BORING LOGS

Log of Test Boring TB-1

Project No. 97020-50

Project: Vern Dow Park Boardwalk

Location: Gurnee, IL

Depth ft	Description of Material	Elevation ft	Geological Origin	WL	Sample No.	Sample type	Testing N	Testing w	Testing DD	Testing QU(psf)
	Ground Surface Elevation = 98.7									
0	ORGANIC LEAN CLAY, black, moist (OL)	98.2	TOPSOIL							
.5 1 2	LEAN CLAY mixed with organic peat, sand and gravel, brown, moist (FILL)	95.7	FILL		1	SB	2	19		
3 4	SILTY SAND with gravel, fine grained, light brown, moist, loose (SM)	92.7	MIXED ALLUVIUM		2	SB	7	12		
5 6 7	SANDY SILT with gravel, light brown, wet, medium dense (ML-SM)	90.7		▽	3	SB	10	18		
8 9	SILTY SAND with gravel, little clay, fine to coarse grained, light brown, wet, dense (SM)	87.7			4	SB	25	13		
10 11 12 13 14	SAND WITH SILT, fine to coarse grained, gray, medium dense to dense to loose (SP-SM)				5	SB	13			
					6	SB	22			
15 16 17 18 19		78.7			7	SB	16			
					8	SB	7	11		
20 21 22 23 24	LEAN CLAY with sand and gravel, gray, moist, rather stiff (CL)		GLACIAL TILL		9	3"T"		17	120	4000
25 26 27 28 29					10	SB	13	19		

Log of Test Boring TB-1 (Cont.) Project No. 97020-50

Project: Vern Dow Park Boardwalk **Location: Gurnee, IL**

Depth ft	Description of Material Ground Surface Elevation = 98.7	Elevation ft	Geological Origin	WL	Sample No.	Sample type	Testing N	Testing w	Testing DD	Testing QU(psf)
30	LEAN CLAY with sand and gravel, gray, moist, rather stiff to stiff (CL)									
31										
32										
33										
34					11*	SB	9	20		
35										
36										
37										
38										
39					12	SB	16	12		
40			GLACIAL TILL							
41										
42										
43										
44					13	SB	23	12		
45										
46										
47										
48										
49					14	SB	11	19		
50	End of Boring									
51										
52										
53										
54										
55										
56										
57										
58										

*LL/PL = 33/15

Water Level Measurements

Date: 2/17/97 Crew Chief: MC

Date	time	depth (ft)	Elevation
2/17/97	While drilling	7.0	91.7
2/17/97	At completion	6.8	91.9

Drilling Method: 3 1/4" HSA

Drilling Co.: C.S. Drilling

Plugging Procedure: Cuttings

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 27 N 2002460 E 611413
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-3
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97 / COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	640.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Brown to black coarse to fine sandy SILT, trace to little coarse to fine gravel, trace clay, trace organics, low plasticity, moist, topsoil ML		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
639.3	1.2		Stiff to medium stiff black to brown silty CLAY, trace coarse to fine sand, medium plasticity, wet CL	18/24"	SS-2 1.0 3.0	6/8/13/14 qu* = 1.25tsf
				15/24"	SS-3 3.0 5.0	3/4/6/7 qu* = 0.8tsf
635.9	4.6		Medium stiff gray clayey SILT, trace medium to fine sand, medium plasticity, wet CL-ML	8/24"	SS-4 5.0 7.0	1/2/5/6 qu* = 0.8tsf Gravel = 0.0% Sand = 10.1% Silt = 51.6% Clay = 38.3%
				15/24"	SS-5 7.0 9.0	2/3/21/27
632.7	7.8		Dense to medium dense gray coarse to fine SAND, trace coarse to fine gravel, trace silt, well graded, moist SW-SM	15/24"	SS-6 9.0 11.0	2/4/14/17 Gravel = 4.9% Sand = 84.7% Fines = 10.4%
629.9	10.6		Medium dense gray coarse to fine SAND, trace coarse to fine gravel, trace silt, poorly graded, moist SP	15/24"	SS-7 11.0 13.0	7/8/20/28 Gravel = 2.9% Sand = 94.2% Fines = 2.9%
				18/24"	SS-8 13.0 15.0	9/11/15/19 qu* = 4.25tsf
626.5	14.0		Hard grayish brown SILT and clay, trace coarse to fine sand, low plasticity, moist CL-ML			
625.5	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite. Obtained Shelby tube samples in offset hole DPRL-3A.

D-9-10

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 27 N 2002460 E 611413
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-3A
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	7.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	7.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 0 / UNDISTURBED 2
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97 / COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	640.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Blind drilled to 3.0'			
637.5	3.0		Medium stiff to stiff dark gray to yellowish gray silty CLAY, trace medium to fine sand, medium plasticity, wet CL	22/24"	3T-1 3.0 5.0	Pushed 3" Shelby tube Moisture Content = 27.6% qu*(middle) = 1.0tsf Torvane Shear Strength (middle) = 0.65tsf LL = 50 PL = 20 Dry Density = 96.3pcf
635.6	4.9		Stiff yellowish gray silty CLAY, trace coarse to fine sand, trace fine gravel, low plasticity, wet CL	24/24"	3T-2 ABC 5.0 7.0	Pushed 3" Shelby tube 3T-2A: Moisture content = 24.9% qu* = 1.5tsf 3T-2B: Moisture content = 22.2% Dry Density = 96.4pcf 3T-2C: Moisture content = 24.9% qu* = 1.5tsf Torvane Shear Strength = 0.20tsf Borehole backfilled with granular bentonite.
634.5	6.0		Gray to black clayey SILT, little coarse to fine sand, non plastic, wet CL-ML			
634.0	6.5					
633.5	7.0		Stiff dark gray to black silty CLAY, with silt lenses, trace coarse to fine sand, trace fine gravel, low plasticity, wet CL			
			End of Boring at 7.0'.			

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 27 N 2003395 E 609808
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-4
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97 / COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	641.3
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Brown silty CLAY, trace coarse to fine sand, trace medium to fine gravel, trace organics, medium plasticity, wet, topsoil CL		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
640.3	1.0		Stiff to soft brown silty CLAY, trace coarse to fine sand, medium plasticity, moist to wet CL	18/24"	SS-2 1.0 3.0	1/2/4/4 qu* = 1.2tsf
				12/24"	SS-3 3.0 5.0	1/2/2/2 qu* = 0.4tsf
636.8	4.5		Very stiff brown to gray silty CLAY, trace coarse to fine sand, medium plasticity, wet to moist CL	20/24"	SS-4 5.0 7.0	1/2/6/7 qu* = 2.8tsf
				8/24"	SS-5 7.0 9.0	2/3/9/10 qu* = 2.5tsf LL = 40 PL = 18 Gravel = 0.0% Sand = 0.1% Silt = 52.3% Clay = 47.6%
				24/24"	SS-6 9.0 11.0	SS-6: 2/3/5/7 Moisture Content = 21.2%
631.3	10.0		Medium dense gray SILT, trace medium to fine sand, trace clay, moist ML			
629.8	11.5			24/24"	SS-7A/B 11.0 13.0	6/8/10/14 SS-7A: qu* = 1.5tsf LL = 37 PL = 16
629.3	12.0		Stiff gray silty CLAY, trace medium to fine sand, medium plasticity, moist CL			
			Medium dense gray SILT, trace fine sand, trace clay, moist to wet ML	24/24"	SS-8 ABC 13.0 15.0	6/10/11/9 SS-8A: Moisture Content = 19.1% SS-8B: LL = 36 PL = 17 SS-8C: Moisture Content = 8.0%
627.3	14.0		Stiff gray silty CLAY, trace fine sand, medium plasticity, moist CL			
626.6	14.7					
626.3	15.0		Gray coarse to fine SAND, some coarse to fine gravel, trace silt, well graded, moist SW			Borehole backfilled with granular bentonite. Obtained Shelby tube samples in offset hole DPRL-4A.
			End of Boring at 15.0'.			

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 27 N 2003395 E 609808
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-4A
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	7.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	7.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 0; UNDISTURBED 3
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97; COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	641.3
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Blind drilled to 1.0'			
640.3	1.0		Stiff yellowish gray silty CLAY, trace fine sand, medium plasticity, moist CL-ML	10/24"	3T-1 1.0 3.0	Pushed 3" Shelby tube qu* = 3.0tsf Torvane Shear Strength = 0.60tsf Moisture content 19.1%
638.9	2.4		Stiff brown silty CLAY, trace coarse to fine sand, trace fine gravel, medium plasticity, wet CL	22/24"	3T-2 3.0 5.0	Pushed 3" Shelby tube 3T-2A: Moisture Content = 23.3% qu* = 1.25tsf Dry Density = 108.0pcf Unconfined Compression = 1.3tsf @ 9% 3T-2B: Moisture Content = 25.5% qu* = 3.75tsf Torvane Shear Strength = 0.63tsf Dry Density = 101.1pcf LL = 31 PL = 18 Pushed 3" Shelby tube 3T-3A: Moisture Content = 25.7% qu* = 1.25tsf Dry Density = 104.1pcf Unconfined Compression = 0.8tsf @ 15% 3T-3B: Moisture Content = 21.0% qu* = 2.5tsf Torvane Shear Strength = 0.60tsf Borehole backfilled with granular bentonite.
636.9	4.4		Stiff brown clayey SILT, trace fine sand, low plasticity, wet CL-ML			
636.4	4.9		Stiff brown silty CLAY, trace medium to fine sand, medium plasticity, wet CL	24/24"	3T-3A/B 5.0 7.0	
634.9	6.4		Very stiff gray silty CLAY, trace medium to fine sand, silt lenses, medium plasticity, wet CL			
634.3	7.0		End of Boring at 7.0'.			

D-9-13

Hole No. DPRL-4A

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 27 N 2003395 E 609808
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-4A
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	7.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	7.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 0; UNDISTURBED 3
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97; COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	641.3
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Blind drilled to 1.0'			
640.3	1.0		Stiff yellowish gray silty CLAY, trace fine sand, medium plasticity, moist CL-ML	10/24"	3T-1 1.0 3.0	Pushed 3" Shelby tube qu* = 3.0tsf Torvane Shear Strength = 0.60tsf Moisture content 19.1%
638.9	2.4		Stiff brown silty CLAY, trace coarse to fine sand, trace fine gravel, medium plasticity, wet CL	22/24"	3T-2 3.0 5.0	Pushed 3" Shelby tube 3T-2A: Moisture Content = 23.3% qu* = 1.25tsf Dry Density = 108.0pcf Unconfined Compression = 1.3tsf @ 9% 3T-2B: Moisture Content = 25.5% qu* = 3.75tsf Torvane Shear Strength = 0.63tsf Dry Density = 101.1pcf LL = 31 PL = 18
636.9	4.4					
636.4	4.9		Stiff brown clayey SILT, trace fine sand, low plasticity, wet CL-ML			
			Stiff brown silty CLAY, trace medium to fine sand, medium plasticity, wet CL	24/24"	3T-3A/B 5.0 7.0	Pushed 3" Shelby tube 3T-3A: Moisture Content = 25.7% qu* = 1.25tsf Dry Density = 104.1pcf Unconfined Compression = 0.8tsf @ 15% 3T-3B: Moisture Content = 21.0% qu* = 2.5tsf Torvane Shear Strength = 0.60tsf Borehole backfilled with granular bentonite.
634.9	6.4					
634.3	7.0		Very stiff gray silty CLAY, trace medium to fine sand, silt lenses, medium plasticity, wet CL			
			End of Boring at 7.0'.			

D-9-13

Hole No. DPRL-5

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 37 N 1981370 E 620859
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-5
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 16 97 / COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	637.7
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Brown to black silty CLAY, trace coarse to fine sand, moist, topsoil -FILL- CL		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
636.7	1.0		Very stiff brown silty CLAY, some coarse to fine sand, little fine gravel, trace organics, low plasticity, moist -FILL- CL	18/24"	SS-2 1.0 3.0	3/4/6/9 qu* = 3.0tsf LL = 27 PL = 14 Moisture Content = 16.0%
634.9	2.8		Stiff brown silty CLAY, little coarse to fine sand, trace organics, medium plasticity, wet -FILL- CL	12/24"	SS-3 3.0 5.0	3/4/7/7 qu* = 1.8tsf Moisture Content = 22.0%
633.2	4.5		Stiff brown silty CLAY, some coarse to fine sand, little coarse to fine gravel, trace organics, low plasticity, wet -FILL- CL	18/24"	SS-4A/B 5.0 7.0	4/7/14/15 SS-4A: Moisture Content = 22.3% Gravel = 16.6% Sand = 25.5% Fines = 57.9% SS-4B: qu* > 4.5tsf LL = 37 PL = 17 Gravel = 0.0% Sand = 13.3% Silt = 43.0% Clay = 43.7%
632.2	5.5		Hard gray silty CLAY, trace coarse to fine sand, medium plasticity, moist CL	18/24"	SS-5A/B 7.0 9.0	7/8/9/16 SS-5A: Moisture Content = 17.2% qu* > 4.5tsf SS-5B: Moisture Content = 14.7% Gravel = 0.6% Sand = 82.7% Fines = 16.7%
629.4	8.3		Medium dense gray coarse to fine SAND, little silt, moist SM	24/24"	SS-6 9.0 11.0	4/9/13/17
628.9	8.8		Medium dense gray SILT, trace clay, trace medium to fine sand, moist ML	24/24"	SS-7 11.0 13.0	6/11/11/14 Moisture Content = 16.6%
				18/24"	SS-8 13.0 15.0	6/11/11/14
622.7	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite.

D-9-14

Hole No. DPRL-6

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 37 N 1979028 E 620340
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-6
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8 / UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	626.0
16. DATE HOLE	STARTED JUN 16 97 / COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	634.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Dark brown SILT, trace clay, trace organics, moist, topsoil -FILL- ML		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
633.0	1.5		Very stiff brown silty CLAY and coarse to fine sand, low plasticity, moist -FILL- CL	14/24"	SS-2 1.0 3.0	4/6/11/12 qu* = 3.4tsf
				6/24"	SS-3 3.0 5.0	9/11/15/18 Coarse gravel in spoon tip. Moisture Content = 15.4%
630.2	4.3		Hard gravish brown silty CLAY, trace medium to fine sand, high plasticity, wet CH	24/24"	SS-4 5.0 7.0	9/11/16/21 Moisture Content = 21.7% qu* = 4.25tsf LL = 50 PL = 21
627.3	7.2		Very stiff to medium stiff gray SILT and clay, trace medium to fine sand, low plasticity, wet ML	18/24"	SS-5 7.0 9.0	9/11/14/14 qu* = 0.8tsf
						Water level approximately 8.5' after 18 hours with approximately 4.0' of cave-in.
				24/24"	SS-6 9.0 11.0	6/9/11/12 qu* = 1.8tsf Moisture Content = 22.0%
				24/24"	SS-7 11.0 13.0	4/6/9/11 qu* = 1.75tsf Gravel = 0.0% Sand = 6.9% Silt = 72.6% Clay = 20.5%
				24/24"	SS-8 13.0 15.0	4/7/11/14 qu* = 2.5tsf Moisture Content = 13.0%
619.5	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite. Offset hole to obtain a Shelby tube sample. See Log DPRL-6A.

(modified by GCA 1/94) Des Plaines River Levee - 5235.10 DPRL-6

Hole No. DPRL-6A

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 37 N 1979028 E 620340
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-6A
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	5.5
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	5.5
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 0 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 16 97 / COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	634.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Blind drilled to 5.0'.			
				0/6"	3T-1 5.0	Attempted to push 3" Shelby tube. Unable to push tube through the hard clay.
629.0	5.5		End of Boring at 5.5'.		5.5	Borehole backfilled with granular bentonite.

D-9-16

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 42 N 1960702 E 624302
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-7
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.2
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.2
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	623.5
16. DATE HOLE	STARTED JUN 16 97; COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	631.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Brown to black SILT, trace to little coarse to fine sand, trace organics, moist, topsoil ML		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
630.0	1.5		Loose brown coarse to fine SAND, trace silt, poorly graded, moist SP-SM	12/24"	SS-2 1.0 3.0	1/2/4/4
				24/24"	SS-3 3.0 5.0	2/3/3/3 Moisture Content = 13.9% Sand = 93.1% Fines = 6.9%
				24/24"	SS-4 5.0 7.0	3/4/4/15
624.5	7.0		Medium dense brown coarse to fine SAND, little silt, trace fine gravel, trace clay, moist SW-SM	14/24"	SS-5A/B 7.0 9.0	4/12/14/16 SS-5A: Moisture Content = 12.2% SS-5B: Moisture Content = 21.8% qu* > 4.5tsf LL = 39 PL = 18
623.8	7.7		Hard brown silty CLAY, trace coarse to fine sand, medium plasticity, moist CL			
622.9	8.6		Very stiff gray silty CLAY, trace coarse to fine sand, trace fine gravel, medium plasticity, moist CL	18/24"	SS-6A/B 9.0 11.0	Water level approximately 8.0' after 24 hours with 4.5' of cave-in. 9/8/26/18 SS-6A: Moisture Content = 18.4% qu* = 3.0tsf LL = 31 PL = 15
621.5	10.0		Dense gray coarse to fine SAND, trace fine gravel, trace silt, well graded, saturated SW			
620.5	11.0		Very stiff gray SILT and clay, trace medium to fine sand, low plasticity, moist CL-ML	24/24"	SS-7 11.0 13.0	9/11/14/17 qu* = 3.5tsf Gravel = 2.1% Sand = 18.8% Silt = 52.7% Clay = 26.4%
				24/24"	SS-8 13.0 15.0	9/11/17/28 Moisture Content = 17.5% qu* = 3.7tsf
616.3	15.2		End of Boring at 15.2'.	0/3"	3T-9 15.0 15.2	Attempted to push a 3" Shelby tube at 15.0'. Shelby tube refusal at 15.2'. Borehole backfilled with granular bantonite.

