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WALTER H. FLOOD & CO., INC.

Soil Investigation No. 7205-0005-1
Proposed Solid Waste Disposal Site
Near Torrence Avenue and Tri-State Expressway
Lansing, Illinois

Prepared for

RECEIVED
JUL 21 1972
ENVIRONMENTAL PROTECTION AGENCY
STATE OF ILLINOIS

Waste Management, Inc.
[illegible] Jorie Boulevard
Oakbrook, Illinois 60521

June 30, 1972

ESTABLISHED 1913

WALTER H. FLOOD (1885-1951)

312 [illegible]

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WALTER H. FLOOD & CO., INC.

ENGINEERS
6102 SO. BLACKSTONE AVE.
CHICAGO 60637

MEMBER
AMERICAN SOCIETY FOR TESTING & MATERIALS
AMERICAN PUBLIC WORKS ASSOCIATION
AMERICAN CONCRETE INSTITUTE
AMERICAN CHEMICAL SOCIETY
ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS
CONSULTING ENGINEERS COUNCIL
ILLINOIS SOCIETY OF PROFESSIONAL ENGINEERS
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
AMERICAN SOCIETY OF CIVIL ENGINEERS
THE AGG & TUNG CONGRESS

INSPECTION AND TESTING OF MATERIALS AND STRUCTURES
SPECIFICATIONS AND REPORTS
PHYSICAL AND CHEMICAL TESTS
RESEARCH AND CONSULTATION
CONCRETE CORE CUTTING
FOUNDATION INVESTIGATION
FACILITIES INSPECTED BY CEMENT & CONCRETE REFERENCE LABORATORY

June 30, 1972

Waste Management, Inc.
900 Jorie Boulevard
OakBrook, Illinois 60521

Attention: Mr. Lawrence Beck

Re: Soil Investigation No. 7205-0005-1
Proposed Solid Waste Disposal Site
Near Torrence Avenue and Tri-State Expressway
Lansing, Illinois

Gentlemen:

Enclosed is our report of the subsoil investigation for the reference project.

If you have any questions concerning this report or should we be able to assist you in any way, please call upon us.

The soil samples are being retained in our laboratory until released by you.

Respectfully submitted,

WALTER H. FLOOD & COMPANY, INC.

Robert E. Rospenda
Project Geologist

Raymond J. Flood
Raymond J. Flood
Registered Professional Engineer
Illinois 2177

WALTER H. FLOOD & CO., INC.

Soil Investigation No. 7205-0005-1

ALL WE NEED!

I. Scope

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and represents the results of the additional subsoil investigation for the proposed solid waste disposal site to be located in the area of Torrence Avenue and the Tri-State Expressway in Lansing, Illinois.

The purpose of the investigation is to secure and log subsoil information, to record the geological nature, type, consistency and thicknesses of the various soils strata as encountered in the borings, to perform laboratory tests, and to aid others in the appraisal of the site and to assist others in the design and construction of the specific project at the location discussed in this report.

II. Site Geology, Soil Conditions and Characteristics

The proposed site is located in a general area of post-glacial lake bottom. The area was inundated in the geological past by the waters of Lake Chicago, the geological predecessor to present Lake Michigan.

Please refer to the enclosed boring location diagram and the soil profiles which were prepared from the six test borings made at the site.

The soils at the site consist of lacustrine clays with silt layers which overlie glacial clay till. Several till sheets are recognized at the site. Between the till sheets at some of the boring locations some outwash sands and silts are noted. Occasionally, lenses or layers of sand and silt are present within till sheets.

[illegible] surface fill is present at the boring locations but is relatively thin. A [illegible] thickness of [illegible] of the fill is present at the boring locations and [illegible] generally thinner. In some places the fill consists almost entirely of clay, while [illegible] portions of the site the clay is mixed in with wood, gravel, and concrete [illegible] fill material.

[illegible] are present at the site down to about elevation [illegible] of clays but with occasional silt [illegible]

[illegible] extending at least to the total depths of the [illegible] sheets. [illegible] separate till sheets appear to be

II. Site Geology, Soil Conditions and Characteristics (continued)

present. From youngest to oldest these are tentatively identified as Park Ridge, Tinley, Valparaiso, and Pre-Valparaiso tills.

"Petosal" was encountered at borings #2, #5, and #6 at depths of 84.4', 61.1', and [illegible].6', respectively (elevations 515.6' to 535.9'), and may represent the bedrock surface. Bedrock in the area consists of dolomite of the Silurian System.

