

Appendix L

Geotechnical Laboratory Reports

FINAL TEST INFORMATION

PROJECT: Vernon County Proposed Landfill

JOB NO. 57786

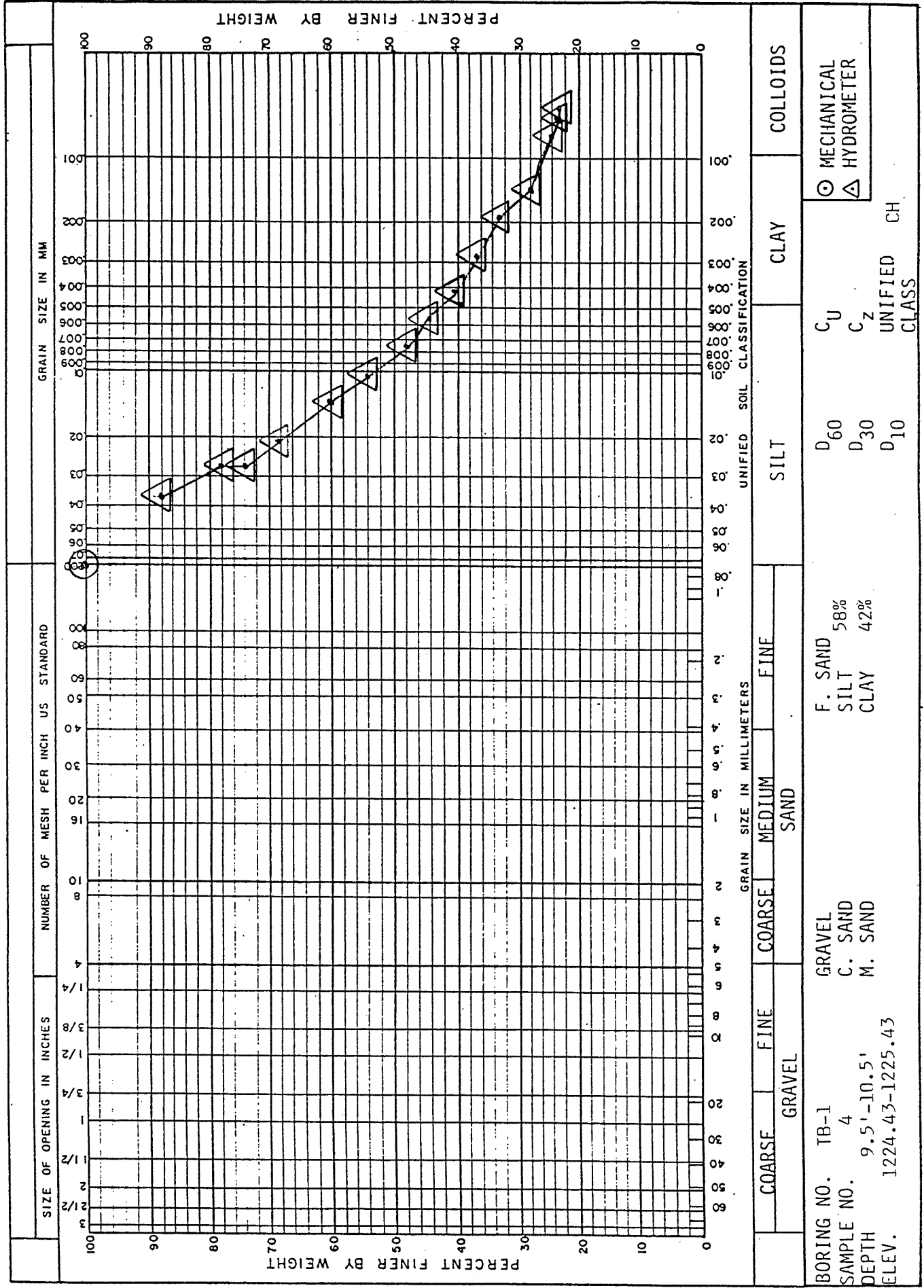
DATE June 3, 1988

Boring No.	Sample No.	Depth	Field Class	GRADATION - % PASSING						LL	PI	USCS	Wn %	e	Yd P.C.F.	GS	k -(CM/S)
				0.005	0.075	0.425	2.0	4.75	10	20	40	60	75	100			
TB-1		5' - 9.5'		20.0	55.0	96.9	98.2	99.7	100	-	-	31.5	8.6	CL			2.44 x 10 ⁻⁷
TB-1		9.5' - 10.5'		42	68							51.8	35.2	CL			
TB-1		10.5' - 12'				44.6	54.37	91.4	99.97	100	-			SC			
TB-1		12' - 13'				49.4	53.5	93.7	100	-	-			SC			
TB-3		1.5' - 6.0'		42	67							47.1	27.9	CL			2.34 x 10 ⁻⁸
TB-3		8.5' - 13.0'		52	72	58.7	66.5	85.7	93.0	96.0	100	48.5	29.77	CL			
TB-4		2' - 4'		50	68							53.4	33.8	CL			
TB-4		7' - 8'				18.8	23.8	65.7	87.6	93.3	100			SC			
TB-5		2.0' - 7.5'		69	86							55.3	32.2	CL			1.13 x 10 ⁻⁶
TB-5		7.5' - 10.0'				36.6	40.6	82.3	99.2	99.8	100			SC			
TB-6		8' - 13.5'		47	72									CL			
TB-7		2.5' - 16.0'		24	59							32.3	12.15	CL			
TB-8		2.0' - 6.5'		26	56							37.8	14.5	CL			
TB-8		6.5' - 12.0'		49	68	18.17	25.0	78.1	98.8	99.5	100			SC			1.35 x 10 ⁻²
TB-8		14' - 22'				37.9	43.1	77.7	85.7	89.8	100			SC			2.96 x 10 ⁻⁷
TB-9		1.5' - 9.0'		24.0	62.0							25.4	8.1	CL			
TB-9		10' - 22'				12.1	20.2	82.1	96.7	98.3	100			SM			

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed Landfill, Klahn Site
 DATE: May 6, 1988
 JOB NO: 57786

Central Wisconsin
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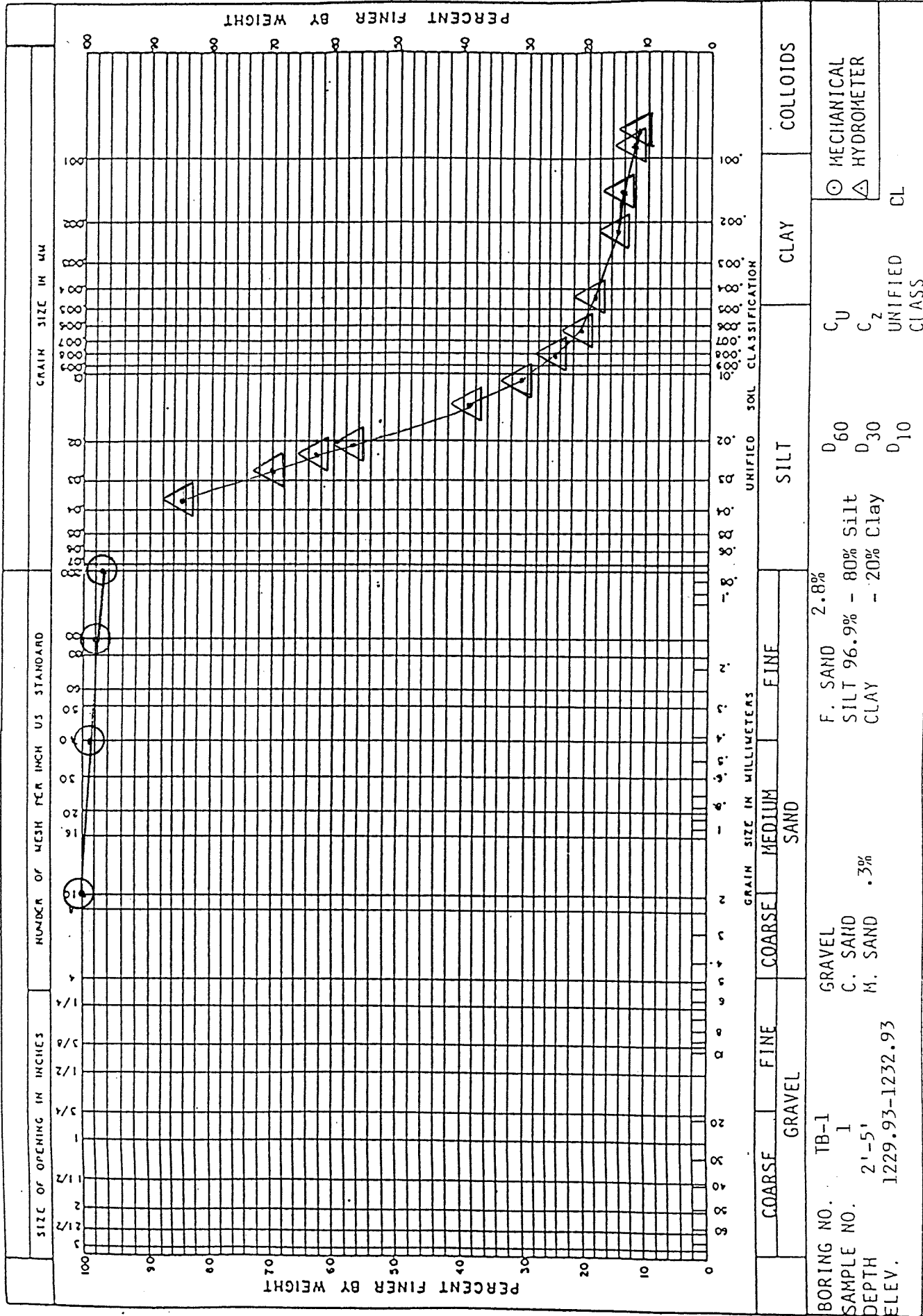


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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed Landfill
Klahn Site TB-1 2'-5'
DATE: May 6, 1988
JOB NO: 57786



PROJECT: Vernon County Proposed Landfill

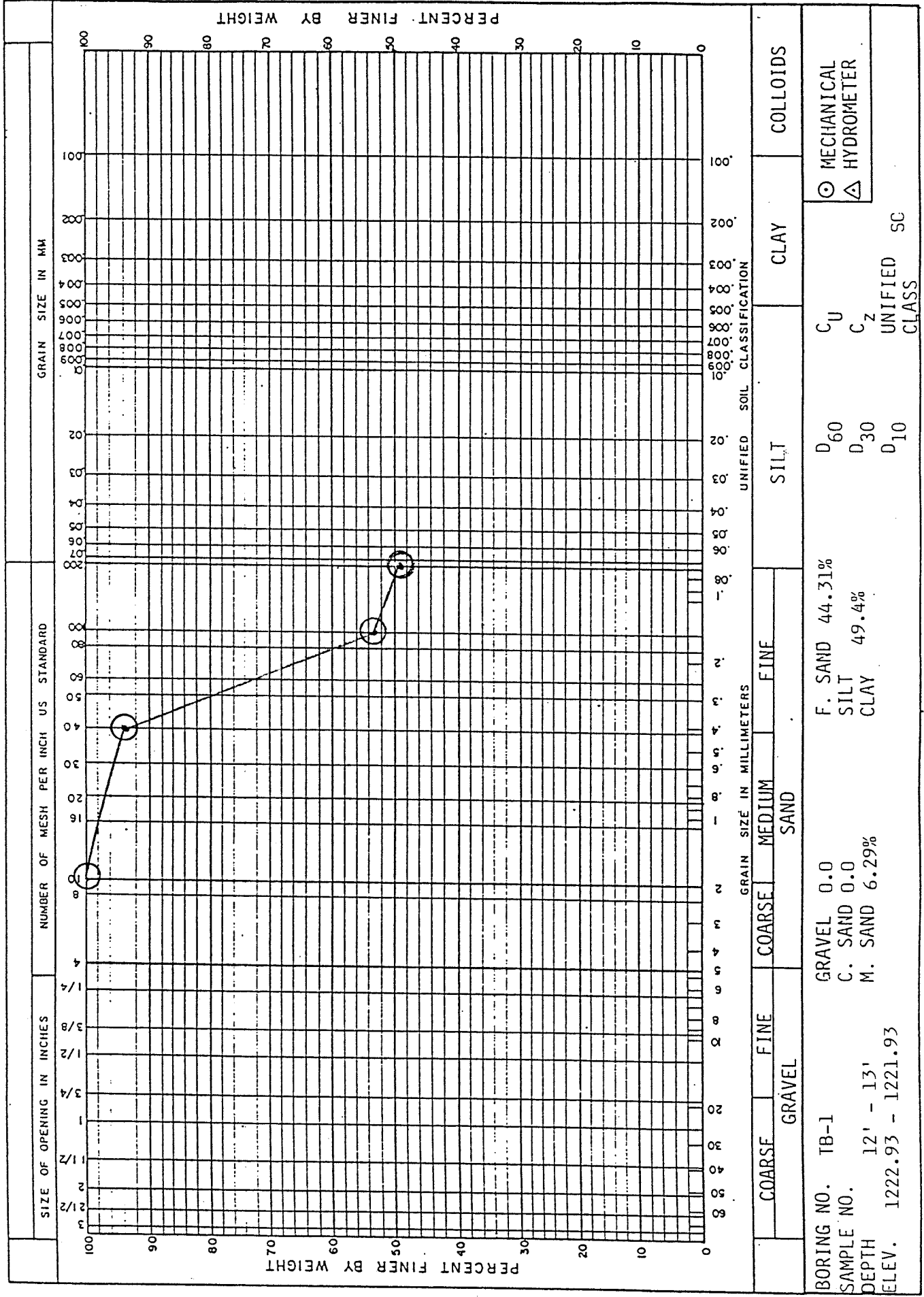
GRAIN
SIZE
DISTRIBUTION
CURVE

Site

DATE: June 2, 1988

JOB NO: 57786

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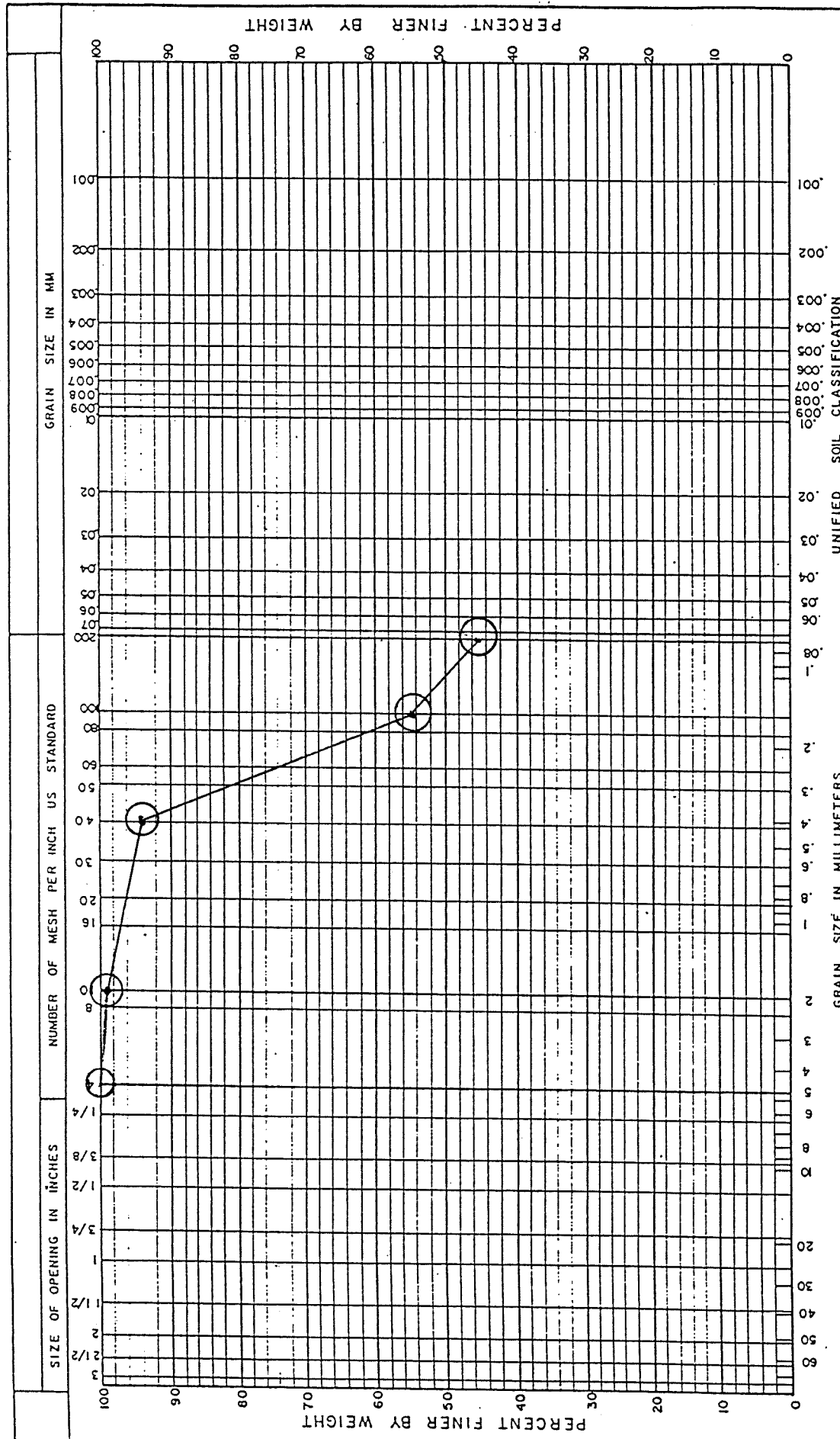
GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County, Klahn Site

DATE: May 11, 1988

JOB NO: 57786

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GRAIN SIZE IN MILLIMETERS			UNIFIED SOIL CLASSIFICATION		
GRAIN SIZE IN MILLIMETERS			UNIFIED SOIL CLASSIFICATION		
COARSE	FINE	GRAVEL	SILT	CLAY	COLLOIDS
GRAVEL			UNIFIED SOIL CLASS		
BORING NO. TB-1	GRAVEL		D ₆₀	C _u	MECHANICAL
SAMPLE NO. 5	C. SAND		D ₃₀	C _z	HYDROMETER
DEPTH 10.5' - 12.0'	M. SAND		D ₁₀		
ELEV. 1222.93 - 1224.43					

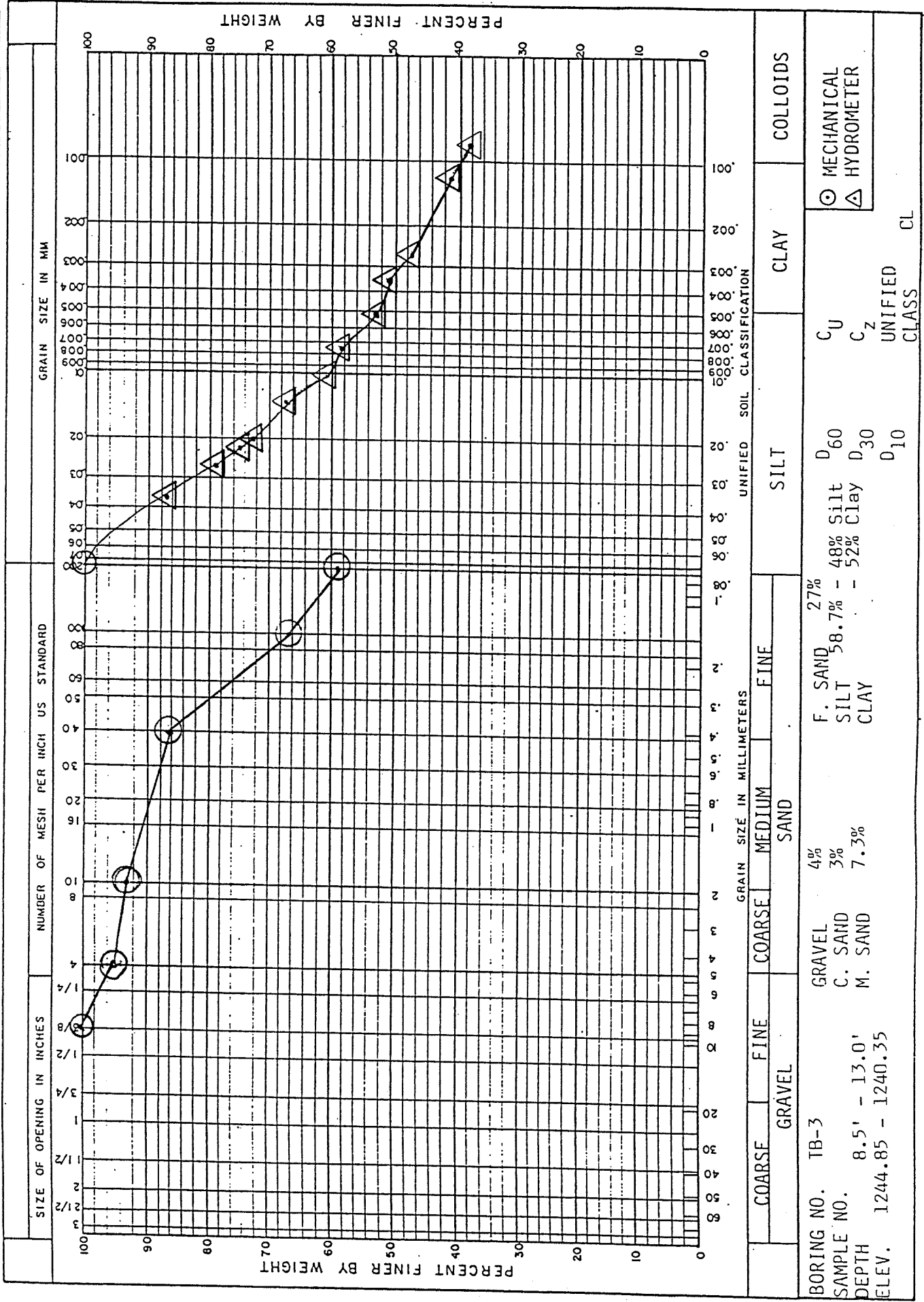
F. SAND 49.55%
SILT 44.57%
CLAY

GRAVEL
C. SAND 3%
M. SAND 5.85%

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed
Landfill Site
DATE: June 1, 1988
JOB NO: 57786

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BORING NO. TB-3
SAMPLE NO. 8.5' - 13.0'
DEPTH 1244.85 - 1240.35
ELEV.

GRAVEL
C. SAND
M. SAND

F. SAND 27%
SILT 58.7%
CLAY 14.3%

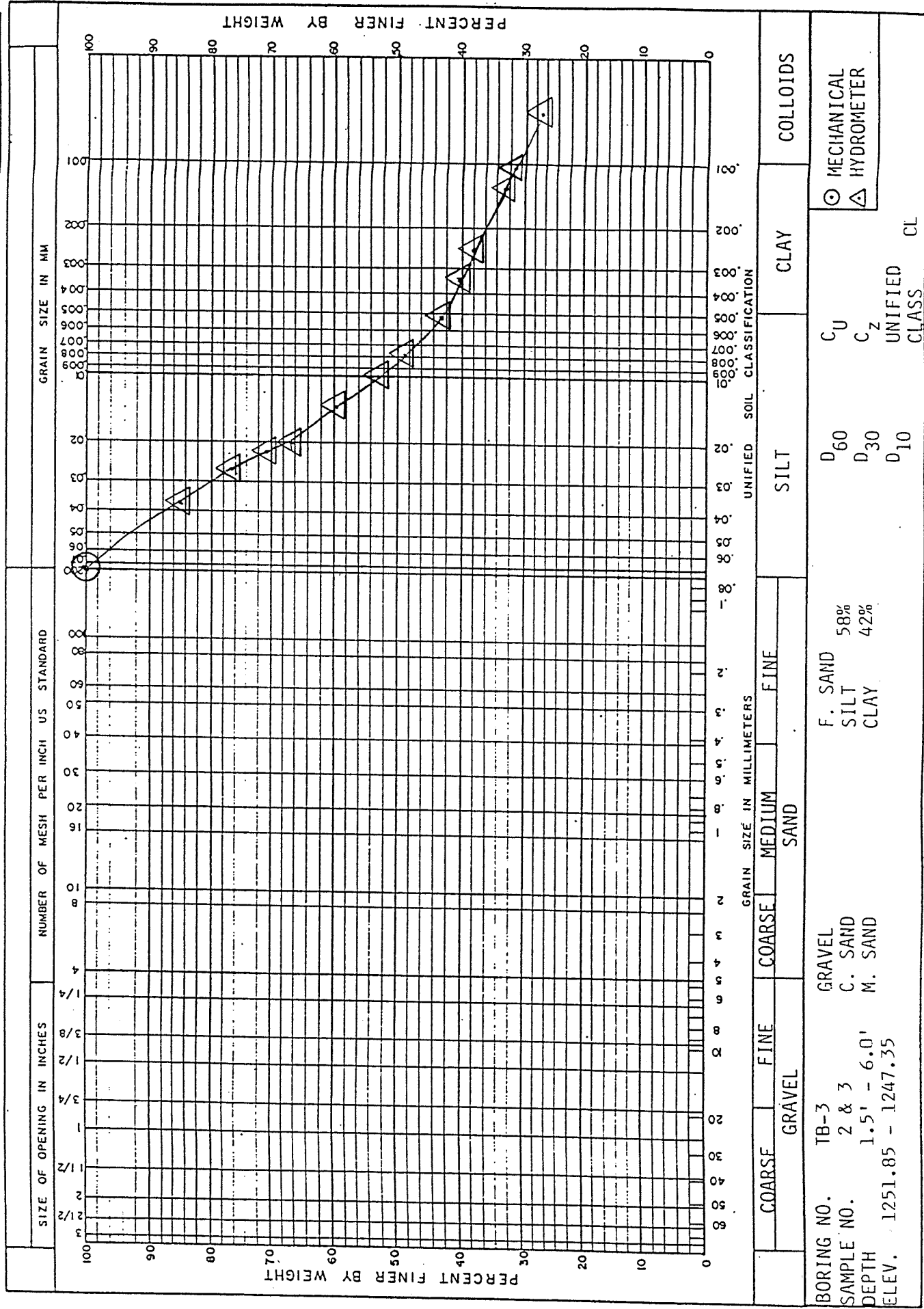
UNIFIED CLASS
CU
CZ
D60
D30
D10

CLAY
COLLOIDS

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed
Landfill Site
DATE: May 26, 1988
JOB NO: 57786

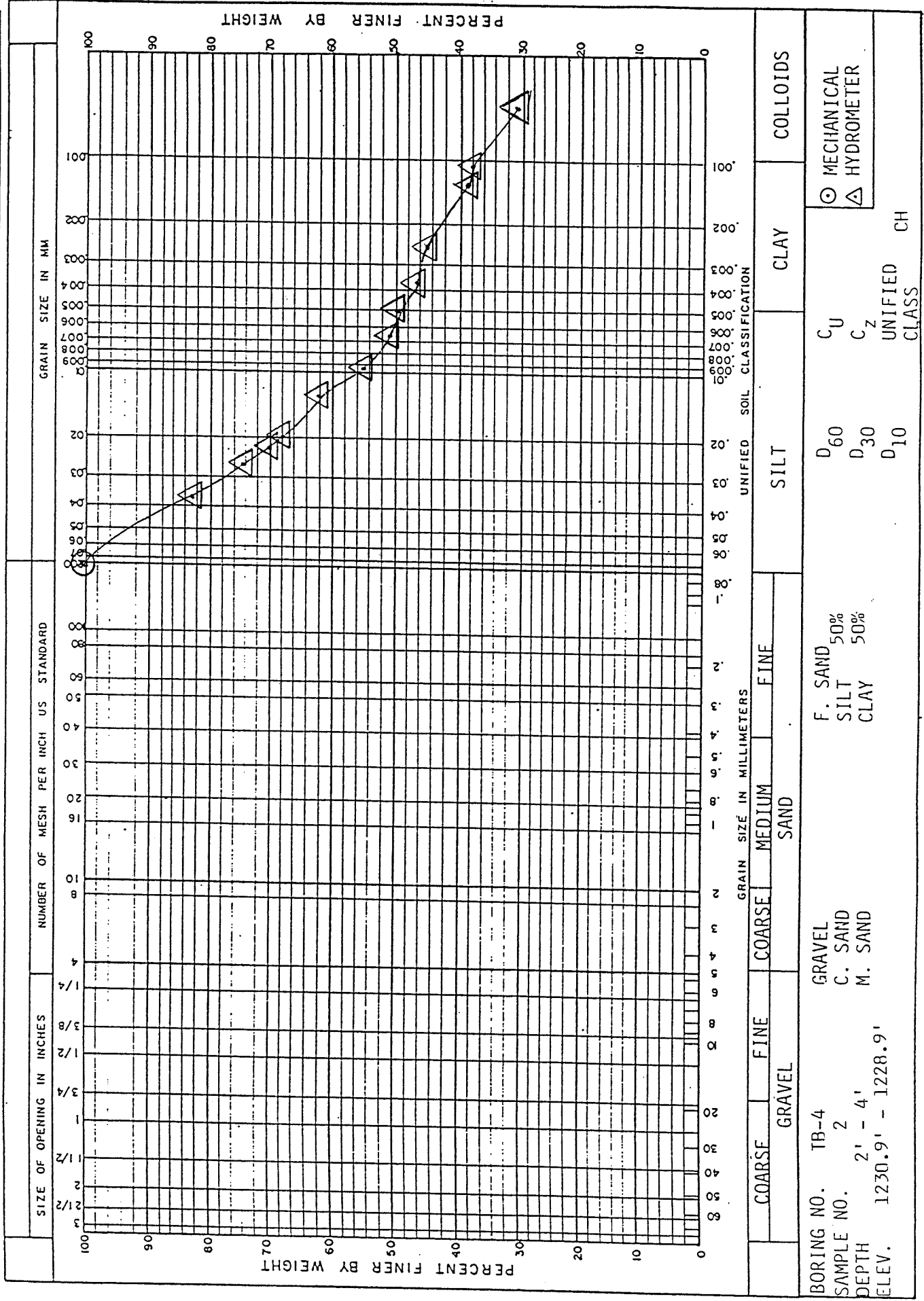
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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed
Landfill Site
DATE: May 26, 1988
JOB NO: 57786

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BORING NO. TB-4
SAMPLE NO. 2
DEPTH 2' - 4'
ELEV. 1230.9' - 1228.9'

GRAVEL
C. SAND
M. SAND

F. SAND 50%
SILT 50%
CLAY

D₆₀
D₃₀
D₁₀

MECHANICAL
HYDROMETER

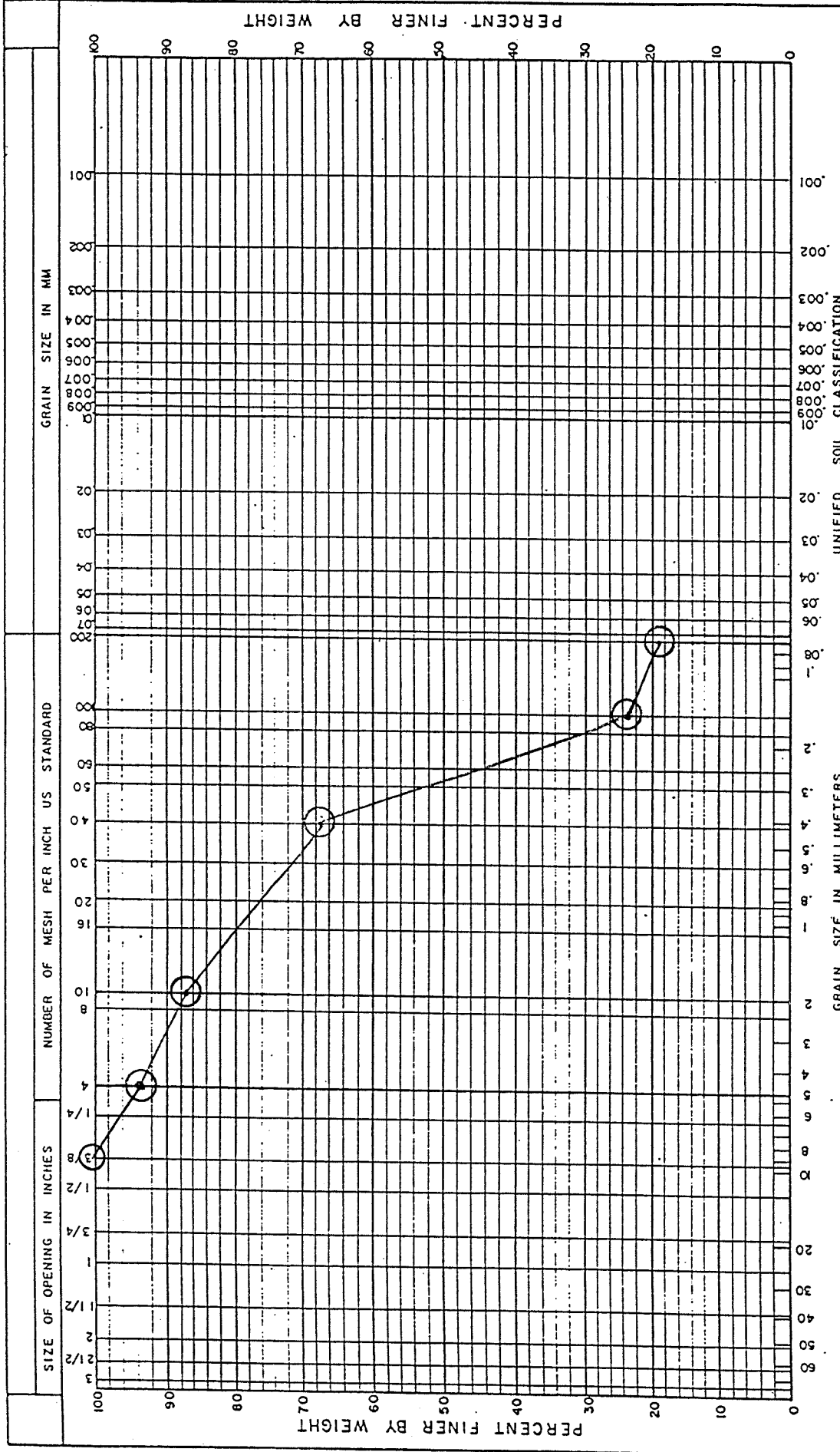
UNIFIED CLASS

CH

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed
Landfill Site
 DATE: June 2, 1988
 JOB NO: 57786

Central Wisconsin
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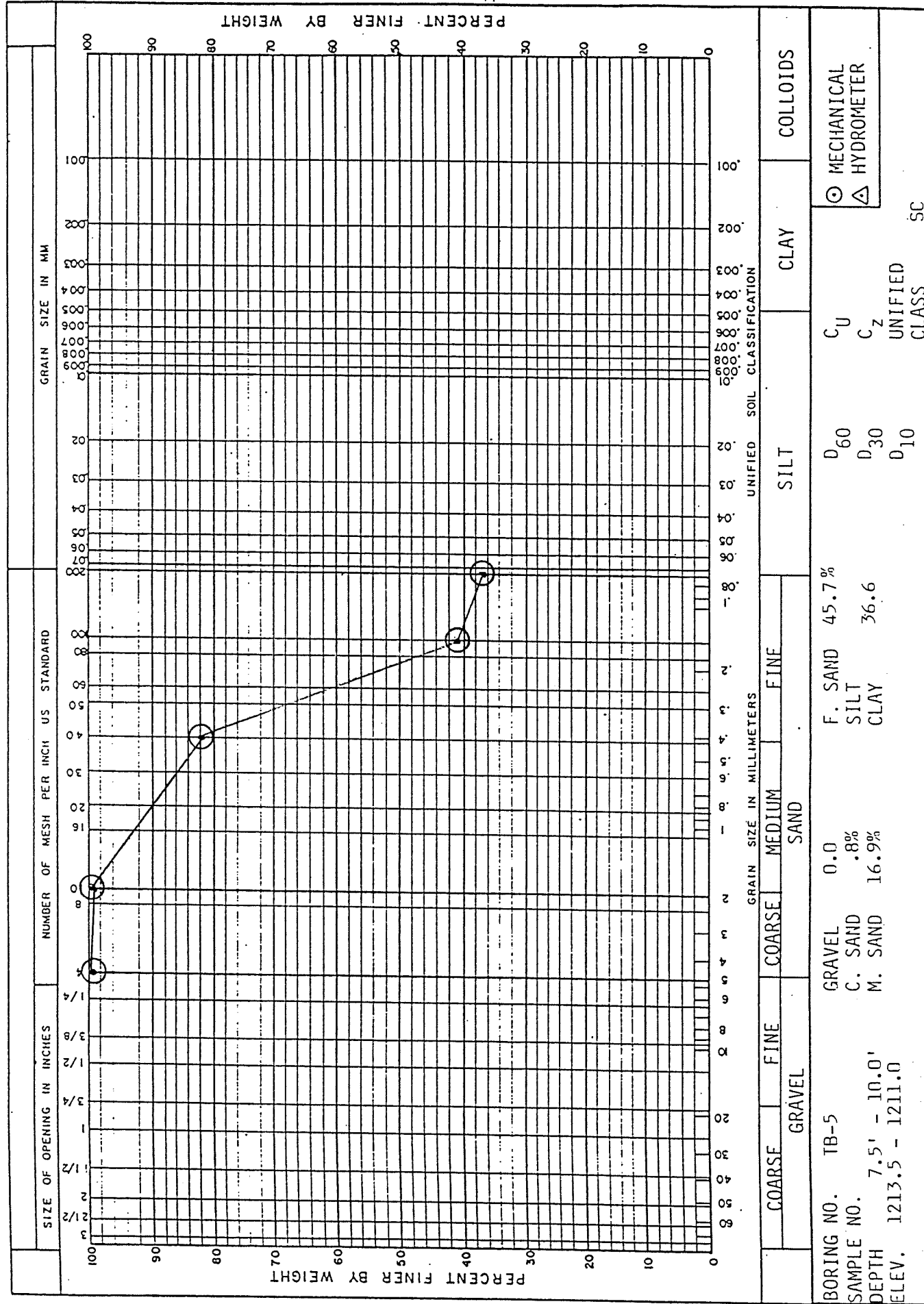
GRAIN SIZE IN MILLIMETERS				UNIFIED SOIL CLASSIFICATION			
COARSE GRAVEL		FINE SAND		SILT		CLAY	
COARSE	FINE	COARSE	FINE	COARSE	FINE	COARSE	FINE
7' - 8'	1225.9 - 1224.9	6.7%	46.9%	D ₆₀	C _U		
		5.7%	18.8%	D ₃₀	C _Z		
		21.9%		D ₁₀	UNIFIED CLASS		SC
BORING NO. TB-4							
SAMPLE NO.							
DEPTH 7' - 8'							
ELEV. 1225.9 - 1224.9							

○ MECHANICAL
 △ HYDROMETER

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed Landfill Site
 DATE: June 1, 1988
 JOB NO.: 57786

Central Wisconsin
 Engineers

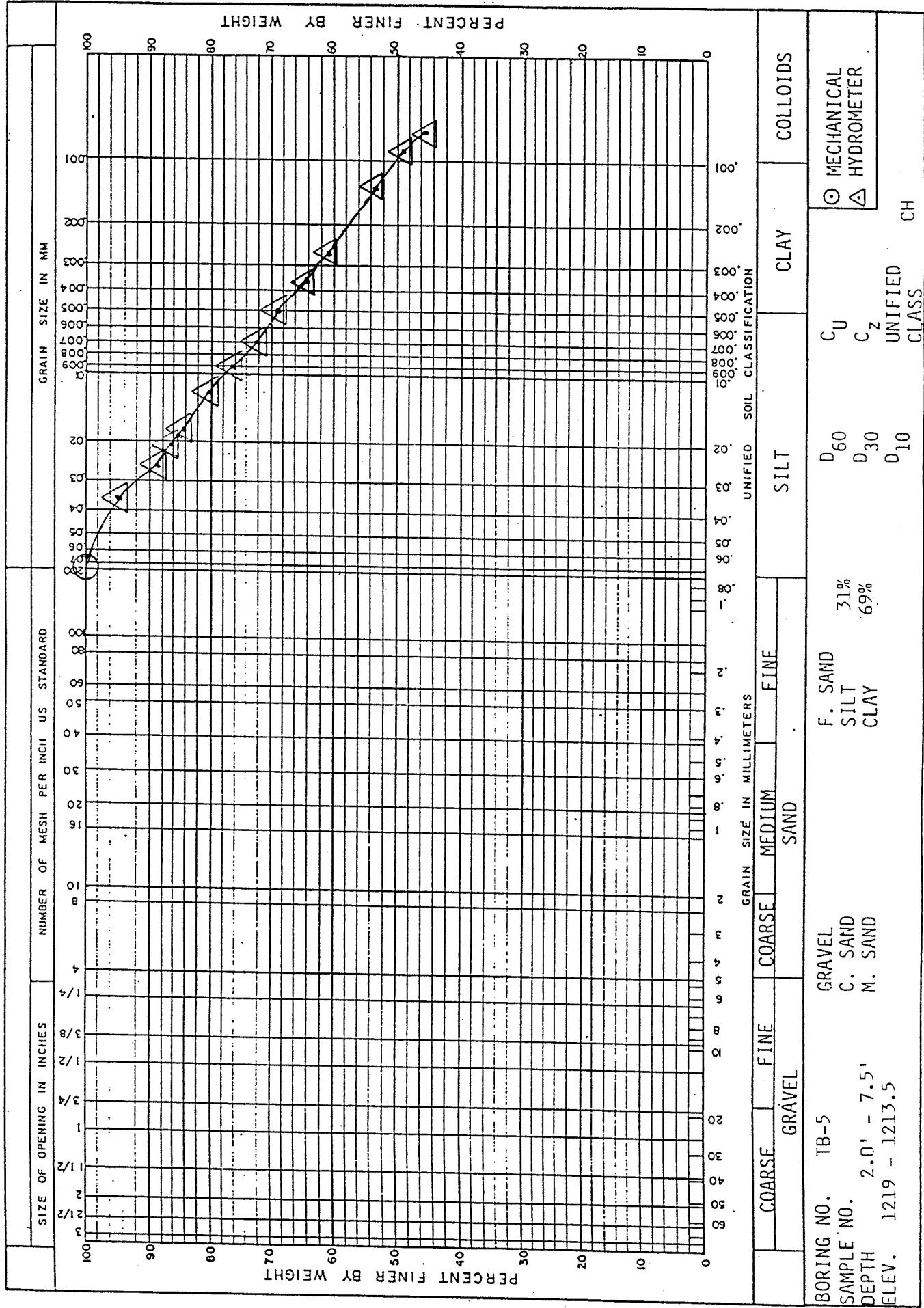


GRAIN SIZE IN MILLIMETERS				UNIFIED SOIL CLASSIFICATION		
COARSE GRAVEL		FINE SAND		SILT	CLAY	COLLOIDS
COARSE	FINE	COARSE	MEDIUM SAND			
TB-5		GRAVEL	0.0			
7.5' - 10.0'		C. SAND	.8%			
1213.5 - 1211.0		M. SAND	16.9%			
		F. SAND	45.7%			
		SILT				
		CLAY				
				D ₆₀	C _U	MECHANICAL
				D ₃₀	C _Z	HYDROMETER
				D ₁₀	UNIFIED CLASS	
					SC	

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed
Landfill Site
DATE: May 31, 1988
JOB NO: 57786

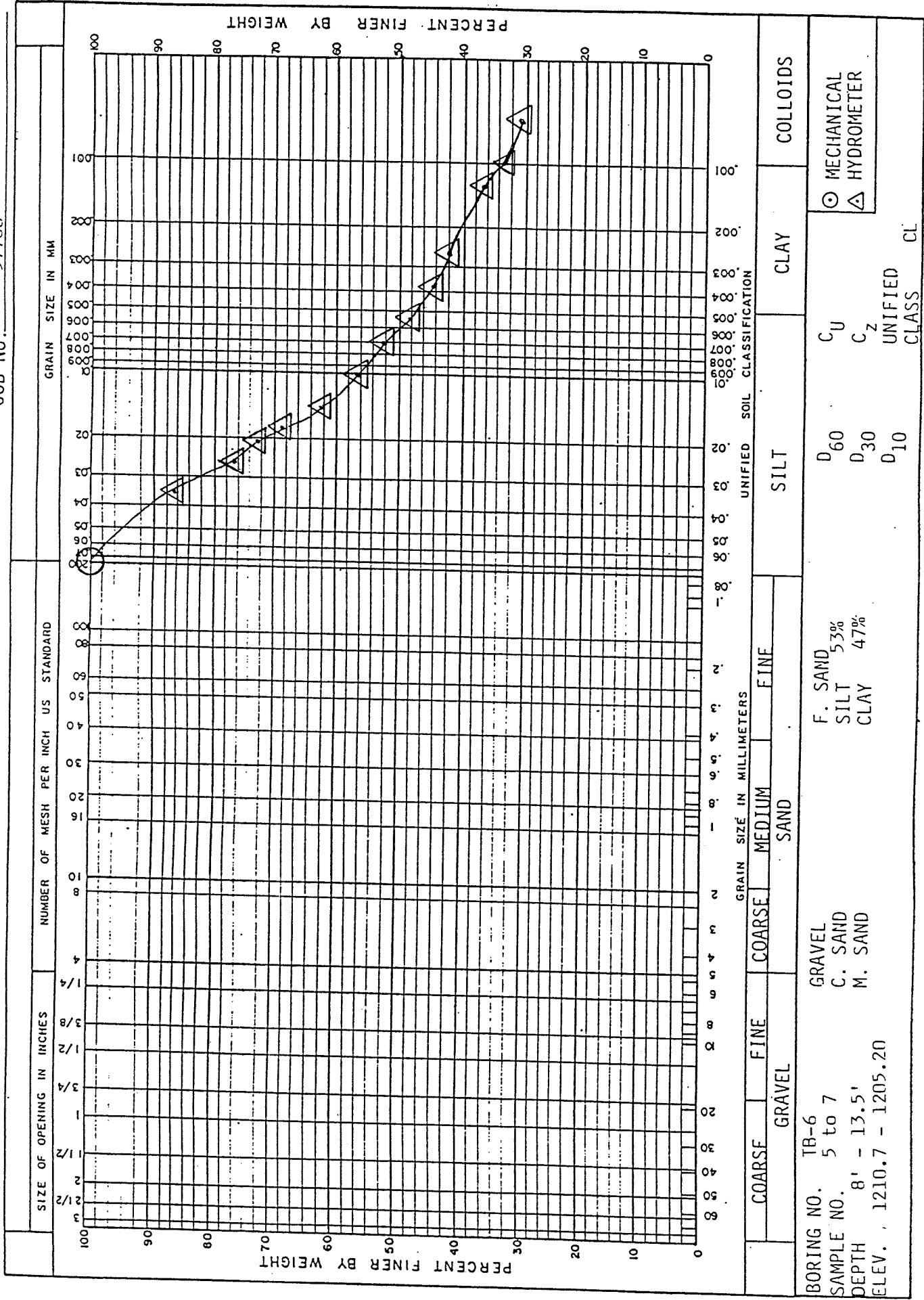
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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed
Landfill Site
DATE: May 26, 1988
JOB NO: 57786

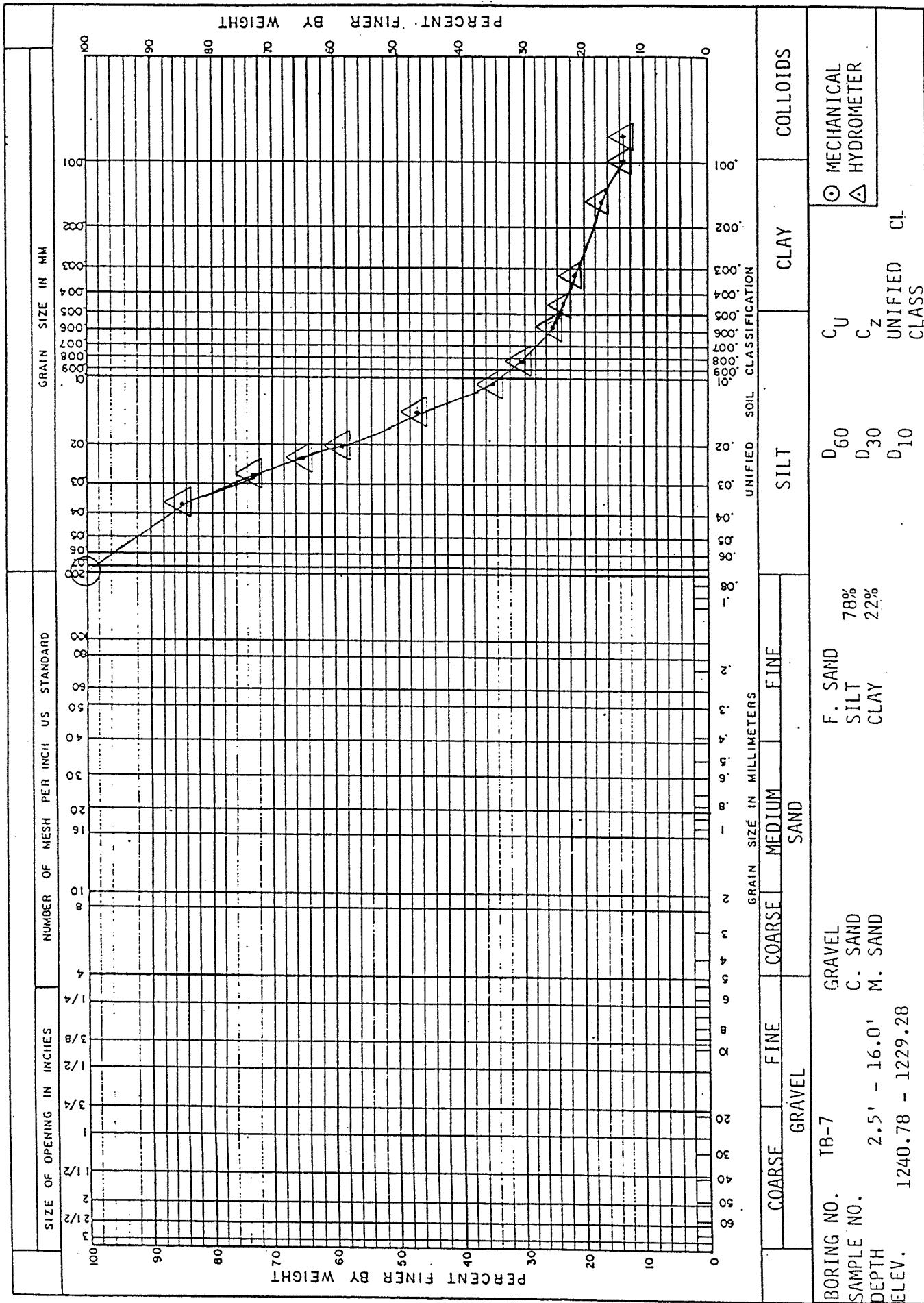
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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed Landfill
 DATE: May 31, 1988
 JOB NO: 57786

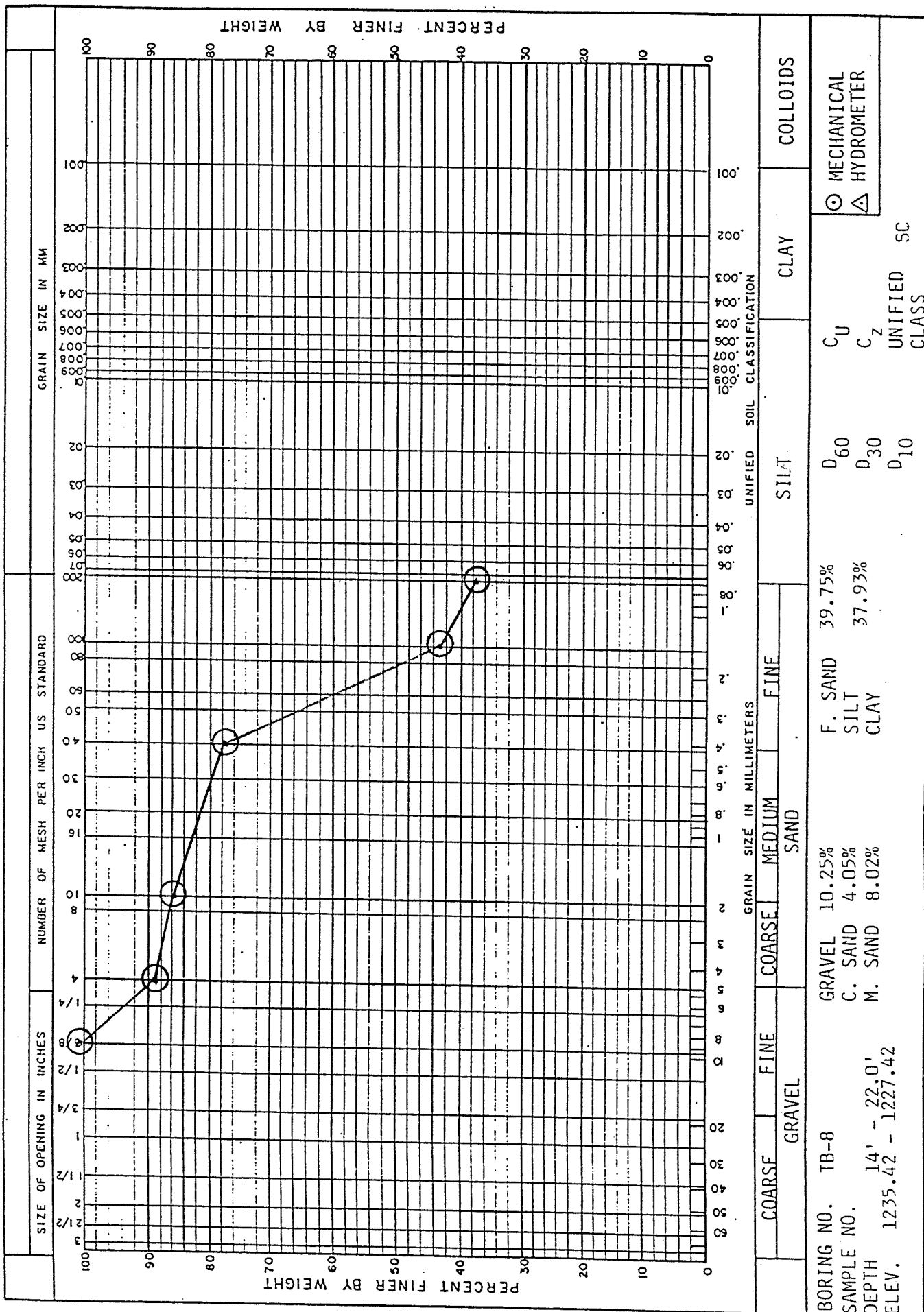
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PROJECT: Vernon County Proposed Landfill
 Site
 DATE: June 2, 1988
 JOB NO: 57786

GRAIN
 SIZE
 DISTRIBUTION
 CURVE

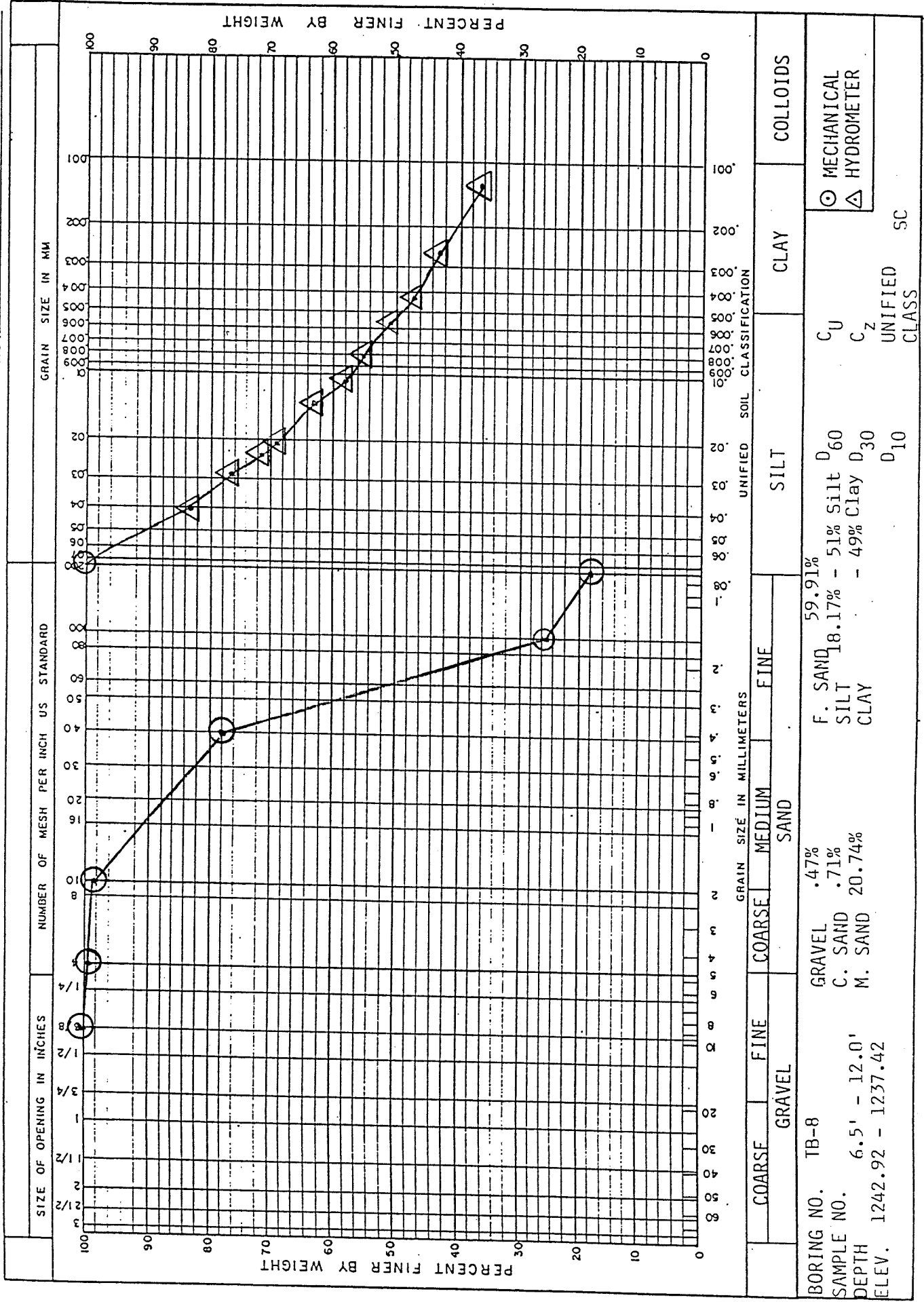
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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County Proposed Landfill Site
DATE: June 2, 1988
JOB NO: 57786

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BORING NO. TB-8
SAMPLE NO. 6.5' - 12.0'
DEPTH 1242.92 - 1237.42
ELEV.

GRAVEL .47%
C. SAND .71%
M. SAND 20.74%

F. SAND 59.91%
SILT 18.17% - 51%
CLAY 49% Clay D₃₀

MECHANICAL
HYDROMETER

COLLOIDS

CLAY

SILT

UNIFIED SOIL CLASSIFICATION

FINE

MEDIUM SAND

COARSE

GRAVEL

COARSE

GRAVEL

C_u

D₆₀

D₃₀

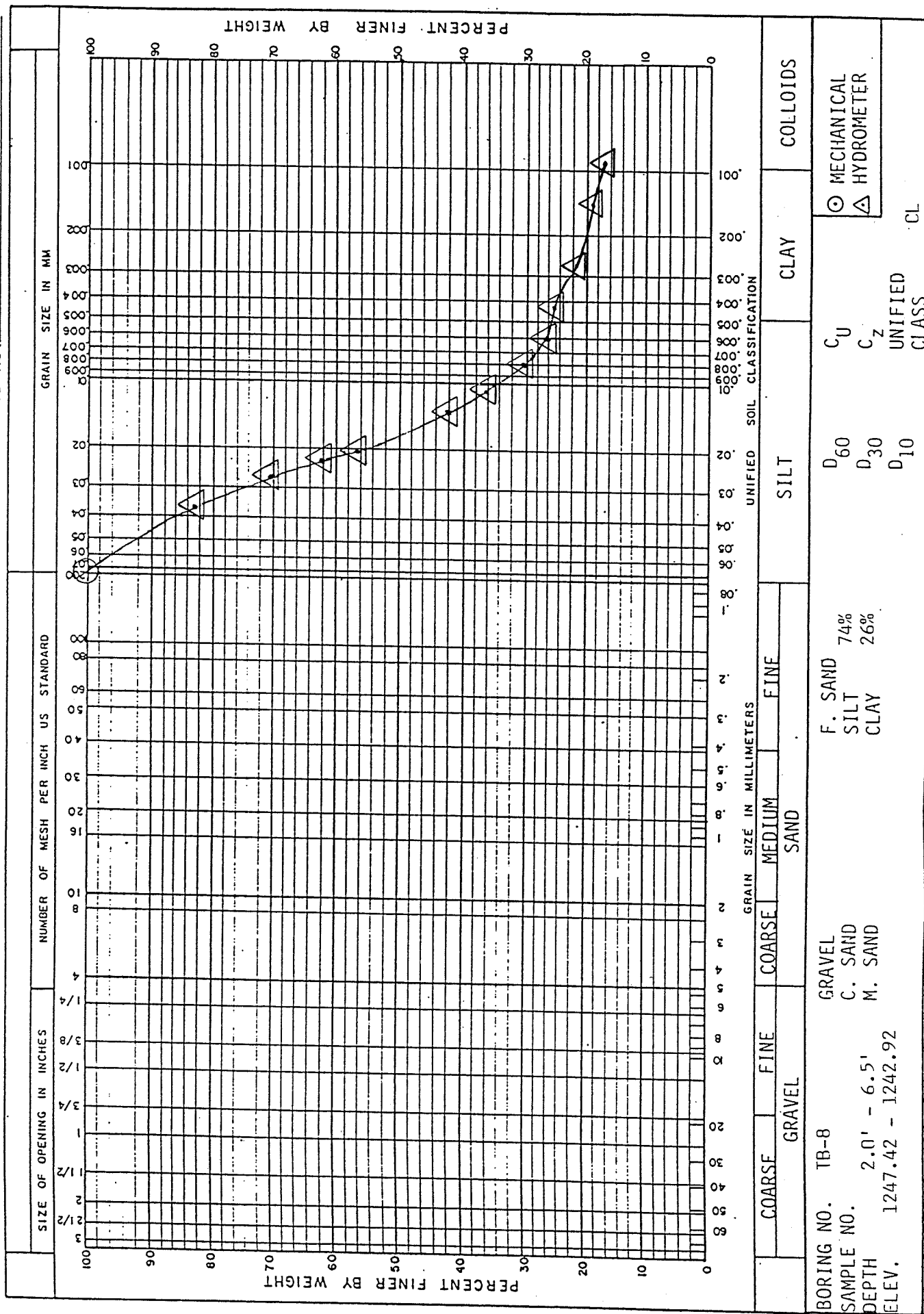
D₁₀

UNIFIED CLASS

SC

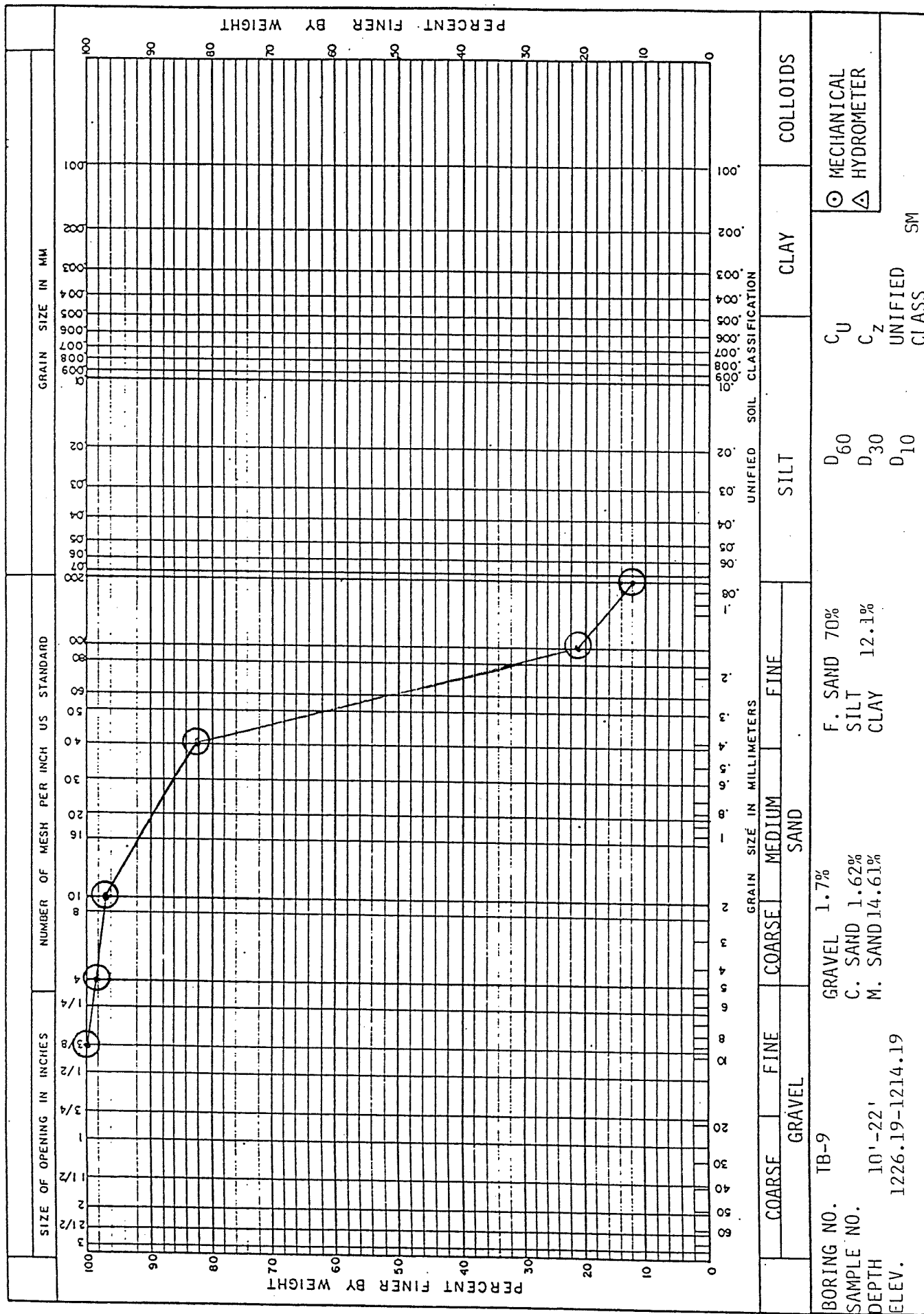
PROJECT: Vernon County Proposed
Landfill Site
 DATE: May 31, 1988
 JOB NO: 57786

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PROJECT: Vernon County Proposed Landfill
Site

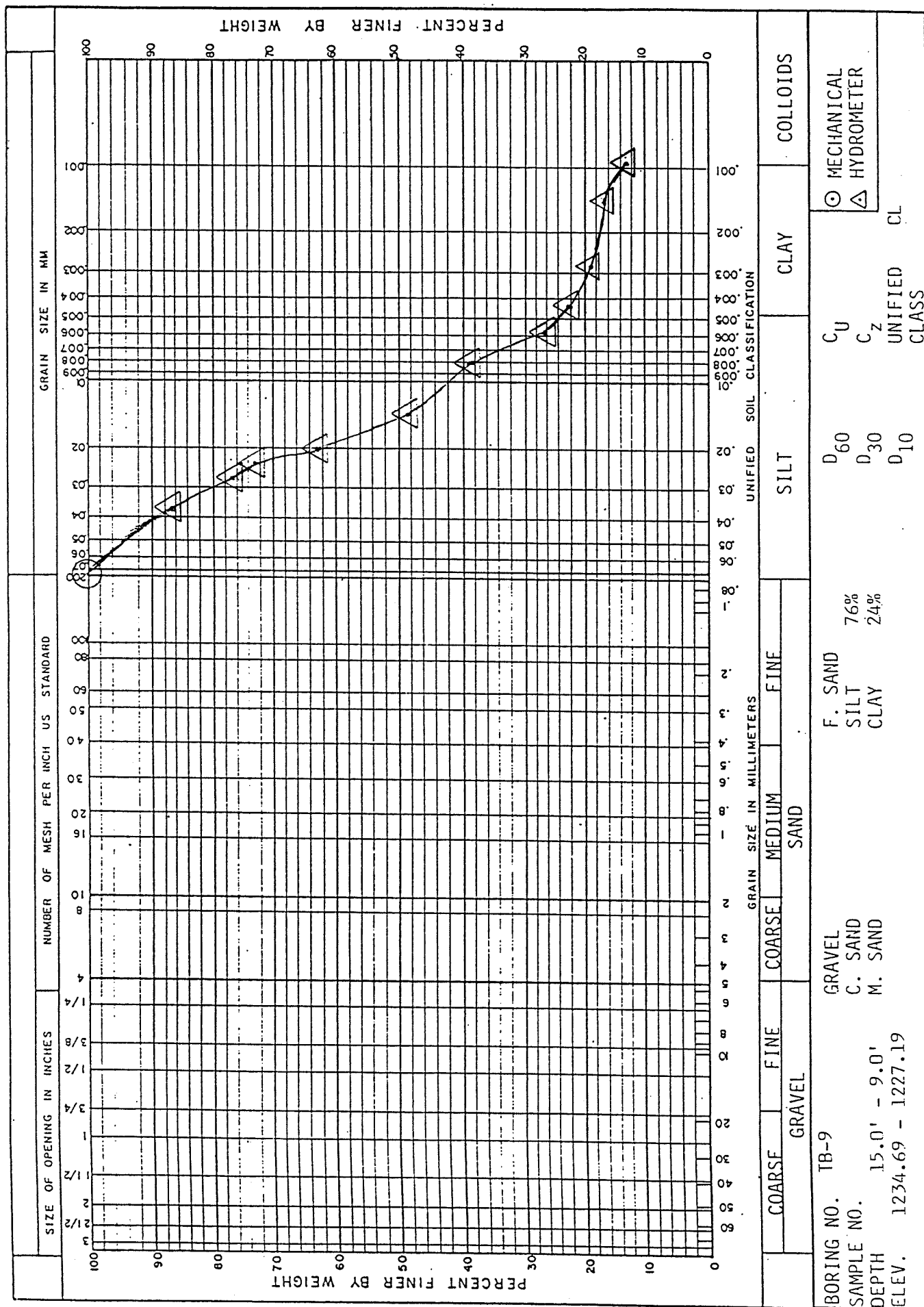
DATE: June 2, 1988
JOB NO: 57786



GRAIN
SIZE
DISTRIBUTION
CURVE

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DATE: May 31, 1988
JOB NO: 57786



PROJECT: Vernon Co.