D-9-17

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 42 N 1960629 E 623738
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-8
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 7 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97 / COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	631.4
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Black SILT, trace to little coarse to fine sand, trace organics, moist, topsoil ML		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
630.4	1.0		Medium stiff brown silty CLAY and coarse to fine sand, trace organics, medium plasticity, moist CL	10/24"	SS-2 1.0 3.0	3/2/4/7 Moisture Content = 15.6%
629.0	2.4		Medium dense to loose brown coarse to fine SAND, little silt, moist SM	8/24"	SS-3 3.0 5.0	3/5/7/6
				12/24"	SS-4 5.0 7.0	2/3/4/3 Moisture Content = 15.2% Sand = 86.9% Fines = 13.1%
624.9	6.5		Medium dense brown coarse to fine SAND, some fine gravel, trace silt, well graded, moist SW-SM	8/24"	SS-5 7.0 9.0	7/10/11/7 Sand = 65.5% Gravel = 25.1% Fines = 9.4%
				6/24"	SS-6 9.0 11.0	9/10/19/17 Moisture Content = 12.8%
621.1	10.3		Very stiff gray silty CLAY, trace coarse to fine sand, trace coarse to fine gravel, medium plasticity, moist to wet CL	18/24"	SS-7 11.0 13.0	9/15/21/24 qu* = 3.8tsf LL = 44 PL = 19 Gravel = 1.4% Sand = 6.7% Silt = 37.5% Clay = 54.4%
618.6	12.8		Medium stiff dark gray silty CLAY, little coarse to fine sand, little fine gravel, trace medium gravel, low plasticity, moist CL	21/24"	3T-8A/B 13.0 15.0	Pushed 3" Shelby tube 3T-8A: Moisture Content = 19.1% qu* = 0.75tsf Dry Density = 105.7pcf 3T-8B: Moisture Content = 15.4% Dry Density = 124.7pcf
617.6	13.8		Hard dark gray SILT, trace coarse to fine sand, trace fine gravel, moist ML			
616.4	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite. Replaced sod on top of boring.

D-9-18

MAR 71 (modified by GCA 1/94)
Des Plaines River Levee - 5235.10 DPRL-8

Hole No. DPRL-9

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 50 N 1957724 E 623824
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-9
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	17.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	17.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 8; UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	621.5
16. DATE HOLE	STARTED JUN 16 97; COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	632.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Stiff dark brown silty CLAY, trace coarse to fine sand, trace coarse to fine gravel, trace organics, low plasticity, wet, topsoil -FILL- CL	10/24"	SS-1 0.0 2.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches. 8/10/10/7 qu* = 1.7tsf
				4/12"	SS-2 2.0 3.0	14/16 Moisture Content = 25.3%
629.8	2.7		Loose to medium dense dark brown coarse to fine SAND, little fine gravel, trace silt, trace slag, trace organics, moist to saturated -CINDER FILL- SP-SM	4/24"	SS-3 3.0 5.0	1/2/2/3 Moisture Content = 20.9%
				4/24"	SS-4 5.0 7.0	4/3/4/4
				5/24"	SS-5 7.0 9.0	4/7/5/3 Moisture Content = 6.4% Sand = 75.8% Gravel = 17.4% Fines = 6.8%
				3/24"	SS-6 9.0 11.0	1/2/4/7
			Saturated at 11.0'	7/24"	SS-7 11.0 13.0	8/3/4/6 Moisture Content = 23.7% Water level approximately 11.0' after 24 hours with 6.0' of cave-in.
619.0	13.5			18/24"	SS-8 13.0 15.0	3/4/7/5 qu* = 0.8tsf
			Medium stiff dark gray silty CLAY, trace shells, medium plasticity, wet CL			
617.7	14.8		Soft black silty CLAY, trace coarse to fine sand, trace fine gravel, high plasticity, wet CH	24/24"	3T-9A/B 15.0 17.0	Pushed 3" Shelby tube 3T-9A: Moisture Content = 39.2% qu* = 0.5tsf Dry Density = 82.5pcf LL = 56 PL = 25 3T-9B: Moisture Content = 24.4% qu* = 0.75tsf Torvane Shear Strength = .08tsf Borehole backfilled with granular bentonite. Obtained Shelby tube samples in offset hole DPRL-9A.
616.2	16.3					
615.5	17.0		Dark gray coarse to fine SAND, some silt, little fine gravel, saturated SM			
			End of Boring at 17.0'.			

D-9-19

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 50 N 1957724 E 623824
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-9A
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	16.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	16.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 0 / UNDISTURBED 1
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 16 97 / COMPLETED JUN 16 97
17. ELEVATION TOP OF HOLE	632.5
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Blind drilled to 14.0'			
618.5	14.0		Medium stiff black organic silty CLAY, little medium to fine sand, high plasticity, wet OH	19/24"	3T-1 14.0 16.0	Pushed 3" Shelby tube qu*(top) = 0.5tsf M.C. (top) = 39.2% qu*(bottom) = 0.75tsf Unconfined Compression = 0.5tsf @ 6% Dry Density = 73.0pcf Sand = 17.5% Silt = 60.2% Clay = 32.3% Borehole backfilled with granular bentonite.
616.5	16.0		End of Boring at 16.0'.			

D-9-20

DRILLING LOG

DIVISION	North Central
INSTALLATION	Chicago District
SHEET	1 OF 1 SHEETS
1. PROJECT	Des Plaines River Levee - 5235.10
2. LOCATION (Coordinates or Station)	Levee 50 N 1958342 E 623965
3. DRILLING AGENCY	Patrick Drilling
4. HOLE NO. (As shown on drawing title and file number)	DPRL-10
5. NAME OF DRILLER	Jerry Copak
6. DIRECTION OF HOLE	[X] VERTICAL [ ] INCLINED 0.0 DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN	15.0
8. DEPTH DRILLED INTO ROCK	0.0
9. TOTAL DEPTH OF HOLE	15.0
10. SIZE AND TYPE OF BIT	3 1/4" I.D. HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)	MSL
12. MANUFACTURER'S DESIGNATION OF DRILL	CME 55
13. TOTAL NO. OF OVER-BURDEN SAMPLES TAKEN	DISTURBED 5 / UNDISTURBED 3
14. TOTAL NUMBER CORE BOXES	N/A
15. ELEVATION GROUND WATER	
16. DATE HOLE	STARTED JUN 17 97 / COMPLETED JUN 17 97
17. ELEVATION TOP OF HOLE	626.8
18. TOTAL CORE RECOVERY FOR BORING	N/A %
19. SIGNATURE OF INSPECTOR	

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g
			Black SILT, trace coarse to fine sand, trace organics, trace clay, topsoil ML -FILL-		AU-1 0.0 1.0	2" split-spoon samples were obtained using a 140 lb. hammer falling 30 inches.
625.6	1.2		Stiff to medium stiff brown silty CLAY to clayey silt, trace coarse to fine sand, medium plasticity, wet -FILL- CL-ML	16/24"	SS-2 1.0 3.0	2/2/3/4 qu* = 1.3tsf
				18/24"	SS-3 3.0 5.0	2/2/2/2 Moisture Content = 23.7% qu* = 0.75tsf Gravel = 0.0% Sand = 14.6% Silt = 57.1% Clay = 28.3%
622.0	4.8		Stiff dark brown silty CLAY, trace medium to fine sand, high plasticity, moist CH -FILL-	17/24"	3T-4 5.0 7.0	Pushed 3" Shelby tube qu* = 0.75tsf Torvane Shear Strength = 0.5tsf M.C. = 32.7% LL = 51 PL = 24 Dry Density = 92.9pcf
620.1	6.7		Medium stiff dark grayish brown CLAY, trace coarse to fine sand, high plasticity, wet CH	18/24"	3T-5 7.0 9.0	3T-4: qu = 1.2tsf @ 10% Dry Density = 86.5pcf Moisture Content = 32.7% Pushed 3" Shelby tube qu* = 1.0tsf Torvane Shear Strength (top) = 0.50tsf M.C. = 37.8%
				12/24"	3T-6 9.0 11.0	Dry Density = 97.9pcf Pushed 3" Shelby tube qu* = 0.75tsf Torvane Shear Strength = 0.35tsf M.C. (middle) = 33.6% LL = 42 PL = 18 Dry Density = 93.5pcf Unconfined Compression = 0.9tsf @ 15%
				20/24"	3T-7 ABC 11.0 13.0	Pushed 3" Shelby tube 3T-7A: Moisture Content = 26.4% qu* = 0.5tsf Torvane Shear Strength = 0.33tsf 3T-7B: Moisture Content = 29.8% Dry Density = 92.6tsf LL = 27 PL = 19 3T-7C: Moisture Content = 8.6%
615.0	11.8		Medium stiff dark gray silty CLAY, some medium to fine sand, medium plasticity, wet CL			
614.0	12.8		Medium dense brown coarse to fine SAND and gravel, trace silt, poorly graded, moist SP-SM	6/24"	SS-8 13.0 15.0	6/8/11/13 Moisture Content = 16.5% Gravel = 45.4% Sand = 47.9% Fines = 6.7%
611.8	15.0		End of Boring at 15.0'.			Borehole backfilled with granular bentonite.

D-9-21

Des Plaines River Levee - 5235.10 DPRL-10

SOIL TESTING LABORATORY DATA

LEVEE SUBSURFACE INVESTIGATION SOIL PARAMETER SUMMARY

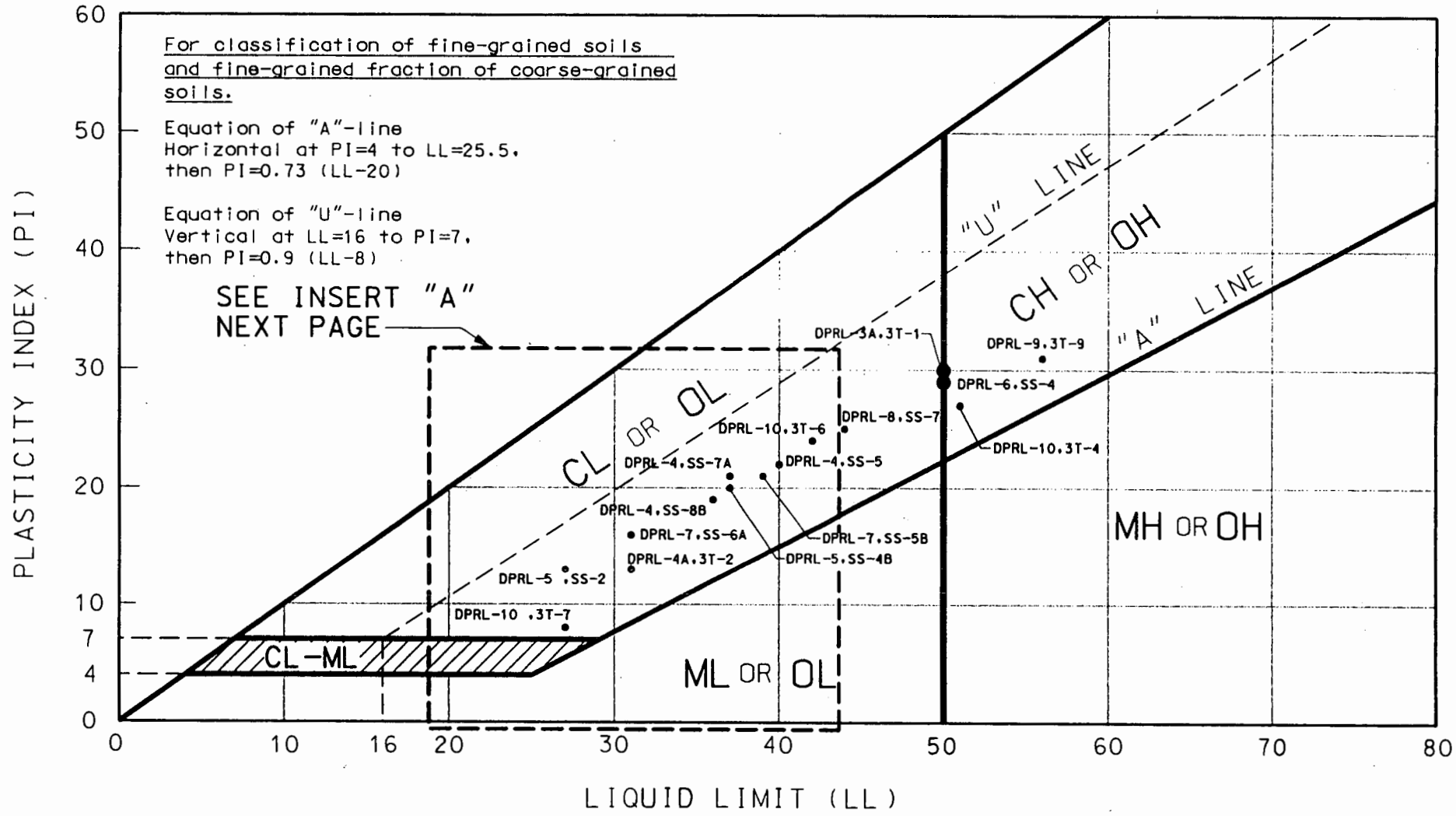
LEVEE (BOREHOLE)	SOIL STRATA NUMBER & SOIL TYPE	SAMPLE TYPE	MEAN BLOW COUNT (blows/foot)	MEAN MOISTURE CONTENT (%)	MEAN qu* (tsf)	MEAN c = qu*/2 (psf)	UNCONFINED qu (tsf)	UNCONFINED c = qu/2 (psf)
L5 (TB-1)	1 OL to CL	SP	2.0	19.00				
	2 SM, ML-SM to SP-SM	SP	14.3	13.50				
	3 CL	SP	14.4	16.50			2.00	2000.00
L27 (DPRL-3)	1 ML, CL	SP	12.6		0.950	950		
	1 to	3T-1	NA	27.60	1.000	1000		
	1 CL-ML	3T-2	NA	24.00	1.500	1500		
	2 SW-SM to SP	SP	23.3					
	3 CL-ML	SP			4.250	4250		
L27 (DPRL-4)	1	SP	11.0	20.15	1.680	1680		
	1 CL	3T-1	NA	19.10	3.000	3000		
	1 to	3T-2	NA	23.30	1.420	1420	1.30	1300.00
	1 ML	3T-2	NA	25.50				
	1	3T-3	NA	23.40	1.875	1875	0.80	800.00
	2 SW	SP		8.00				
L37 (DPRL-6)	1 ML, CL -FILL-	SP	21.5	15.40	3.400	3400		
	2 CH	SP	27.0	21.70	4.250	4250		
	3 ML	SP	19.5	17.50	1.710	1710		
L37 (DPRL-5)	1 CL -FILL-	SP	14.0	20.10	2.400	2400		
	2 CL	SP	17.0	17.20	4.500	4500		
	3 ML	SP	22.0	16.60				
L42 (DPRL-8)	1 ML, CL, SM to SW-SM	SP	17.3	14.00				
	2 CL	SP			3.800	3800		
	2 to ML	3T-8A	NA		0.750	750		
L42 (DPRL-7)	1 ML, SP-SM to SW-SM	SP	11.5	13.05				
	2 CL, SW to CL-ML	SP	29.0	19.23	3.675	3675		
L50 (DPRL-10)	1 ML, CL-ML	SP	4.5	23.70	1.025	1025		
	1 to CH	3T-4	NA	32.70	0.750	750		
	1 -FILL-	3T-4	NA	32.70			1.20	1200.00
	2 CH	3T-5	NA	37.80	1.000	1000		
	2 to	3T-6	NA	33.60	0.750	750	0.90	900.00
	2 CL	3T-7	NA	26.40	0.500	500		
	3 SP-SM	SP	19.0	16.50				
L50 (DPRL-9)	2 CL	SP	12.0	39.20	0.650	650		
	2 to CH	3T-1	NA	39.20	0.625	625	0.50	500.00

SP = Split spoon, 3T-# = Shelby tube, NA = Not Applicable, qu* = Pocket penetrometer reading

