37

CAD FILE: L:\1999\DRAFTING\30130710\directshear.dwg



TEST TYPE	CD/WET/STAGED		
BORING NO	B15		
DEPTH - ft	55		
SOIL DESCRIPTION	Dark Brown Silty Sand (SW/SM)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			
FINAL DRY DENSITY - pcf			
INITIAL WATER CONTENT - %			
FINAL WATER CONTENT - %			26.6
NORMAL STRESS - psf	2000	4000	8000
MAXIMUM STRESS - psf	1677	3118	6499

FRICTION ANGLE - deg	39
COHESION - psf	0

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RENO RAILROAD CORRIDOR

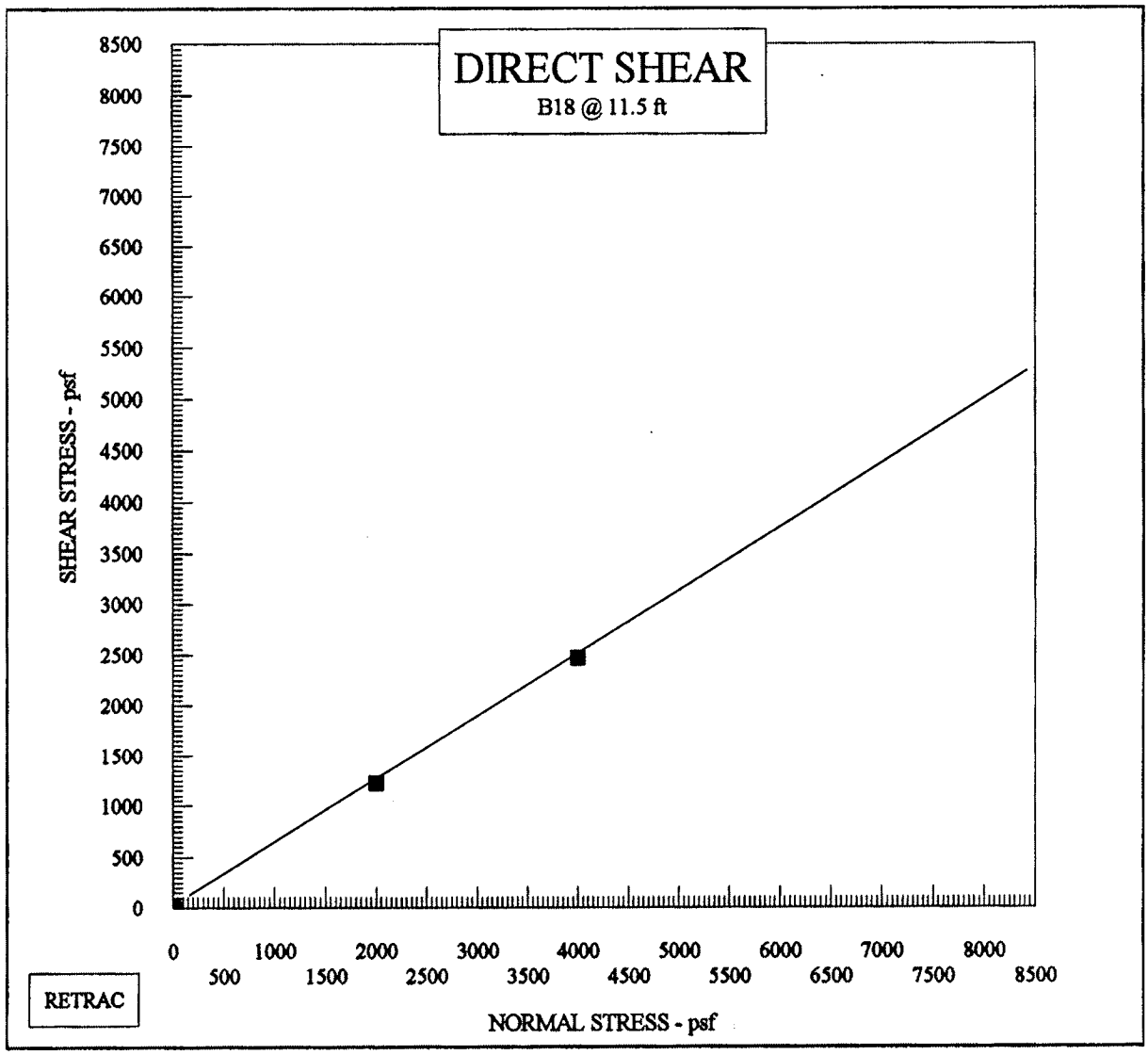
RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C38

CAD FILE: L:\1999\DRAFTING\30130710\directshear.dwg



TEST TYPE	CD/WET/STAGED		
BORING NO	B18		
DEPTH - ft	11.5		
SOIL DESCRIPTION	Light Brown Sandy Silt (ML)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			82.6
FINAL DRY DENSITY - pcf			109.9
INITIAL WATER CONTENT - %			20.2
FINAL WATER CONTENT - %			30.5
NORMAL STRESS - psf	2000	4000	
MAXIMUM STRESS - psf	1224	2468	