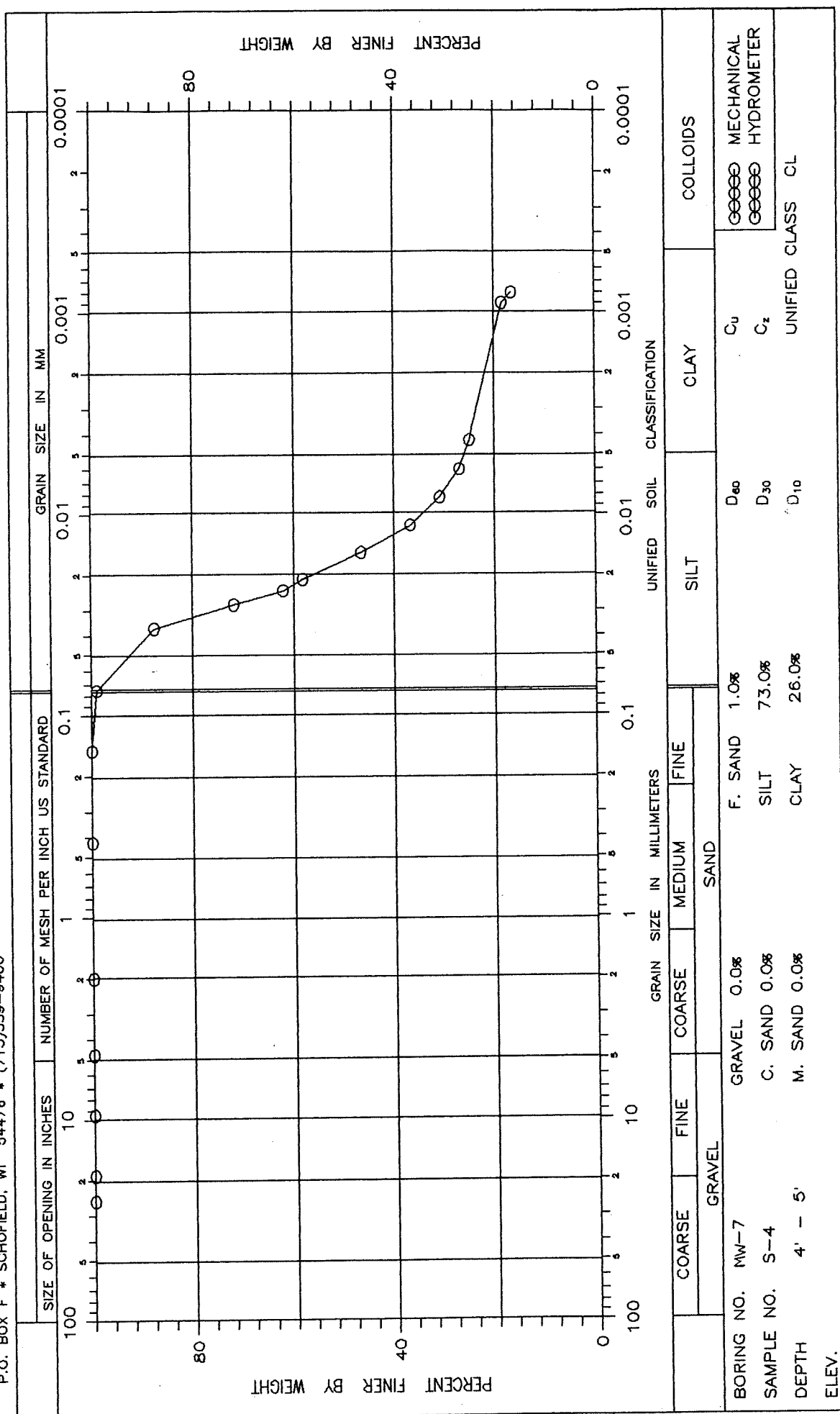
DATE: 07/13/90

JOB NO: 70388

GRAIN SIZE DISTRIBUTION CURVE

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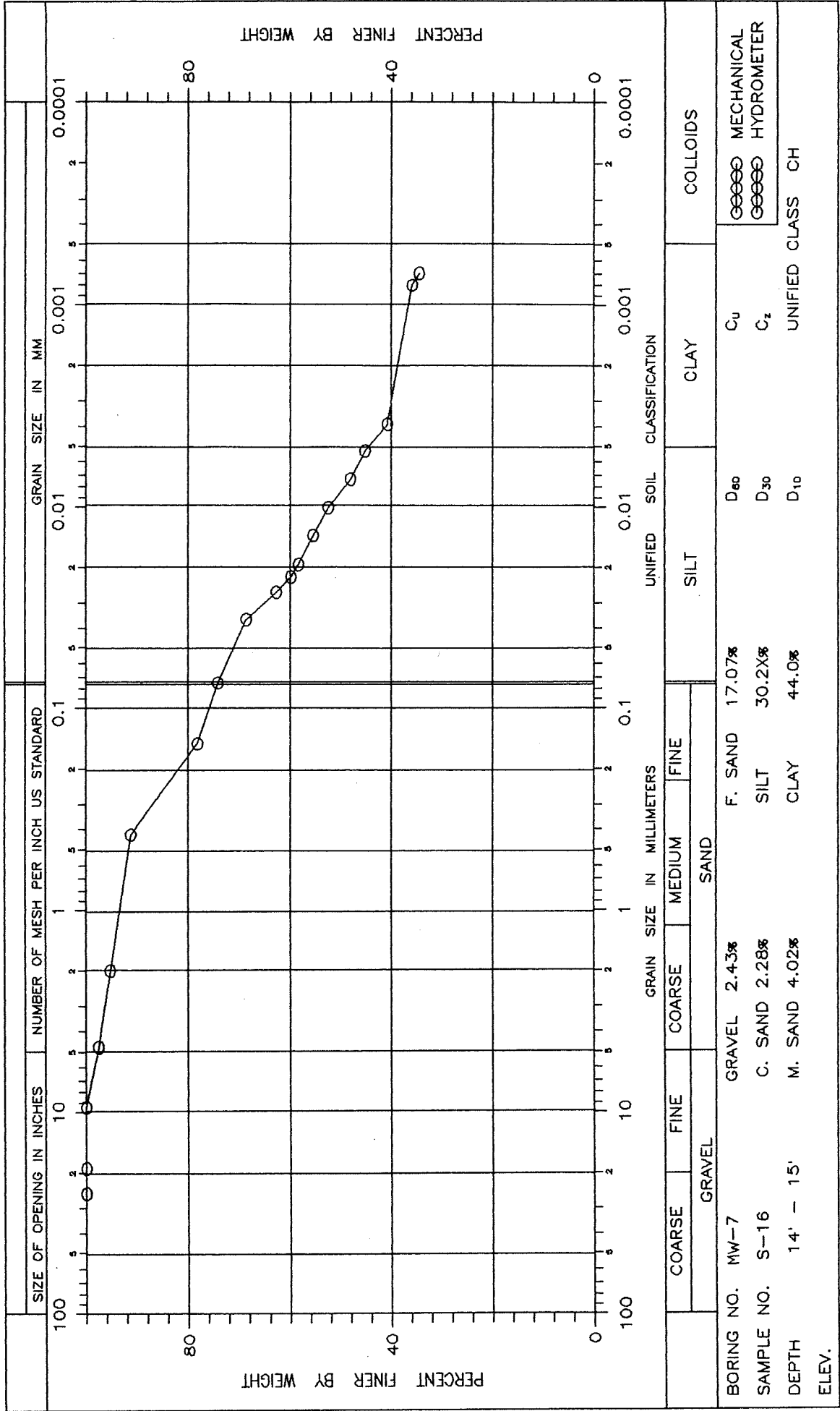
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PROJECT: Vernon Co.
 DATE: 07/13/90
 JOB NO: 70388

GRAIN SIZE DISTRIBUTION CURVE

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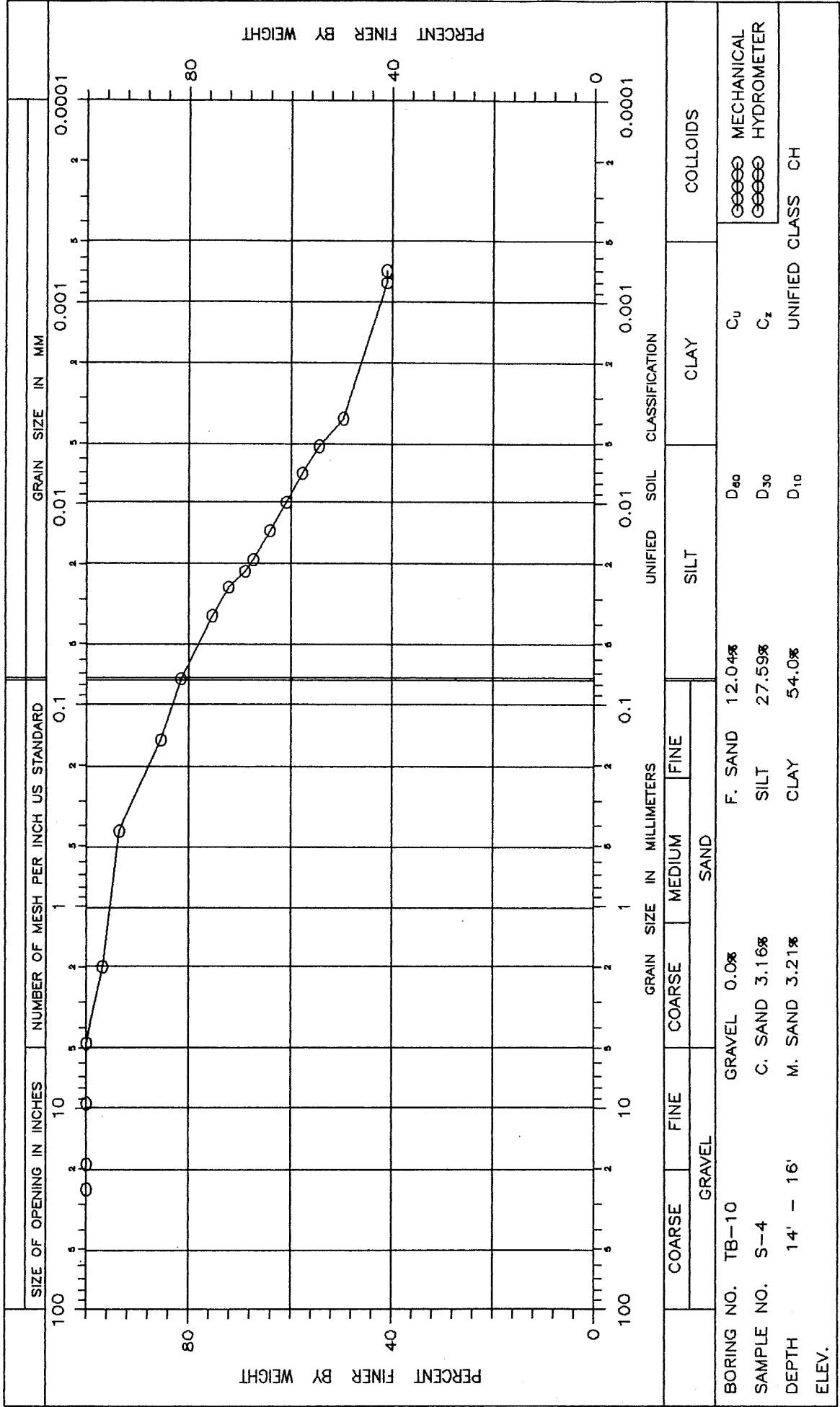


BORING NO. MW-7	GRAVEL 2.43%	F. SAND 17.07%	D ₆₀	C _u	MECHANICAL
SAMPLE NO. S-16	C. SAND 2.28%	SILT 30.2X%	D ₃₀	C _c	HYDROMETER
DEPTH 14' - 15'	M. SAND 4.02%	CLAY 44.0%	D ₁₀	UNIFIED CLASS	CH
ELEV.					

PROJECT: Vernon Co.
 DATE: 07/13/90
 JOB NO: 70388

GRAIN SIZE DISTRIBUTION CURVE

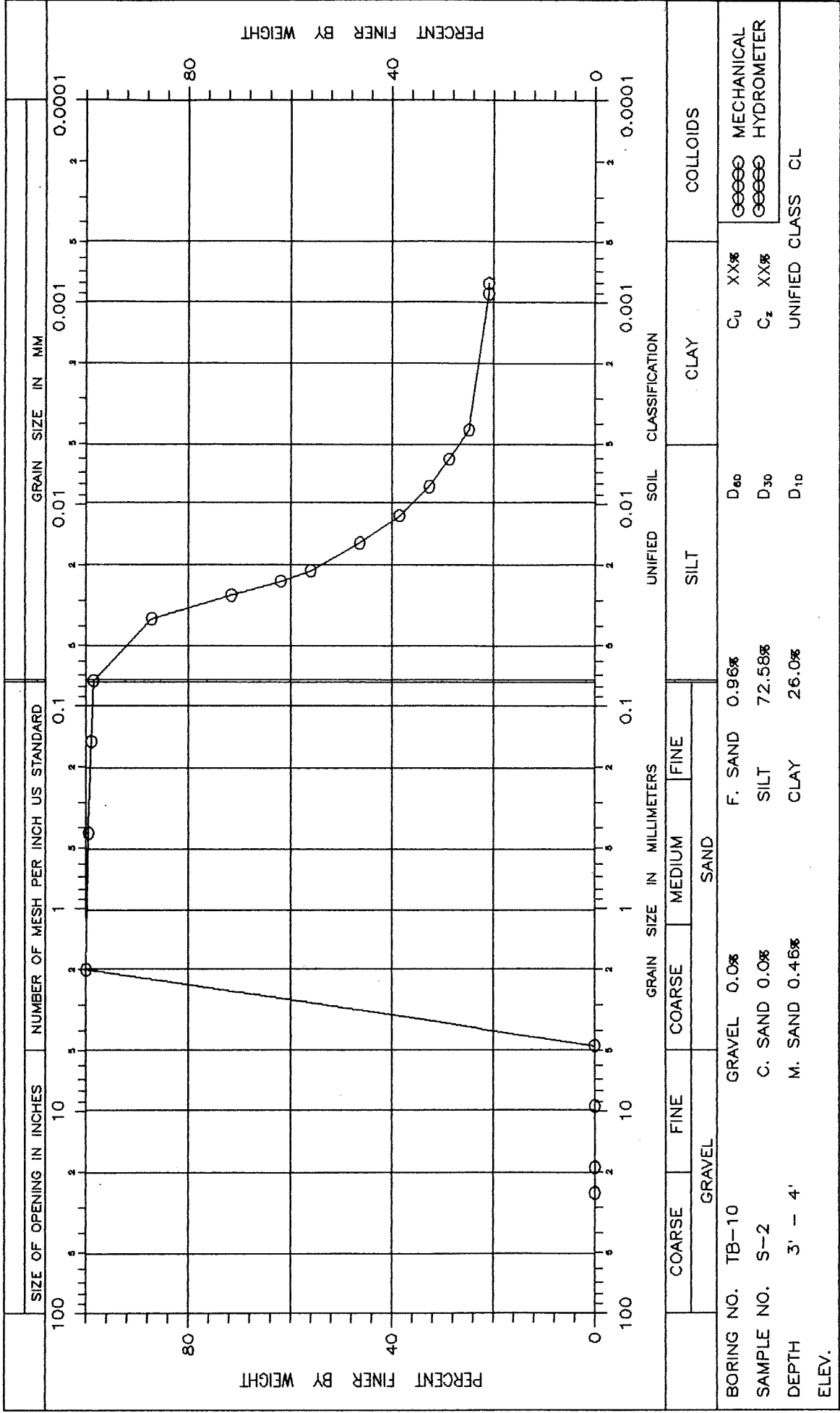
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PROJECT: Vernon Co.
 DATE: 07/13/90
 JOB NO: 70388

GRAIN SIZE DISTRIBUTION CURVE

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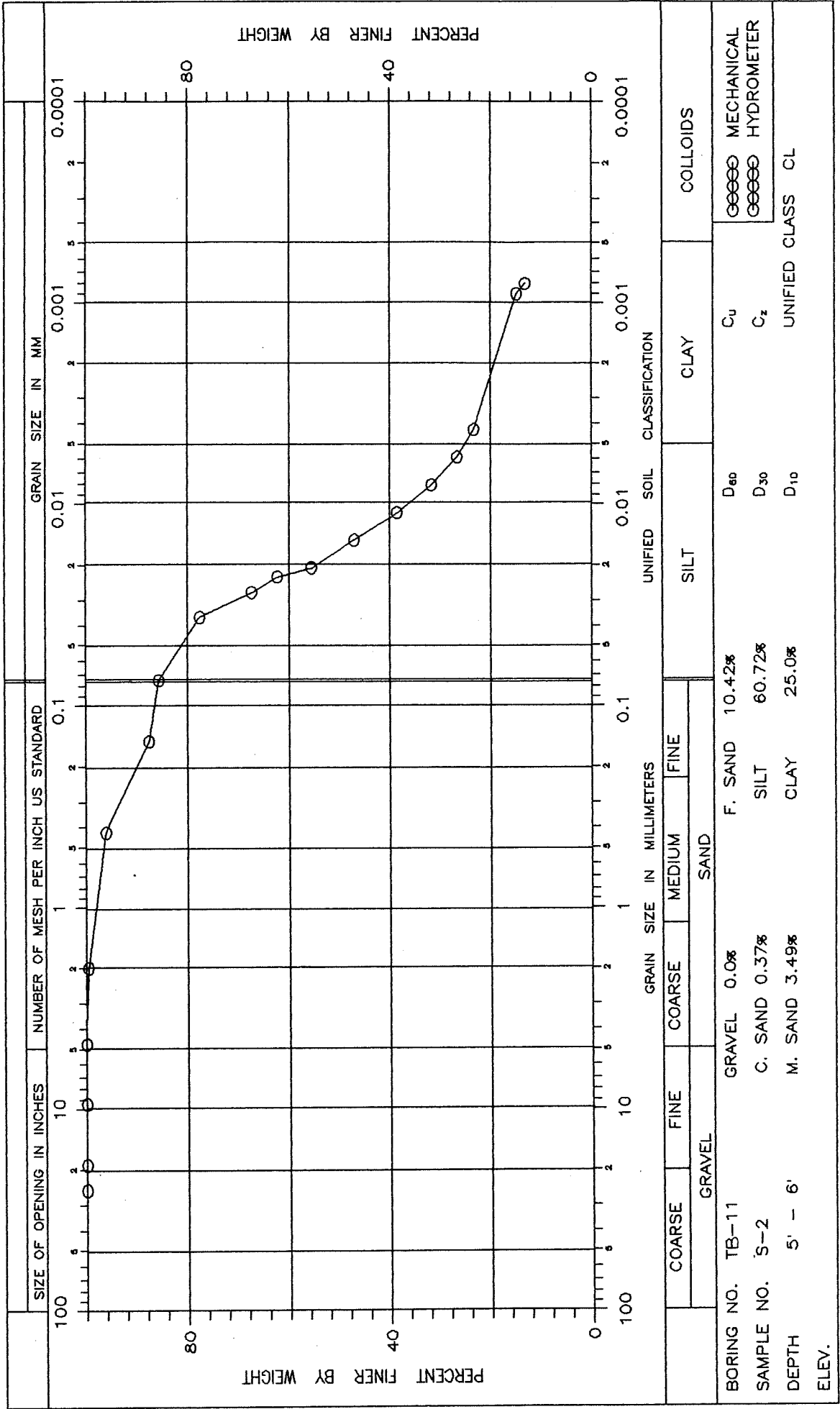


PROJECT: Vernon Co.
 DATE: 7/13/90
 JOB NO: 70388

GRAIN SIZE DISTRIBUTION CURVE

Central Wisconsin
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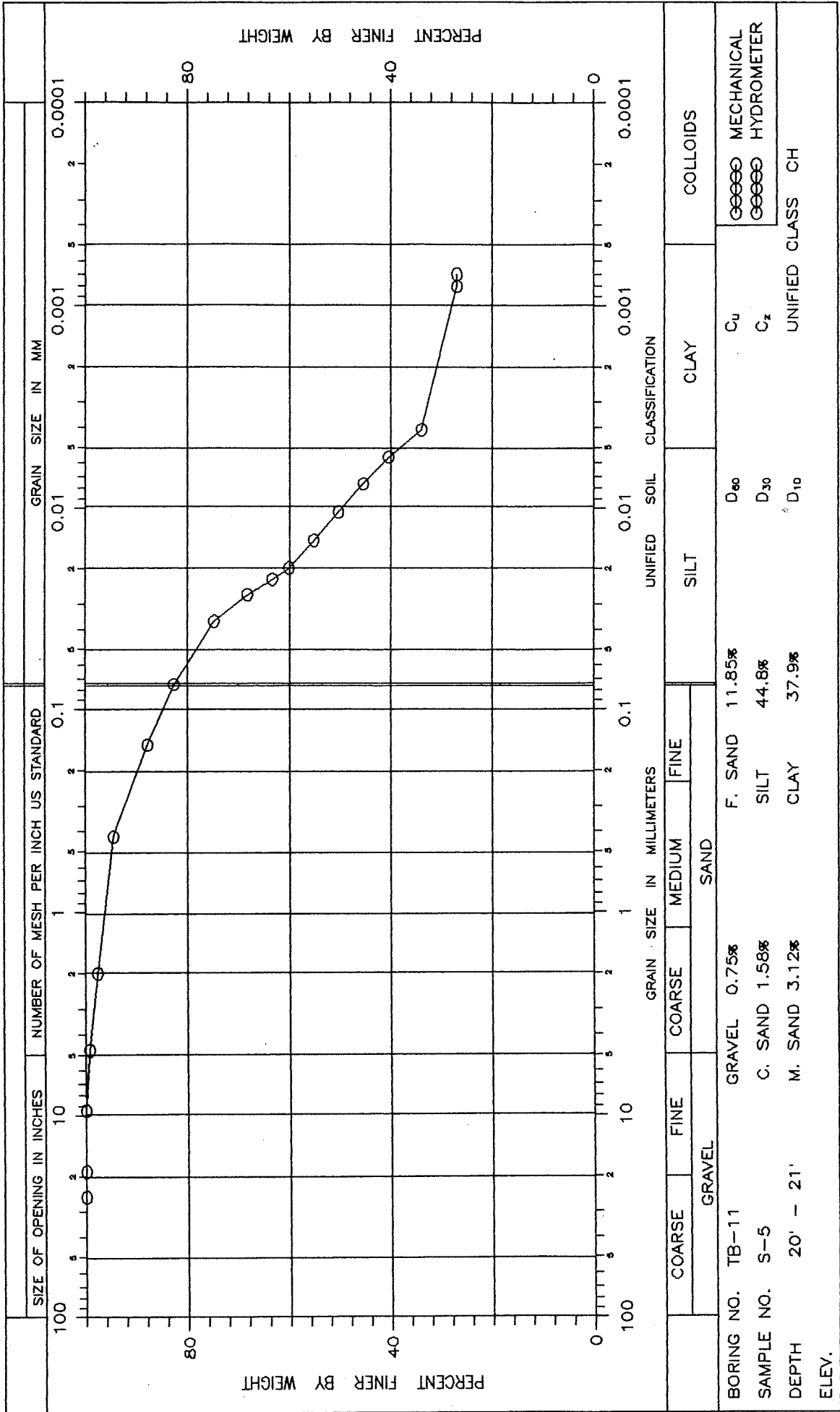
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PROJECT: Vernon Co.
DATE: 07/13/90
JOB NO: 70388

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FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 57786

Sample No.: TB-1, 2 ft to 3 ft

Sample Description: Clay, Brown, Trace of Silt and Sand

Sample Diameter: 6.2 cm

Sample Height (L): 6.0 cm

Sample Area (A): 30.19 cm²

Standpipe Area (a): 1.77 cm²

Dry Density:

Moisture Content (Initial):

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h^i}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_r (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	89400	89.5	83.3	2.82 x 10 ⁻⁷
2	76800	83.3	79.1	2.37 x 10 ⁻⁷
3	319140	79.1	61.4	2.79 x 10 ⁻⁷
4	86400	61.4	58.2	2.18 x 10 ⁻⁷
5	89100	58.2	55.3	2.02 x 10 ⁻⁷
Ave. K _r				2.44 x 10 ⁻⁷

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 57786

Sample No.: TB-3, at 2 feet

Sample Description: Clay, Red-Brown, with Sand and Some Gravel

Sample Diameter: 3.4 cm

Sample Height (L): 2.5 cm

Sample Area (A): 9.079 cm²

Standpipe Area (a): 1.77 cm²

Dry Density:

Moisture Content (Initial):

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h^f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	1500	89.0	88.3	2.57 x 10 ⁻⁶
2	318720	88.3	87.2	1.92 x 10 ⁻⁸
3	86400	87.2	86.8	2.59 x 10 ⁻⁸
4	89340	86.8	86.4	2.52 x 10 ⁻⁸

Ave. K_r 2.34 x 10⁻⁸
(Trials 2, 3, and 4)

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 57786

Sample No.: TB-5 (2 ft - 3 ft)

Sample Description: Clay, Red-Brown, Trace of Sand and Gravel

Sample Diameter: 3.4 cm

Sample Height (L): 6.1 cm

Sample Area (A): 9.08 cm²

Standpipe Area (a): 1.77 cm²

Dry Density:

Moisture Content (Initial):

$$K_f = \frac{aL}{At} \ln h_o \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_f (cm/sec)</u>
1	88200	87.0	63.5	4.24 x 10 ⁻⁶
2	343320	63.5	59.6	2.20 x 10 ⁻⁷
3	86400	59.6	59.5	2.31 x 10 ⁻⁸
4	89280	59.5	59.4	2.24 x 10 ⁻⁸
Ave. K _f				1.13 x 10 ⁻⁶

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 57786

Sample No.: TB-8 (at 8.0 ft)

Sample Description: Sand, Red M-F with Silt and Clay

Sample Diameter: 3.5 cm

Sample Height (L): 5.1 cm

Sample Area (A): 9.631 cm²

Standpipe Area (a): 1.77 cm²

Dry Density:

Moisture Content (Initial):

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h^f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	37.5	89.0	57.0	1.11 x 10 ⁻²
2	30.97	89.0	57.0	1.35 x 10 ⁻²
3	34.75	89.0	56.0	1.25 x 10 ⁻²
4	32.54	89.0	54.0	1.44 x 10 ⁻²
5	29.94	89.0	56.0	1.45 x 10 ⁻²
6	29.04	89.0	57.0	1.44 x 10 ⁻²
7	36.4	89.0	50.0	1.49 x 10 ⁻²
Ave. K _r				1.35 x 10 ⁻²

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 57786

Sample No.: TB-8 (at 15 feet)

Sample Description: Sand, Red Brown with Clay

Sample Diameter: 3.4 cm

Sample Height (L): 2.3 cm

Sample Area (A): 9.079 cm²

Standpipe Area (a): 1.77 cm²

Dry Density:

Moisture Content (Initial):

$$K_r = \frac{aL}{At} \ln h_0 \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	328800	89.0	69.2	3.43 x 10 ⁻⁷
2	86400	69.2	65.6	2.77 x 10 ⁻⁷
3	89520	65.6	62.2	2.67 x 10 ⁻⁷
Ave. K _r				2.96 x 10 ⁻⁷

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PROJECT: _____
Vernon County Clay Search

JOB NO. _____
70389

DATE _____
10/19/89

Boring No.	Sample No.	Depth	Field Class	GRADATION - % PASSING							LL	PI	USCS	Wn %	e	Yd P.C.F.	GS	k -(CM/S)	
				GRADATION - % PASSING															
				#100	#200	#40	#10	#4	3/8"	3/4"									
TP-7	S1-7	1'-5'-2'		28.0	58.0	59.53	100%	100%	100%	100%	100%	37.7	19.4	OL					
	S2-7	3'-4'-5'		26.0	50.0	38.58	89.72	96.06	98.79	99.39	100%	35.0	15.22	OL					
	S3-7	6'-8'		50.0	65.0	78.53	81.07	92.06	94.02	94.49	94.72	100%	56.0	29.91	OH				
TP-8	S1-8	3'-4'		25.0	52.0	38.25	98.71	100%	100%	100%	100%	39.6	16.8	OL					
	S2-8	5'-5'-5'		26.0	38.0	52.8	58.57	85.3	90.65	92.73	95.58	100%	42.3	23.52	OL				
	S3-8	6'-7'		25.0	49.0	35.3	96.41	98.30	99.38	100%	100%	54.8	29.37	OH					
TP-9	S2-9	3'-4'		20.0	41.0	73.53	75.95	88.48	94.65	96.9	100%	37.0	17.27	OL					
	S3-9	5'-6'		40.0	56.0	72.87	76.75	88.26	93.43	94.79	96.76	100%	54.5	27.99	OL				
	S1-10	2'-3'		27.0	56.0	38.71	100%	100%	100%	100%	100%	40.0	18.1	OL					
	S2-10	6'-7'		29.0	36.0	43.54	45.58	76.81	98.54	99.0	100%	48.9	24.32	OL					
	S3-10	9'-10'		68.0	84.0	96.89	97.49	99.43	100%	100%	100%	113.5	56.36	PT					
	S1-11	1'-2'		27.0	54.0	34.5	95.37	97.23	98.42	99.17	100%	39.5	16.55	OL					
	S2-11	3'-5'-4'		42.0	53.0	73.59	77.18	92.57	96.34	97.35	98.36	100%	47.8	25.92	OL				
	S3-11	6'-7'		—	—	33.55	35.27	72.49	98.73	99.48	100%	—	—	—					
	S1-13	2'-3'		26.0	54.0	39.45	100%	100%	100%	100%	100%	42.2	17.99	OL					
TP-13	S2-13	5'-6'		39.0	58.0	78.43	81.61	95.46	98.83	99.17	100%	58.8	31.62	OH					
	S2-14	4'-5'		27.0	53.0	39.47	100%	100%	100%	100%	100%	36.8	15.36	OL					
	S3-14	7'-8'		23.0	52.0	38.42	100%	100%	100%	100%	100%	40.5	17.51	OL					
	S4-14	9'-10'		31.0	41.0	51.63	50.38	88.76	94.87	95.99	97.58	100%	42.7	21.18	OL				
	S1-15	1'-2'		27.0	58.0	39.63	100%	100%	100%	100%	100%	41.4	16.27	OL					
	S2-15	3'-4'		22.0	52.0	39.56	100%	100%	100%	100%	100%	38.3	17.03	OL					
	S3-15	8'-9'		—	—	29.12	36.90	90.37	99.02	99.17	100%	—	—	—					
	S1-20	2'-3'		26.0	53.0	39.77	100%	100%	100%	100%	100%	36.3	15.12	OL					
	S2-20	4'-5'		27.0	56.0	39.71	100%	100%	100%	100%	100%	41.5	18.19	OL					

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FINAL TEST INFORMATION

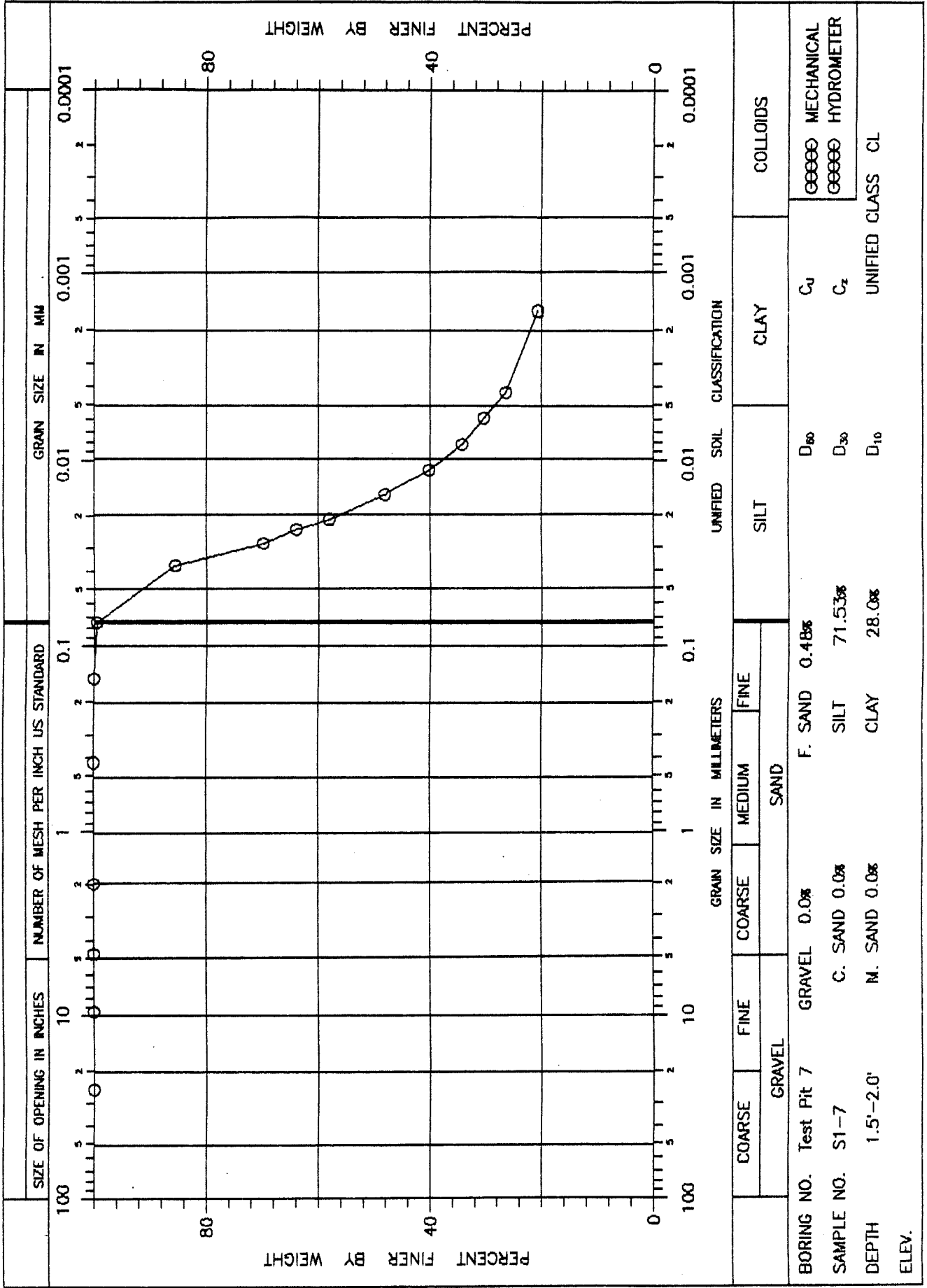
PROJECT: Vernon County Clay Search JOB NO. 70389 DATE 10/19/89

Boring No.	Sample No.	Depth	Field Class	GRADATION - % PASSING							LL	PI	USCS	W _n %	M %	D.D. P.C.E	GS	k ⁻ (CM/S)
				#100	#200	#40	#10	#4	3/8"	3/4"								
TP-20	S3-20	8'-9'		16.0	54.0	99.70	100%	100%	100%	100%	36.5	15.05	OL		26.8			
	S4-20	10'-11'		39.0	51.0	61.21	66.18	93.35	99.50	99.65	45.0	23.33	OL					
TP-21	S1-21	2'-3'		30.0	60.0	99.73	100%	100%	100%	100%	41.3	19.31	OL					
	S2-21	6'-7'		28.0	56.0	99.64	100%	100%	100%	100%	37.4	15.39	OL					
	S3-21	10'-11'		32.0	47.0	59.81	64.32	84.52	93.74	94.81	55.5	30.8	OH					
TP-22	S1-22	3'-4'		19.0	55.0	99.81	100%	100%	100%	100%	38.8	15.58	OL		23.3			
	S3-22	9'-10'		36.0	58.0	75.36	78.07	93.44	97.83	98.95	49.5	23.56	OL		25.2			
TP-25	S1-25	1.5'-2.5'		25.0	52.0	98.09	98.4	98.94	99.5	100%	38.3	15.45	OL					
	S2-25	4'-5'		57.0	72.0	78.85	81.25	92.66	98.97	100%	63.6	35.71	OH					
TP-27	S1-27	1.5'-2.5'		27.0	52.0	98.95	99.26	99.49	99.66	99.75	40.5	17.6	OL		21.5			
	S2-27	4'-5'		50.0	68.0	84.04	86.28	95.59	98.59	99.56	65.0	32.55	OH		21.1			
	S3-27	7'-9'		—	—	32.24	41.38	83.5	100%	100%	—	—	—		20.1			
TP-A	S1-A	4'-5'		54.0	73.0	91.49	92.16	98.1	99.29	99.58	62.8	32.36	OH					
	S2-A	7'-8'		50.0	63.0	78.64	80.61	93.6	98.64	100%	58.2	30.99	OH					
TP-B	S1-B	3'-4'		34.0	59.0	96.40	96.99	98.12	98.68	99.04	38.9	16.38	OL					
	S2-B	5'-6'		39.0	51.0	73.09	76.61	94.61	99.69	100%	45.3	22.72	OL					
	S3-B	8'-9'		69.0	73.0	84.76	87.24	96.74	99.09	99.46	63.5	32.48	OH		18.0			
TP-C	S1-C	3'-3.5'		26.0	54.0	99.46	100%	100%	100%	100%	34.9	15.09	OL					
	S2-C	5'-6'		30.0	57.0	99.0	100%	100%	100%	100%	43.8	20.78	OL		19.9			
	S3-C	7'-8'		42.0	51.0	60.91	64.92	88.51	93.51	94.92	54.2	28.7	OL					
TP-D	S1-D	3'-4'		24.0	51.0	98.94	99.16	100%	100%	100%	41.1	16.23	OL					
TP-12	S2-12														22.7	104.65	9.47x10 ⁻⁹	
TP-12	S2-12														24.8	100.24	7.79x10 ⁻⁹	
TP-12	S2-12														18.64	109.74	2.66x10 ⁻⁸	
TP-12	S2-12														15.89	107.43	1.03x10 ⁻⁸	

PROJECT: Vernon County
 DATE: 9/27/89
 JOB NO: 70389

GRAIN SIZE DISTRIBUTION CURVE

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PROJECT: Vernon County

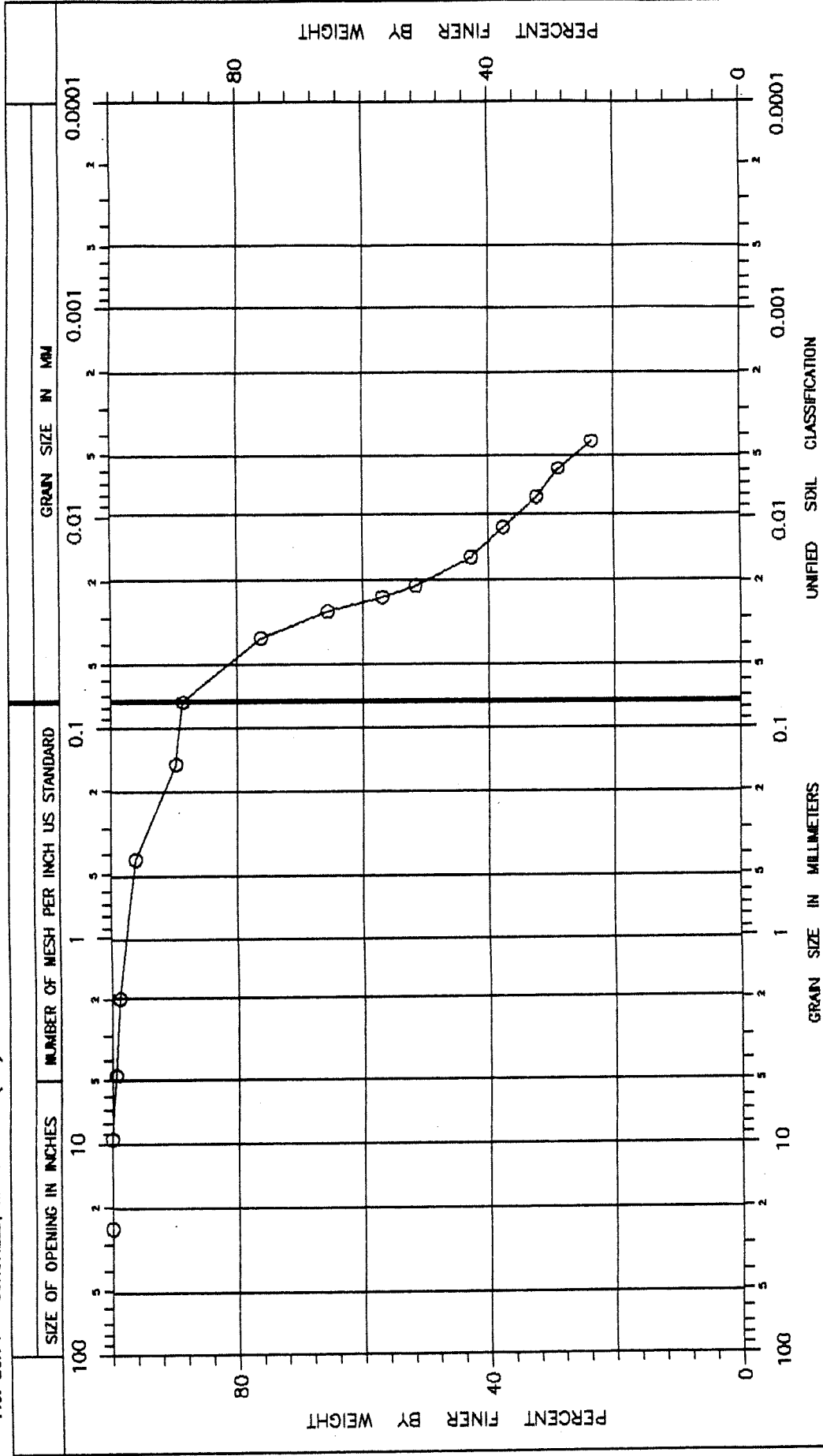
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BORING NO.	Test Pit	GRAIN SIZE IN MILLIMETERS			UNIFIED SOIL CLASSIFICATION			COLLOIDS
		COARSE	FINE	GRAVEL	COARSE	MEDIUM	FINE	
7	Test Pit 7	GRAVEL	0.61%	F. SAND	7.48%			
S2-7				C. SAND	0.60%	SILT	62.58%	
3'-4.5'				M. SAND	2.73%	CLAY	26.0%	
ELEV.								

MECHANICAL
HYDROMETER

C_u
C_z

D₅₀
D₆₀
D₁₀

UNIFIED CLASS

CL

PROJECT: Vernon County

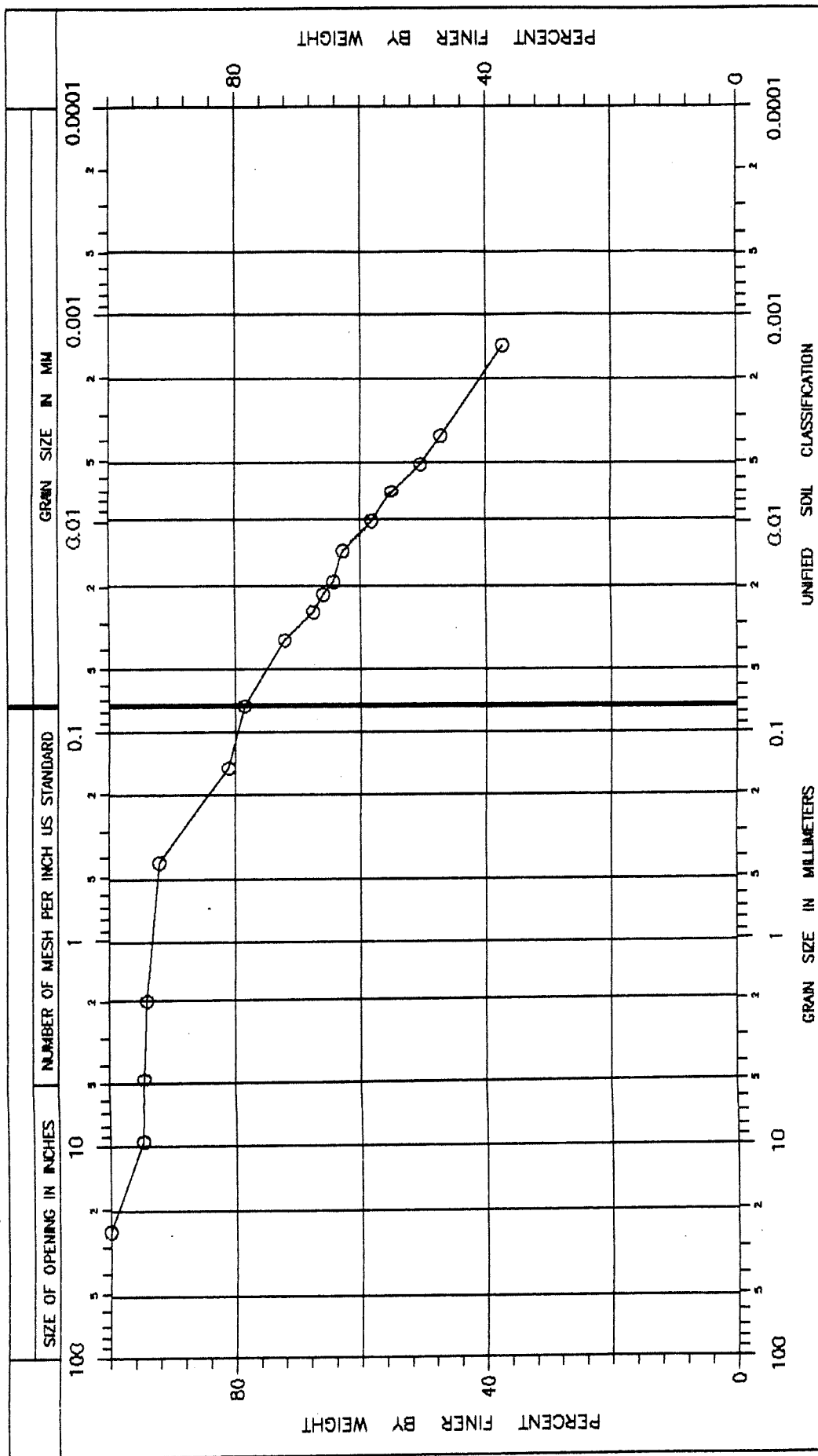
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GRAIN SIZE IN MILLIMETERS				UNIFIED SOIL CLASSIFICATION		
GRAVEL		SAND		SILT	CLAY	COLLOIDS
COARSE	FINE	COARSE	MEDIUM	FINE		
BORING NO. Test Pit 7	GRAVEL 5.51%	F. SAND 13.53%				
SAMPLE NO. S3-7	C. SAND 0.47%	SILT 28.53%				
DEPTH 6'-8"	M. SAND 1.98%	CLAY 50.0%				
ELEV.						

MECHANICAL
HYDROMETER

C_u

C_c

D₆₀

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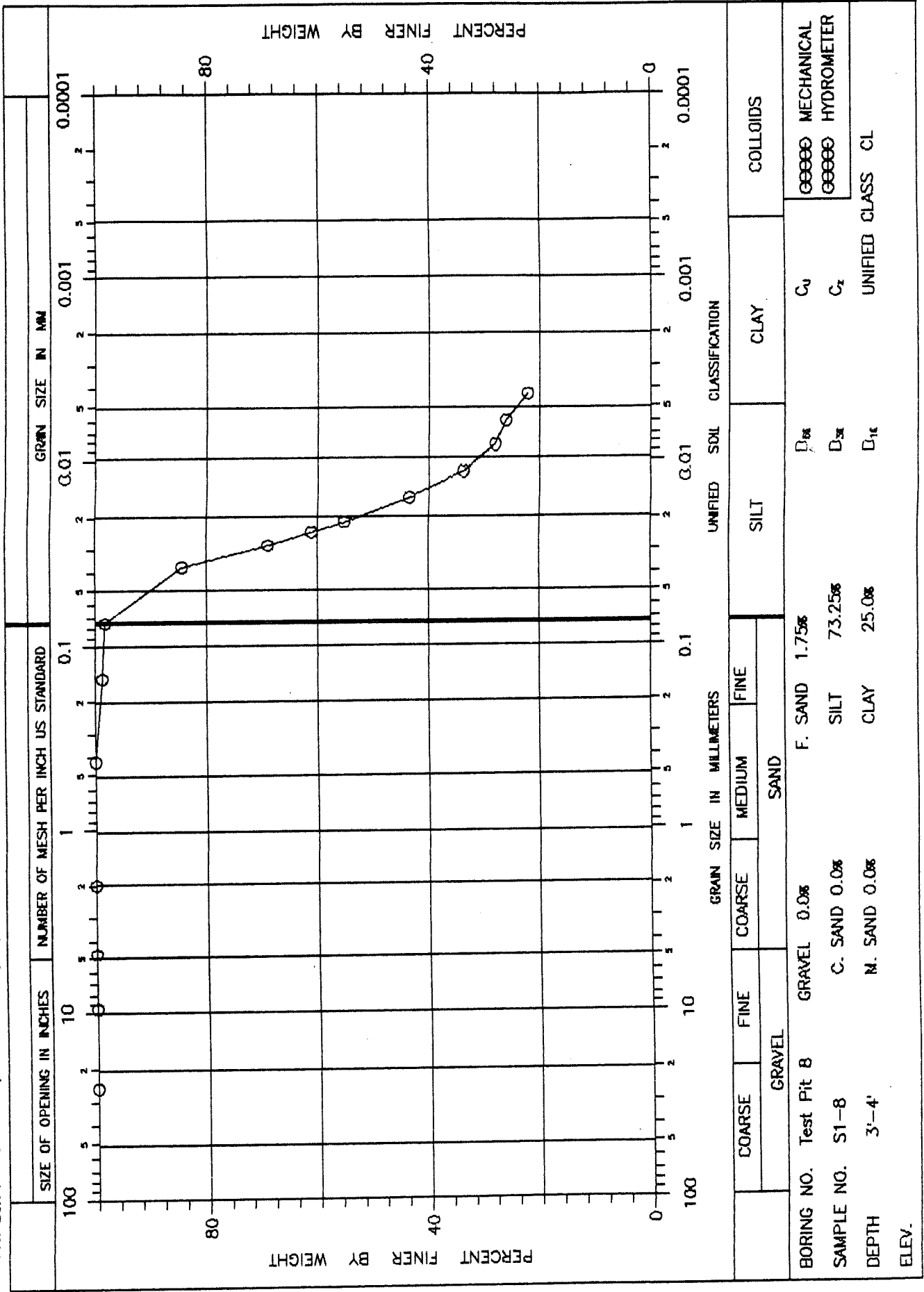
UNIFIED CLASS

CH

PROJECT: Yernon County
 DATE: 9/29/89
 JOB NO: 70389

GRAIN SIZE DISTRIBUTION CURVE

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BORING NO.	Test Pit B	GRAIN SIZE IN MILLIMETERS			UNIFIED SOIL CLASSIFICATION			COLLOIDS
		COARSE	FINE	GRAVEL	COARSE	MEDIUM	FINE	
SAMPLE NO.	S1-8	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
DEPTH	3'-4'	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ELEV.								

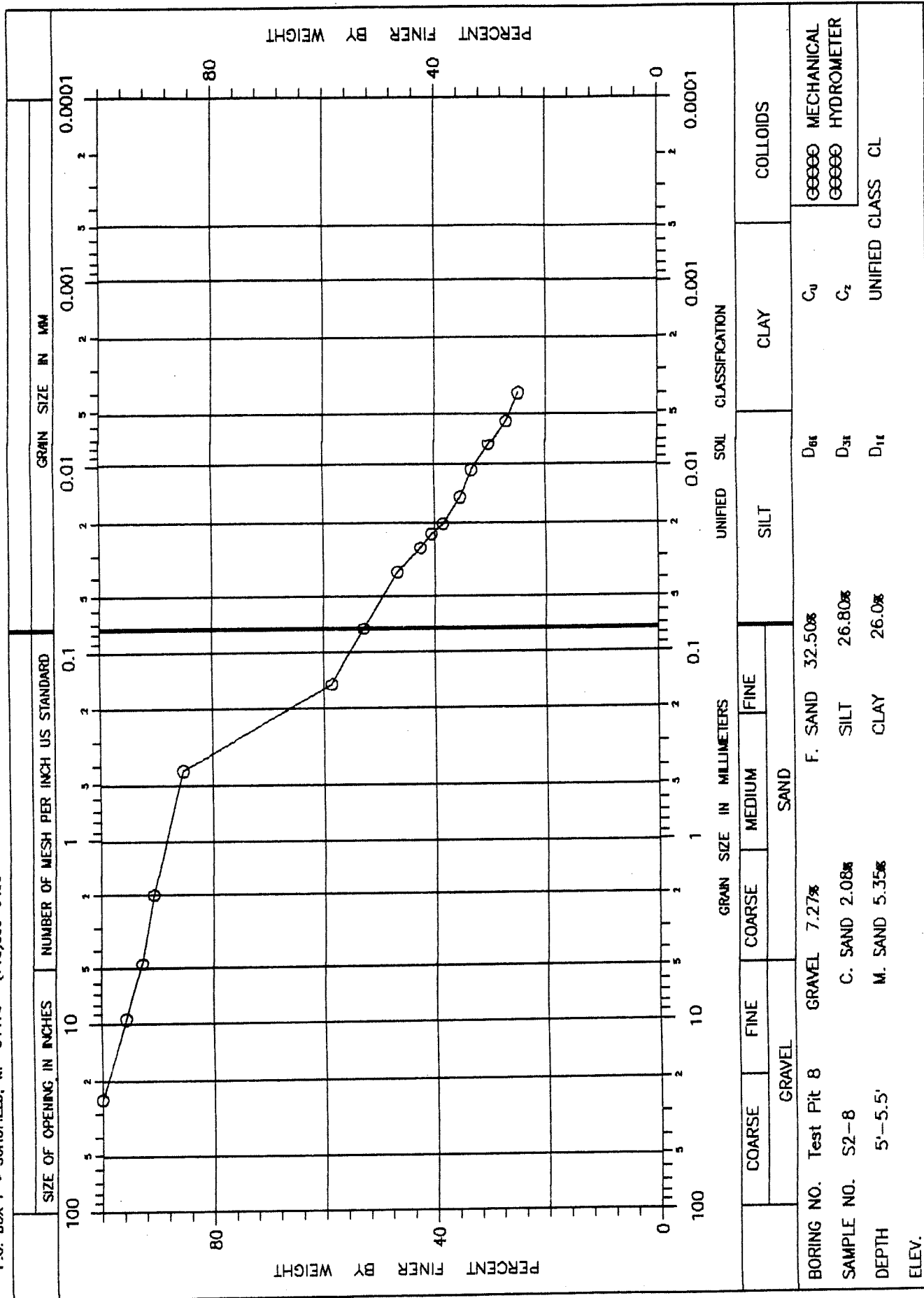
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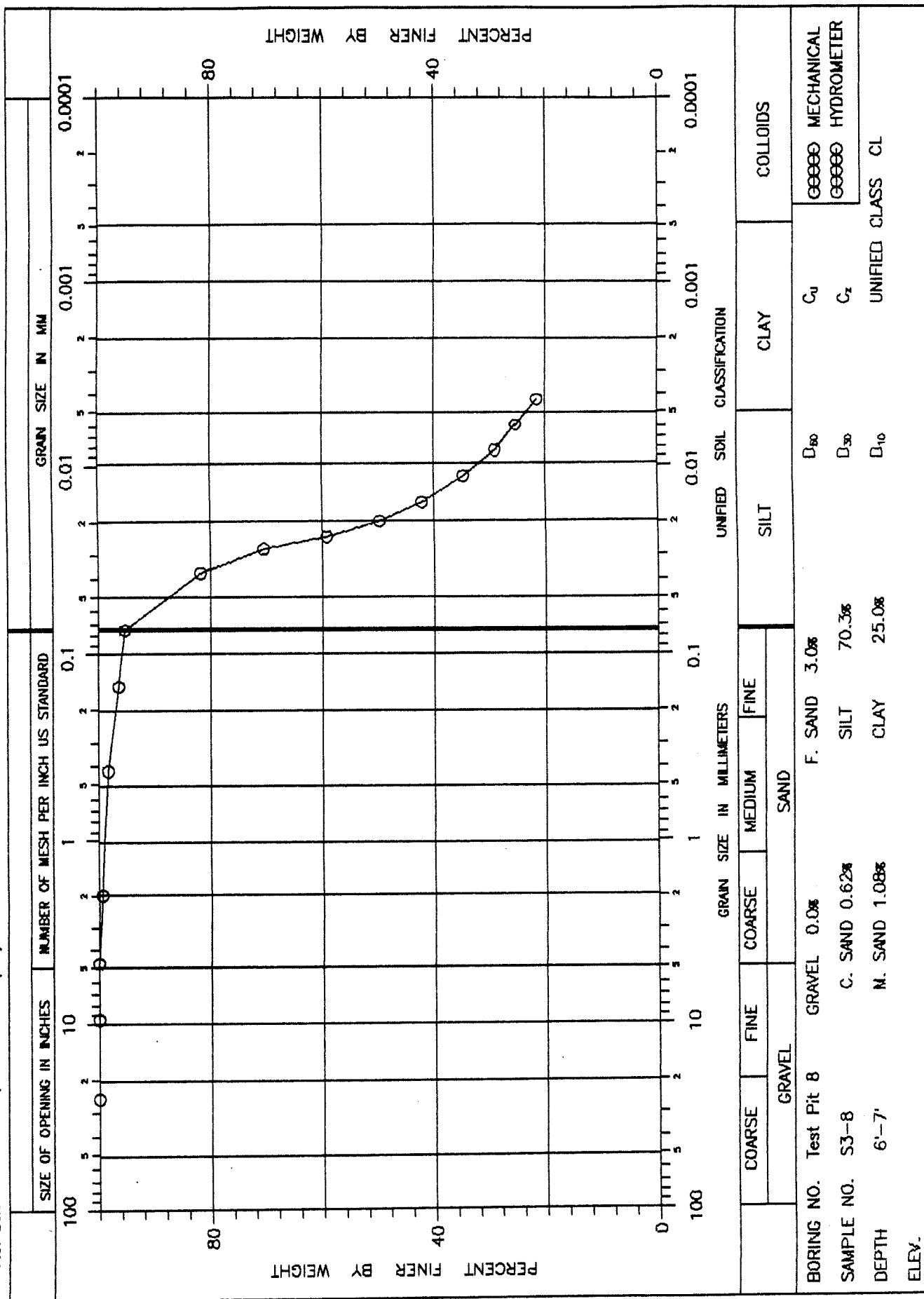
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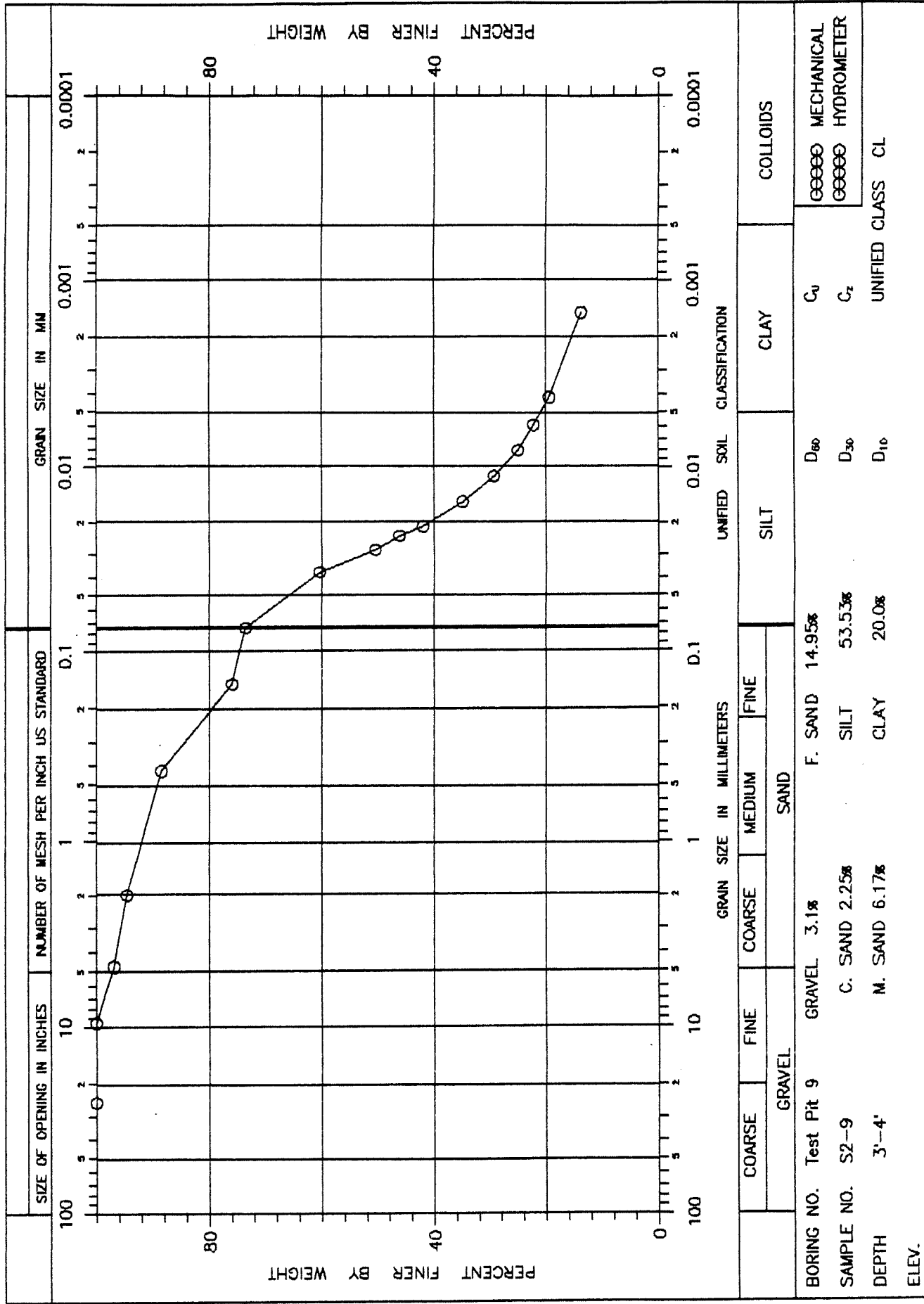
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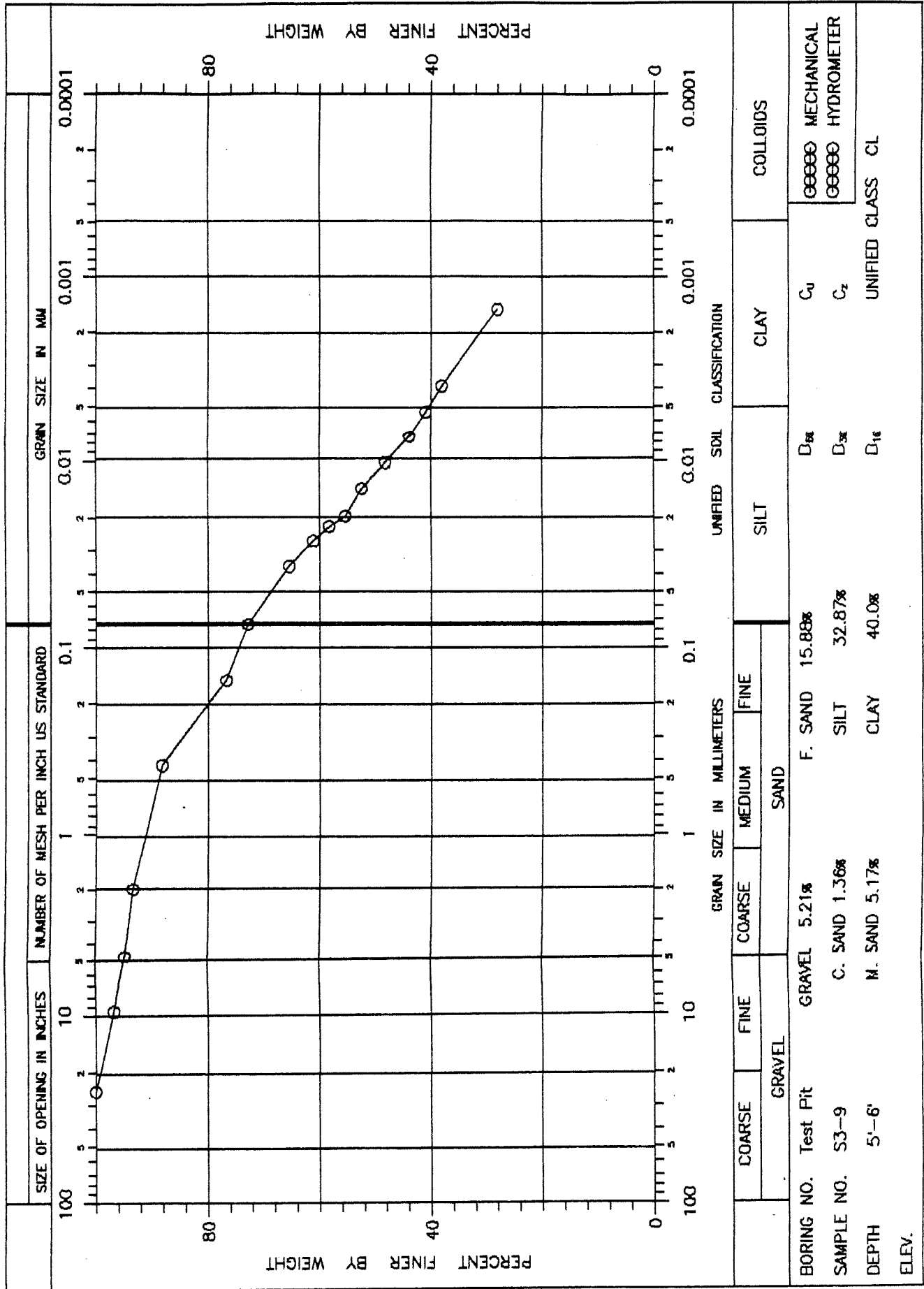
PROJECT: Vernon County

DATE: 8/25/89

JOB NO: 70389



BORING NO.	Test Pit 9	GRAVEL	3.1%	F. SAND	14.95%	D ₆₀	C _u	MECHANICAL
SAMPLE NO.	S2-9	C. SAND	2.25%	SILT	53.53%	D ₃₀	C _c	HYDROMETER
DEPTH	3'-4'	M. SAND	6.17%	CLAY	20.0%	D ₁₀	UNIFIED CLASS	CL
ELEV.								

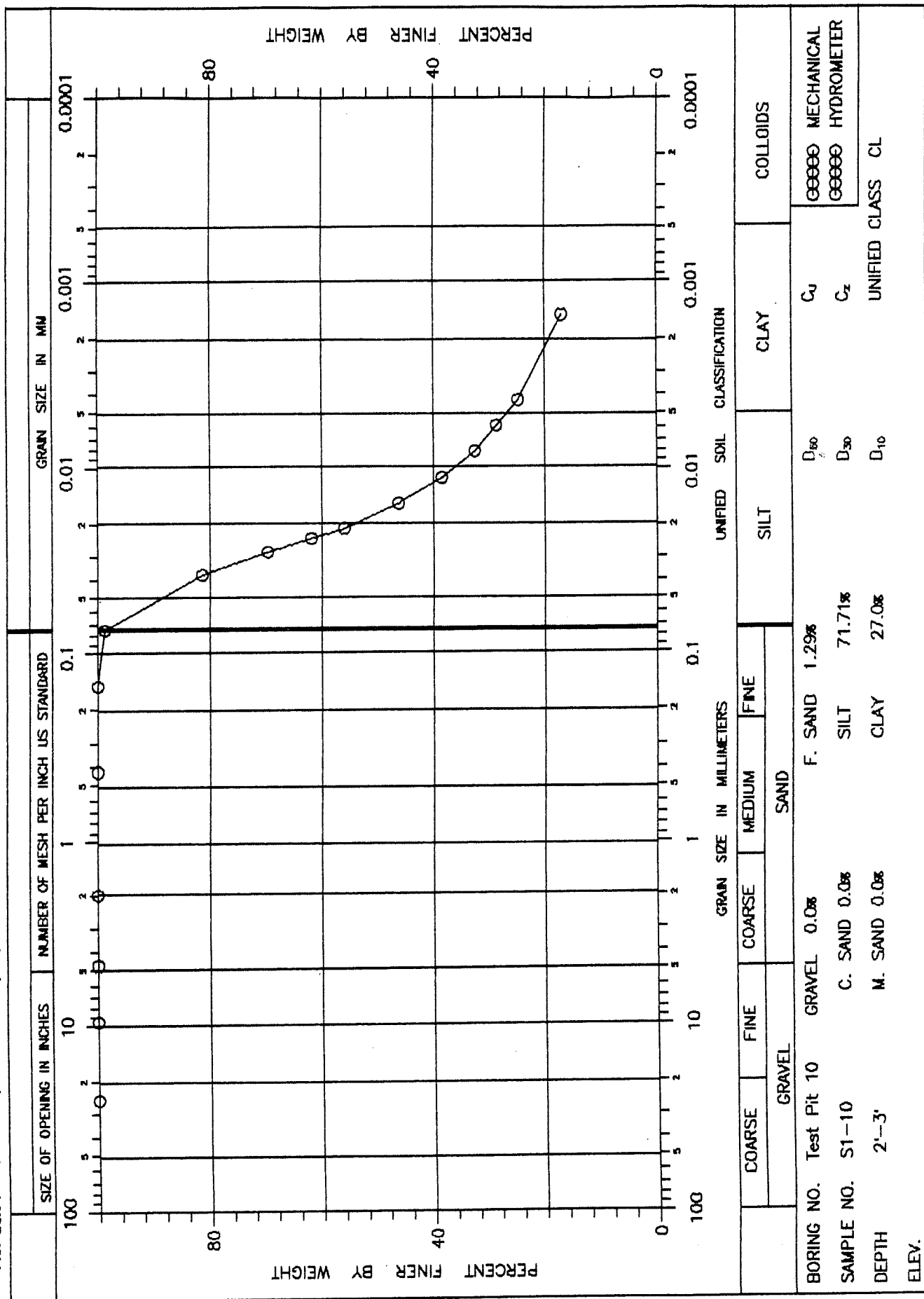


PROJECT: Vernon
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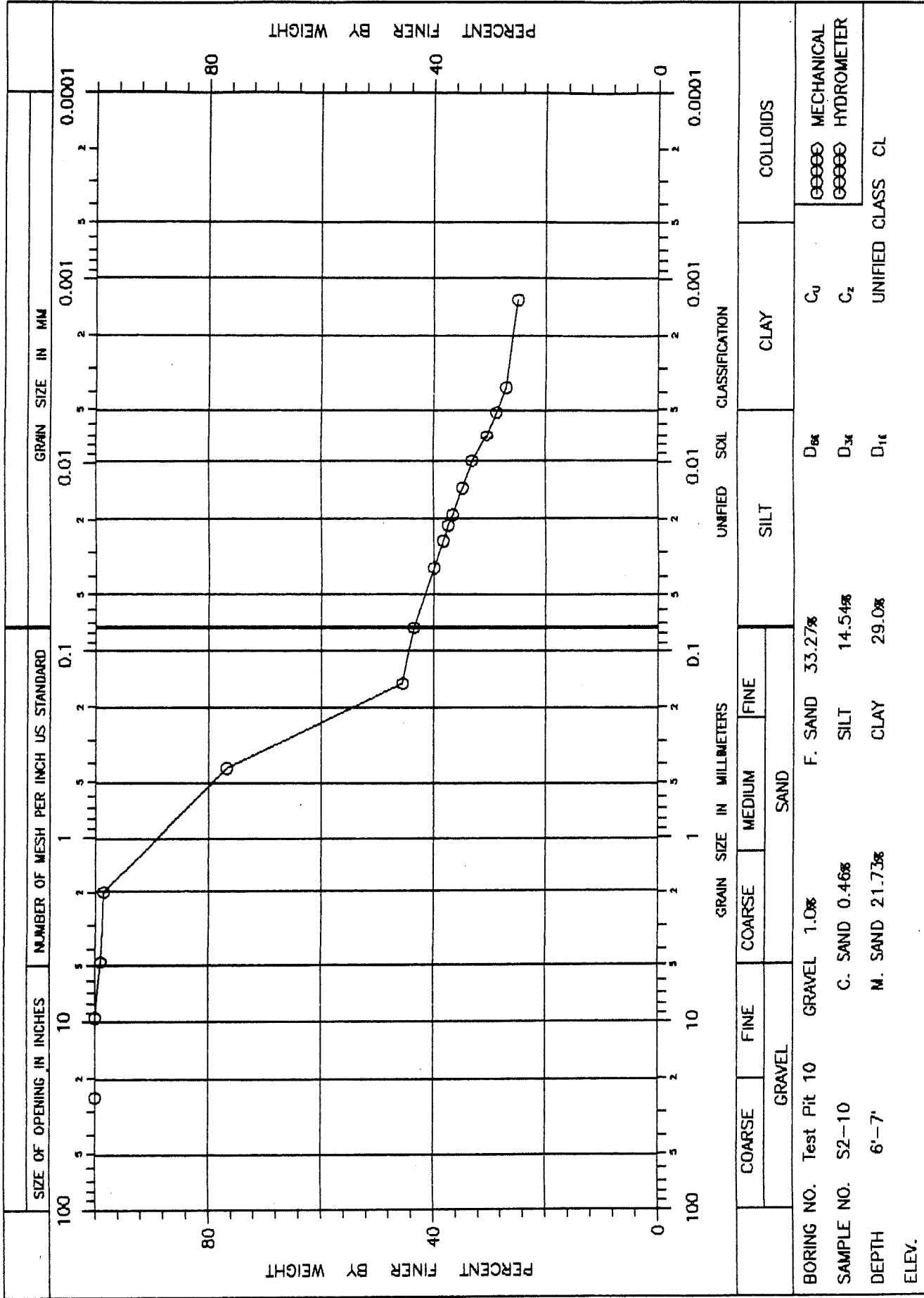
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PROJECT: Vernon County

DATE: 9/28/89

JOB NO: 70389



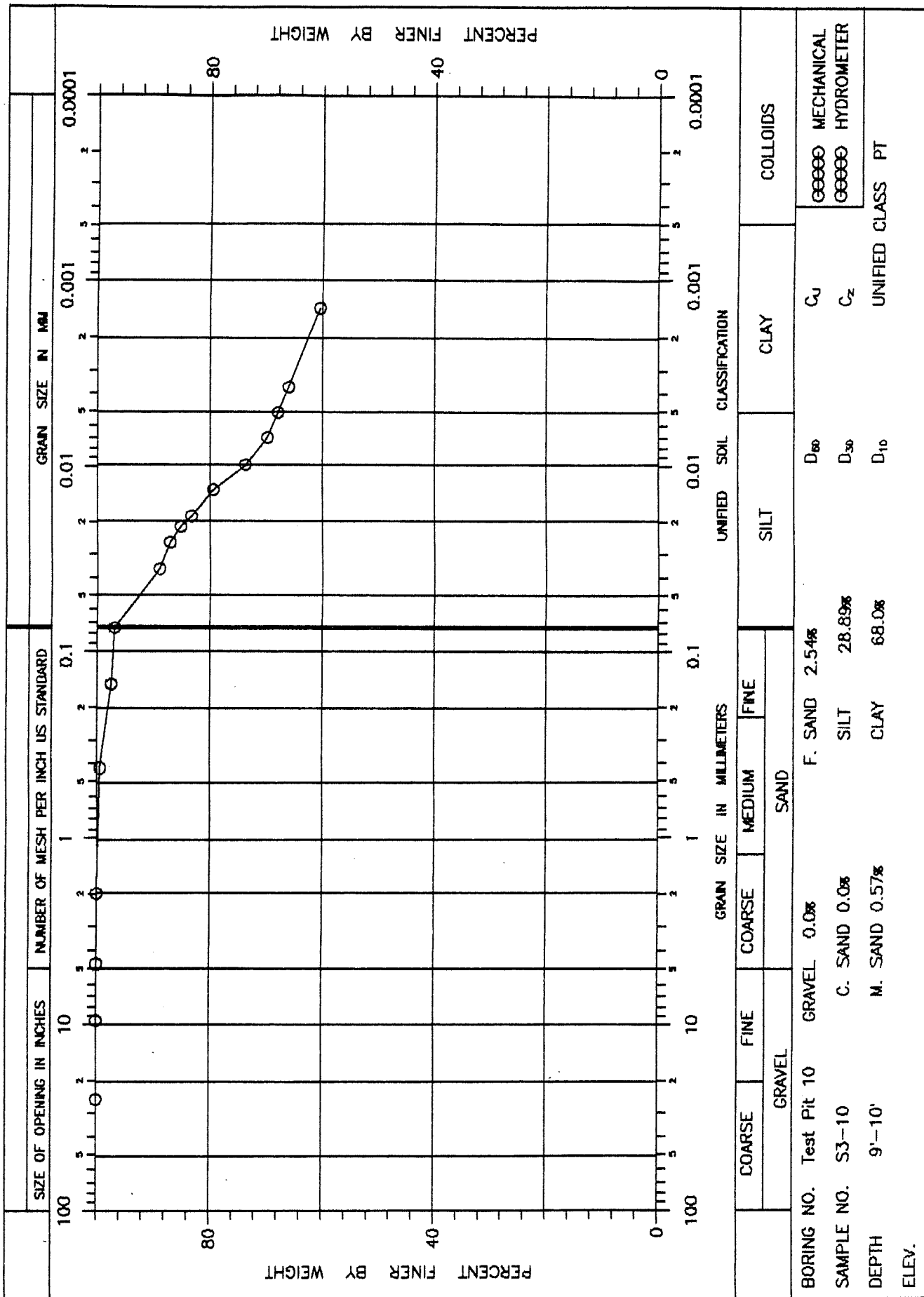
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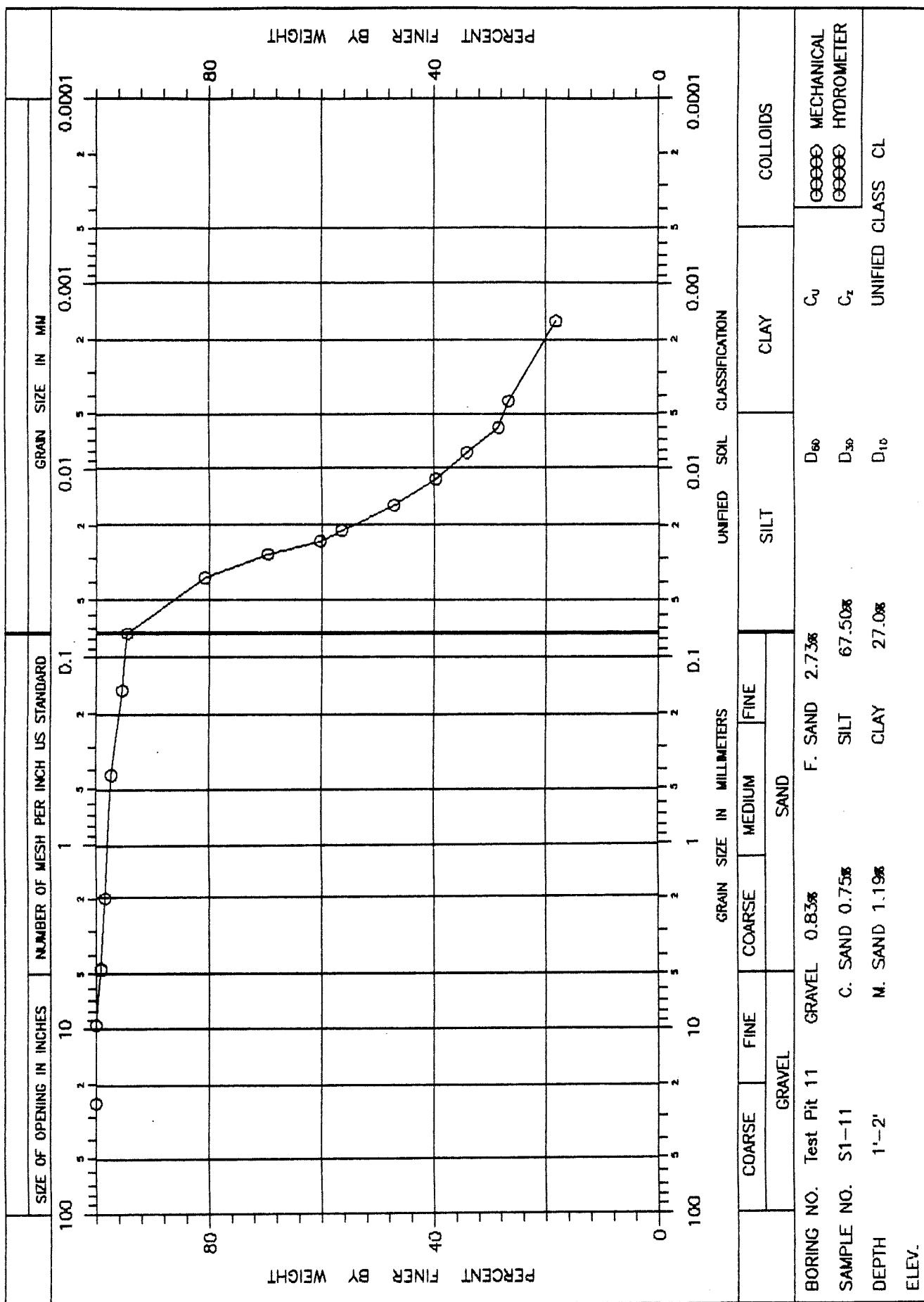