III. Conclusions

A. Site Suitability

The lacustrine sediments and the glacial tills at the site are highly impermeable as a mass. Except for local layers of relatively more permeable sands and silts at the site, the sediments and tills will provide a natural seal to prevent leachate from the proposed fill from entering the ground-water aquifers.

Where local layers of more permeable sand and silt occur in the walls and floor of the proposed pit, they can be readily sealed by use of compacted clay. Clay soils from the site will be suitable for use as compacted clay liner where needed. Where clay liner is required, it is to be placed and compacted in layers.

It is noted that no continuous pervious stratum was encountered at the site, either in the lacustrine deposits or the glacial tills. All layers or lenses of relatively more permeable sand or silt appear to be local.

B. Ground Water

Ground-water readings were made in the boreholes during drilling, immediately after completion of drilling, and at intervals after completion of the boreholes.

Ground-water level readings that were made in the boreholes and in the observation [illegible] at the times indicated on the soil boring logs and on the enclosed [illegible]. However, it must be noted that fluctuations in the level of the [illegible] in rainfall, temperature, soil permeability, [illegible] the time of the water level measurements. The [illegible] is anticipated, the design drawings [illegible] possibilities, and construction planning [illegible] of the ground water.

III. Conclusions (continued)

C. Observation and Test Wells

Observation wells have been placed at two of the boring locations. As requested, one of the wells has been placed at the north side of the proposed waste disposal site and one at the south end. These have been placed at boring locations #6 and #1 respectively.

The depths at which these wells have been placed is indicated on the enclosed soil profiles and as indicated on the table below.

Well No.	Surface Elevation*	Size	Material	Tip Elevation	Screen Size	Screen Length	Ground-water Elevation** (6-30-72)
1A	600.0'	2"I.D.	PVC	529.0'	.010	4.0'	563.2' 596.5
6A	599.0'	2"I.D.	PVC	544.0'	.010	4.0'	598.3' ? 597.0

*See report for method determined.
**Reading made on date indicated (continuing readings to be made).

The procedures and materials used in the installation of the wells are as follows:

Pipe type: PVC
Pipe size: 2" I.D.
Screen size: 010
Screen length: 4.0'

The bored hole was used if hole not caving. If hole was caving, 3" I.D. casing was set. Prior to installing the well point and sand pack, the hole was flushed with clean water. The well point and casing were set at the selected depth and sand pack consisting of #2 Torpedo sand was placed around well point. A backfill seal consisting of 50% bentonite and 50% sand was then placed to the ground surface. All installation data was recorded in the field, including the depth of the point tip, the length of pipe installed, the depth to the top of the sand pack, the screen size and length, and ground-water levels. Continuing water level readings are being made in these wells.

D. Permeability

A falling head permeability test was run on the dense Valparaiso till and field permeability tests were run on the lacustrine silt and lacustrine clay. The coefficient of soil permeability was computed from data from these tests.

ON SITE SAMPLE?

III. Conclusions (continued)

D. Soil Permeability (continued)

Soil Type	Coefficient of Permeability
Lacustrine clay	6.6×10^{-7} cm/sec.
Lacustrine silt	2.4×10^{-6} cm/sec.
Glacial till	1.9×10^{-7} cm/sec.

IV. Conditions of Investigation

A. Changed Soil Conditions

The analysis and recommendations made in this report are based upon the data obtained from the six borings performed at the locations selected by your consultant. This report does not reflect any soil variations which may occur between the borings. Since the nature and extent of soil variations between the borings may not become evident until construction, it may be necessary to re-evaluate the recommendations of this report after performing on-site observations during the excavation period of construction. It is recommended that we be retained to perform continuous construction review as the project proceeds. We can assume no responsibility for the construction compliance with the recommendations unless we have been retained to perform this on-site review.

B. Soil Boring Logs

The soil boring logs have been prepared from the field and laboratory data. The soils descriptions have been made by visual classificaiton by qualified soils personnel. Consistency classifications are based upon the laboratory test or field penetration test data. The stratification lines may represent approximate boundaries between soil types as the change may be transitional. For instance, coloring changes in the upper soils are often due to weathering and are usually transitional rather than abrupt. Natural topsoil stratification is almost always transitional. Soil stratification by consistency may be abrupt in the case of stratification of soils of differing origin, but may be transitional in soils of the same origin.