FRICTION ANGLE - deg	31
COHESION - psf	0

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RENO RAILROAD CORRIDOR

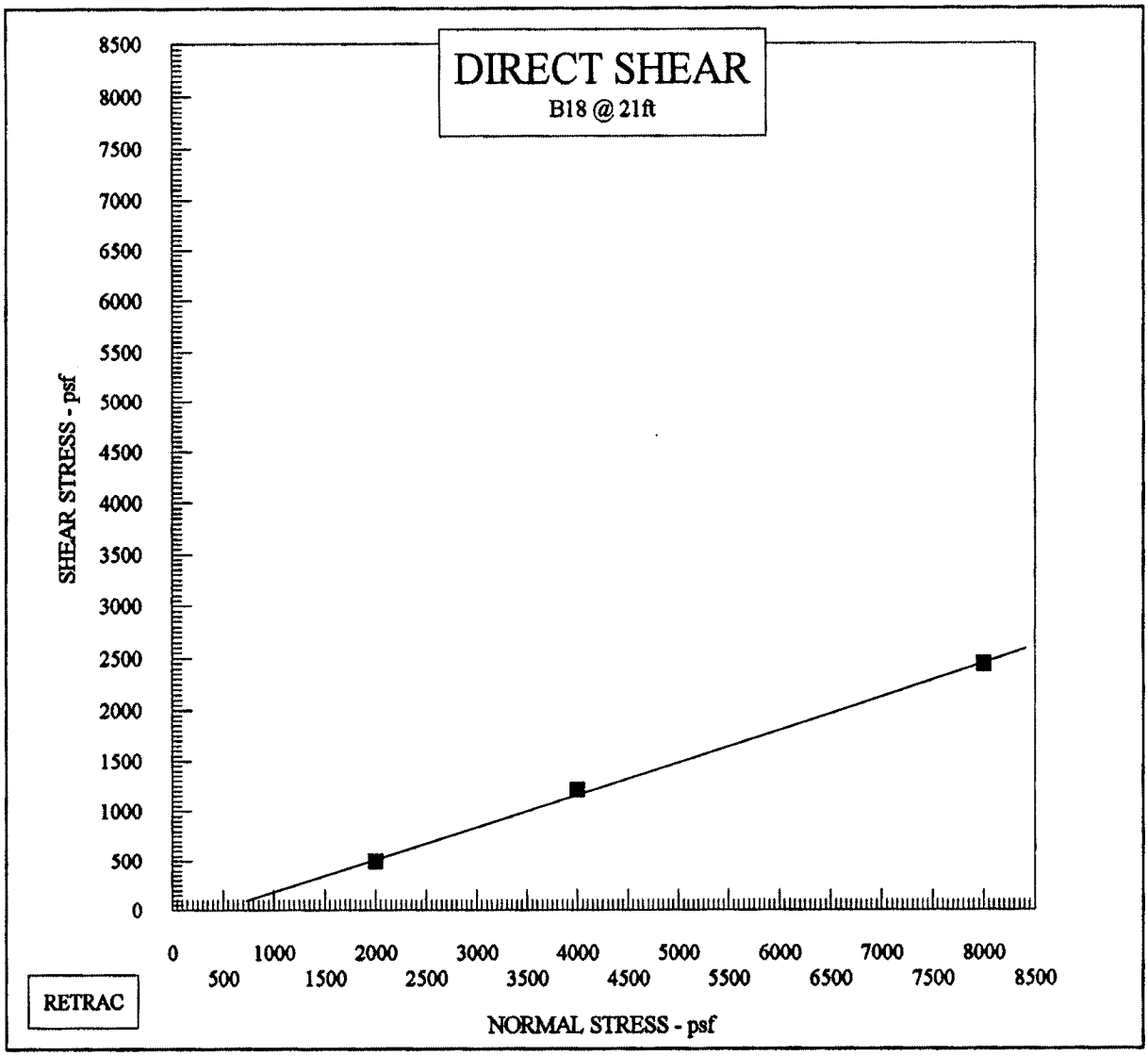
RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C39

CAD FILE: L:\1999\DRAFTING\30130710\directshear.dwg



TEST TYPE	CD/WET/STAGED		
BORING NO	B18		
DEPTH - ft	21		
SOIL DESCRIPTION	Brown Silty Sand (SM)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			100.8
FINAL DRY DENSITY - pcf			103.7
INITIAL WATER CONTENT - %			11.7
FINAL WATER CONTENT - %			18.8
NORMAL STRESS - psf	2000	4000	8000
MAXIMUM STRESS - psf	496	1214	2443

FRICTION ANGLE - deg	17
COHESION - psf	0

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RENO RAILROAD CORRIDOR

RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C40

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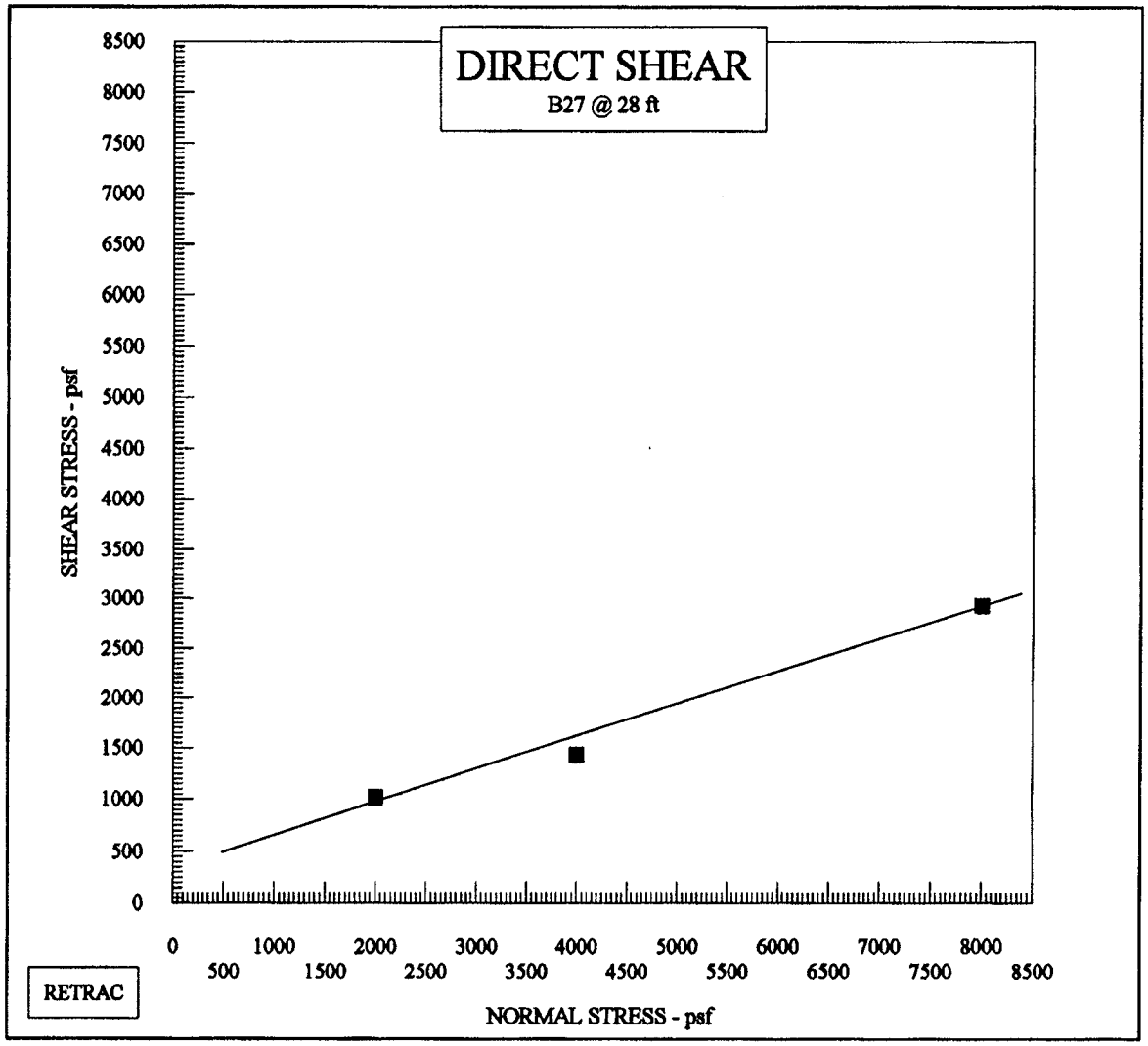