PROJECT: Vernon County
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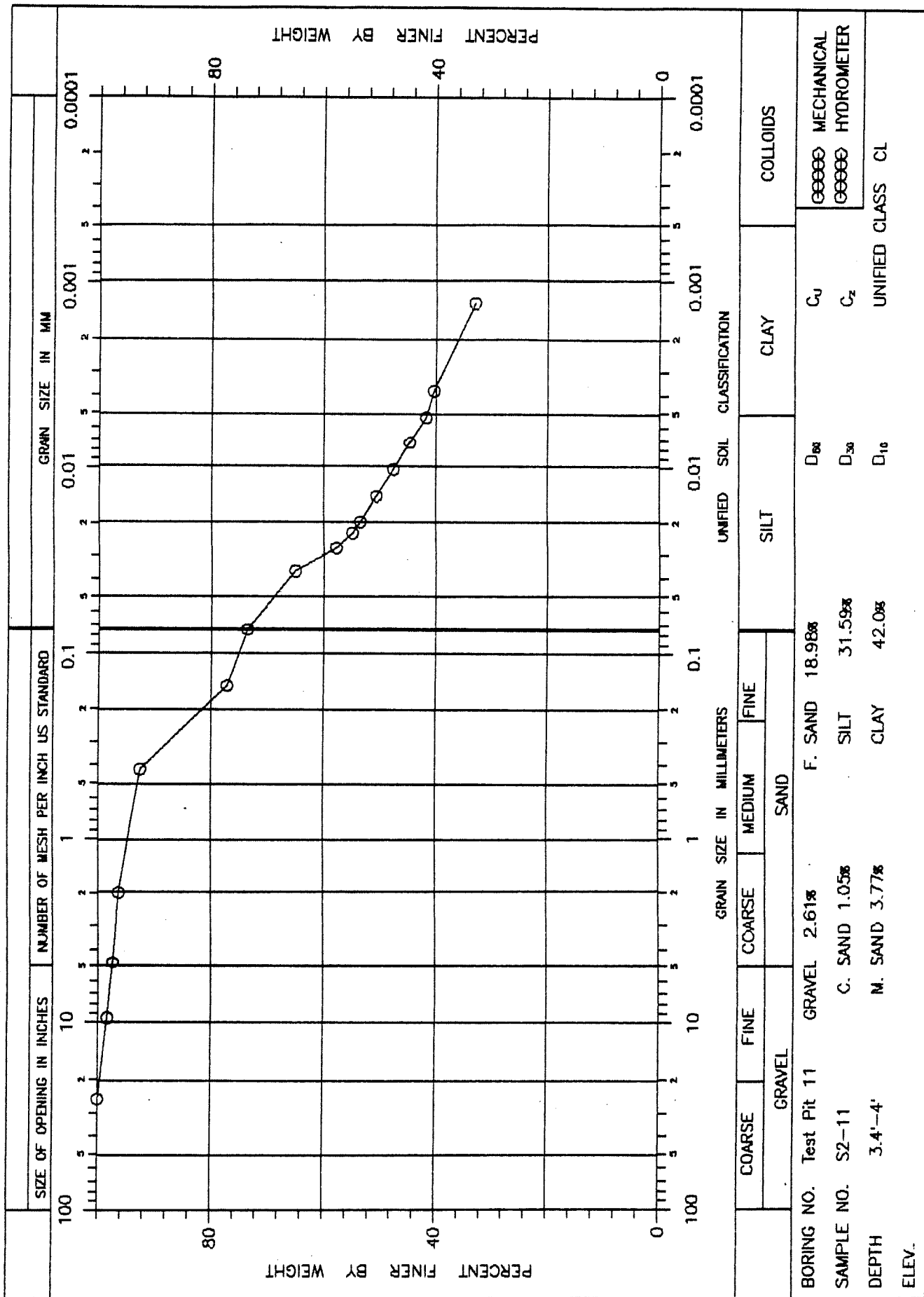
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PROJECT: Vernon County

DATE: 8/25/89

JOB NO: 70389

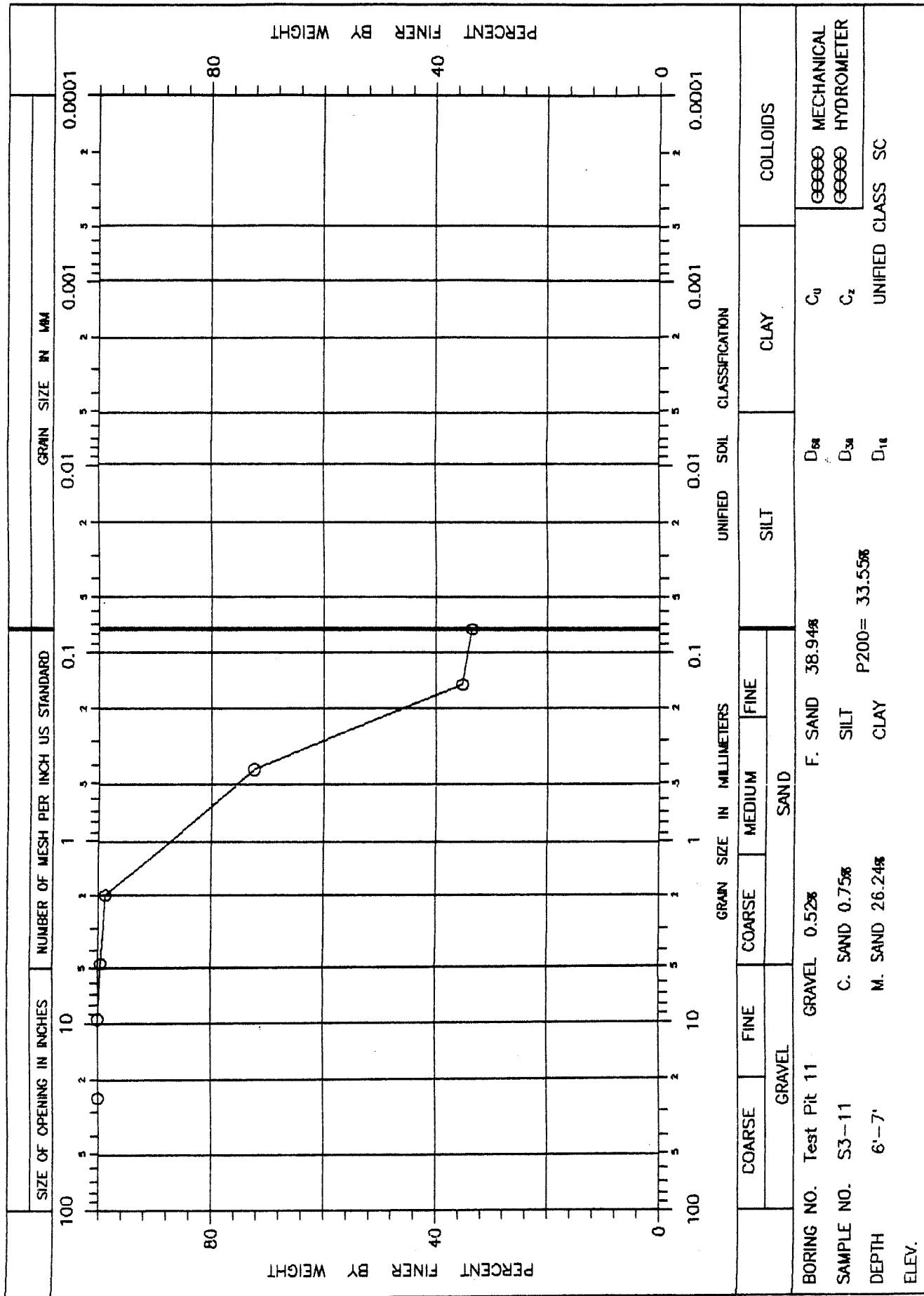
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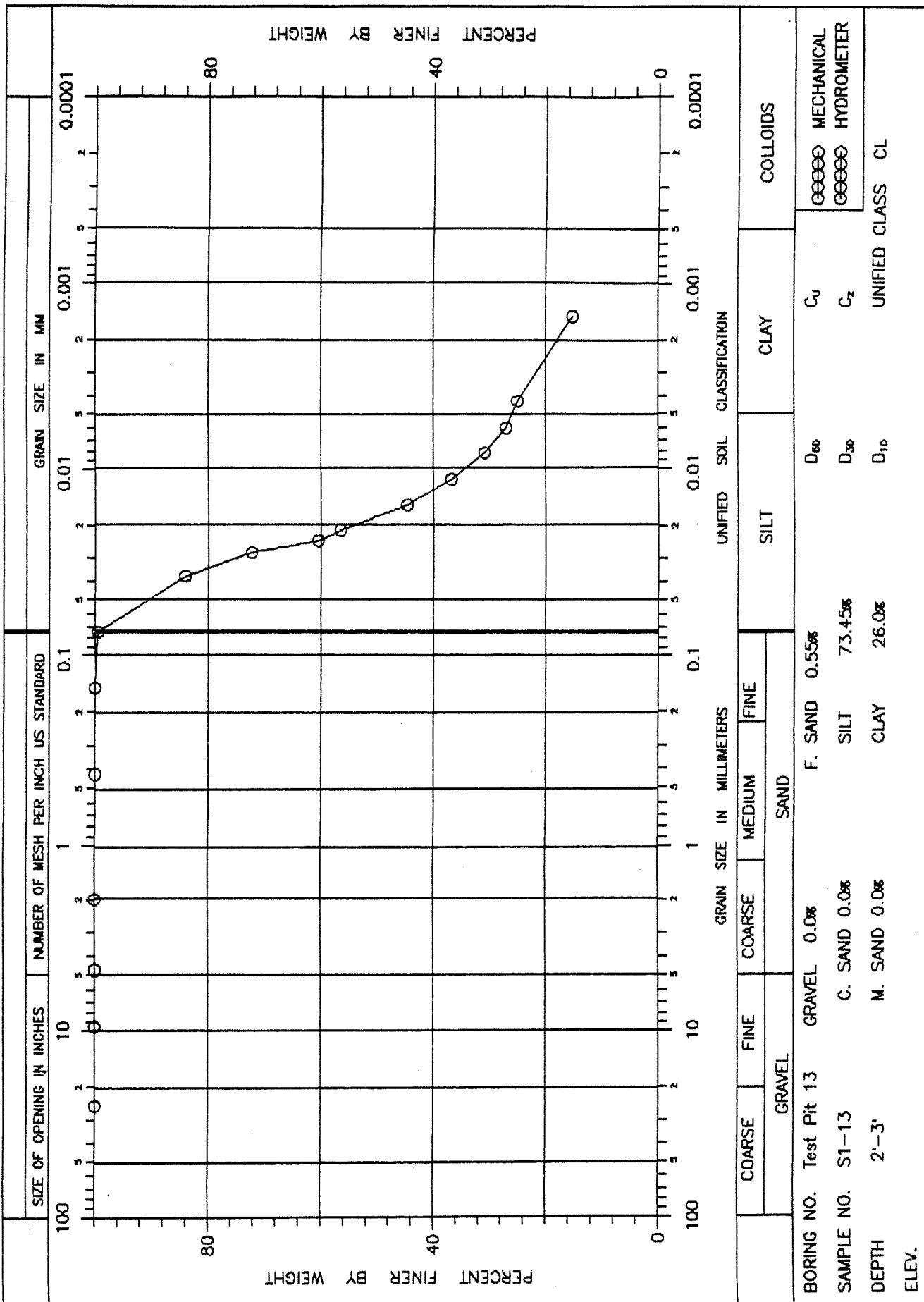


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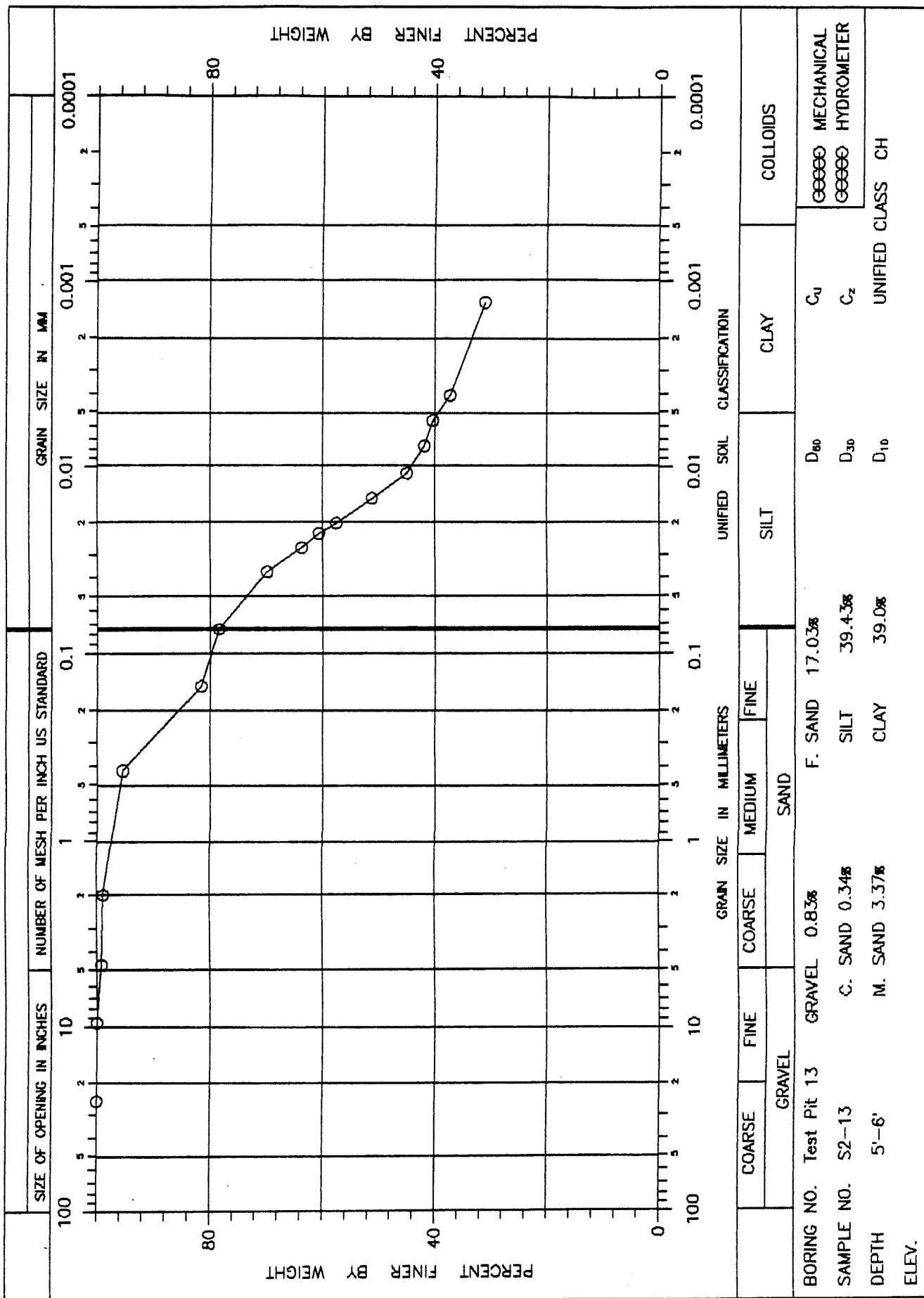
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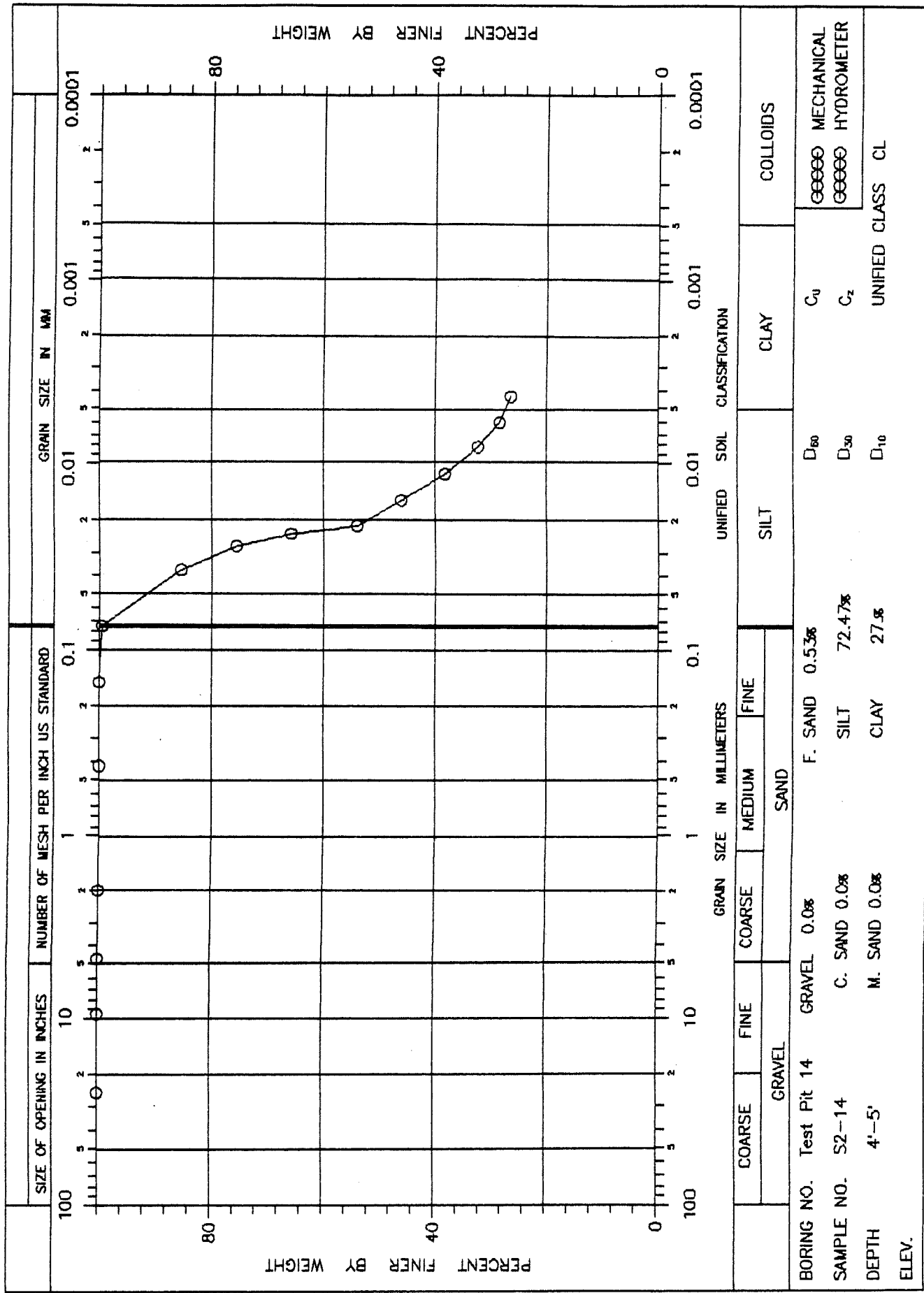
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PROJECT: Yernon County

DATE: 10/1/89

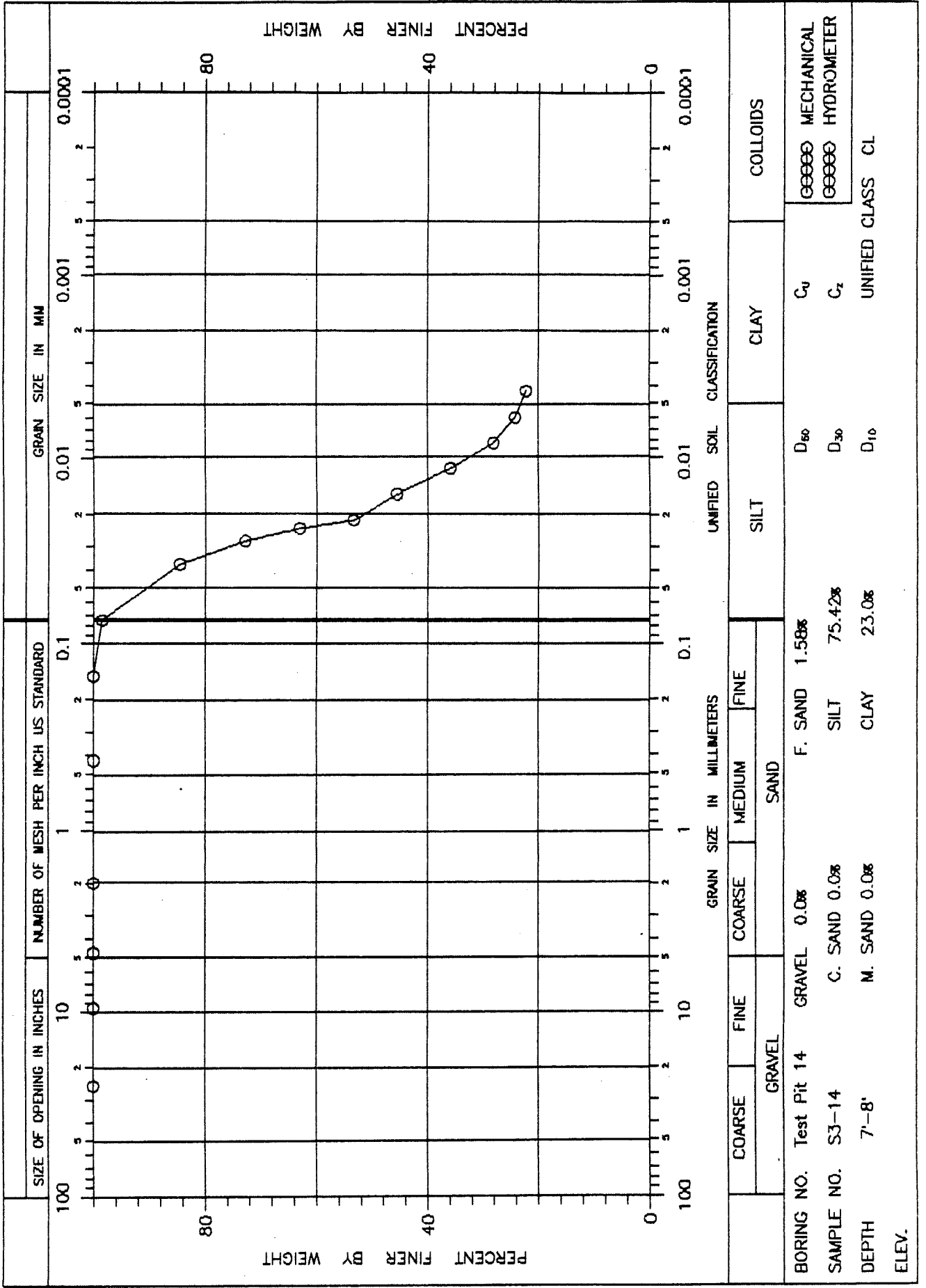
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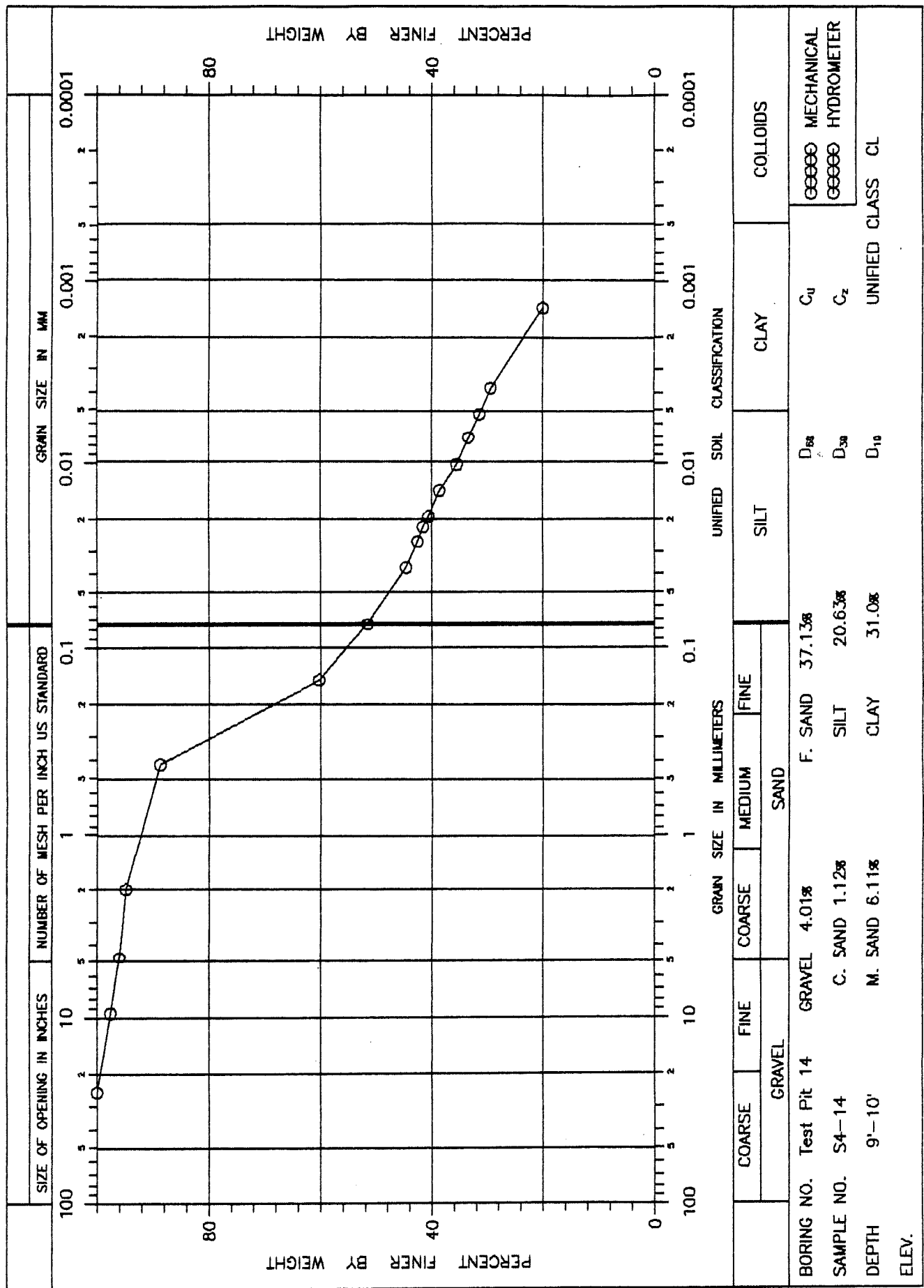


PROJECT: Vernon County
 DATE: 10/1/89
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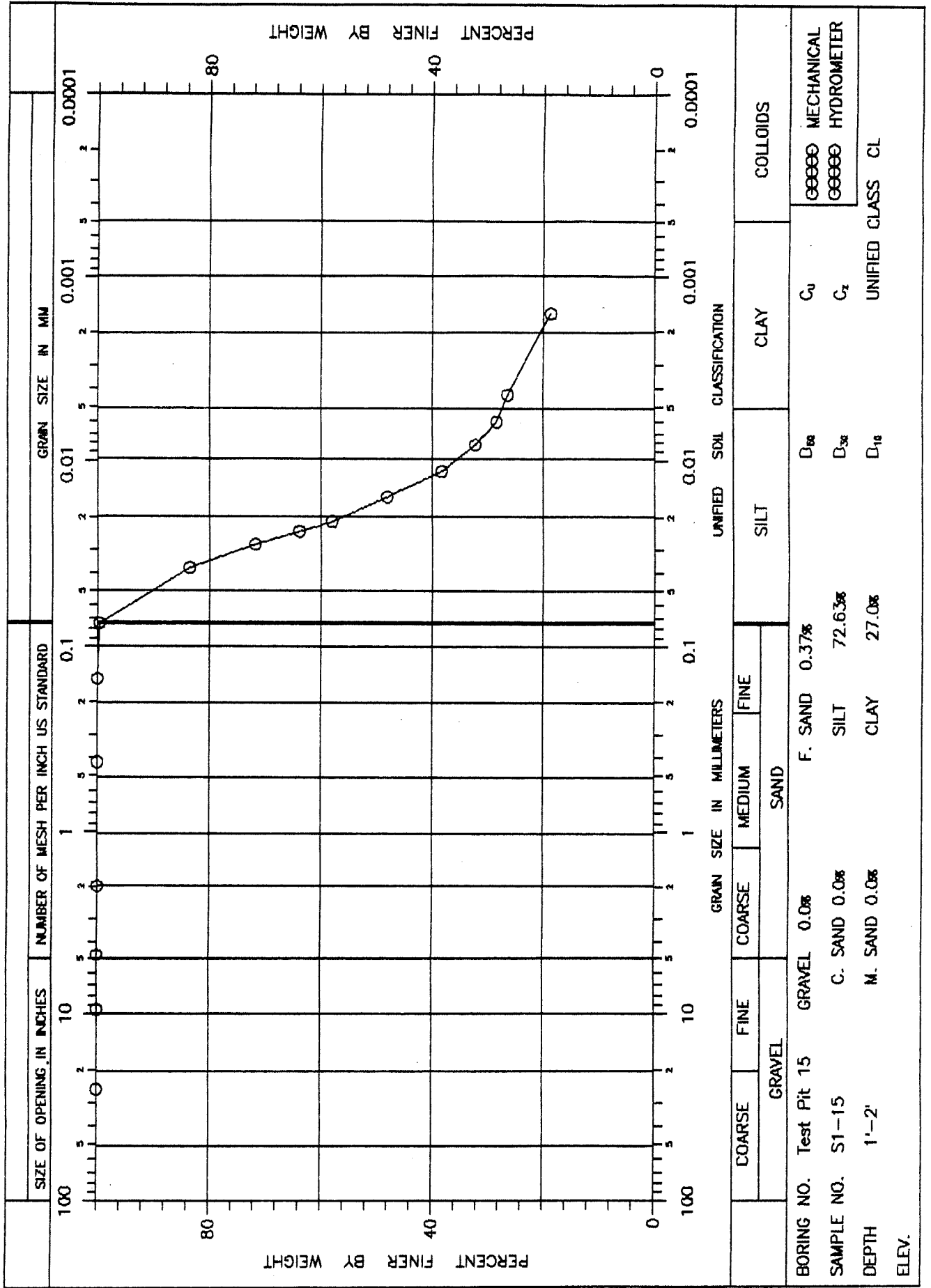


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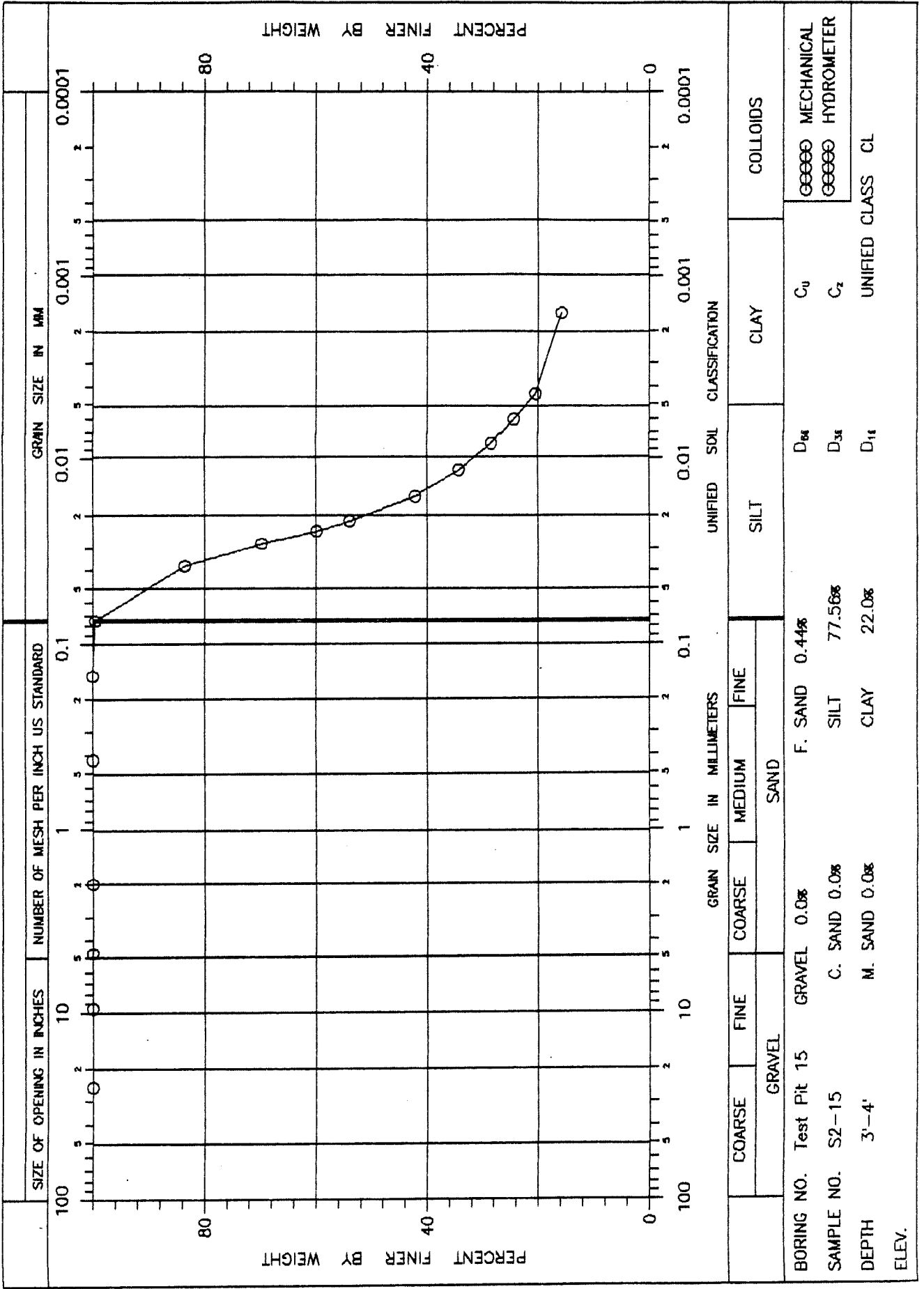
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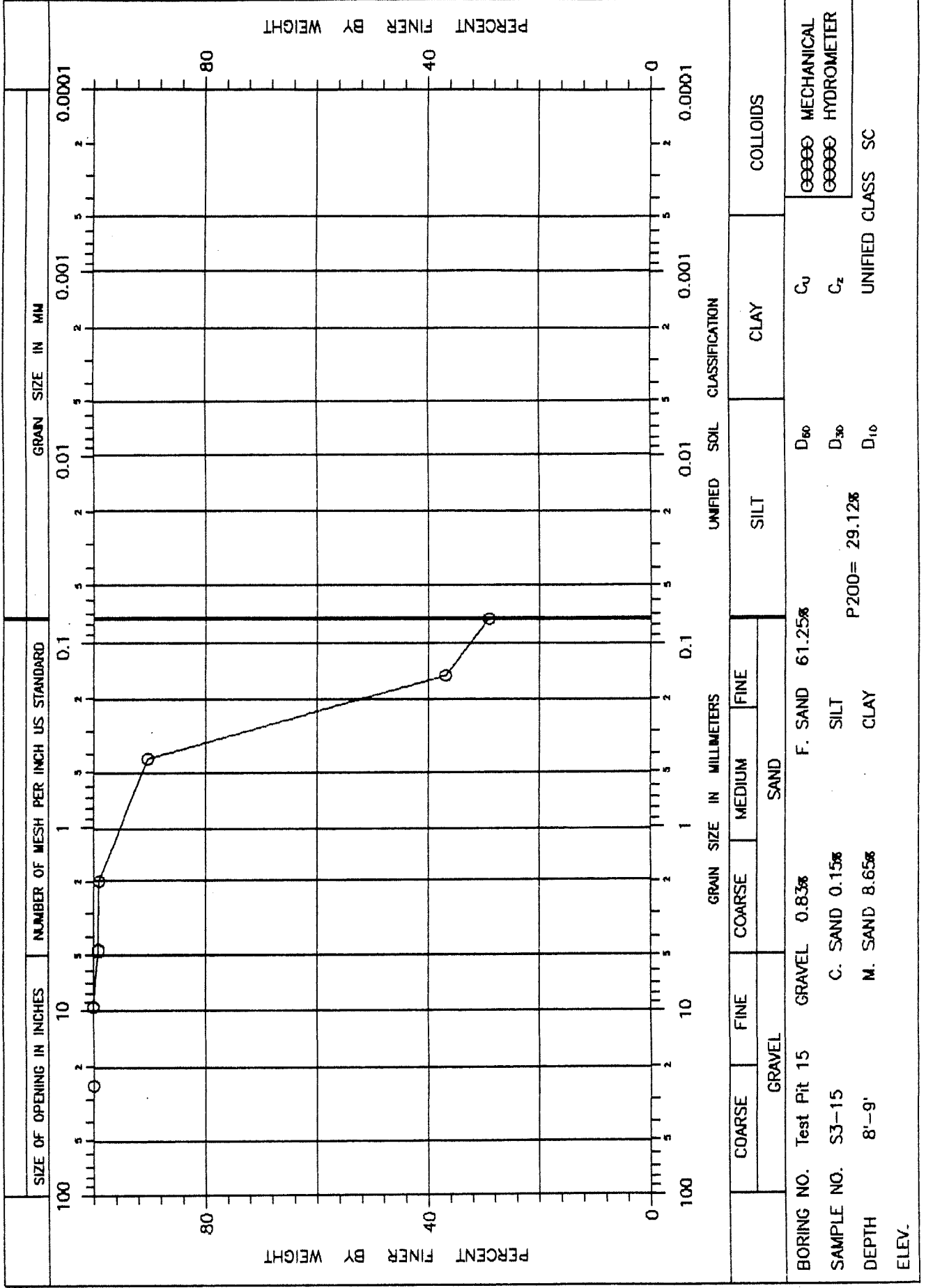
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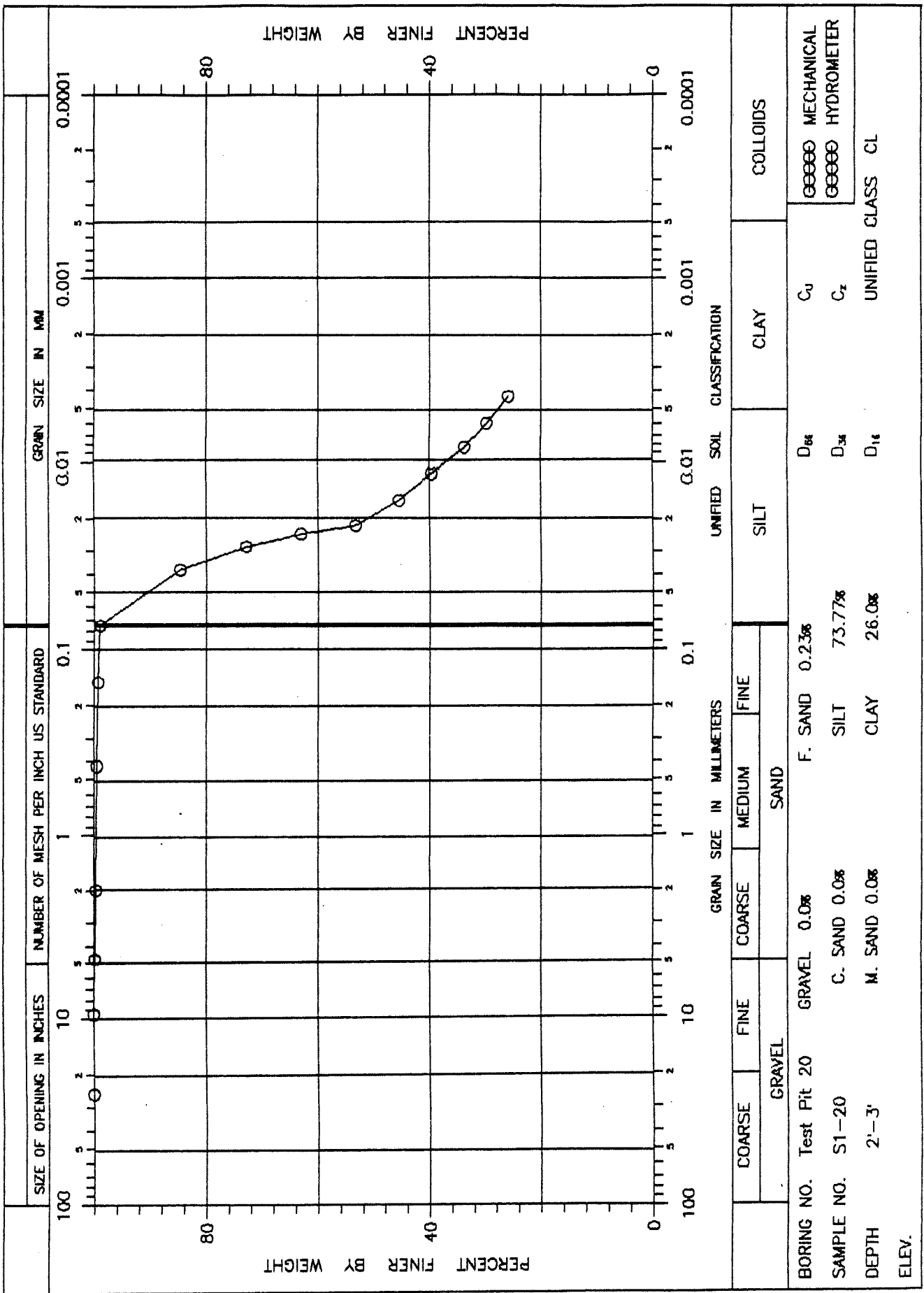


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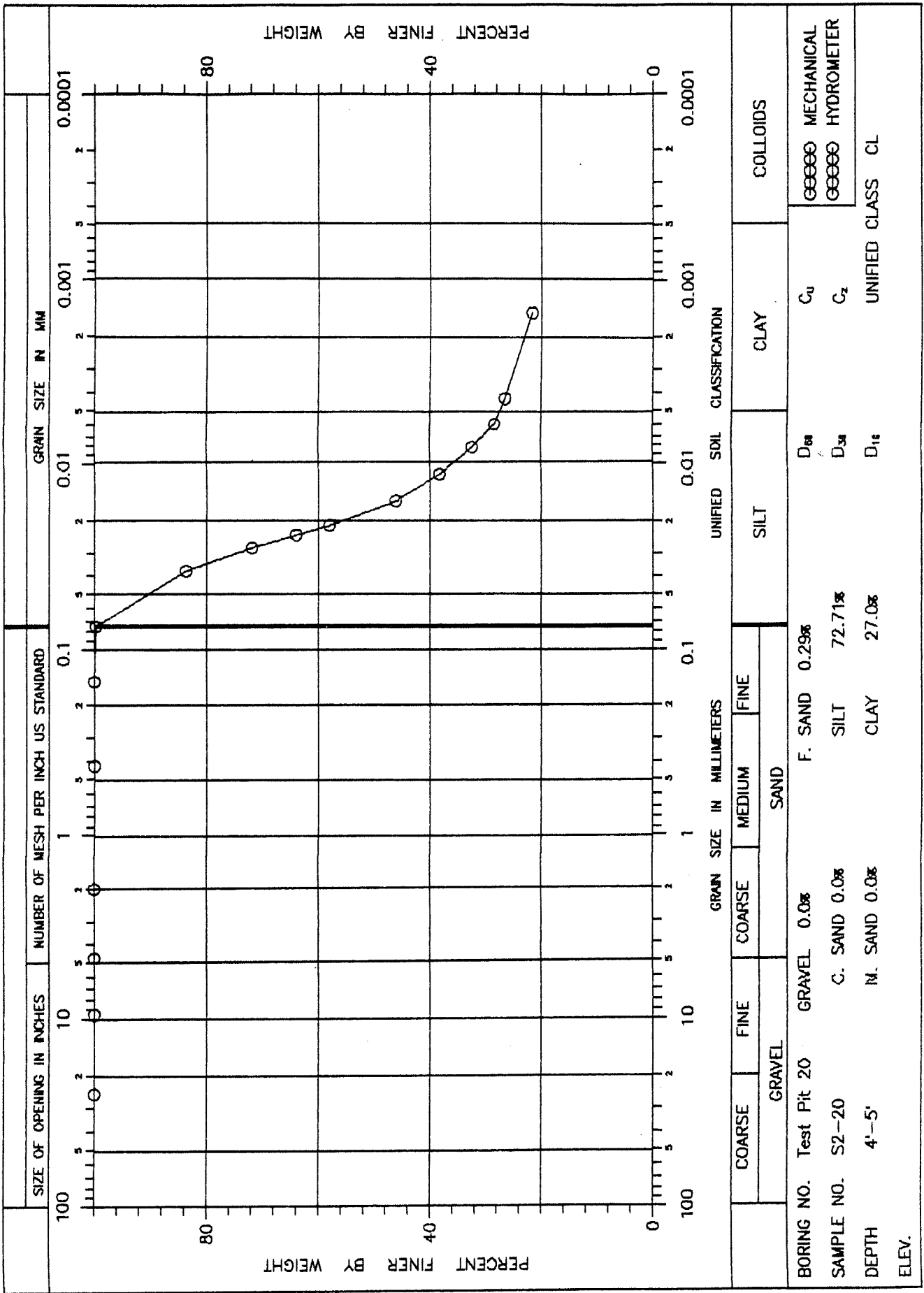
PROJECT: Vermon County
DATE: 10/1/89
JOB NO: 70389



PROJECT: Vernon County
 DATE: 9/28/89
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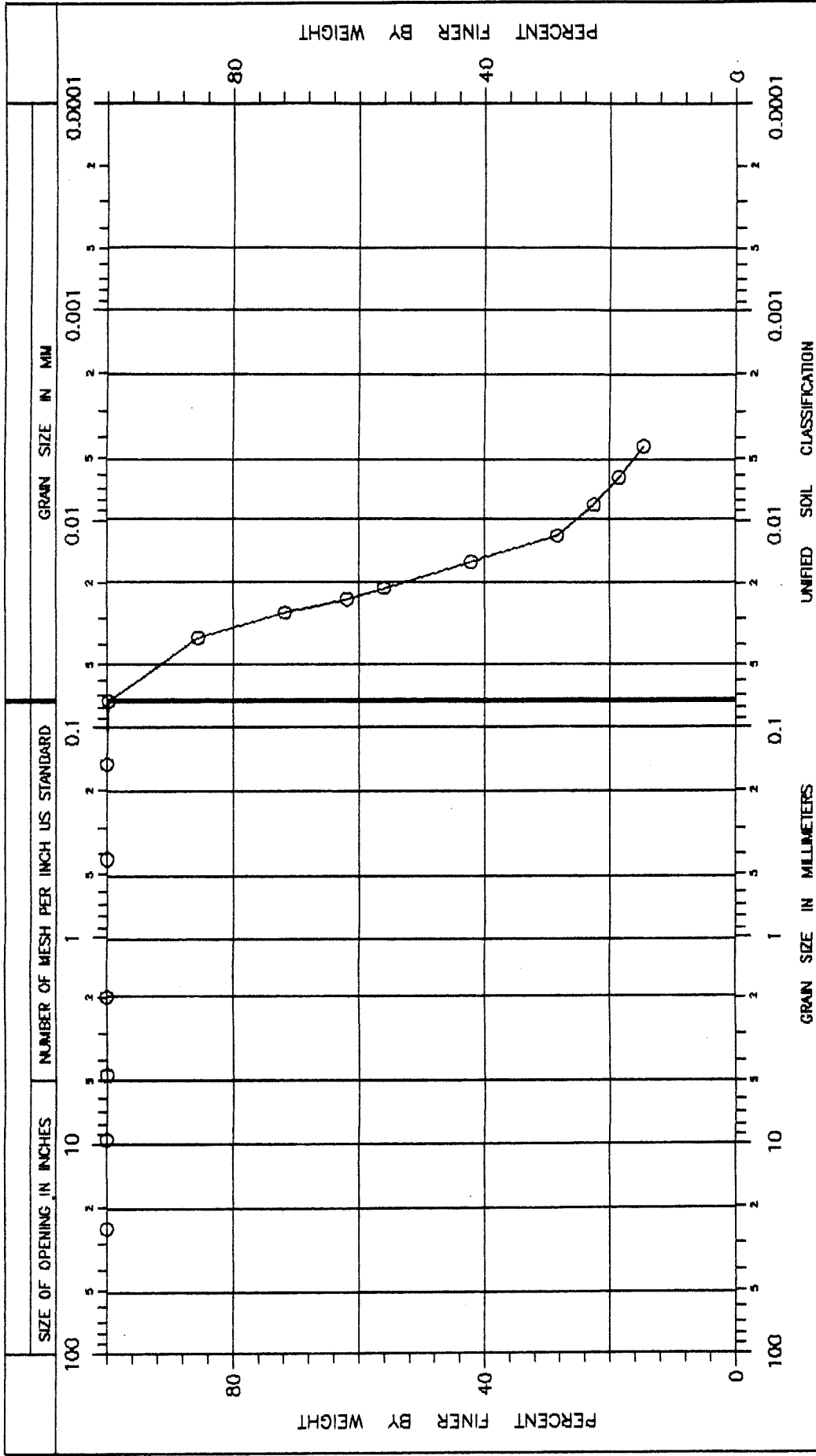


GRAIN SIZE IN MILLIMETERS				UNIFIED SOIL CLASSIFICATION		
GRAVEL		SAND		SILT	CLAY	COLLOIDS
COARSE	FINE	COARSE	FINE			
BORING NO. Test Pit 20		GRAVEL 0.0%		F. SAND 0.29%	D ₅₀	C _u
SAMPLE NO. S2-20		C. SAND 0.0%		SILT 72.71%	D ₃₀	C _c
DEPTH 4'-5'		M. SAND 0.0%		CLAY 27.0%	D ₁₀	UNIFIED CLASS CL
ELEV.						MECHANICAL HYDROMETER

PROJECT: Vernon County
 DATE: 9/29/89
 JOB NO: 70389

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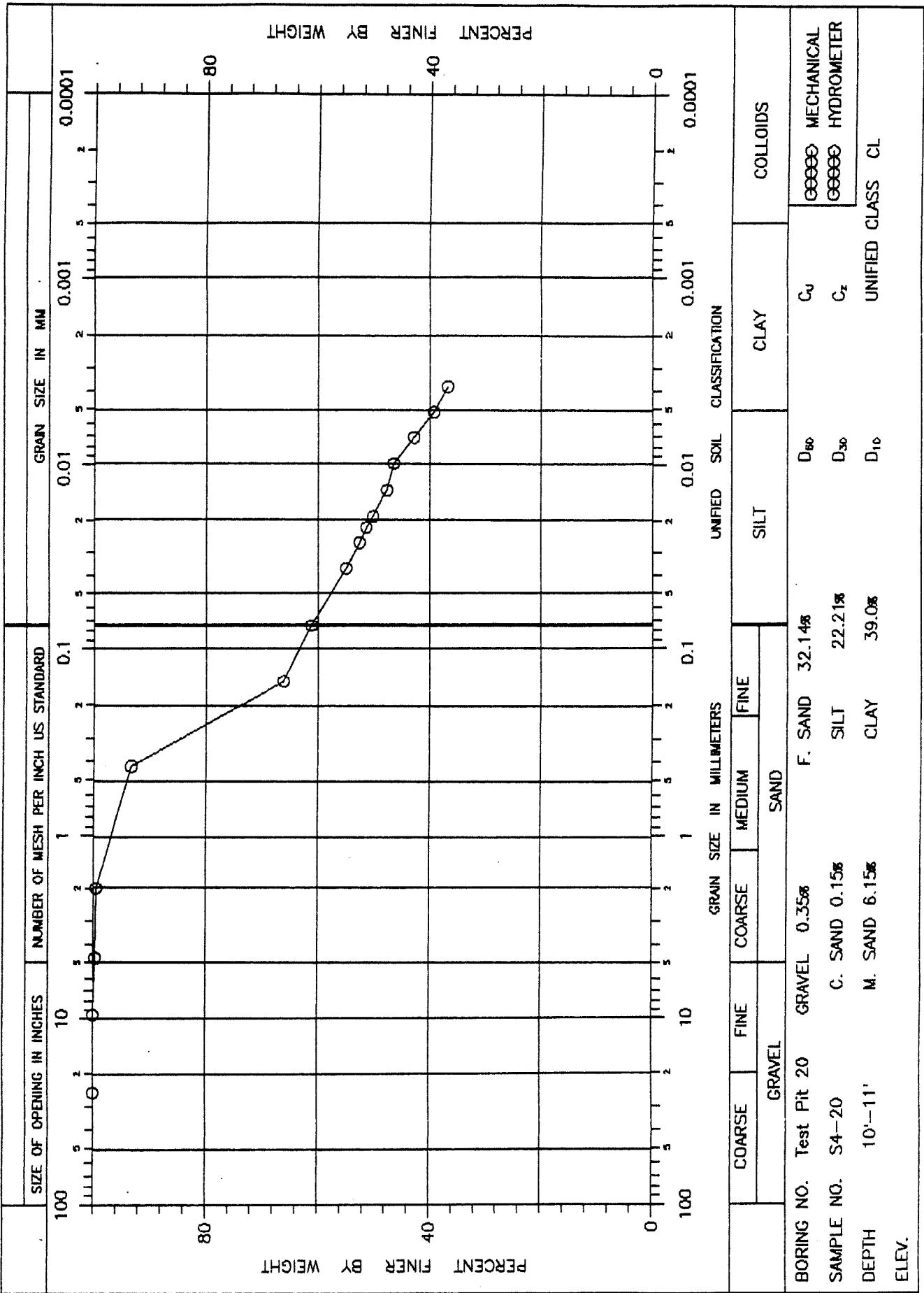


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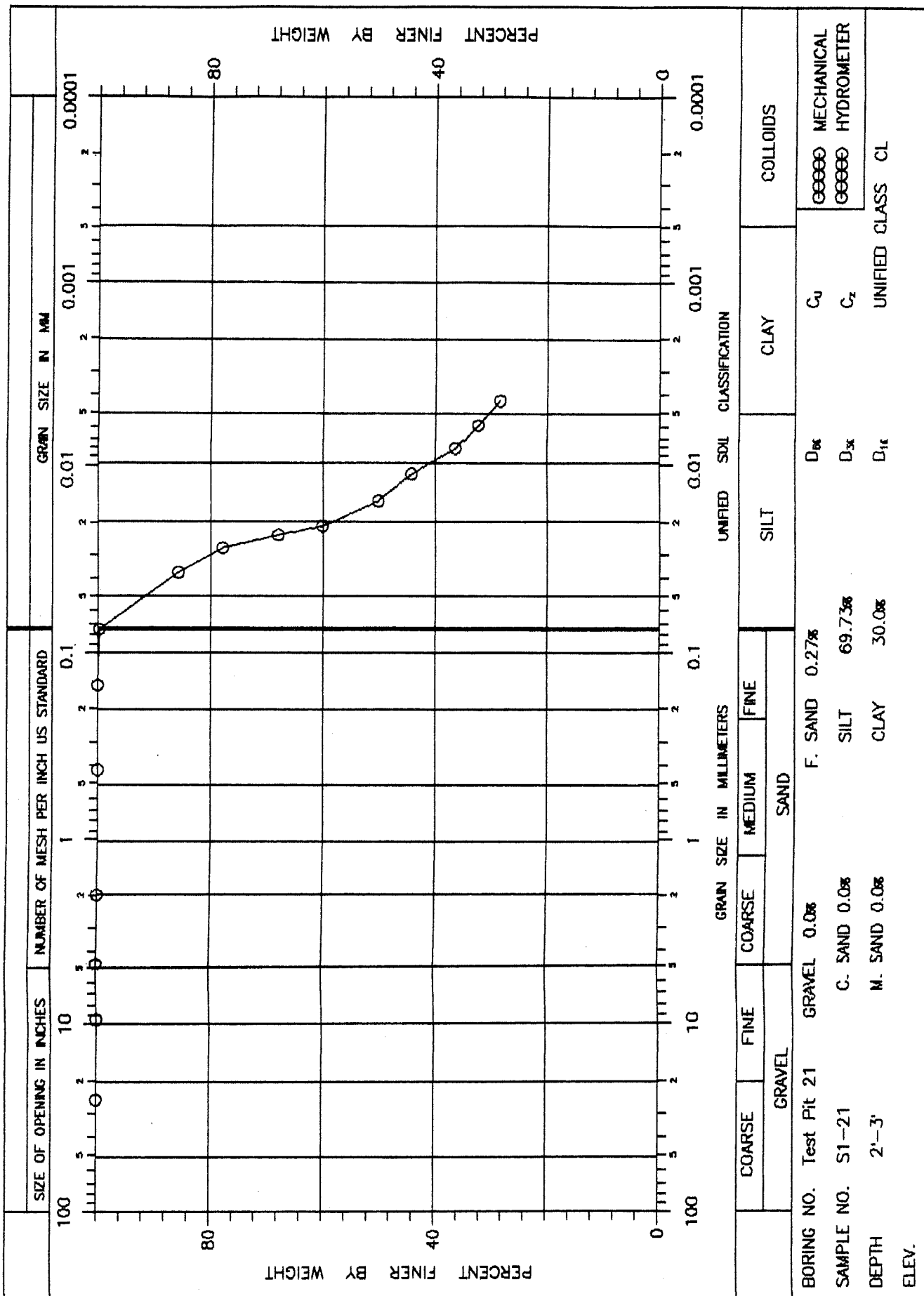
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PROJECT: Yernan County

DATE: 10/1/89

JOB NO: 30389

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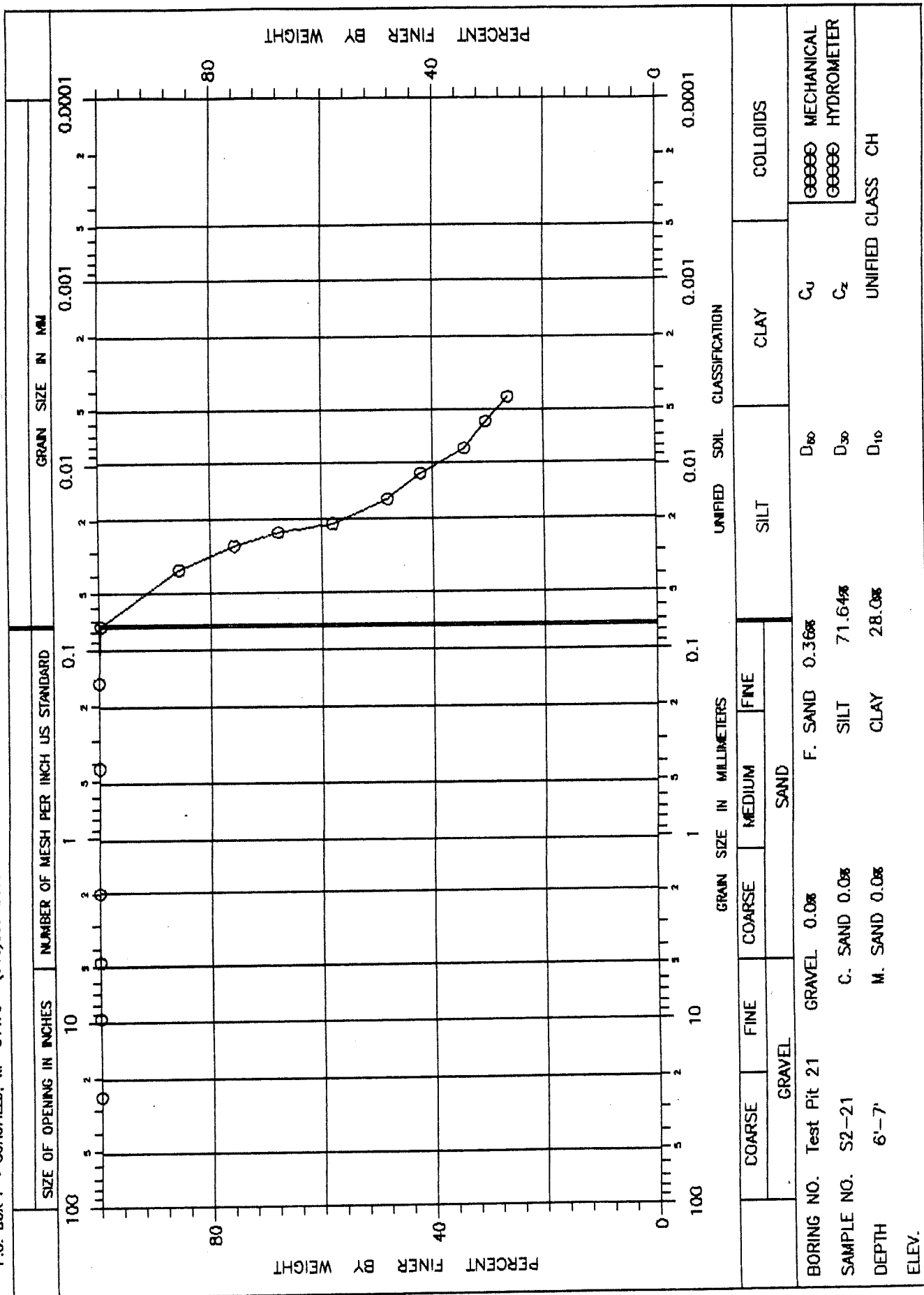
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PROJECT: Vernon County

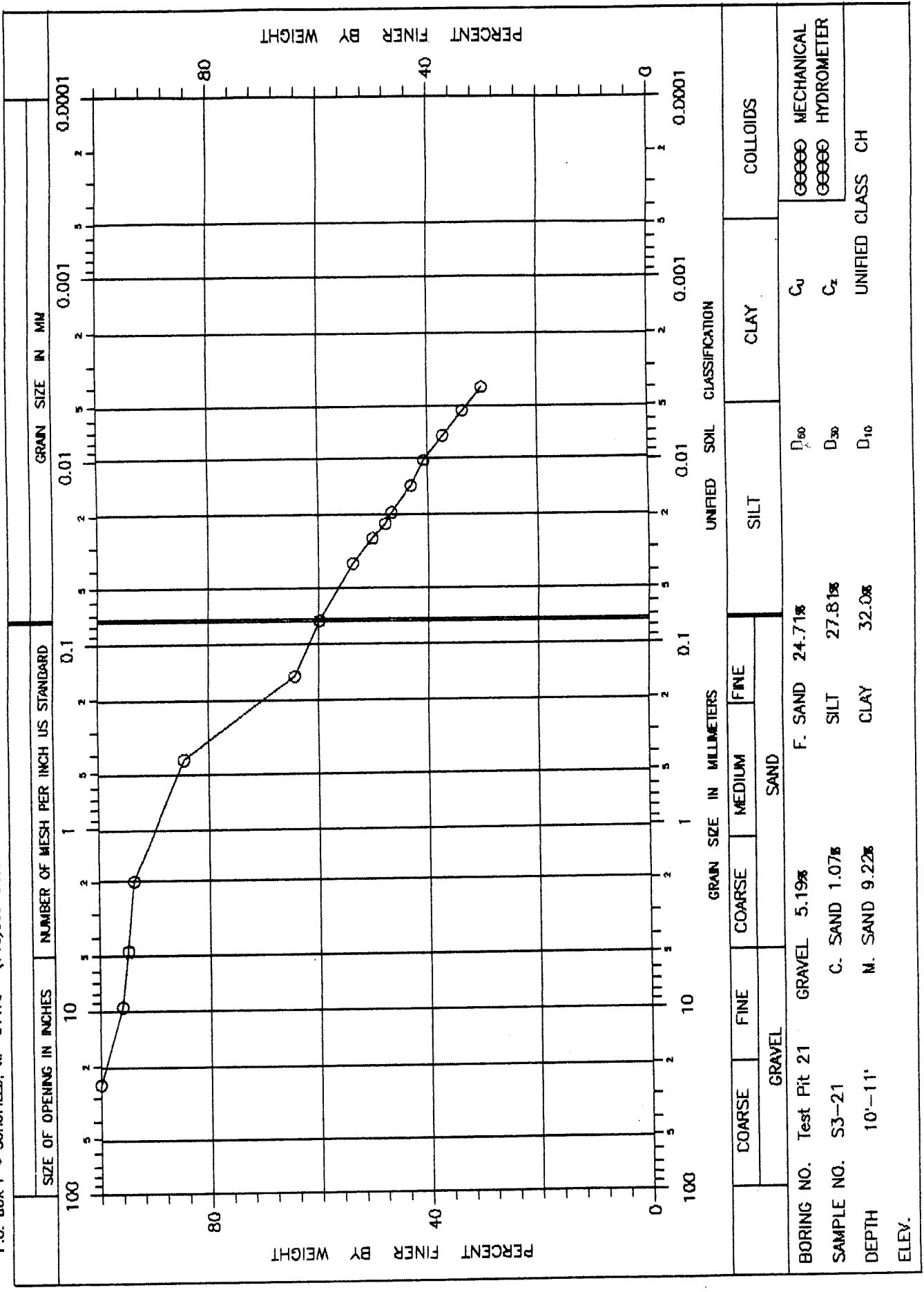
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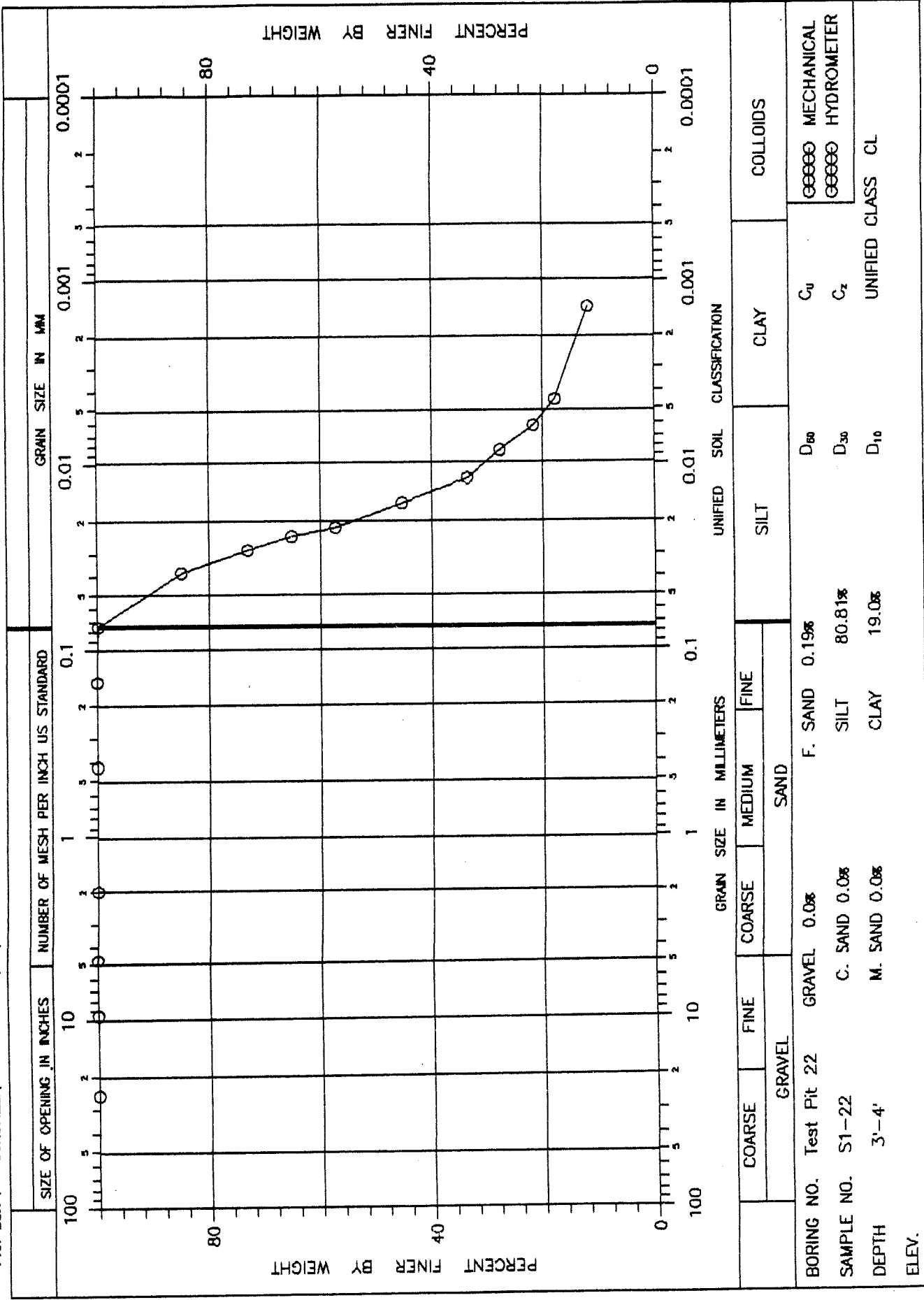


PROJECT: Vernon County
 DATE: 9/29/89
 JOB NO: 70389

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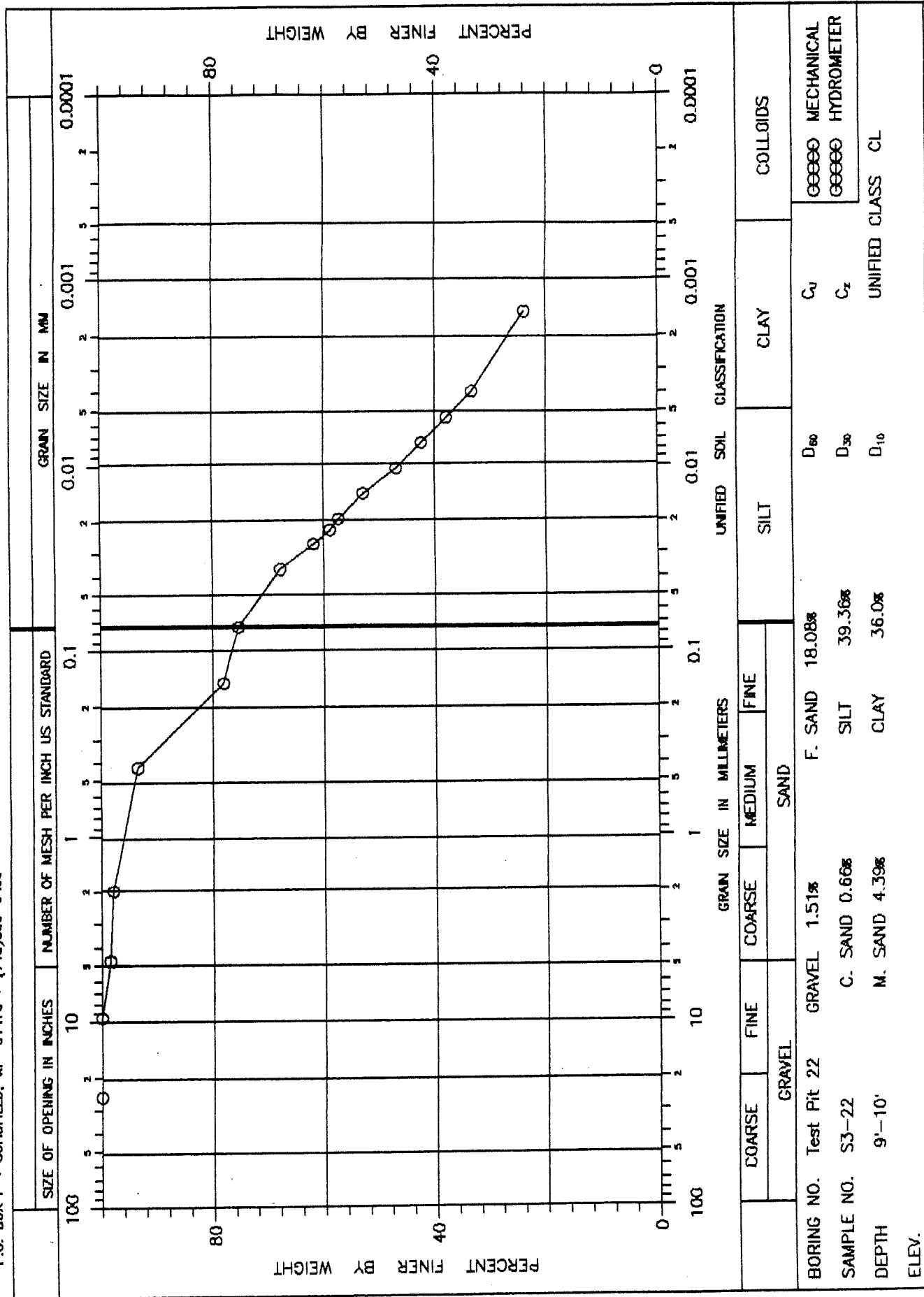