LEVEE SUBSURFACE INVESTIGATION SOIL PARAMETER SUMMARY

LEVEE (BOREHOLE)	SOIL STRATA NUMBER & SOIL TYPE	SOIL STRATA DEPTH (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE CONTENT ** (%)	MOIST DENSITY (pcf)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)
L5 (TB-1)	1 OL to CL	0-3	SP						
	2 SM, ML-SM to SP-SM	3-20	SP						
	3 CL	20-50	SP	120.0	17.00	140.4	33.0	15.0	18.0
L27 (DPRL-3)	1 ML, CL		SP						
	1 to	0-7.8	3T-1	96.3	27.60	122.9	50.0	20.0	30.0
	1 CL-ML		3T-2	96.4	22.20	117.8			
	2 SW-SM to SP	7.8-14	SP						
	3 CL-ML	14-15	SP						
L27 (DPRL-4)	1		SP				37.6	17.0	20.6
	1 CL		3T-1						
	1 to	0-14.7	3T-2	108.0	23.30	133.2	31.0	18.0	13.0
	1 ML		3T-2	101.1	25.50	126.9			
	1		3T-3	104.1	25.70	130.9			
	2 SW	14.7-15	SP						
L37 (DPRL-6)	1 ML, CL -FILL-	0-4.3	SP						
	2 CH	4.3-7.2	SP				50.0	21.0	29.0
	3 ML	7.2-15	SP						
L37 (DPRL-5)	1 CL -FILL-	0-5.5	SP				27.0	14.0	13.0
	2 CL	5.5-8.3	SP				37.0	17.0	20.0
	3 ML	8.3-15	SP						
L42 (DPRL-8)	1 ML, CL, SM to SW-SM	0-10.3	SP						
	2 CL	10.3-15	SP				44.0	19.0	25.0
	2 to ML		3T-8A	105.7	19.10	125.9			
L42 (DPRL-7)	1 ML, SP-SM to SW-SM	0-7.7	SP						
	2 CL, SW to CL-ML	7.7-15.2	SP				35.0	16.5	18.5
L50 (DPRL-10)	1 ML, CL-ML		SP						
	1 to CH	0-6.7	3T-4	92.9	32.70	123.3	51.0	24.0	27.0
	1 -FILL-		3T-4	86.5	32.70	114.8			
	2 CH		3T-5	97.9	37.80	134.9			
	2 to	6.7-12.8	3T-6	93.5	33.60	124.9	42.0	18.0	24.0
	2 CL		3T-7	92.6	29.80	120.2	27.0	19.0	8.0
	3 SP-SM	12.8-15	SP						
L50 (DPRL-9)	2 CL	13.5-16.3	SP	82.5	39.20	114.8	56.0	25.0	31.0
	2 to CH		3T-1	73.0	39.20	101.6			

** Moisture content for dry density sample, SP = Split spoon, 3T-# = Shelby tube



LEGEND

• DPRL-8, SS-7 PLOT OF LIQUID LIMIT AND PLASTICITY INDEX
BORING NUMBER, SAMPLE NUMBER

PATRICK ENGINEERING INC.
LISLE, ILLINOIS

ARMY CORPS OF ENGINEERS
DES PLAINES RIVER LEVEE PROJECT

PLASTICITY CHART

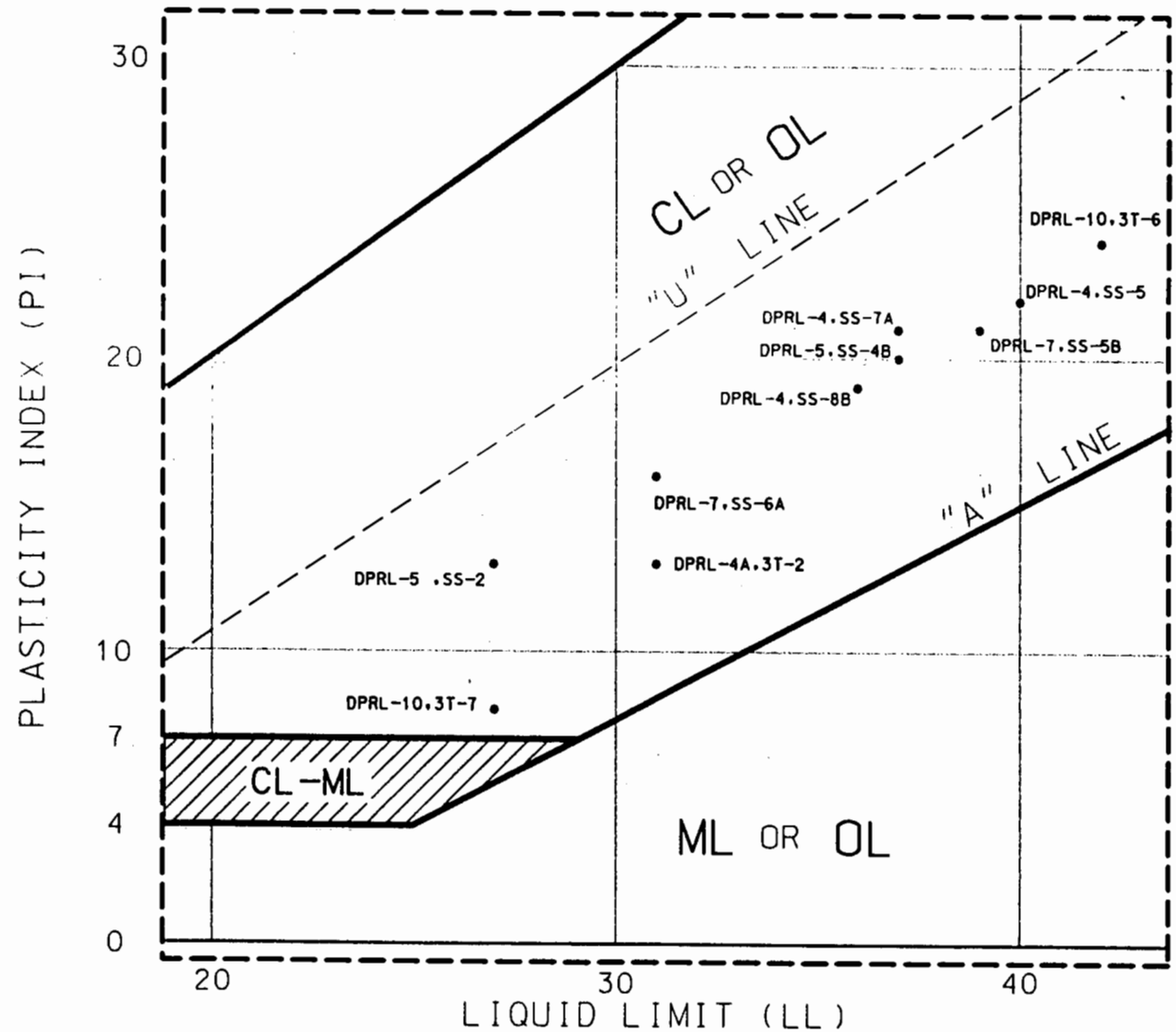
DATE: JULY, 1997
PROJ. NO.: 5235.10
APP. BY: JFB

For classification of fine-grained soils and fine-grained fraction of coarse-grained soils.

Equation of "A"-line
Horizontal at PI=4 to LL=25.5,
then PI=0.73 (LL-20)

Equation of "U"-line
Vertical at LL=16 to PI=7,
then PI=0.9 (LL-8)

INSERT "A"



LEGEND

• DPRL-4. SS-5 PLOT OF LIQUID LIMIT AND PLASTICITY INDEX
BORING NUMBER. SAMPLE NUMBER

D-9-26

PATRICK ENGINEERING INC.
LISLE, ILLINOIS

ARMY CORPS OF ENGINEERS
DES PLAINES RIVER LEVEE PROJECT

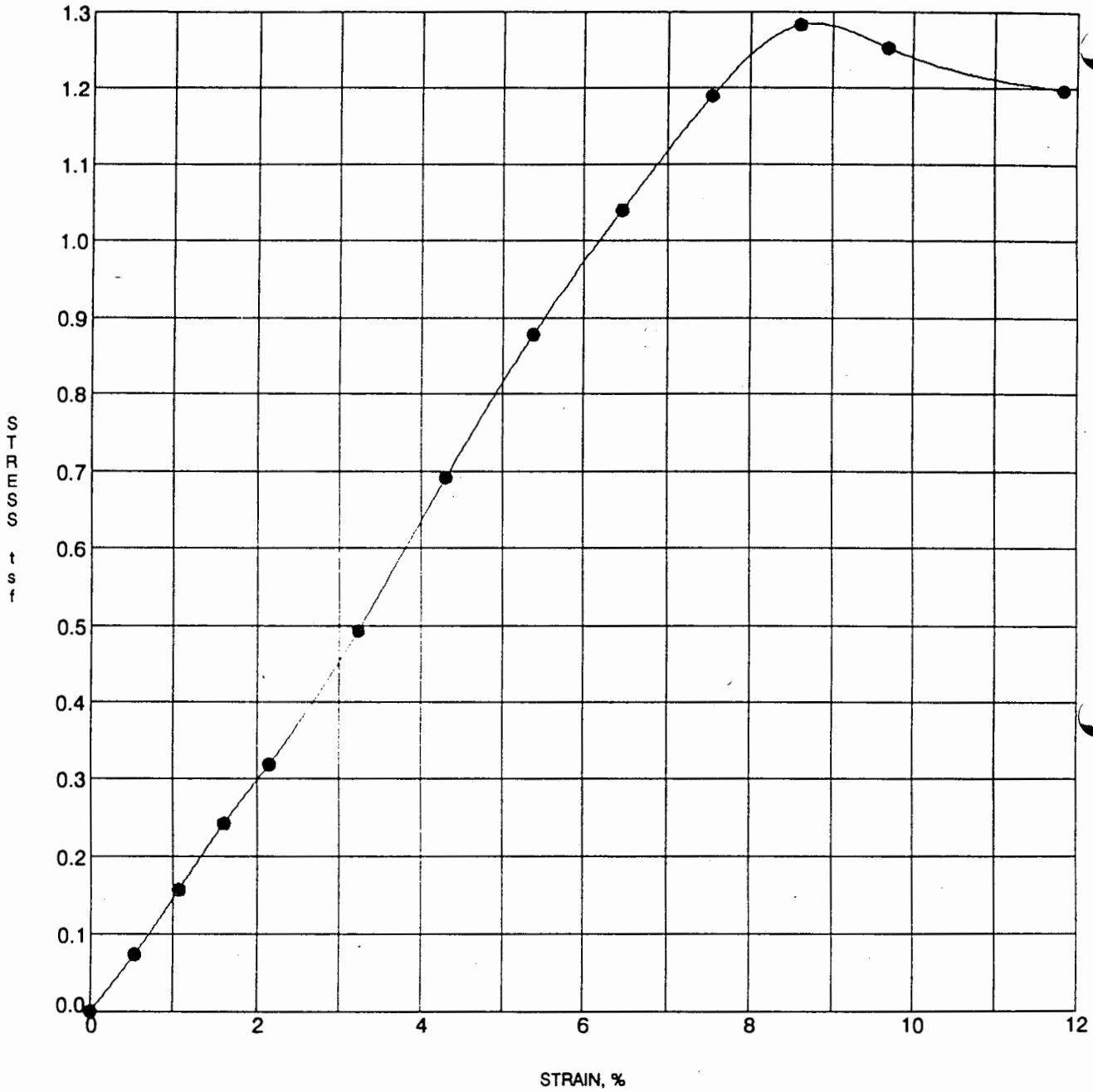
PLASTICITY CHART

DATE: JULY, 1997
PROJ. NO.: 5235.10

LEVEE SITES SUBSURFACE INVESTIGATION
UNCONFINED COMPRESSION TEST DATA SUMMARY

LEVEE SYSTEM (BOREHOLE)	SAMPLE NUMBER	SAMPLE DEPTH (feet)	DRY DENSITY (pcf)	NATURAL MOISTURE CONTENT (%)	MAXIMUM SHEAR STRESS, qu (tsf)	(psf)	STRAIN AT qu (%)	COHESION, c (psf)
L27								
(DPRL-4A)	3T-2	3.0 to 5.0	108.0	21.0	1.28	2567	8.5	1280
(DPRL-4A)	3T-3	5.0 to 7.0	104.1	23.6	0.81	1620	15.4	810
L50								
(DPRL-9A)	3T-1	14.0 to 16.0	73.0	50.7	0.55	1100	5.2	550
(DPRL-10)	3T-4	5.0 to 7.0	86.5	35.0	1.23	2460	10.4	1230
(DPRL-10)	3T-6	9.0 to 11.0	93.5	31.6	0.95	1900	20.0	950

pcf = pounds per cubic foot; % = percent; tsf = tons per square foot; psf = pounds per square foot



Specimen Identification	Classification	D.Den.	MC%
DPRL-4A 3T-2	Brown Silty Clay CL	108.0	21.0
3.0-5.0'			

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.I0-99

DATE 7/21/97

UNCONFINED COMPRESSION TEST

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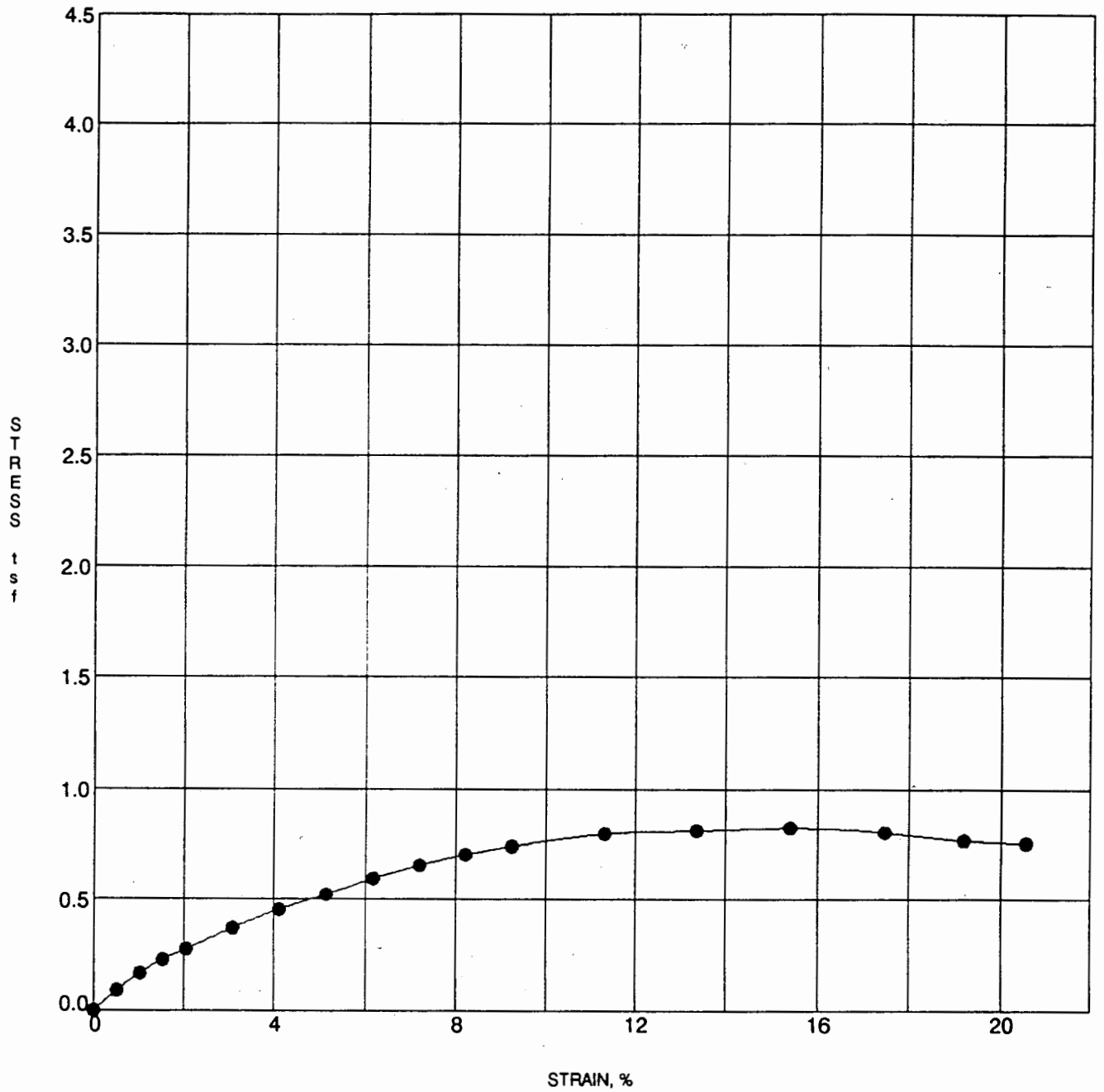
D-9-28



Specimen Identification	Classification	D.Den.	MC%
DPRL-4A 3T-3	Brown Silty Clay	104.1	23.6
5.0-7.0'			