TEST TYPE	CD/WET/STAGED		
BORING NO	B27		
DEPTH - ft	28		
SOIL DESCRIPTION	Brown Clayey Sand (SC)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			112.6
FINAL DRY DENSITY - pcf			102.2
INITIAL WATER CONTENT - %			15.7
FINAL WATER CONTENT - %			20.6
NORMAL STRESS - psf	2000	4000	8000
MAXIMUM STRESS - psf	1022	1431	2928

FRICTION ANGLE - deg	16
COHESION - psf	400

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DIRECT SHEAR TEST

PLATE

C41

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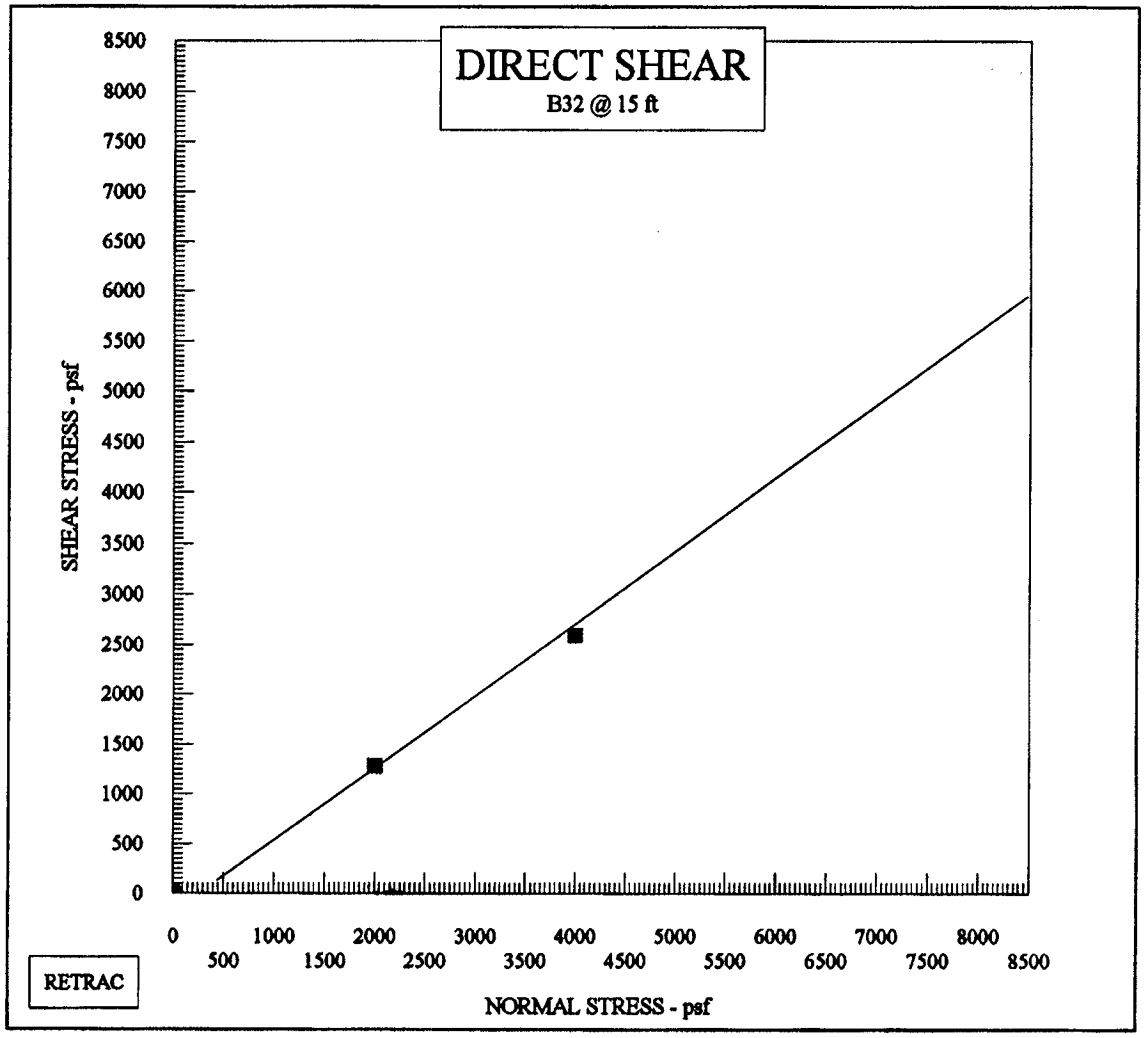

TEST TYPE	CD/WET/STAGED		
BORING NO	B32		
DEPTH - ft	15		
SOIL DESCRIPTION	Brown Sand (SP)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			
FINAL DRY DENSITY - pcf			84.0
INITIAL WATER CONTENT - %			6.1
FINAL WATER CONTENT - %			26.8
NORMAL STRESS - psf	2000	4000	
MAXIMUM STRESS - psf	1284	2594	

FRICTION ANGLE - deg	33
COHESION - psf	0

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RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C42