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PROJECT: Vernon County

DATE: 9/28/89

JOB NO: 30389



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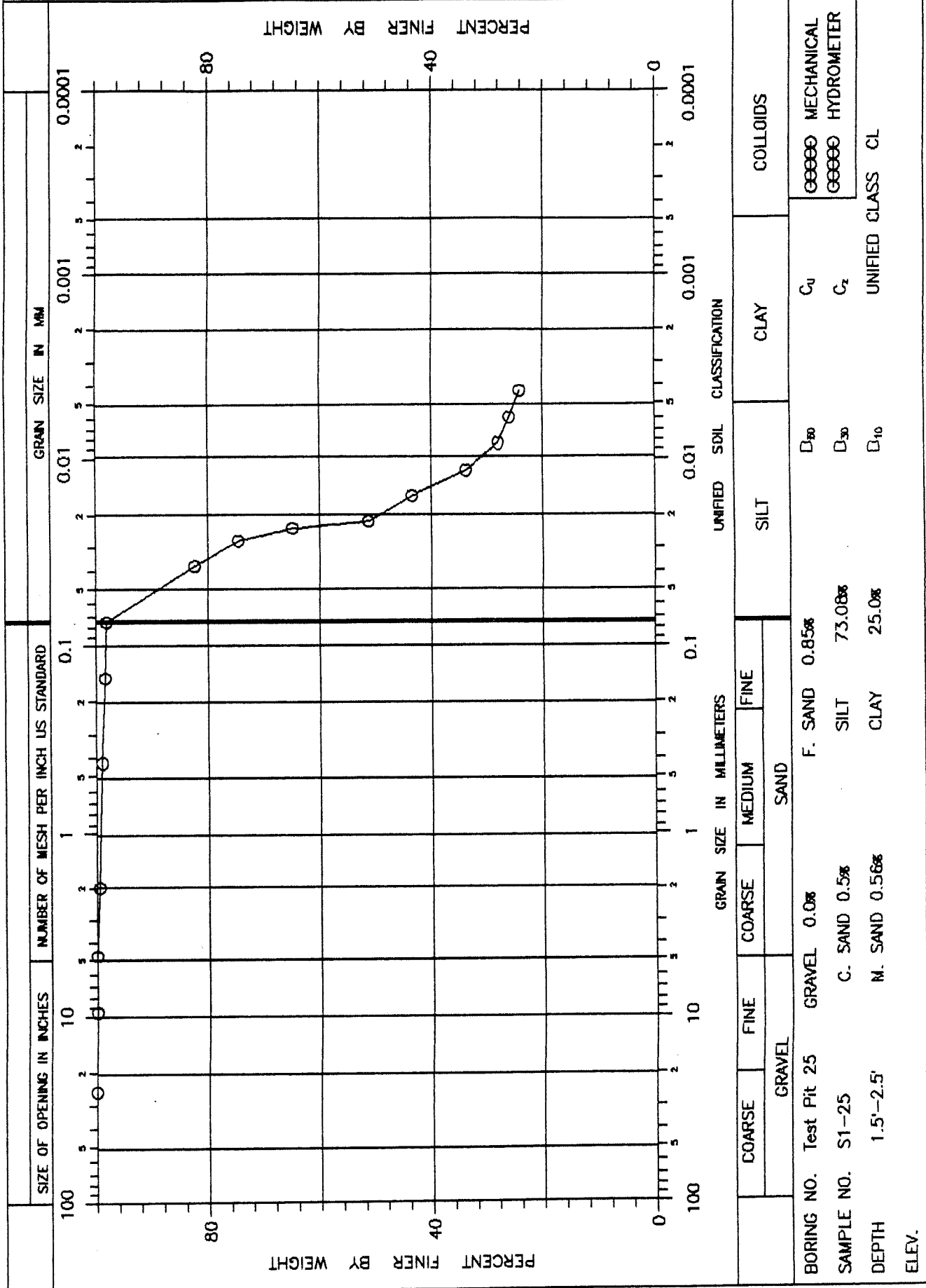
PROJECT: Vernon County

DATE: 10/1/89

JOB NO: 70389

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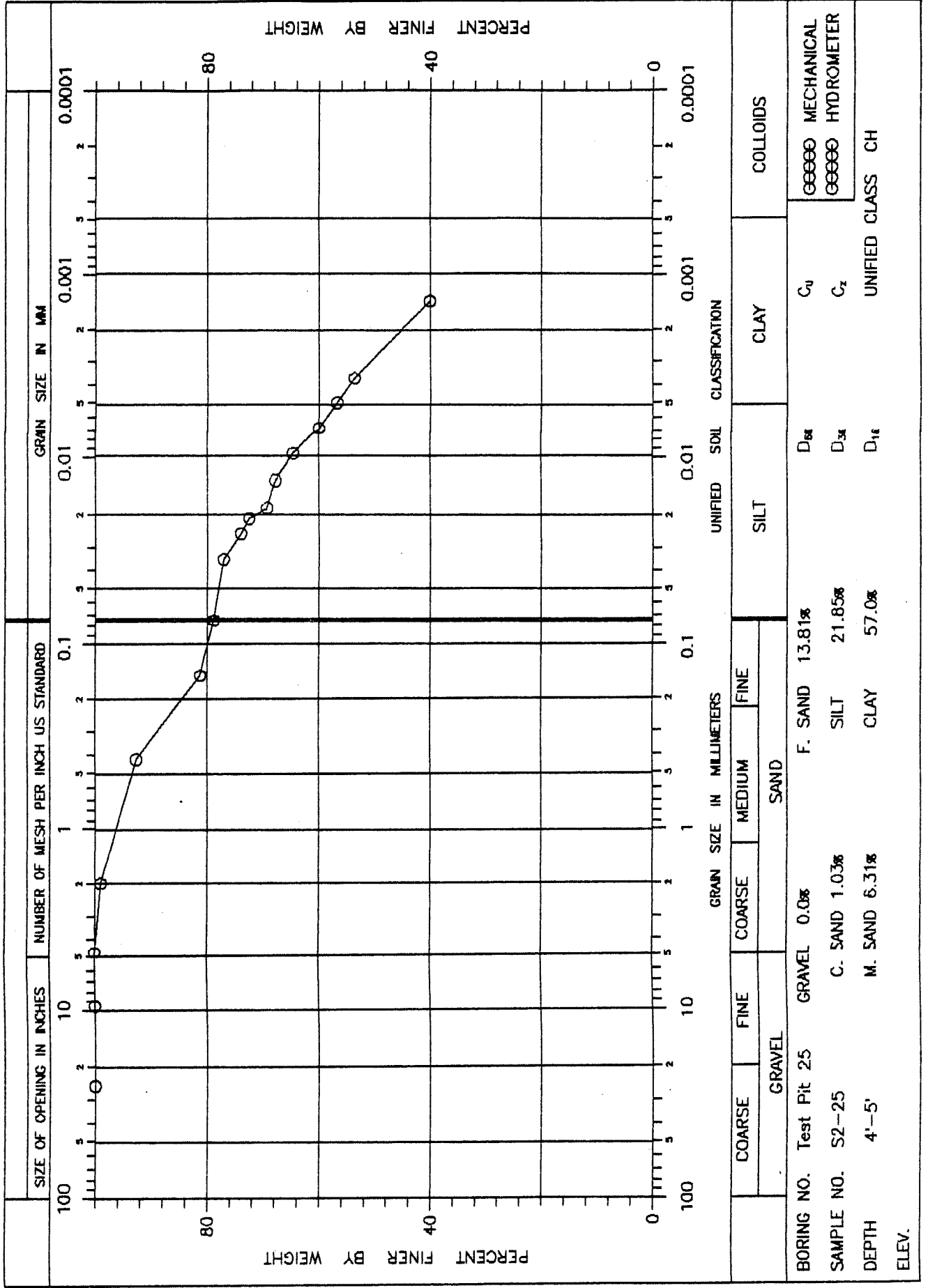
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PROJECT: Vernon County
 DATE: 10/4/89
 JOB NO: 70389

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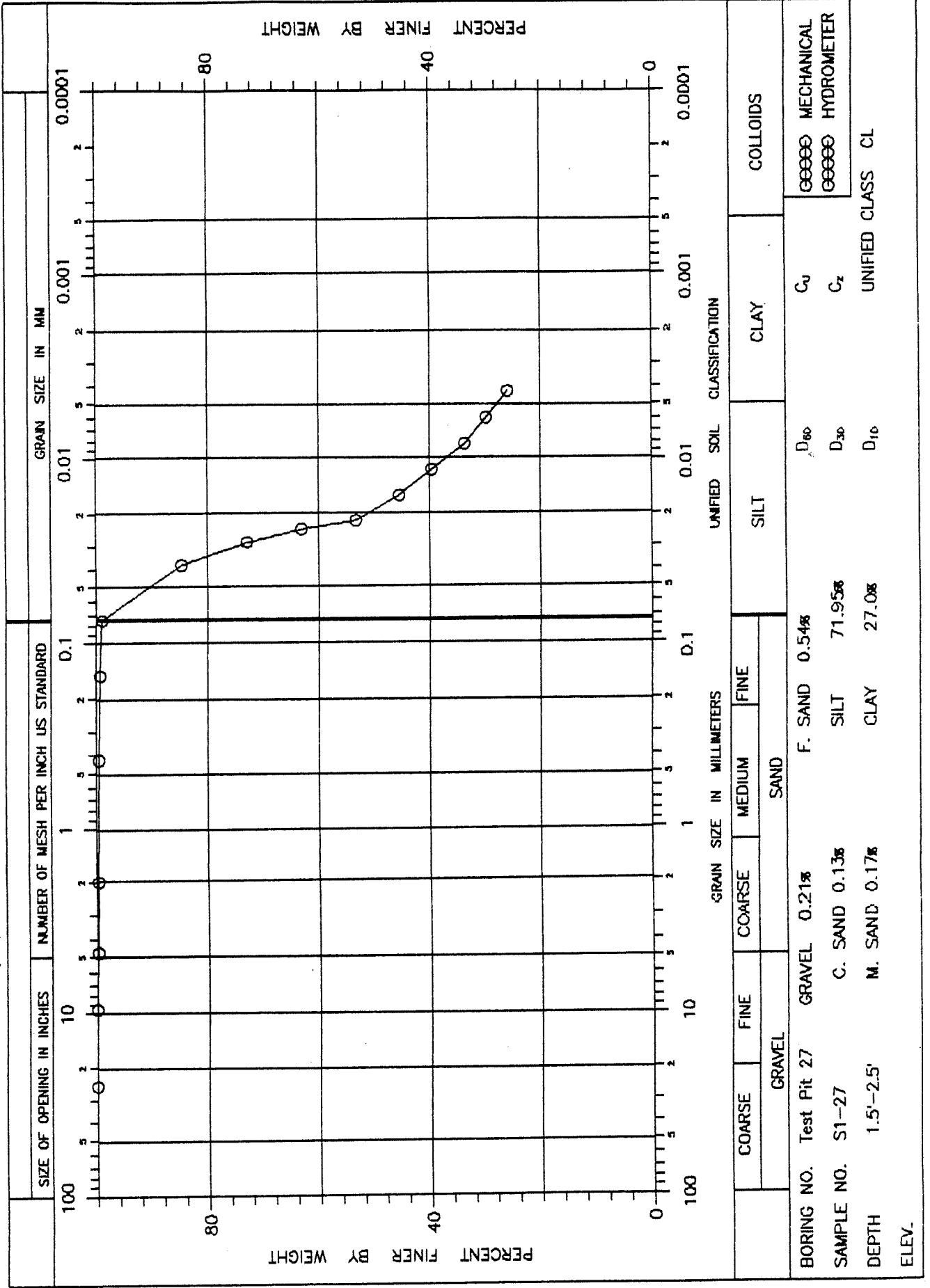
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PROJECT: Vernon County

DATE: 9/29/89

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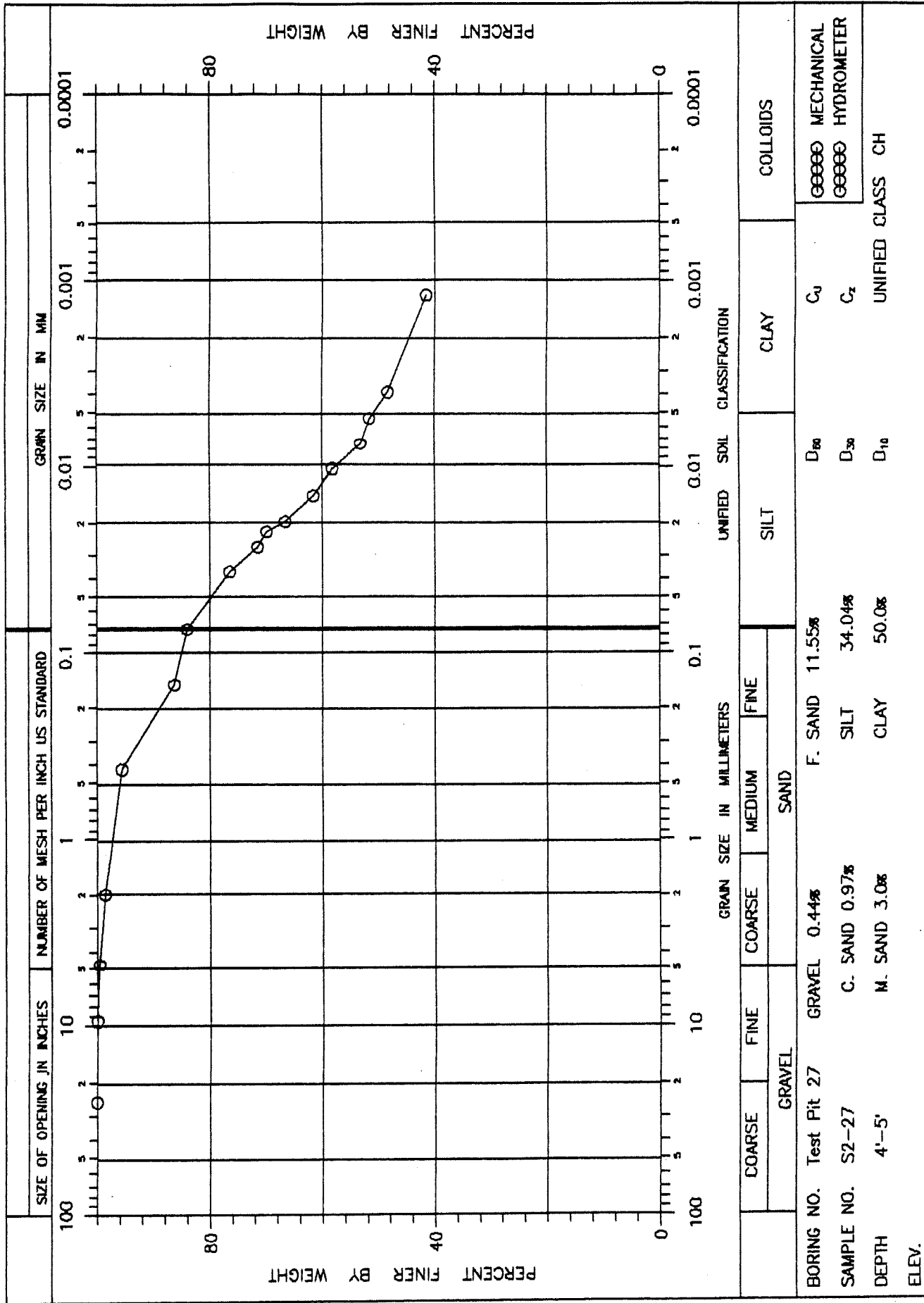
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PROJECT: Vernon County

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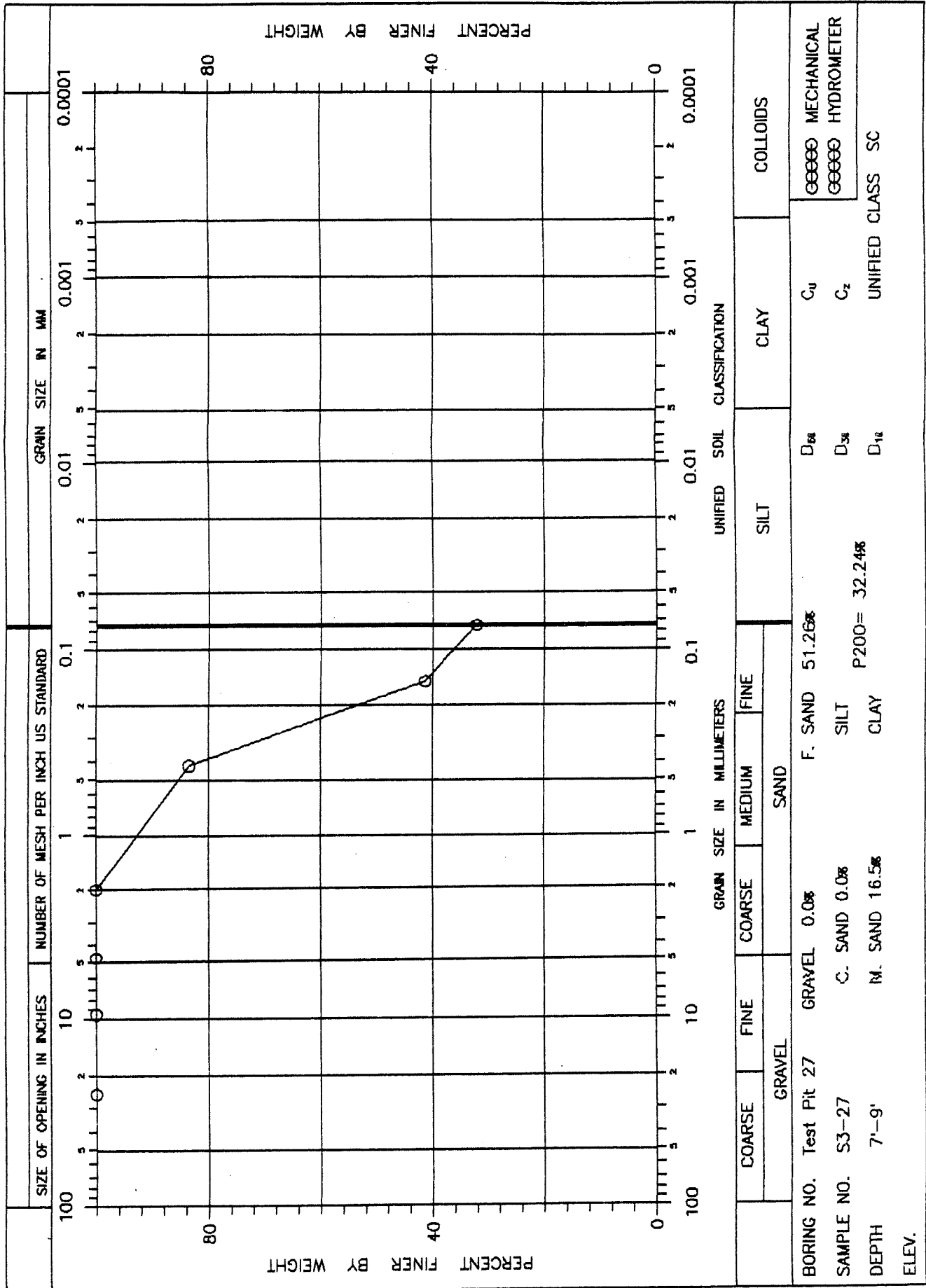
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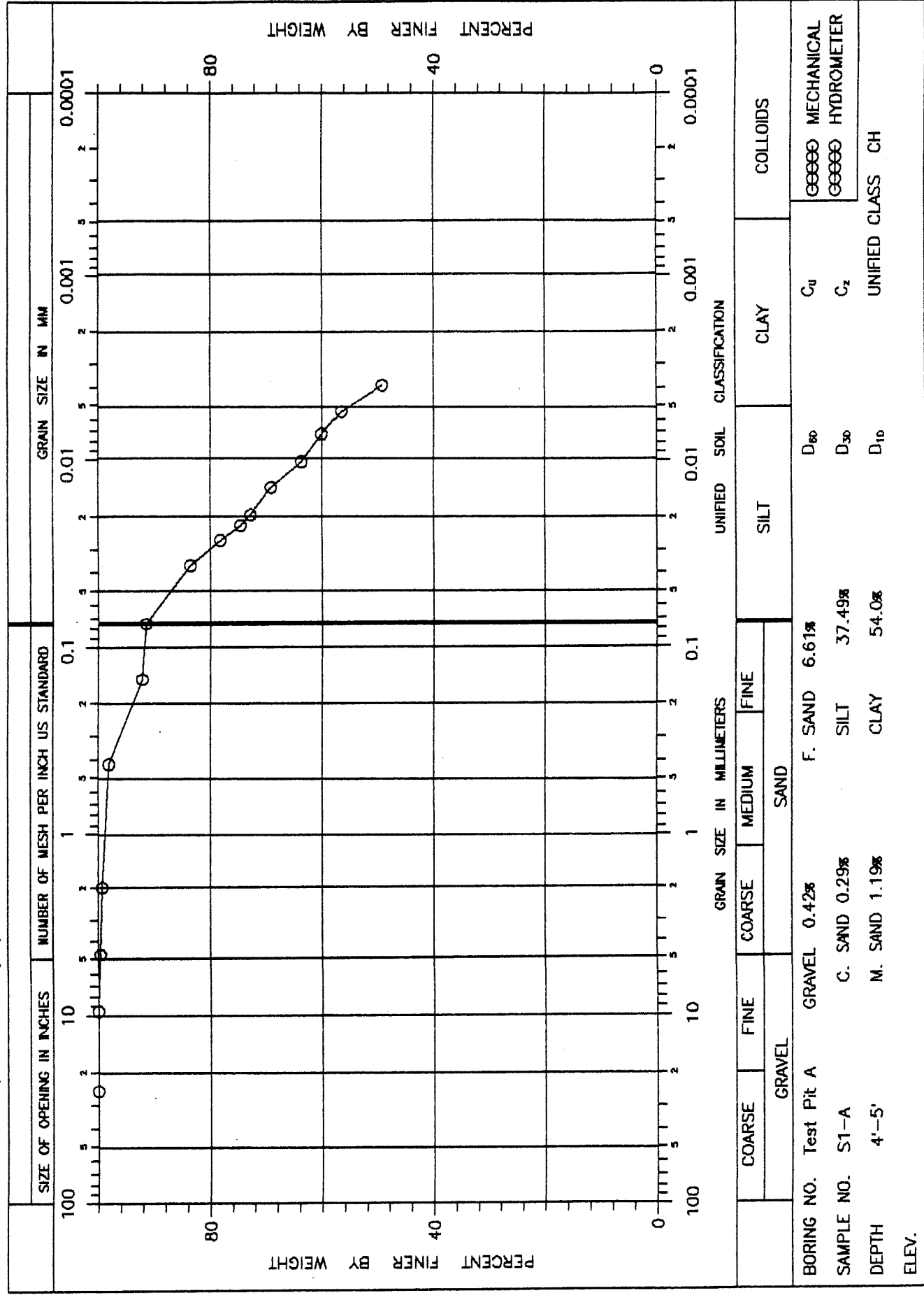
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PROJECT: Vermon County
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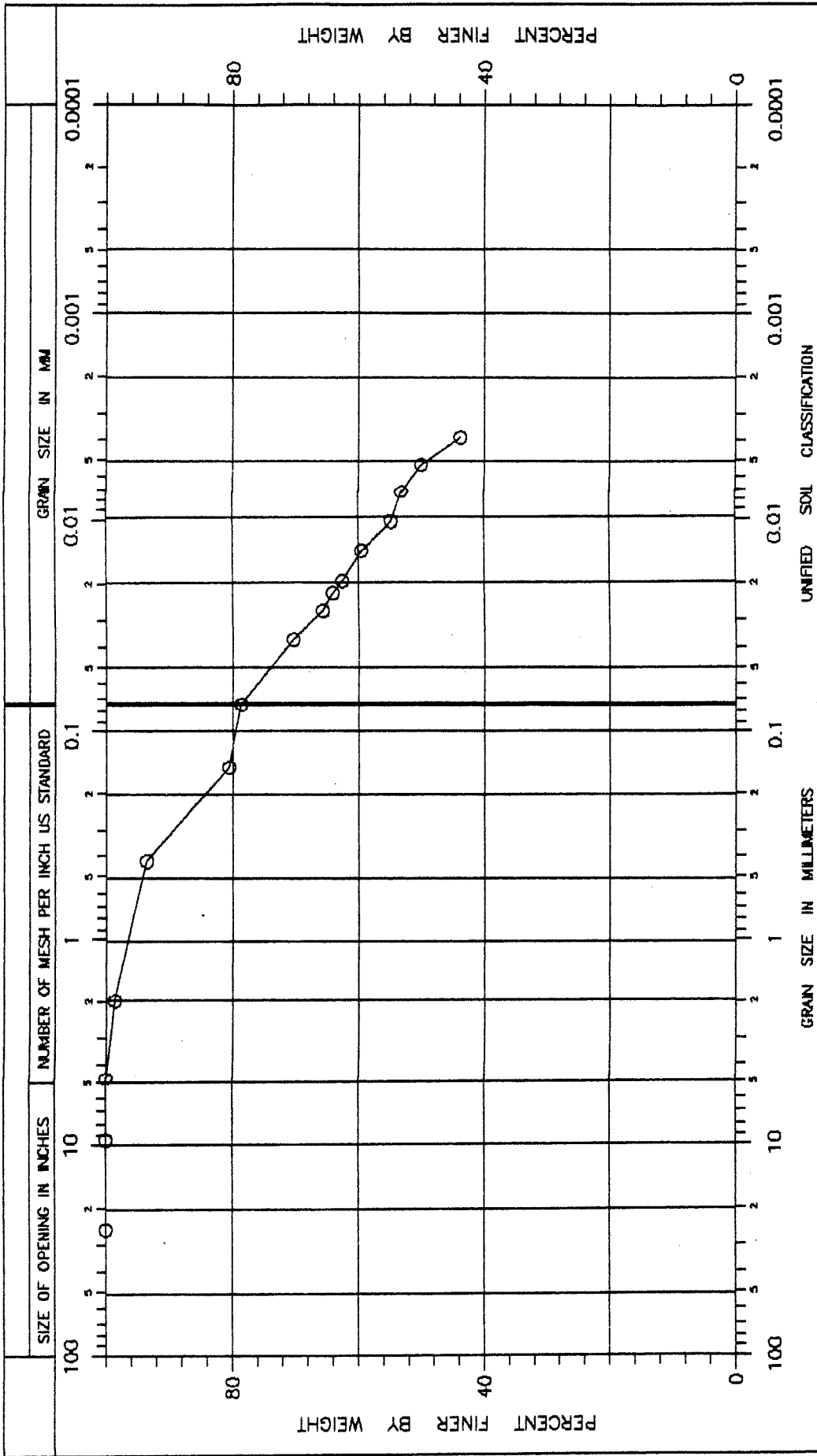


GRAIN SIZE IN MILLIMETERS				UNIFIED SOIL CLASSIFICATION		
GRAVEL		SAND		SILT	CLAY	COLLOIDS
COARSE	FINE	COARSE	MEDIUM	FINE		
BORING NO. Test Pit A	GRAVEL 0.42%	F. SAND 6.61%		D ₆₀	C _u	MECHANICAL HYDROMETER
SAMPLE NO. S1-A	C. SAND 0.29%	SILT 37.49%		D ₃₀	C _z	
DEPTH 4'-5'	M. SAND 1.19%	CLAY 54.0%		D ₁₀	UNIFIED CLASS CH	
ELEV.						

PROJECT: Yaman County
 DATE: 9/29/89
 JOB NO: 70389

GRAIN SIZE DISTRIBUTION CURVE

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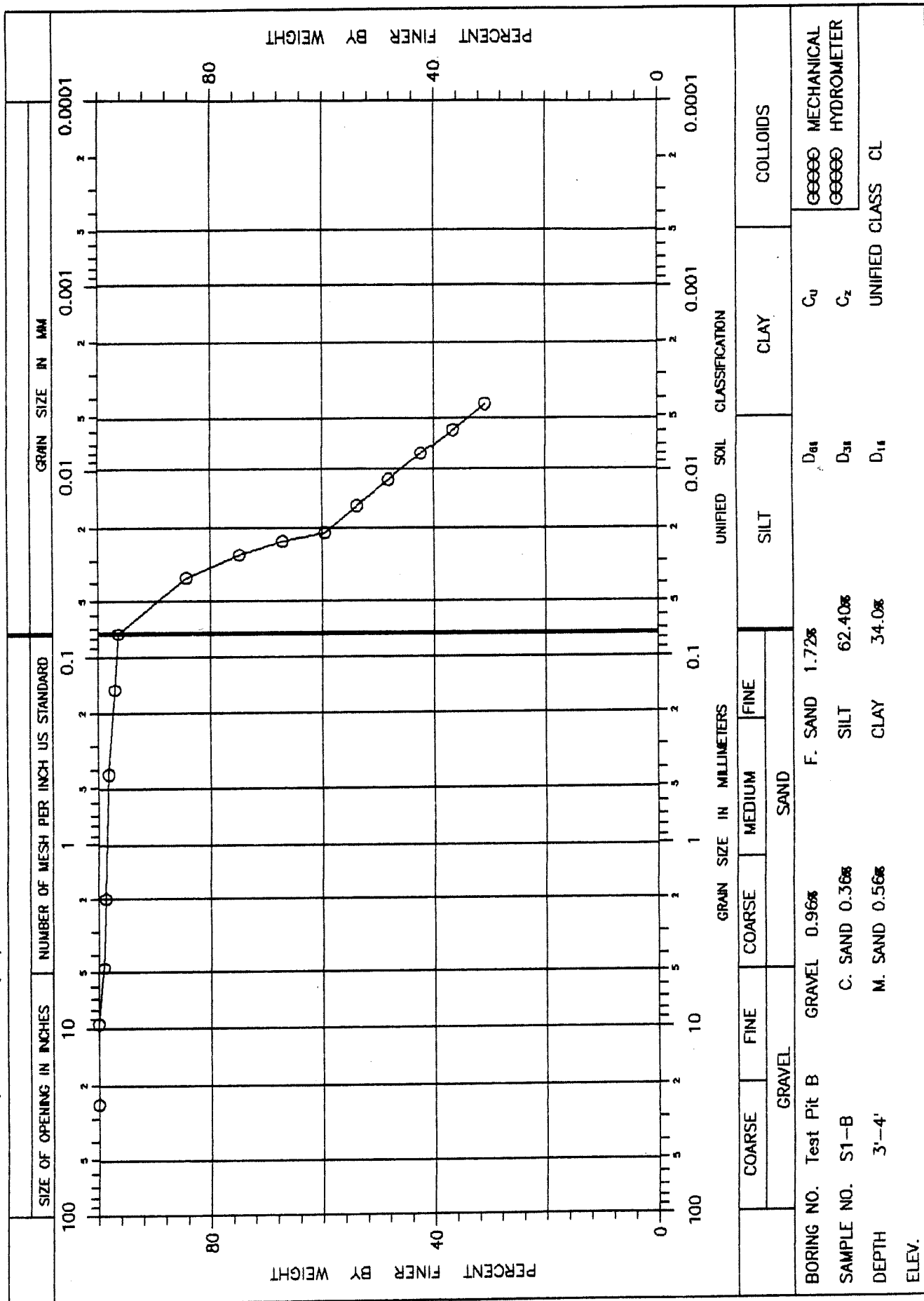
PROJECT: Yemen CountyDATE: 9/29/89

JOB NO: 70389

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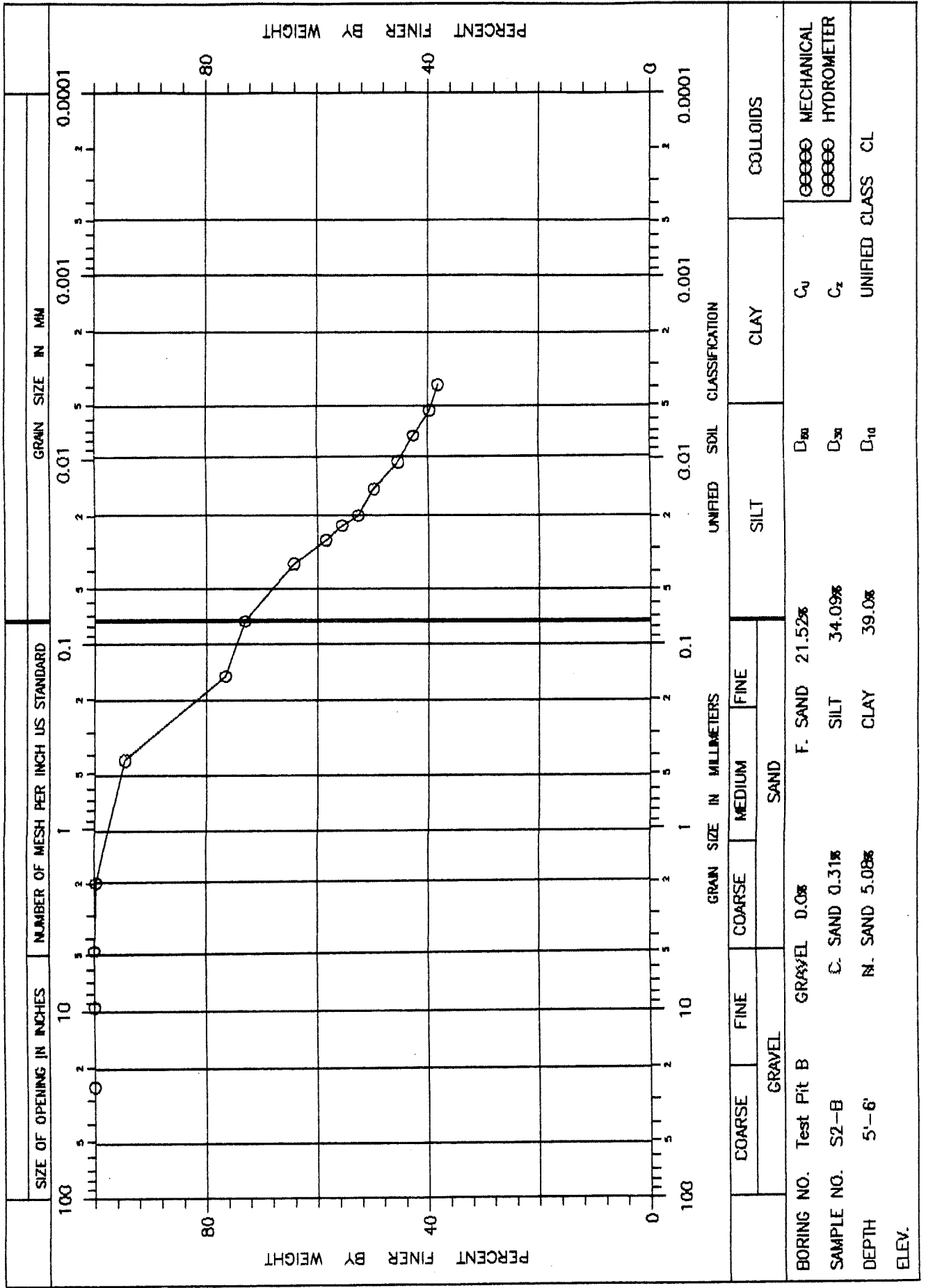
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PROJECT: Vernon County
DATE: 9/29/89
JOB NO: 70389

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GRAIN SIZE DISTRIBUTION CURVE

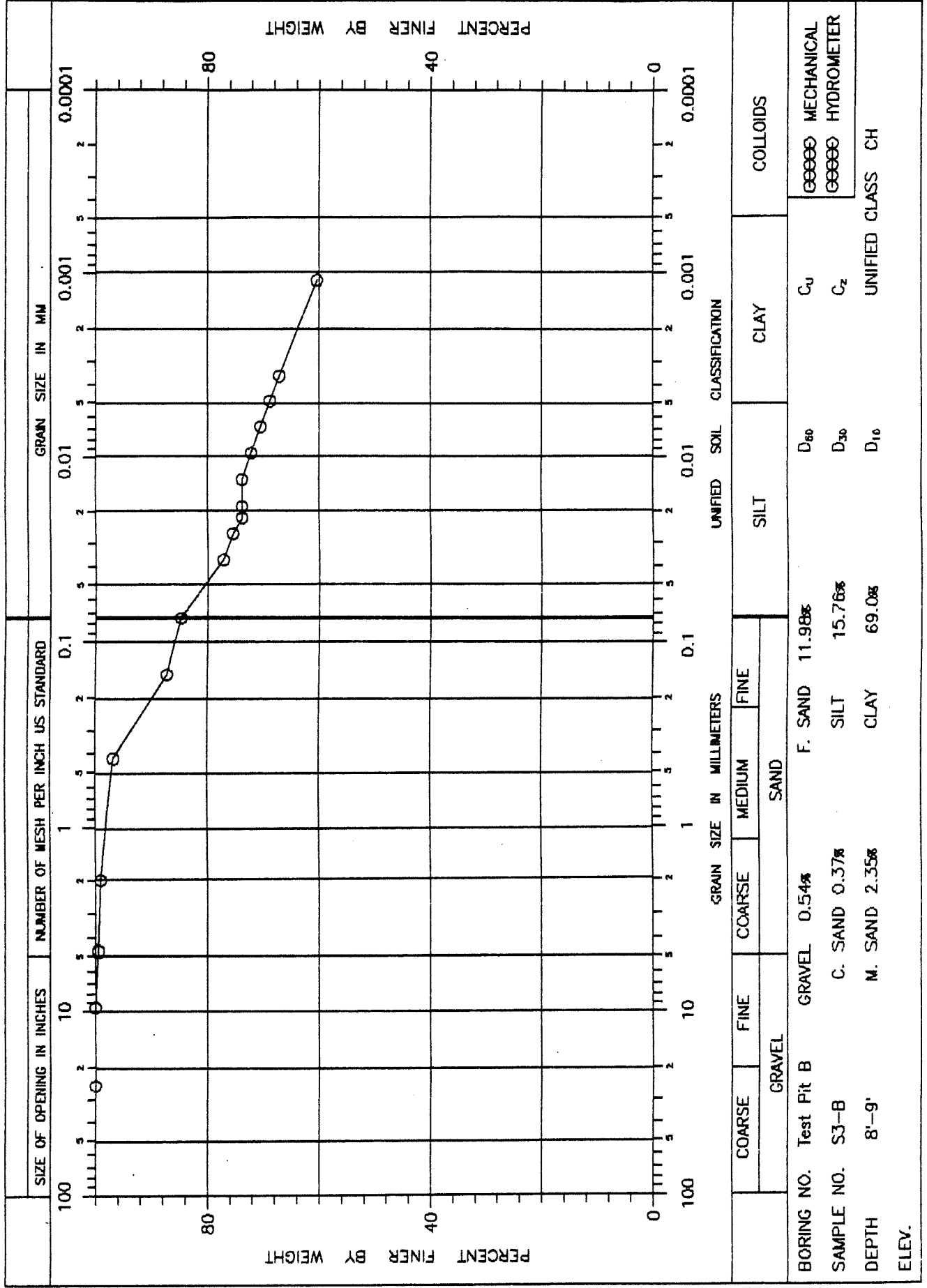
PROJECT: Vernon County

DATE: 9/28/89

JOB NO: 70389

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PROJECT: Vernon County

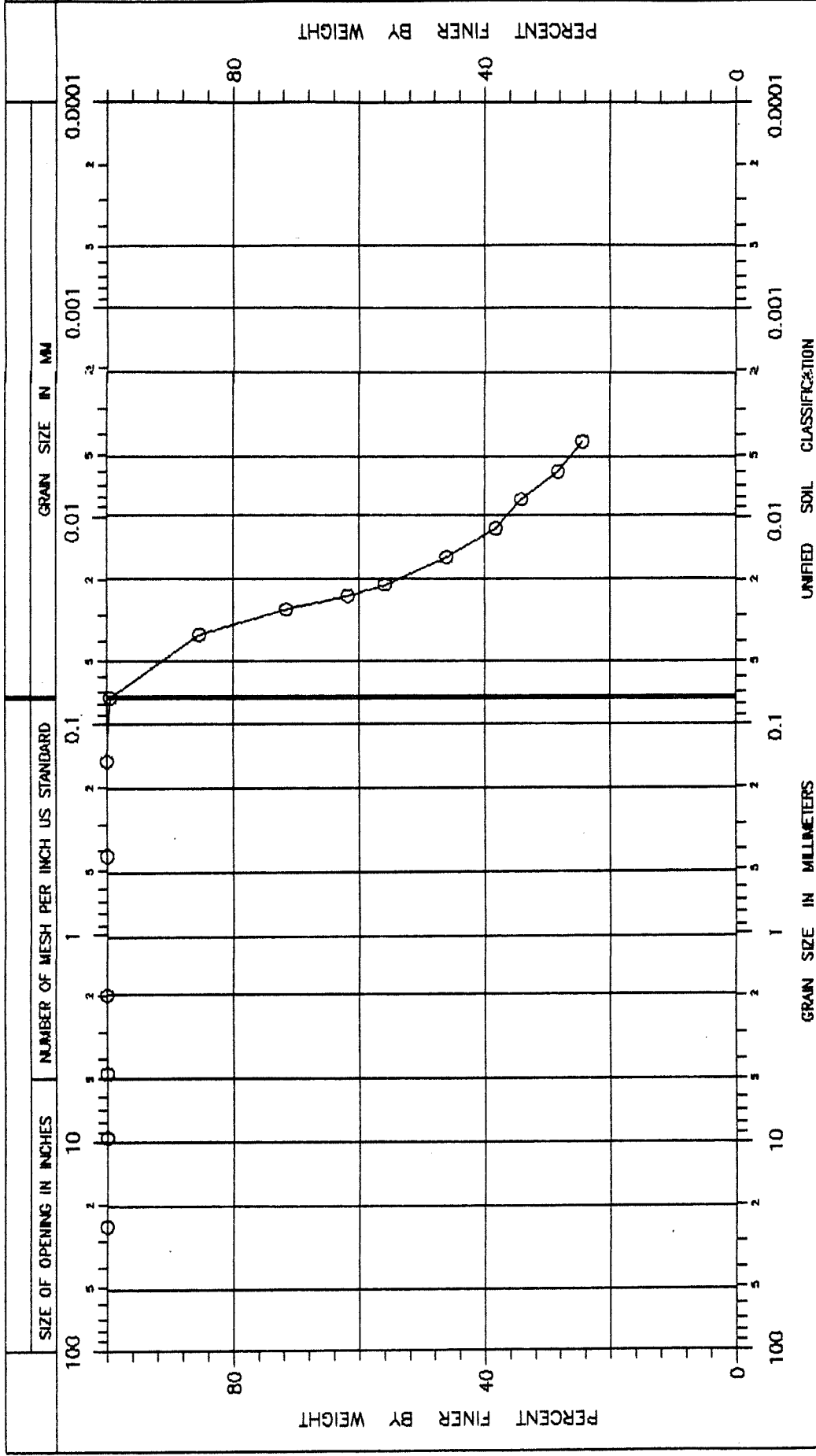
DATE: 10/1/89

JOB NO: 70389

GRAIN SIZE DISTRIBUTION CURVE

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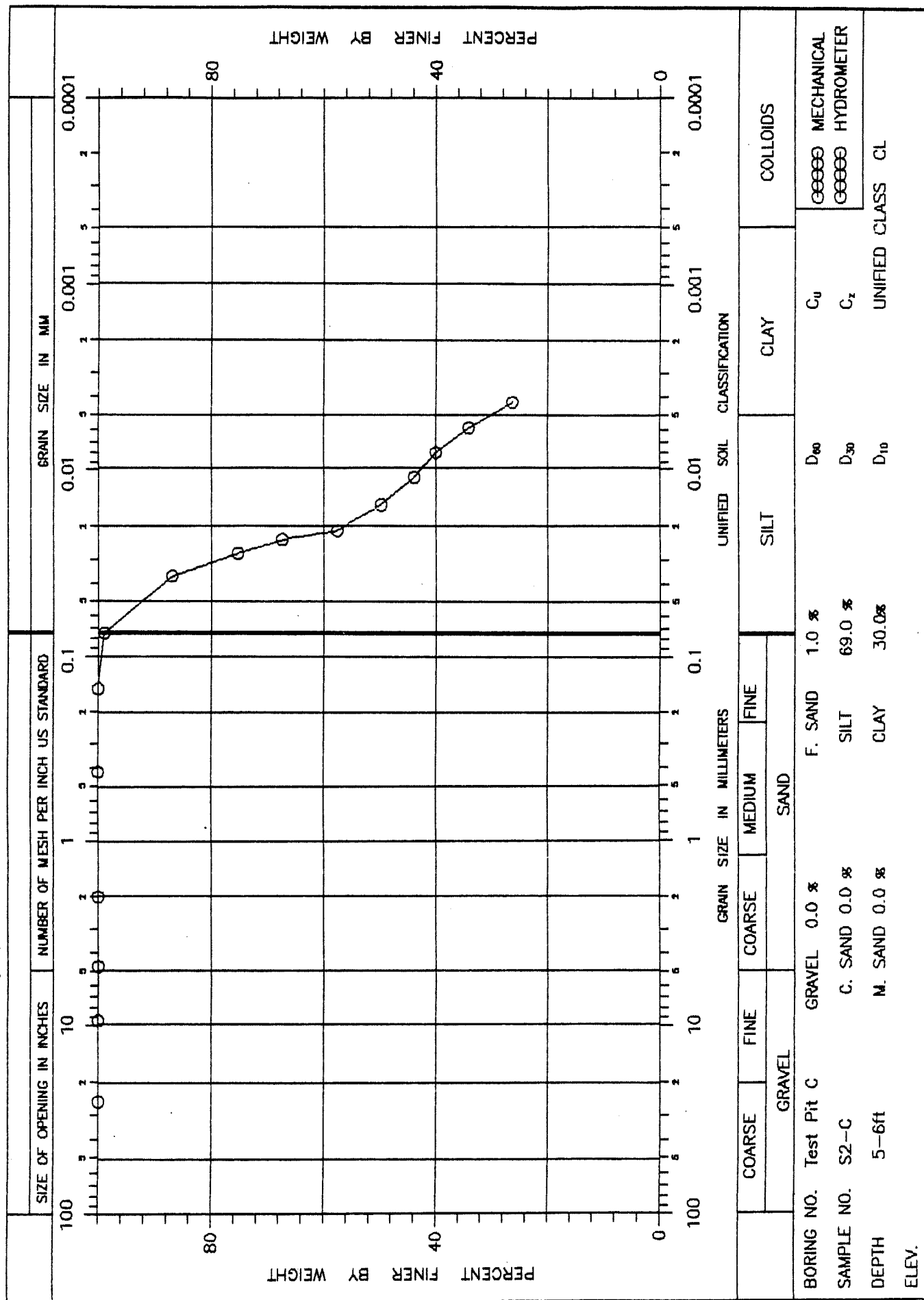
Engineers

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County

DATE: 8/31/89

JOB NO: 70389



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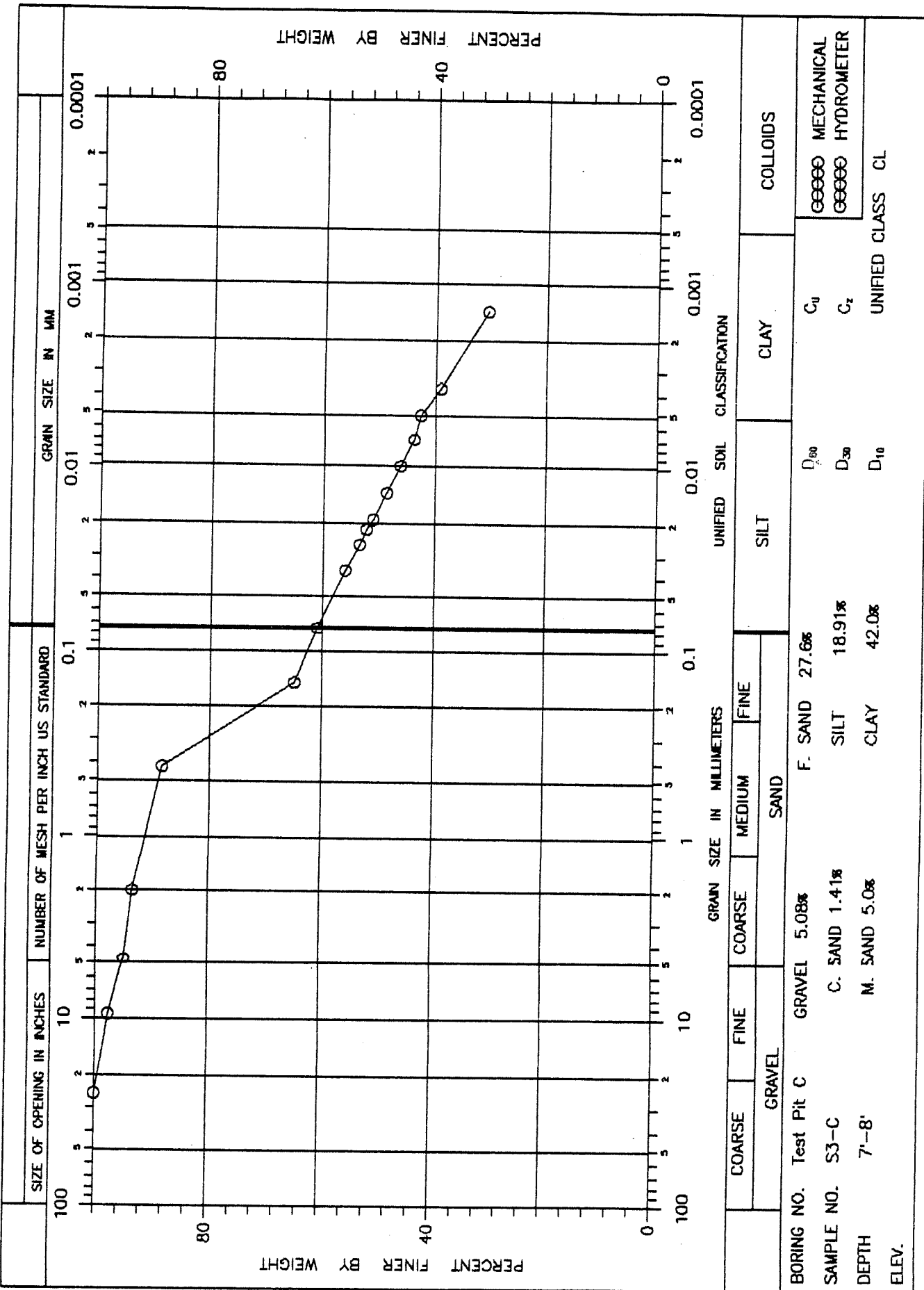
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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County

DATE: 9/27/89

JOB NO: 70389



		GRAVEL				SAND		SILT	CLAY	COLLOIDS
		COARSE	FINE	GRAVEL	F. SAND	27.6%				
							COARSE			
BORING NO.	Test Pit C									
SAMPLE NO.	S3-C			GRAVEL	5.08%		F. SAND	27.6%	C _u	MECHANICAL
DEPTH	7'-8'								C _z	HYDROMETER
ELEV.										

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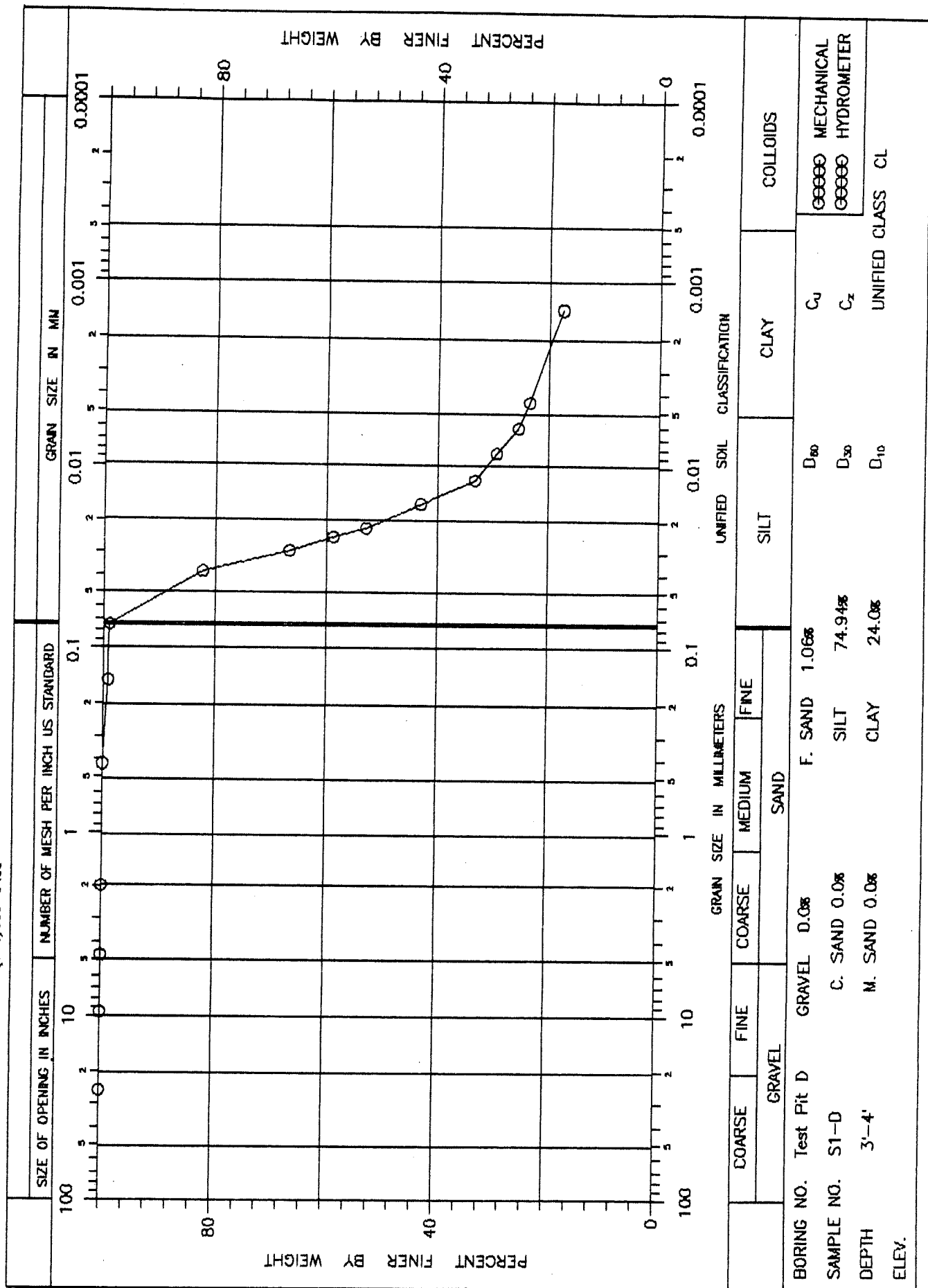
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GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County

DATE: 9/28/89

JOB NO: 70389



FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 70389

Sample No.: S2-12 (Proctor Case Test #1)

Sample Description: Clay

Sample Diameter: 5.4 cm

Sample Height (L): 6.8 cm

Sample Area (A): 22.89 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 107.43 pcf

Moisture Content (Initial): 15.89%

$$K_f = \frac{aL}{At} \ln h_o \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_f (cm/sec)</u>
1	64,800	193.1	192.8	1.26 x 10 ⁻⁸
2	108,000	192.8	192.6	5.05 x 10 ⁻⁹
3	86,400	192.6	192.1	1.58 x 10 ⁻⁸
4	68,400	192.1	191.9	8.00 x 10 ⁻⁹
Ave. K _f =				1.03 x 10 ⁻⁸

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 70389

Sample No.: S2-12 (Proctor Case Test #2)

Sample Description: Clay

Sample Diameter: 5.8 cm

Sample Height (L): 7.2 cm

Sample Area (A): 26.40 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 109.74

Moisture Content (Initial): 18.64

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h^f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	72,000	187.5	186.4	3.94 x 10 ⁻⁸
2	108,000	186.4	184.3	5.06 x 10 ⁻⁸
3	86,400	184.3	184.0	9.10 x 10 ⁻⁹
4	68,400	184.0	183.8	7.67 x 10 ⁻⁹
Ave. K _r =				2.66 x 10 ⁻⁸

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 70389

Sample No.: S2-12 (Proctor Case Test #3)

Sample Description: Clay

Sample Diameter: 5.7 cm

Sample Height (L): 7.3 cm

Sample Area (A): 25.5 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 104.65

Moisture Content (Initial): 22.71%

$$K_f = \frac{aL}{At} \ln h_o \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_f (cm/sec)</u>
1	72,000	194.8	194.5	1.08 x 10 ⁻⁸
2	108,000	194.5	194.1	9.65 x 10 ⁻⁹
3	86,400	194.1	193.9	6.04 x 10 ⁻⁹
4	68,400	193.9	193.6	1.14 x 10 ⁻⁸
Ave. K _f =				9.47 x 10 ⁻⁹

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 70389

Sample No.: S2-12 (Proctor Case Test #4)

Sample Description: Clay

Sample Diameter: 5.7 cm

Sample Height (L): 7.2 cm

Sample Area (A): 25.5 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 100.24

Moisture Content (Initial): 24.8%

$$K_T = \frac{aL}{At} \ln h_o \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_T (cm/sec)</u>
1	72,000	193.1	193.0	3.59 x 10 ⁻⁹
2	108,000	193.0	192.7	7.19 x 10 ⁻⁹
3	86,400	192.7	192.4	9.01 x 10 ⁻⁹
4	68,400	192.4	192.1	1.14 x 10 ⁻⁸
Ave. K _T =				7.79 x 10 ⁻⁹

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 703

Sample No.: S-8 Proctor Case Test No. 2

Sample Description: Clay

Sample Diameter: 5.9 cm

Sample Height (L): 7.0 cm

Sample Area (A): 27.33 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 116.92 pcf

Moisture Content (Initial): 12.38%

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h^f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	90000	192.4	191.5	2.36 x 10 ⁻⁸
2	83400	191.5	190.9	1.70 x 10 ⁻⁸
3	85800	190.9	190.2	1.94 x 10 ⁻⁸
4	86700	190.2	189.4	2.20 x 10 ⁻⁸
5	261600	189.4	187.3	1.93 x 10 ⁻⁸
6	89100	187.3	186.8	1.36 x 10 ⁻⁸
7	86400	186.8	186.4	1.12 x 10 ⁻⁸
8	102600	186.4	185.8	1.42 x 10 ⁻⁸
9.	86400	185.8	185.0	2.26 x 10 ⁻⁸
Ave. K _r				1.81 x 10 ⁻⁸

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 703

Sample No.: S-8 Proctor Case Test No. 3

Sample Description: Clay

Sample Diameter: 5.6 cm

Sample Height (L): 6.6 cm

Sample Area (A): 24.62 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 117.92 pcf

Moisture Content (Initial): 13.21%

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	90000	192.0	191.5	1.37 x 10 ⁻⁸
2	83400	191.5	191.3	5.94 x 10 ⁻⁹
3	89800	191.3	190.8	1.44 x 10 ⁻⁸
4	86700	190.8	190.5	8.61 x 10 ⁻⁹
5	261600	190.5	189.5	9.54 x 10 ⁻⁹
6	89100	189.5	189.4	2.81 x 10 ⁻⁹
7	86400	189.4	189.1	8.70 x 10 ⁻⁹
8	102600	189.1	188.8	7.34 x 10 ⁻⁹
9	86400	188.8	188.4	1.16 x 10 ⁻⁸
Ave. K _r				9.18 x 10 ⁻⁹

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 703

Sample No.: S-8 Proctor Case Test No. 4

Sample Description: Clay

Sample Diameter: 5.8 cm

Sample Height (L): 7.0 cm

Sample Area (A): 26.41 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 114.13 pcf

Moisture Content (Initial): 17.23%

$$K_r = \frac{aL}{At} \ln h_o \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	90000	196.6	196.0	1.59 x 10 ⁻⁸
2	83400	196.0	195.4	1.72 x 10 ⁻⁸
3	85800	195.4	194.7	1.96 x 10 ⁻⁸
4	86700	194.7	194.0	1.11 x 10 ⁻⁸
5	261600	194.0	192.8	1.11 x 10 ⁻⁸
6	89100	192.8	192.4	1.09 x 10 ⁻⁸
7	86400	192.4	191.9	1.41 x 10 ⁻⁸
8	102600	191.9	191.4	1.19 x 10 ⁻⁸
9	86400	191.4	190.8	1.70 x 10 ⁻⁸
Ave. K _r				1.52 x 10 ⁻⁸

FALLING HEAD PERMEABILITY TEST

Project: Vernon County

Project No.: 703

Sample No.: S-8 Proctor Case Test No. 5

Sample Description: Clay

Sample Diameter: 5.7 cm

Sample Height (L): 6.5 cm

Sample Area (A): 25.5 cm²

Standpipe Area (a): 1.77 cm²

Dry Density: 101.54 pcf

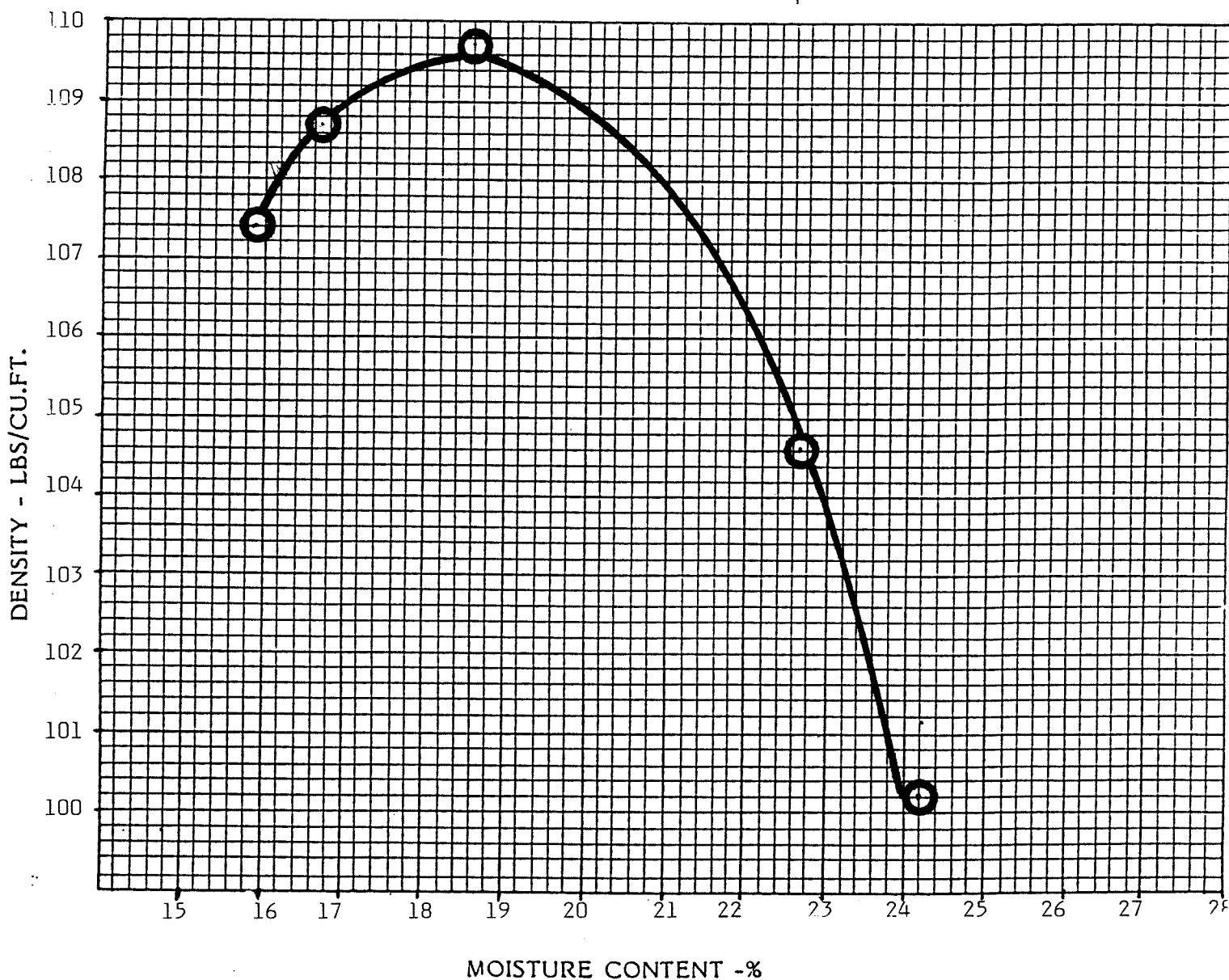
Moisture Content (Initial): 22.91%

$$K_r = \frac{aL}{At} \ln h_0 \frac{1}{h_f}$$

<u>Trial No.</u>	<u>Duration, t (seconds)</u>	<u>Initial Head, Head, h^o (cm)</u>	<u>Final Head h_f (cm)</u>	<u>Permeability, K_r (cm/sec)</u>
1	90000	195.9	191.1	1.24 x 10 ⁻⁷
2	83400	191.1	187.8	9.42 x 10 ⁻⁸
3	85800	187.8	185.1	7.61 x 10 ⁻⁸
4	86700	185.1	182.2	8.21 x 10 ⁻⁸
5	261600	182.2	174.0	7.94 x 10 ⁻⁸
6	89100	174.0	171.4	7.62 x 10 ⁻⁸
7	86400	171.4	168.8	7.98 x 10 ⁻⁸
8	102600	168.8	166.0	7.35 x 10 ⁻⁸
9	86400	166.0	163.4	8.24 x 10 ⁻⁸
Ave. K _r				8.53 x 10 ⁻⁸

COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM Vernon County Clay Search TEST NO. S-5
SAMPLE DESCRIPTION Clay SAMPLE NO. S2-12
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER

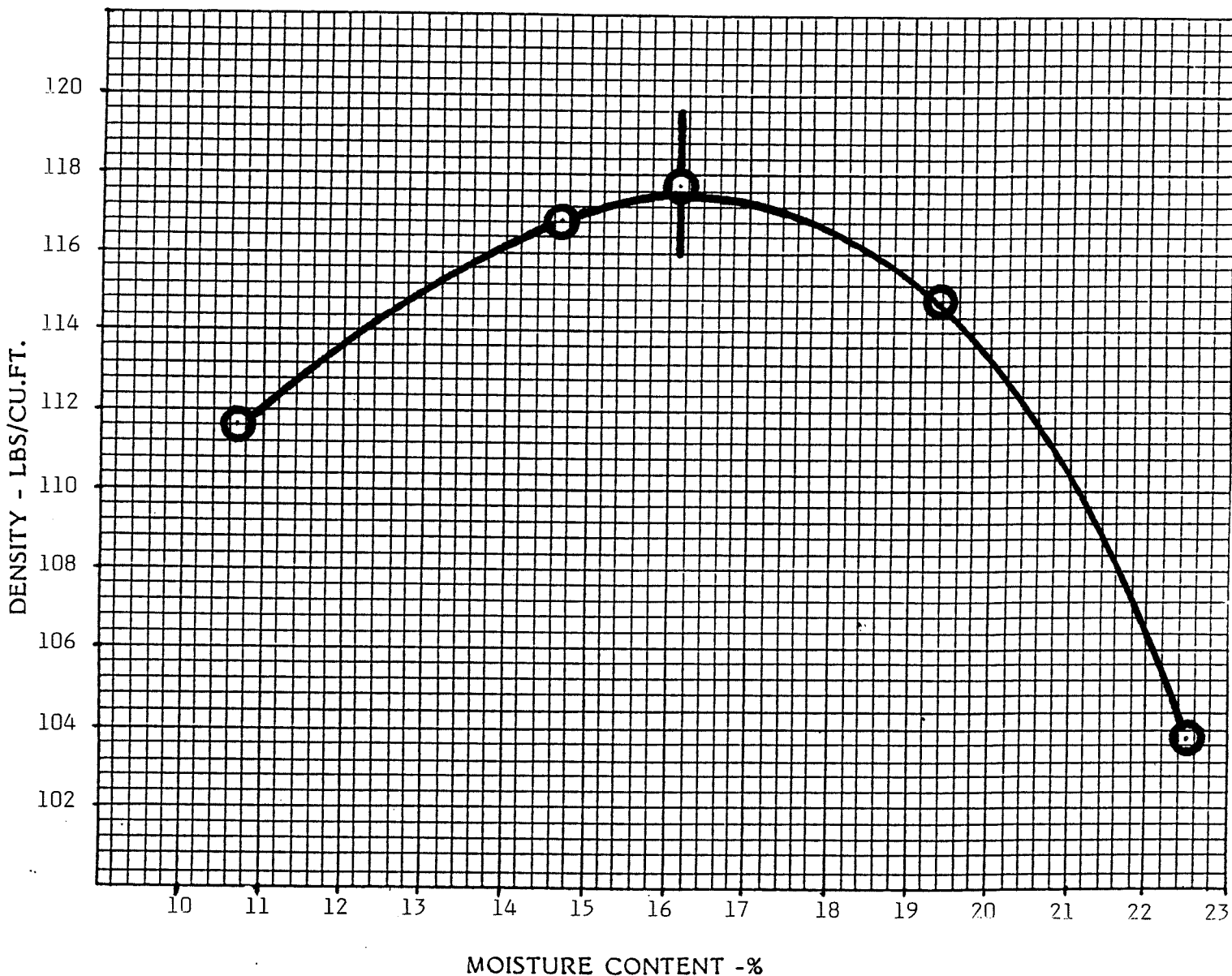


MAIXMUM DRY DENSITY 109.7 LBS./CU.FT. OPTIMUM MOISTURE 18.6 %

REMARKS _____
TESTED BY K. Y. DATE Oct. 5 19 89

COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM Vernon County Clay Search TEST NO. S-2
SAMPLE DESCRIPTION Clay SAMPLE NO. S4-8
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



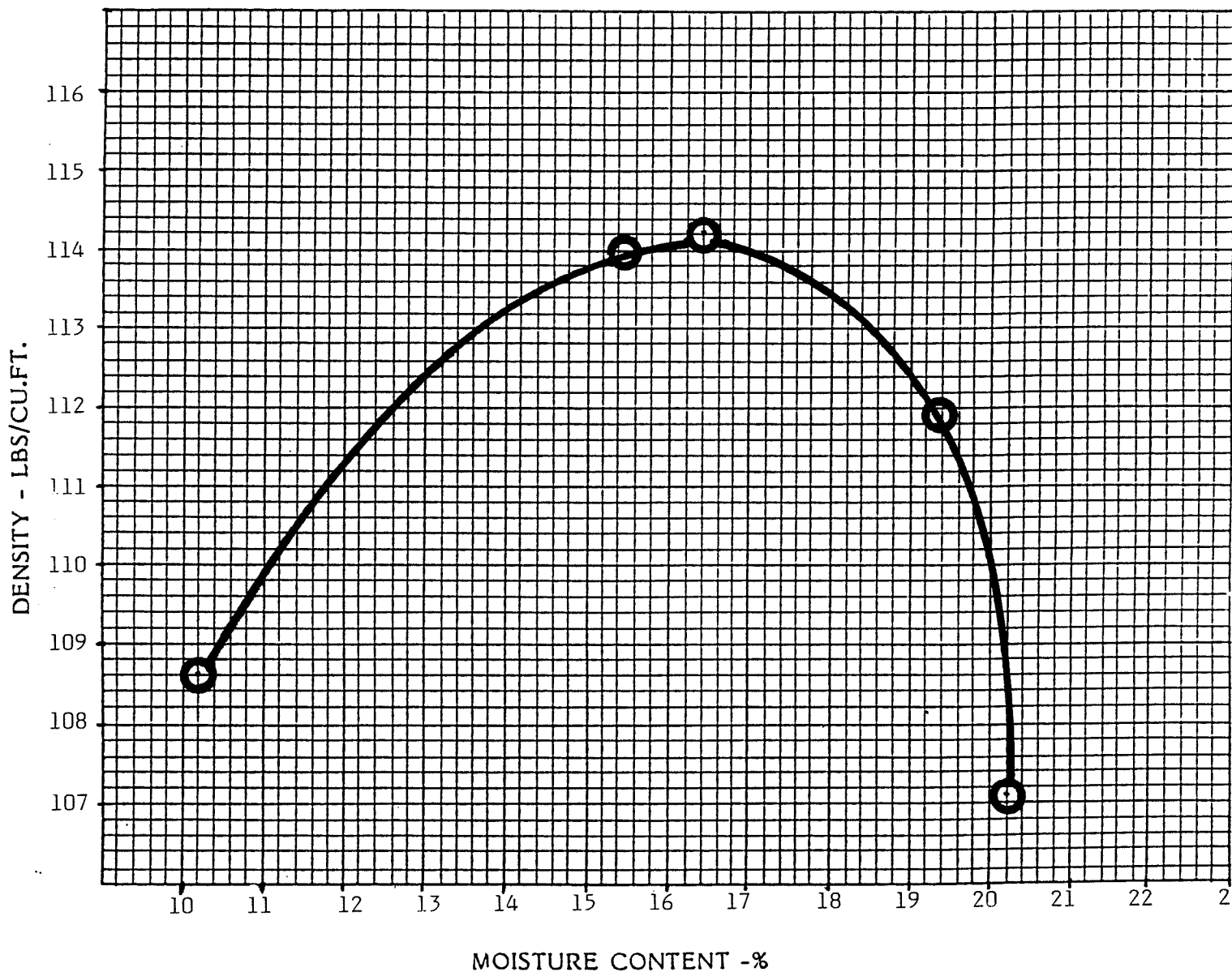
MAIXMUM DRY DENSITY 117.9 LBS./CU.FT. OPTIMUM MOISTURE 16.1 %

REMARKS _____

TESTED BY K. Y. DATE Oct. 9 19 89

COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM Vernon County Clay Search TEST NO. S-3
SAMPLE DESCRIPTION Clay SAMPLE NO. S4-13
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