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UNCONFINED COMPRESSION TEST

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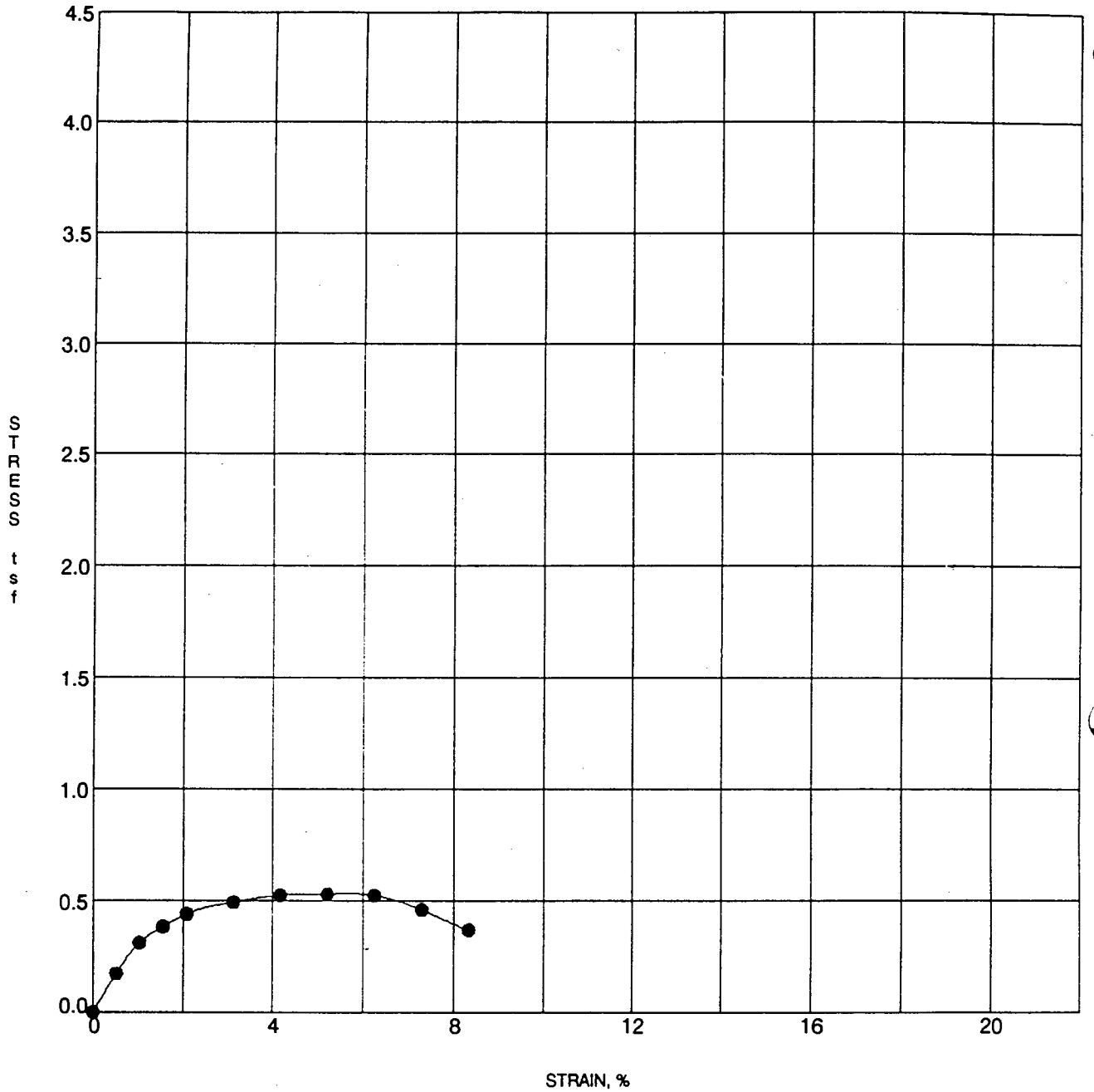

Specimen Identification	Classification	D.Den.	MC%
DPRL-9A 3T-1	Black Organic Clay OL	73.0	50.7
14.0-16.0'			

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JOB NO. 5235.10-99

DATE 7/21/97

UNCONFINED COMPRESSION TEST

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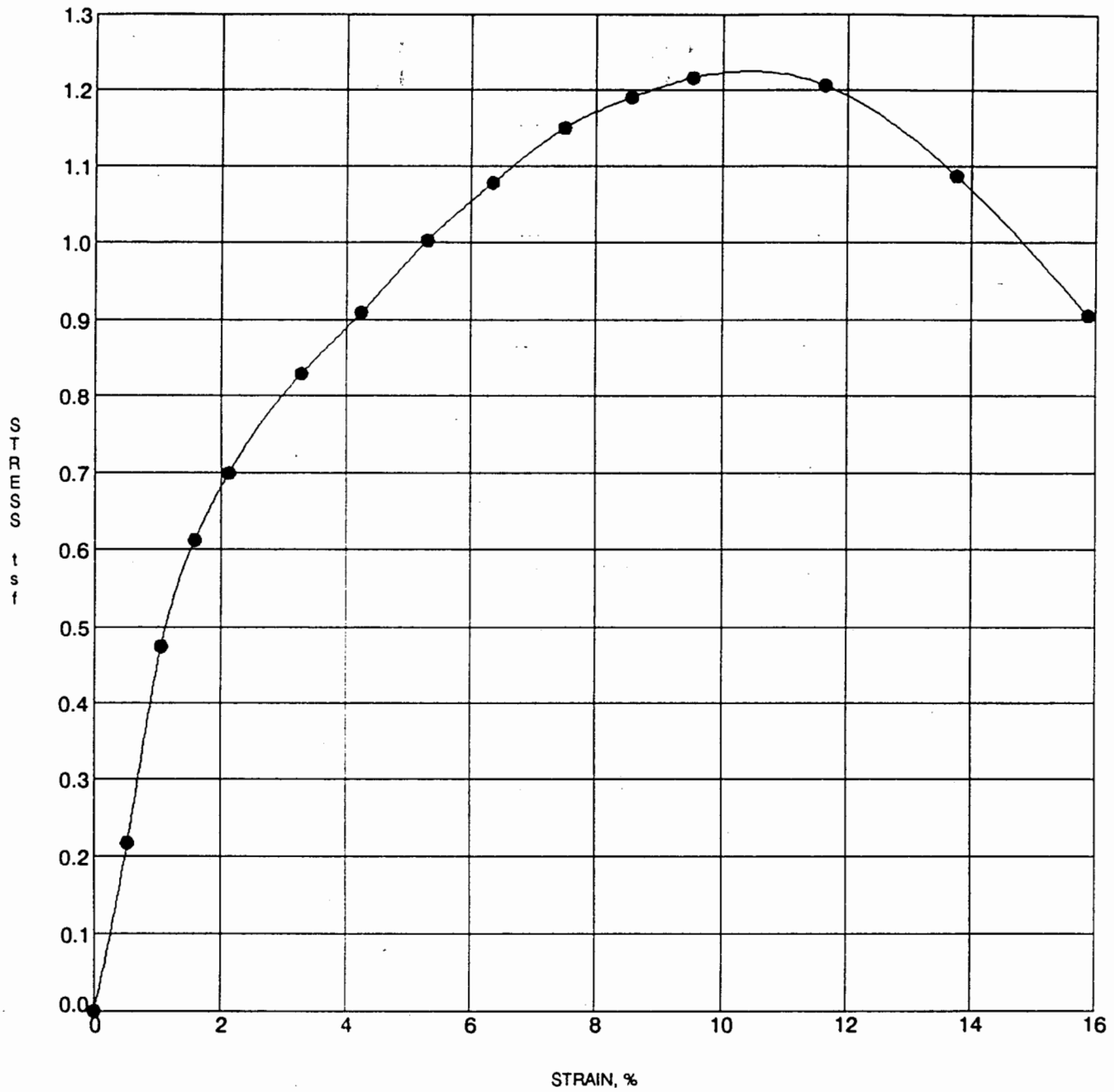

Specimen Identification	Classification	D.Den.	MC%
DPRL-10 3T-4	Dark Brown Silty Clay, Trace Coarse to Fine Sand	86.5	35.0
5.0-7.0'	CL		

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UNCONFINED COMPRESSION TEST

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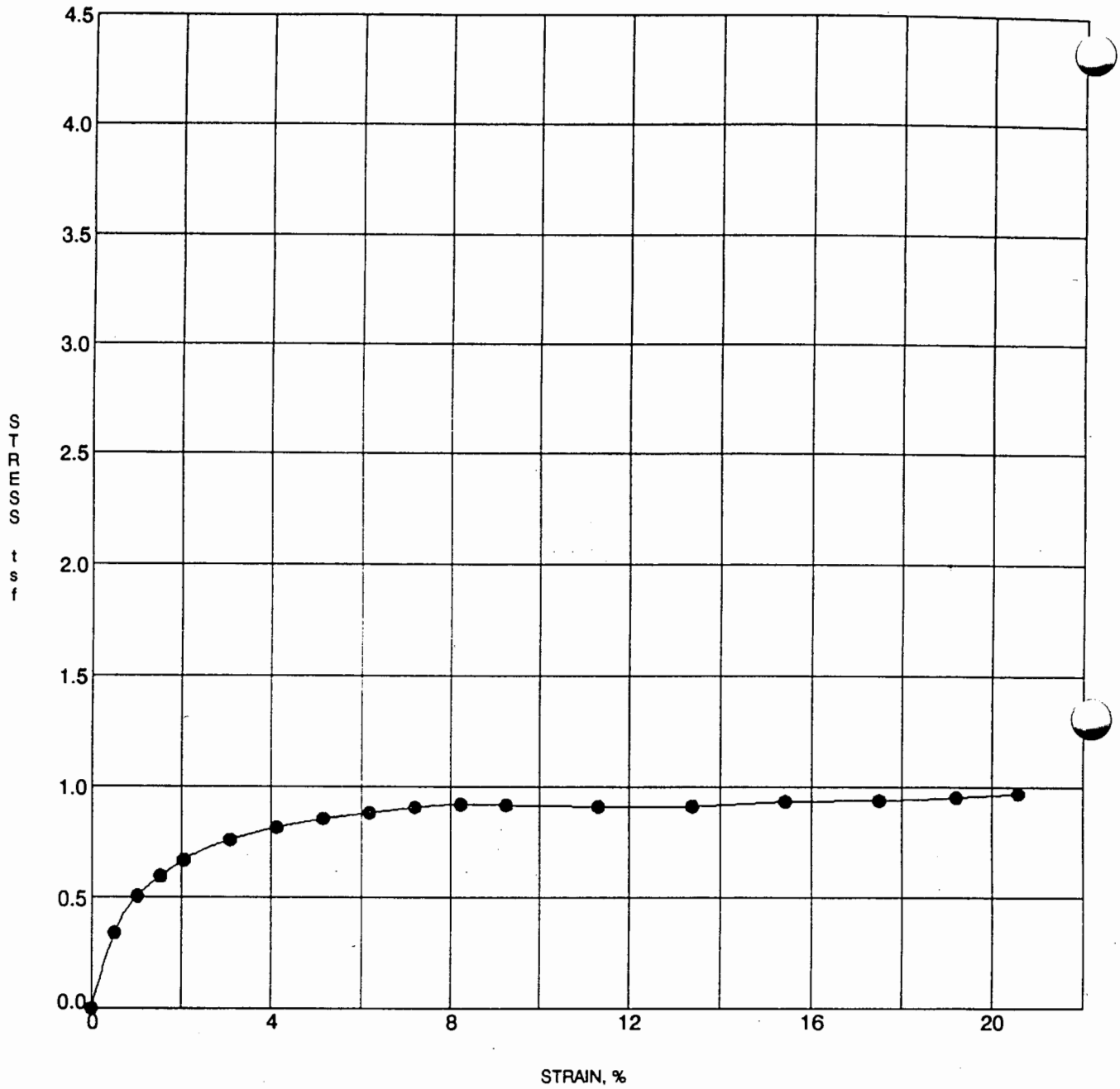

Specimen Identification	Classification	D.Den.	MC%
DPRL-10 3T-6	Brown Clay CH	93.5	31.6
9.0-11.0'			

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JOB NO. 5235.I0-99

DATE 7/21/97

UNCONFINED COMPRESSION TEST

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Lisle, Illinois

D-9-32

LEVEE SUBSURFACE INVESTIGATION
SOIL MECHANICAL AND HYDROMETER PARAMETER SUMMARY

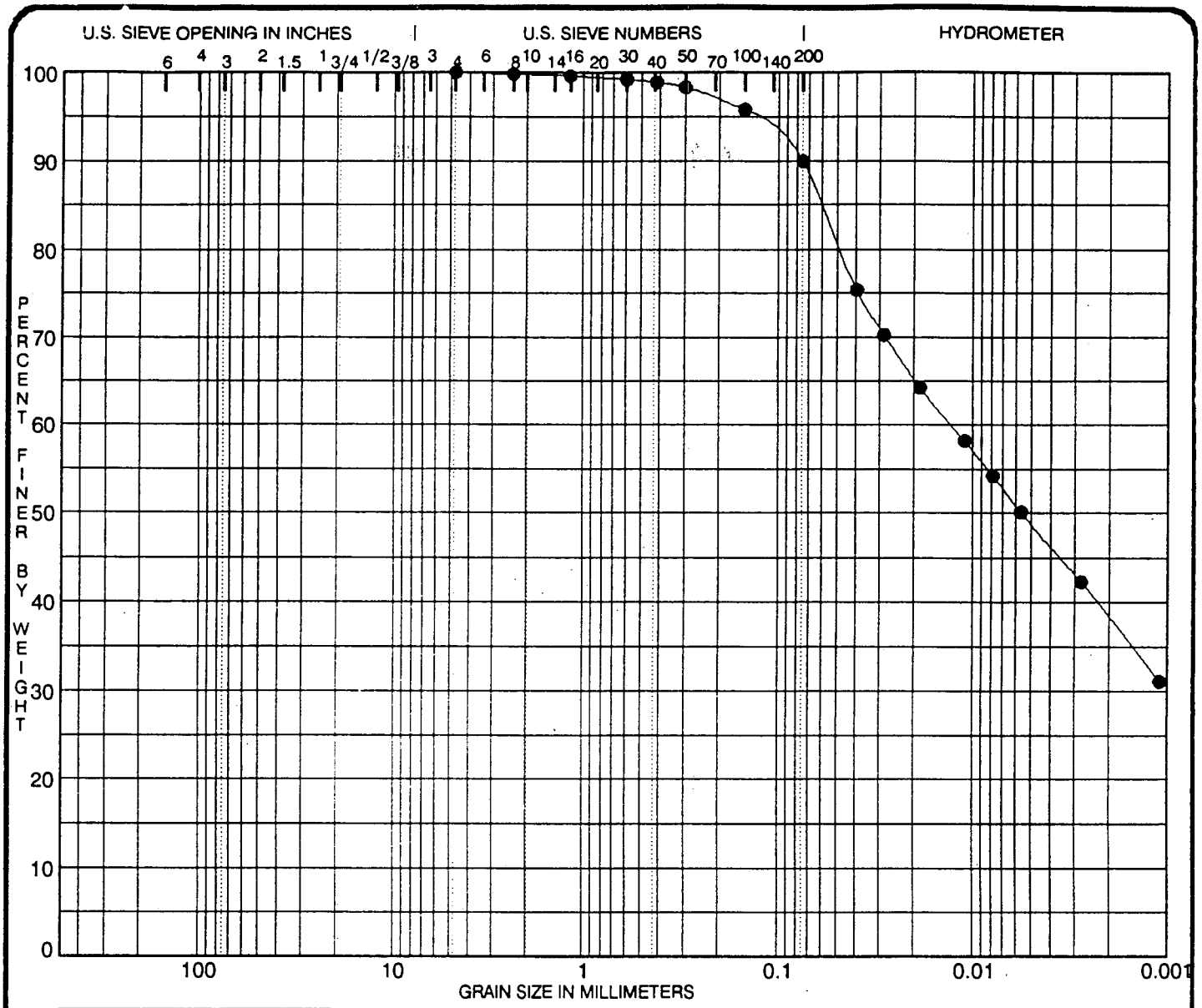
LEVEE (BOREHOLE)	SAMPLE NUMBER	SAMPLE DEPTH (feet)	MECHANICAL ANALYSIS GRAVEL %	SAND %	FINES %	HYDROMETER ANALYSIS SILT %	CLAY %
L27 (DPRL-3)	SS-4	5.0 to 7.0	0.0	10.1	– –	51.6	38.3
	SS-6	9.0 to 11.0	4.9	84.7	10.4	**	**
	SS-7	11.0 to 13.0	2.9	94.2	2.9	**	**
L27 (DPRL-4)	SS-5	7.0 to 9.0	0.0	0.1	– –	52.3	47.6
L37 (DPRL-5)	SS-4A	5.0 to 5.5	16.6	25.5	57.9	**	**
	SS-4B	5.5 to 7.0	0.0	13.3	– –	43.0	43.7
	SS-5B	8.7 to 9.0	0.6	82.7	16.7	**	**
L37 (DPRL-6)	SS-7	11.0 to 13.0	0.0	6.9	– –	72.6	20.5
L42 (DPRL-7)	SS-3	3.0 to 5.0	0.0	93.1	6.9	**	**
	SS-7	11.0 to 13.0	2.1	18.8	– –	52.7	26.4
L42 (DPRL-8)	SS-4	5.0 to 7.0	0.0	86.9	13.1	**	**
	SS-5	7.0 to 9.0	25.1	65.5	9.4	**	**
	SS-7	11.0 to 13.0	1.4	6.7	– –	37.5	54.4
L50 (DPRL-9)	SS-5	7.0 to 9.0	17.4	75.8	6.8	**	**
L50 (DPRL-9A)	3T-1	14.0 to 16.0	0.0	17.5	– –	50.2	32.3
L50 (DPRL-10)	SS-3	3.0 to 5.0	0.0	14.6	– –	57.1	28.3
	SS-8	13.0 to 15.0	45.4	47.9	6.7	**	**