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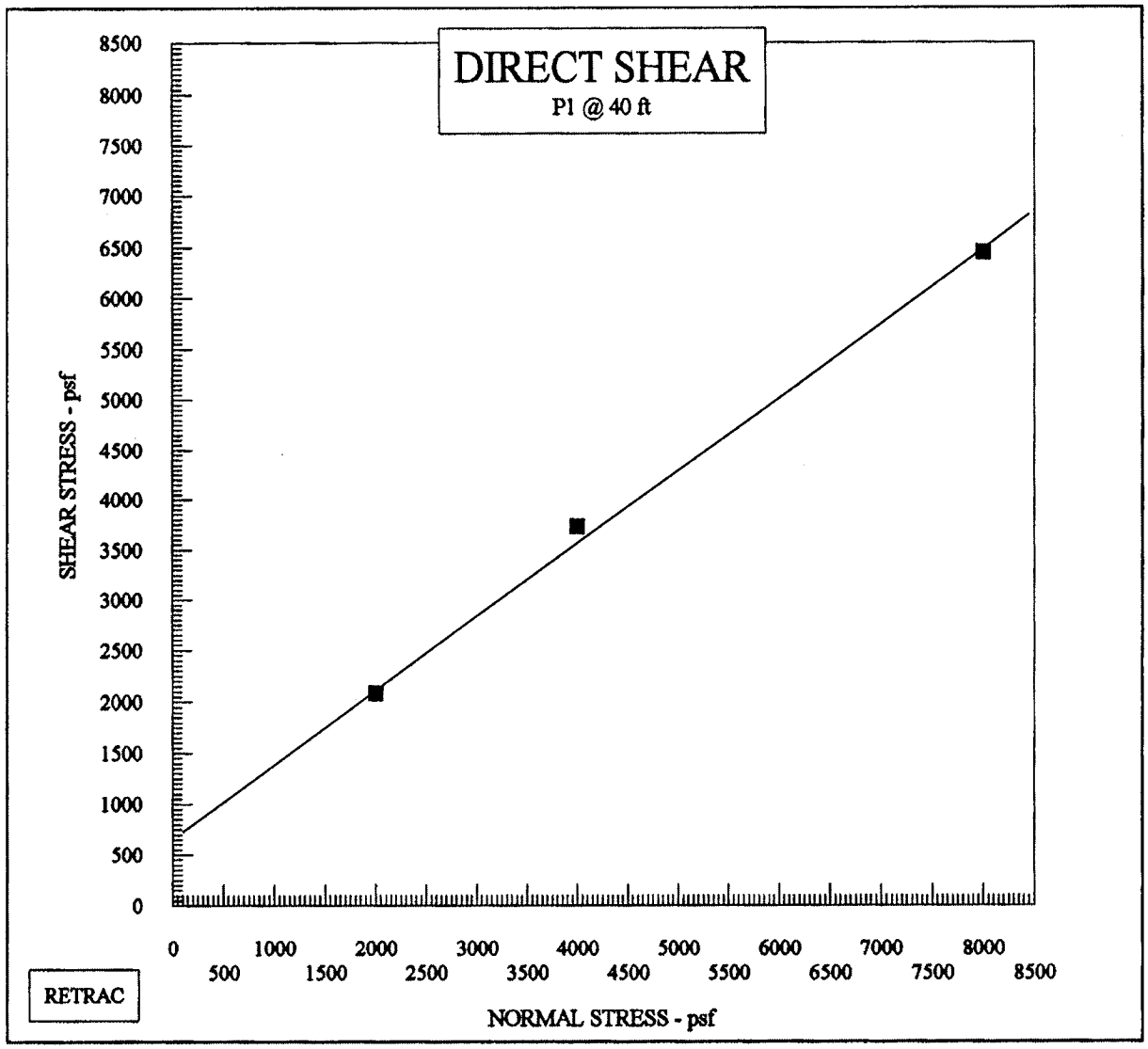

TEST TYPE	CD/WET/STAGED		
BORING NO	P1		
DEPTH - ft	40		
SOIL DESCRIPTION	Brown Silty Sand (SM)		
RATE OF SHEAR - in/	0.001		
INITIAL DRY DENSITY - pcf			97.4
FINAL DRY DENSITY - pcf			102.1
INITIAL WATER CONTENT - %			22.6
FINAL WATER CONTENT - %			24.1
NORMAL STRESS - psf	2000	4000	8000
MAXIMUM STRESS - psf	2089	3732	6448

FRICTION ANGLE - deg	36
COHESION - psf	500

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RENO RAILROAD CORRIDOR

RENO, NEVADA

DIRECT SHEAR TEST

PLATE

C43

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PERMEABILITY TEST DATA

09/07/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-8 @ 7-8.5 ft.; Lab #4034

Undisturbed Tube Sample

Sample readings taken with no backpressure.

	BEFORE TEST	AFTER TEST
	740.80	809.90
tare & sample, dry:	719.10	719.10
wt. of water:	21.70	90.80
wt. of tare:	328.90	328.90
wt. of sample dry:	390.20	390.20
percent water:	5.60	23.30
diameter of sample:	1.94	1.94
height of sample:	5.00	5.00
area of sample:	2.96	2.96
volume of sample:	14.80	14.80
dry unit weight(pcf):	100.5	100.5
degree of saturation:	24	99
specific gravity:		2.5938
void ratio:	0.6052	0.6105

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	23.65

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
08/29/99		9.59	60.8076	
08/29/99	240	7.76	56.1594	1.1E-002
08/29/99		7.76	56.1594	
08/29/99	900	2.38	42.4942	1.1E-002
08/31/99		12.59	68.4276	
08/31/99	1920	0.67	38.1508	1.0E-002
08/31/99		0.67	38.1508	
08/31/99	3840	-9.92	11.2522	1.1E-002

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RENO RAILROAD CORRIDOR

RENO, NEVADA

PERMEABILITY TEST

PLATE

C44

CAD FILE: L:\1999\DRAFTING\30130710\permeability.dwg

PERMEABILITY TEST DATA

08/26/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-15 @ 15-16 ft.; Lab #4005

Undisturbed Tube Sample

Sample readings taken with no backpressure.

Tare & sample, wet, before:	765.50
Tare & sample, wet, after:	811.50
Tare & sample, dry:	745.50
Tare wt:	319.30
Sample diameter (in):	1.94
Sample height (in):	5.00
final ht (in):	5.00

	BEFORE TEST	AFTER TEST
	765.50	811.50
tare & sample, dry:	745.50	745.50
wt. of water:	20.00	66.00
wt. of tare:	319.30	319.30
wt. of sample dry:	426.20	426.20
percent water:	4.70	15.50
diameter of sample:	1.94	1.94
height of sample:	5.00	5.00
area of sample:	2.96	2.96
volume of sample:	14.80	14.80
dry unit weight(pcf):	109.7	109.7
degree of saturation:	30	99
specific gravity:		2.4257
void ratio:	0.3800	0.3798

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	18.04

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
08/21/99		10.77	78.0542	
08/21/99	300	7.04	68.5800	1.5E-002
08/21/99		7.04	68.5800	
08/21/99	480	1.82	55.3212	1.5E-002
08/24/99		1.72	55.0672	
08/24/99	600	-3.87	40.8686	1.7E-002
08/25/99		11.49	79.8830	
08/25/99	1920	-7.62	31.3436	1.7E-002

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RENO RAILROAD CORRIDOR

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PERMEABILITY TEST

PLATE

C45

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PERMEABILITY TEST DATA

08/25/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-15 @ 30-31 ft.; Lab #4005

Undisturbed Tube Sample

Sample readings taken with no backpressure.