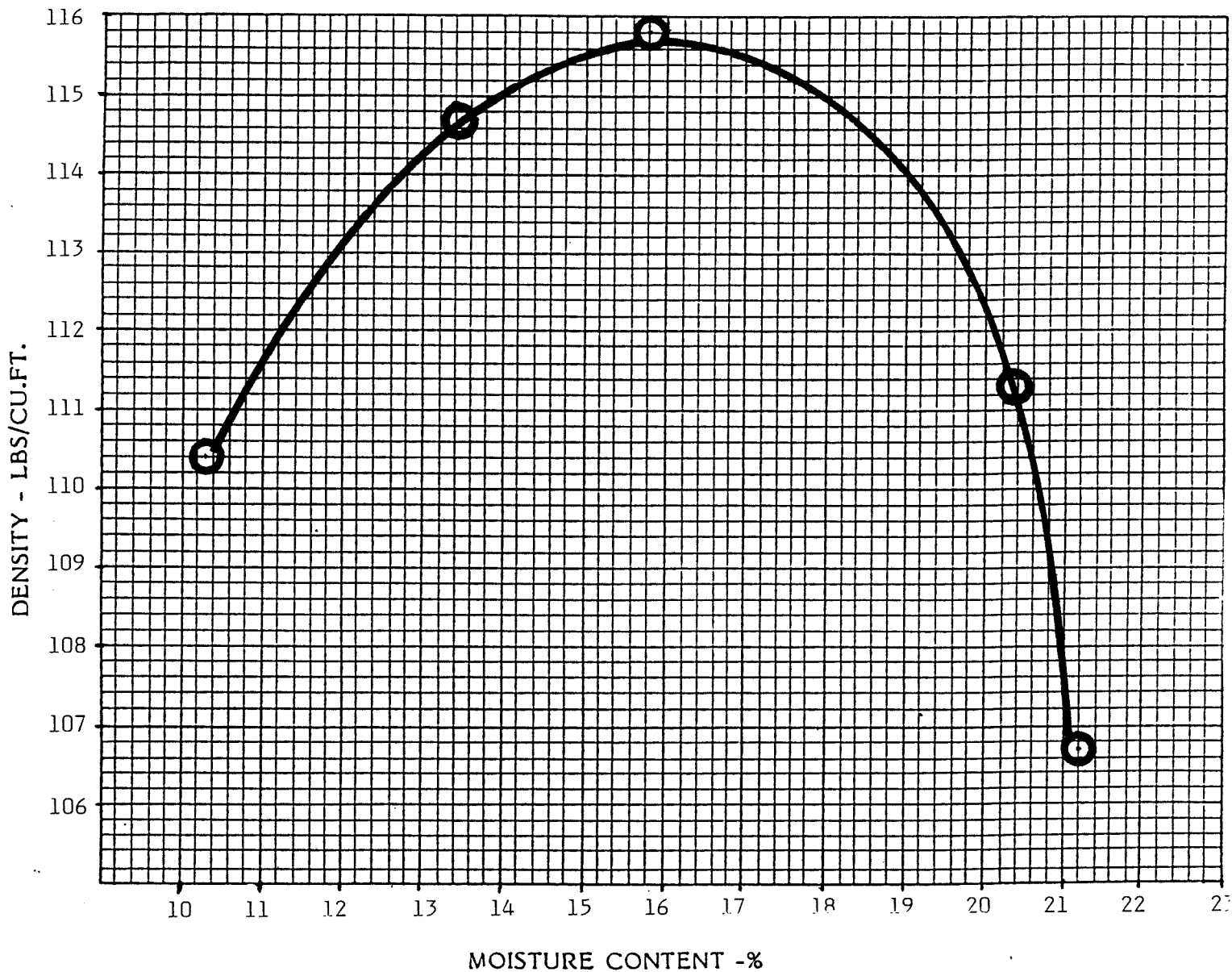
MAIAXMUM DRY DENSITY 114.2 LBS./CU.FT. OPTIMUM MOISTURE 16.4 %

REMARKS _____

TESTED BY K. Y. DATE Oct. 9 1989

COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM Vernon County Clay Search TEST NO. S-4
SAMPLE DESCRIPTION Clay SAMPLE NO. S4-15
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



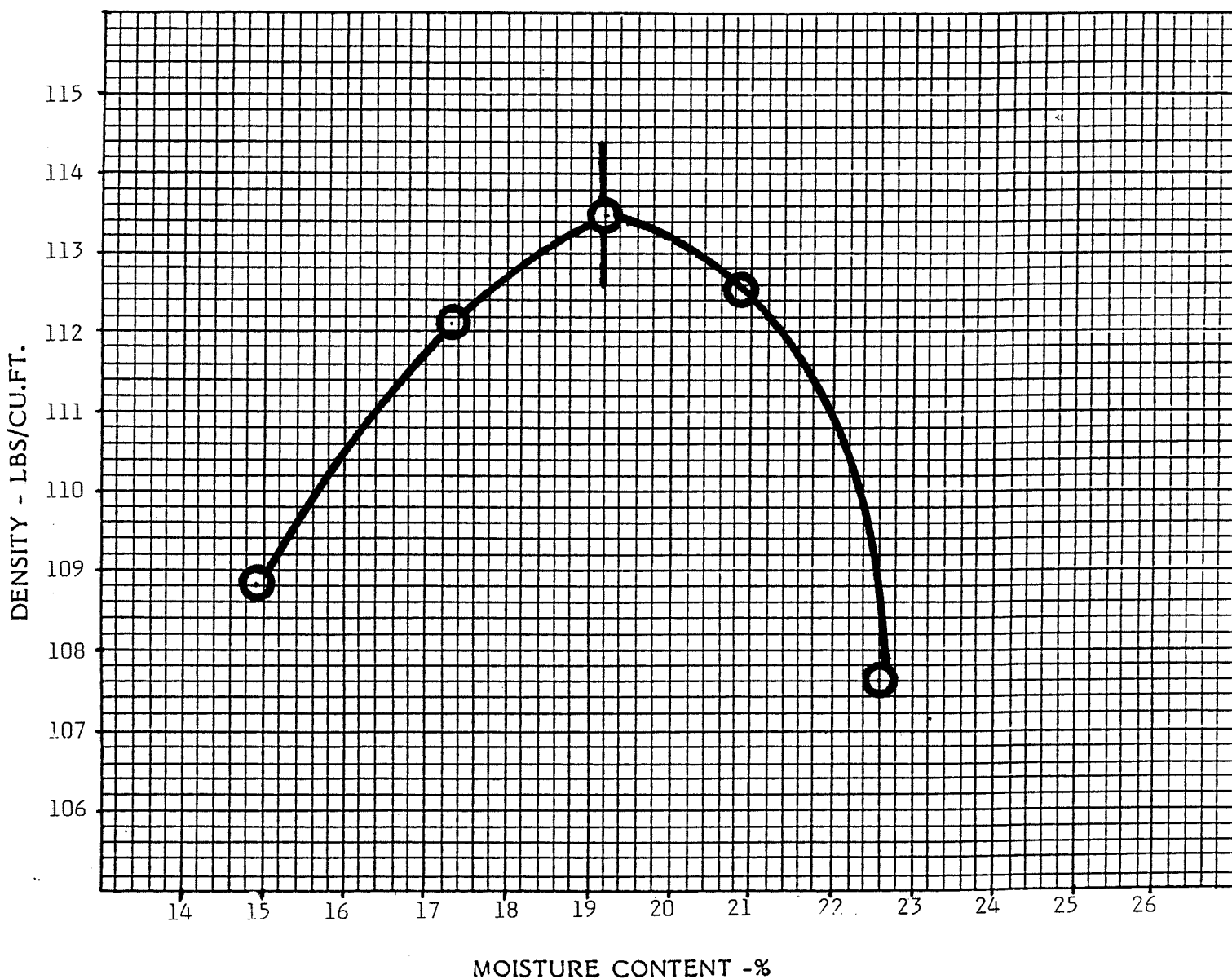
MAIXMUM DRY DENSITY 115.8 LBS./CU.FT. OPTIMUM MOISTURE 15.8 %

REMARKS _____

TESTED BY K. Y. DATE Oct. 8 1989

COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM Vernon County Clay Search TEST NO. S-1
SAMPLE DESCRIPTION Clay SAMPLE NO. S4-23
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



MAI XMUM DRY DENSITY 113.5 LBS./CU.FT. OPTIMUM MOISTURE 19.2 %

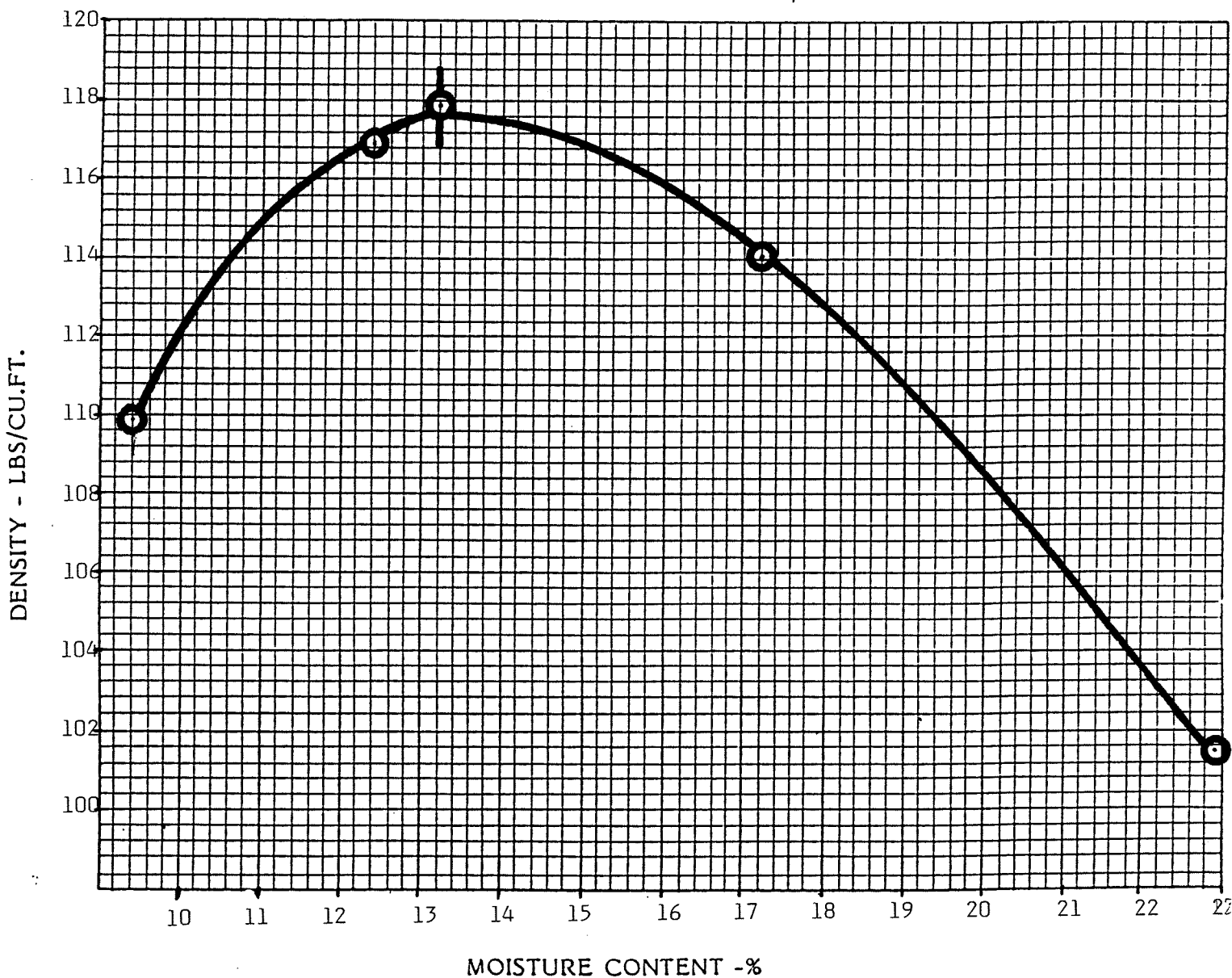
REMARKS _____
TESTED BY K. Y. DATE Oct. 8 19 89

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Engineers

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COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM _____ TEST NO. 8
SAMPLE DESCRIPTION Clay SAMPLE NO. S-8
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



MAIXMUM DRY DENSITY 117.92 LBS./CU.FT. OPTIMUM MOISTURE 13.21 %

REMARKS _____

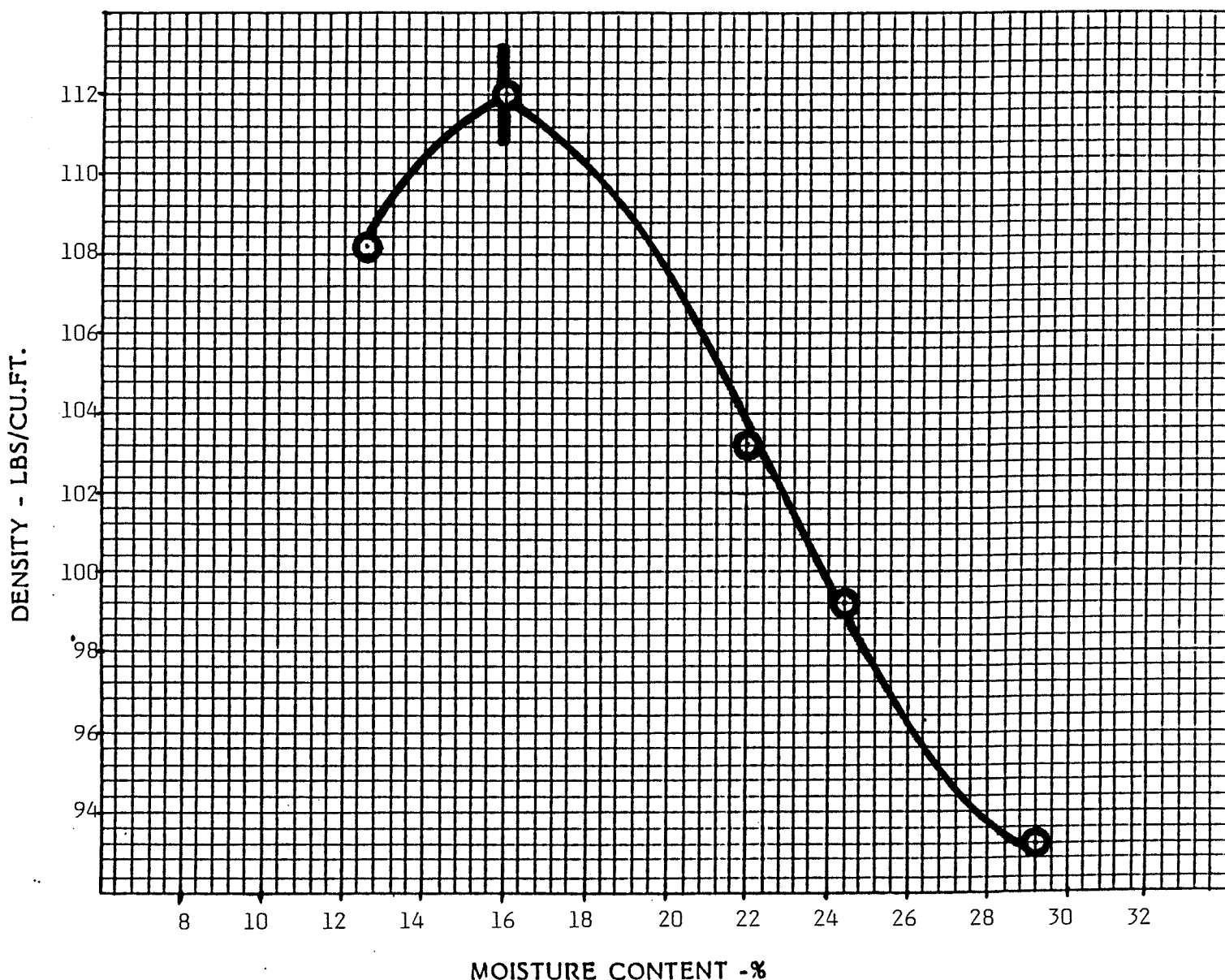
TESTED BY K.Y. DATE Jan. 9 19 90

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COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM _____ TEST NO. 7
SAMPLE DESCRIPTION Clay SAMPLE NO. S-7
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



MAIAXMUM DRY DENSITY 111.99 LBS./CU.FT. OPTIMUM MOISTURE 15.99 %

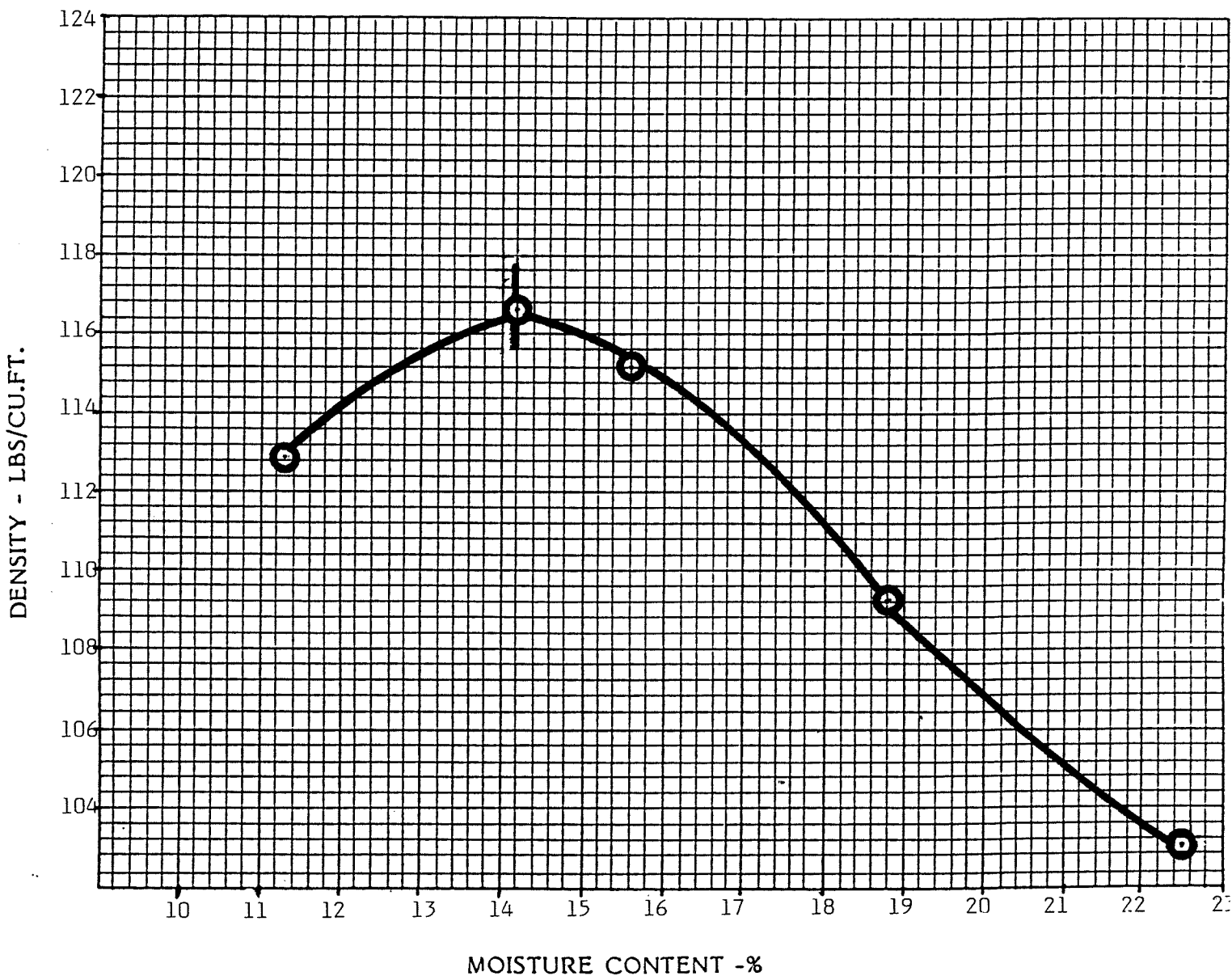
REMARKS _____
TESTED BY K.Y. DATE Jan. 4 19 90

Central Wisconsin
Engineers

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COMPACTION TEST

PROJECT NAME Vernon County JOB NO. 70389
SAMPLE FROM _____ TEST NO. 6
SAMPLE DESCRIPTION Clay SAMPLE NO. S-6
ASTM D1557-78 Method A MOLD SIZE 4 IN.
HAMMER WT. 10 LBS. 18 IN. 5 LAYERS 25 BLOWS/LAYER



MAIXMUM DRY DENSITY 116.64 LBS./CU.FT. OPTIMUM MOISTURE 14.20 %

REMARKS _____
TESTED BY K.Y. DATE Jan 4 19 90

Project: Vernon County Landfill Bafefill

Job No. 946-02-000

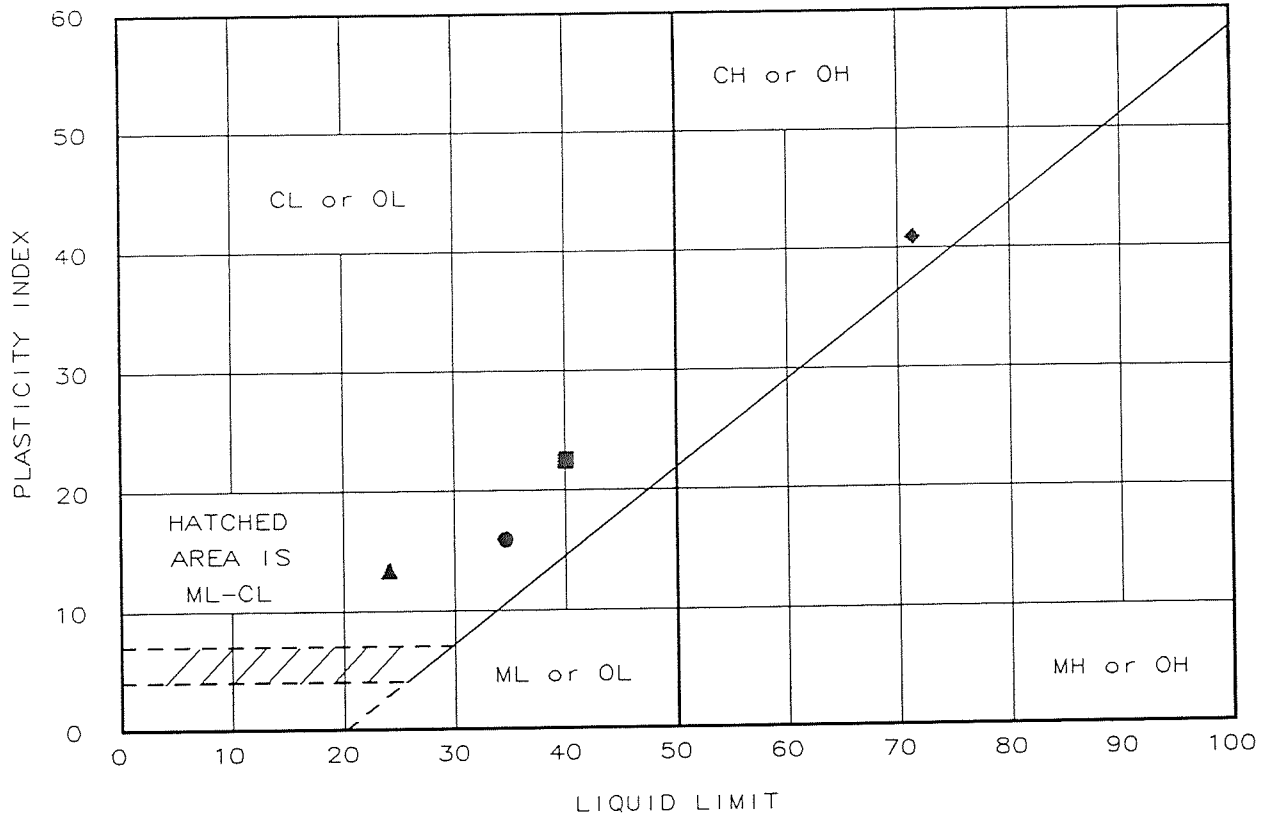
Date: 8/20/03

By: Ka Yang

[illegible]

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LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-90
● MW 1RZ S-1 3'- 6' Yellowish light brown lean clay	34.6	18.7	15.9	97.9	CL, Lean clay
▲ MW 1RZ S-2 13'- 15' Reddish-yellowish clayey sand w/gravel	24.1	10.7	13.4	33.9	SC, Clayey sand
■ MW 1RZ S-5 49'- 50' Reddish-yellowish brown clayey sand w/gravel	40.1	17.6	22.5	35.2	SC, Clayey sand
◆ MW 1RZ S-7 71'- 73' Brown fat clay w/sand	71.3	30.4	40.9	60.3	CH, Sandy fat clay

Project No.: 946-02-000
 Project: Vernon County Landfill Balefill

 Client: Vernon County Landfill
 Location:

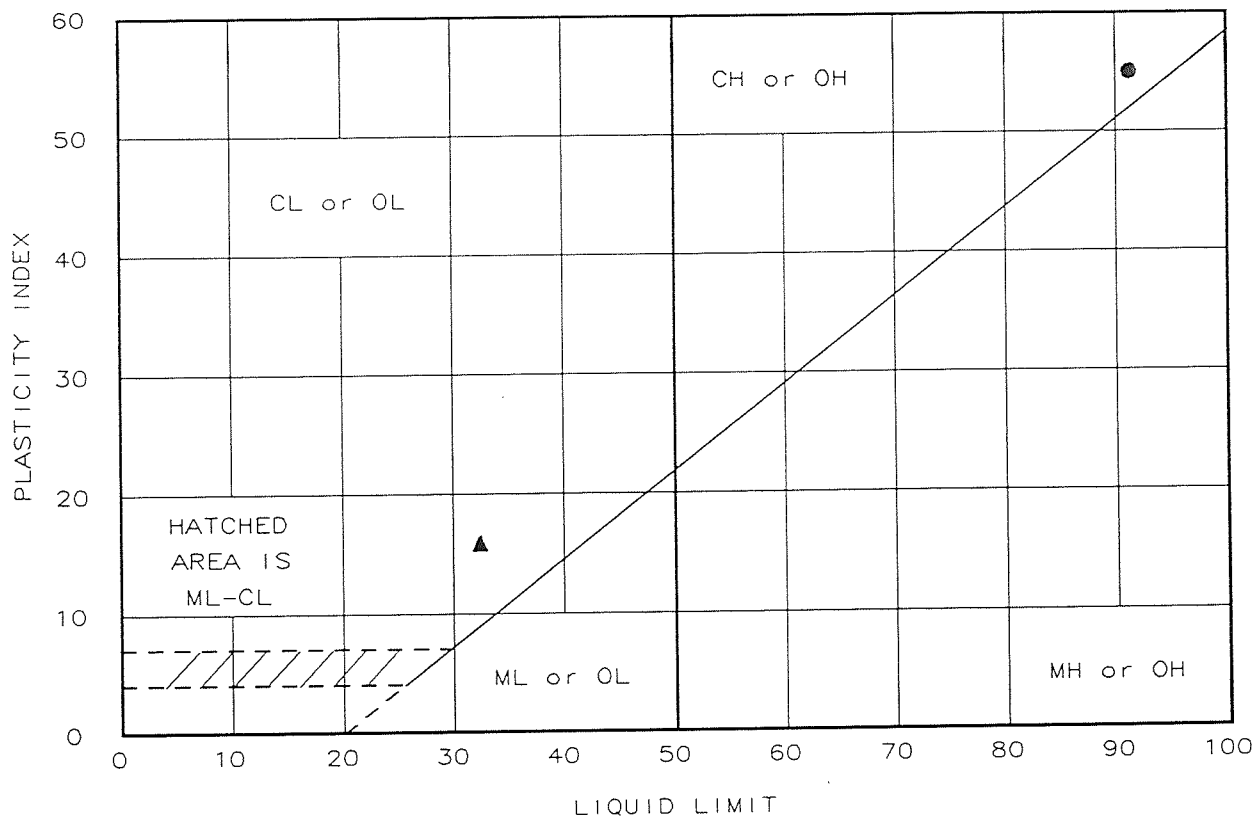
 Date: 8/18/03

Remarks:
 Monitoring wells

LIQUID AND PLASTIC LIMITS TEST REPORT
CENTRAL WISCONSIN ENGINEERS, INC.

Fig. No. 1

LIQUID AND PLASTIC LIMITS TEST REPORT



Location + Description	LL	PL	PI	-200	ASTM D 2487-90
● MW 14Z S-1 48'-50' Brown fat clay w/sand	91.2	36.2	55	95.7	CH, Fat clay
▲ MW 14Z S-2 66' Brown sandy lean clay	32.4	16.5	15.9	69.5	CL, Sandy lean clay

Project No.: 946-02-000
 Project: Vernon County Landfill Balefill
 Client: Vernon County Landfill
 Location:

Date: 8/18/03

LIQUID AND PLASTIC LIMITS TEST REPORT
CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Fig. No. 2

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 5

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-1 MW 1RZ 3'- 6'

Sample Description: Yellowish light brown lean clay

USCS Class: CL

Liquid limit: 34.6

AASHTO Class:

Plasticity index: 15.9

Notes

Remarks: Monitoring wells

Fig. No.: 1

Mechanical Analysis Data

	Initial	After wash
Dry sample and tare=	403.10	80.90
Tare	= 74.30	74.30
Dry sample weight =	328.80	6.60
Minus #200 from wash=	98.0 %	
Sieve tare method		

Sieve	Weight retained	Sieve tare	Percent finer
# 4	0.00	0.00	100.0
# 10	0.10	0.00	100.0
# 40	1.00	0.00	99.7
# 100	3.80	0.00	98.5
# 200	1.90	0.00	97.9

Hydrometer Analysis Data

Separation sieve is number 200

Percent -#200 based on complete sample= 97.9

Weight of hydrometer sample: 50

Calculated biased weight= 51.06

Automatic temperature correction

Composite correction at 20 deg C = -6

Meniscus correction only= 1

Specific gravity of solids= 2.72

Specific gravity correction factor= 0.985

Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.0	22.0	53.0	47.4	0.0130	54.0	7.4	0.0356	91.4
2.0	22.0	46.0	40.4	0.0130	47.0	8.6	0.0270	77.9
3.0	22.0	41.5	35.9	0.0130	42.5	9.3	0.0230	69.3
4.0	22.0	38.5	32.9	0.0130	39.5	9.8	0.0204	63.5
8.0	22.0	31.3	25.7	0.0130	32.3	11.0	0.0153	49.5
16.0	22.0	25.0	19.4	0.0130	26.0	12.0	0.0113	37.4
32.0	22.0	21.0	15.4	0.0130	22.0	12.7	0.0082	29.7
62.0	22.0	18.5	12.9	0.0130	19.5	13.1	0.0060	24.9
122.0	22.0	16.5	10.9	0.0130	17.5	13.4	0.0043	21.0
1101.0	22.0	13.5	7.9	0.0130	14.5	13.9	0.0015	15.3

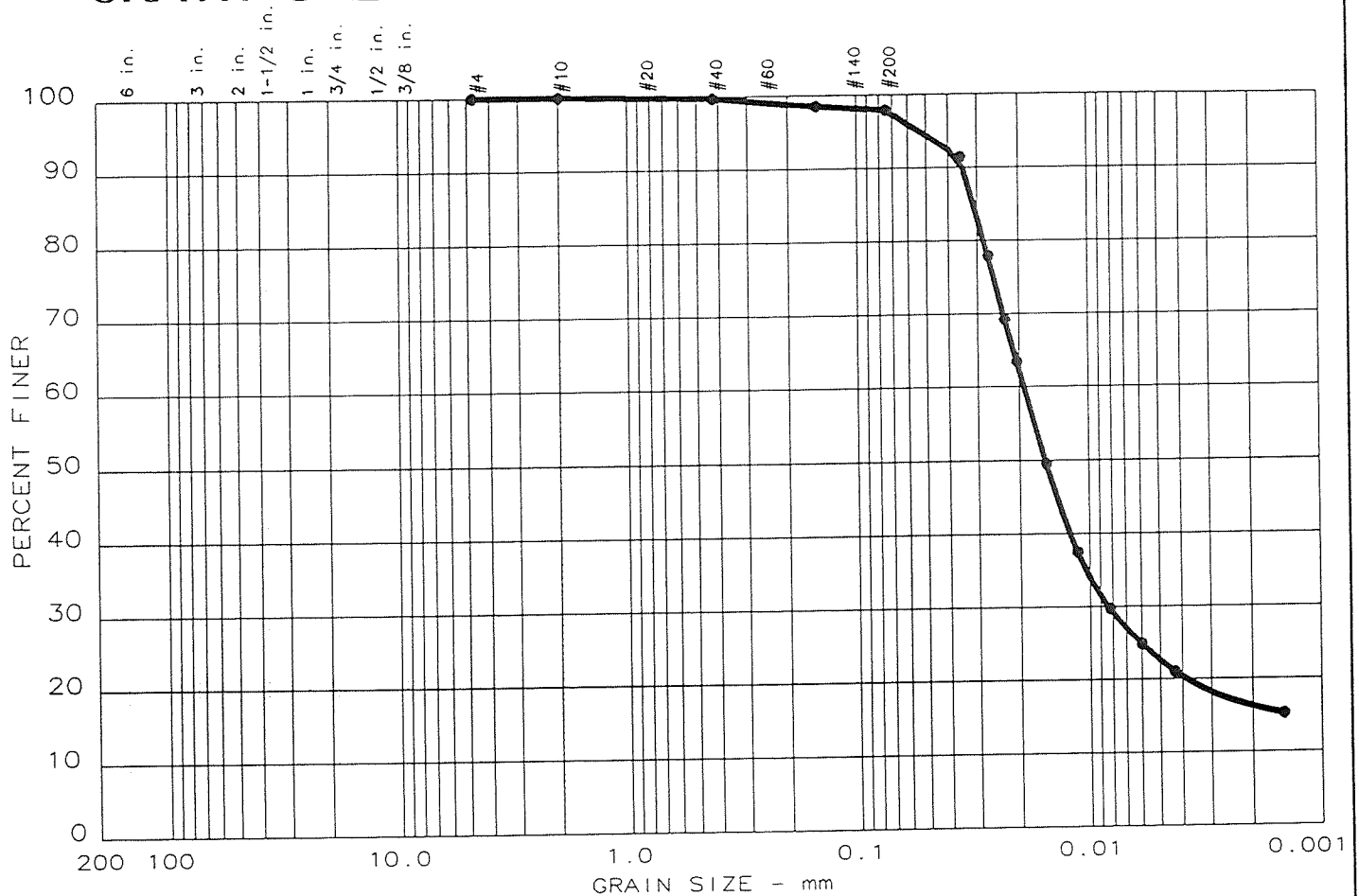
Fractional Components

Gravel/Sand based on #4 sieve
 Sand/Fines based on #200 sieve

+ 3 in. = 0.0 % GRAVEL = 0.0 % SAND = 2.1
 SILT = 75.3 % CLAY = 22.6

W85= 0.03 D60= 0.019 D50= 0.015
 W0= 0.0083

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	2.1	75.3	22.6

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
34.6	15.9			0.0155	0.0083				

MATERIAL DESCRIPTION	USCS	AASHTO
Yellowish light brown lean clay	CL	

Project No.: 946-02-000 Project: Vernon County landfill Balefill Location: S-1 MW 1RZ 3'- 6' Date: 4/23/03	Remarks: Monitoring wells Figure No. 1
GRAIN SIZE DISTRIBUTION TEST REPORT CENTRAL WISCONSIN ENGINEERS, INC.	

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 6

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-2 MW 1RZ 13'-15'

Sample Description: Reddish-yellowish clayey sand

USCS Class: SC

Liquid limit: 24.1

ASHTO Class:

Plasticity index: 13.4

Notes

Remarks: Monitoring wells

Fig. No.: 2

Mechanical Analysis Data

	Initial	After wash
Wet sample and tare=	532.80	387.80
Wet tare	74.00	74.00
Dry sample weight =	458.80	313.80
Percent #200 from wash=	31.6 %	

Wet tare method

Sieve	Weight retained	Sieve tare	Percent finer
0.375 inches	0.00	0.00	100.0
# 4	4.90	0.00	98.9
# 10	1.60	0.00	98.6
# 40	19.50	0.00	94.3
# 100	247.40	10.00	42.6
# 200	40.00	0.00	33.9

Hydrometer Analysis Data

Separation sieve is number 200

Percent -#200 based on complete sample= 33.9

Weight of hydrometer sample: 50

Calculated biased weight= 147.62

Automatic temperature correction

Composite correction at 20 deg C = -6

Meniscus correction only= 1

Specific gravity of solids= 2.68

Specific gravity correction factor= 0.993

Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
2.0	23.0	48.5	43.2	0.0130	49.5	8.2	0.0264	29.0
3.0	23.0	46.0	40.7	0.0130	47.0	8.6	0.0221	27.4
4.0	23.0	44.0	38.7	0.0130	45.0	8.9	0.0195	26.0
8.0	23.0	40.0	34.7	0.0130	41.0	9.6	0.0143	23.3
16.0	23.0	35.5	30.2	0.0130	36.5	10.3	0.0105	20.3
32.0	23.0	31.5	26.2	0.0130	32.5	11.0	0.0076	17.6
62.0	22.0	28.5	22.9	0.0132	29.5	11.5	0.0057	15.4
122.0	22.0	25.0	19.4	0.0132	26.0	12.0	0.0041	13.1
1092.0	22.0	17.5	11.9	0.0132	18.5	13.3	0.0015	8.0

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

% + 3 in. = 0.0 % GRAVEL = 1.1 % SAND = 65.1

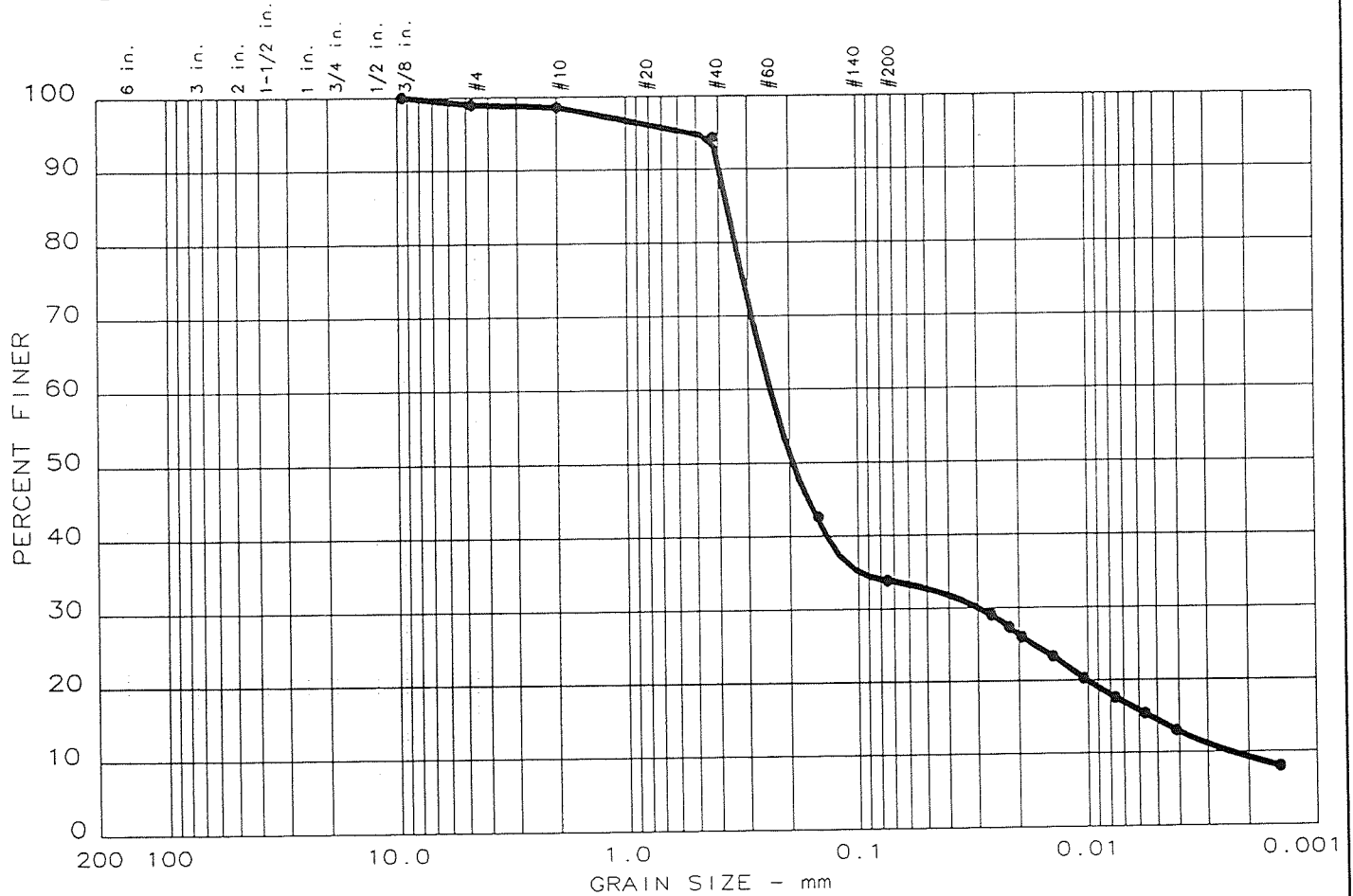
% SILT = 19.4 % CLAY = 14.4

D85= 0.37 D60= 0.240 D50= 0.193

D30= 0.0295 D15= 0.00531 D10= 0.00232

Cu = 1.5668 Cu = 103.5142

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	1.1	65.1	19.4	14.4

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
24.1	13.4	0.367	0.240	0.193	0.0295	0.0053	0.0023	1.57	103.5

MATERIAL DESCRIPTION	USCS	AASHTO
● Reddish-yellowish clayey sand	SC	

Project No.: 946-02-000
 Project: Vernon County landfill Balefill
 ● Location: S-2 MW 1RZ 13'- 15'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 7

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-3 MW 1RZ 15'- 20'

Sample Description: Reddish-yellowish m-f sand w/fines

USCS Class: SM

Liquid limit:

AASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 3

Mechanical Analysis Data

	Initial	After wash
Dry sample and tare=	599.80	481.30
Tare =	74.30	74.30
Dry sample weight =	525.50	407.00
Minus #200 from wash=	22.5 %	

Sieve	Weight retained	Sieve tare	Percent finer
# 10	0.00	0.00	100.0
# 40	34.70	0.00	93.4
# 100	308.60	0.00	34.7
# 200	63.30	0.00	22.6

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

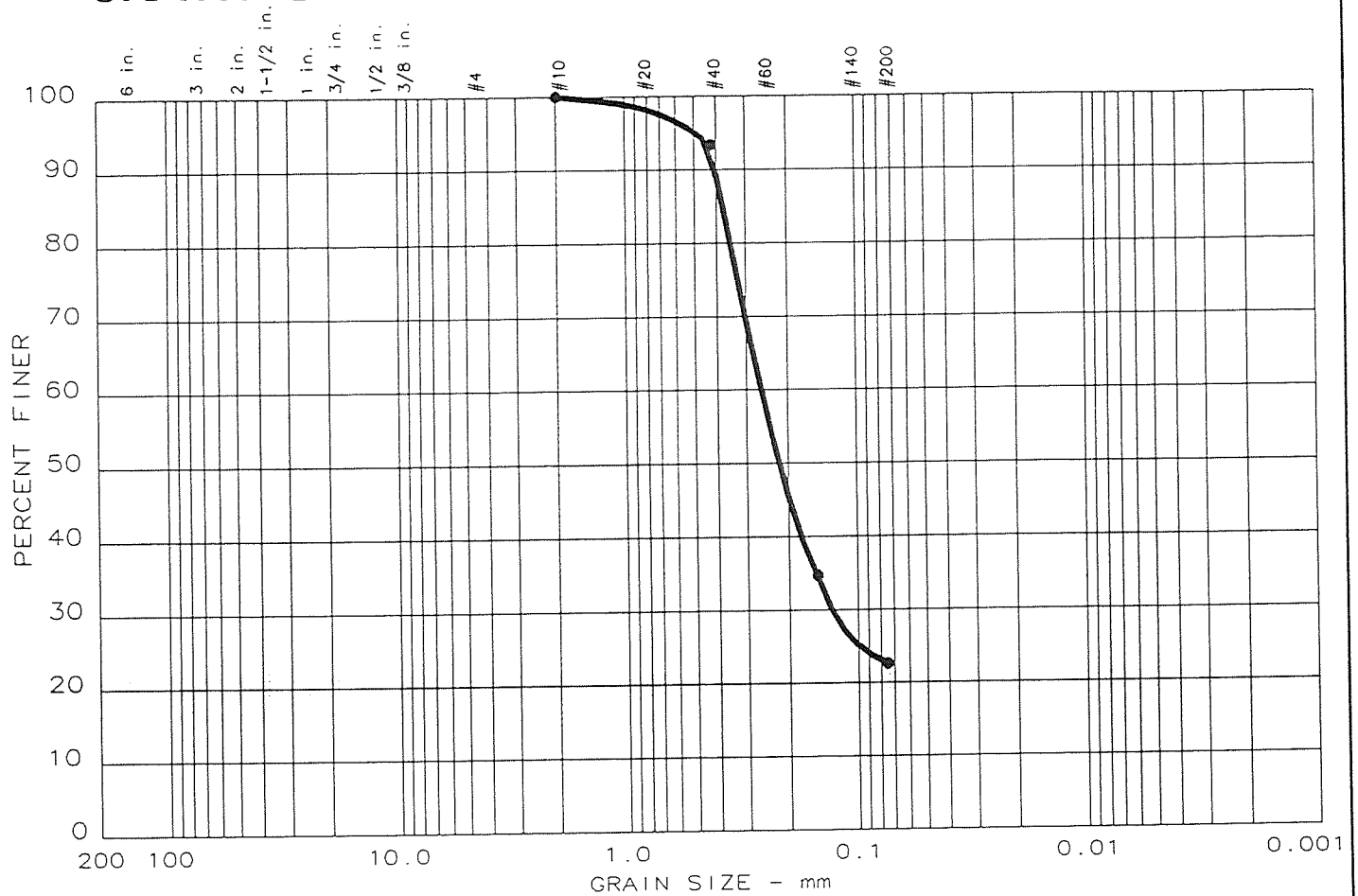
% + 3 in. = 0.0 % GRAVEL = 0.0 % SAND = 77.4

FINES = 22.6

D85= 0.38 D60= 0.259 D50= 0.218

D30= 0.1296

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	77.4	22.6	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.376	0.259	0.218	0.130				

MATERIAL DESCRIPTION	USCS	AASHTO
● Reddish-yellowish m-f sand w/fines	SM	

Project No.: 946-02-000
 Project: Vernon County landfill Bolefill
 ● Location: S-3 MW 1RZ 15'- 20'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 3

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 8

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-4 MW 1RZ 33'- 34'

Sample Description: Reddish-yellowish brown c-f sand w/fines

USCS Class: SM

Liquid limit:

ASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 4

Mechanical Analysis Data

	Initial	After wash	
Wet sample and tare=	509.50	415.90	
Moisture =	74.80	74.80	
Dry sample weight =	434.70	341.10	
Minus #200 from wash=	21.5 %		
Moisture tare method			
Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	0.00	0.00	100.0
0.375 inches	14.70	0.00	96.6
# 4	29.60	0.00	89.8
# 10	25.20	0.00	84.0
# 40	84.50	0.00	64.6
# 100	157.80	0.00	28.3
# 200	28.30	0.00	21.8

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

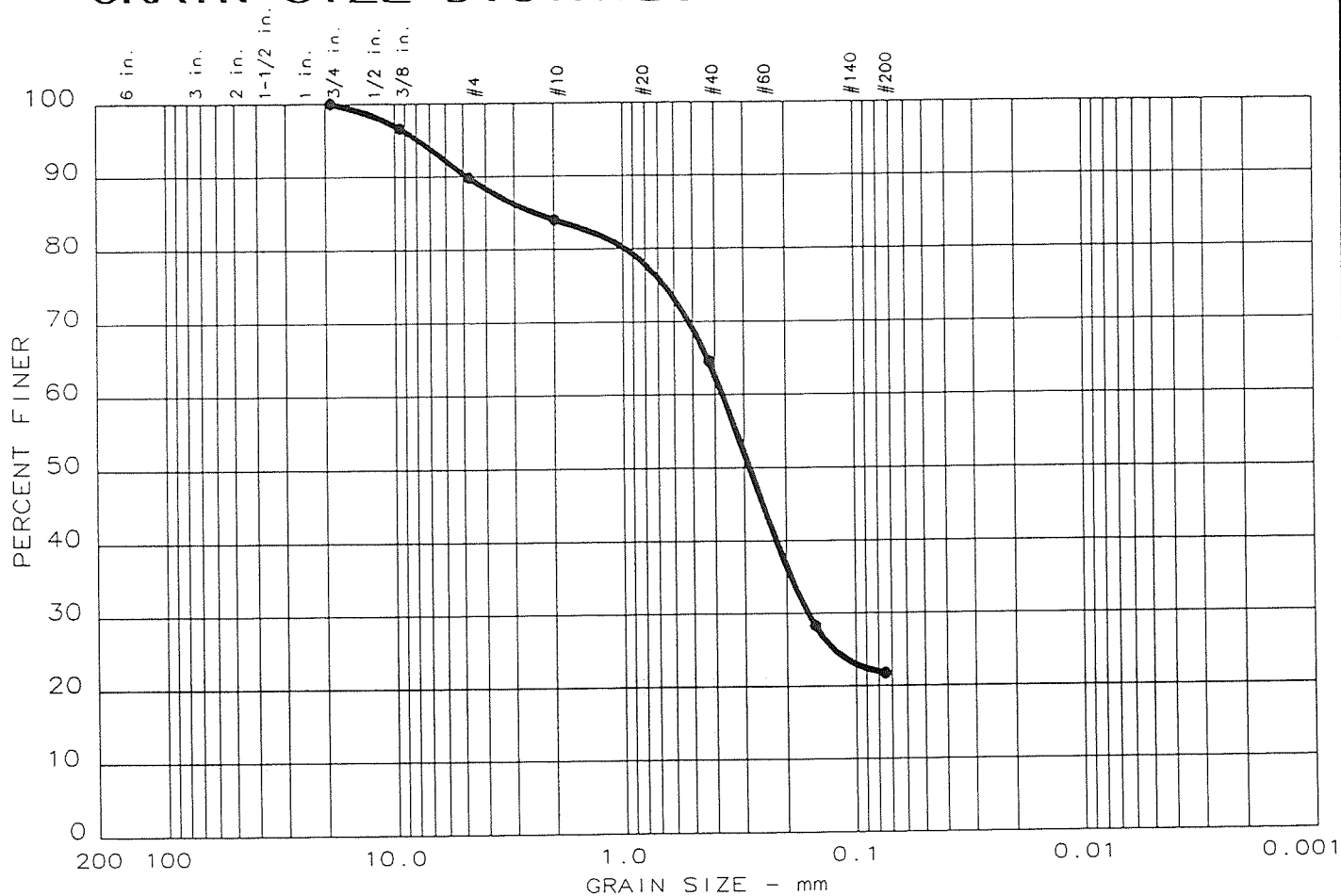
+ 3 in. = 0.0 % GRAVEL = 10.2 % SAND = 68.0

FINES = 21.8

D85= 2.37 D60= 0.371 D50= 0.284

D30= 0.1600

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	10.2	68.0	21.8	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		2.37	0.371	0.284	0.160				

MATERIAL DESCRIPTION	USCS	AASHTO
● Reddish-yellowish brown c-f sand w/fines	SM	

Project No.: 946-02-000
 Project: Vernon County Landfill Bolefill
 ● Location: S-4 MW 1RZ 33'- 34'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 4

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 9

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-5 MW 1RZ 49' - 50'

Sample Description: Yellowish reddish brown clayey sand

USCS Class: SC

Liquid limit:

ASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 5

Mechanical Analysis Data

	Initial	After wash	
Wet sample and tare=	424.60	302.30	
Wet re =	74.80	74.80	
Dry sample weight =	349.80	227.50	
Minus #200 from wash=	35.0 %		
Wet re tare method			
Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	0.00	0.00	100.0
0.375 inches	17.10	0.00	95.1
# 4	7.10	0.00	93.1
# 10	4.80	0.00	91.7
# 40	29.20	0.00	83.4
# 100	150.60	0.00	40.3
# 200	17.70	0.00	35.2

Hydrometer Analysis Data

Preparation sieve is number 200
 Percent -#200 based on complete sample= 35.2
 Height of hydrometer sample: 50
 Calculated biased weight= 141.85
 Automatic temperature correction
 Composite correction at 20 deg C = -6

Viscosity correction only= 1
 Specific gravity of solids= 2.68
 Specific gravity correction factor= 0.993
 Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.0	23.0	44.0	38.7	0.0130	45.0	8.9	0.0389	27.1
2.0	23.0	40.5	35.2	0.0130	41.5	9.5	0.0284	24.6
3.0	23.0	39.0	33.7	0.0130	40.0	9.7	0.0235	23.6
4.0	23.0	38.0	32.7	0.0130	39.0	9.9	0.0205	22.9
8.0	23.0	36.5	31.2	0.0130	37.5	10.1	0.0147	21.8
16.0	23.0	35.0	29.7	0.0130	36.0	10.4	0.0105	20.8
32.0	23.0	33.0	27.7	0.0130	34.0	10.7	0.0075	19.4
62.0	23.0	31.5	26.2	0.0130	32.5	11.0	0.0055	18.3
122.0	22.0	30.0	24.4	0.0132	31.0	11.2	0.0040	17.1
1083.0	22.0	28.0	22.4	0.0132	29.0	11.5	0.0014	15.7

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

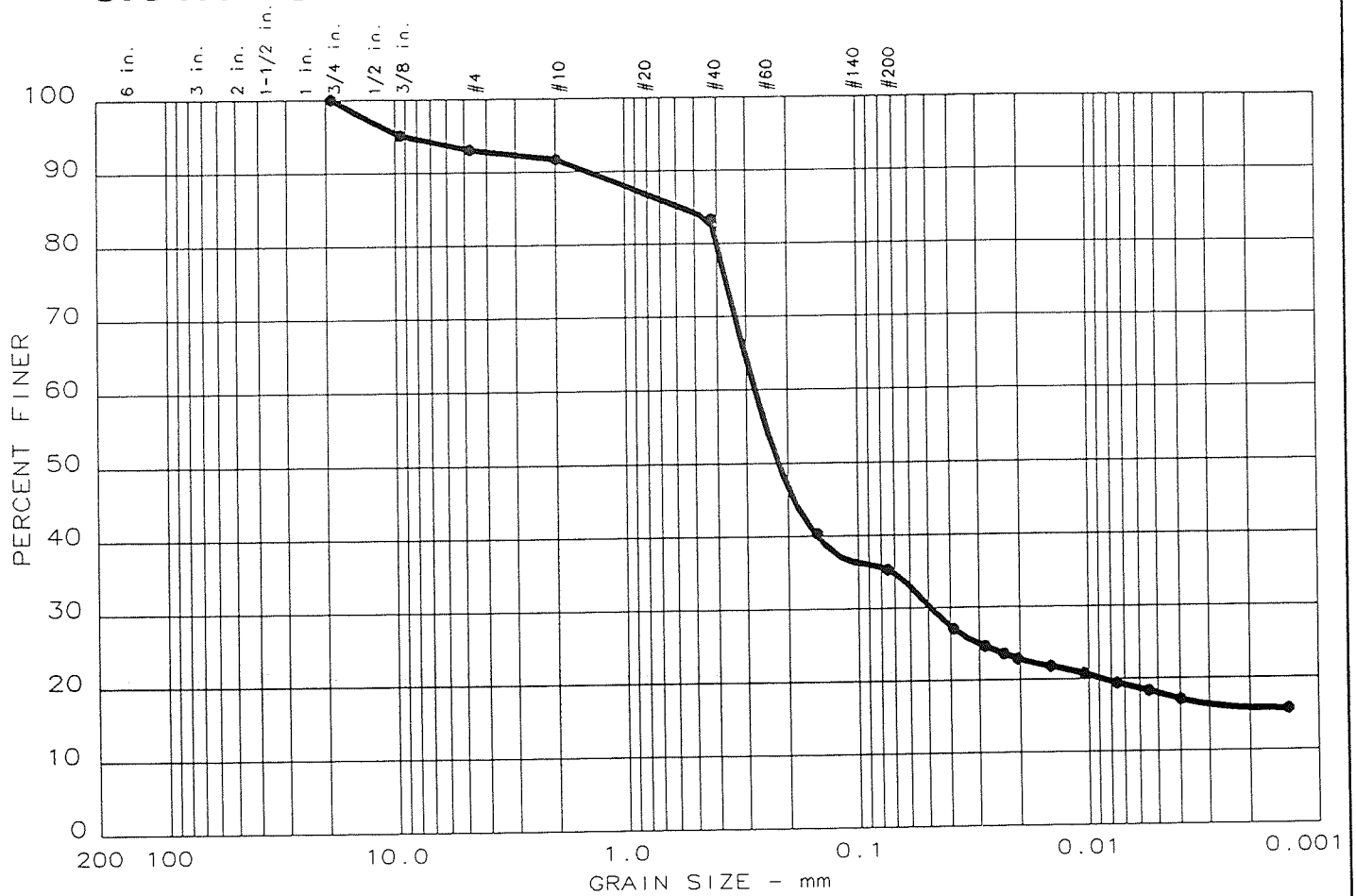
+ 3 in. = 0.0 % GRAVEL = 6.9 % SAND = 57.8

SILT = 17.3 % CLAY = 18.0

D₈₅= 0.56 D₆₀= 0.275 D₅₀= 0.218

D₃₀= 0.0483

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	6.9	57.8	17.3	18.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.562	0.275	0.218	0.0483				

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellowish reddish brown clayey sand	SC	

Project No.: 946-02-000
 Project: Vernon County landfill Bolefill
 ● Location: S-5 MW 1RZ 49'- 50'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 5

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 10

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-6 MW 1RZ 58' - 60'

Sample Description: Yellowish brown clayey-sandy gravel

USCS Class: GM

Liquid limit:

AASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 6

Mechanical Analysis Data

	Initial	After wash	
Wet sample and tare=	480.90	400.70	
Tare =	74.20	74.20	
Dry sample weight =	406.70	326.50	
Minus #200 from wash=	19.7 %		
Wet tare method			
Sieve	Weight retained	Sieve tare	Percent finer
1.5 inches	0.00	0.00	100.0
1 inches	96.90	0.00	76.2
0.75 inches	8.10	0.00	74.2
0.375 inches	43.10	0.00	63.6
# 4	53.50	0.00	50.4
# 10	46.60	0.00	39.0
# 40	48.20	0.00	27.1
# 100	21.00	0.00	22.0
# 200	9.20	0.00	19.7

Hydrometer Analysis Data

Separation sieve is number 200

Percent -#200 based on complete sample= 19.7

Weight of hydrometer sample: 50

Calculated biased weight= 253.87

Automatic temperature correction

Composite correction at 20 deg C = -6

Meniscus correction only= 1

Specific gravity of solids= 2.68

Specific gravity correction factor= 0.993
Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

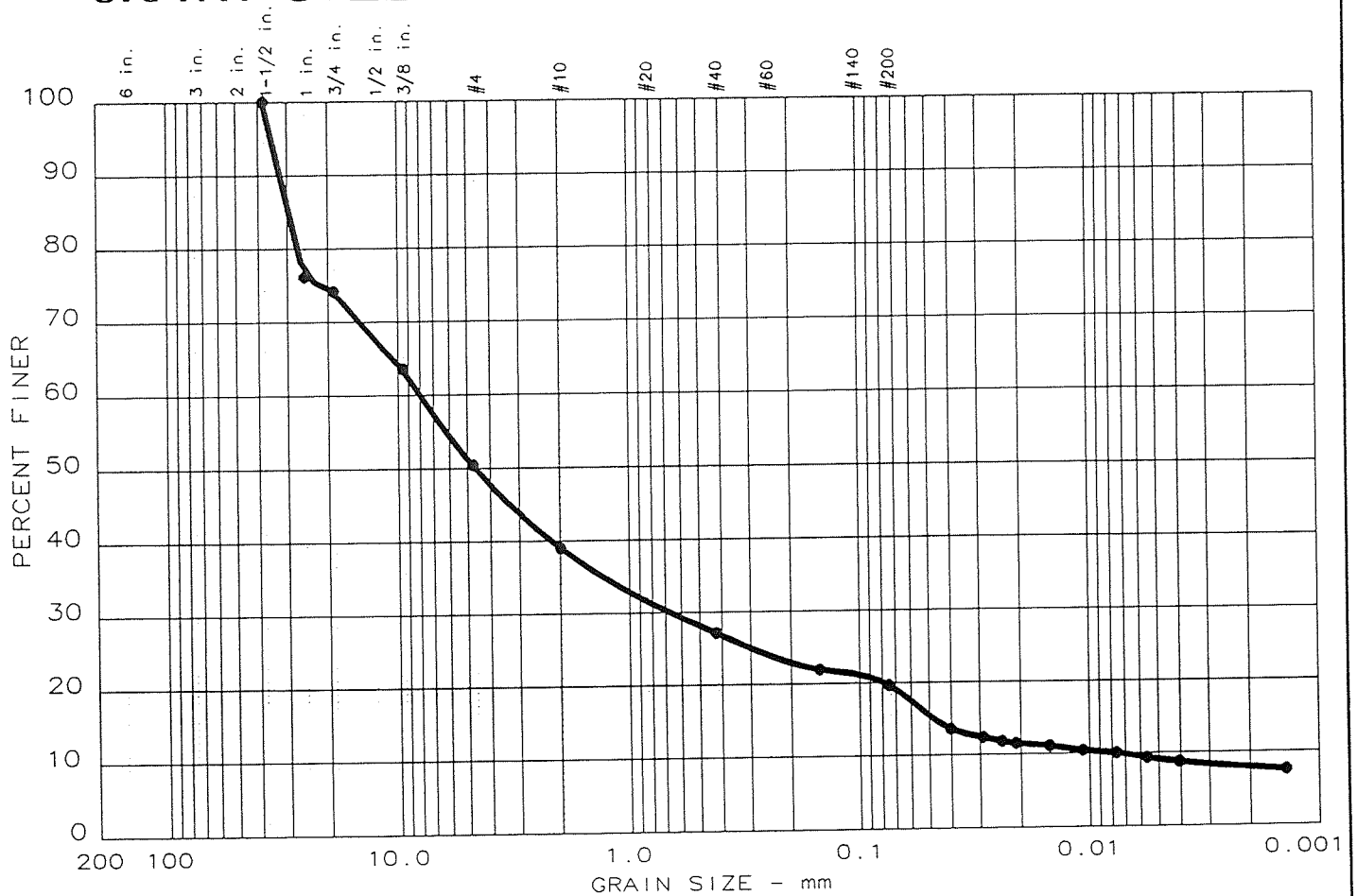
Elapsed time, min	Temp, Actual deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.0	23.0	40.0	34.7	0.0130	41.0	9.6	0.0403	13.6
2.0	23.0	37.0	31.7	0.0130	38.0	10.1	0.0292	12.4
3.0	23.0	35.5	30.2	0.0130	36.5	10.3	0.0242	11.8
4.0	23.0	34.8	29.4	0.0130	35.8	10.4	0.0211	11.5
8.0	23.0	33.8	28.4	0.0130	34.8	10.6	0.0150	11.1
16.0	23.0	32.0	26.7	0.0130	33.0	10.9	0.0108	10.4
32.0	23.0	31.0	25.7	0.0130	32.0	11.0	0.0077	10.0
62.0	22.0	29.5	23.9	0.0132	30.5	11.3	0.0056	9.4
122.0	22.0	28.0	22.4	0.0132	29.0	11.5	0.0041	8.8
1074.0	22.0	25.0	19.4	0.0132	26.0	12.0	0.0014	7.6

Fractional Components

Gravel/Sand based on #4 sieve
Sand/Fines based on #200 sieve
+ 3 in. = 0.0 % GRAVEL = 49.6 % SAND = 30.7
SILT = 10.6 % CLAY = 9.1

P85= 29.51 D60= 7.943 D50= 4.624
P30= 0.6607 D15= 0.04732 D10= 0.00741
Cu = 7.4131 Cu = 1071.5193

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	49.6	30.7	10.6	9.1

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		29.5	7.94	4.62	0.661	0.0473	0.0074	7.41	1071.5

MATERIAL DESCRIPTION	USCS	AASHTO
● Yellowish brown clayey-sandy gravel	GM	

Project No.: 946-02-000
 Project: Vernon County landfill Balefill
 ● Location: S-6 MW 1RZ 58'- 60'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 6

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 11

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-7 MW 1RZ 71'- 73'

Sample Description: Brown fat clay with sand

USCS Class: CH

Liquid limit:

AASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 7

Mechanical Analysis Data

	Initial	After wash
Wet sample and tare=	398.40	203.90
Tare =	75.60	75.60
Dry sample weight =	322.80	128.30
Percent #200 from wash=	60.3 %	

Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	0.00	0.00	100.0
0.375 inches	13.60	0.00	95.8
# 4	29.50	0.00	86.6
# 10	23.80	0.00	79.3
# 40	20.50	0.00	72.9
# 100	34.20	0.00	62.3
# 200	6.40	0.00	60.3

Hydrometer Analysis Data

Separation sieve is number 200

Percent -#200 based on complete sample= 60.3

Weight of hydrometer sample: 50

Calculated biased weight= 82.85

Automatic temperature correction

Composite correction at 20 deg C = -6

Meniscus correction only= 1

Specific gravity of solids= 2.71

Specific gravity correction factor= 0.987

Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.0	23.0	53.0	47.7	0.0129	54.0	7.4	0.0352	56.8
2.0	23.0	49.0	43.7	0.0129	50.0	8.1	0.0260	52.0
3.0	23.0	47.0	41.7	0.0129	48.0	8.4	0.0216	49.6
4.0	23.0	45.5	40.2	0.0129	46.5	8.7	0.0190	47.8
8.0	23.0	42.0	36.7	0.0129	43.0	9.2	0.0139	43.7
16.0	23.0	38.0	32.7	0.0129	39.0	9.9	0.0102	38.9
32.0	23.0	34.0	28.7	0.0129	35.0	10.6	0.0074	34.1
62.0	22.0	30.0	24.4	0.0131	31.0	11.2	0.0056	29.1
122.0	22.0	26.5	20.9	0.0131	27.5	11.8	0.0041	24.9
1065.0	22.0	19.5	13.9	0.0131	20.5	12.9	0.0014	16.6

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

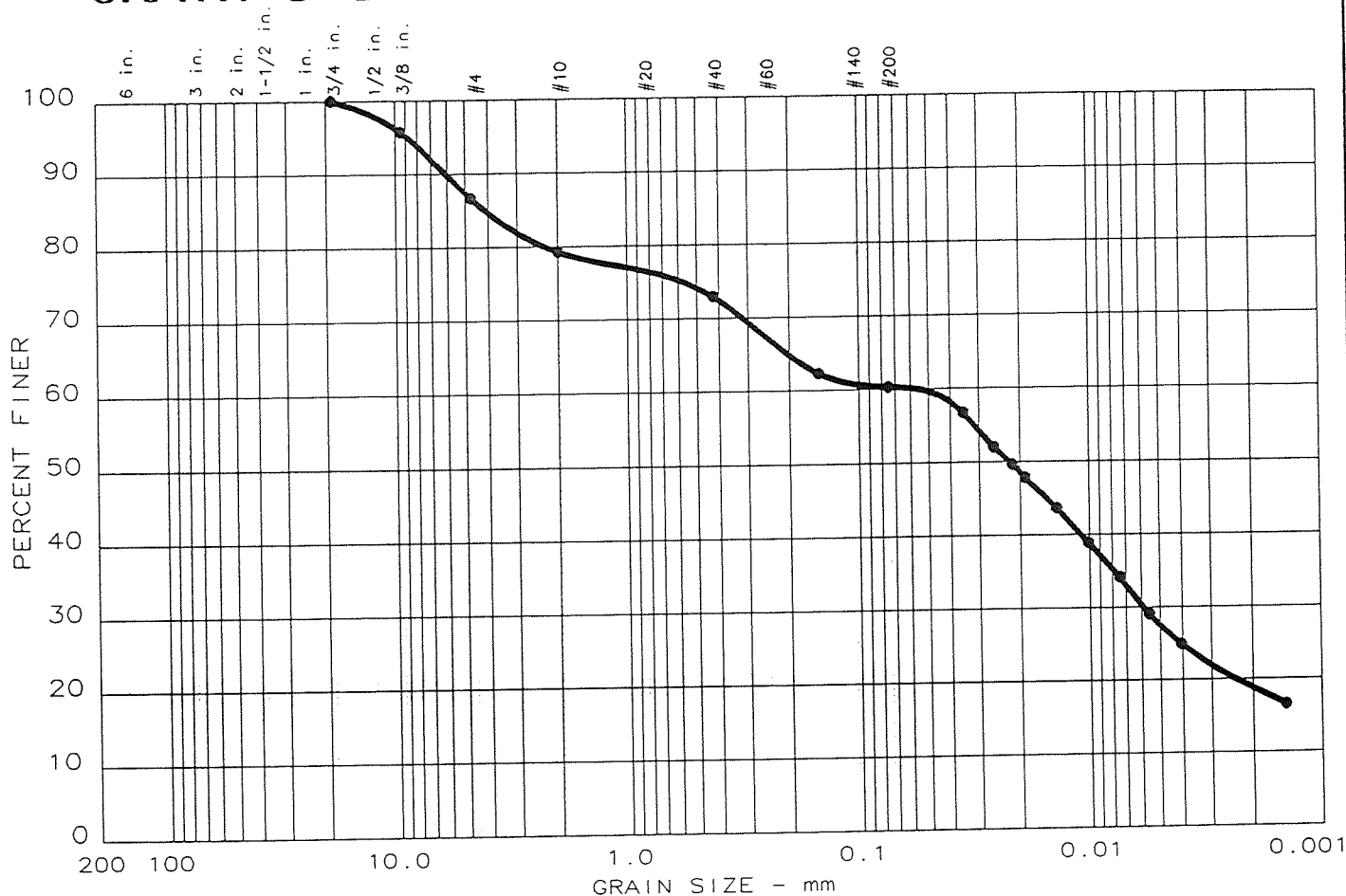
+ 3 in. = 0.0 % GRAVEL = 13.4 % SAND = 26.3

SILT = 32.9 % CLAY = 27.4

D₁₅ = 4.12 D₆₀ = 0.053 D₅₀ = 0.022

D₁₀ = 0.0058

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	13.4	26.3	32.9	27.4

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		4.12		0.0221	0.0058				

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown fat clay with sand	CH	

Project No.: 946-02-000
 Project: Vernon County landfill Bolefill
 ● Location: S-7 MW 1RZ 71'- 73'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 7

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 12

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-8 MW 1RZ 76'- 78'

Sample Description: Light brown c-f silty sand

USCS Class: SM

Liquid limit:

ASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 8

Mechanical Analysis Data

	Initial	After wash	
Wet sample and tare=	565.40	341.20	
Tare =	74.80	74.80	
Dry sample weight =	490.60	266.40	
Minus #200 from wash=	45.7 %		
Leve tare method			
Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	0.00	0.00	100.0
0.375 inches	10.50	0.00	97.9
# 4	0.60	0.00	97.7
# 10	3.90	0.00	96.9
# 40	13.20	0.00	94.3
# 100	138.40	0.00	66.0
# 200	96.70	0.00	46.3

Fractional Components

Gravel/Sand based on #4 sieve

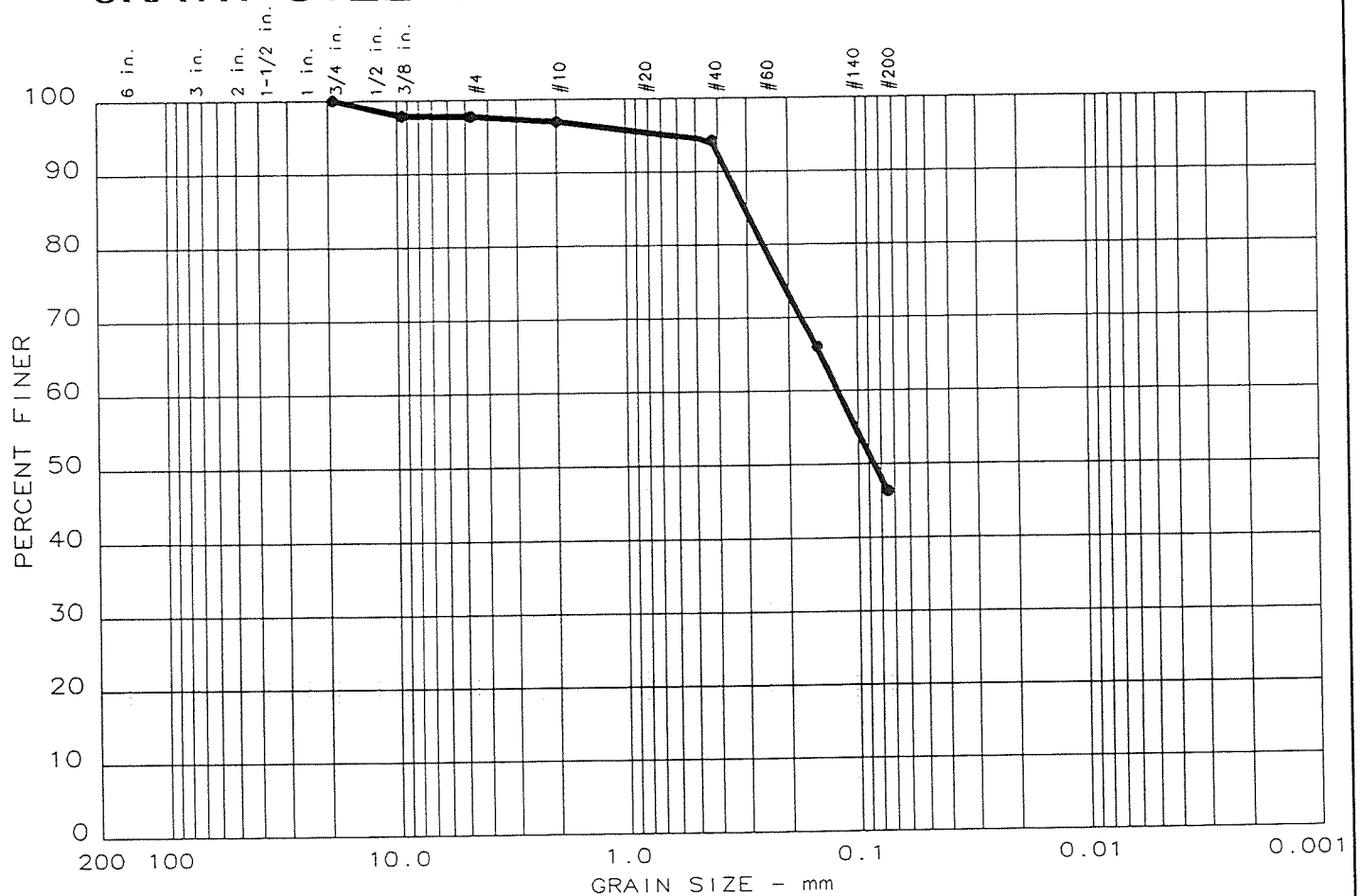
Sand/Fines based on #200 sieve

+ 3 in. = 0.0 % GRAVEL = 2.3 % SAND = 51.4

FINES = 46.3

D85= 0.31 D60= 0.122 D50= 0.085

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.3	51.4	46.3	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.305	0.122	0.0851					