– – Silt and clay fraction measured with hydrometer analysis, ** Silt and clay fractions not determined

LEVEE SUBSURFACE INVESTIGATION
SOIL MECHANICAL AND HYDROMETER PARAMETER SUMMARY

LEVEE (BOREHOLE)	SAMPLE NUMBER	SEDIMENT DIAMETER (millimeter) D100	D60	D30	D10	Cu (unitless)	Cc (unitless)
L27 (DPRL-3)	SS-4	4.75	0.01			NC	NC
	SS-6	19.00	0.50	0.236		NC	NC
	SS-7	9.50	0.88	0.472	0.2388	3.7	1.1
L27 (DPRL-4)	SS-5	0.30	0.00			NC	NC
L37 (DPRL-5)	SS-4A	19.00	0.12			NC	NC
	SS-4B	4.75	0.00			NC	NC
	SS-5B	9.50	0.28	0.165		NC	NC
L37 (DPRL-6)	SS-7	4.75	0.02	0.005		NC	NC
L42 (DPRL-7)	SS-3	4.75	0.23	0.174	0.0972	2.4	1.4
	SS-7	9.50	0.02	0.003		NC	NC
L42 (DPRL-8)	SS-4	4.75	0.33	0.183		NC	NC
	SS-5	19.00	2.54	0.783	0.0914	27.7	2.6
	SS-7	9.50	0.00			NC	NC
L50 (DPRL-9)	SS-5	19.00	0.27	0.175	0.0893	3.0	1.3
L50 (DPRL-9A)	3T-1	4.75	0.02	0.001		NC	NC
L50 (DPRL-10)	SS-3	4.75	0.02	0.003		NC	NC
	SS-8	37.50	7.46	0.676	0.1818	41.0	0.3

Cu = Coefficient of uniformity = D60/D10
Cc = Coefficient of curvature = (D30)exp2 / ((D10)(D60))
NC = Not computable (e.g., D10 is unknown)



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-3	SS-4	Gray Clayey Silt, Trace Coarse to Fine Sand						
		5.0-7.0'	CL-ML						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-3	5.0	4.75	0.01			0.0	10.1	51.6	38.3

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

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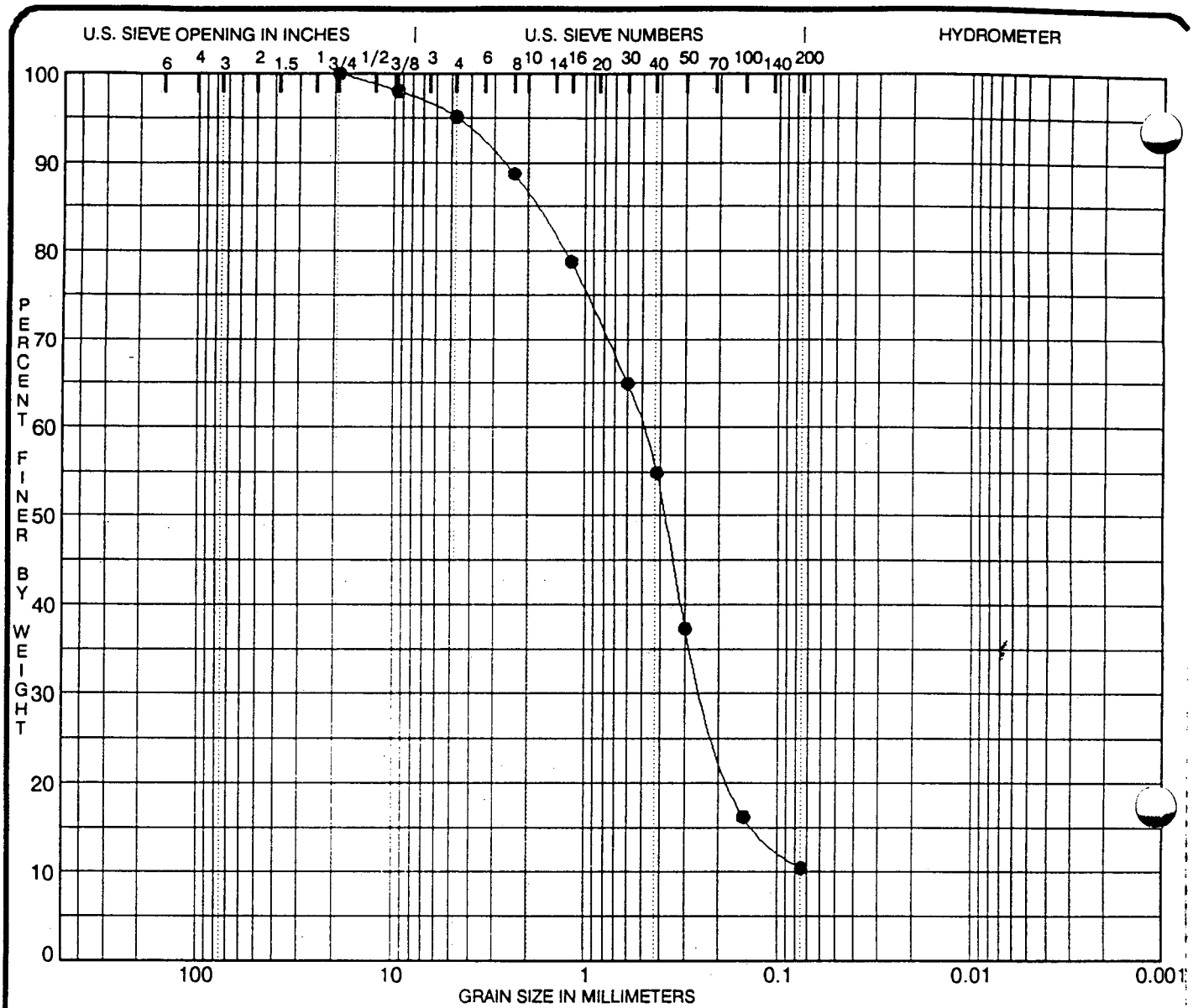

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-3	SS-6	Gray C to F Sand, Trace Fine Gravel, Little					1.58	7.2
		9.0-11.0'	Silt SW-SM						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-3	9.0	19.00	0.50	0.236		4.9	84.7	10.4	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

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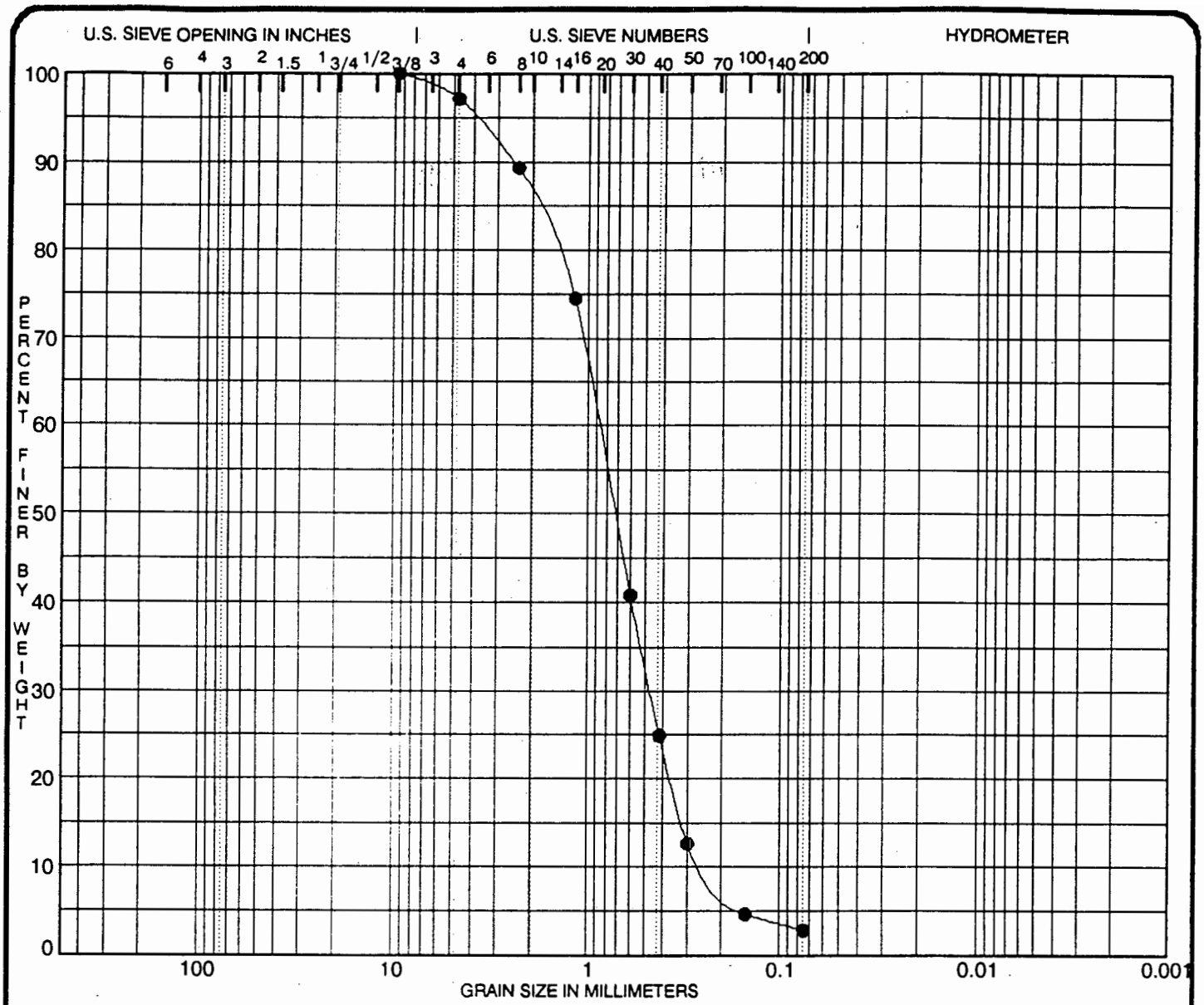

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-3	SS-7	Brown Coarse to Fine Sand, Trace Fine					1.06	3.7
	11.0-13..0'		Gravel, Trace Silt SP						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-3	11.0	9.50	0.88	0.472	0.2388	2.9	94.2	2.9	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99

DATE 8/7/97

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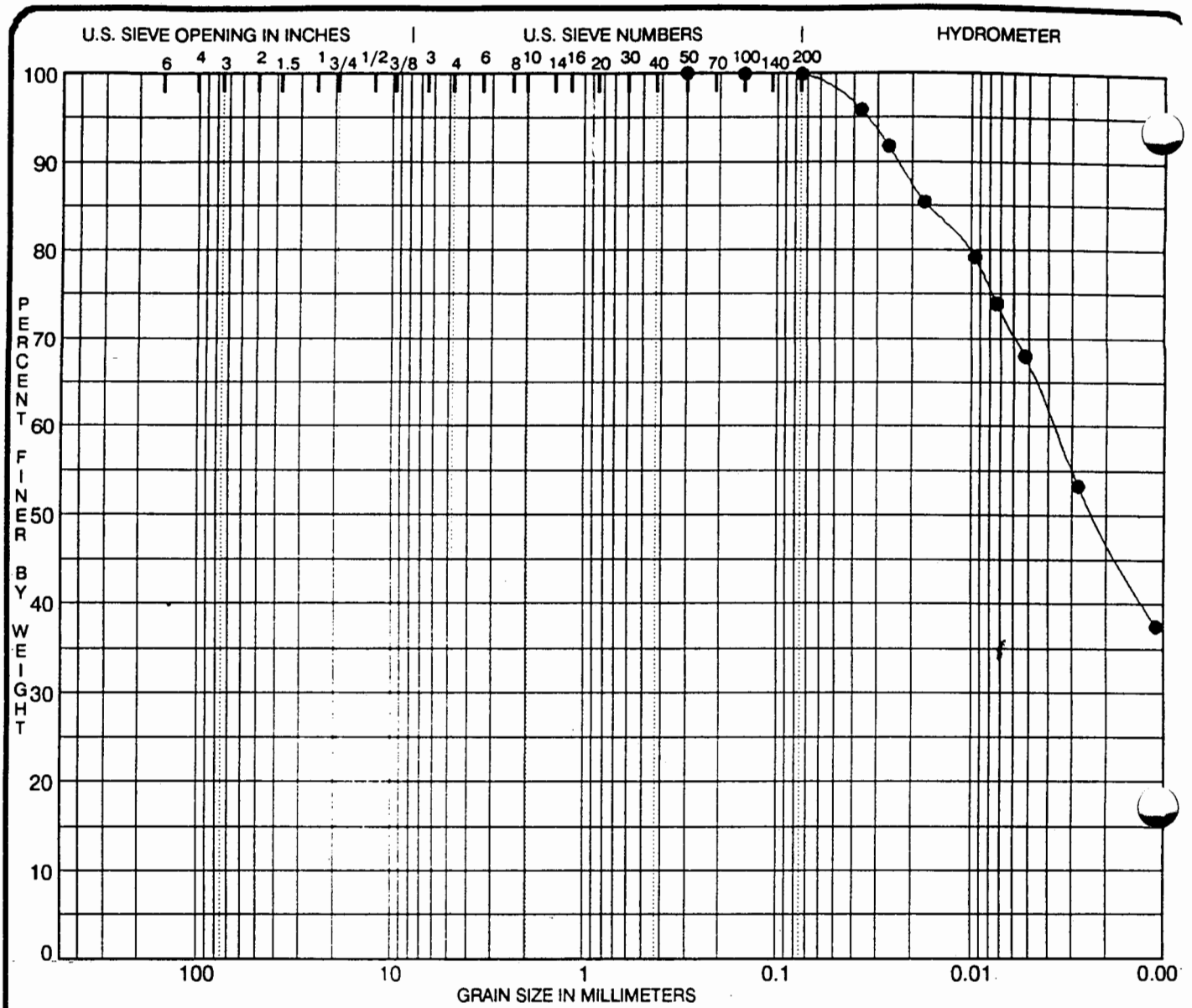

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-4	SS-5	Brownish Gray Silty Clay, Trace Fine Sand		40	18	22		
		7.0-9.0'	CL						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-4	7.0	0.30	0.00			0.0	0.1	52.3	47.6