C. Laboratory Soil Tests

The laboratory tests performed on samples of the soils consisted of calibrated penetrometer [illegible], natural water content (ASTM D2216-66), grain-size distribution, permeability [illegible]. The results of these tests are noted on the enclosed boring logs, [illegible], the USA textural classification chart, and particle-size distribution curves.

IV. Conditions of Investigation (continued)

C. Laboratory Soil Tests (continued)

Although no ion-exchange capability tests were conducted on soil samples, data from the University of Illinois Agricultural Experiment Station Bulletin 665 indicates that the ion-exchange capacity of the soils would be of the magnitude of 20 milli-equivalents per 100 grams.

V. HIGH!

D. Field Investigation

The field investigation for the four most recent borings (#1, #2, #5, and #6) was started on May 23, 1972 and completed on May 25, 1972. Two previous borings #3 and #4 were made in January 1972. The test borings were made with truck-mounted hollow stem auger type drill rigs utilizing split tube (ASTM D1586-67) type of sampling at 2.5-foot maximum intervals. Six test borings were made. The soil types, nature, consistency, strata depths and thicknesses, and the sampling data were recorded on the field logs. In the split tube sampling, the standard penetration "N" (the number of blows of a 140-pound hammer dropping 30 inches to drive the standard 2-inch O.D. split tube) was recorded in 6-inch increments and entered on the field logs. Representative samples from the split tube were placed in jars, sealed, and delivered to the laboratory for further classification and testing.

In the non-cohesive soils the hollow stem auger served as casing to prevent caving of the soils.

During drilling, immediately after completion of drilling, and intermittently after completion of drilling, readings of the ground water were taken in the boreholes and the readings recorded on the boring logs.

Ground surface elevations of the boreholes were determined from site topography provided by us ("Portion of Section 30, 136 N, R10 E, Cook County, Illinois") and [illegible] to be within an accuracy of 1.0% of the stated elevation.

FOR: Waste Management, Inc.	SOIL BORING LOG NO. 1
PROJECT: Proposed Solid Waste Disposal Site	Sheet 1 of 2
LOCATION: Lansing, Illinois	WALTER H. FLOOD & CO., INC.
	• Engineers •
	• CHICAGO • KALAMAZOO •

METHOD OF BORING: HS
SPLIT SPOON SIZE: 2 IN.
WT. OF HAMMER 140 LBS.
INCH DROP 30
SHELBY TUBE SIZE
CASING USED 2¼" IDHS

WATER LEVEL READINGS
Dry W.D.
B.C.R.
63.5' A.C.R.
4.5'@48 HRS. AFTER DRILLING
HRS. AFTER DRILLING

DATE OF BORING: 5-25-72
BY: BJ&JA&MC:bc
JOB NO.: 7205-0005-1
VERTICAL SCALE: 1"=10'

ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu ● LABORATORY × 1000	O PENETROMETER
600.0	0.0						Ground surface		
599.0	1.0						Black clay fill		
		1	ss	11			Brown clay, tough to very tough	17.1	4000
		2	ss	11				19.3	4000
		3	ss	14				18.5	5000
591.5	8.5	4	ss	19			Brown clay, occasional silt seams, tough	19.3	4000
589.0	11.0	5	ss	7			Gray clay, occasional silt seams, stiff to tough	1500	19.9
		6	ss	8				2000	22.0
		7	ss	8				2000	20.2
		8	ss	9				1500	18.5
		9	ss	10				2000	19.6
		10	ss	10				2500	24.4
574.0	26.0	11	ss	10			Gray clay, trace of small gravel, tough to very tough	3500	19.6
		12	ss	12				4000	20.8
		13	ss	14				4000	20.2
		14	ss	18				19.6	4500
		15	ss	16				19.9	5000
		16	ss	19				19.0	5500
559.0	41.0	17	ss	26			Gray silt with fine sand layers, medium dense	19.0	
556.5	43.5	18	ss	18			Gray silty clay with silt & sand layers, trace of small*	12.1	5000
554.0	46.0	19	ss	21			Gray silty clay, trace of small gravel, very tough to hard	13.1	6500
		20	ss	16				13.6	6000
		21	ss	23				13.6	5500
		22	ss	23				12.6	5000
		23	ss	30				12.3	9000+
		24	ss	33				12.1	9000+
539.0	61.0						Continued on Sheet 2		