MATERIAL DESCRIPTION	USCS	AASHTO
● Light brown c-f silty sand	SM	

Project No.: 946-02-000
 Project: Vernon County landfill Balefill
 ● Location: S-8 MW 1RZ 76'-78'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 8

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 13

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-9 MW 1RZ 86'- 88'

Sample Description: Grayish brown c-f sand with fines

JSCS Class: SP-SM

Liquid limit:

ASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 9

Mechanical Analysis Data

	Initial	After wash
Wet sample and tare=	518.50	469.90
Tare	= 74.20	74.20
Dry sample weight =	444.30	395.70
Loss #200 from wash=	10.9 %	

Leve tare method

Sieve	Weight retained	Sieve tare	Percent finer
0.375 inches	0.00	0.00	100.0
# 4	3.90	0.00	99.1
# 10	3.10	0.00	98.4
# 40	19.40	0.00	94.1
# 100	318.60	0.00	22.3
# 200	49.20	0.00	11.3

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

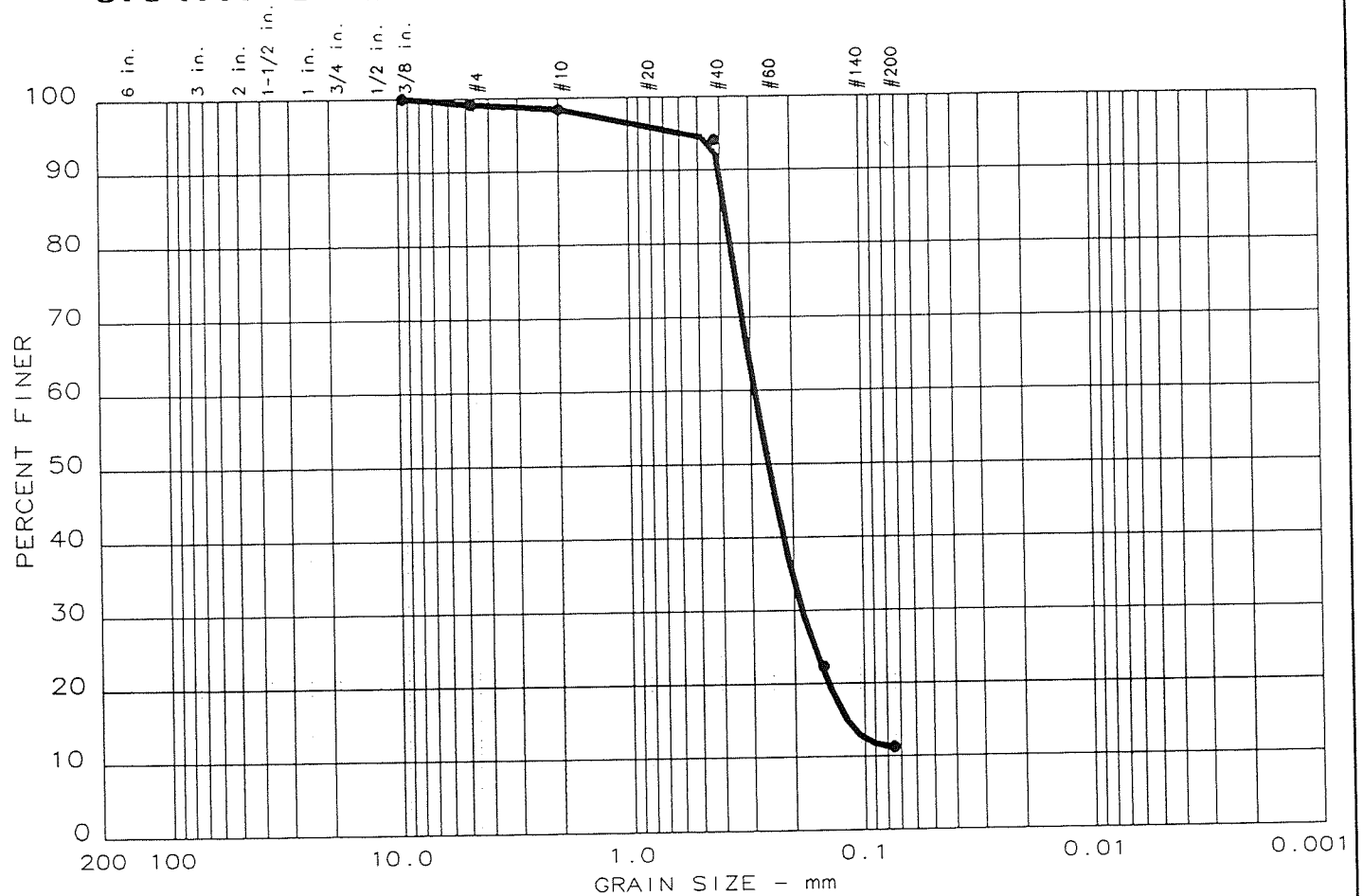
Gravel + 3 in. = 0.0 % GRAVEL = 0.9 % SAND = 87.8

% FINES = 11.3

D15= 0.38 D60= 0.288 D50= 0.253

D30= 0.1834 D15= 0.11844

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.9	87.8	11.3	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.384	0.288	0.253	0.183	0.118			

MATERIAL DESCRIPTION	USCS	AASHTO
● Grayish brown c-f sand with fines	SP-SM	

Project No.: 946-02-000
 Project: Vernon County landfill Bafefill
 ● Location: S-9 MW 1RZ 86'- 88'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 9

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 14

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-10 MW 1RZ 88'- 90'

Sample Description: Light brown sandy gravel w/fines

USCS Class: GP-GM

Liquid limit:

ASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 10

Mechanical Analysis Data

	Initial	After wash
Dry sample and tare=	1305.00	1230.00
Tare =	14.10	74.40
Dry sample weight =	1290.90	1155.60
Minus #200 from wash=	10.5 %	
Sieve tare method		

Sieve	Weight retained	Sieve tare	Percent finer
2 inches	0.00	0.00	100.0
1.5 inches	113.30	0.00	91.2
1 inches	415.30	0.00	59.1
0.75 inches	167.70	0.00	46.1
0.375 inches	106.10	0.00	37.8
# 4	72.00	0.00	32.3
# 10	37.00	0.00	29.4
# 40	20.20	0.00	27.8
# 100	134.60	0.00	17.4
# 200	79.70	0.00	11.2

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

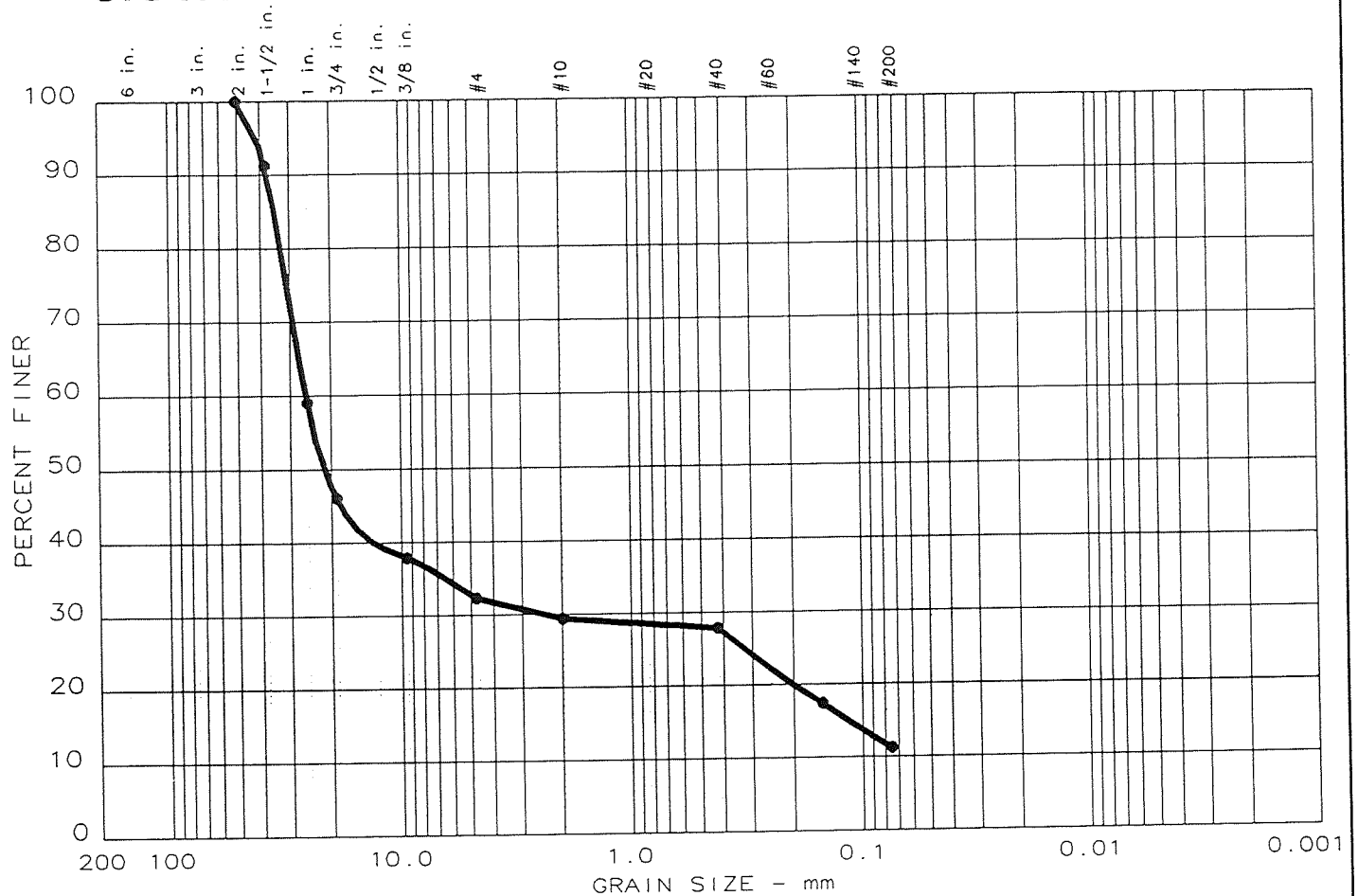
Gravel + 3 in. = 0.0 % GRAVEL = 67.7 % SAND = 21.0

FINES = 11.3

D85= 34.67 D60= 25.704 D50= 21.380

D30= 2.3714 D15= 0.11614

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	67.7	21.0	11.3	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		34.7	25.7	21.4	2.37	0.116			

MATERIAL DESCRIPTION		USCS	AASHTO
● Light brown sandy gravel w/fines		GP-GM	
Project No.: 946-02-000 Project: Vernon County landfill Bolefill ● Location: S-10 MW 1RZ 88'- 90' Date: 4/23/03		Remarks: Monitoring wells	
GRAIN SIZE DISTRIBUTION TEST REPORT CENTRAL WISCONSIN ENGINEERS, INC.		Figure No. 10	

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 15

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-1 MW 14Z 48'- 50'

Sample Description: Brown fat clay

USCS Class: CH

Liquid limit:

ASTM Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 11

Mechanical Analysis Data

	Initial	After wash
Wet sample and tare=	375.10	87.50
Tare =	74.60	74.60
Dry sample weight =	300.50	12.90
Percent #200 from wash=	95.7 %	

Leve tare method

Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	0.00	0.00	100.0
0.375 inches	1.60	0.00	99.5
# 4	1.00	0.00	99.1
# 10	1.00	0.00	98.8
# 40	3.00	0.00	97.8
# 100	2.00	0.00	97.1
# 200	4.30	0.00	95.7

Hydrometer Analysis Data

Preparation sieve is number 200

Percent -#200 based on complete sample= 95.7

Weight of hydrometer sample: 50

Calculated biased weight= 52.24

Automatic temperature correction

Composite correction at 20 deg C = -6

Meniscus correction only= 1

Specific gravity of solids= 2.72

Specific gravity correction factor= 0.985

Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.0	22.0	54.0	48.4	0.0130	55.0	7.3	0.0352	91.2
2.0	22.0	51.0	45.4	0.0130	52.0	7.8	0.0257	85.6
3.0	22.0	50.0	44.4	0.0130	51.0	7.9	0.0212	83.7
4.0	22.0	49.5	43.9	0.0130	50.5	8.0	0.0185	82.8
8.0	22.0	47.5	41.9	0.0130	48.5	8.3	0.0133	79.0
16.0	22.0	44.0	38.4	0.0130	45.0	8.9	0.0097	72.4
32.0	22.0	40.0	34.4	0.0130	41.0	9.6	0.0071	64.9
62.0	22.0	36.0	30.4	0.0130	37.0	10.2	0.0053	57.3
122.0	22.0	32.5	26.9	0.0130	33.5	10.8	0.0039	50.7
1056.0	22.0	23.0	17.4	0.0130	24.0	12.4	0.0014	32.8

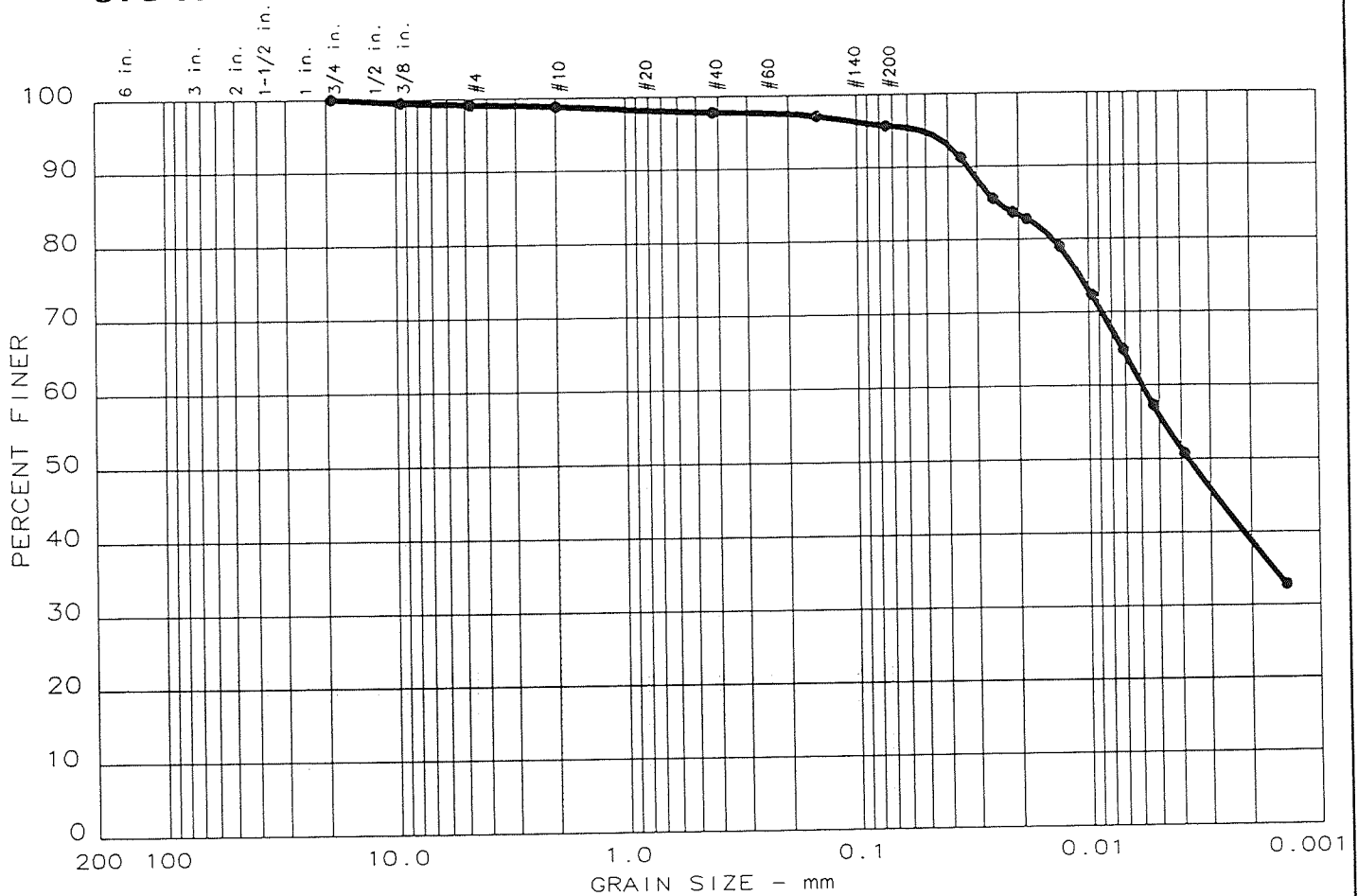
Fractional Components

Gravel/Sand based on #4 sieve
 Sand/Fines based on #200 sieve

+ 3 in. = 0.0 % GRAVEL = 0.9 % SAND = 3.4
 SILT = 39.7 % CLAY = 56.0

D₁₅ = 0.02 D₆₀ = 0.006 D₅₀ = 0.004

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.9	3.4	39.7	56.0

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
				0.0037					

MATERIAL DESCRIPTION	USCS	AASHTO
● Brown fat clay	CH	

Project No.: 946-02-000
 Project: Vernon County landfill Bolefill
 ● Location: S-1 MW 14Z 48'- 50'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 11

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 16

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-2 MW 14Z 66'

Sample Description: Brown sandy silty lean clay

USCS Class: CL

Liquid limit:

AASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 12

Mechanical Analysis Data

	Initial	After wash
Wet sample and tare=	492.90	203.90
Tare =	75.30	75.30
Dry sample weight =	417.60	128.60
Minus #200 from wash=	69.2 %	

Leave tare method

Sieve	Weight retained	Sieve tare	Percent finer
0.375 inches	0.00	0.00	100.0
# 4	2.40	0.00	99.4
# 10	6.70	0.00	97.8
# 40	22.00	0.00	92.6
# 100	59.10	0.00	78.4
# 200	37.20	0.00	69.5

Hydrometer Analysis Data

Separation sieve is number 200

Percent -#200 based on complete sample= 69.5

Weight of hydrometer sample: 50

Calculated biased weight= 71.95

Automatic temperature correction

Composite correction at 20 deg C = -6

Meniscus correction only= 1

Specific gravity of solids= 2.68

Specific gravity correction factor= 0.993

Hydrometer type: 152H Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.0	23.0	50.0	44.7	0.0130	51.0	7.9	0.0367	61.7
2.0	23.0	44.5	39.2	0.0130	45.5	8.8	0.0274	54.1
3.0	23.0	41.0	35.7	0.0130	42.0	9.4	0.0231	49.2
4.0	23.0	39.0	33.7	0.0130	40.0	9.7	0.0203	46.5
8.0	23.0	34.0	28.7	0.0130	35.0	10.6	0.0150	39.6
16.0	23.0	29.5	24.2	0.0130	30.5	11.3	0.0110	33.4
32.0	23.0	25.5	20.2	0.0130	26.5	11.9	0.0080	27.8
62.0	22.0	22.5	16.9	0.0132	23.5	12.4	0.0059	23.3
122.0	22.0	20.0	14.4	0.0132	21.0	12.9	0.0043	19.9
1047.0	22.0	14.0	8.4	0.0132	15.0	13.8	0.0015	11.6

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

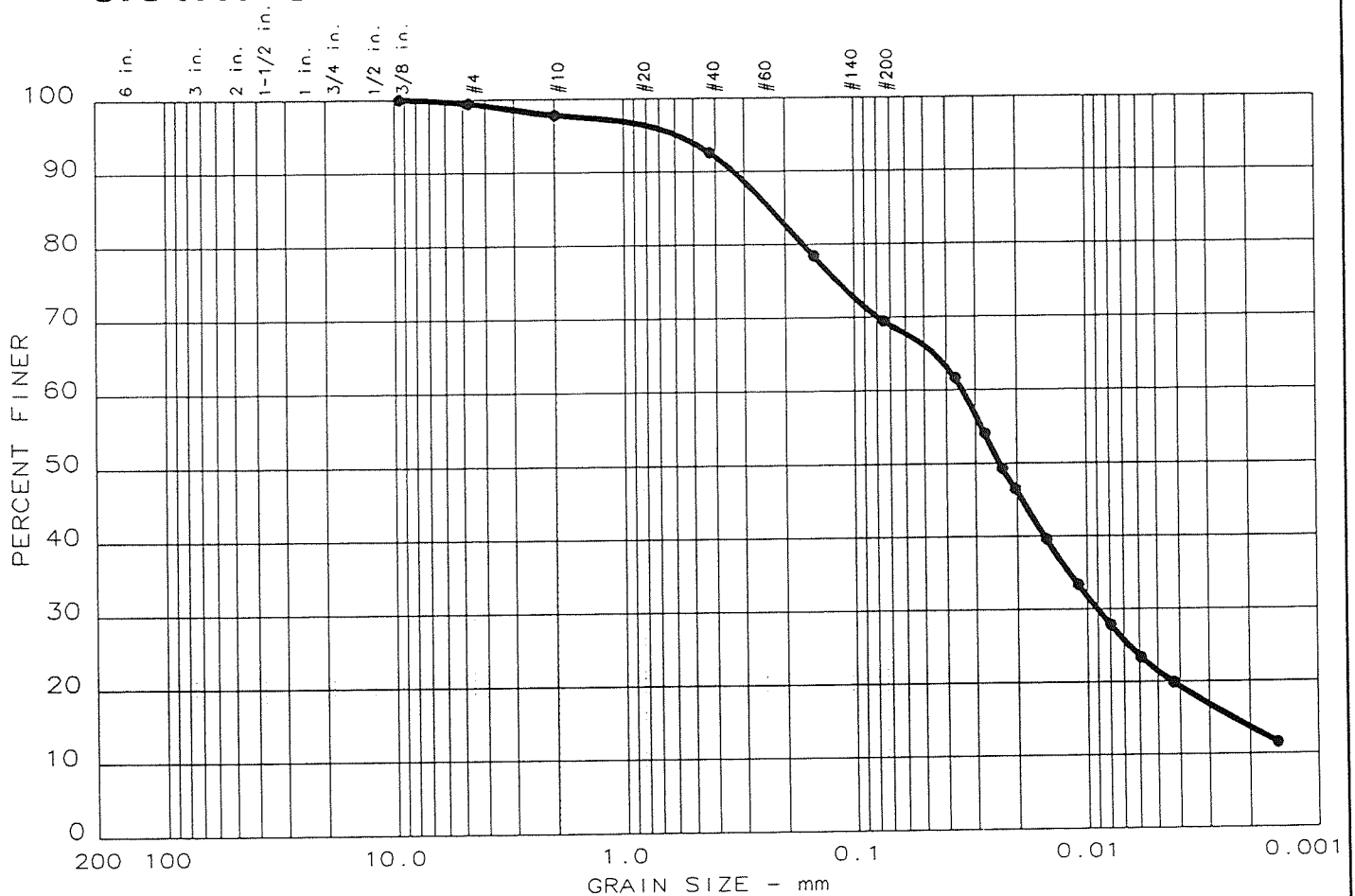
+ 3 in. = 0.0 % GRAVEL = 0.6 % SAND = 29.9

SILT = 48.1 % CLAY = 21.4

D35= 0.23 D60= 0.034 D50= 0.024

D30= 0.0090 D15= 0.00237

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.6	29.9	48.1	21.4

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.232		0.0237	0.0090	0.0024			

MATERIAL DESCRIPTION	USCS	AASHTO
• Brown sandy silty lean clay	CL	

Project No.: 946-02-000
 Project: Vernon County Landfill Bolefill
 • Location: S-2 MW 14Z 66'

Date: 4/23/03

GRAIN SIZE DISTRIBUTION TEST REPORT
 CENTRAL WISCONSIN ENGINEERS, INC.

Remarks:
 Monitoring wells

Figure No. 12

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 17

Date: 4/23/03

Project No.: 946-02-000

Project: Vernon County landfill Balefill

Sample Data

Location of Sample: S-3 MW 14Z 76'- 78'

Sample Description: Brown c-f sand w/fines & gravel

USCS Class: SM

Liquid limit:

AASHTO Class:

Plasticity index:

Notes

Remarks: Monitoring wells

Fig. No.: 13

Mechanical Analysis Data

	Initial	After wash	
Wet sample and tare=	576.90	475.70	
Tare =	74.30	74.30	
Dry sample weight =	502.60	401.40	
Minus #200 from wash=	20.1 %		
Sieve tare method			
Sieve	Weight retained	Sieve tare	Percent finer
0.75 inches	0.00	0.00	100.0
0.375 inches	49.50	0.00	90.2
# 4	13.40	0.00	87.5
# 10	11.50	0.00	85.2
# 40	19.90	0.00	81.2
# 100	203.90	0.00	40.7
# 200	100.20	0.00	20.7

Fractional Components

Gravel/Sand based on #4 sieve

Sand/Fines based on #200 sieve

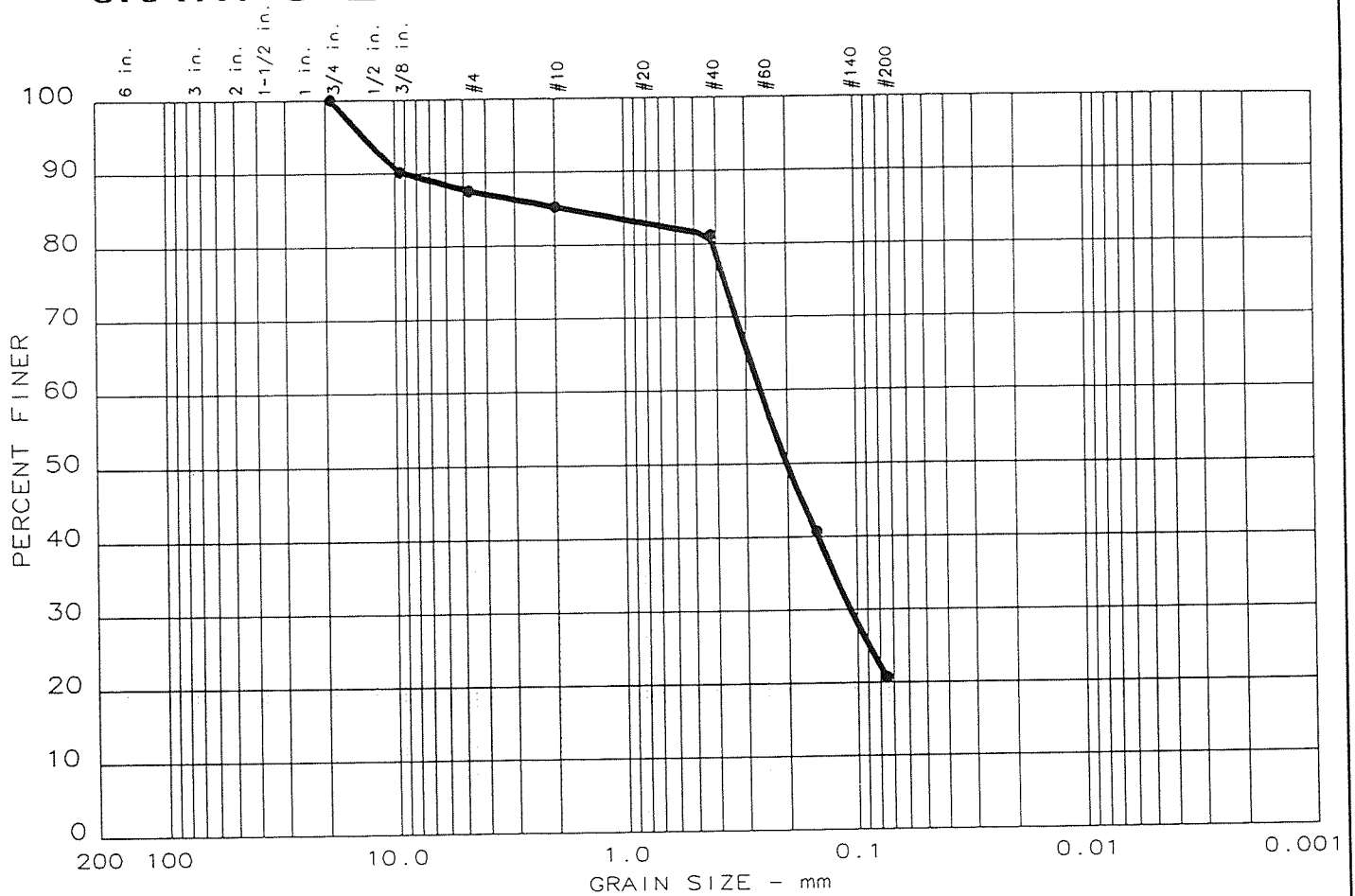
Gravel + 3 in. = 0.0 % GRAVEL = 12.5 % SAND = 66.8

FINES = 20.7

D85= 1.78 D60= 0.260 D50= 0.201

D30= 0.1069

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	12.5	66.8	20.7	

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		1.78	0.260	0.201	0.107				

MATERIAL DESCRIPTION	USCS	AASHTO
• Brown c-f sand w/fines & gravel	SM	

Project No.: 946-02-000 Project: Vernon County landfill Bolefill • Location: S-3 MW 14Z 76'- 78' Date: 4/23/03	Remarks: Monitoring wells
GRAIN SIZE DISTRIBUTION TEST REPORT CENTRAL WISCONSIN ENGINEERS, INC.	
Figure No. 13	

FINAL TEST INFORMATION

 PROJECT: Vernon County Proposed Landfill JOB NO. 57786 DATE June 3, 1988

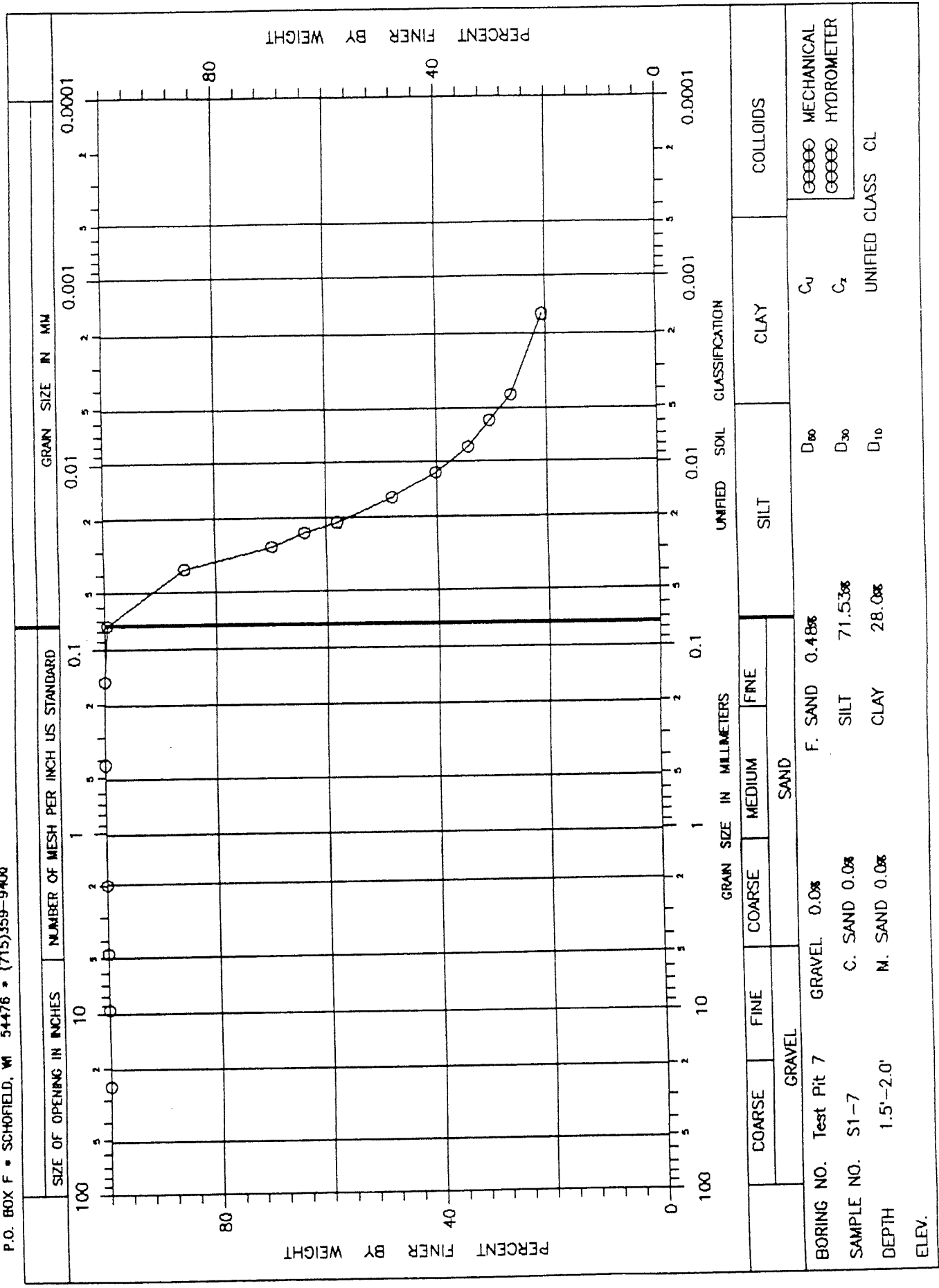
Boring No.	Sample No.	Depth	Field Class	GRADATION - % PASSING							LL	P1	USCS.	Wn %	e	Yd P.C.F.	GS	k ⁻ (CM/S)
				005	02	200	100	40	#10	#4	3/8"	3/4"						
TB-1		5' - 9.5'		20.0	55.0	96.9	98.2	99.7	100	-	-	-	31.5	8.6				2.44 x 10 ⁻⁷
TB-1		9.5' - 10.5'		42	68								51.8	35.2				
TB-1		10.5' - 12'				44.6	54.37	91.4	99.97	100	-	-						
TB-1		12' - 13'				49.4	53.5	93.7	100	-	-	-						
TB-3		1.5' - 6.0'		42	67								47.1	27.9				2.34 x 10 ⁻⁸
TB-3		8.5' - 13.0'		52	72	58.7	66.5	85.7	93.0	96.0	100	-	48.5	29.77				
TB-4		2' - 4'		50	68								53.4	33.8				
TB-4		7' - 8'				18.8	23.8	65.7	87.6	93.3	100	-						
TB-5		2.0' - 7.5'		69	86								55.3	32.2				1.13 x 10 ⁻⁶
TB-5		7.5' - 10.0'				36.6	40.6	82.3	99.2	99.8	100	-						
TB-6		8' - 13.5'		47	72													
TB-7		2.5' - 16.0'		24	59								32.3	12.15				
TB-8		2.0' - 6.5'		26	56								37.8	14.5				
TB-8		6.5' - 12.0'		49	68	18.17	25.0	78.1	98.8	99.5	100	-						1.35 x 10 ⁻²
TB-8		14' - 22'				37.9	43.1	77.7	85.7	89.8	100	-						2.96 x 10 ⁻⁷
TB-9		1.5' - 9.0'		24.0	62.0								25.4	8.1				
TB-9		10' - ??				12.1	20.2	82.1	96.7	98.3	100	-						

GRAIN SIZE DISTRIBUTION CURVE

PROJECT: Vernon County
 DATE: 9/27/89
 JOB NO: 70389

Central Wisconsin
 Engineers

P.O. BOX F • SCHOFIELD, WI 54476 • (715)359-9400



Geotechnical Factual Report

Vernon County Landfill
S3705 County Road LF
Viroqua, Wisconsin

Prepared for

Vernon County Solid Waste & Recycling Department

Project B2205032

July 12, 2023
Braun Intertec Corporation

July 12, 2023

Project B2205032

Ms. Stacie Sanborn
Vernon County Solid Waste & Recycling Department
S3705 County Road LF
Viroqua, WI 54665

Re: Geotechnical Factual Report
Vernon County Landfill
S3705 County Road LF
Viroqua, Wisconsin

Dear Ms. Sanborn:

We are pleased to present this Geotechnical Factual Report for the Vernon County Landfill located at S3705 County Road LF in Viroqua, Wisconsin. This summary report provides our borings logs and laboratory test results for the project.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Brandon Wright at 608.781.7277 or by email (bwright@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION



Brandon K. Wright, PE
Technical Manager, Senior Engineer



Philip E. Bailey, PE
Business Unit Leader, Senior Engineer

C: Ms. Melissa Lindenfelser, Short Elliott Hendrickson

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Appendix A

Soil Boring Location Sketch

Log of Boring Sheets B-18 to B-21 & MW-14WT to MW-17WT

Descriptive Terminology of Soil

Appendix B

Laboratory Test Results

-Classification Test Results (4)

-Atterberg Limits (2)

-Sieve Hydrometer Test Results (23)

-Proctor Test Results (6)

-Hydraulic Conductivity (5)

-Specific Gravity (2)

-Triaxial (CU) Test Results (5)

A. Introduction

A.1. Project Description

This Geotechnical Factual Report provides a summary of our subsurface exploration and laboratory test results for the Vernon County Landfill located at S3705 County Road LF in Viroqua, Wisconsin.

A.2. Site Conditions and History

Currently, the site exists as an active landfill. An aerial photograph of the site is shown in Photograph 1 below.

Photograph 1. Aerial Photograph of the Site



Photograph provided by Google Earth™.

A.3. Background Information and Reference Documents

We reviewed the following information:

- Aerial photographs of the site on Google Earth™
- Web based Geographic Information Systems (GIS) sites to assess topographic data and land records for the site.
- Communications with Short Elliott Hendrickson regarding project details.

A.4. Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB156849 to Vernon County Solid Waste and Recycling Department care of Short Elliott Hendrickson, dated April 22, 2022. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Clearing the exploration location of underground utilities. Short Elliott Hendrickson selected the exploration locations. Ground elevations and boring coordinates were collected by others and were later provided to us. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.
- Performing eight (8) standard penetration test (SPT) borings, denoted as Borings B-18 to B-21 & MW-14WT to MW-17WT. Four of the borings were drilled to depths of 30 feet and four borings were drilled depths of 100 feet to allow for installation of permanent groundwater monitoring wells.
- Performing laboratory testing on select samples.
- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, and results of laboratory testing.

B. Results

B.1. Geologic Overview

We based the geologic origins used in this report on the soil types, laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Boring Results

Table 1 provides a summary of the soil boring results; in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details.

Table 1. Subsurface Profile Summary*

Strata**	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Topsoil Fill	CL, CH, SC	NA	- Topsoil was composed of lean clay, fat clay, and clayey sand. - Contained trace roots and was dark brown to black. - Thickness was about 1 to 1 ½-feet. - Moisture condition was moist.
Fill***	CH, CL, CL-ML, ML, SP, SC, GC	2 to 80 BPF	- Beneath the topsoil fill, the borings encountered fill. - Fill extended to depths of 9 to 31 feet. - Fill is composed mainly of clayey soils, but also contained sand and gravels intermixed with clayey and silty soils. - Penetration resistance testing in the fill suggests the fill was not placed or compacted uniformly. - Moisture condition was moist.
Alluvial	SC, SM, SP- SM, CH, CL, ML	2 to 20 BPF	- Beneath the fill, the borings encountered alluvial soils. - Alluvial soils were intermixed and were composed of sand, silt, and clay soils. - Penetration resistance testing indicates the clayey soils are soft to very stiff and the silty and sandy soils are loose to medium dense. - Moisture condition (dry, moist, or wet).

Strata**	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Residuum	CL, CH, SC	11 to 22 BPF & >50	- Below the fill and alluvial soils, the borings encountered residual soils. - Residual soils were composed sand, silt, clay, and gravel soils. - Penetration resistance testing in the clayey soils indicate it was stiff to hard. - Penetration resistance testing in the sand and gravel soils indicates it was medium dense to very dense.
	SP, ML, SM	20 to 47 BPF & >50	
	GM, GC	24 to 36 & BPF >50	
Bedrock	Dolostone	50 blows for less than 6 inches of penetration	- Below the alluvial and residual soils, our borings encountered dolostone bedrock. Retrieved split-spoon samples in the bedrock were tan and were dry to moist. The retrieved samples were slightly- to highly-weathered. - The bedrock was cored at one location. The rock cores returned RQD values from 8 to 16 and recovery varied from 30 to 44 percent.

*Abbreviations defined in the attached Descriptive Terminology sheets.

**It should be noted that collected SPT samples for Borings MW-14WT and MW-16 were collected with a failing hollow-stem auger plug. The soil samples from these two borings are still generally representative of the soil column above the bedrock, they may not be representative of those specific depths and may be mixed with soil from other strata.

***For simplicity in this report, we define existing fill to mean existing, uncontrolled, or undocumented fill.

B.3. Groundwater

We did not observe groundwater while performing our borings. Groundwater may take days or longer to reach equilibrium in the boreholes and we immediately backfilled the boreholes, in accordance with our scope of work. If the project team identifies a need for more accurate determination of groundwater depth, we can install piezometers. Project planning should anticipate seasonal and annual fluctuations of groundwater. Following installation of monitoring wells, Short Elliott Hendrickson measured groundwater elevations as noted in Table 2.

Table 2. Monitoring Well Summary

Location	Measured Depth to Groundwater (ft)	Corresponding Elevation (ft)
MW-14WT	100.63	1146.52
MW-15WT	Not Observed	Not Observed
MW-16	81.54	1102.73
MW-17WT	80.27	1116.16

B.4. Laboratory Test Results

Laboratory testing was completed in general accordance with American Society for Testing and Materials (ASTM) standards. More information including soil characteristics and laboratory test results are presented in the following subsections.

B.4.a. Laboratory Soil Classification Tests

Tables 3 and 4 present the results of our laboratory tests.

Table 3. Laboratory Classification Test Results

Boring	Sample Depth (ft)	USCS Soil Classification	Moisture Content (w, %)	Liquid Limit	Plastic Index	Particle Size			
						% Gravel	% Sand	% Silt	% Clay
B-18	0 – 2	CL	20	38	19	1.1	14.6	54.0	30.3
B-18	2 ½	CH	27	64	40	0.0	14.4	20.4	65.2
B-18	5	CH	27	51	32	0.0	36.5	17.7	45.8
B-18	7 ½	SP	10	---	---	---	---	---	---
B-18	10	SC	15	39	24	0.0	58.6	8.9	32.5
B-18	12 ½	CH	27	72	49	0.0	29.5	14.2	56.3
B-18	15	SC	20	---	---	---	---	---	---
B-18	17 ½	CH	16	---	---	---	---	---	---
B-19	0 – 2	CH	---	50	33	0.0	25.5	30.5	44.0
B-19*	0 – 2	CH	---	51	33	---	---	---	---
B-19	2 ½	CH	16	52	33	23.7	22.7	22.1	31.5
B-19	5	CH	44	---	---	---	---	---	---
B-19	7 ½	CH	53	---	---	---	---	---	---
B-19	10	CH	54	---	---	---	---	---	---
B-19	12 ½	GC	33	---	---	---	---	---	---
B-19	15	GC	40	---	---	---	---	---	---
B-19	17 ½	CH	57	105	71	0.0	3.3	8.4	88.3
B-19	20	CH	57	---	---	---	---	---	---
B-20	0 – 2	CH	---	58	42	0.0	35.1	16.2	48.7
B-20*	0 – 2	CL	---	35	12	---	---	---	---
B-20	2 ½	CL	19	---	---	---	---	---	---
B-20	5	CL	27	---	---	---	---	---	---
B-20	7 ½	CH	33	---	---	---	---	---	---
B-20	10	SC	15	---	---	---	---	---	---
B-20	12 ½	CH	30	---	---	---	---	---	---

Boring	Sample Depth (ft)	USCS Soil Classification	Moisture Content (w, %)	Liquid Limit	Plastic Index	Particle Size			
						% Gravel	% Sand	% Silt	% Clay
B-20	15	CH	46	---	---	---	---	---	---
B-20	17 ½	CH	39	---	---	---	---	---	---
B-21	0 – 2	CH	---	67	48	0.0	25.4	26.4	48.2
B-21	2 ½	CH	24	50	34	0.0	24.5	29.3	46.2
B-21	5	CH	25	---	---	---	---	---	---
B-21	7 ½	ML	19	---	---	---	---	---	---
B-21	10	CL	17	36	18	2.9	11.5	56.6	29
B-21	12 ½	CL	19	36	14	0.0	6.2	65.2	28.6
B-21	15	CL	20	---	---	---	---	---	---
B-21	17 ½	CL	18	36	18	0.0	11.6	58.8	29.6
B-21	20	CL	19	40	21	0.0	4.9	63.6	31.5
B-21	25	CL	19	---	---	---	---	---	---
B-21	30	CL	18	33	13	0.0	1.4	72.7	25.9

*Bulk samples collected on May 24, 2023.

Table 4. Laboratory Classification Test Results

Boring	Sample Depth (ft)	USCS Soil Classification	Moisture Content (w, %)	Liquid Limit	Plastic Index	Particle Size			
						% Gravel	% Sand	% Silt	% Clay
MW-14WT	7 ½	CH	37	64	42	0.0	32.0	9.8	58.2
MW-15WT	17 ½	CH	46	109	73	0.0	2.6	7.5	89.9
MW-16	7 – 9	CL	---	43	21	---	---	---	---
MW-16	10 – 12	CL	24	37	16	0.0	3.9	66.0	30.1
MW-16	25	SC	18	41	24	0.0	62.1	11.4	26.5
MW-17WT	5	SC	20	59	40	12.7	44.6	7.8	34.9
MW-17WT	7 ½	SC	17	39	27	8.9	47.7	13.4	30.0
MW-17WT	10	SC	16	41	29	0.0	51.9	14.2	33.9

B.4.b. Moisture-Density Relationship (Proctor Tests)

We performed standard and modified Proctor tests on bulk samples collected from subgrade soils. The results are presented in Table 5.

Table 5. Standard and Modified Proctor Summary

Boring	Depth (ft)	Standard Proctor (ASTM D698)		Modified Proctor (ASTM D1557)	
		Maximum Dry Density (pcf)	Optimum Moisture (%)	Maximum Dry Density (pcf)	Optimum Moisture (%)
B-19	0 – 2	105.0	19.6	116.7	15.0
B-19*	0 – 2	104.3	17.8	---	---
B-20*	0 – 2	106.0	19.6	---	---
B-21	0 – 2	100.0	22.1	112.3	16.1

*Bulk samples collected on May 24, 2023.

B.4.c. Remolded Permeability Tests

We performed remolded permeability tests on bulk samples of the materials obtained from within the upper 2 feet of the borings in accordance with ASTM D5084. The results of the permeability tests are presented in Table 6.

Table 6. Summary of Hydraulic Conductivity

Boring	Depth (ft)	USCS Soil	Moisture (%)		Density (pcf)		Average Hydraulic Conductivity (cm/sec)
			Initial	Final	Initial	Final	
B-19*	0 – 2	CH	18.0	24.3	106.3	101.1	5.4 E-09
B-19*	0 – 2	CH	19.7	24.3	101.6	100.9	6.1 E-09
B-20*	0 – 2	CL	22.0	24.8	98.4	99.7	3.0 E-07
MW-14WT	26 – 28 ½	CL	25.3	24.1	101.2	102.9	3.1 E-08
MW-16	10 – 12	CL	25.7	25.4	103.3	102.6	3.0 E-08

*Bulk samples collected on May 24, 2023.

B.4.d. Specific Gravity

We performed specific gravity tests on bulk samples collected from Boring B-19 and B-20. The specific gravity for each sample is summarized in Table 7.

Table 7. Summary of Specific Gravity

Boring	Depth	USCS Soil	Specific Gravity
B-19*	0 – 2	CH	2.67
B-20*	0 – 2	CL	2.66

*Bulk samples collected on May 24, 2023.

B.4.e. Triaxial Test Results

We performed consolidated undrained triaxial tests in accordance with the ASTM D4767. The results of this test are summarized in Table 8.

Table 8. Summary of Triaxial Tests

Boring	Depth (ft)	Item	Consolidated Undrained (CU)		Unconsolidated Undrained (UU)
			Total	Effective	
B-19*	0 – 2	Cohesion, tsf	0.2742	0.2097	0.7848
		ϕ , degrees	12.5	23.3	0
		$\tan(\phi)$	0.22	0.43	0
B-20*	0 – 2	Cohesion, tsf	0.4281	0	0.4152
		ϕ , degrees	15.4	34.8	0
		$\tan(\phi)$	0.28	0.69	0
MW-16	7 – 9	Cohesion, tsf	0.9366	0.2976	---
		ϕ , degrees	11.4	28.5	---
		$\tan(\phi)$	0.20	0.54	---

*Bulk samples collected on May 24, 2023.

C. Procedures

C.1. Penetration Test Borings

We drilled the penetration test borings with an all-terrain core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance with ASTM D1586. We collected thin-walled tube samples in general accordance with ASTM D1587 at selected depths. The boring logs show the actual sample intervals and corresponding depths. We also collected bulk samples of auger cuttings at selected locations for laboratory testing.

C.2. Exploration Logs

C.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

C.2.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

C.3. Material Classification and Testing

C.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

C.3.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM procedures.

C.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. Where monitoring wells were installed, Short Elliott Hendrickson measured and recorded observed groundwater depths.

D. Qualifications

D.1. Variations in Subsurface Conditions

D.1.a. Material Strata

We developed our boring logs from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation, and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work or starting construction.

D.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs and interpreted in the text of this report. Note that the observation periods were short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

D.2. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. The included information may not be appropriate for other parties or projects.

D.3. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix A



 DENOTES APPROXIMATE LOCATION OF
STANDARD PENETRATION TEST BORING



100' 0 200'

SCALE: 1"= 200'

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Project No:
B2205032

Drawing No:
B2205032

Drawn By: JAG
Date Drawn: 2/14/23
Checked By: BW
Last Modified: 2/14/23

Vernon County Landfill Upgrades

53705 County Road LF

Viroqua, Wisconsin

**Soil Boring
Location Sketch**

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: B-18		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 164513	EASTING: 715479	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/19/22	END DATE: 09/19/22		
SURFACE ELEVATION: 1239.0 ft	RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Grass	WEATHER: Sunny		
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1238.0		LEAN CLAY with SAND (CL), trace roots, brown, moist (TOPSOIL FILL)				20	LL=38, PL=19, PI=19
1.0		FILL: FAT CLAY (CH), orangish brown to tan, moist		2-3-4 (7) 7"		27	LL=64, PL=24, PI=40
1234.5		FILL: SANDY FAT CLAY (CH), medium-grained, trace Gravel, orangish brown, moist	5	2-3-3 (6) 8"		27	LL=51, PL=19, PI=32
1232.5		FILL: POORLY GRADED SAND (SP), fine to medium-grained, orangish brown, moist		3-7-8 (15) 14"		10	
1230.0		FILL: CLAYEY SAND (SC), orangish brown with black, moist	10	2-7-9 (16) 14"		15	LL=39, PL=15, PI=24
1227.5		FILL: FAT CLAY with SAND (CH), brown and reddish brown, moist		6-6-5 (11) 16"		27	LL=72, PL=23, PI=49
1225.5		CLAYEY SAND (SC), brown, moist, very stiff (ALLUVIUM)	15	5-8-8 (16) 16"		20	
1222.5		FAT CLAY (CH), trace Gravel, reddish brown, moist, stiff (RESIDUUM)		3-3-12 (15) 12"		16	
1216.0			20	14-12-10 (22) 14"			
23.0		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in our split-spoon sampler.	25	24-50/5" (REF) 12"			
1208.0			30				No recovery
31.0		END OF BORING		50/1" (REF)			Water not observed while drilling.
		Boring then grouted					

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: B-19		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 164380	EASTING: 715477	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/19/22	END DATE: 09/19/22		
SURFACE ELEVATION: 1233.3 ft		RIG: 8505	METHOD: 3 1/4" HSA	SURFACING: Grass		WEATHER: Sunny	
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1232.3		FAT CLAY with SAND (CH), brown, moist (TOPSOIL FILL)					LL=50, PL=17, PI=33
1.0		FILL: SANDY FAT CLAY with GRAVEL (CH), grayish brown, moist		4-7-4 (11) 10"		16	LL=52, PL=19, PI=33
1229.3		FILL: SANDY FAT CLAY (CH), brown and red, moist	5	2-3-2 (5) 10"		44	
4.0				4-2-2 (4) 12"		53	
			10	2-2-2 (4) 14"		54	
1221.8		FILL: CLAYEY GRAVEL (GC), fine to coarse- grained, dark brown and gray, moist		1-2-1 (3) 6"		33	
11.5			15	1-1-1 (2) 8"		40	
1216.8		FILL: FAT CLAY (CH), dark brown, moist		1-1-2 (3) 14"		57	LL=105, PL=34, PI=71
16.5			20	0-1-5 (6) 6"		57	
1210.3		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as 'Silty Sand (SM)' in our split- spoon sampler.	25	50/4" (REF) 4"			
23.0							
1202.3		END OF BORING	30	50/1" (REF)			Water not observed while drilling.
31.0		Boring then grouted					

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: B-20		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 164064	EASTING: 715518	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/19/22	END DATE: 09/19/22		
SURFACE ELEVATION: 1215.8 ft		RIG: 8505	METHOD: 3 1/4" HSA	SURFACING: Open Cut	WEATHER: Sunny		
Elev./Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1214.8		SANDY FAT CLAY (CH), trace roots, dark brown, moist (TOPSOIL FILL)					LL=58, PL=16, PI=42
1.0		FILL: LEAN CLAY with GRAVEL (CL), brown, moist		10-4-5 (9) 12"		19	
			5	3-4-6 (10) 12"		27	
1209.3		FILL: SANDY FAT CLAY (CH), brown, moist		2-3-6 (9) 12"		33	
6.5							
1206.8		FILL: CLAYEY SAND with GRAVEL (SC), dark brown and black, moist	10	2-12-11 (23) 12"		15	
9.0							
1204.3		FILL: SANDY FAT CLAY (CH), dark brown and gray, moist		3-4-5 (9) 12"		30	
11.5			15	2-1-2 (3) 14"		46	
1199.3		FILL: SANDY FAT CLAY (CH), reddish brown and black, moist		5-4-4 (8) 16"		39	
16.5			20	4-7-10 (17) 16"			
1194.8		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, tan, moist, medium dense (RESIDUUM)					
21.0							
1192.8		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in our split-spoon sampler.	25	50/3" (REF) 3"			
23.0							
			30	14-18-50/5" (REF) 10"			
1184.8		END OF BORING					Water not observed while drilling.
31.0		Boring then grouted					

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: B-21		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163857	EASTING: 715398	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/19/22	END DATE: 09/19/22		
SURFACE ELEVATION: 1226.1 ft		RIG: 8505	METHOD: 3 1/4" HSA	SURFACING: Grass		WEATHER: Sunny	
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1224.9		FAT CLAY with SAND (CH), trace roots, dark brown, moist (TOPSOIL FILL)					LL=67, PL=19, PI=48
1.3		FILL: FAT CLAY with SAND (CH), trace roots, brown, moist		2-2-3 (5) 8"		24	LL=50, PL=16, PI=34
1222.1		FILL: FAT CLAY (CH), medium to coarse-grained, trace Gravel, brown, moist	5	1-1-2 (3) 8"		25	
1219.6		FILL: SANDY SILT (ML), trace roots, dark brown, moist		1-4-8 (12) 12"		19	
1217.1		FILL: LEAN CLAY (CL), trace Gravel, dark brown, moist	10	3-6-7 (13) 12"		17	LL=36, PL=18, PI=18
1214.6		FILL: LEAN CLAY (CL), trace organic, dark brown, moist		3-7-8 (15) 14"		19	LL=36, PL=22, PI=14
1211.6		FILL: LEAN CLAY (CL), trace Sand, brown, moist	15	2-3-5 (8) 10"		20	
14.5				4-6-9 (15) 14"		18	LL=36, PL=18, PI=18
			20	5-5-7 (12) 12"		19	LL=40, PL=19, PI=21
1203.1		FILL: LEAN CLAY (CL), gray to brown, moist	25	9-7-8 (15) 12"		19	
23.0				4-6-10 (16) 14"		18	LL=33, PL=20, PI=13
1195.1		END OF BORING					Water not observed while drilling.
31.0		Boring then grouted					

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-14WT		
					LOCATION: See attached sketch. Offset 5 feet		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 164748		EASTING: 715687
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 08/26/22	END DATE: 08/26/22		
SURFACE ELEVATION: 1247.2 ft		RIG: 8505	METHOD: 3 1/4" HSA	SURFACING: Grass	WEATHER: Sunny		
Elev./Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1246.2		LEAN CLAY (CL), fine to medium-grained, brown, moist (TOPSOIL FILL)					
1.0		FILL: LEAN CLAY (CL), brown, moist		3-6-7 (13) 18"			
1243.2		FILL: CLAYEY SAND (SC), brown, moist	5	4-7-7 (14) 18"			
1240.6		FILL: SANDY FAT CLAY (CH), fine to coarse-grained, brownish red, moist		4-3-6 (9) 18"		37	LL=64, PL=42, PI=22
1235.6			10	8-6-11 (17) 6"			
1233.2		FILL: SILTY CLAY (CL-ML), fine to medium-grained, light gray, moist		3-4-8 (12) 16"			
1230.6		FILL: LEAN CLAY (CL), reddish brown, moist	15	3-5-6 (11) 16"			
1228.2		FILL: CLAYEY SAND (SC), brown, moist		14-12-8 (20) 18"			
1224.2		SILTY SAND (SM), orangish brown, moist, medium dense (ALLUVIUM)	20	6-8-12 (20) 18"			
23.0		LEAN CLAY (CL), fine to coarse-grained, brown, moist, very stiff (RESIDUUM)	25	4-9-11 (20) 16"			Groundwater not observed above mud rotary drilling depth
			30	10-50/4" (REF)			Began mud rotary drilling at 30 feet

Continued on next page

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-14WT					
					LOCATION: See attached sketch. Offset 5 feet					
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)					
					NORTHING: 164748		EASTING: 715687			
DRILLER: E. Rislov		LOGGED BY: T. Felker			START DATE: 08/26/22		END DATE: 08/26/22			
SURFACE ELEVATION: 1247.2 ft		RIG: 8505		METHOD: 3 1/4" HSA		SURFACING: Grass		WEATHER: Sunny		
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks			
		LEAN CLAY (CL), fine to coarse-grained, brown, moist, very stiff (RESIDUUM)	35	50/0" (REF)			No Recovery			
1210.2 37.0		ST. LAWRENCE FORMATION, DOLOSTONE, tan, dry to moist, highly weathered to decomposed, moderately hard	40	8 44	1 9 15 10 10				Run 1	
1205.6 41.5		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, retrieved as "Silty Sand (SM)" in our split-spoon sampler	45	50/0" (REF)						
			50	50/5" (REF)						
1196.6 50.5		ST. LAWRENCE FORMATION, DOLOSTONE, tan, dry to moist, slightly weathered, moderately hard to hard	55	16 30	1 1 1 1 2 1 3 3				Run 2	
1186.6 60.5		ST. LAWRENCE FORMATION, DOLOSTONE, tan, dry to moist, slightly weathered, moderately hard to hard	60		1 1 8 6 1 4 5				Run 3	
		Continued on next page		RQD %	Recovery %	Drilling Rate (min/ft)	Bit Pressure (psi)	Water Pressure (psi)	Water Return %	Remarks

Continued on next page

B2205032 Braun Intertec Corporation Print Date:02/16/2023 MW-14WT page 4 of 4

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-15WT		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 164382	EASTING: 715726	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/26/22		END DATE: 09/26/22	
SURFACE ELEVATION: 1220.6 ft		RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Open Cut		WEATHER: Sunny

Elev./Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1219.6		CLAYEY SAND (SC), trace roots, brown, moist (TOPSOIL FILL)					
1.0		FILL: SANDY LEAN CLAY (CL), trace Gravel, orangish brown, moist		5-7-6 (13) 14"			
			5	6-5-6 (11) 4"			
1214.6		FILL: FAT CLAY (CH), with Sand Layers, orangish brown, moist		5-4-5 (9) 16"			
6.0							
1211.6		FILL: CLAYEY SAND (SC), brown, moist		6-6-22 (28) 14"			
9.0			10				
1209.1		FILL: FAT CLAY (CH), with Clayey Sand Layers, dark brown to reddish brown, moist		3-4-5 (9) 14"			
11.5				3-3-4 (7) 16"			
			15				
				2-4-4 (8) 18"			
				2-4-6 (10) 18"			
1200.6		SANDY FAT CLAY (CH), with Poorly Graded Sand layers, brown, moist, stiff (ALLUVIUM)					
20.0			20				
1198.1		FAT CLAY (CH), trace Gravel, dark brown, moist, stiff to very stiff (ALLUVIUM)		2-6-9 (15) 16"			
22.5			25				
				9-8-4 (12) 16"			
			30				

Continued on next page

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-15WT				
					LOCATION: See attached sketch				
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)				
					NORTHING: 164382	EASTING: 715726			
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/26/22		END DATE: 09/26/22			
SURFACE ELEVATION: 1220.6 ft		RIG: 8505		METHOD: 3 1/4" HSA		SURFACING: Open Cut		WEATHER: Sunny	

Elev./Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1182.6		FAT CLAY (CH), trace Gravel, dark brown, moist, stiff to very stiff (ALLUVIUM)	35	2-1-1 (2) 14"			
38.0		SANDY SILT (ML), with Clay seams, tan to gray, moist, very dense (RESIDUUM)	40	38-17-50/4" (REF) 12"			
1173.1			45	10-15-50/2" (REF) 14"			
47.5		SILTY SAND (SM), fine to medium-grained, orangish brown, moist, very dense (RESIDUUM)	50	25-45-50/2" (REF) 12"			
			55				
			60	32-27-24 (51) 14"			
1158.1		CLAYEY SAND (SC), orangish brown, moist, stiff (RESIDUUM)	65	6-5-10 (15) 14"			
62.5							
1153.1		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in our split-spoon sampler.					
67.5							

Continued on next page

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-15WT		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 164382	EASTING: 715726	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/26/22	END DATE: 09/26/22		
SURFACE ELEVATION: 1220.6 ft		RIG: 8505	METHOD: 3 1/4" HSA	SURFACING: Open Cut	WEATHER: Sunny		
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in our split- spoon sampler.	70	50/2" (REF) 2"			Permanent monitoring well installed with screen set from 73 to 83 feet
			75				
			80				
			85				
			90				
			95				
1121.6							
99.0		END OF BORING	100				Water not observed while drilling.

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-16		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163940	EASTING: 715674	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 08/21/22		END DATE: 08/23/22	
SURFACE ELEVATION: 1184.8 ft		RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Dirt/Open Cut		WEATHER: Sunny

Elev./Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1183.8		LEAN CLAY (CL), brown, moist (TOPSOIL)					
1.0		FILL: LEAN CLAY (CL), brown, moist		2-2-2 (4) 0"			No recovery
			5	1-1-2 (3) 10"			
1175.8				2-3-3 (6) 14" TW			LL=43, PL=21, PI=22
9.0		LEAN CLAY (CL), brown, moist, medium (LOESS)	10	TW		24	LL=37, PL=16, PI=21
1170.8				2-3-3 (6) 14"			
14.0		CLAYEY SAND with GRAVEL (SC), fine to coarse-grained, brown and yellow, moist, stiff (ALLUVIUM)	15	8-7-6 (13) 14"			
				4-4-6 (10) 18"			
			20	4-5-6 (11) 18"			
				4-4-5 (9) 14"		18	LL=41, PL=24, PI=17
			25				
				8-7-5 (12) 8"			
			30				
1151.8		CLAYEY GRAVEL (GC), fine to coarse-grained, brown, moist, medium dense to very dense (RESIDUUM)					
33.0							

Continued on next page

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-16		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163940	EASTING: 715674	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 08/21/22		END DATE: 08/23/22	
SURFACE ELEVATION: 1184.8 ft		RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Dirt/Open Cut		WEATHER: Sunny
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
		CLAYEY GRAVEL (GC), fine to coarse-grained, brown, moist, medium dense to very dense (RESIDUUM)	35	22-28-30 (58) 8"			Groundwater not observed above mud rotary depth
			40	6-15-42 (57)			
			45	5-8-16 (24) 16"			
1136.8							
48.0		SILTY GRAVEL (GM), fine to coarse-grained, brown, moist to wet, dense to very dense (RESIDUUM)	50	8-10-26 (36) 16"			Began mud rotary drilling at 50 feet Groundwater perched at 50 feet, static at 68 feet
			55	50/5" (REF) 4"			
			60	15-50/5" (REF) 8"			
1120.8							
64.0		CLAYEY SAND with GRAVEL (SC), fine to coarse-grained, tan, wet, stiff (RESIDUUM)	65	35-8-3 (11) 18"			Adjacent well MW-16WT installed screen from 65 to 75 feet
1116.8							
68.0							

Continued on next page

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-16		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163940	EASTING: 715674	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 08/21/22		END DATE: 08/23/22	
SURFACE ELEVATION: 1184.8 ft		RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Dirt/Open Cut		WEATHER: Sunny
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in split- spoon sampler	70	50/3" (REF) 3"			
			75	3-9-25 (34) 18"			
			80	50/1" (REF) 1"			
			85	50/0" (REF) 0"			
			90	50/4" (REF) 2"			
			95	50/1" (REF) 1"			
1086.8 98.0		END OF BORING	100				Permanent monitoring well installed with screen set from 92 to 97 feet Water not observed while drilling.

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-17WT		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163691		EASTING: 715688
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/22/22		END DATE: 09/22/22	
SURFACE ELEVATION: 1196.4 ft		RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Grass		WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1195.4		SANDY FAT CLAY (CH), trace roots, brown, moist (TOPSOIL FILL)					
1.0		FILL: CLAYEY SAND with GRAVEL (SC), brown, moist		5-9-6 (15) 14"			
			5	10-28-20 (48) 12"		20	LL=59, PL=40, PI=19
1190.4		FILL: CLAYEY SAND (SC), trace Gravel, brown, moist		14-10-12 (22) 14"		17	LL=39, PL=27, PI=12
6.0			10	10-10-10 (20) 16"		16	LL=41, PL=29, PI=12
1184.9		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, brown, moist		14-14-25 (39) 14"			
11.5			15	24-40-40 (80) 14"			
1179.9		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, with thin clay layers, light brown, moist		15-9-10 (19) 16"			
16.5			20	7-14-34 (48) 16"			Began mud rotary drilling at 20 feet
			25	12-14-16 (30) 16"			
1167.9		SILTY SAND (SM), fine to medium-grained, orangish brown, moist, medium dense (ALLUVIUM)		4-5-11 (16) 14"			
28.5			30				

Continued on next page

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-17WT		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163691	EASTING: 715688	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/22/22		END DATE: 09/22/22	
SURFACE ELEVATION: 1196.4 ft		RIG: 8505	METHOD: 3 1/4" HSA		SURFACING: Grass		WEATHER: Sunny

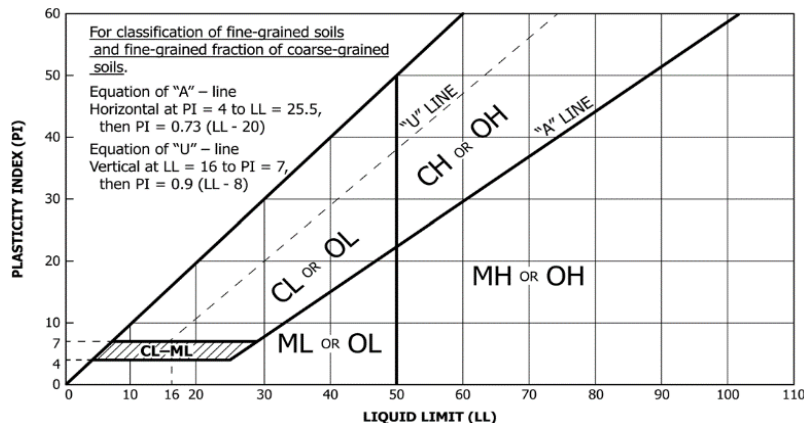
Elev./Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
1158.9		SILTY SAND (SM), fine to medium-grained, orangish brown, moist, medium dense (ALLUVIUM)	35	10-15-32 (47) 14"			
37.5		CLAYEY SAND (SC), with Silt, brown, moist, stiff (ALLUVIUM)	40	8-6-6 (12) 12"			
1153.4		SANDY SILT (ML), brown, moist, very dense (RESIDUUM)	45	35-50/2" (REF) 6"			
1148.4		SANDY SILT (ML), fine to medium-grained, brown, moist, medium dense (RESIDUUM)	50	10-10-17 (27) 12"			
			55	10-14-16 (30) 12"			
			60	14-10-10 (20) 10"			
1133.4		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in our split-spoon sampler.	65	50/1" (REF) 1"			

Continued on next page

Project Number B2205032 Factual Report Vernon County Landfill S3705 County Road LF Viroqua, Wisconsin					BORING: MW-17WT		
					LOCATION: See attached sketch		
					DATUM: NAD 1983 HARN Wisconsin CRS Vernon (US Feet)		
					NORTHING: 163691	EASTING: 715688	
DRILLER: E. Rislov		LOGGED BY: T. Felker		START DATE: 09/22/22	END DATE: 09/22/22		
SURFACE ELEVATION: 1196.4 ft		RIG: 8505	METHOD: 3 1/4" HSA	SURFACING: Grass		WEATHER: Sunny	
Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q _p tsf	MC %	Tests or Remarks
		ST. LAWRENCE FORMATION, DOLOSTONE, tan, moist, highly weathered, soft to moderately hard, retrieved as "Silty Sand (SM)" in our split- spoon sampler.	70				Permanent monitoring well installed with screen set from 77 to 87 feet
			75				
			80				
			85				
			90				
1103.4							
93.0		END OF BORING					
			95				
			100				

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^A					Soil Classification		
					Group Symbol	Group Name ^B	
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines ^C)	$C_u \geq 4$ and $1 \leq C_c \leq 3^D$	GW	Well-graded gravel ^E		
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$) ^D	GP	Poorly graded gravel ^E		
		Gravels with Fines (More than 12% fines ^C)	Fines classify as ML or MH	GM	Silty gravel ^{EFG}		
			Fines Classify as CL or CH	GC	Clayey gravel ^{EFG}		
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines ^H)	$C_u \geq 6$ and $1 \leq C_c \leq 3^D$	SW	Well-graded sand ^I		
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$) ^D	SP	Poorly graded sand ^I		
		Sands with Fines (More than 12% fines ^H)	Fines classify as ML or MH	SM	Silty sand ^{FGI}		
			Fines classify as CL or CH	SC	Clayey sand ^{FGI}		
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line ^J	CL	Lean clay ^{KLM}		
			PI < 4 or plots below "A" line ^J	ML	Silt ^{KLM}		
		Organic	Liquid Limit – oven dried Liquid Limit – not dried <0.75	OL	Organic clay ^{KLMN} Organic silt ^{KLMQ}		
			PI plots on or above "A" line	CH	Fat clay ^{KLM}		
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots below "A" line	MH	Elastic silt ^{KLM}		
			Liquid Limit – oven dried Liquid Limit – not dried <0.75	OH	Organic clay ^{KLMP} Organic silt ^{KLMQ}		
		Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

- A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains $\geq 15\%$ sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
I. If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains $\geq 30\%$ plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



DD Dry density, pcf
WD Wet density, pcf
P200 % Passing #200 sieve

Laboratory Tests
OC Organic content, %
q_p Pocket penetrometer strength, tsf
MC Moisture content, %
q_u Unconfined compression test, tsf

LL Liquid limit
PL Plastic limit
PI Plasticity index

Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions^{L M}

trace..... 0 to 5%
little..... 6 to 14%
with..... $\geq 15\%$

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose 0 to 4 BPF
Loose 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils

Blows Per Foot Approximate Unconfined Compressive Strength
Very soft..... 0 to 1 BPF..... < 0.25 tsf
Soft..... 2 to 4 BPF..... 0.25 to 0.5 tsf
Medium..... 5 to 8 BPF 0.5 to 1 tsf
Stiff..... 9 to 15 BPF..... 1 to 2 tsf
Very Stiff..... 16 to 30 BPF..... 2 to 4 tsf
Hard..... over 30 BPF..... > 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (, at the end of drilling (, or at some time after drilling (.

Appendix B

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Metafield ID: 498857 **Sampled By:** Drill Crew
Sample Date: 11/29/2022
Received Date: 12/14/2022 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Completed Date: 12/14/2022 **Tested By:** Seokaran, Kanhai

Laboratory Results Summary

Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
B-18		7.0	10.3									
B-18		14.5	19.5									
B-18		17.0	15.9									
B-19		4.5	43.8									
B-19		7.0	52.5									
B-19		9.5	54.0									
B-19		12.0	33.4									
B-19		14.5	39.9									
B-19		19.5	57.2									
B-20		2.0	19.2									
B-20		4.5	27.1									
B-20		7.0	33.3									
B-20		9.5	15.0									
B-20		12.0	30.0									
B-20		14.5	46.1									
B-20		17.0	39.3									
B-21		4.5	25.4									
B-21		7.0	18.6									
B-21		14.5	20.2									
B-21		24.5	18.9									
MW-16	TW	10.0			37	21	16					
B-19		0.0			50	17	33					
B-21		0.0			67	19	48					

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S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
MW-16	TW	7.0			43	22	21					
B-19		17.0			105	34	71					
B-20	Bulk	0.0			58	16	42					
B-21		2.0			50	16	34					
B-21		9.5			36	18	18					
B-21		12.0			36	22	14					
B-21		17.0			36	18	18					
B-21		19.5			40	19	21					
B-21		29.5			33	20	13					
MW-14WT		7.0			64	22	42					
MW-15WT		17.0			109	36	73					
MW-16		24.5			41	17	24					
MW-17WT		4.5			59	19	40					
MW-17WT		7.0			39	12	27					
MW-17WT		9.5			41	12	29					
B-18		0.0			38	19	19					
B-18		2.0			64	24	40					
B-18		4.5			51	19	32					
B-18		9.5			39	15	24					
B-18		12.0			72	23	49					
B-19		2.0			52	19	33					

General

Results: The test is for informational purposes.

Bob K. Wilt

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Minneapolis, MN 55438
Phone: 952-995-2000

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Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Metafield ID: 499072

Completed Date: 12/16/2022

Prepared By: Streier, Jim

Laboratory Results Summary

Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q _u (tsf)	Specific Gravity
MW-14WT		7.0	36.8									
MW-15WT		17.0	46.0									
MW-16		10.0	24.2									
MW-16		24.5	18.0									
MW-17WT		4.5	19.8									
MW-17WT		7.0	16.8									
MW-17WT		9.5	15.9									
B-18		0.0	19.5									
B-18		2.0	27.1									
B-18		4.5	26.7									
B-18		9.5	15.4									
B-18		12.0	26.5									
B-19		2.0	15.8									
B-19		17.0	57.4									
B-21		2.0	24.2									
B-21		9.5	17.0									
B-21		12.0	18.5									
B-21		17.0	17.9									
B-21		19.5	19.0									
B-21		29.5	18.2									

General

Results: The test is for informational purposes.

The results included in this report relate only to the items inspected or tested. Sample plan outlined in project specifications as applicable. Additionally, this report is for the exclusive use of the addressed parties. We assume no responsibility to other parties regarding this report. The information indicated in this report shall not be reproduced, except in full, without the prior written approval.