			BEFORE TEST	AFTER TEST
Tare & sample, wet, before:	676.90		676.90	676.80
Tare & sample, wet, after:	676.80	tare & sample, dry:	602.50	602.50
Tare & sample, dry:	602.50	wt. of water:	74.40	74.30
Tare wt:	174.60	wt. of tare:	174.60	174.60
		wt. of sample dry:	427.90	427.90
Sample diameter (in):	1.94	percent water:	17.40	17.40
Sample height (in):	5.00			
final ht (in):	5.00	diameter of sample:	1.94	1.94
		height of sample:	5.00	5.00
		area of sample:	2.96	2.96
		volume of sample:	14.80	14.80
		dry unit weight(pcf):	110.2	110.2
		degree of saturation:	99	99
		specific gravity:		2.5609
		void ratio:	0.4501	0.4501

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	24.78

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
08/21/99		11.86	63.7032	
08/21/99	57600	11.71	63.3222	3.6E-006
08/22/99		11.71	63.3222	
08/24/99	186360	11.32	62.3316	2.9E-006
08/24/99		11.32	62.3316	
08/25/99	76020	11.16	61.9252	2.9E-006
08/25/99		11.16	61.9252	
08/25/99	9240	11.14	61.8744	3.0E-006
08/25/99		11.14	61.8744	
08/25/99	72720	10.98	61.4680	3.1E-006

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RENO RAILROAD CORRIDOR

RENO, NEVADA

PERMEABILITY TEST

PLATE

C46

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PERMEABILITY TEST DATA

09/10/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-18 @ 15-16.5 ft.; Lab #4063

Undisturbed Tube Sample

Sample readings taken with no backpressure.

	BEFORE TEST	AFTER TEST
	734.70	786.80
tare & sample, dry:	693.30	693.30
wt. of water:	41.40	93.50
wt. of tare:	331.60	331.60
wt. of sample dry:	361.70	361.70
percent water:	11.40	25.90
diameter of sample:	1.94	1.94
height of sample:	5.00	5.00
area of sample:	2.96	2.96
volume of sample:	14.80	14.80
dry unit weight(pcf):	93.1	93.1
degree of saturation:	44	99
specific gravity:		2.4472
void ratio:	0.6340	0.6402

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	18.25

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
09/05/99		6.01	65.4304	
09/05/99	46740	5.67	64.5668	9.7E-006
09/05/99		5.67	64.5668	
09/06/99	37740	5.52	64.1858	5.4E-006
09/06/99		5.52	64.1858	
09/06/99	44480	5.39	63.8556	4.0E-006
09/06/99		5.39	63.8556	
09/07/99	42900	5.31	63.6524	2.5E-006
09/07/99		5.31	63.6524	
09/07/99	49020	5.20	63.3730	3.1E-006
09/07/99		5.2	63.3730	
09/08/99	42000	5.15	63.2460	1.6E-006
09/08/99		5.15	63.2460	
09/08/99	44700	5.08	63.0682	2.2E-006
09/08/99		5.08	63.0682	
09/09/00	33420	5.02	62.9158	2.5E-006
09/06/99		5.39	63.8556	
09/09/99	212040	5.02	62.9158	2.4E-006
Average:				

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RENO RAILROAD CORRIDOR

RENO, NEVADA

PERMEABILITY TEST

PLATE

C47

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PERMEABILITY TEST DATA

08/16/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-18 @ 30-31 ft.

Undisturbed Tube Sample

Sample readings taken with approximately 6 lbs. backpressure.

			BEFORE TEST	AFTER TEST
Tare & sample, wet, before:	725.00		725.00	734.00
Tare & sample, wet, after:	734.00	tare & sample, dry:	680.50	680.50
Tare & sample, dry:	680.50	wt. of water:	44.50	53.50
Tare wt:	175.20	wt. of tare:	175.20	175.20
		wt. of sample dry:	505.30	505.30
Sample diameter (in):	1.94	percent water:	8.80	10.60
Sample height (in):	5.00			
final ht (in):	5.00	diameter of sample:	1.94	1.94
		height of sample:	5.00	5.00
		area of sample:	2.96	2.96
		volume of sample:	14.80	14.80
		dry unit weight(pcf):	130.1	130.1
		degree of saturation:	82	99
		specific gravity:		2.6841
		void ratio:	0.2880	0.2874

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	18.39

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
08/13/99		10.79	77.2160	
08/13/99	2040	10.50	76.4794	1.1E-007
08/13/99		10.50	76.4794	
08/13/99	20160	5.28	63.2206	2.3E-007
08/16/99		11.36	78.6638	
08/16/99	427	9.22	73.2282	4.1E-006
08/16/99		9.22	73.2282	
08/16/99	9240	7.07	67.7672	2.0E-007
08/16/99		7.07	67.7672	
08/16/99	6540	5.58	63.9826	2.1E-007
08/16/99		5.58	63.9826	
08/16/99	2340	5.06	62.6618	2.2E-007

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PROJECT NO. 30-1307-10.001

RENO RAILROAD CORRIDOR

RENO, NEVADA

PERMEABILITY TEST

PLATE

C48

CAD FILE: L:\1999\DRAFTING\30130710\permeability.dwg

PERMEABILITY TEST DATA

09/10/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-19@ 38.5-40 ft.; Lab #4063

Undisturbed Tube Sample

Sample readings taken with no backpressure.

	BEFORE TEST	AFTER TEST
	830.50	851.50
tare & sample, dry:	791.00	791.00
wt. of water:	39.50	60.50
wt. of tare:	321.20	321.20
wt. of sample dry:	469.80	469.80
percent water:	8.40	12.90
diameter of sample:	1.94	1.94
height of sample:	5.00	5.00
area of sample:	2.96	2.96
volume of sample:	14.80	14.80
dry unit weight(pcf):	120.9	120.9
degree of saturation:	64	99
specific gravity:		2.5918
void ratio:	0.3402	0.3377

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	25.625

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
09/06/99		10.54	58.2041	
09/06/99	38100	10.01	56.8579	2.1E-005
09/06/99		10.01	56.8579	
09/07/99	42960	9.67	55.9943	1.2E-005
09/07/99		9.67	55.9943	
09/07/99	49440	8.64	53.3781	3.3E-005
09/07/99		8.64	53.3781	
09/08/99	42240	8.18	52.2097	1.8E-005
09/06/99		10.54	58.2041	
AVERAGE: 09/08/99	172740	8.18	52.2097	2.2E-005

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RENO RAILROAD CORRIDOR

RENO, NEVADA

PERMEABILITY TEST

PLATE

C49

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PERMEABILITY TEST DATA

09/07/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-27 @ 23.5-25 ft.; Lab #4008

Undisturbed Tube Sample

Sample readings taken with 10.0 psi backpressure applied.