LAC

TILL

*...gravel, very tough

ELEV. DEPTH S T N LR DD DESCRIPTION

Wc ▲ NATURAL

LEGEND: DEPTH - FEET BELOW GROUND SURFACE; SAMPLE NUMBER; TYPE OF SAMPLE; N - PENETRATION BLOWS PER FOOT; SAMPLE LENGTH; LENGTH OF SAMPLE RECOVERED; DRY DENSITY LB PER CU FOOT

WO - WASHOUT; A - AUGER; HS - HOLLOW STEM AUGER; SS - SPLIT SPOON; ST - SHELBY TUBE; FT - FISH TAIL; C - CORE; Wc - WATER CONTENT PERCENT

BCR - BEFORE CASING REMOVAL; ACR - AFTER CASING REMOVAL; WD - WHILE DRILLING; WCI - WET CAVE IN; DCI - DRY CAVE IN; Qu - UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR	Waste Management, Inc.
PROJECT:	Proposed Solid Waste Disposal Site
LOCATION	Lansing, Illinois

SOIL BORING LOG NO. 1

Sheet 2 of 2

WALTER H. FLOOD & CO., INC.

• Engineers •

• CHICAGO • KALAMAZOO •

METHOD OF BORING:	WATER LEVEL READINGS
SPLIT SPOON SIZE: IN.	W.D.
WT. OF HAMMER See LBS.	B.C.R.
INCH DROP Sheet 1	A.C.R.
SHELBY TUBE SIZE	HRS. AFTER DRILLING
CASING USED	HRS. AFTER DRILLING

DATE OF BORING: See Sheet 1	BY:
JOB NO..	VERTICAL SCALE:

ELEV	DEPTH	S	T	N	LR	DO	DESCRIPTION	Qu ● LABORATORY × 1000 / O PENETROMETER (2, 4, 6, 8, 10)
							Continued from Sheet 1	
539.0	61.0	25	SS	96/9"			Gray silt, occasional clay seams, very dense	▲ 13.1
		26	SS	85/11"				▲ 14.2
		27	SS	75/9"				▲ 12.1
531.5	68.5	28	SS	72/9"			Greenish-gray silt, very dense	10.1 ▲
529.0	71.0	29	SS	[illegible]			Greenish-gray silt and gray dolomite fragments, very dense	▲ 8.2
526.0	74.0	30	SS	[illegible]			End of boring	▲ 8.2

ELEV	DEPTH	S	T	N	LR	DO	DESCRIPTION	Wc ▲ NATURAL (10, 20, 30, 40, 50)

LEGEND

[illegible]

WO - WASHOUT
A - AUGER
HS - HOLLOW STEM AUGER
SS - SPLIT SPOON
ST - SHELBY TUBE
FT - FISH TAIL
C - CORE
WC - WATER CONTENT PERCENT

BCR - BEFORE CASING REMOVAL
ACR - AFTER CASING REMOVAL
WD - WHILE DRILLING
WCI - WET CAVE IN
DCI - DRY CAVE IN
Qu - UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR: Waste Management, Inc.	SOIL BORING LOG NO. 2
PROJECT: Proposed Solid Waste Disposal Site	Sheet 1 of 2
LOCATION: Lansing, Illinois	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •

METHOD OF BORING: HS	WATER LEVEL READINGS	DATE OF BORING: 5-24-72	BY: BJ&JA&MC:bc
SPLIT SPOON SIZE: 2 IN.	6.5', W.D. 43.5'		
WT. OF HAMMER 140 LBS.	75.5' B.C.R.		
INCH DROP 30	7.5' A.C.R.		
SHELBY TUBE SIZE	3.5'@24 HRS. AFTER DRILLING	JOB NO.: 7205-0005-1	VERTICAL SCALE: 1"=10'
CASING USED 2¼" IDHS	HRS. AFTER DRILLING		