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Client:

Vernon County Solid Waste & Recycling
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Bob K. Wilt

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Viroqua, WI 54665

Sample Information

Sample Number:	522626	Sampled By:	Wright, Brandon
Sampling Method:	Project Specified	Depth (ft):	0-2
Boring Number:	B-19		
Location Details:	B-19		
Sample Date:	05/24/2023		
Received Date:	05/24/2023	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	06/06/2023	Tested By:	Streier, Jim

Laboratory Data

<u>Description</u>	<u>Result</u>	<u>Specifications</u>
Liquid Limit:	51	-
Plastic Limit:	18	
Plastic Index:	33	-
Soil Classification:	CH Fat Clay	

General

Results: The test is for informational purposes.



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Sample Information

Sample Number:	522628	Sampled By:	Wright, Brandon
Sampling Method:	Project Specified	Depth (ft):	0-2
Boring Number:	B-20		
Location Details:	B-20		
Sample Date:	05/24/2023		
Received Date:	05/24/2023	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	06/06/2023	Tested By:	Streier, Jim

Laboratory Data

<u>Description</u>	<u>Result</u>	<u>Specifications</u>
Liquid Limit:	35	-
Plastic Limit:	23	
Plastic Index:	12	-
Soil Classification:	CL SANDY LEAN CLAY	

General

Results: The test is for informational purposes.



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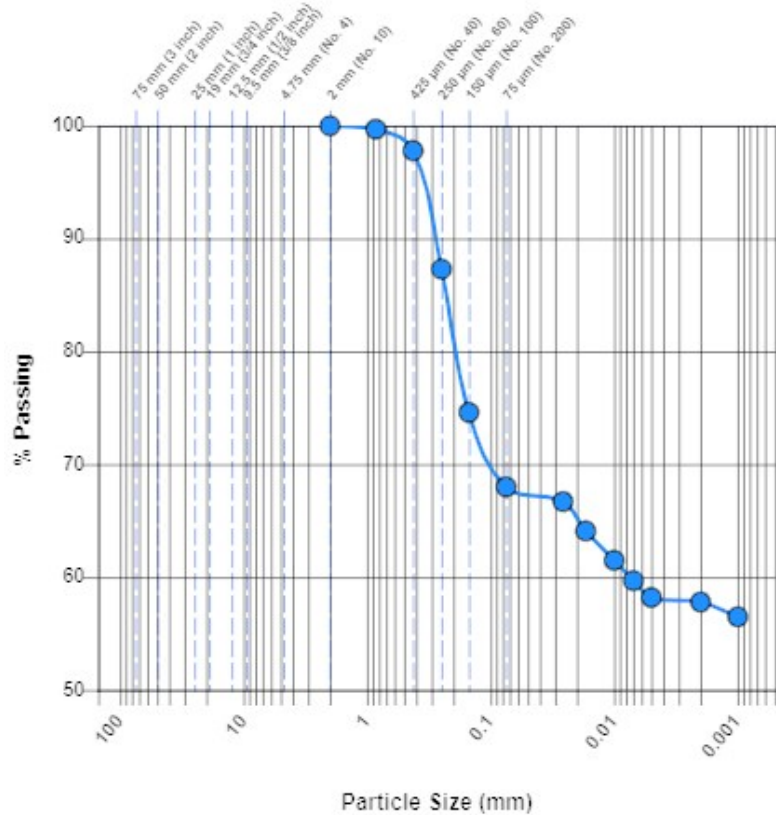
Sample Information

Sample Number:	499074	Depth (ft):	7-8.5
Boring Number:	MW-14WT	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.7	-
425 µm (No. 40)	97.8	-
250 µm (No. 60)	87.3	-
150 µm (No. 100)	74.6	-
75 µm (No. 200)	68.0	-
26.2 (µm)	66.7	-
16.7 (µm)	64.1	-
9.7 (µm)	61.5	-
6.9 (µm)	59.7	-
4.9 (µm)	58.2	-
2.4 (µm)	57.8	-
1.0 (µm)	56.5	-



Soil Classification: CH Sandy fat clay

Gravel (%):	0	Sand (%):	32.0	Silt (%):	9.8	Clay (%):	58.2
D₆₀ (µm):	7.5						

General

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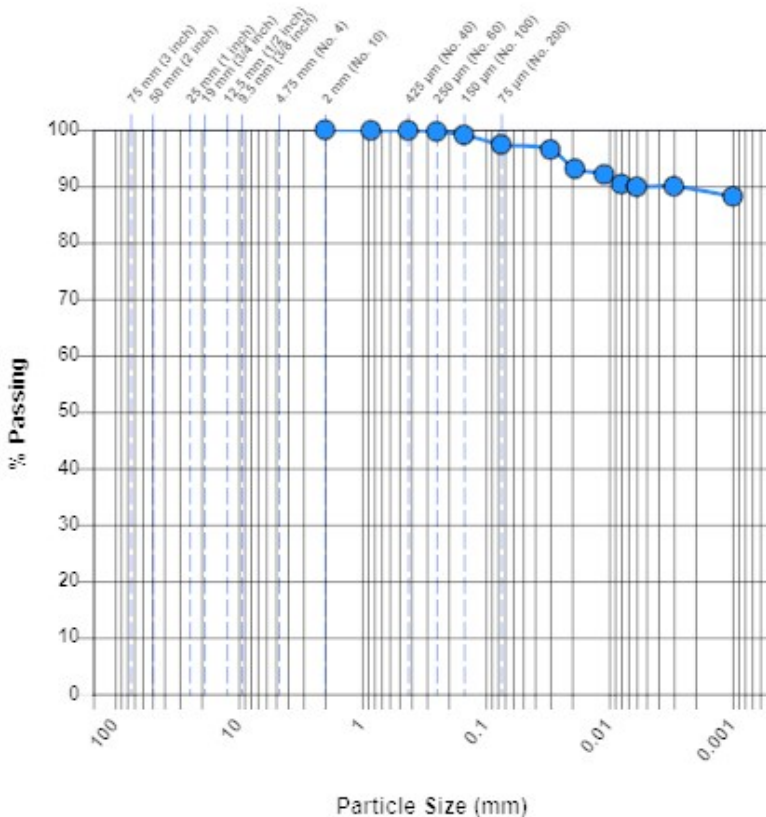
Sample Information

Sample Number:	499075	Depth (ft):	17-18.5
Boring Number:	MW-15WT	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	99.9	-
250 µm (No. 60)	99.7	-
150 µm (No. 100)	99.1	-
75 µm (No. 200)	97.4	-
29.8 (µm)	96.5	-
19.0 (µm)	93.1	-
11.0 (µm)	92.1	-
7.8 (µm)	90.4	-
5.5 (µm)	89.9	-
2.7 (µm)	90.0	-
1.2 (µm)	88.2	-



Soil Classification: CH Fat Clay

Gravel (%): 0 **Sand (%):** 2.6 **Silt (%):** 7.5 **Clay (%):** 89.9

General

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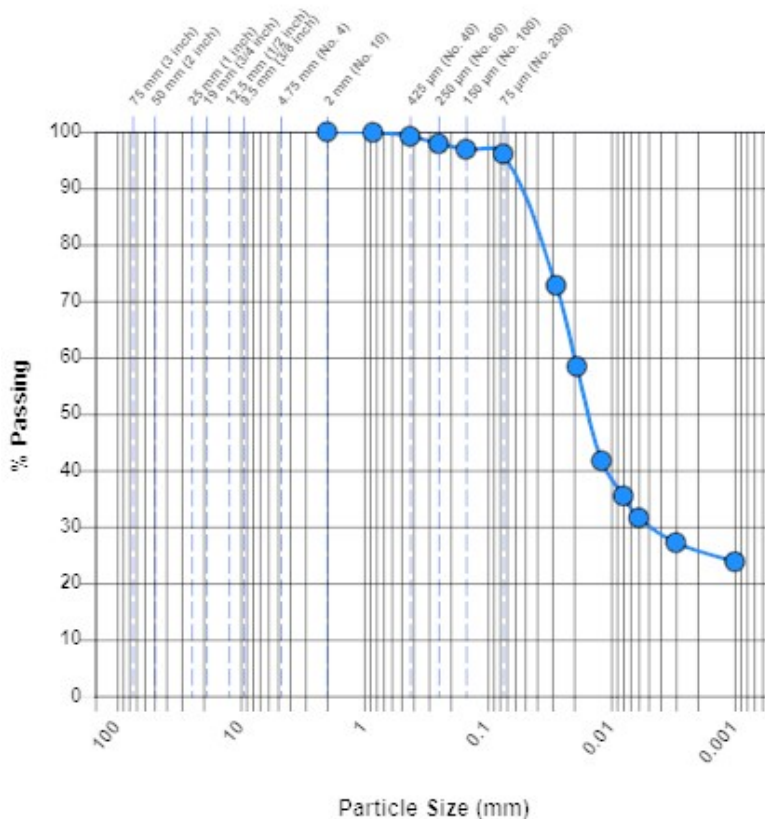
Sample Information

Sample Number:	499076	Depth (ft):	10-12
Boring Number:	MW-16	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	99.2	-
250 µm (No. 60)	97.9	-
150 µm (No. 100)	96.9	-
75 µm (No. 200)	96.1	-
28.1 (µm)	72.8	-
18.9 (µm)	58.4	-
11.6 (µm)	41.7	-
8.4 (µm)	35.5	-
6.0 (µm)	31.6	-
3.0 (µm)	27.2	-
1.3 (µm)	23.8	-



Soil Classification: CL Lean clay

Gravel (%):	0	Sand (%):	3.9	Silt (%):	66.0	Clay (%):	30.1
D₆₀ (µm):	20.0	D₃₀ (µm):	4.9				

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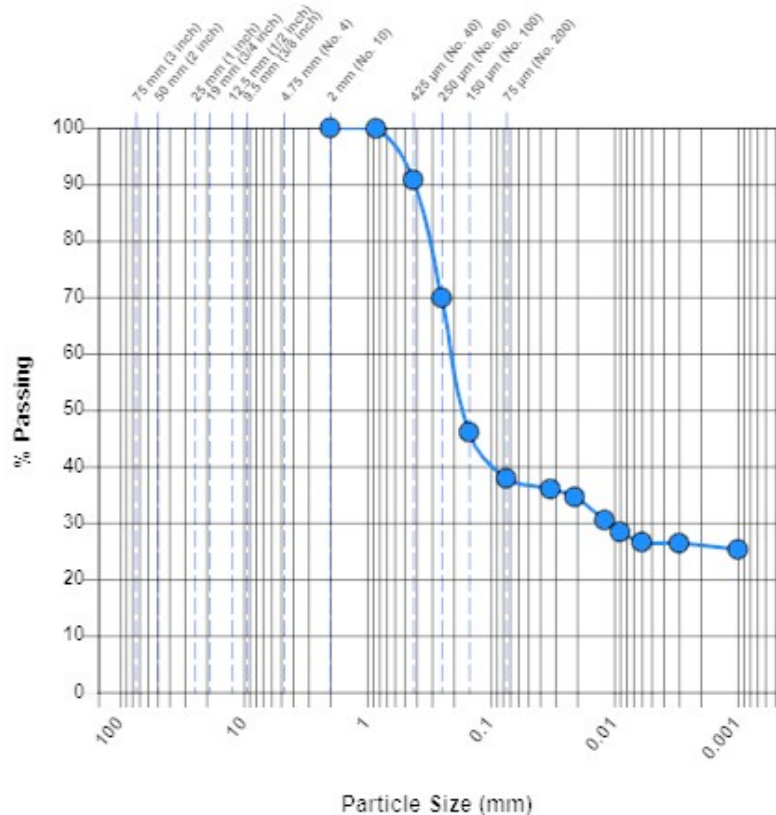
Sample Information

Sample Number:	499077	Depth (ft):	24.5-26
Boring Number:	MW-16	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	90.8	-
250 µm (No. 60)	69.9	-
150 µm (No. 100)	46.1	-
75 µm (No. 200)	37.9	-
33.2 (µm)	36.0	-
21.0 (µm)	34.6	-
12.3 (µm)	30.5	-
8.7 (µm)	28.4	-
6.2 (µm)	26.6	-
3.0 (µm)	26.4	-
1.3 (µm)	25.3	-



Soil Classification: SC Clayey sand

Gravel (%):	0	Sand (%):	62.1	Silt (%):	11.4	Clay (%):	26.5
D₆₀ (µm):	208.4	D₃₀ (µm):	11.3				

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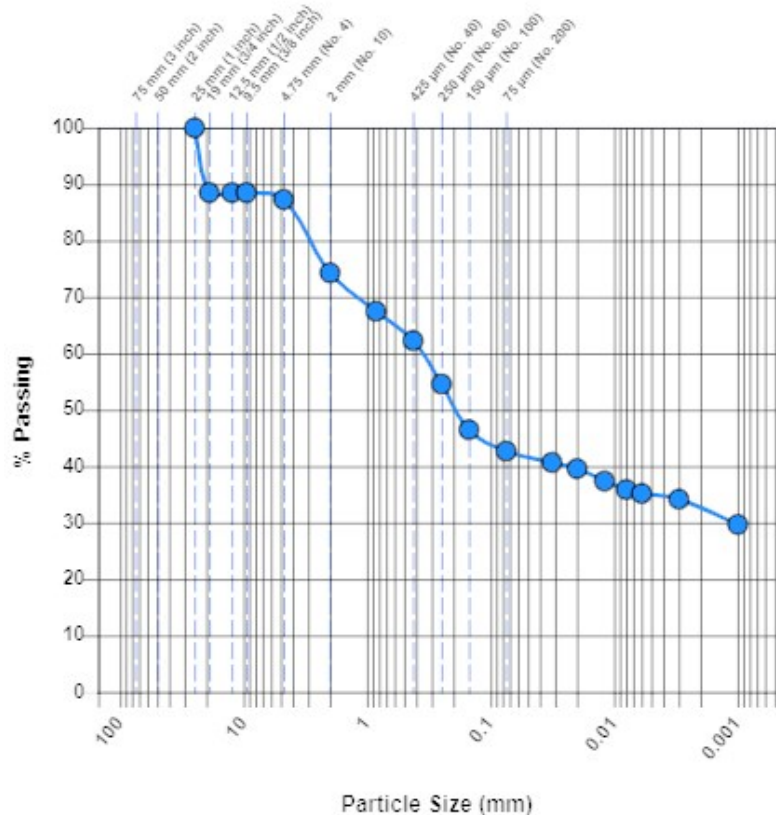
Sample Information

Sample Number:	499079	Depth (ft):	4.5-6
Boring Number:	MW-17WT	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
25 mm (1 inch)	100.0	-
19 mm (3/4 inch)	88.5	-
12.5 mm (1/2 inch)	88.5	-
9.5 mm (3/8 inch)	88.5	-
4.75 mm (No. 4)	87.3	-
2 mm (No. 10)	74.3	-
850 µm (No. 20)	67.5	-
425 µm (No. 40)	62.3	-
250 µm (No. 60)	54.6	-
150 µm (No. 100)	46.5	-
75 µm (No. 200)	42.7	-
32.1 (µm)	40.7	-
20.4 (µm)	39.6	-
11.8 (µm)	37.4	-
8.4 (µm)	35.9	-
5.9 (µm)	35.2	-
2.9 (µm)	34.2	-
1.3 (µm)	29.7	-



Soil Classification: SC Clayey sand

Gravel (%):	12.7	Sand (%):	44.6	Silt (%):	7.8	Clay (%):	34.9
D₆₀ (µm):	372.7	D₃₀ (µm):	1.1				

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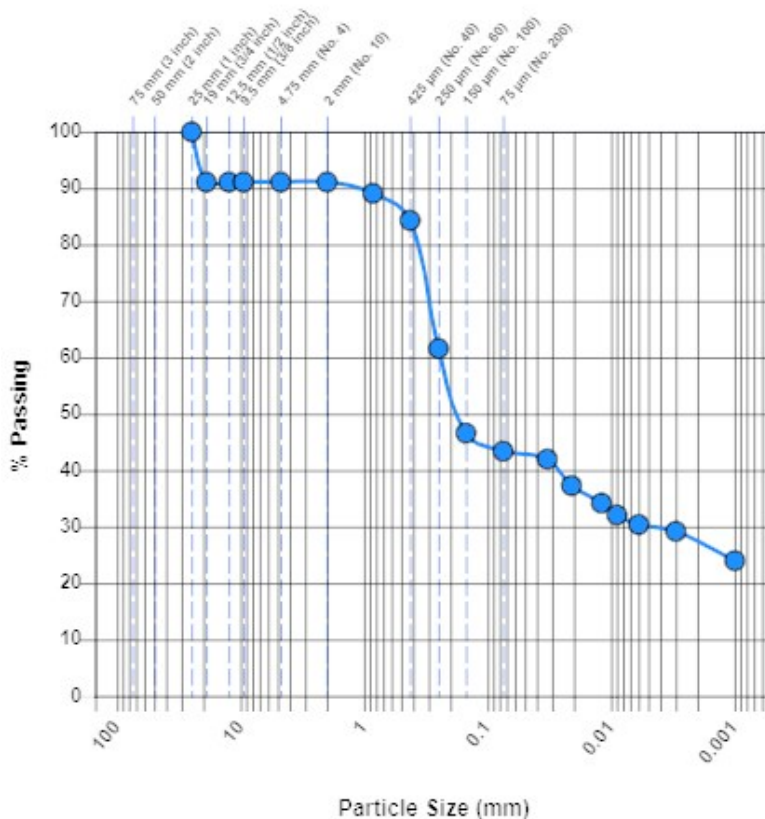
Sample Information

Sample Number:	499080	Depth (ft):	7-8.5
Boring Number:	MW-17WT	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
25 mm (1 inch)	100.0	-
19 mm (3/4 inch)	91.1	-
12.5 mm (1/2 inch)	91.1	-
9.5 mm (3/8 inch)	91.1	-
4.75 mm (No. 4)	91.1	-
2 mm (No. 10)	91.1	-
850 µm (No. 20)	89.1	-
425 µm (No. 40)	84.3	-
250 µm (No. 60)	61.6	-
150 µm (No. 100)	46.6	-
75 µm (No. 200)	43.4	-
32.5 µm	42.0	-
20.8 µm	37.3	-
12.1 µm	34.2	-
8.6 µm	32.1	-
6.1 µm	30.4	-
3.0 µm	29.2	-
1.3 µm	24.0	-



Soil Classification: SC Clayey sand

Gravel (%):	8.9	Sand (%):	47.7	Silt (%):	13.4	Clay (%):	30.0
D₆₀ (µm):	239.3	D₃₀ (µm):	5.0				

General

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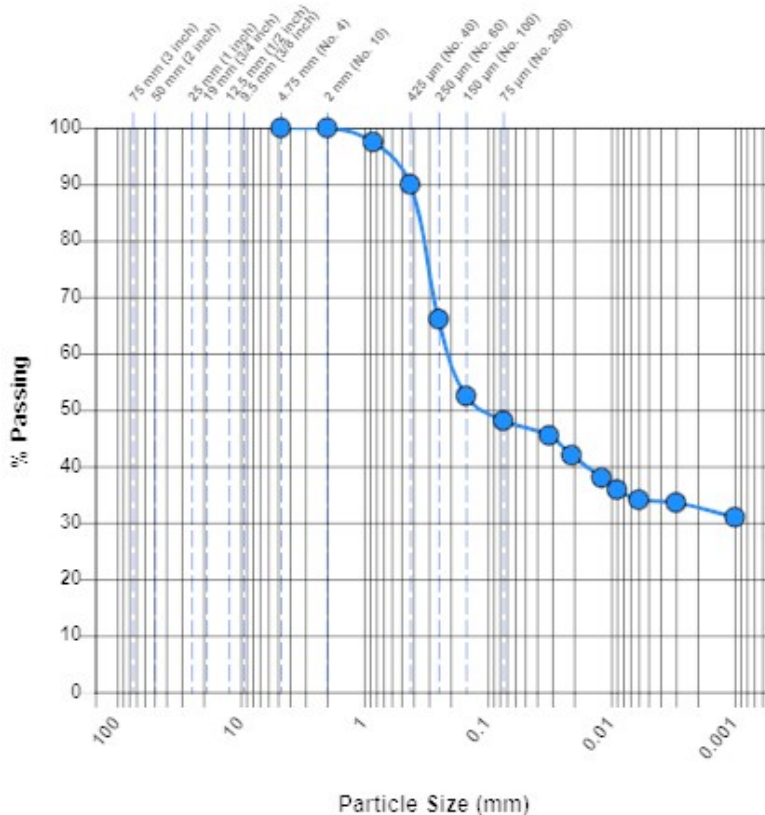
Sample Information

Sample Number:	499082	Depth (ft):	9.5-11
Boring Number:	MW-17WT	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	100.0	-
850 µm (No. 20)	97.5	-
425 µm (No. 40)	90.0	-
250 µm (No. 60)	66.1	-
150 µm (No. 100)	52.5	-
75 µm (No. 200)	48.1	-
32.4 (µm)	45.5	-
20.7 (µm)	42.0	-
12.0 (µm)	38.0	-
8.6 (µm)	35.9	-
6.1 (µm)	34.1	-
3.0 (µm)	33.6	-
1.3 (µm)	31.0	-



Soil Classification: SC Clayey sand

Gravel (%):	0.0	Sand (%):	51.9	Silt (%):	14.2	Clay (%):	33.9
D₆₀ (µm):	205.1						

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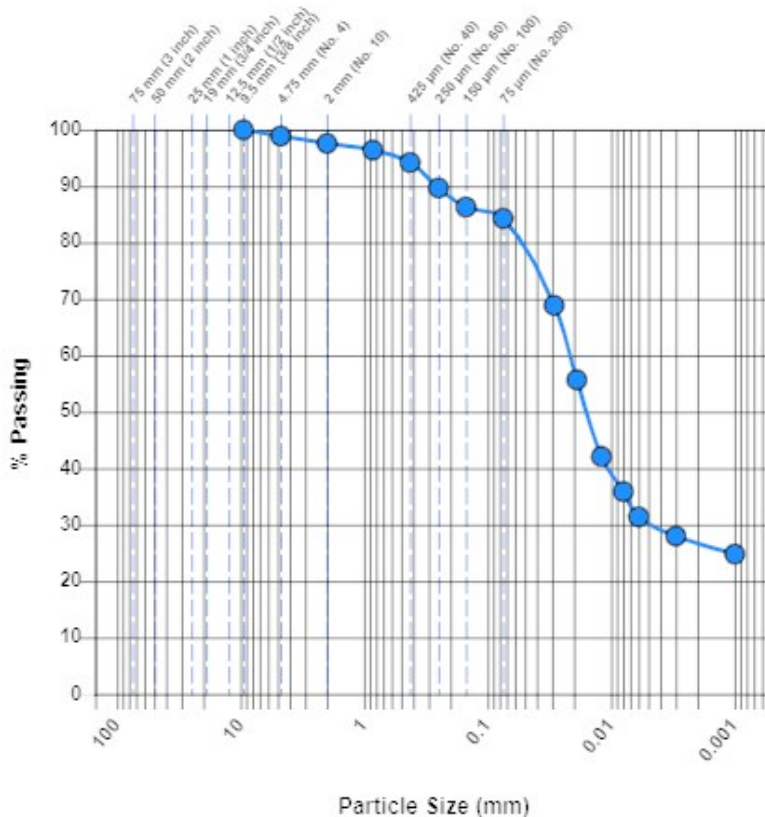
Sample Information

Sample Number:	499084	Depth (ft):	0-2
Boring Number:	B-18	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
9.5 mm (3/8 inch)	100.0	-
4.75 mm (No. 4)	98.9	-
2 mm (No. 10)	97.6	-
850 µm (No. 20)	96.4	-
425 µm (No. 40)	94.2	-
250 µm (No. 60)	89.7	-
150 µm (No. 100)	86.3	-
75 µm (No. 200)	84.3	-
29.2 µm	68.9	-
19.3 µm	55.7	-
11.6 µm	42.1	-
8.4 µm	35.9	-
6.0 µm	31.4	-
3.0 µm	28.0	-
1.3 µm	24.8	-



Soil Classification: CL Lean clay with sand

Gravel (%):	1.1	Sand (%):	14.6	Silt (%):	54.0	Clay (%):	30.3
D₆₀ (µm):	22.3	D₃₀ (µm):	4.8				

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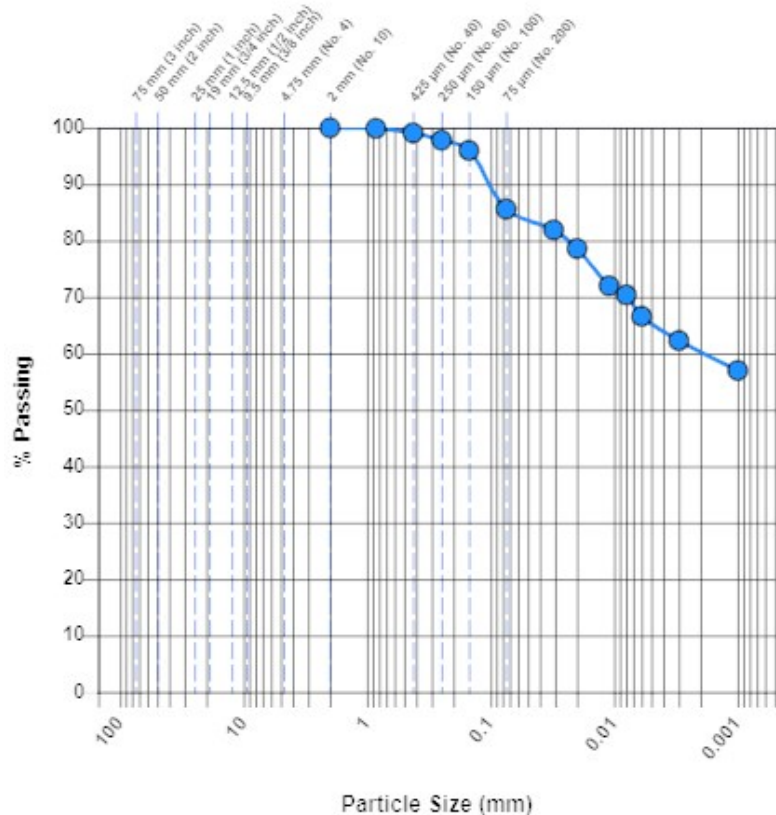
Sample Information

Sample Number:	499085	Depth (ft):	2-3.5
Boring Number:	B-18	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	99.1	-
250 µm (No. 60)	97.8	-
150 µm (No. 100)	96.0	-
75 µm (No. 200)	85.6	-
30.6 (µm)	81.9	-
19.5 (µm)	78.6	-
11.4 (µm)	72.0	-
8.1 (µm)	70.4	-
5.7 (µm)	66.6	-
2.8 (µm)	62.3	-
1.3 (µm)	57.0	-



Soil Classification: CH Fat Clay

Gravel (%):	0	Sand (%):	14.4	Silt (%):	20.4	Clay (%):	65.2
D₆₀ (µm):	2.1						

General

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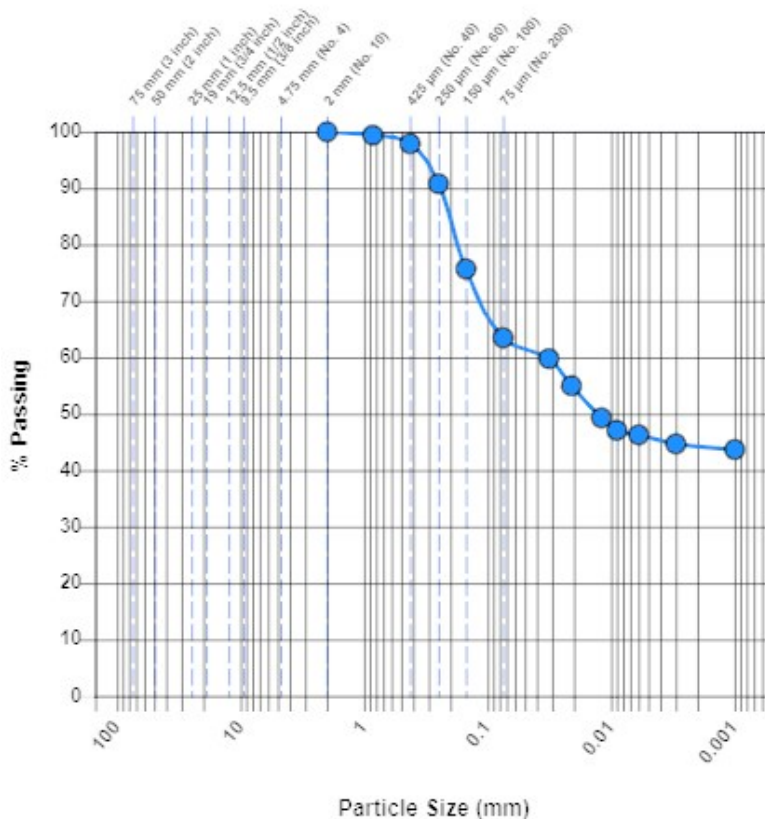
Sample Information

Sample Number:	499086	Depth (ft):	4.5-6
Boring Number:	B-18	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.4	-
425 µm (No. 40)	97.9	-
250 µm (No. 60)	90.8	-
150 µm (No. 100)	75.7	-
75 µm (No. 200)	63.5	-
32.4 (µm)	59.8	-
20.7 (µm)	55.0	-
12.1 (µm)	49.3	-
8.6 (µm)	47.1	-
6.0 (µm)	46.3	-
3.0 (µm)	44.7	-
1.3 (µm)	43.7	-



Soil Classification: CH Sandy fat clay

Gravel (%): 0 **Sand (%):** 36.5 **Silt (%):** 17.7 **Clay (%):** 45.8
D₆₀ (µm): 34.3

General

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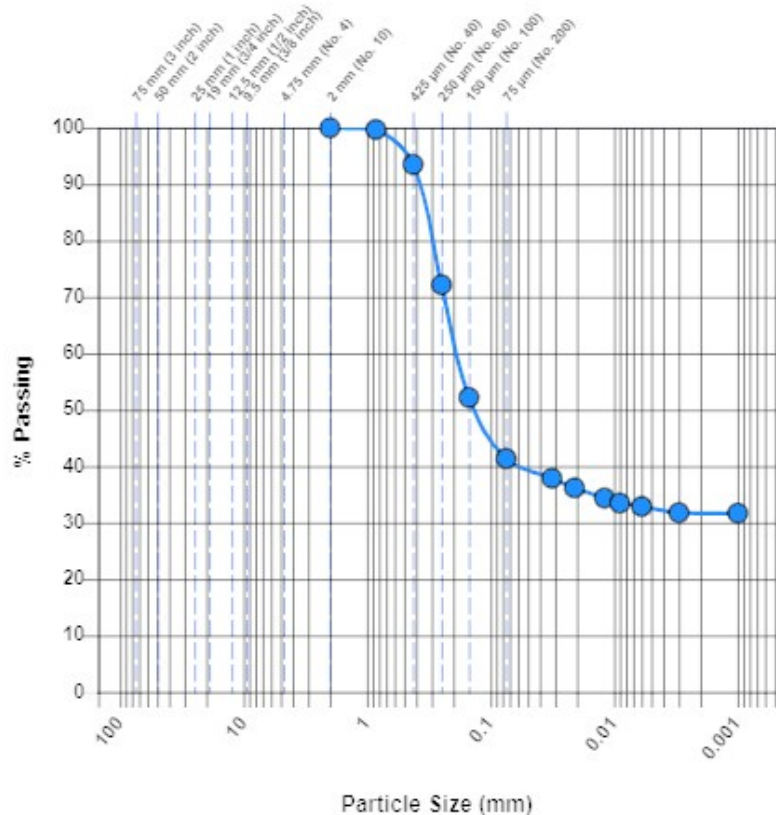
Sample Information

Sample Number:	499088	Depth (ft):	9.5-11
Boring Number:	B-18	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.7	-
425 µm (No. 40)	93.5	-
250 µm (No. 60)	72.2	-
150 µm (No. 100)	52.2	-
75 µm (No. 200)	41.4	-
32.3 (µm)	37.9	-
20.6 (µm)	36.2	-
11.9 (µm)	34.4	-
8.5 (µm)	33.5	-
6.0 (µm)	32.9	-
2.9 (µm)	31.8	-
1.3 (µm)	31.7	-



Soil Classification: SC Clayey sand

Gravel (%):	0	Sand (%):	58.6	Silt (%):	8.9	Clay (%):	32.5
D₆₀ (µm):	189.0						

General

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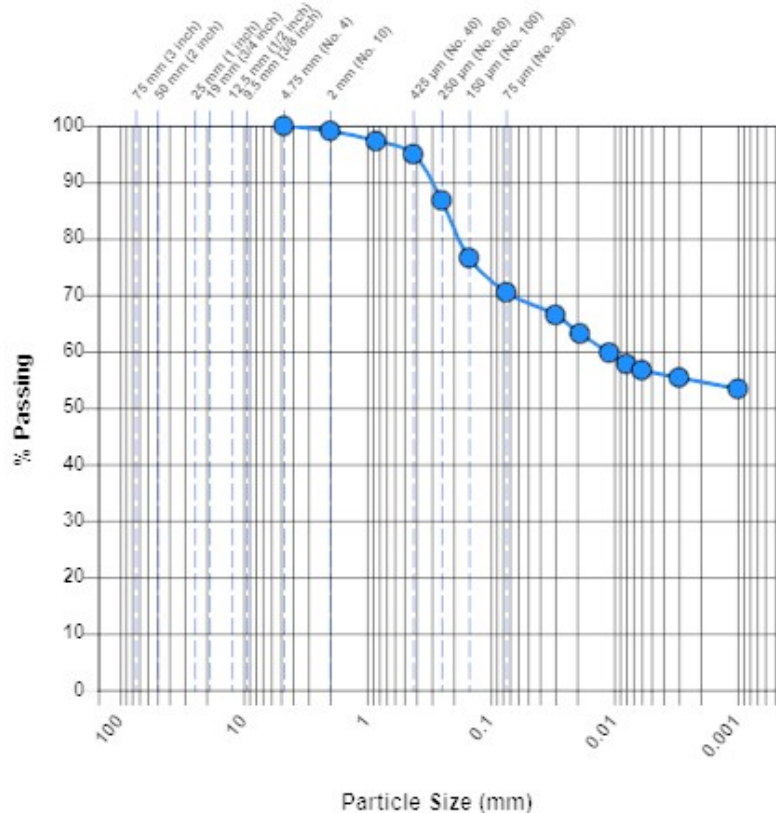
Sample Information

Sample Number:	499090	Depth (ft):	12-13.5
Boring Number:	B-18	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.1	-
850 µm (No. 20)	97.3	-
425 µm (No. 40)	95.0	-
250 µm (No. 60)	86.8	-
150 µm (No. 100)	76.6	-
75 µm (No. 200)	70.5	-
30.1 (µm)	66.5	-
19.2 (µm)	63.2	-
11.2 (µm)	59.8	-
8.0 (µm)	57.8	-
5.6 (µm)	56.7	-
2.8 (µm)	55.4	-
1.2 (µm)	53.4	-



Soil Classification: CH Fat clay with sand

Gravel (%):	0.0	Sand (%):	29.5	Silt (%):	14.2	Clay (%):	56.3
D₆₀ (µm):	11.5						

General

Bob K. Wilt

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Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

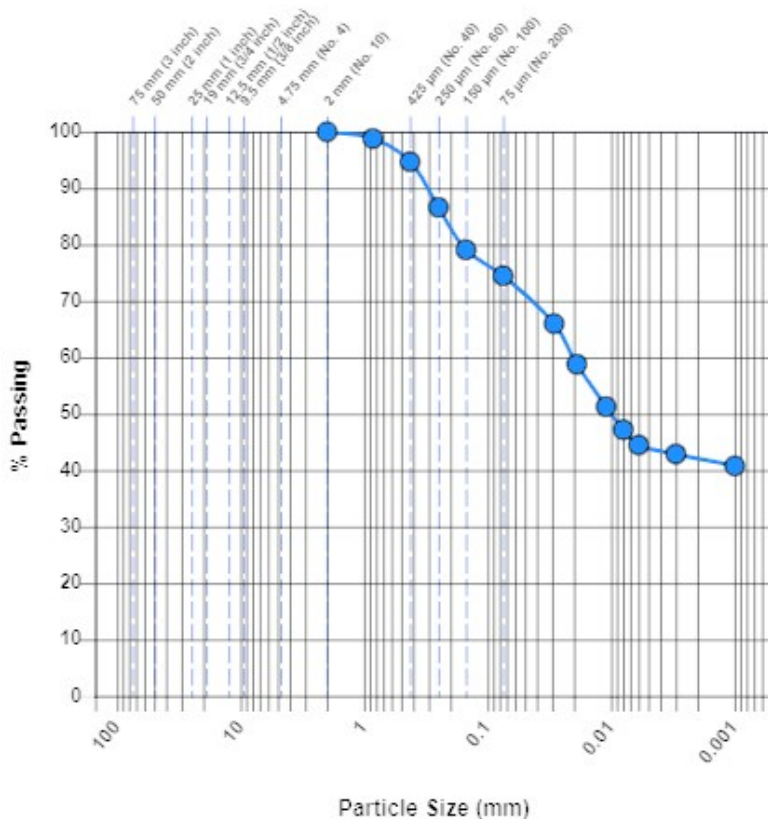
Sample Information

Sample Number:	499091	Depth (ft):	0-2
Boring Number:	B-19	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	98.8	-
425 µm (No. 40)	94.7	-
250 µm (No. 60)	86.6	-
150 µm (No. 100)	79.1	-
75 µm (No. 200)	74.5	-
28.9 (µm)	66.0	-
18.8 (µm)	58.8	-
11.1 (µm)	51.3	-
8.0 (µm)	47.2	-
5.7 (µm)	44.5	-
2.8 (µm)	42.9	-
1.2 (µm)	40.8	-



Soil Classification: CH Fat clay with sand

Gravel (%): 0 **Sand (%):** 25.5 **Silt (%):** 30.5 **Clay (%):** 44.0
D₆₀ (µm): 20.7

General

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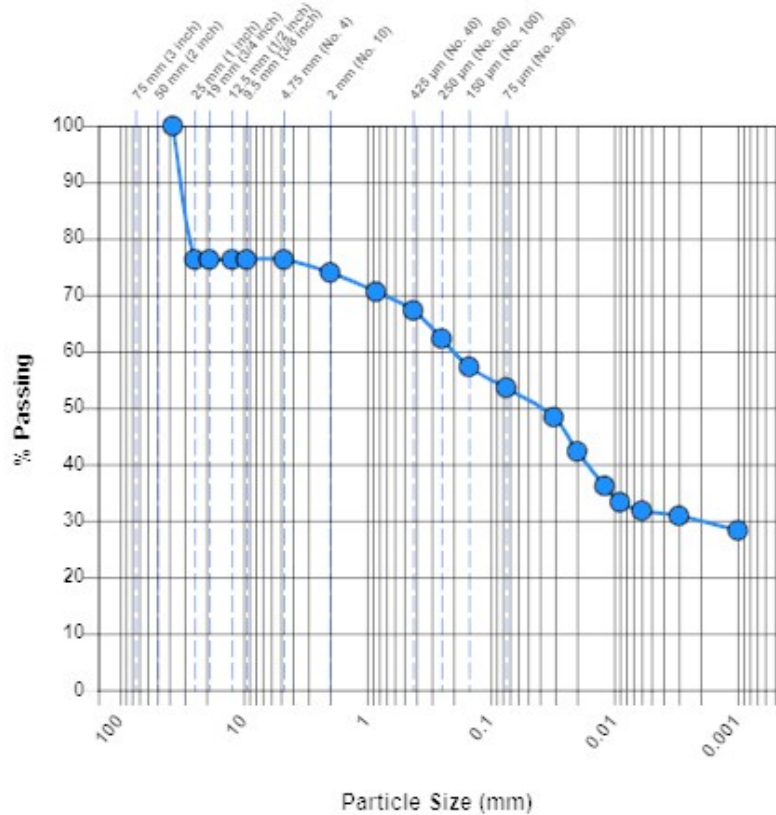
Sample Information

Sample Number: 499092 **Depth (ft):** 2-3.5
Boring Number: B-19 **Sampled By:** Drill Crew
Sample Date: 12/15/2022
Received Date: 12/15/2022 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Tested Date: 12/16/2022 **Tested By:** Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
37.5 mm (1.5 inch)	100.0	-
25 mm (1 inch)	76.3	-
19 mm (3/4 inch)	76.3	-
12.5 mm (1/2 inch)	76.3	-
9.5 mm (3/8 inch)	76.3	-
4.75 mm (No. 4)	76.3	-
2 mm (No. 10)	74.0	-
850 µm (No. 20)	70.6	-
425 µm (No. 40)	67.3	-
250 µm (No. 60)	62.3	-
150 µm (No. 100)	57.3	-
75 µm (No. 200)	53.6	-
31.4 (µm)	48.4	-
20.2 (µm)	42.3	-
11.9 (µm)	36.2	-
8.5 (µm)	33.3	-
6.0 (µm)	31.8	-
2.9 (µm)	30.9	-
1.3 (µm)	28.3	-



Soil Classification: CH Fat clay with gravel

Gravel (%): 23.7 **Sand (%):** 22.7 **Silt (%):** 22.1 **Clay (%):** 31.5
D₆₀ (µm): 204.0 **D₃₀ (µm):** 2.3

General

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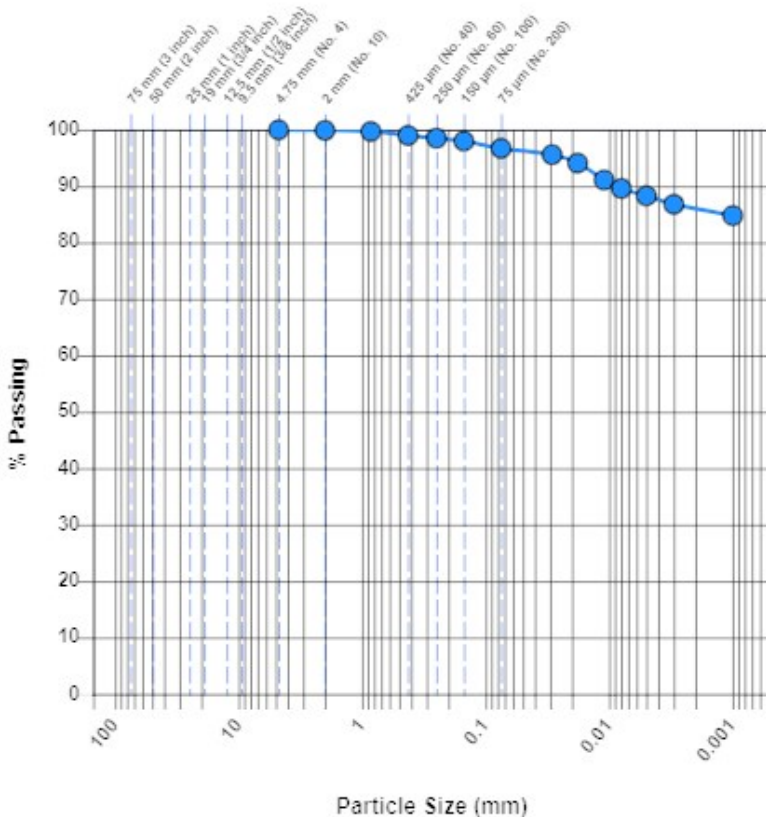
Sample Information

Sample Number:	499093	Depth (ft):	17-18.5
Boring Number:	B-19	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.9	-
850 µm (No. 20)	99.7	-
425 µm (No. 40)	99.0	-
250 µm (No. 60)	98.5	-
150 µm (No. 100)	98.0	-
75 µm (No. 200)	96.7	-
28.9 (µm)	95.6	-
18.4 (µm)	94.1	-
10.7 (µm)	91.1	-
7.6 (µm)	89.6	-
5.4 (µm)	88.3	-
2.6 (µm)	86.8	-
1.2 (µm)	84.8	-



Soil Classification: CH Fat Clay

Gravel (%): 0.0 **Sand (%):** 3.3 **Silt (%):** 8.4 **Clay (%):** 88.3

General

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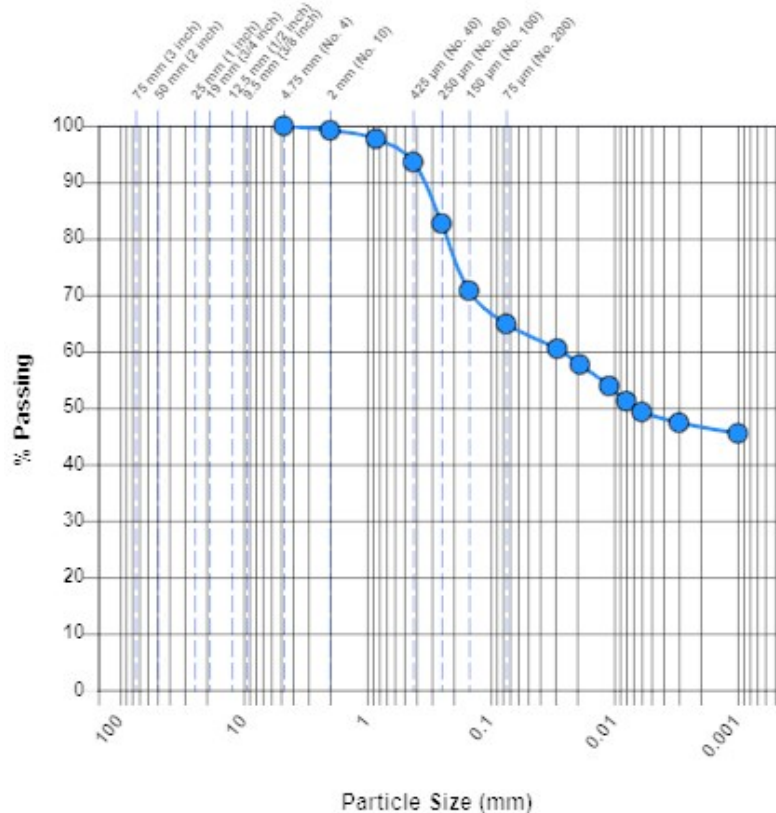
Sample Information

Sample Number:	499095	Depth (ft):	0-2
Boring Number:	B-20	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.2	-
850 µm (No. 20)	97.7	-
425 µm (No. 40)	93.6	-
250 µm (No. 60)	82.7	-
150 µm (No. 100)	70.8	-
75 µm (No. 200)	64.9	-
28.9 (µm)	60.5	-
18.5 (µm)	57.7	-
10.9 (µm)	53.9	-
7.8 (µm)	51.2	-
5.5 (µm)	49.3	-
2.7 (µm)	47.4	-
1.2 (µm)	45.5	-



Soil Classification: CH Sandy fat clay

Gravel (%):	0.0	Sand (%):	35.1	Silt (%):	16.2	Clay (%):	48.7
D₆₀ (µm):	27.2						

General

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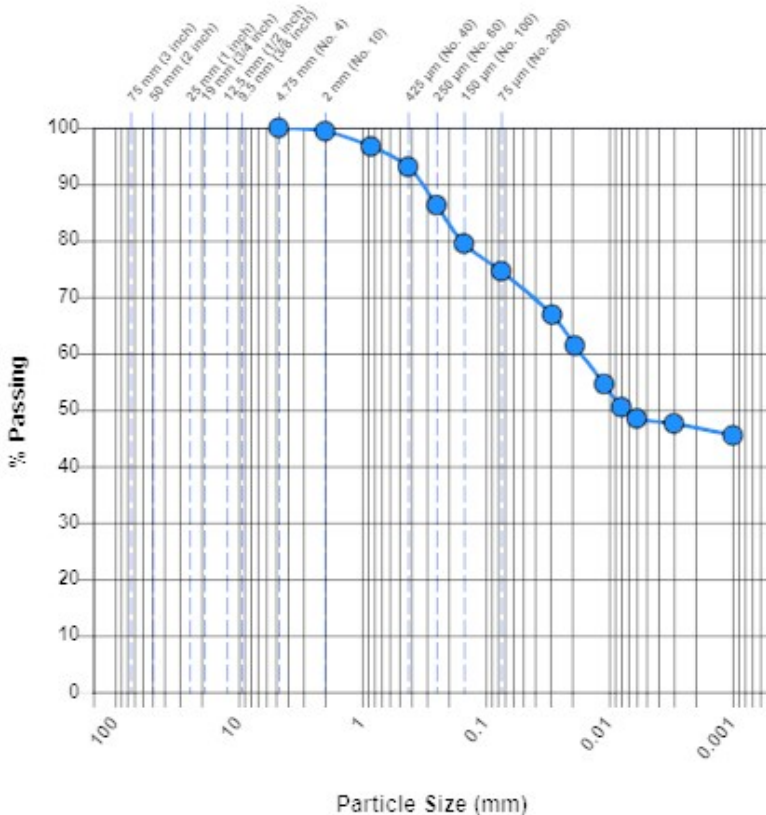
Sample Information

Sample Number:	499096	Depth (ft):	0-2
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.4	-
850 µm (No. 20)	96.7	-
425 µm (No. 40)	93.1	-
250 µm (No. 60)	86.3	-
150 µm (No. 100)	79.5	-
75 µm (No. 200)	74.6	-
28.8 (µm)	66.9	-
18.6 (µm)	61.4	-
11.0 (µm)	54.6	-
7.9 (µm)	50.5	-
5.6 (µm)	48.5	-
2.8 (µm)	47.6	-
1.2 (µm)	45.5	-



Soil Classification: CH Fat clay with sand

Gravel (%):	0.0	Sand (%):	25.4	Silt (%):	26.4	Clay (%):	48.2
D₆₀ (µm):	17.4						

General

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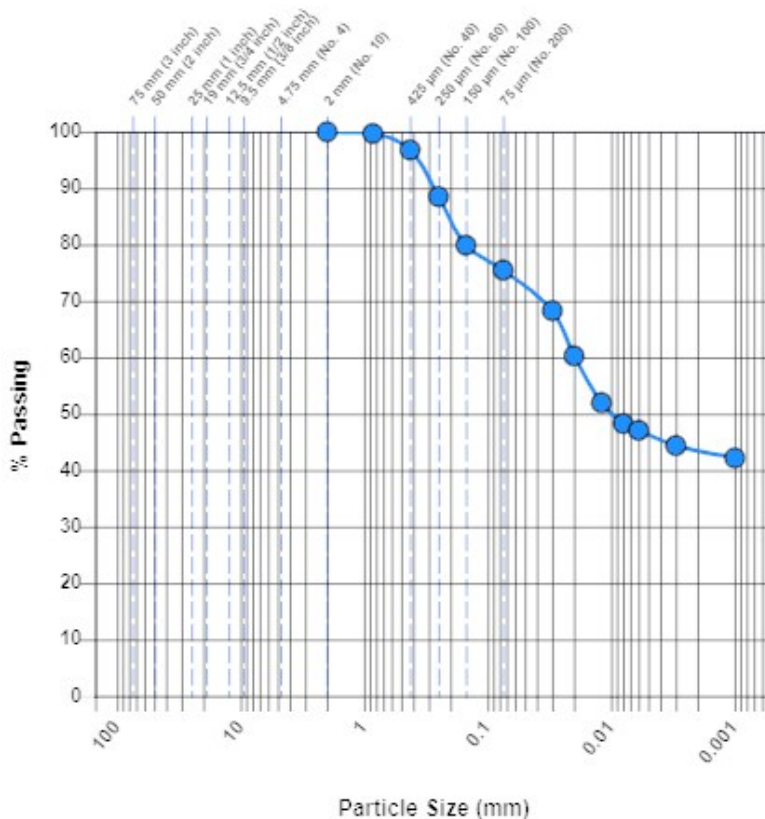
Sample Information

Sample Number:	499098	Depth (ft):	2-3.5
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.7	-
425 µm (No. 40)	96.8	-
250 µm (No. 60)	88.5	-
150 µm (No. 100)	79.9	-
75 µm (No. 200)	75.5	-
30.1 (µm)	68.3	-
19.5 (µm)	60.3	-
11.5 (µm)	52.0	-
8.2 (µm)	48.3	-
5.8 (µm)	47.1	-
2.9 (µm)	44.4	-
1.3 (µm)	42.2	-



Soil Classification: CH Fat clay with sand

Gravel (%): 0 **Sand (%):** 24.5 **Silt (%):** 29.3 **Clay (%):** 46.2
D₆₀ (µm): 19.7

General

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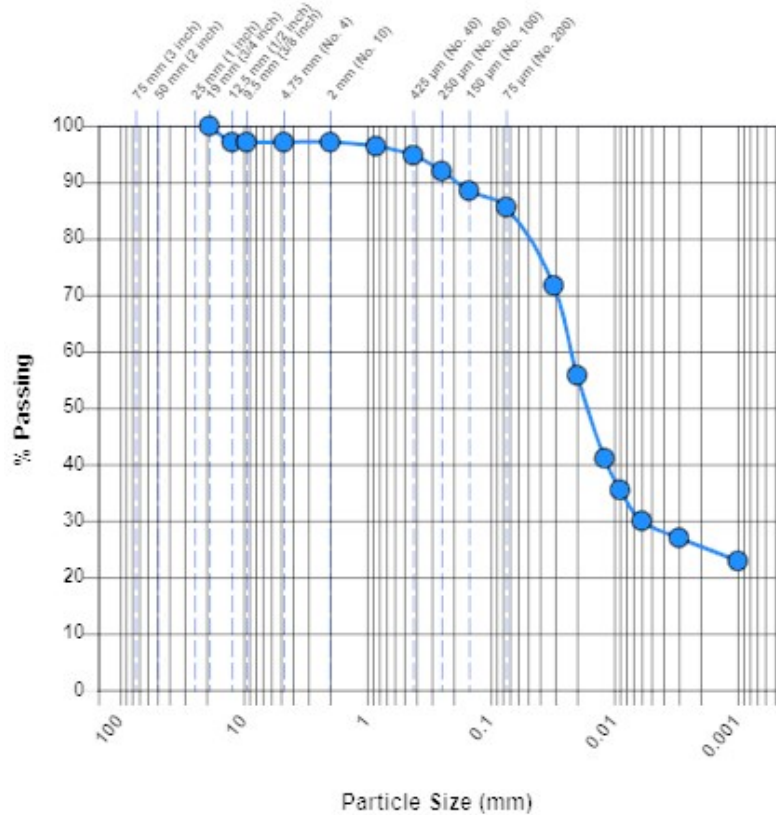
Sample Information

Sample Number:	499099	Depth (ft):	9.5-11
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
19 mm (3/4 inch)	100.0	-
12.5 mm (1/2 inch)	97.1	-
9.5 mm (3/8 inch)	97.1	-
4.75 mm (No. 4)	97.1	-
2 mm (No. 10)	97.1	-
850 µm (No. 20)	96.4	-
425 µm (No. 40)	94.8	-
250 µm (No. 60)	92.0	-
150 µm (No. 100)	88.5	-
75 µm (No. 200)	85.6	-
30.5 (µm)	71.7	-
20.1 (µm)	55.8	-
12.0 (µm)	41.1	-
8.6 (µm)	35.5	-
6.1 (µm)	30.0	-
3.0 (µm)	27.0	-
1.3 (µm)	22.9	-



Soil Classification: CL Lean clay

Gravel (%):	2.9	Sand (%):	11.5	Silt (%):	56.6	Clay (%):	29.0
D₆₀ (µm):	22.9	D₃₀ (µm):	6.0				

General

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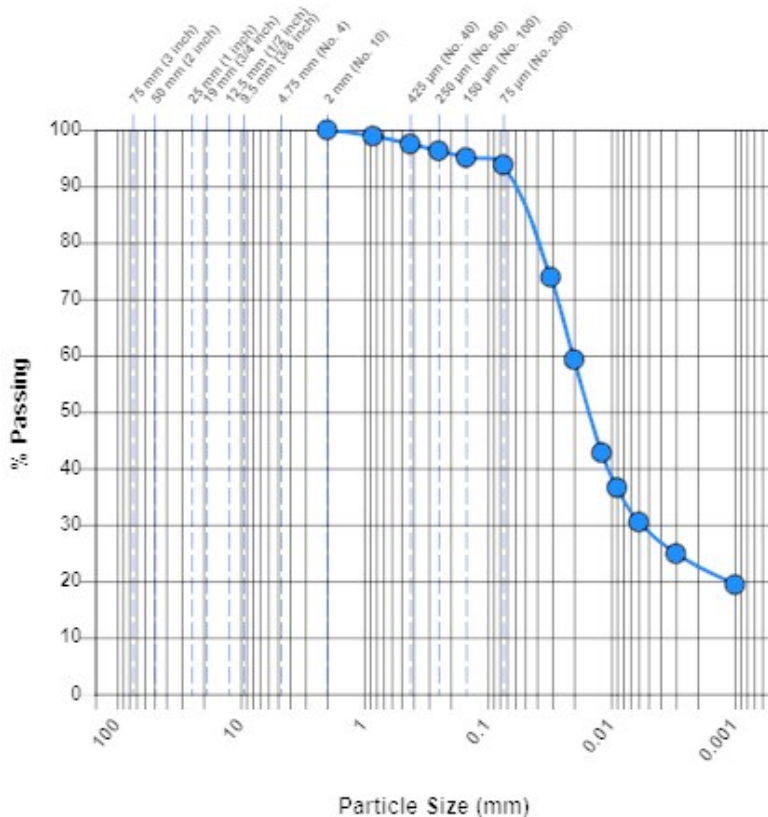
Sample Information

Sample Number:	499100	Depth (ft):	12-13.5'
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	98.9	-
425 µm (No. 40)	97.5	-
250 µm (No. 60)	96.3	-
150 µm (No. 100)	95.1	-
75 µm (No. 200)	93.8	-
30.9 (µm)	73.9	-
20.2 (µm)	59.3	-
12.1 (µm)	42.8	-
8.6 (µm)	36.6	-
6.2 (µm)	30.5	-
3.0 (µm)	24.9	-
1.4 (µm)	19.4	-



Soil Classification: CL Lean clay

Gravel (%): 0	Sand (%): 6.2	Silt (%): 65.2	Clay (%): 28.6
D₆₀ (µm): 20.5	D₃₀ (µm): 5.7		

General

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Vernon County Landfill
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Viroqua, WI 54665

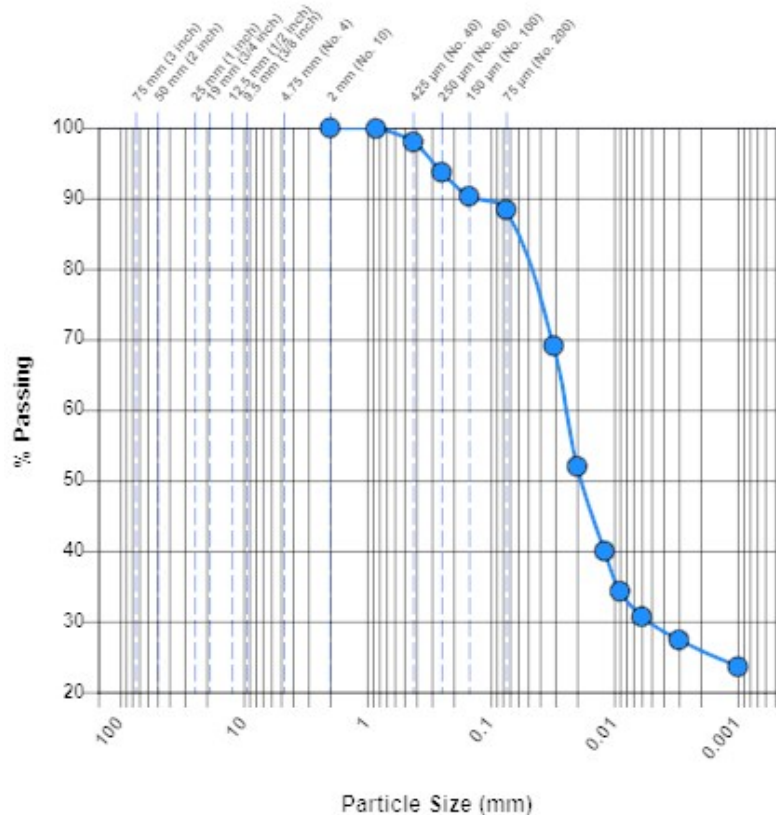
Sample Information

Sample Number:	499101	Depth (ft):	17-18.5
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	99.9	-
425 µm (No. 40)	98.0	-
250 µm (No. 60)	93.7	-
150 µm (No. 100)	90.3	-
75 µm (No. 200)	88.4	-
30.8 (µm)	69.1	-
20.3 (µm)	52.0	-
12.0 (µm)	40.0	-
8.6 (µm)	34.3	-
6.1 (µm)	30.7	-
3.0 (µm)	27.4	-
1.3 (µm)	23.6	-



Soil Classification: CL Lean clay

Gravel (%):	0	Sand (%):	11.6	Silt (%):	58.8	Clay (%):	29.6
D₆₀ (µm):	25.1	D₃₀ (µm):	5.4				

General

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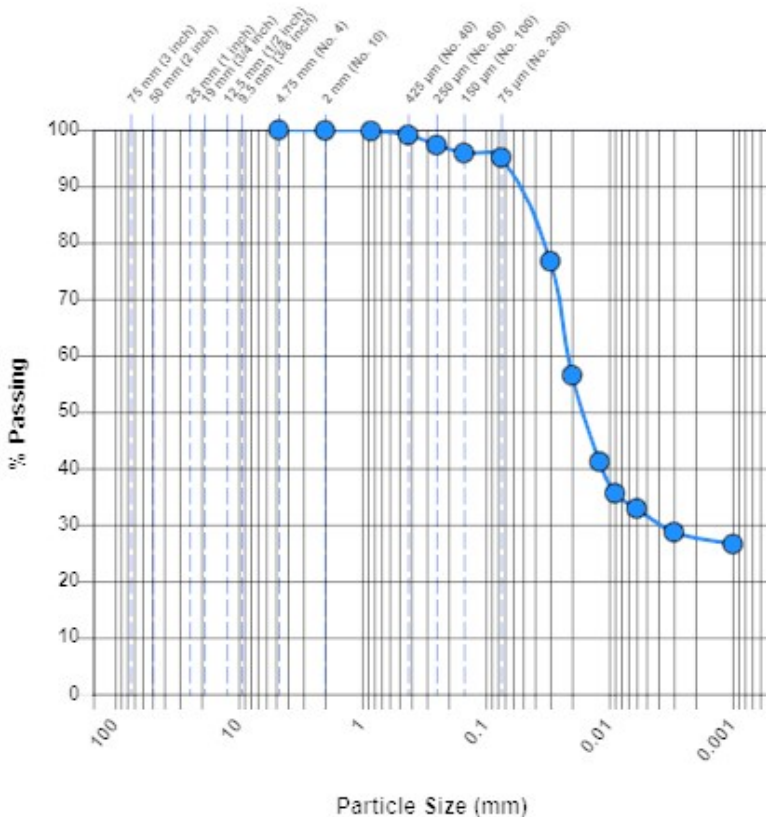
Sample Information

Sample Number:	499102	Depth (ft):	19.5-21
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
4.75 mm (No. 4)	100.0	-
2 mm (No. 10)	99.9	-
850 µm (No. 20)	99.8	-
425 µm (No. 40)	99.1	-
250 µm (No. 60)	97.3	-
150 µm (No. 100)	95.9	-
75 µm (No. 200)	95.1	-
30.1 (µm)	76.7	-
20.0 (µm)	56.5	-
12.0 (µm)	41.2	-
8.6 (µm)	35.6	-
6.1 (µm)	32.9	-
3.0 (µm)	28.7	-
1.3 (µm)	26.6	-



Soil Classification: CL Lean clay

Gravel (%):	0.0	Sand (%):	4.9	Silt (%):	63.6	Clay (%):	31.5
D₆₀ (µm):	21.7	D₃₀ (µm):	3.9				

General

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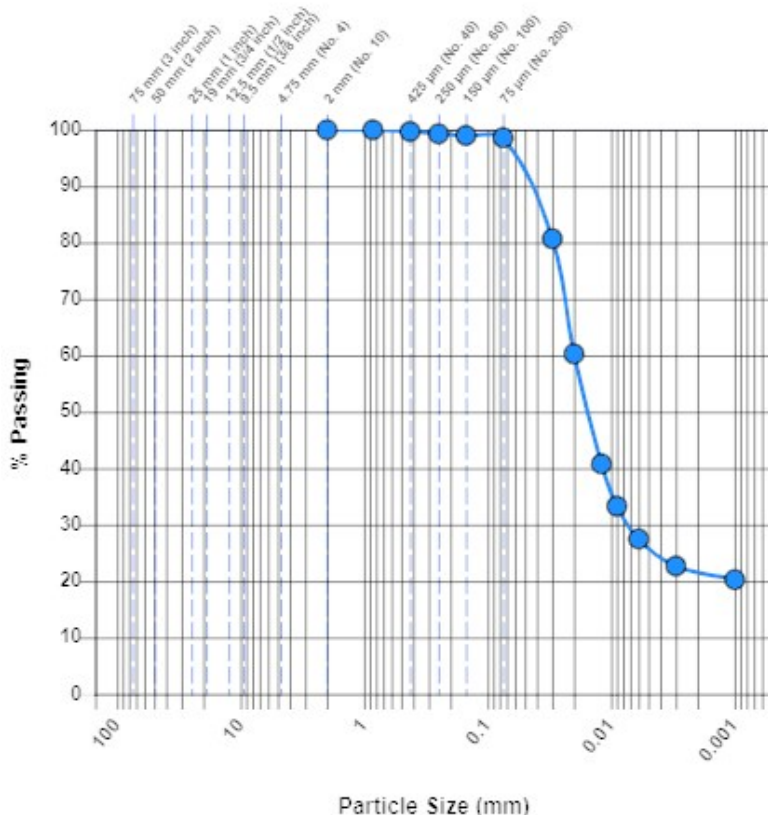
Sample Information

Sample Number:	499104	Depth (ft):	29.5-31
Boring Number:	B-21	Sampled By:	Drill Crew
Sample Date:	12/15/2022		
Received Date:	12/15/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/16/2022	Tested By:	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
2 mm (No. 10)	100.0	-
850 µm (No. 20)	100.0	-
425 µm (No. 40)	99.7	-
250 µm (No. 60)	99.3	-
150 µm (No. 100)	99.0	-
75 µm (No. 200)	98.6	-
30.0 (µm)	80.7	-
20.0 (µm)	60.3	-
12.0 (µm)	40.8	-
8.7 (µm)	33.3	-
6.2 (µm)	27.5	-
3.0 (µm)	22.7	-
1.3 (µm)	20.3	-



Soil Classification: CL Lean clay

Gravel (%):	0	Sand (%):	1.4	Silt (%):	72.7	Clay (%):	25.9
D₆₀ (µm):	19.9	D₃₀ (µm):	7.3				

General

Bob K. Wilt

Standard Proctor M-D Relationship

ASTM D698

Report Date: 12/07/2022

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
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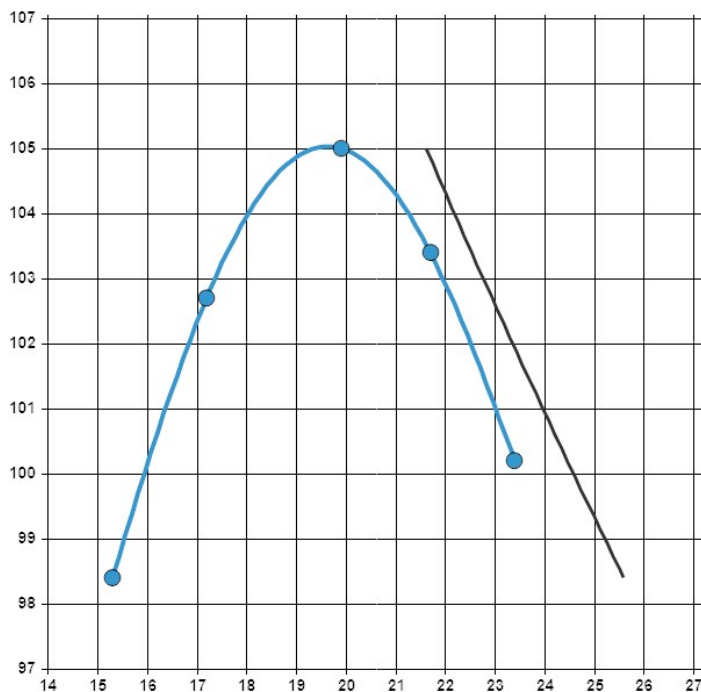
Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number:	497688	Depth (ft):	0-2'
Boring Number:	B-19	Sampled By:	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Location Details:	B-19, 0-2'		
Sample Date:	12/07/2022		
Received Date:	12/07/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/07/2022	Tested By:	Vang, Yang

Laboratory Data



Proctor ID:	P-01-std	
Maximum Dry Density (pcf):	105.0	
Optimum Moisture (%):	19.6	
Method:	Method A	
Preparation Method:	Moist	
Rammer Type:	Manual Round	
Specific Gravity:	2.65	
Specific Gravity Source:	Assumed	
Passes #200 (%):	75.0	Retained #200 (%): 25.0
Retained On 3/4 (%):	0	Retained On 3/8 (%): 0
Retained On #4 (%):	0	Passing #4 (%): 100

Classification: CH Fat clay with sand, brown

General

Remarks: The % passing the #200 is for informational purposes only.

Bob K. Wilt

Modified Proctor M-D Relationship

ASTM D1557

11001 Hampshire Avenue S
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Client:

Vernon County Solid Waste & Recycling
Department
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Viroqua, WI 54665

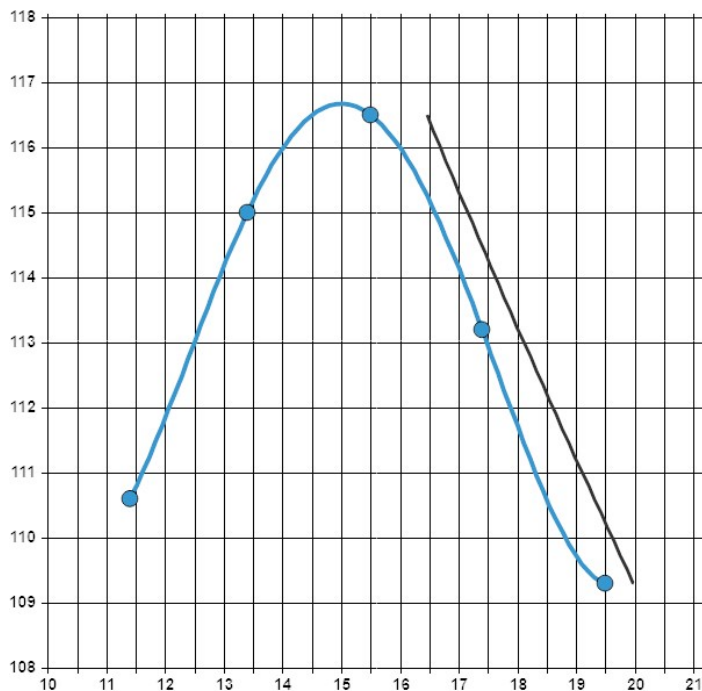
Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number:	497688	Depth (ft):	0-2'
Boring Number:	B-19	Sampled By:	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Location Details:	B-19, 0-2'		
Sample Date:	12/07/2022		
Received Date:	12/07/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/07/2022	Tested By:	Vang, Yang

Laboratory Data



Proctor ID:	P-01-mod
Maximum Dry Density (pcf):	116.7
Optimum Moisture (%):	15.0
Method:	Method A
Total Retained:	0 % on #4 Sieve
Preparation Method:	Moist
Rammer Type:	Mechanical Round
Specific Gravity:	2.70
Specific Gravity Source:	Assumed
Passes #200 (%):	75.0
Retained #200 (%):	25.0
Retained On 3/4 (%):	0
Retained On 3/8 (%):	0
Retained On #4 (%):	0
Passing #4 (%):	100

Classification: CH Fat clay with sand, brown

General

Remarks: The % passing the #200 is for informational purposes only.

Bob K. Wilt

Standard Proctor M-D Relationship

ASTM D698

Report Date: 07/03/2023

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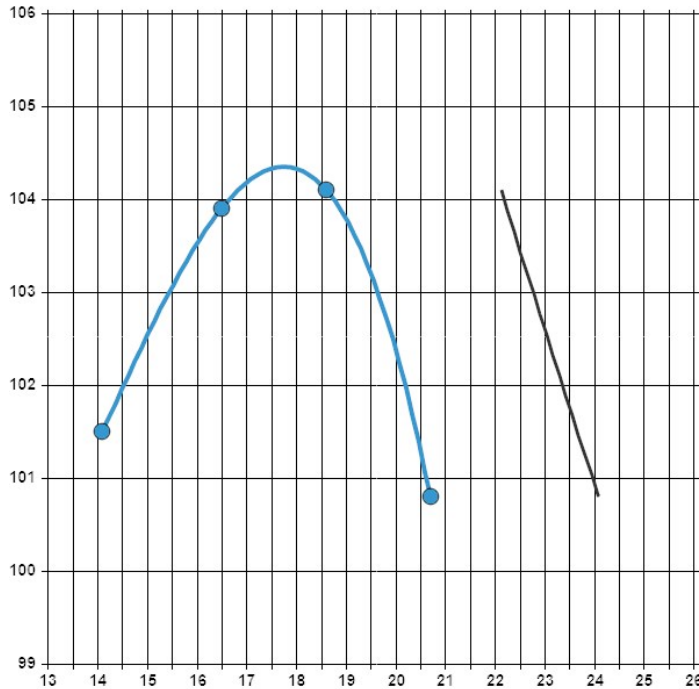
Project:

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Viroqua, WI 54665

Sample Information

Sample Number:	522626	Depth (ft):	0-2
Boring Number:	B-19	Sampled By:	Wright, Brandon
Sampling Method:	Project Specified		
Location Details:	B-19		
Sample Date:	05/24/2023		
Received Date:	05/24/2023	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	05/24/2023	Tested By:	Vang, Yang

Laboratory Data



Proctor ID:	P-03-std	
Maximum Dry Density (pcf):	104.3	
Optimum Moisture (%):	17.8	
Method:	Method A	
Preparation Method:	Moist	
Rammer Type:	Manual Round	
Specific Gravity:	2.67	
Specific Gravity Source:	ASTM D854	
Passes #200 (%):	95.0	Retained #200 (%): 5.0
Retained On 3/4 (%):	0	Retained On 3/8 (%): 0
Retained On #4 (%):	1	Passing #4 (%): 99

Classification: Fat Clay (CH)

General

Remarks: The % passing the #200 is for informational purposes only.