	BEFORE TEST	AFTER TEST
	810.10	820.30
tare & sample, dry:	730.58	730.58
wt. of water:	79.52	89.72
wt. of tare:	320.58	320.58
wt. of sample dry:	410.00	410.00
percent water:	19.40	21.90
diameter of sample:	1.94	1.94
height of sample:	5.00	5.00
area of sample:	2.96	2.96
volume of sample:	14.80	14.80
dry unit weight(pcf):	105.5	105.5
degree of saturation:	88	99
specific gravity:		2.7008
void ratio:	0.5954	0.5974

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	17.61

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
08/29/99		12.37	83.2104	
08/31/99	171660	10.50	78.4606	1.7E-008
08/31/99		10.50	78.4606	
08/31/99	15960	10.37	78.1304	1.3E-008
08/31/99		10.37	78.1304	
09/01/99	70260	9.78	76.6318	1.3E-008
09/01/99		9.78	76.6318	
09/01/99	13560	9.69	76.4032	1.1E-008
09/02/99		9.69	76.4032	
09/02/99	73020	9.16	75.0570	1.2E-008

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RENO RAILROAD CORRIDOR

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PERMEABILITY TEST

PLATE

C50

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PERMEABILITY TEST DATA

09/10/99

PROJECT: Reno Railroad Access Corridor, 30-1307-10.001

Sample ID: B-28 @ 25-26.5 ft.; Lab #4034

Undisturbed Tube Sample

Sample readings taken with no backpressure.

	BEFORE TEST	AFTER TEST
	831.80	860.80
tare & sample, dry:	793.80	793.80
wt. of water:	38.00	67.00
wt. of tare:	327.60	327.60
wt. of sample dry:	466.20	466.20
percent water:	8.20	14.40
diameter of sample:	1.94	1.94
height of sample:	5.00	5.00
area of sample:	2.96	2.96
volume of sample:	14.80	14.80
dry unit weight(pcf):	120.0	120.0
degree of saturation:	56	99
specific gravity:		2.6699
void ratio:	0.3909	0.3883

Sample diameter (in) =	1.94
Sample height (in) =	5.00
Sample height, L (cm) =	12.70
Sample area, A (cm) =	7.51
Standpipe area, a (cm) =	20.26

Height from counter to bottom of ruler =	38
Height from counter to flow from sample =	25.5

Date	Elapsed Time, t (sec)	Volume Reading (in)	Change in vol. H, (cm)	K (cm/sec)
09/05/99		10.3	57.9120	
09/05/99	120	9.72	56.4388	7.4E-003
09/05/99		7.56	50.9524	
09/05/99	120	6.81	49.0474	1.1E-002
09/06/99		4.7	43.6880	
09/06/99	120	4.05	42.0370	1.1E-002
09/06/99		2.69	38.5826	
09/06/99	120	2.09	37.0586	1.1E-002

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RENO RAILROAD CORRIDOR

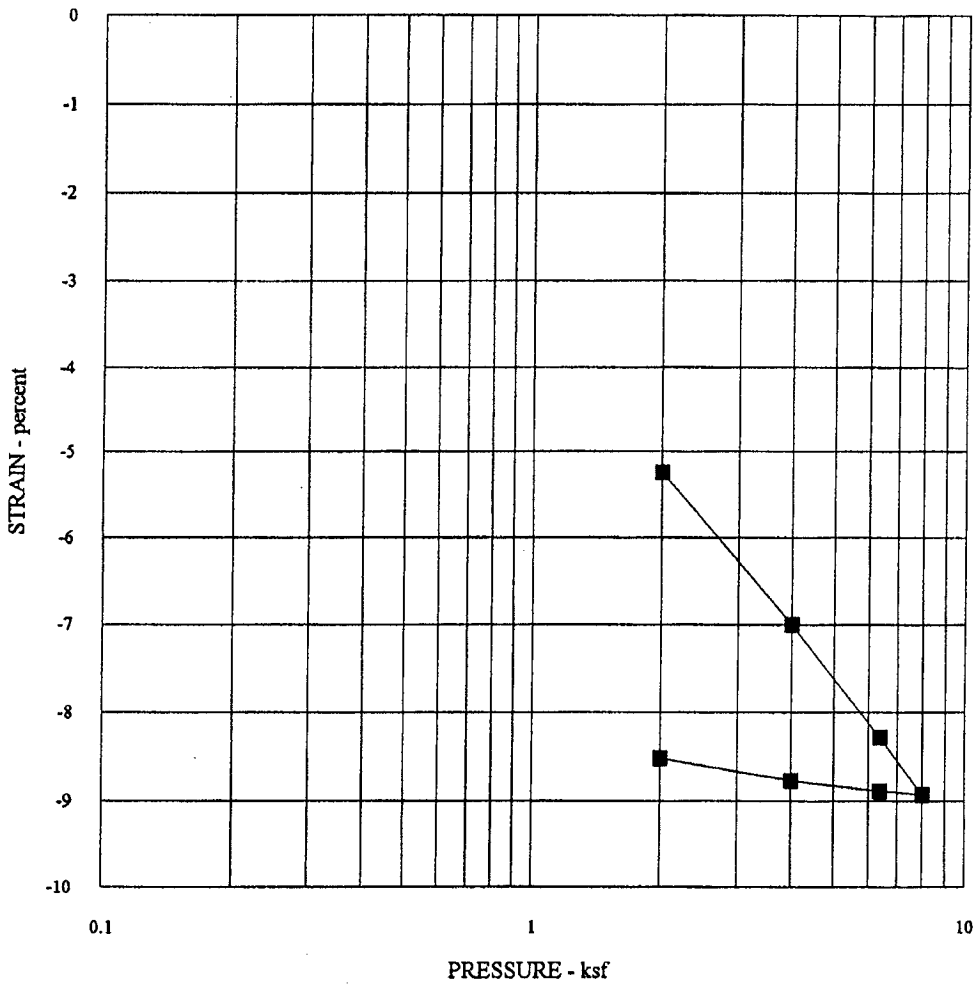
RENO, NEVADA

PERMEABILITY TEST

PLATE

C51

CAD FILE: L:\1999\DRAFTING\30130710\permeability.dwg



BORING NO.: B27	DEPTH:	32.5-34 ft
SAMPLE DESCRIPTION: Light Brown Clayey Sand (SC)		
OVERBURDEN PRESSURE, psf:		4100
PRECONSOLIDATION PRESSURE, psf :		4500

	INITIAL	FINAL
DRY DENSITY - pcf	93.5	102
WATER CONTENT - %	30.5	25.9
VOID RATIO	0.9073	0.7448
DEGREE OF SATURATION, %	96.00	99.00
SAMPLE HEIGHT - inches	1.0000	0.9148

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RENO RAILROAD CORRIDOR

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CONSOLIDATION TEST

PLATE

C52

CAD FILE: L:\1999\DRAFTING\30130710\consolidation.dwg

STEEL CORROSION POTENTIAL OF SOILS*

Corrosion Resistance	Resistivity (ohm-cm)
Excellent	6,000 to 10,000
Good	4,500 to 6,000
Fair	2,000 to 4,500
Bad	0 to 2,000