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

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DATE 8/7/97

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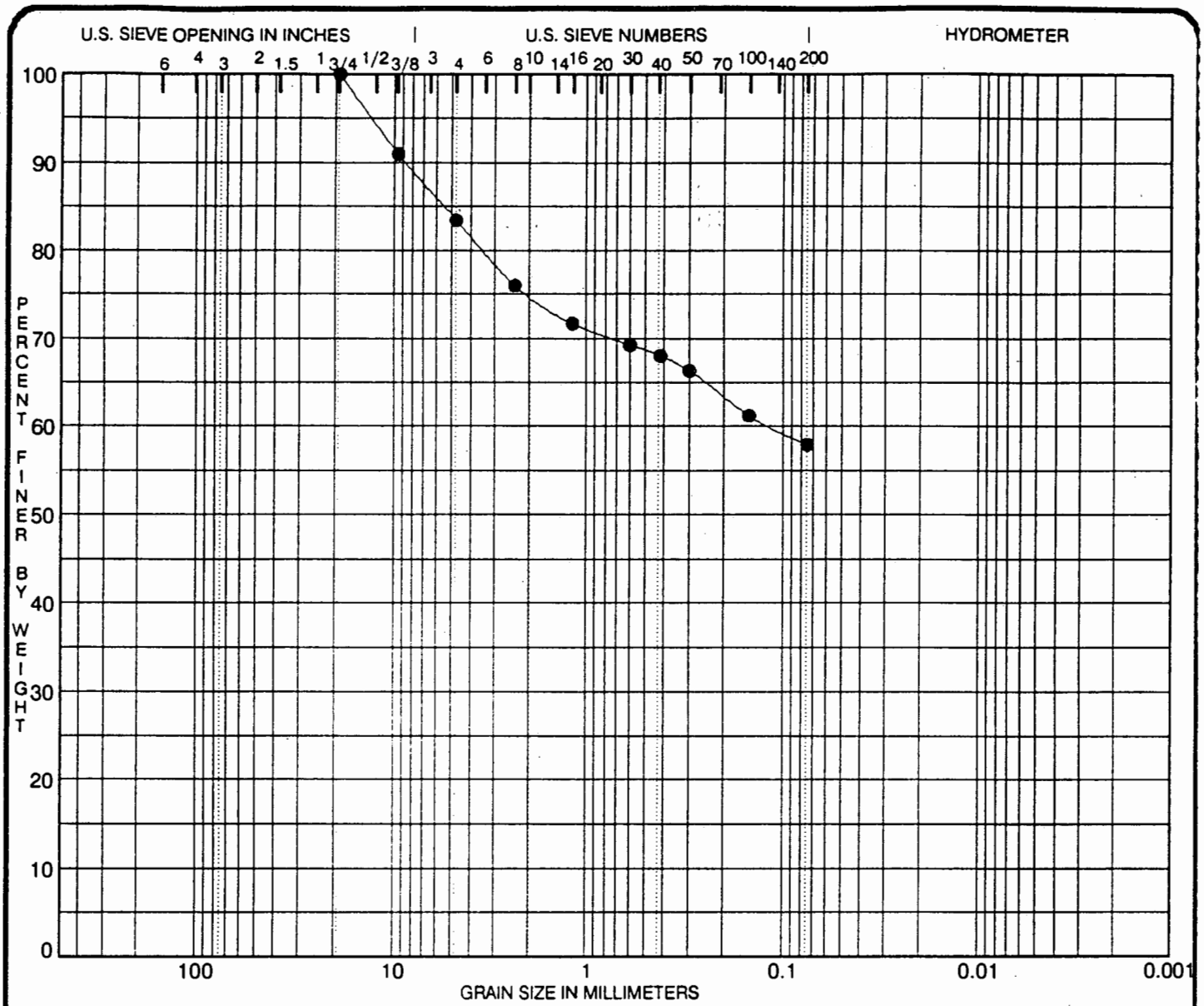

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-5	SS-4A	Brown Silty Clay, Some C to F Sand, Little						
		5.0-5.5'	Fine Gravel CL						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-5	5.0	19.00	0.12			16.6	25.5	57.9	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

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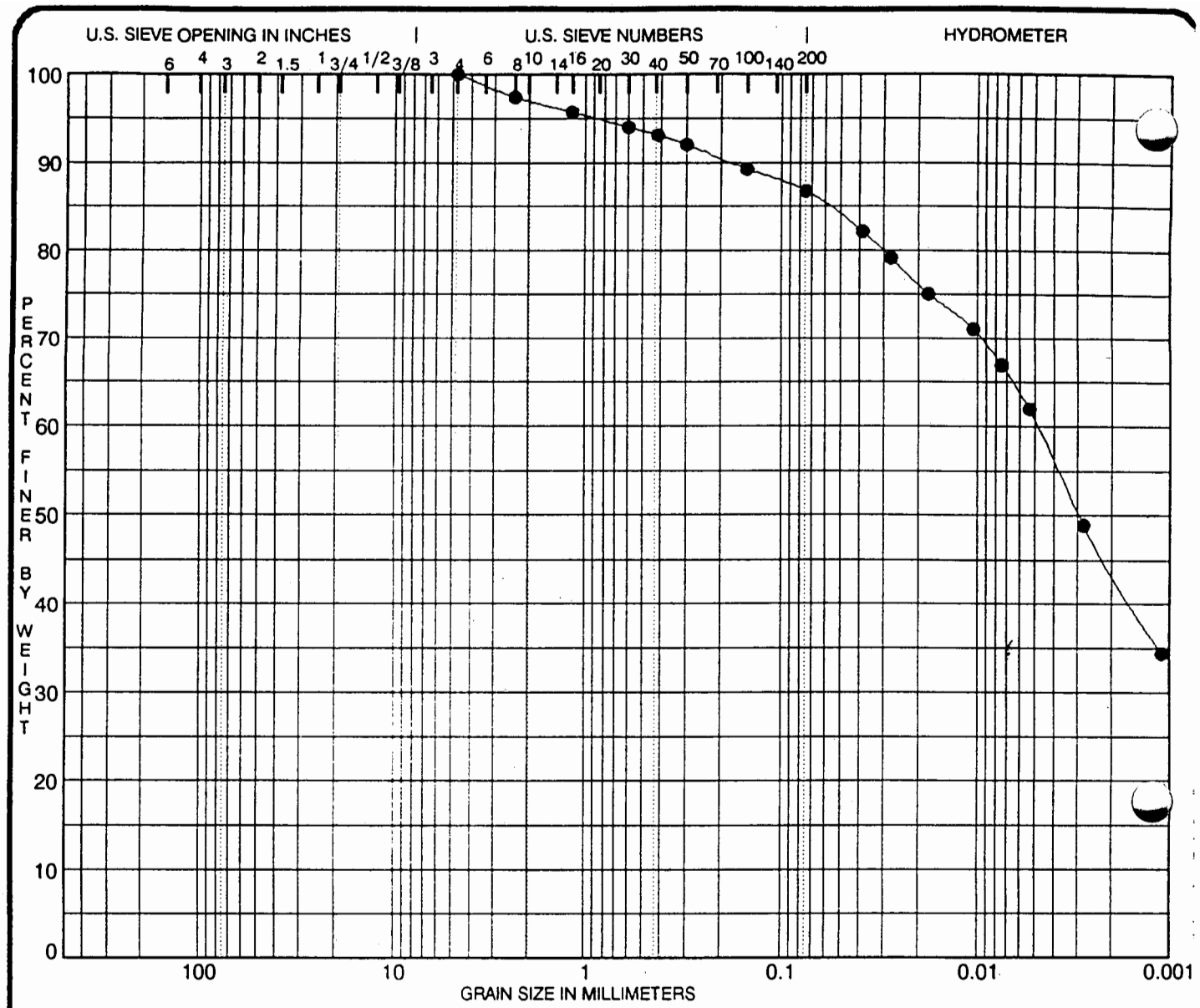

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-5	SS-4B	Brown and Gray Silty Clay, Little Coarse to		37	17	20		
		5.5-7.0'	Fine Sand CL						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-5	5.5	4.75	0.00			0.0	13.3	43.0	43.7

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

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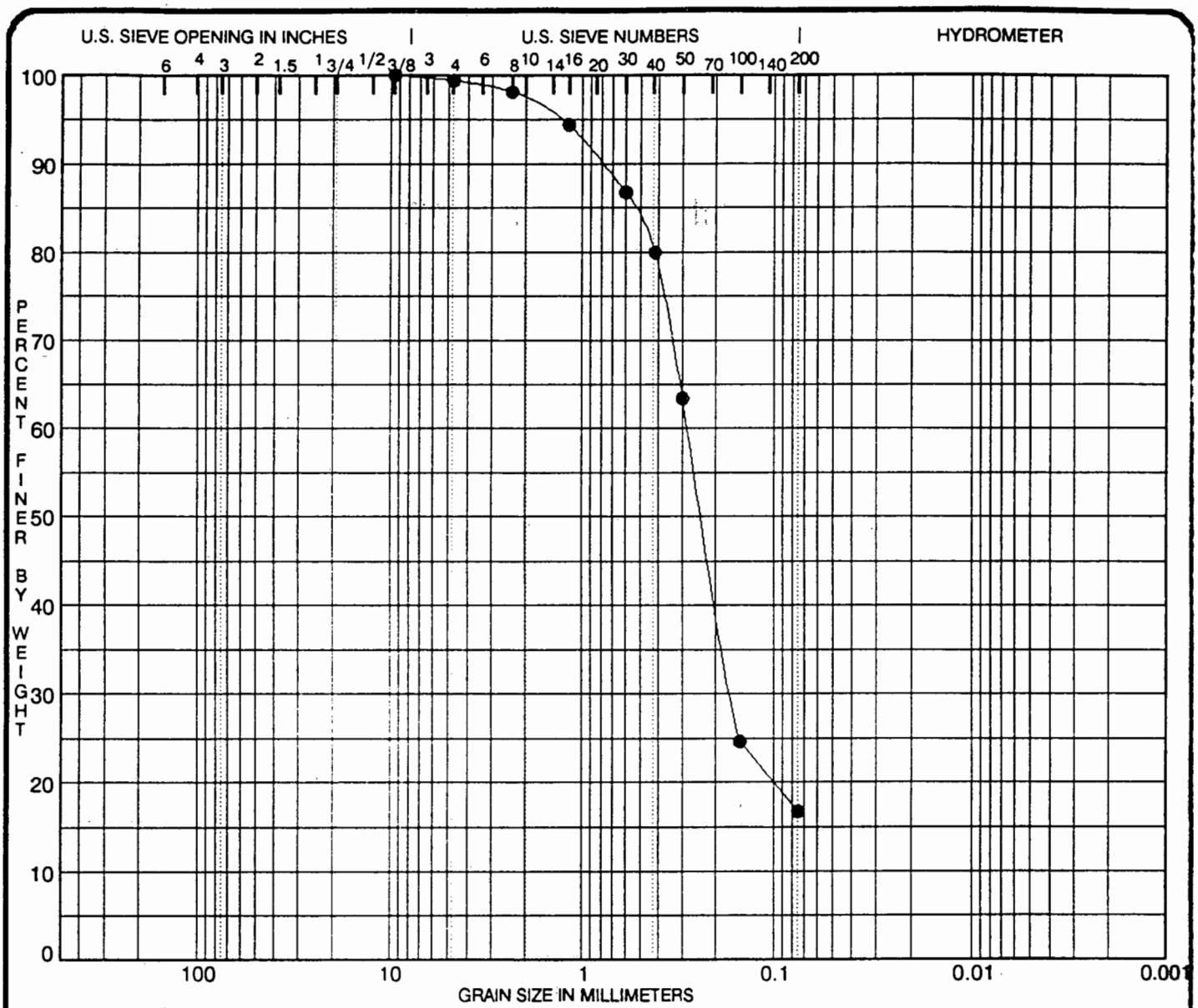

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-5	SS-5B	Gray Coarse to Fine Sand, Little Silt SM						
		8.7-9.0'							

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-5	7.0	9.50	0.28	0.165		0.6	82.7	16.7	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.I0-99
DATE 8/7/97

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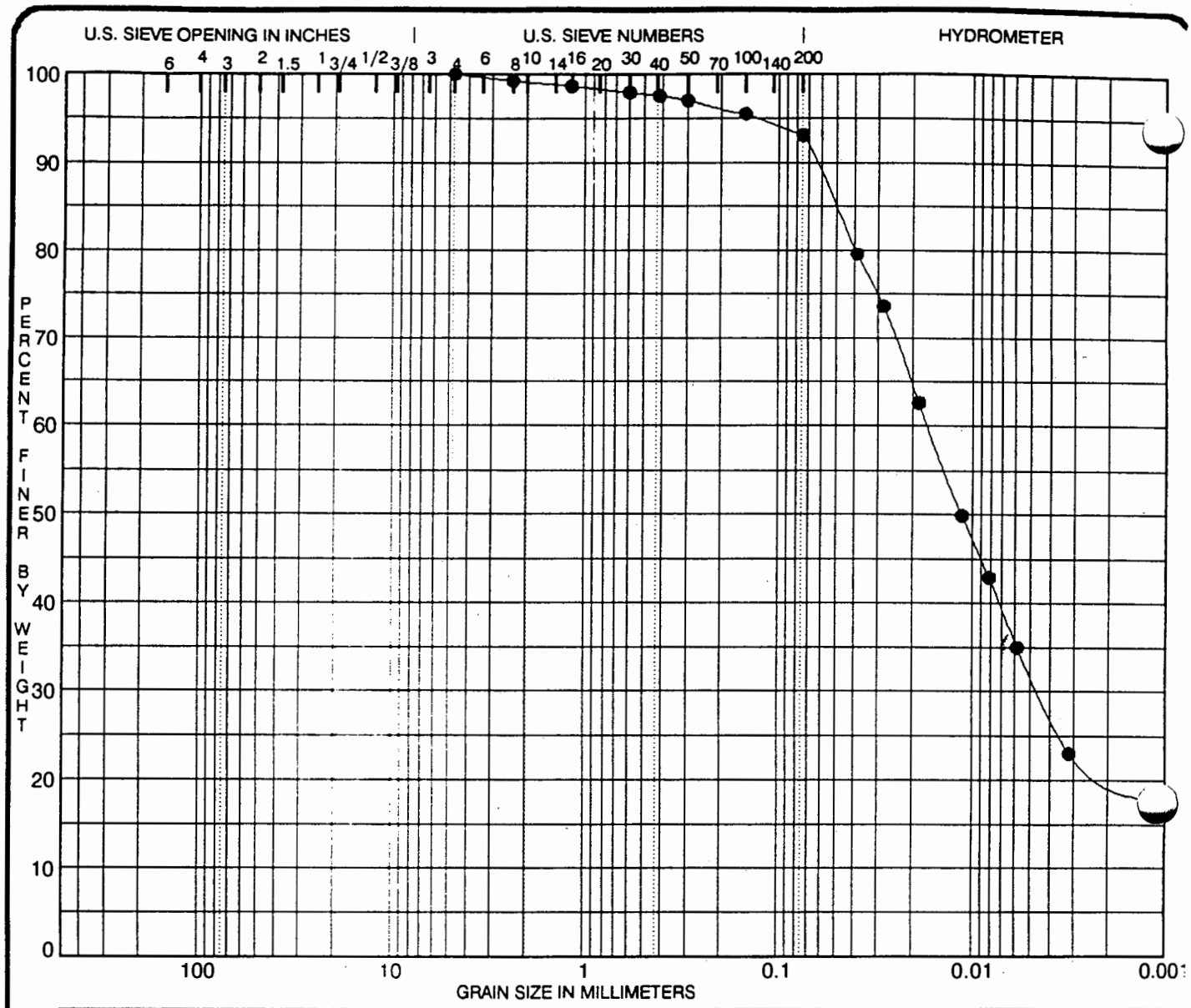

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-6	SS-7	Gray Clayey Silt, Trace Coarse to Fine Sand						
	11.0-13.0'		CL-ML						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-6	11.0	4.75	0.02	0.005		0.0	6.9	72.6	20.5

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

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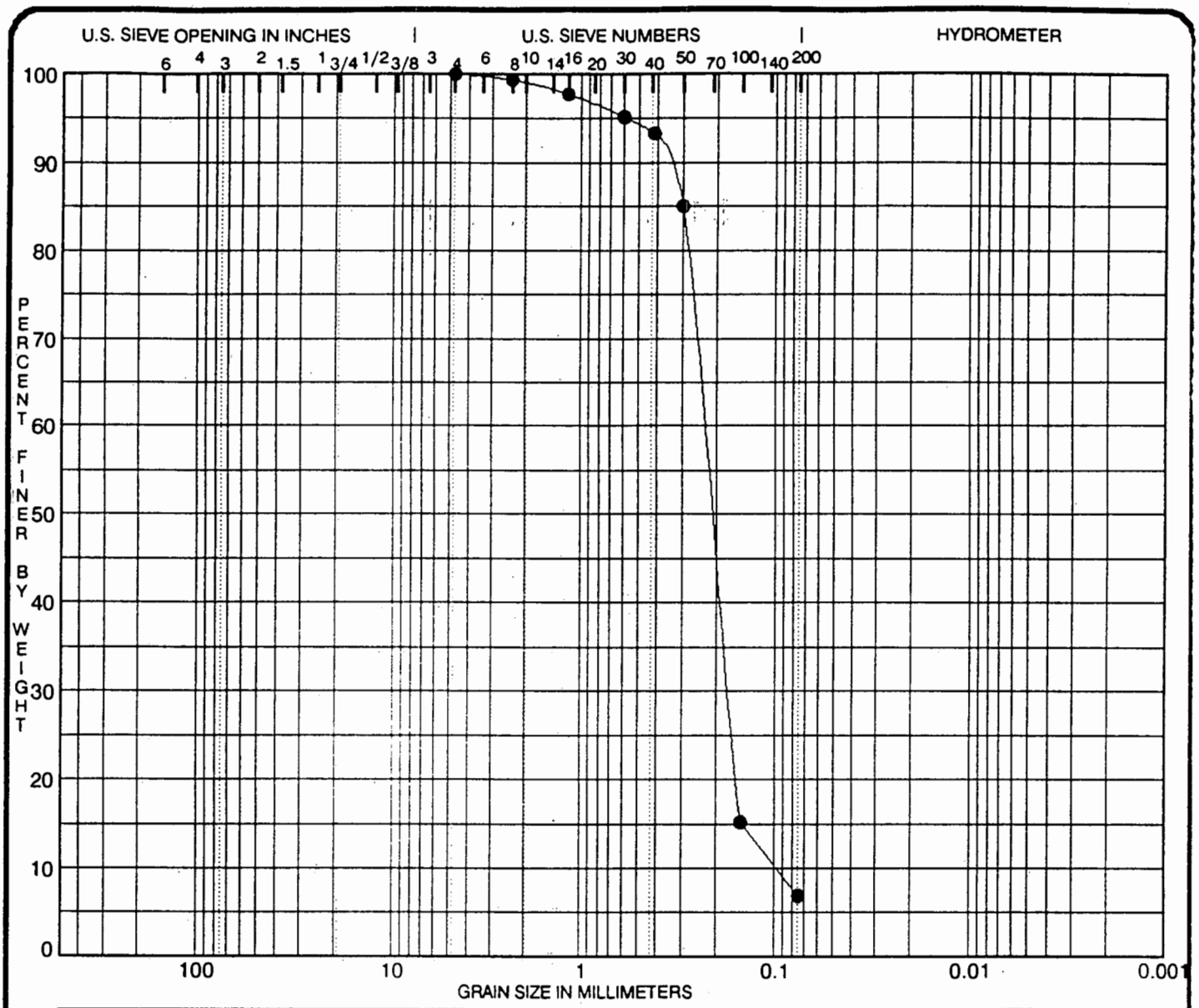