Bob K. Wright

Standard Proctor M-D Relationship

ASTM D698

Report Date: 07/03/2023

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

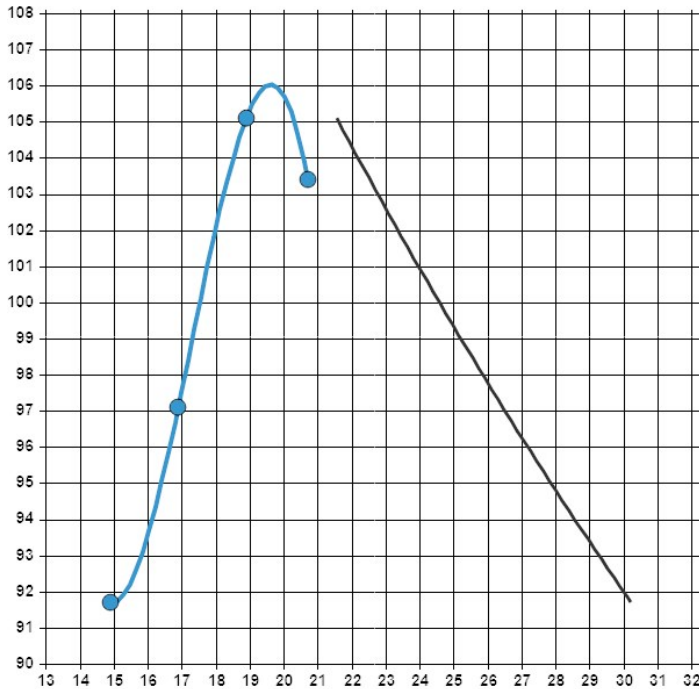
Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number:	522628	Depth (ft):	0-2
Boring Number:	B-20	Sampled By:	Wright, Brandon
Sampling Method:	Project Specified		
Location Details:	B-20		
Sample Date:	05/24/2023		
Received Date:	05/24/2023	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	05/24/2023	Tested By:	Vang, Yang

Laboratory Data



Proctor ID:	P-04-std		
Maximum Dry Density (pcf):	106.0		
Optimum Moisture (%):	19.6		
Method:	Method A		
Preparation Method:	Moist		
Rammer Type:	Manual Round		
Specific Gravity:	2.66		
Specific Gravity Source:	ASTM D854		
Passes #200 (%):	52.0	Retained #200 (%):	48.0
Retained On 3/4 (%):	4	Retained On 3/8 (%):	5
Retained On #4 (%):	5	Passing #4 (%):	95

Classification: CL Sandy lean clay, brown

General

Remarks: The % passing the #200 is for informational purposes only.

Bob K. Wright

Standard Proctor M-D Relationship

ASTM D698

Report Date: 12/07/2022

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

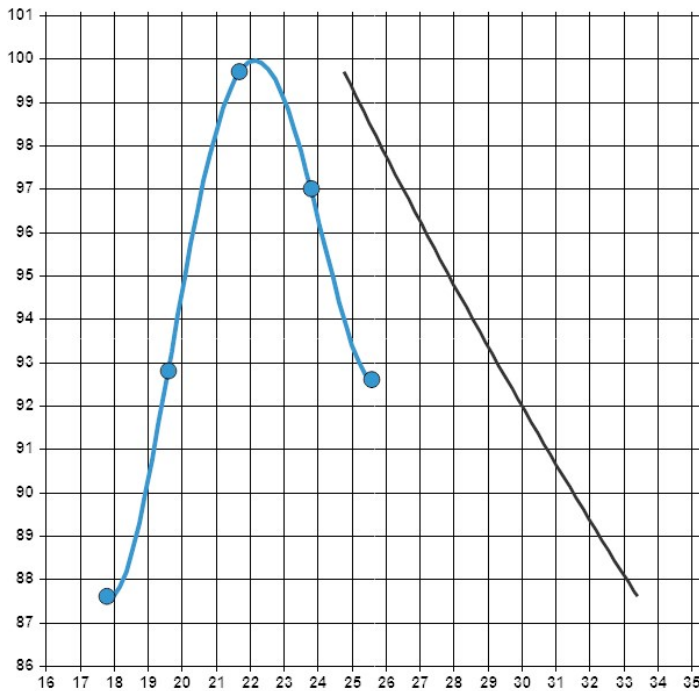
Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number:	497689	Depth (ft):	0-2'
Boring Number:	B-21	Sampled By:	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Location Details:	B-21, 0-2'		
Sample Date:	12/07/2022		
Received Date:	12/07/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/07/2022	Tested By:	Vang, Yang

Laboratory Data



Proctor ID:	P-02-std		
Maximum Dry Density (pcf):	100.0		
Optimum Moisture (%):	22.1		
Method:	Method A		
Preparation Method:	Moist		
Rammer Type:	Manual Round		
Specific Gravity:	2.65		
Specific Gravity Source:	Assumed		
Passes #200 (%):	72.0	Retained #200 (%):	28.0
Retained On 3/4 (%):	0	Retained On 3/8 (%):	0
Retained On #4 (%):	1	Passing #4 (%):	99

Classification: CH Fat clay with sand, brown

General

Remarks: The % passing the #200 is for informational purposes only.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Modified Proctor M-D Relationship

ASTM D1557

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

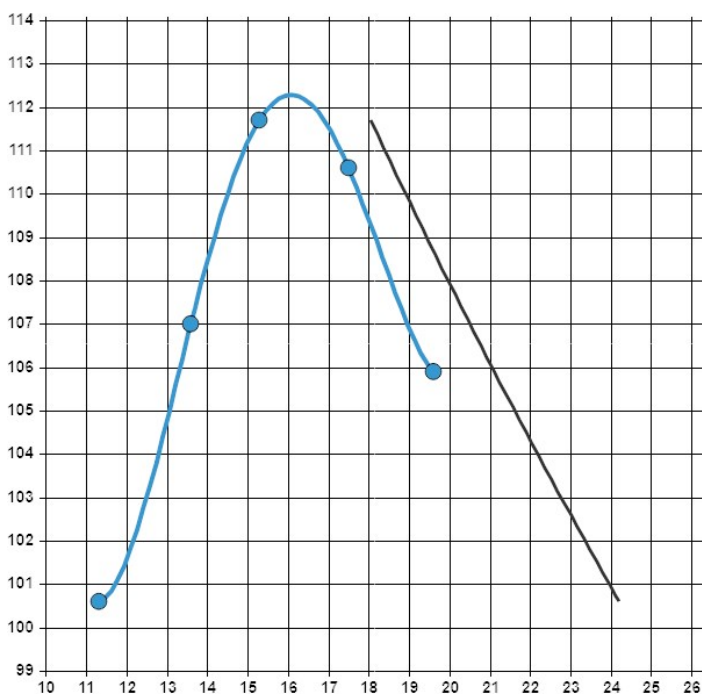
Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number:	497689	Depth (ft):	0-2'
Boring Number:	B-21	Sampled By:	Drill Crew
Sampling Method:	Auger Boring ASTM D1452		
Location Details:	B-21, 0-2'		
Sample Date:	12/07/2022		
Received Date:	12/07/2022	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	12/07/2022	Tested By:	Vang, Yang

Laboratory Data



Proctor ID:	P-02-mod		
Maximum Dry Density (pcf):	112.3		
Optimum Moisture (%):	16.1		
Method:	Method A		
Total Retained:	1 % on #4 Sieve		
Preparation Method:	Moist		
Rammer Type:	Mechanical Round		
Specific Gravity:	2.65		
Specific Gravity Source:	Assumed		
Passes #200 (%):	72.0	Retained #200 (%):	28.0
Retained On 3/4 (%):	0	Retained On 3/8 (%):	0
Retained On #4 (%):	1	Passing #4 (%):	99

Classification: CH Fat clay with sand, brown

General

Remarks: The % passing the #200 is for informational purposes only.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number: 522626 **Depth (ft):** 0-2
Sampling Method: Project Specified **Sampled By:** Wright, Brandon
Boring Number: B-19
Sample Location : B-19
Sample Date: 05/24/2023
Received Date: 05/24/2023 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Tested Date: 06/09/2023 **Tested By:** Seokaran, Kanhai

Laboratory Data

Type Of Specimen: Remolded **Back Pressure (psi):** 81.00
Permeant Liquid: Water **Specific Gravity:** 2.67 (ASTM D854)
Saturation B Coefficient: 1.00 **Effective Pressure (psi):** 8.00
Method: Method C Falling Head Rising Tailwater

Elapsed Time (sec)	Average Test Temp. (°C)	Influent Reading Initial (cm)	Influent Reading Final (cm)	Effluent Reading Initial (cm)	Effluent Reading Final (cm)	Average Head Loss (cm)	Hydraulic Gradient	Hydraulic Conductivity @ 20 °C (cm/sec)
19380	22.0	19.60	19.40	6.40	6.60	224.0	39.76	5.7E-09
49260	22.0	19.40	18.90	6.60	7.10	223.3	39.64	5.6E-09
36780	22.0	18.90	18.55	7.10	7.45	222.5	39.49	5.3E-09
37920	22.0	18.55	18.20	7.45	7.80	221.8	39.36	5.1E-09

Average Of Last Four Hydraulic Conductivity (cm/sec): 5.4E-09

	<u>Initial</u>	<u>Final</u>
Saturation (%)	84.8	99.6
Moisture Content (%):	18	24.3
Dry Density Of Specimen (pcf):	106.3	101.0
Soil Classification:	CH Fat clay	

General

Remarks: Control parameters meet the testing requirements.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number: 522626 **Depth (ft):** 0-2
Sampling Method: Project Specified **Sampled By:** Wright, Brandon
Boring Number: B-19
Sample Location : B-19
Sample Date: 05/24/2023
Received Date: 05/24/2023 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Tested Date: 06/09/2023 **Tested By:** Seokaran, Kanhai

Laboratory Data

Type Of Specimen: Remolded **Back Pressure (psi):** 81.00
Permeant Liquid: Water **Specific Gravity:** 2.67 (ASTM D854)
Saturation B Coefficient: 1.00 **Effective Pressure (psi):** 8.00
Method: Method C Falling Head Rising Tailwater

Elapsed Time (sec)	Average Test Temp. (°C)	Influent Reading Initial (cm)	Influent Reading Final (cm)	Effluent Reading Initial (cm)	Effluent Reading Final (cm)	Average Head Loss (cm)	Hydraulic Gradient	Hydraulic Conductivity @ 20 °C (cm/sec)
19380	22.0	11.20	11.00	16.80	17.00	205.2	36.63	6.2E-09
49140	22.0	11.00	10.45	17.00	17.55	204.5	36.49	6.7E-09
89580	22.0	10.65	9.85	14.00	14.80	206.9	36.92	5.3E-09
9300	22.0	10.00	9.90	14.90	15.00	206.0	36.77	6.4E-09

Average Of Last Four Hydraulic Conductivity (cm/sec): 6.1E-09

	<u>Initial</u>	<u>Final</u>
Saturation (%)	82.2	99.6
Moisture Content (%):	19.7	24.3
Dry Density Of Specimen (pcf):	101.6	100.9
Soil Classification:	CH Fat clay	

General

Remarks: Control parameters meet the testing requirements.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number: 522628 **Depth (ft):** 0-2
Sampling Method: Project Specified **Sampled By:** Wright, Brandon
Boring Number: B-20
Sample Location : B-20
Sample Date: 05/24/2023
Received Date: 05/24/2023 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Tested Date: 06/08/2023 **Tested By:** Seokaran, Kanhai

Laboratory Data

Type Of Specimen: Remolded **Back Pressure (psi):** 81.00
Permeant Liquid: Water **Specific Gravity:** 2.66 (ASTM D854)
Saturation B Coefficient: 1.00 **Effective Pressure (psi):** 8.00
Method: Method C Falling Head Rising Tailwater

Elapsed Time (sec)	Average Test Temp. (°C)	Influent Reading Initial (cm)	Influent Reading Final (cm)	Effluent Reading Initial (cm)	Effluent Reading Final (cm)	Average Head Loss (cm)	Hydraulic Gradient	Hydraulic Conductivity @ 20 °C (cm/sec)
360	22.0	20.90	20.70	6.50	6.70	225.2	39.94	3.0E-07
900	22.0	20.70	20.20	6.70	7.20	224.5	39.81	3.0E-07
2940	22.0	20.20	18.60	7.20	8.80	222.4	39.44	3.0E-07
7740	22.0	18.60	14.60	8.80	12.80	216.8	38.45	2.9E-07

Average Of Last Four Hydraulic Conductivity (cm/sec): 3.0E-07

	<u>Initial</u>	<u>Final</u>
Saturation (%)	85.1	99.2
Moisture Content (%):	22.0	24.8
Dry Density Of Specimen (pcf):	98.4	99.7
Soil Classification:	CL Sandy lean clay	

General

Remarks: Control parameters meet the testing requirements.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number: 498838 **Depth (ft):** 26-28.5
Boring Number: MW-14 **Sampled By:** Drill Crew
Sample Date: 11/29/2022
Received Date: 12/14/2022 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Tested Date: 12/14/2022 **Tested By:** Seokaran, Kanhai

Laboratory Data

Type Of Specimen: Intact **Back Pressure (psi):** 81.00
Permeant Liquid: Water **Specific Gravity:** 2.65 (Assumed)
Saturation B Coefficient: 1.00 **Effective Pressure (psi):** 8.00
Method: Method C Falling Head Rising Tailwater

Elapsed Time (sec)	Average Test Temp. (°C)	Influent Reading Initial (cm)	Influent Reading Final (cm)	Effluent Reading Initial (cm)	Effluent Reading Final (cm)	Average Head Loss (cm)	Hydraulic Gradient	Hydraulic Conductivity @ 20 °C (cm/sec)
18600	22.0	13.50	12.75	10.30	11.05	213.5	31.65	3.0E-08
18240	22.0	10.20	9.30	13.60	14.50	206.7	30.65	3.8E-08
239160	22.0	9.55	0.95	14.50	23.10	197.5	29.28	2.9E-08
15300	22.0	21.00	20.40	8.50	9.10	222.9	33.05	2.8E-08

Average Of Last Four Hydraulic Conductivity (cm/sec): 3.1E-08

	<u>Initial</u>	<u>Final</u>
Saturation (%)	105.6	105.2
Moisture Content (%):	25.3	24.1
Dry Density Of Specimen (pcf):	101.2	102.9
Soil Classification:	CL Lean clay	

General

Results: The test is for informational purposes.
Remarks: Control parameters meet the testing requirements.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number: 498836 **Depth (ft):** 10-12
Boring Number: MW-16 **Sampled By:** Drill Crew
Sample Date: 11/29/2022
Received Date: 12/14/2022 **Lab:** 11001 Hampshire Ave S, Bloomington, MN
Tested Date: 12/14/2022 **Tested By:** Seokaran, Kanhai

Laboratory Data

Type Of Specimen: Intact **Back Pressure (psi):** 81.00
Permeant Liquid: Water **Specific Gravity:** 2.65 (Assumed)
Saturation B Coefficient: 1.00 **Effective Pressure (psi):** 8.00
Method: Method C Falling Head Rising Tailwater

Elapsed Time (sec)	Average Test Temp. (°C)	Influent Reading Initial (cm)	Influent Reading Final (cm)	Effluent Reading Initial (cm)	Effluent Reading Final (cm)	Average Head Loss (cm)	Hydraulic Gradient	Hydraulic Conductivity @ 20 °C (cm/sec)
18060	22.0	18.25	18.05	4.65	4.85	224.4	31.75	2.9E-08
33300	22.0	16.25	15.90	7.90	8.25	219.0	30.98	2.9E-08
70200	22.0	15.90	15.15	8.25	9.00	217.9	30.83	2.9E-08
17580	22.0	15.40	15.20	9.00	9.20	217.2	30.73	3.1E-08

Average Of Last Four Hydraulic Conductivity (cm/sec): 3.0E-08

	<u>Initial</u>	<u>Final</u>
Saturation (%)	113.2	109.7
Moisture Content (%):	25.7	25.4
Dry Density Of Specimen (pcf):	103.3	102.6
Soil Classification:	CL Lean clay	

General

Results: The test is for informational purposes.
Remarks: Control parameters meet the testing requirements.

Bob K. Wilt

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

Sample Number:	522626	Depth (ft):	0-2
Sampling Method:	Project Specified	Sampled By:	Wright, Brandon
Boring Number:	B-19		
Location Details:	B-19		
Sample Date:	05/24/2023		
Received Date:	05/24/2023	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	06/08/2023	Tested By:	Streier, Jim

Laboratory Data

Soil Specific Gravity At 20 °C:	2.67
Method Used:	Method B Dry

General

Bob K. Wright

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Vernon County Solid Waste & Recycling
Department
S3705 County Road LF
Viroqua, WI 54665

Project:

B2205032
Vernon County Landfill
S3705 County Road LF
Viroqua, WI 54665

Sample Information

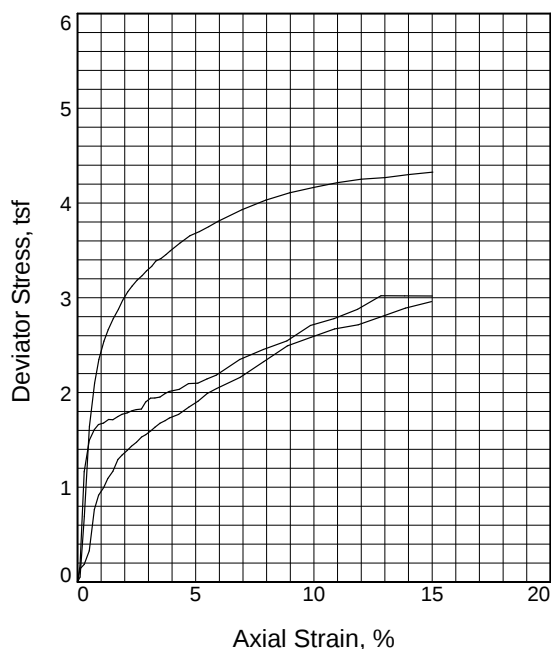
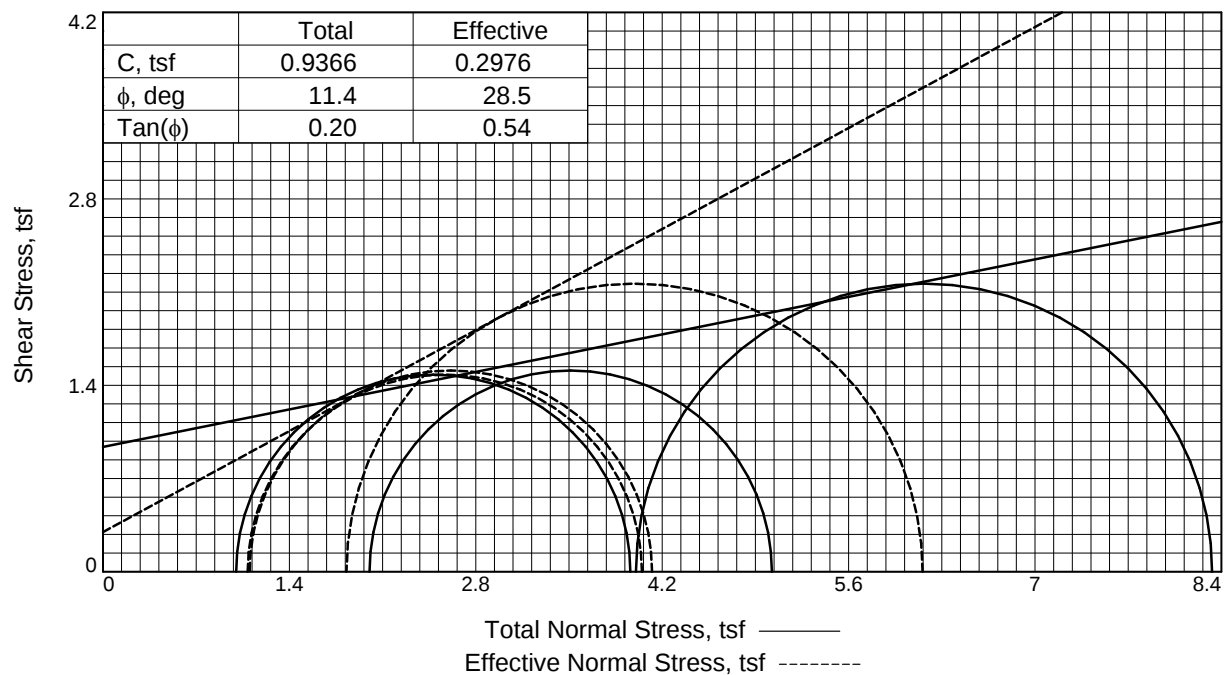
Sample Number:	522628	Depth (ft):	0-2
Sampling Method:	Project Specified	Sampled By:	Wright, Brandon
Boring Number:	B-20		
Location Details:	B-20		
Sample Date:	05/24/2023		
Received Date:	05/24/2023	Lab:	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	06/08/2023	Tested By:	Streier, Jim

Laboratory Data

Soil Specific Gravity At 20 °C:	2.66
Method Used:	Method B Dry

General

Bob K. Wright



Sample No.		1	2	3
Initial	Water Content, %	26.3	25.4	28.5
	Dry Density, pcf	99.3	96.0	95.4
	Saturation, %	99.1	88.8	98.2
	Void Ratio	0.7291	0.7874	0.7991
	Diameter, in.	1.411	1.398	1.409
	Height, in.	2.824	2.821	2.814
At Test	Water Content, %	25.3	28.0	26.3
	Dry Density, pcf	101.3	97.1	99.5
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6945	0.7687	0.7246
	Diameter, in.	1.402	1.393	1.389
	Height, in.	2.805	2.812	2.775
Strain rate, %/min.				
Back Pressure, tsf		6.127	5.126	3.125
Cell Pressure, tsf		7.128	7.128	7.128
Fail. Stress, tsf		2.960	3.022	4.327
Total Pore Pr., tsf		6.041	6.026	5.299
Ult. Stress, tsf		2.960	3.019	4.327
Total Pore Pr., tsf		6.041	5.969	5.299
$\bar{\sigma}_1$ Failure, tsf		4.048	4.124	6.156
$\bar{\sigma}_3$ Failure, tsf		1.087	1.102	1.829

Type of Test:

CU with Pore Pressures

Sample Type: Shelby Tube

Description: Lean Clay (CL), brown

LL= 43 **PL=** 22 **PI=** 21

Assumed Specific Gravity= 2.75

Remarks: CU Triax ASTM D 4767

Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

S3705 County Road LF, Viroqua, WI

Source of Sample: MW-16

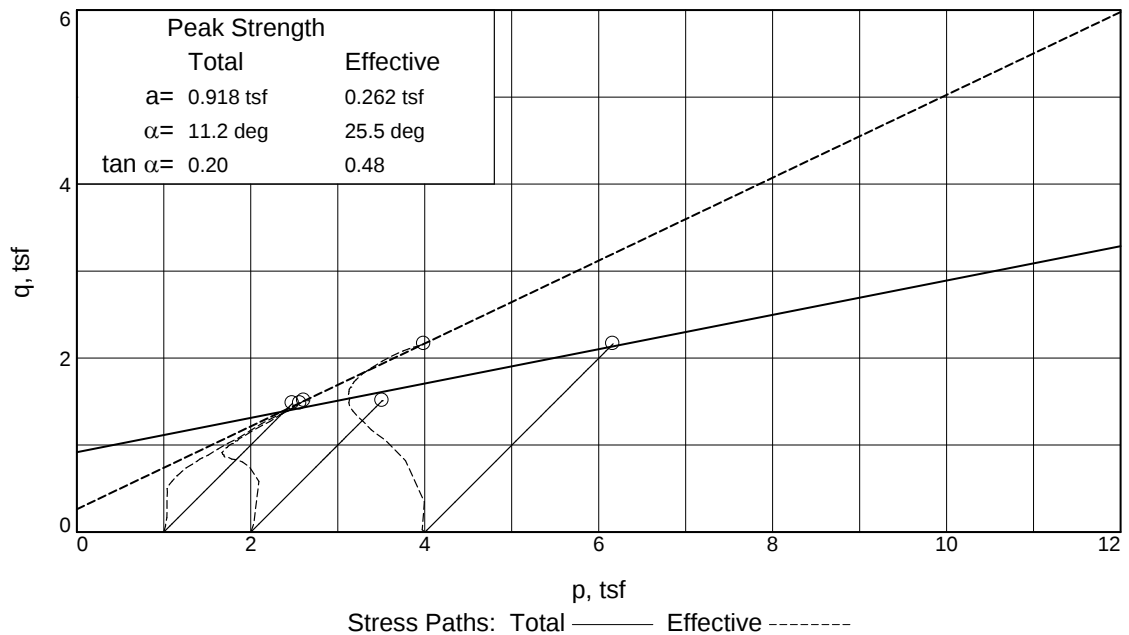
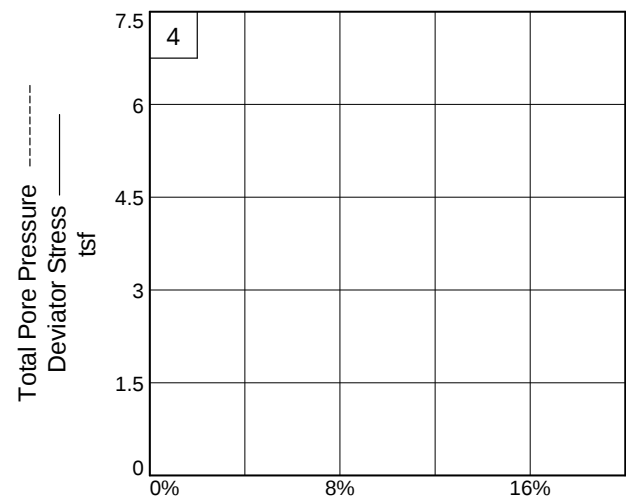
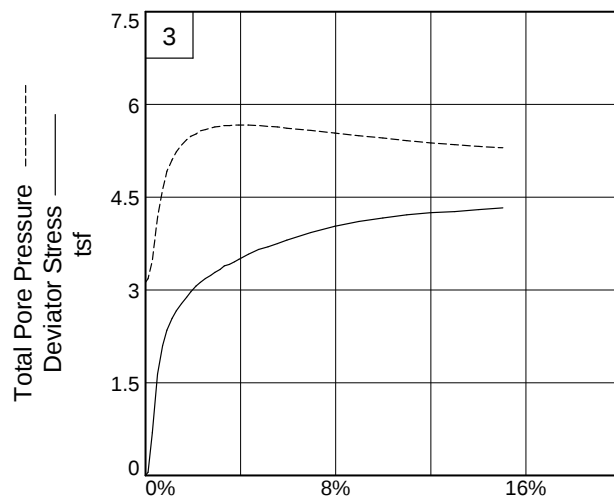
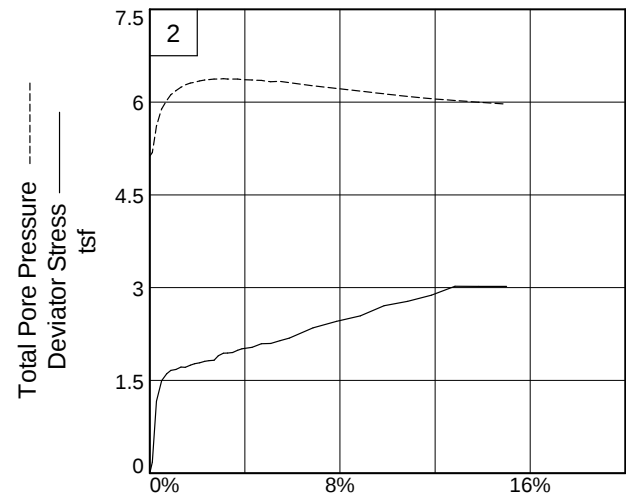
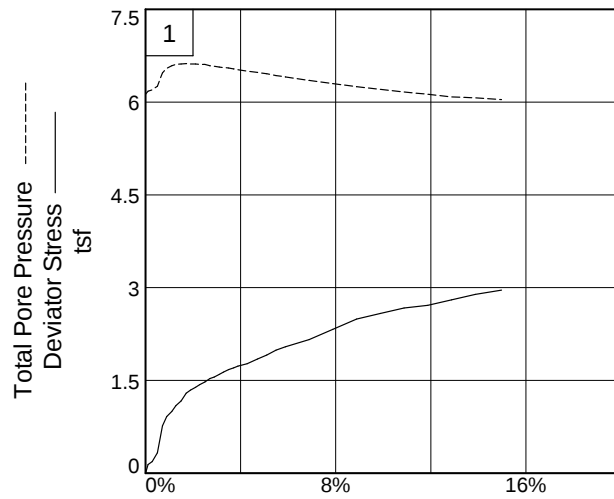
Depth: 7-9'

Proj. No.: B2205032

Date Sampled:

BRAUNSM
INTERTEC

Figure _____



Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

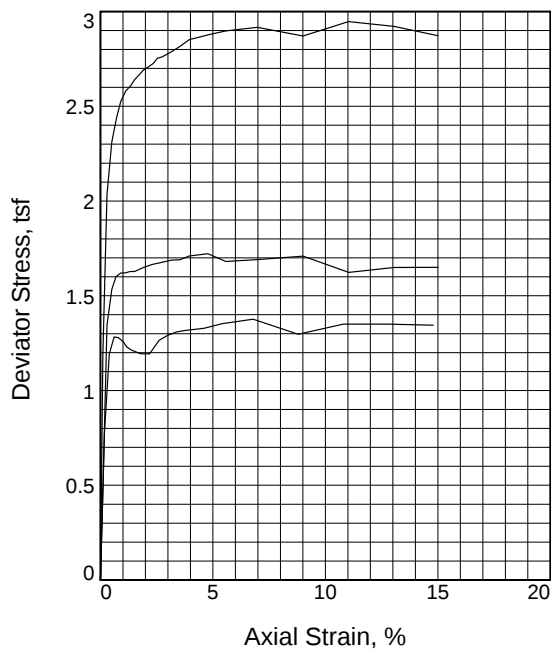
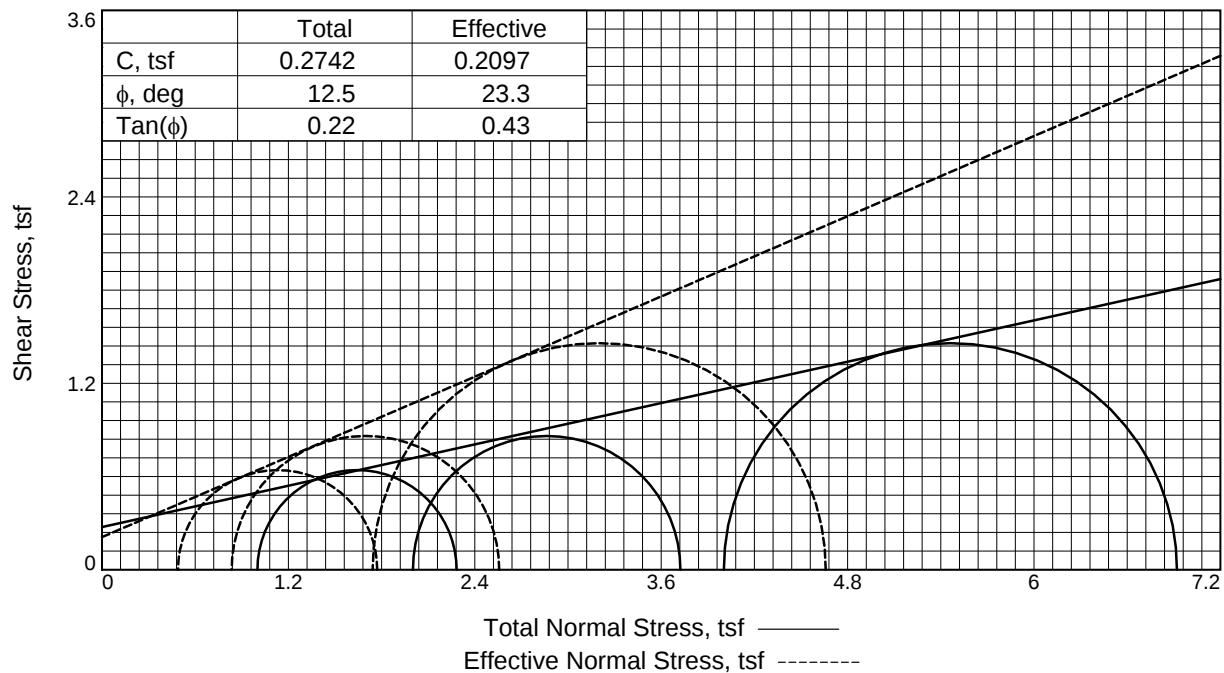
Source of Sample: MW-16

Depth: 7-9'

Project No.: B2205032

Figure _____

Braun Intertec



Sample No.		1	2	3
Initial	Water Content, %	24.2	24.2	24.2
	Dry Density, pcf	99.2	97.8	98.4
	Saturation, %	94.9	91.8	93.2
	Void Ratio	0.6807	0.7038	0.6934
	Diameter, in.	1.405	1.406	1.403
	Height, in.	2.801	2.778	2.801
At Test	Water Content, %	25.3	25.4	23.5
	Dry Density, pcf	99.5	99.3	102.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6753	0.6781	0.6287
	Diameter, in.	1.403	1.399	1.385
	Height, in.	2.798	2.764	2.765
Strain rate, %/min.				
Back Pressure, tsf		6.127	5.126	3.125
Cell Pressure, tsf		7.128	7.128	7.128
Fail. Stress, tsf		1.282	1.722	2.917
Total Pore Pr., tsf		6.638	6.293	5.386
Ult. Stress, tsf		1.194	1.623	2.871
Total Pore Pr., tsf		6.617	6.199	5.335
$\bar{\sigma}_1$ Failure, tsf		1.772	2.557	4.659
$\bar{\sigma}_3$ Failure, tsf		0.490	0.835	1.742

Type of Test:

CU with Pore Pressures

Sample Type: Remold

Description: Fat Clay (CH), brown

Assumed Specific Gravity= 2.67

Remarks: CU Triax ASTM D 4767

Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

S3705 County Road LF, Viroqua, WI

Source of Sample: B-19

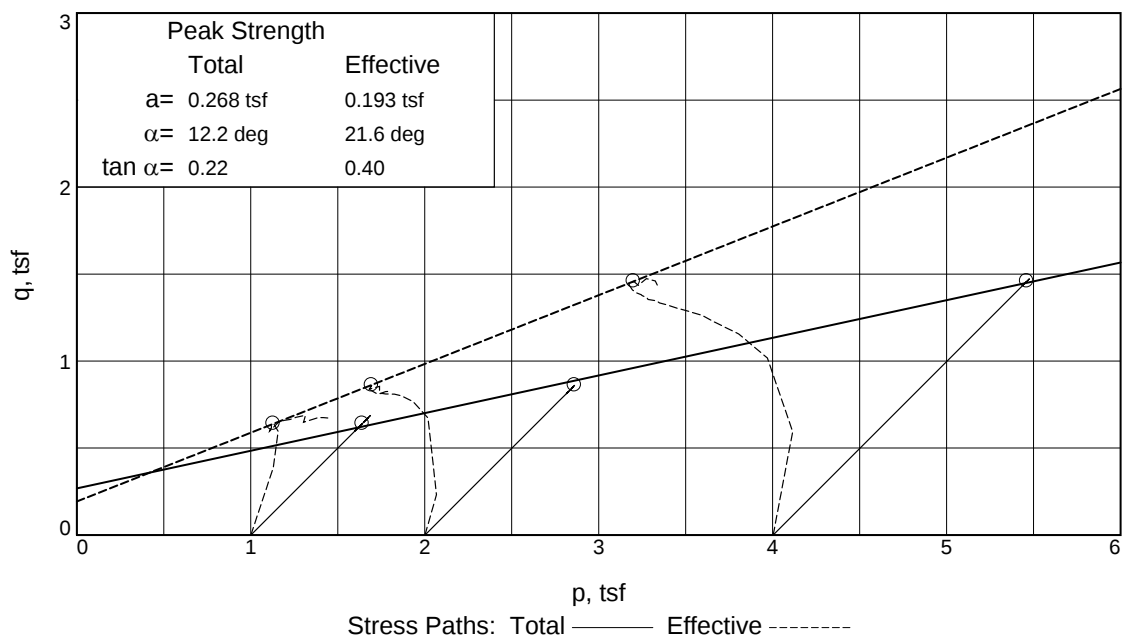
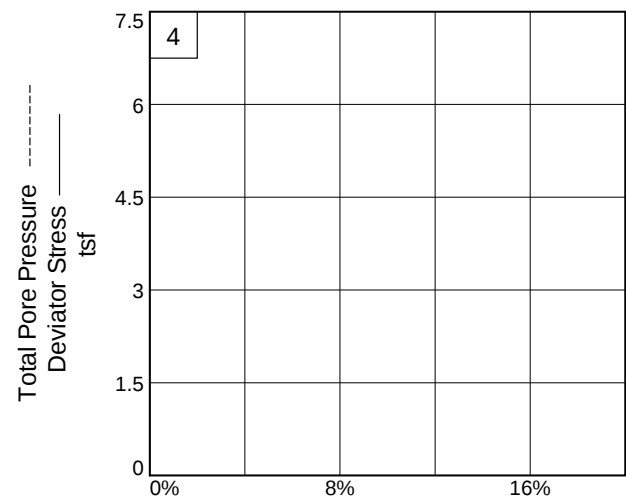
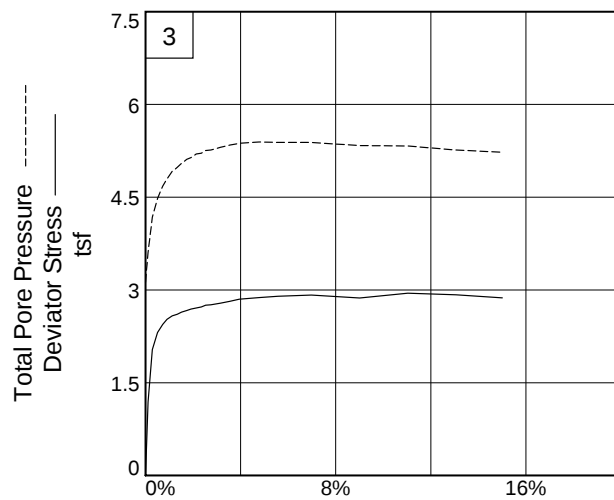
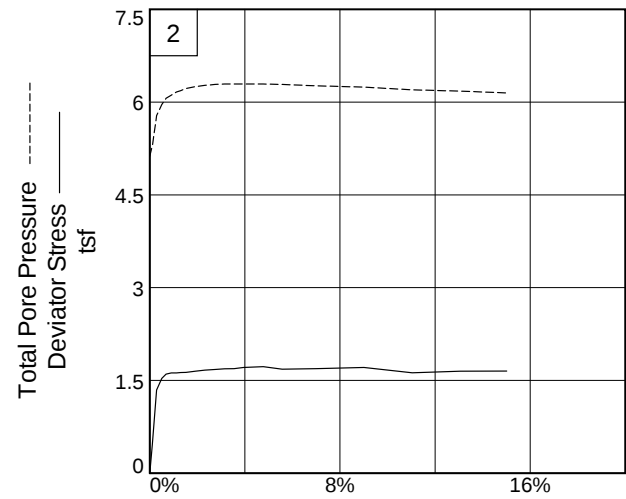
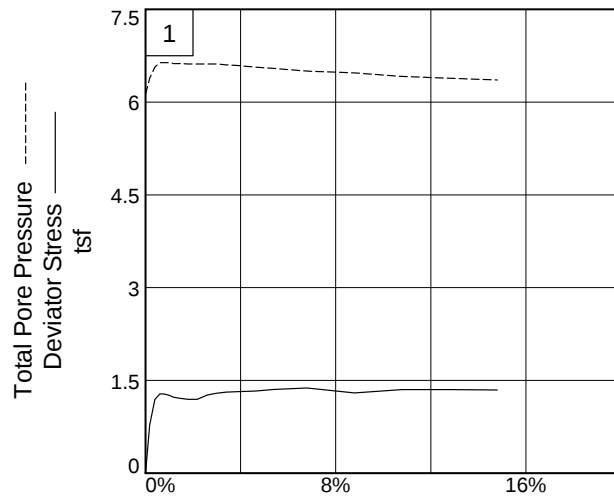
Sample Number: 522626

Proj. No.: B2205032

Date Sampled:

BRAUNSM
INTERTEC

Figure _____



Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

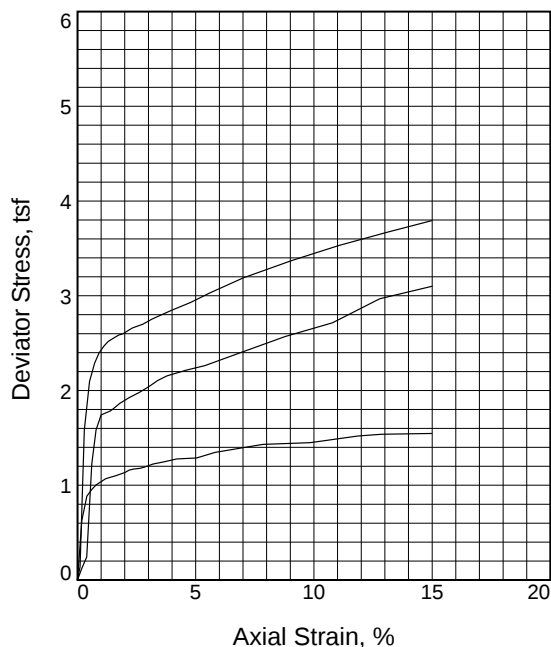
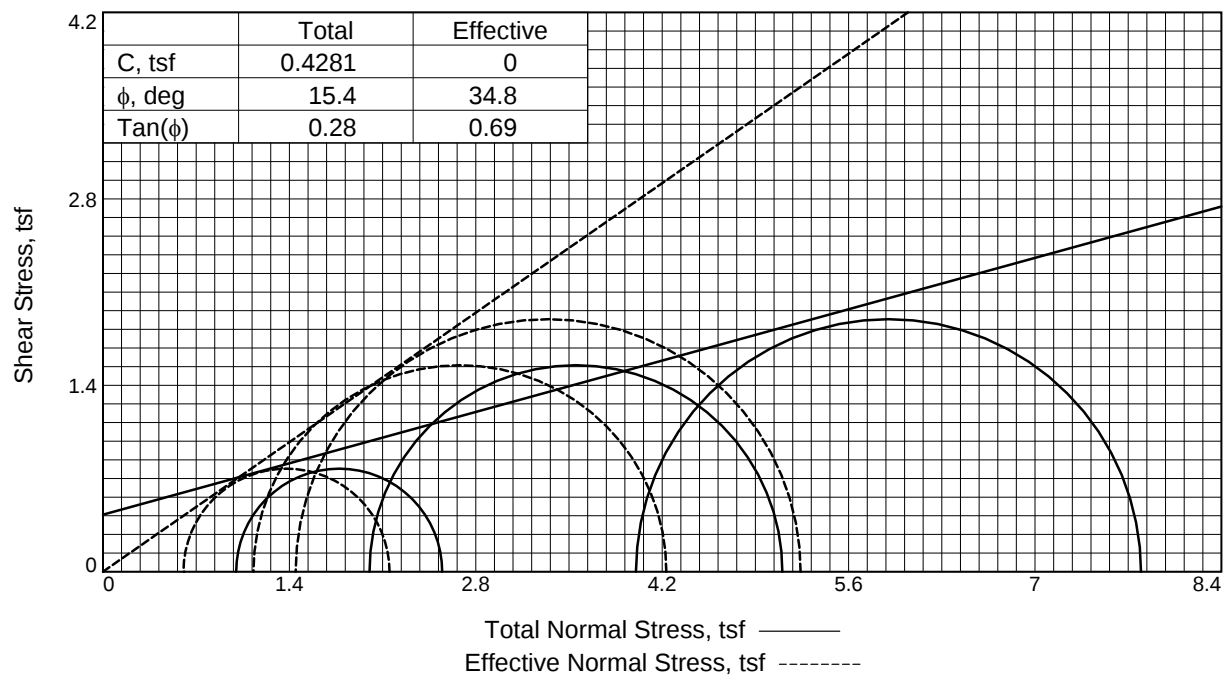
Source of Sample: B-19

Sample Number: 522626

Project No.: B2205032

Figure _____

Braun Intertec



Sample No.		1	2	3
Initial	Water Content, %	25.3	25.3	25.3
	Dry Density, pcf	97.6	98.6	97.4
	Saturation, %	96.0	98.4	95.5
	Void Ratio	0.7014	0.6841	0.7047
	Diameter, in.	1.420	1.410	1.403
	Height, in.	2.793	2.803	2.814
At Test	Water Content, %	25.6	25.6	22.7
	Dry Density, pcf	98.8	98.8	103.6
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.6814	0.6805	0.6025
	Diameter, in.	1.414	1.409	1.374
	Height, in.	2.782	2.801	2.757
Strain rate, %/min.				
Back Pressure, tsf		6.127	5.126	3.125
Cell Pressure, tsf		7.128	7.128	7.128
Fail. Stress, tsf		1.547	3.101	3.792
Total Pore Pr., tsf		6.523	5.998	5.681
Ult. Stress, tsf		1.547	3.101	3.792
Total Pore Pr., tsf		6.523	5.998	5.681
$\bar{\sigma}_1$ Failure, tsf		2.152	4.231	5.240
$\bar{\sigma}_3$ Failure, tsf		0.605	1.130	1.447

Type of Test:

CU with Pore Pressures

Sample Type: Remold

Description: Sandy Lean Clay (CL), brown

Assumed Specific Gravity= 2.66

Remarks: CU Triax ASTM D 4767

Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

S3705 County Road LF, Viroqua, WI

Source of Sample: B-20

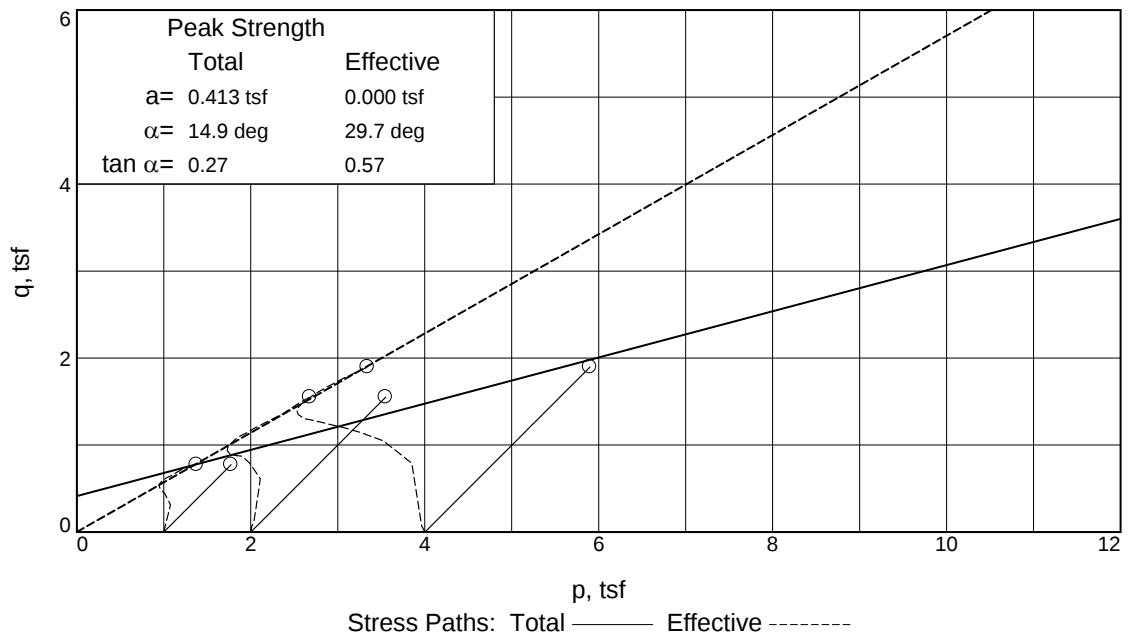
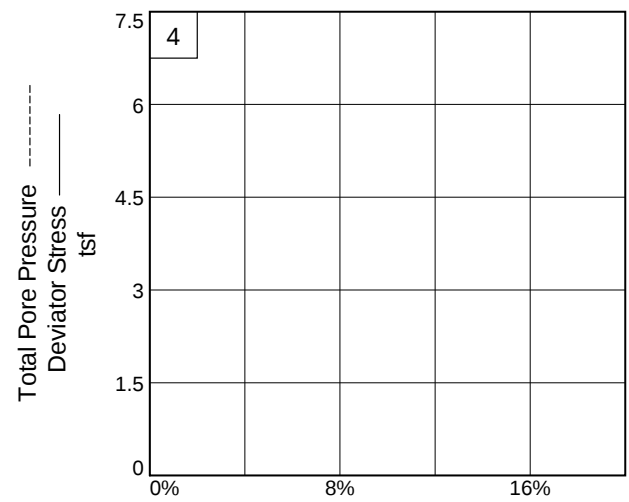
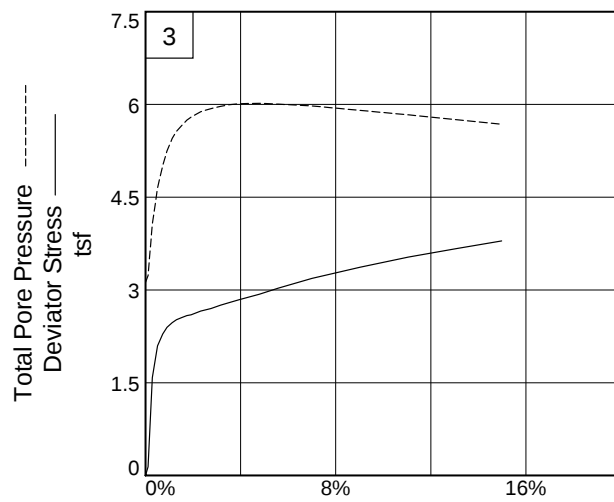
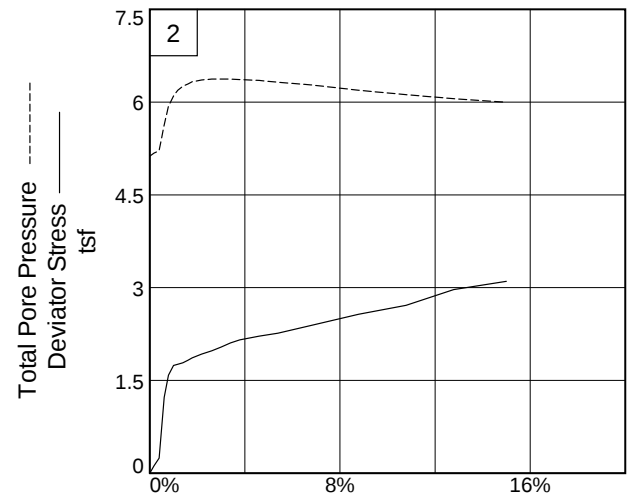
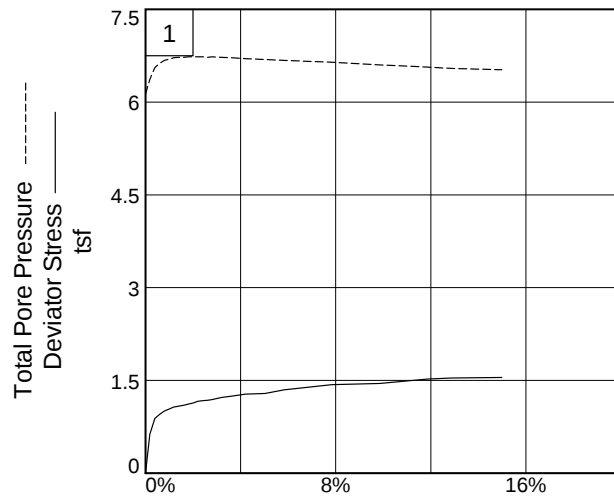
Sample Number: 522628

Proj. No.: B2205032

Date Sampled:

BRAUNSM
INTERTEC

Figure _____



Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

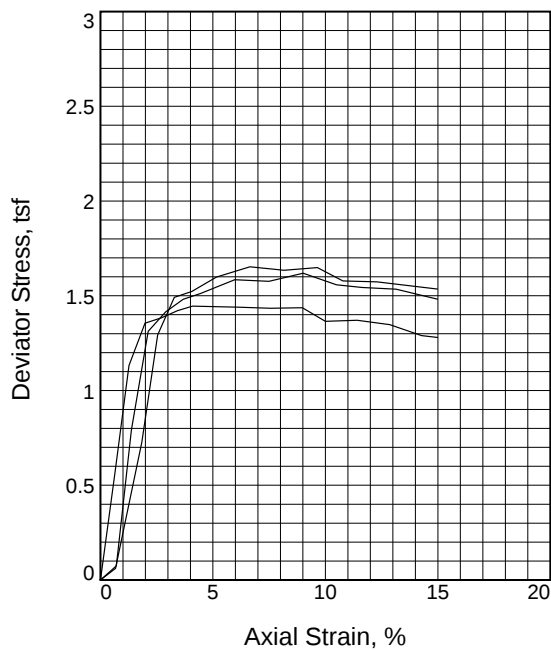
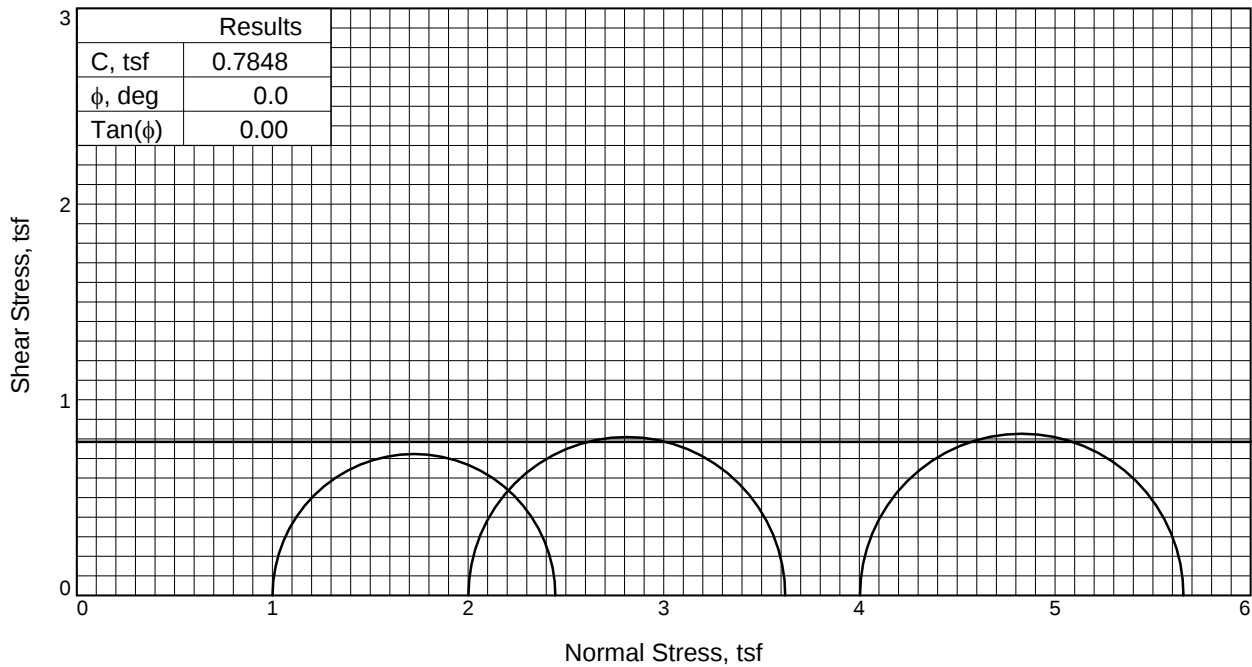
Source of Sample: B-20

Sample Number: 522628

Project No.: B2205032

Figure _____

Braun Intertec



Sample No.		1	2	3
Initial	Water Content, %	24.8	24.8	24.8
	Dry Density, pcf	96.3	95.7	96.3
	Saturation, %	90.7	89.3	90.7
	Void Ratio	0.7303	0.7422	0.7307
	Diameter, in.	1.436	1.430	1.430
	Height, in.	2.830	2.830	2.830
At Test	Water Content, %	27.4	27.8	27.4
	Dry Density, pcf	96.3	95.7	96.3
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7303	0.7422	0.7307
	Diameter, in.	1.436	1.430	1.430
	Height, in.	2.830	2.830	2.830
Strain rate, %/min.		1.00	1.00	1.00
Back Pressure, tsf		0.000	0.000	0.000
Cell Pressure, tsf		1.001	2.002	4.003
Fail. Stress, tsf		1.445	1.619	1.653
Ult. Stress, tsf		1.280	1.482	1.535
σ_1 Failure, tsf		2.446	3.621	5.656
σ_3 Failure, tsf		1.001	2.002	4.003

Type of Test:

Unconsolidated Undrained

Sample Type: Remold

Description: Fat Clay (CH), brown

Assumed Specific Gravity= 2.67

Remarks: UU Triax ASTM D 2850

Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

S3705 County Road LF, Viroqua, WI

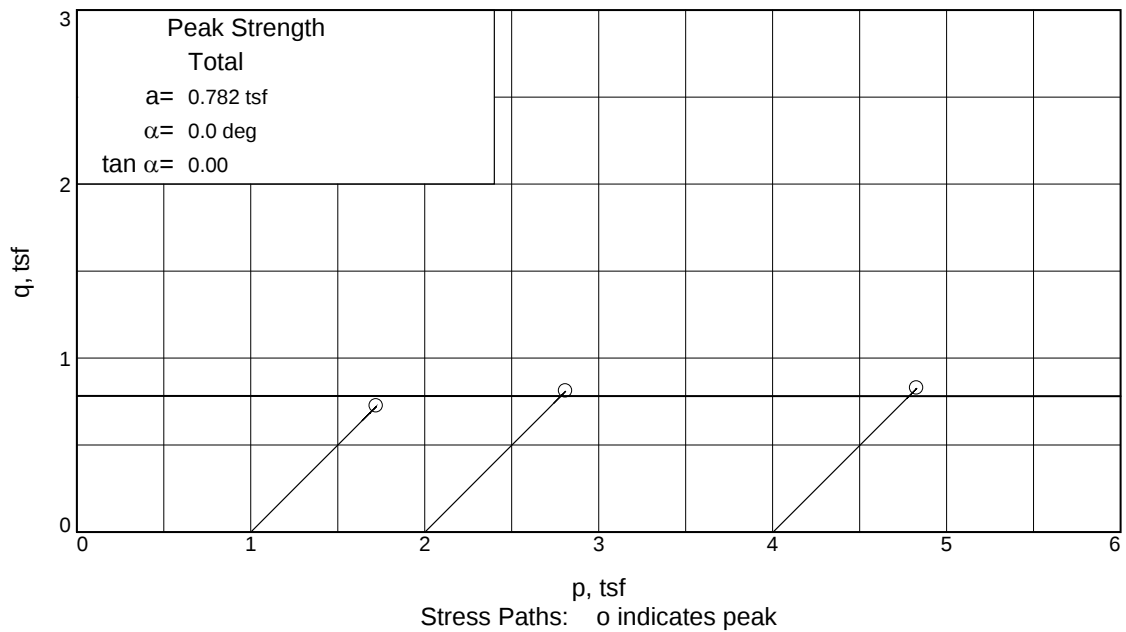
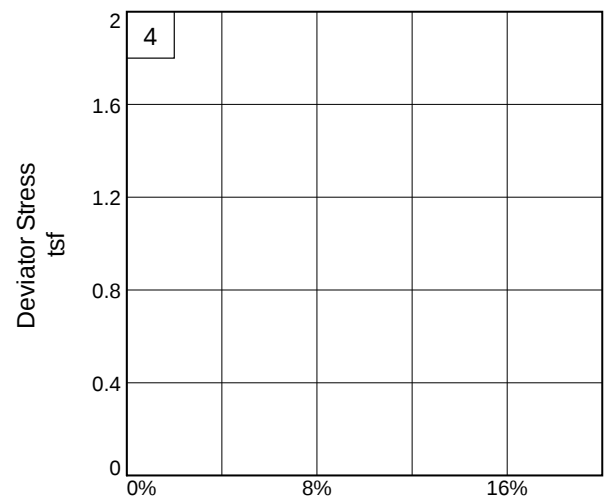
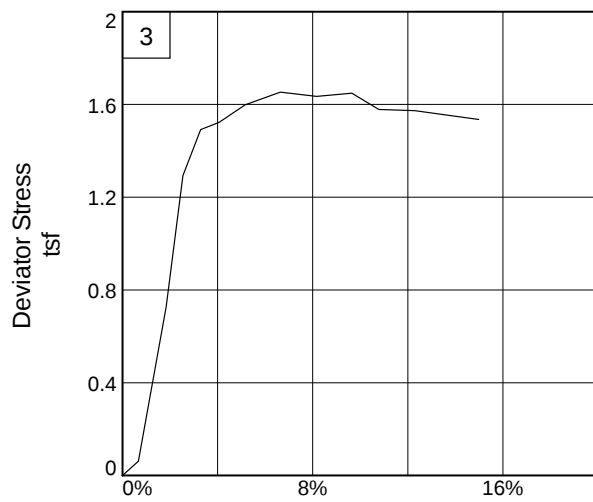
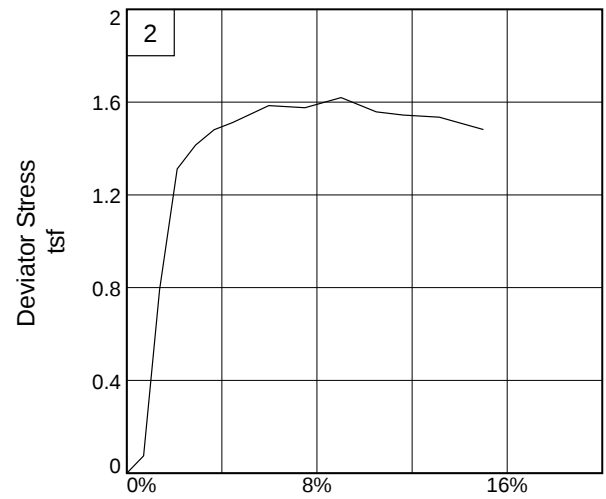
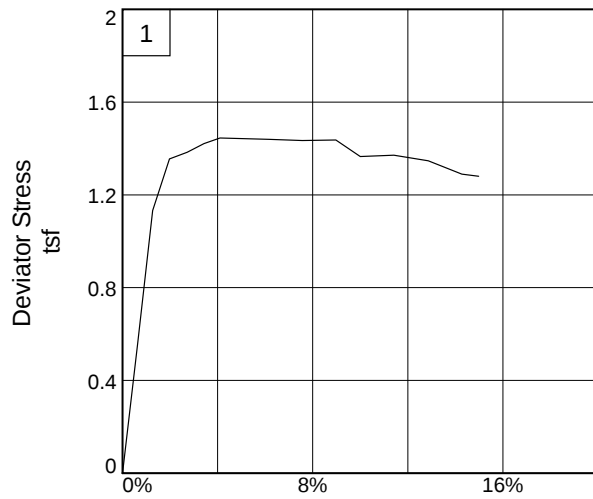
Source of Sample: B-19

Proj. No.: B2205032

Date Sampled:

BRAUNSM
INTERTEC

Figure _____



Client: Vernon County Solid Waste & Recycling Department

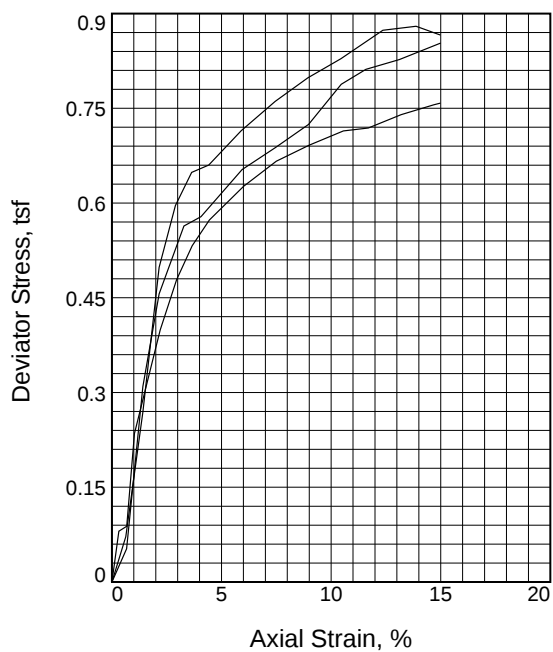
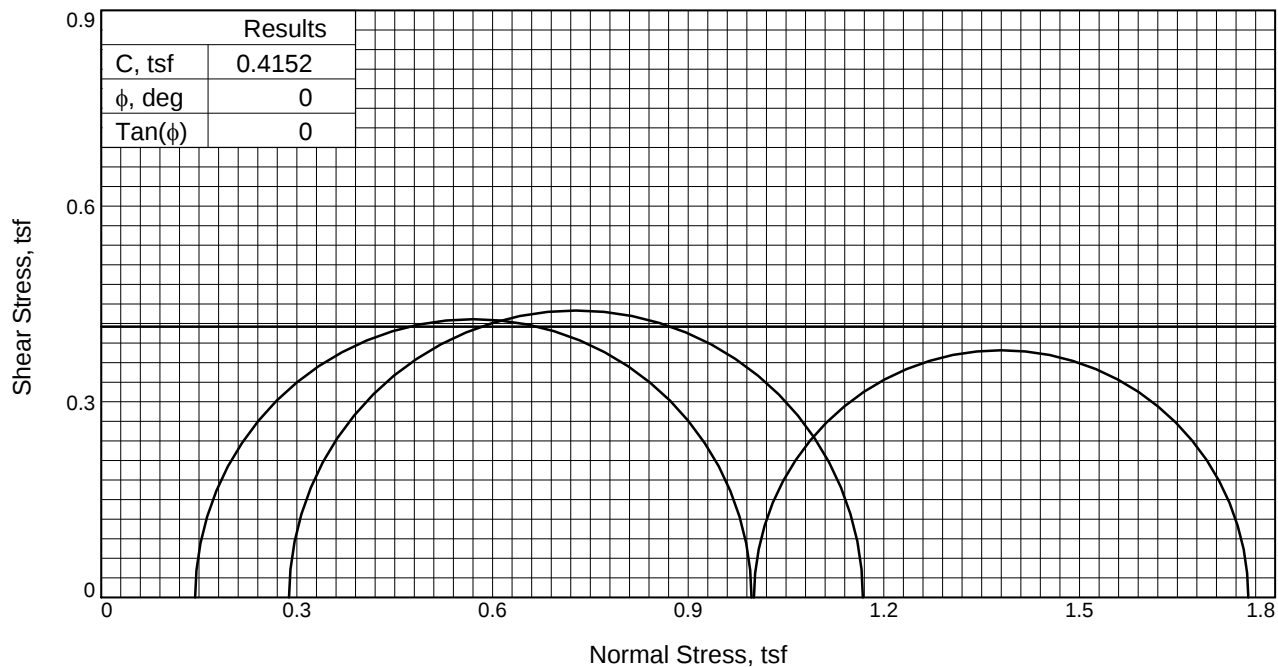
Project: Vernon County Landfill

Source of Sample: B-19

Project No.: B2205032

Figure _____

Braun Intertec



Sample No.		1	2	3
Initial	Water Content, %	25.7	25.5	25.8
	Dry Density, pcf	95.2	94.7	94.8
	Saturation, %	92.0	90.2	91.4
	Void Ratio	0.7443	0.7531	0.7517
	Diameter, in.	1.430	1.430	1.420
	Height, in.	2.813	2.830	2.832
At Test	Water Content, %	28.0	28.3	28.3
	Dry Density, pcf	95.2	94.7	94.8
	Saturation, %	100.0	100.0	100.0
	Void Ratio	0.7443	0.7531	0.7517
	Diameter, in.	1.430	1.430	1.420
	Height, in.	2.813	2.830	2.832
Strain rate, %/min.		1.00	1.00	1.00
Back Pressure, tsf		0.000	0.000	0.000
Cell Pressure, tsf		1.001	0.144	0.288
Fail. Stress, tsf		0.758	0.853	0.880
Ult. Stress, tsf		0.758	0.853	0.866
σ_1 Failure, tsf		1.759	0.997	1.168
σ_3 Failure, tsf		1.001	0.144	0.288

Type of Test:

Unconsolidated Undrained

Sample Type: Remold

Description: Sandy Lean Clay (CL), brown

Assumed Specific Gravity= 2.66

Remarks: UU Triax ASTM D 2850

Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

S3705 County Road LF, Viroqua, WI

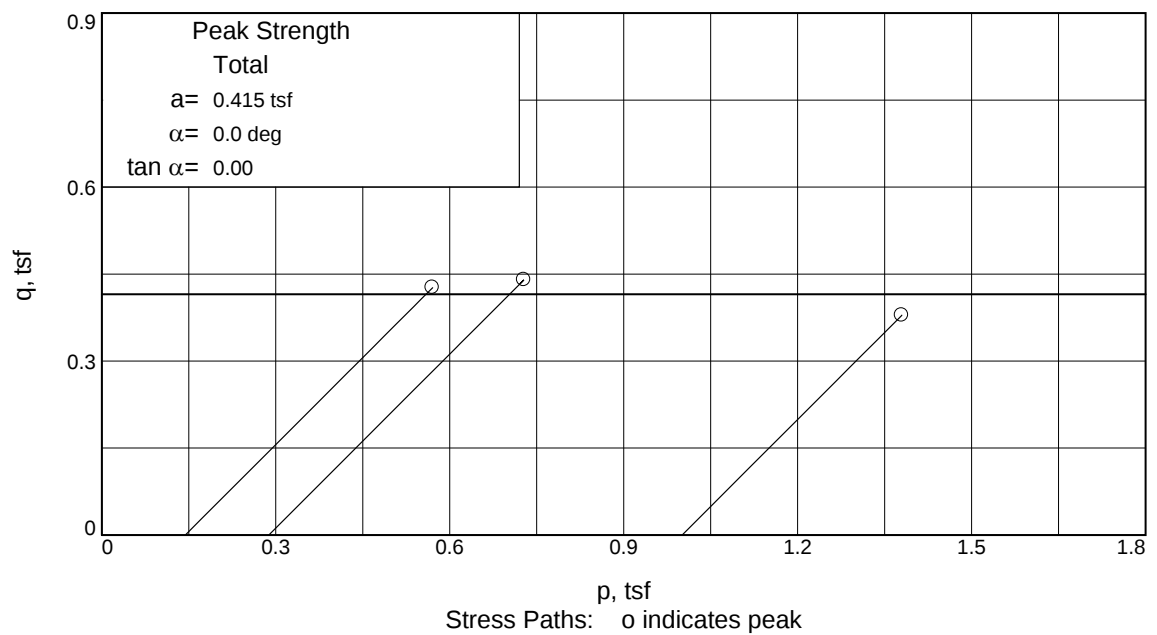
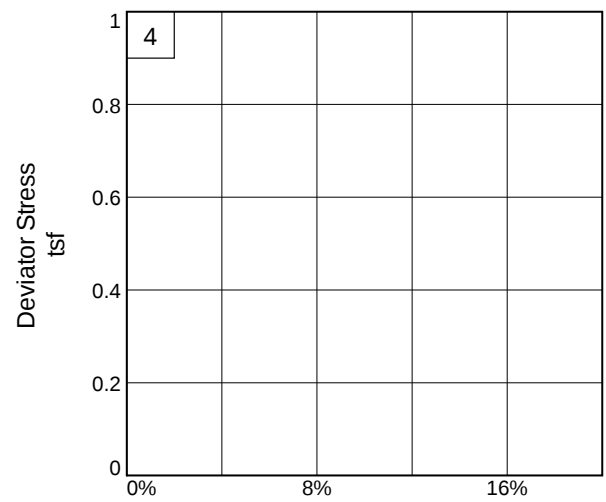
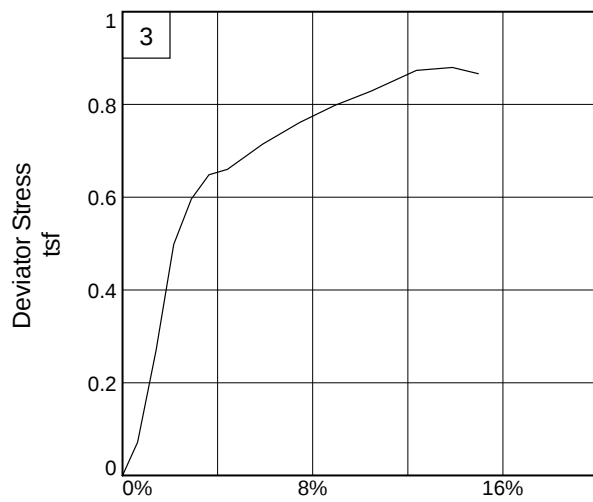
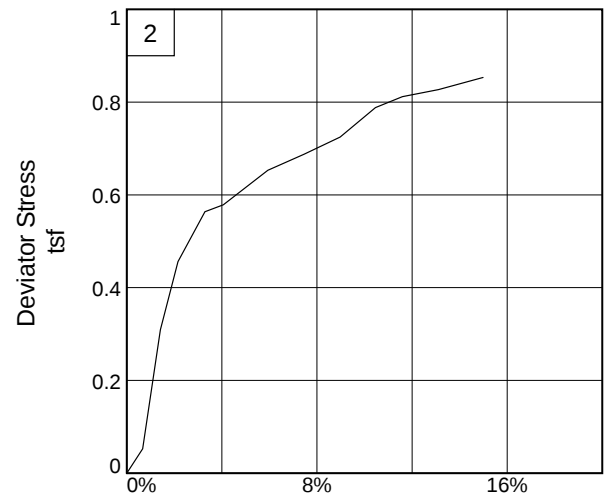
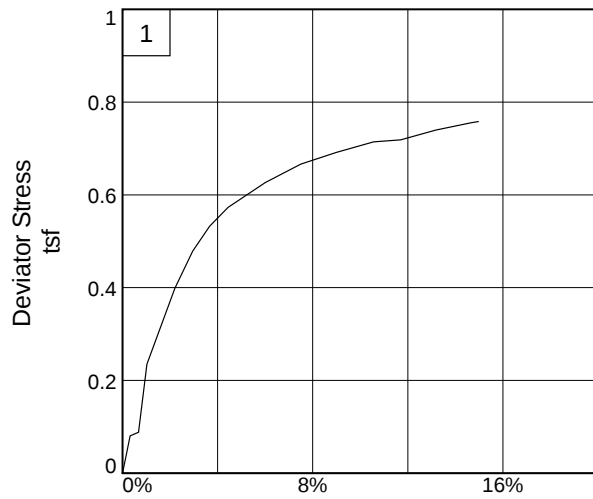
Source of Sample: B-20

Proj. No.: B2205032

Date Sampled:

BRAUNSM
INTERTEC

Figure _____



Client: Vernon County Solid Waste & Recycling Department

Project: Vernon County Landfill

Source of Sample: B-20

Project No.: B2205032

Figure _____

Braun Intertec