LABORATORY TEST RESULTS

Soil Type	Source	Resistivity (ohm-cm)	pH**
DARK BROWN SANDY SILT (ML)	B-2@ 7 - 8 FT.	4930	7.71
BROWN GRAVELLY SAND W/ SILT (SP)	B-16@ 6.5 FT.	646	7.20
BROWN SILTY SAND (SM)	B-18@ 6.5 FT.	2160	6.92
LIGHT BROWN CLAYEY SAND (SC)	B-27@ 32.5 - 34 FT.	1830	6.39
BROWN SAND (SP)	B-32@ 15 - 16.5 FT.	17500	7.05

* Reference: "Accelerated Corrosion Tests for Buried Metal Structures", by Paul Lieberman, Ph.D., in Pipeline and Gas Journal October, 1996, Pg.51

** Note: Corrosion potential of soils generally increases as pH decreases below 7.

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STEEL CORROSION POTENTIAL OF SOIL

PLATE C53

CAD FILE: L:\1999\drafting\30130710\3013070001-react-corr.dwg

POTENTIAL REACTIVITY OF SOLUBLE SULFATES IN SOIL OR GROUNDWATER WITH PORTLAND CEMENT CONCRETE

TABLE 1: RECOMMENDATIONS FOR CONCRETE IN SULFATE ENVIRONMENTS *				
Soluble Sulfates In Soil %	Sulfates In Water P.P.M.	Cement Type	Maximum Water/Cement Ratio	Minimum Cement Content – Lbs.
0–0.02	0–150	(Negligible.....Sulfate.....Reaction)		
0.02–0.10	150–1000	I or II	0.55	470
0.10–0.20	1000–2000	II	0.50	560
0.20–1.50	2000–15,000	II	0.45	660
		V	0.50	560
Over 1.50	Over 15,000	V	0.45	660

* NOTE A. Concrete for piling and other concrete in sea water environments may contain Type II cement when the water–cement ratio is a maximum of 0.50 or the cement factor is a minimum of 560 pounds. The sulfate concentration in Table I should govern in all cases.

* NOTE B. Sewage treatment facilities normally are constructed using Type II cement except in areas where high sulfate soils of waters exist (See Table I). In sewage, sulfides rather than where sulfates are formed. The sulfide combining with water in the presence of oxygen, can produce sulfuric acid to which no Portland cement is time resistant. Under these conditions, plastic liners, or coatings, are generally used. Closed tanks normally contain an atmosphere of methane rather than oxygen, so acid attack would not be likely to occur. Good quality concretes containing Type II cement with a maximum water cement ratio of 0.53 have provided excellent service in Los Angeles City and County sanitary treatment facilities.

Under special conditions, a concrete materials engineer should be consulted.

Reference: "Recommended Practice to Minimuze Attack on Concrete by Sulfate Soils and Water" by Cement Industry Technical Committee of California.

SAMPLE IDENTIFICATION	B-2@ 7-8 FT.	B-16@ 6.5 FT.	B-18@ 6.5 FT.
SAMPLE DESCRIPTION	DARK BROWN SANDY SILT (ML)	BROWN GRAVELLY SAND W/ SILT (SP)	BROWN SILTY SAND (SM)
SOLUBLE SULFATE (%)	---	---	---
SOLUBLE SULFATES (PPM)	33	250	300
COMMENTS	NEGLIGIBLE SULFATE REACTION	MINOR SULFATE REACTION	MINOR SULFATE REACTION

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RENO RAILROAD CORRIDOR

RENO, NEVADA

POTENTIAL REACTIVITY

PLATE C54

CAD FILE: L:\1999\DRAFTING\30130710\30130710001-REACT-CORR.DWG

POTENTIAL REACTIVITY OF SOLUBLE SULFATES IN SOIL OR GROUNDWATER WITH PORTLAND CEMENT CONCRETE

TABLE 1: RECOMMENDATIONS FOR CONCRETE IN SULFATE ENVIRONMENTS *				
Soluble Sulfates In Soil %	Sulfates In Water P.P.M.	Cement Type	Maximum Water/Cement Ratio	Minimum Cement Content – Lbs.
0–0.02	0–150	(Negligible.....Sulfate.....Reaction)		
0.02–0.10	150–1000	I or II	0.55	470
0.10–0.20	1000–2000	II	0.50	560
0.20–1.50	2000–15,000	II	0.45	660
		V	0.50	560
Over 1.50	Over 15,000	V	0.45	660

* NOTE A. Concrete for piling and other concrete in sea water environments may contain Type II cement when the water-cement ratio is a maximum of 0.50 or the cement factor is a minimum of 560 pounds. The sulfate concentration in Table I should govern in all cases.

* NOTE B. Sewage treatment facilities normally are constructed using Type II cement except in areas where high sulfate soils of waters exist (See Table I). In sewage, sulfides rather than where sulfates are formed. The sulfide combining with water in the presence of oxygen, can produce sulfuric acid to which no Portland cement is time resistant. Under these conditions, plastic liners, or coatings, are generally used. Closed tanks normally contain an atmosphere of methane rather than oxygen, so acid attack would not be likely to occur. Good quality concretes containing Type II cement with a maximum water cement ratio of 0.53 have provided excellent service in Los Angeles City and County sanitary treatment facilities.

Under special conditions, a concrete materials engineer should be consulted.

Reference: "Recommended Practice to Minimuze Attack on Concrete by Sulfate Soils and Water" by Cement Industry Technical Committee of California.

SAMPLE IDENTIFICATION	B-27@ 32.5 – 34 FT.	B-32@ 15 – 16.5 FT.	
SAMPLE DESCRIPTION	LIGHT BROWN CLAYEY SAND (SC)	BROWN SAND (SP)	
SOLUBLE SULFATE (%)	---	---	
SOLUBLE SULFATES (PPM)	20	25	
COMMENTS	NEGLIGIBLE SULFATE REACTION	NEGLIGIBLE SULFATE REACTION	

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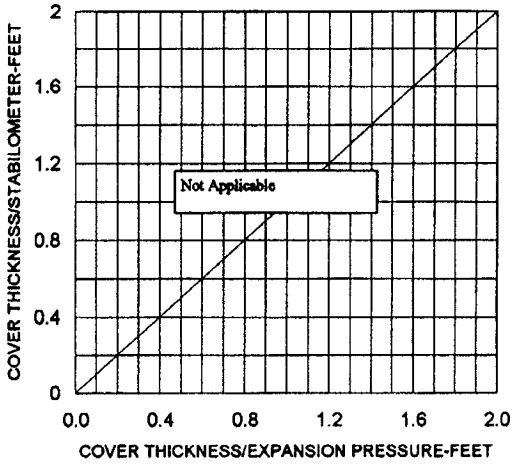
POTENTIAL REACTIVITY