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-7	SS-3	Brown Coarse to Fine Sand, Trace Silt					1.33	2.4
		3.0-5.0'	SP-SM						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-7	3.0	4.75	0.23	0.174	0.0972	0.0	93.1	6.9	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.I0-99
DATE 8/7/97

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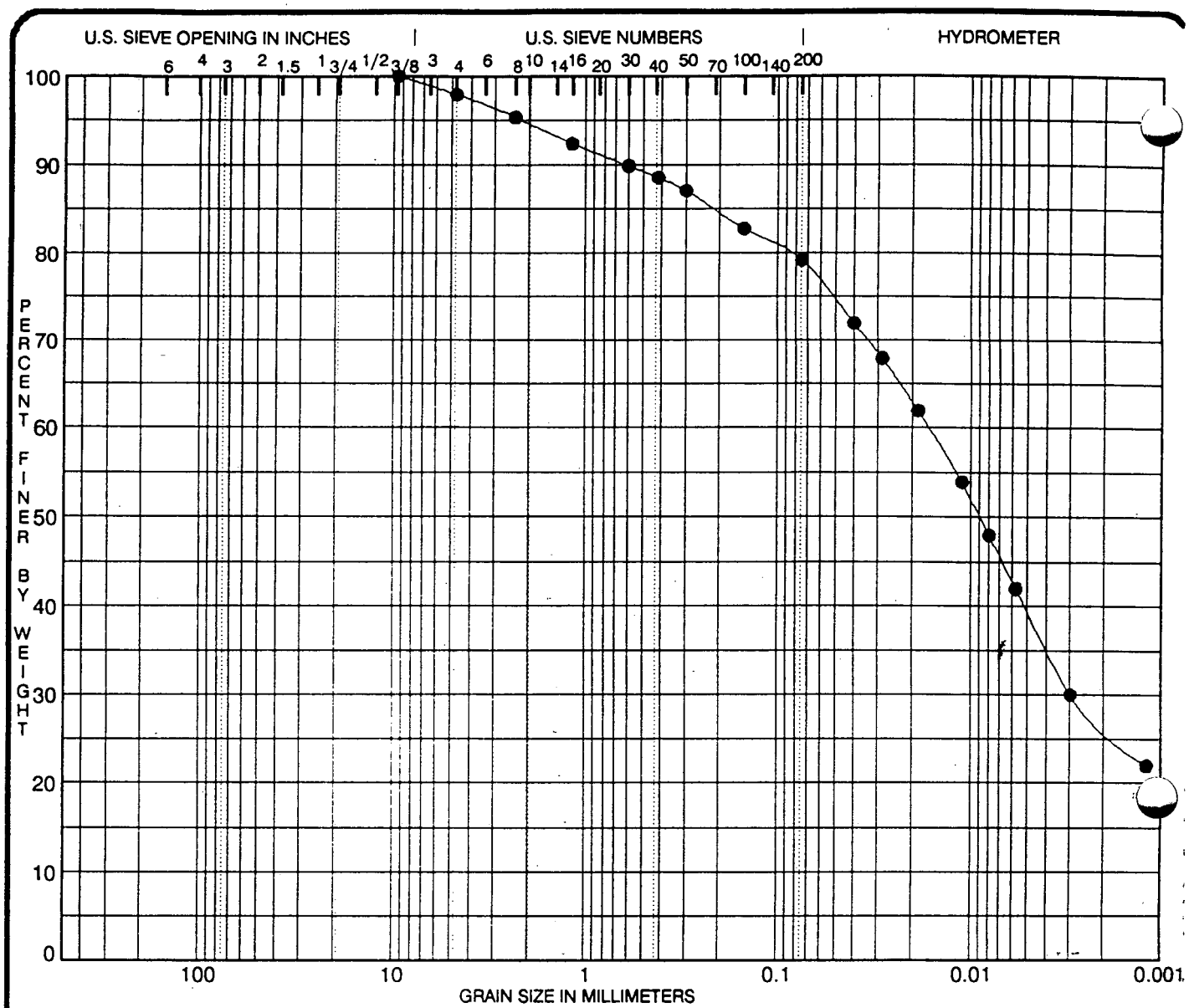

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-7	SS-7	Gray Clayey Silt, Little C to F Sand, Trace						
		11.0-13.0'	Fine Gravel CLML						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-7	11.0	9.50	0.02	0.003		2.1	18.8	52.7	26.4

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

GRADATION CURVES

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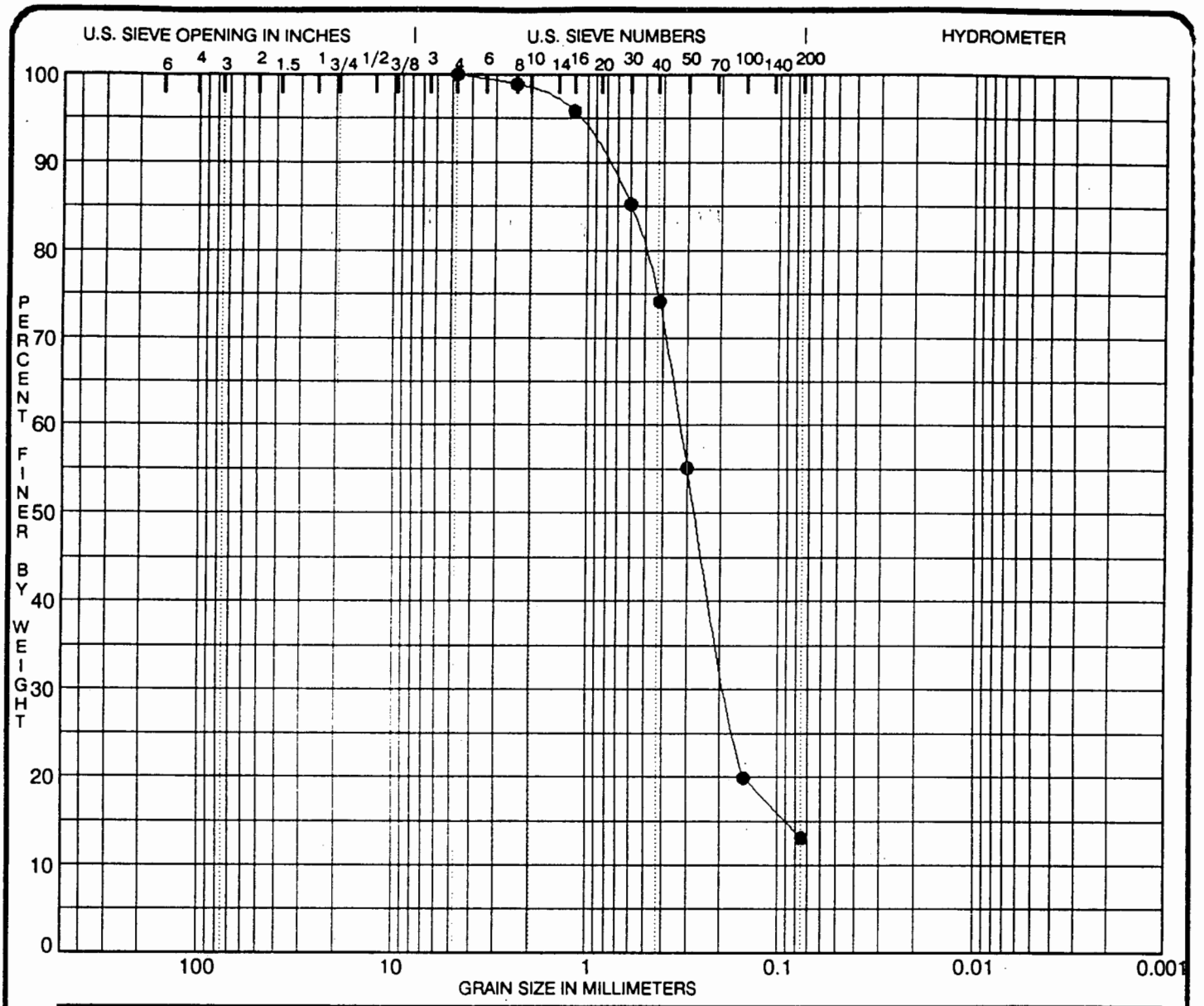
D-9-44



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-8	SS-4	Brown Coarse to Fine Sand, Little Silt SM						
		5.0-7.0'							

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-8	5.0	4.75	0.33	0.183		0.0	86.9	13.1	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/8/97

GRADATION CURVES

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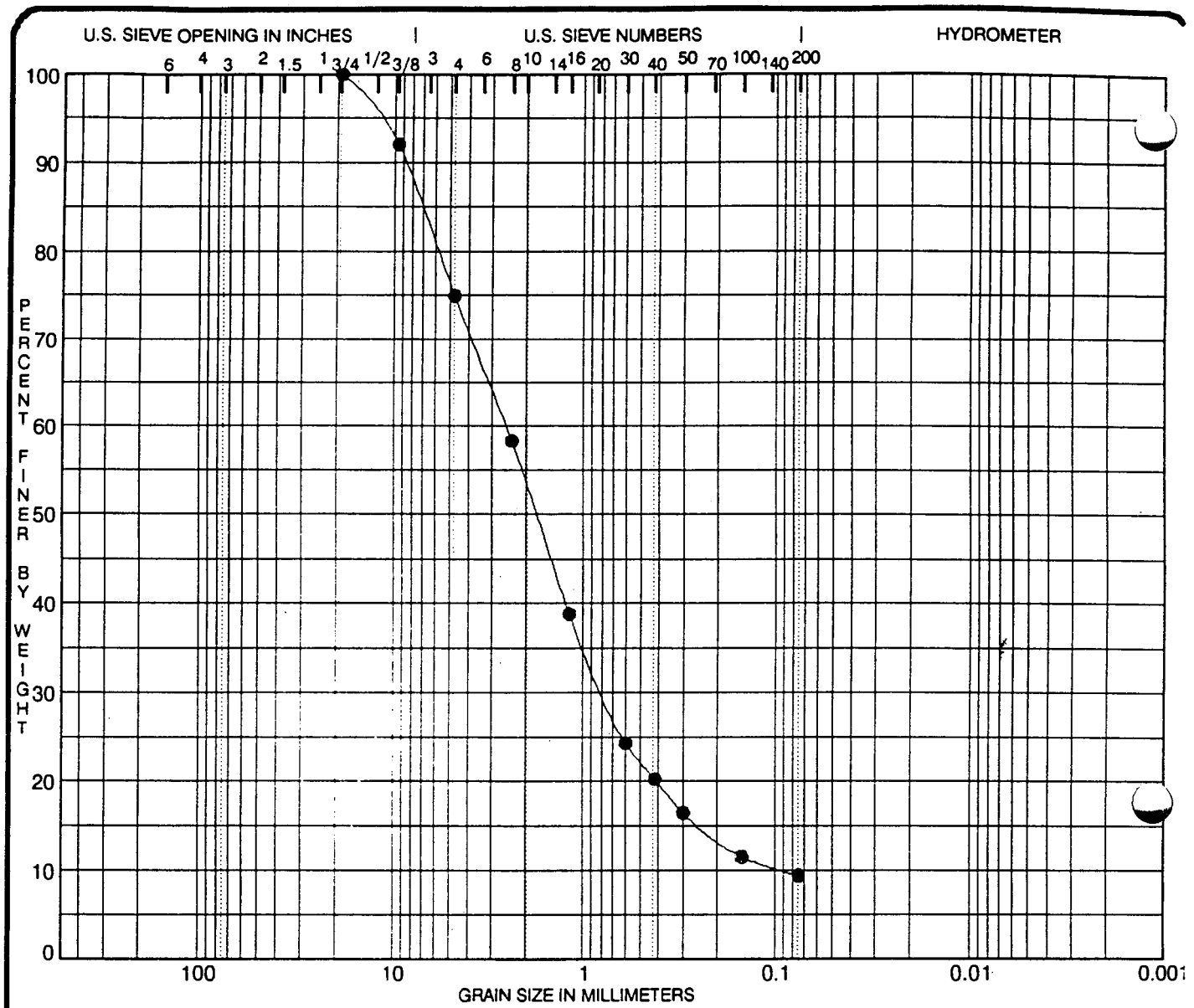
Lisle, Illinois

D-9-45



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-8	SS-5	Brown C to F Sand, Some Fine Gravel,					2.64	27.7
		7.0-9.0'	Trace Silt SW-SM						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-8	7.0	19.00	2.54	0.783	0.0914	25.1	65.5	9.4	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

GRADATION CURVES

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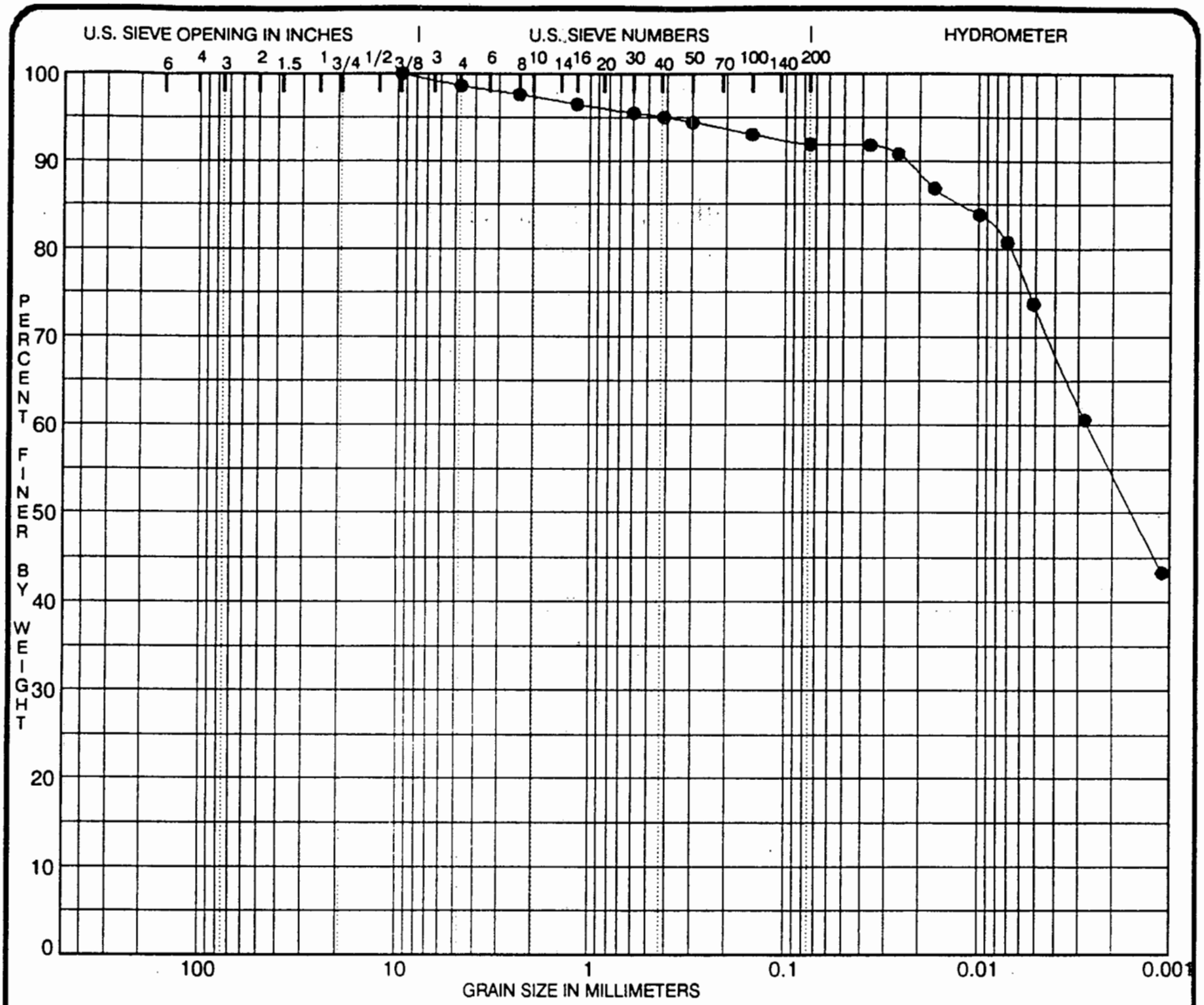
Lisle, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-8	SS-7	Gray Silty Clay, Trace C to F Sand, Trace		44	19	25		
		11.0-13.0'	Fine Gravel CL						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-8	11.0	9.50	0.00			1.4	6.7	37.5	54.4