PLATE C55

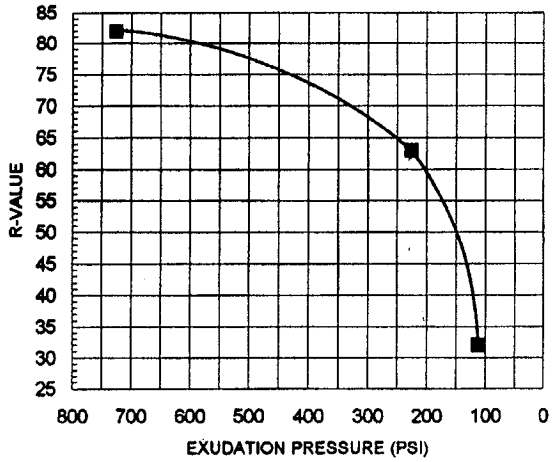
CAD FILE: L:\1999\DRAFTING\30130710\30130710001-REACT-CORR.DWG

Sample Source: SF-1 @ 0'-1'
Sample Description: Dark Brown Gravelly Sand w/Silt

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



Specimen	A	B	C
Exudation Pressure, psi	113	226	726
Expansion Dial (.0001")	0.0000	0.0000	0.0001
Expansion Pressure, psf	0	0	4
Resistance Value, R	32	63	82
% Moisture at Test	9.6	8.5	7.9
Dry Density at Test, pcf	128.5	130.8	132.5
R Value by Expansion Pressure (TI=)		Not Applicable	
R Value at 300 psi Exudation Pressure		68	

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RENO RAILROAD CORRIDOR

RENO, NEVADA

R VALUE

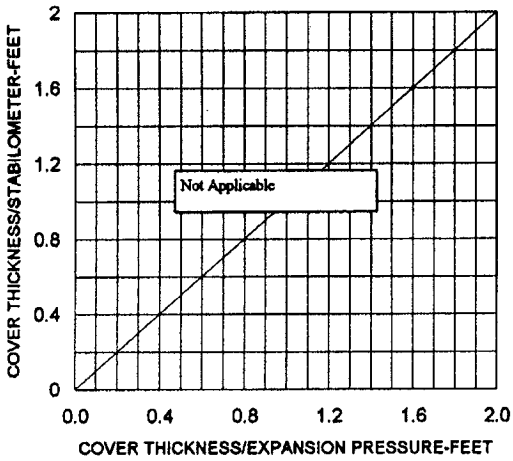
PLATE

C56

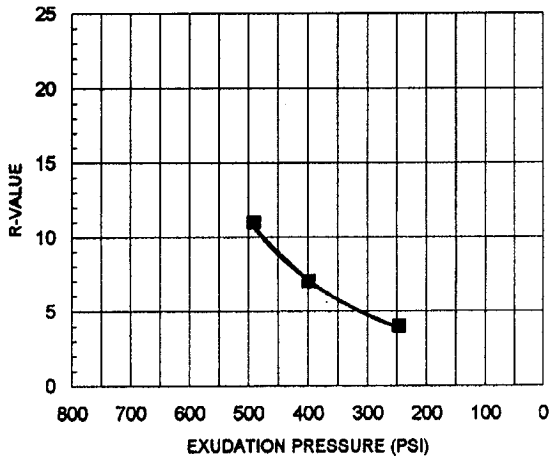
CAD FILE: L:\1999\DRAFTING\30130710\r-value.dwg

Sample Source: SF-4 @ 0'-1'
Sample Description: Olive Brown Sandy Clay w/Gravel

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



Specimen	A	B	C
Exudation Pressure, psi	491	399	247
Expansion Dial (.0001")	0.0000	0.0000	0.0000
Expansion Pressure, psf	0	0	0
Resistance Value, R	11	7	4
% Moisture at Test	17.8	19.5	21.3
Dry Density at Test, pcf	110.0	105.4	102.4
R Value by Expansion Pressure (TI=)		Not Applicable	
R Value at 300 psi Exudation Pressure		5	

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RENO RAILROAD CORRIDOR

RENO, NEVADA

R VALUE

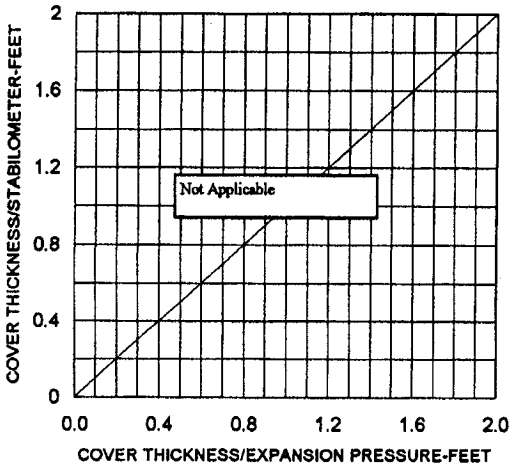
PLATE

C57

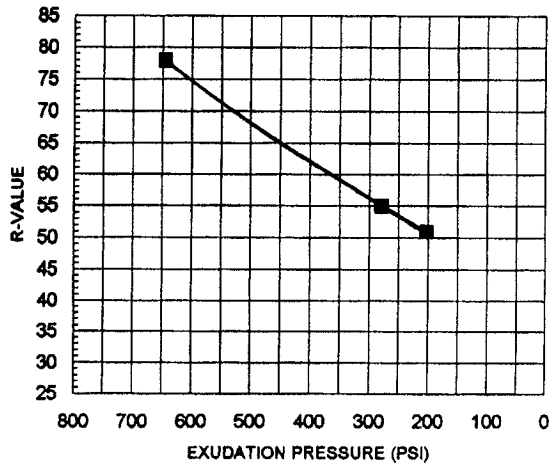
CAD FILE: L:\1999\DRAFTING\30130710\r-value.dwg

Sample Source: SF-11 @ 0'-1'
Sample Description: Dark Brown Silty Sand w/Gravel

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



Specimen	A	B	C
Exudation Pressure, psi	203	280	645
Expansion Dial (.0001")	0.0000	0.0000	0.0000
Expansion Pressure, psf	0	0	0
Resistance Value, R	51	55	78
% Moisture at Test	8.9	8.4	7.8
Dry Density at Test, pcf	132.5	133.1	134.4
R Value by Expansion Pressure (TI=)		Not Applicable	
R Value at 300 psi Exudation Pressure		57	

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RENO RAILROAD CORRIDOR

RENO, NEVADA

R VALUE

PLATE

C58

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