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

GRADATION CURVES

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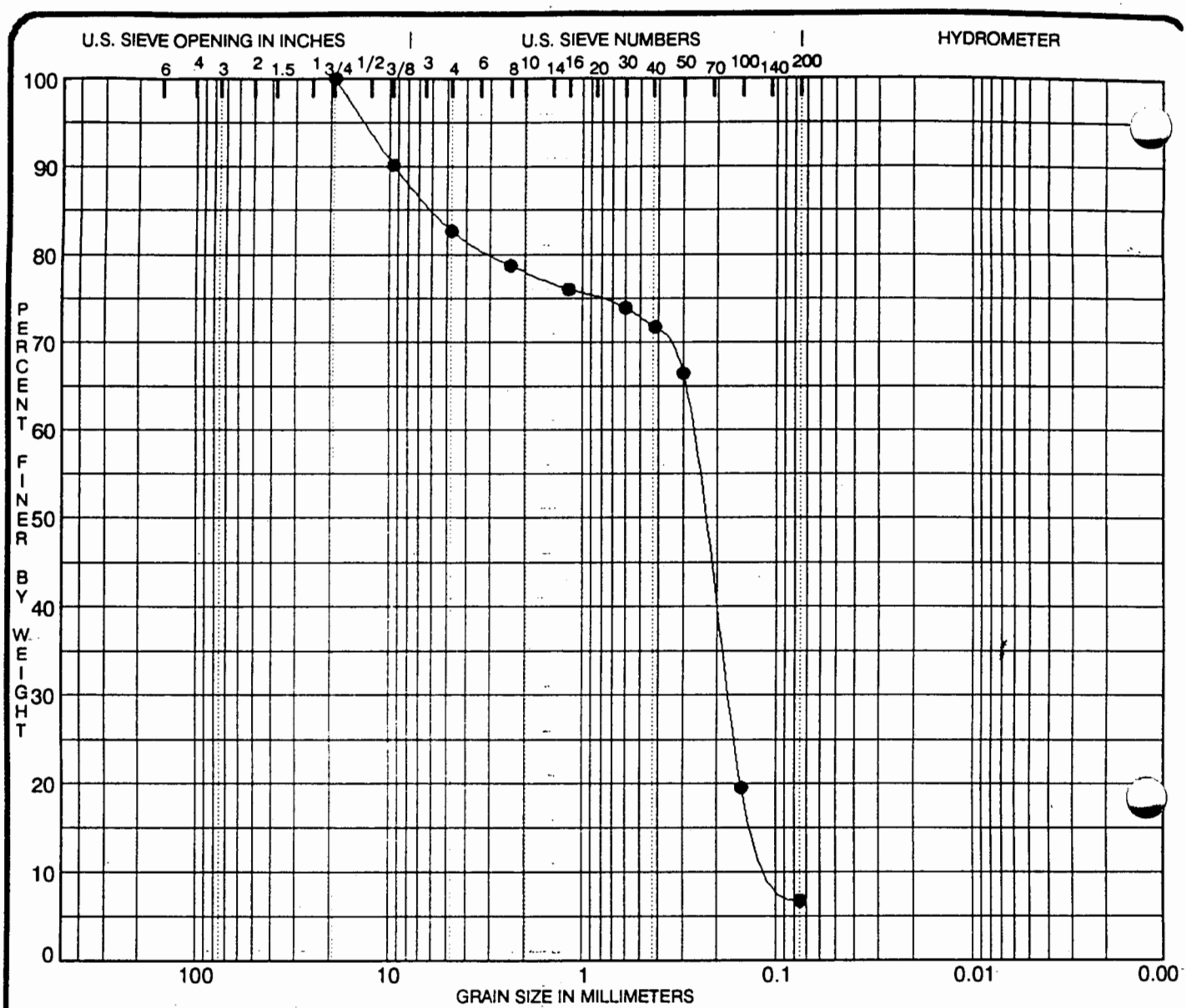
Lisle, Illinois

D-9-47



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-9	SS-5	Dark Brown C to F Sand, Little Fine Gravel,					1.26	3.1
		7.0-9.0'	Trace Silt SP-SM						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-9	7.0	19.00	0.27	0.175	0.0893	17.4	75.8	6.8	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

GRADATION CURVES

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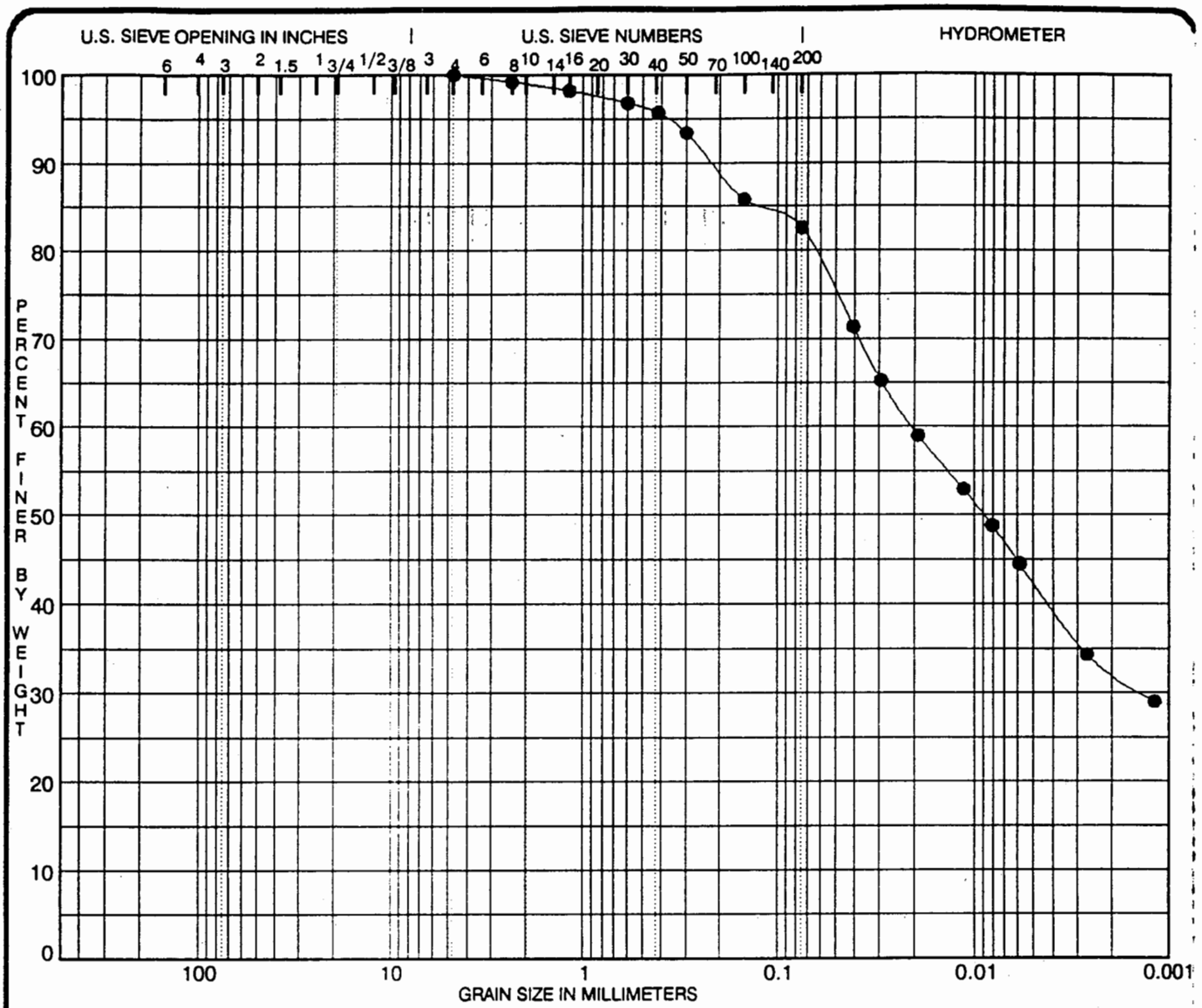
D-9-48



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-9A 3T-1 14.0-16.0'	Black Organic Silty Clay, Little Coarse to Fine Sand OH	50.7					

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-9A 14.0	4.75	0.02	0.001		0.0	17.5	50.2	32.3

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.I0-99
DATE 8/7/97

GRADATION CURVES

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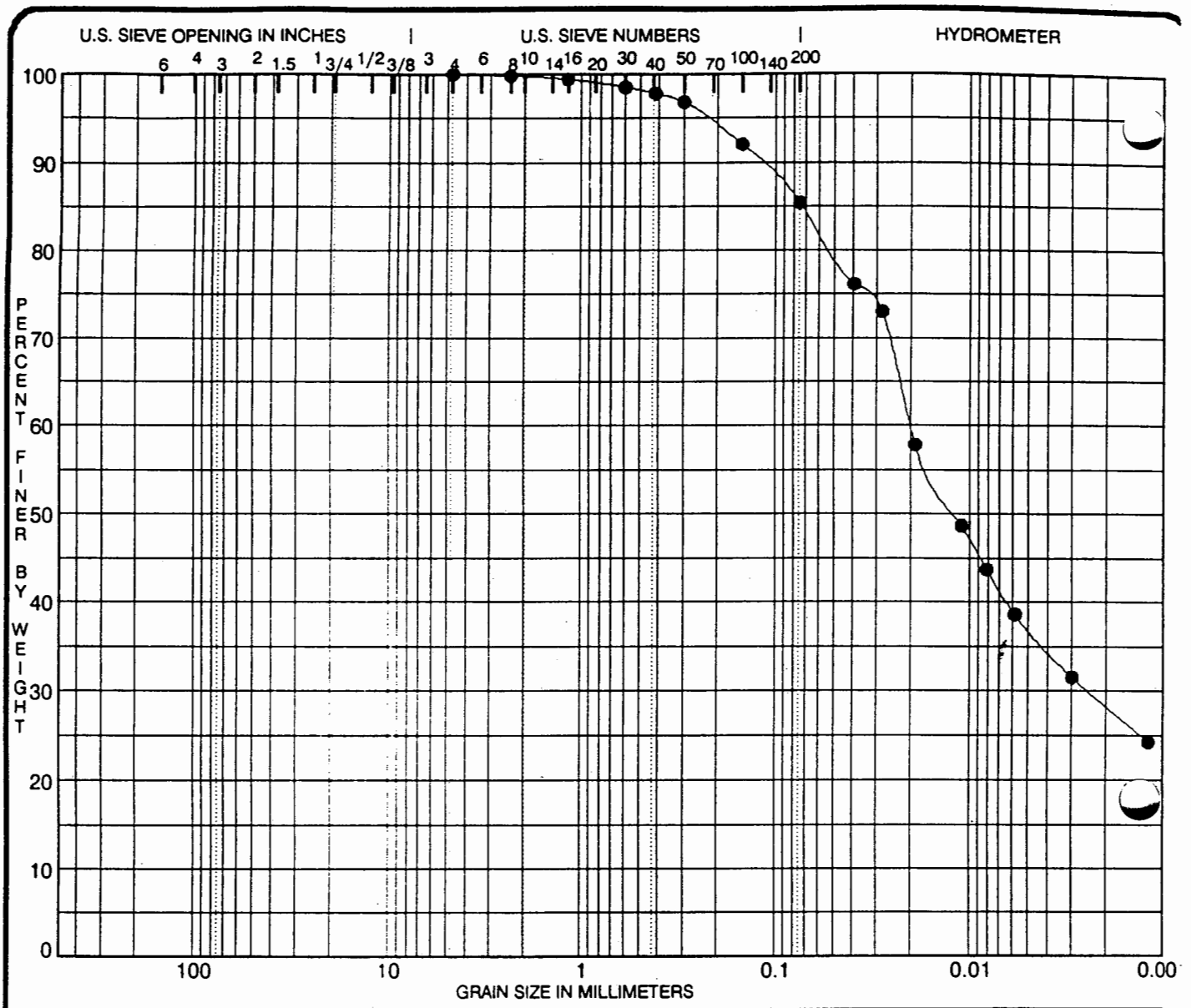

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-10	SS-3	Brown Clayey Silt, Little Coarse to Fine						
		3.0-5.0'	Sand CL-ML						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-10	3.0	4.75	0.02	0.003		0.0	14.6	57.1	28.3

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

JOB NO. 5235.10-99
DATE 8/7/97

GRADATION CURVES

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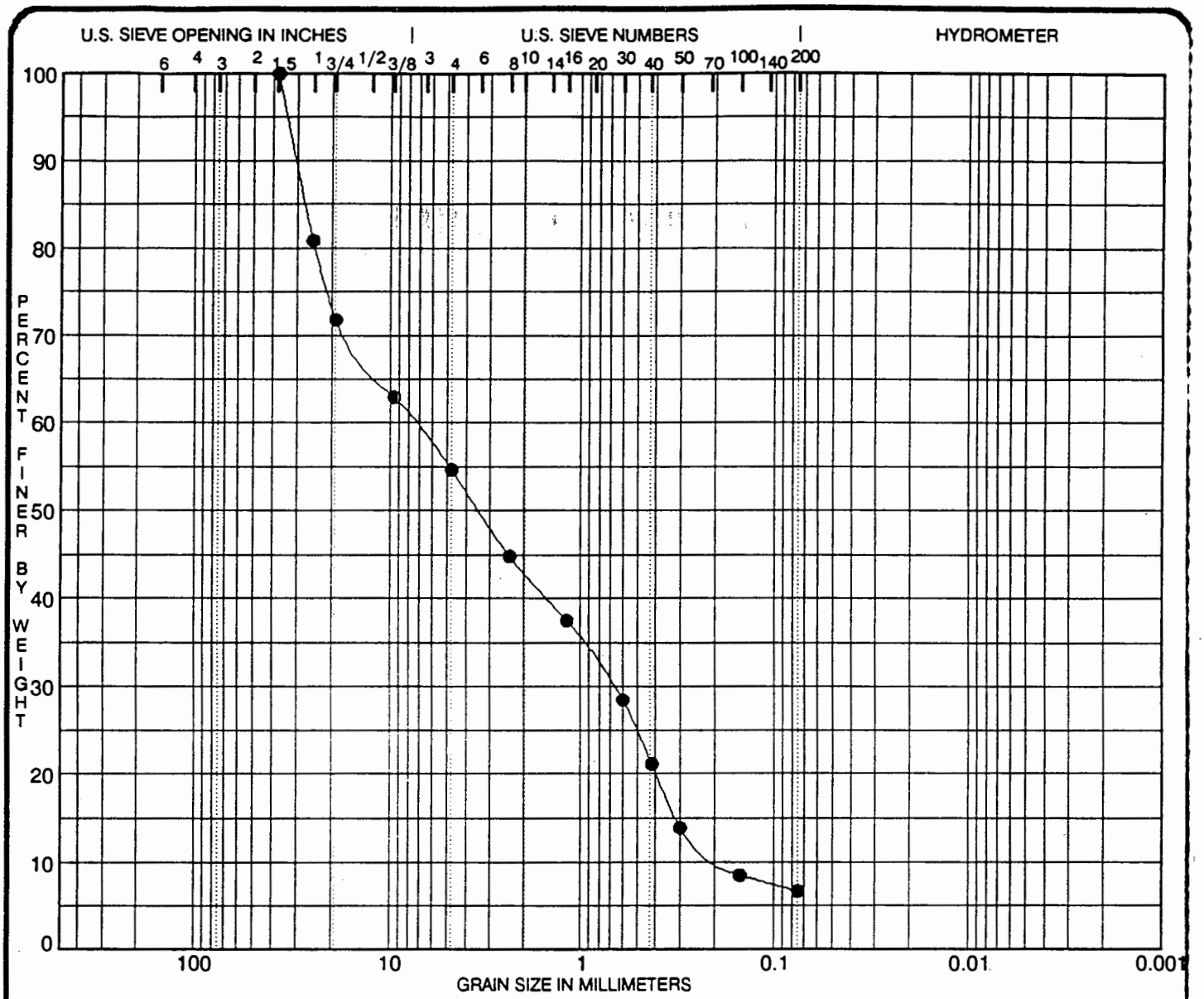
D-9-50



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	DPRL-10	SS-8	Brown Coarse to Fine Sand and Fine					0.34	41.0
		13.0-15.0	Gravel, Trace Silt SP-SM						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	DPRL-10	13.0	37.50	7.46	0.676	0.1818	45.4	47.9	6.7	

PROJECT U.S. Army Corps of Engineers - Des Plaines River Levee

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DATE 8/7/97

GRADATION CURVES

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D-9-51