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu ● LABORATORY × 1000	O PENETROMETER
600.0	0.0						Ground surface		
599.0	1.0						Dark brown clay	17.6	4000
		1	ss	10			Brown to gray clay, tough		
596.5	3.5	2	ss	12			Brown clay, occasional silt seams, tough	16.6	4000
594.0	6.0	3	ss	11			Brown to gray silt, medium dense		23.5
		4	ss	16					22.9
		5	ss	19				17.9	
586.5	13.5	6	ss	7			Gray clay, stiff	1500	21.4
		7	ss	7				1500	28.5
581.5	18.5	8	ss	6			See note	1500	20.8
579.0	21.0	9	ss	8			Gray clay, trace of small gravel, stiff to very tough	2000	18.2
		10	ss	9				2500	18.2
		11	ss	10				2000	20.8
		12	ss	10				3500	19.0
		13	ss	9				2500	15.5
		14	ss	10				2000	22.6
		15	ss	13				2500	19.0
		16	ss	21					16.3 / 6500
559.0	41.0	17	ss	23			Gray silty clay, trace of small gravel, very tough to hard		13.1 / 6500
		18	ss	19					12.9 / 8000
		19	ss	20					13.6 / 8000
		20	ss	24					12.3 / 8000
		21	ss	18					13.6 / 8000
		22	ss	25					12.1 / 8000
		23	ss	22					13.6 / 8000
		24	ss	24					13.1 / 8000
540.0	60.0								

Continued on Sheet 2

Note: Gray clay with silt layers, little sand, trace of small gravel, stiff

LAC

T/LL

Wc ▲ NATURAL

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION

[illegible]	WO WASHOUT	BCR	BEFORE CASING REMOVAL
[illegible]	A AUGER	ACR	AFTER CASING REMOVAL
[illegible]	HS HOLLOW STEM AUGER	WD	WHILE DRILLING
[illegible]	SS SPLIT SPOON	WCI	WET CAVE IN
[illegible]	ST SHELBY TUBE	DCI	DRY CAVE IN
[illegible]	FT FISH TAIL	Qu	UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT
[illegible]	C CORE		
[illegible]	Wc WATER CONTENT PERCENT		

FOR:	Waste Management, Inc.
PROJECT:	Proposed Solid Waste Disposal Site
LOCATION	Lansing, Illinois

SOIL BORING LOG NO. 2
Sheet 2 of 2

WALTER H. FLOOD & CO., INC.
• Engineers •
• CHICAGO • KALAMAZOO •

METHOD OF BORING:		WATER LEVEL READINGS	
SPLIT SPOON SIZE:	IN.	W.D.	
WT. OF HAMMER	LBS.	B.C.R.	
INCH DROP	See Sheet 1	A.C.R.	
SHELBY TUBE SIZE		HRS. AFTER DRILLING	
CASING USED		HRS. AFTER DRILLING	

DATE OF BORING:	See Sheet 1	BY:	
JOB NO.:		VERTICAL SCALE:	

ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu ● LABORATORY × 1000 (2, 4, 6, 8, 10)	O PENETROMETER
							Continued from Sheet 1		
540.0	60.0						Gray silty clay, trace of small gravel, very tough to hard		
		25	SS	42				▲12.1	9000+ O
536.5	63.5	26	SS	99/9"			Fine gray sand & silt layers, very dense		
534.0	66.0	27	SS	99/6"			Gray clayey silt, trace of small gravel, very dense	▲8.7	
		28	SS	99/6"				▲7.8	
		29	SS	99/6"				▲9.2	
525.6	74.4	30	SS	99/6"			Greenish-gray clayey silt, trace of small gravel, very dense	▲8.9	
		31	SS	99/6"				▲11.4	
		32	SS	100/6"				▲10.8	
		33	SS	100/6"				8.7▲	
515.6	84.4	34	SS	100/6"			Refusal at 84.4'	▲ 7.6	

ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION	Wc ▲ NATURAL (10, 20, 30, 40, 50)

LEGEND: DEPTH FEET BELOW GROUND SURFACE; SAMPLE NUMBER; TYPE SAMPLE; PENETRATION BLOWS PER FOOT; SAMPLE LENGTH; LENGTH OF SAMPLE RECOVERED; DRY DENSITY LB PER CU FOOT

AO WASHOUT; A AUGER; HS HOLLOW STEM AUGER; SS SPLIT SPOON; ST SHELBY TUBE; FT FISH TAIL; C CORE; W WATER CONTENT PERCENT

BCR – BEFORE CASING REMOVAL; ACR – AFTER CASING REMOVAL; WD – WHILE DRILLING; WCI – WET CAVE IN; DCI – DRY CAVE IN; Qu – UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR	Waste Management, Inc.
PROJECT:	Proposed Solid Waste Disposal Site
LOCATION	Lansing, Illinois

SOIL BORING LOG NO. 3

WALTER H. FLOOD & CO., INC.

• Engineers •

• CHICAGO • KALAMAZOO •

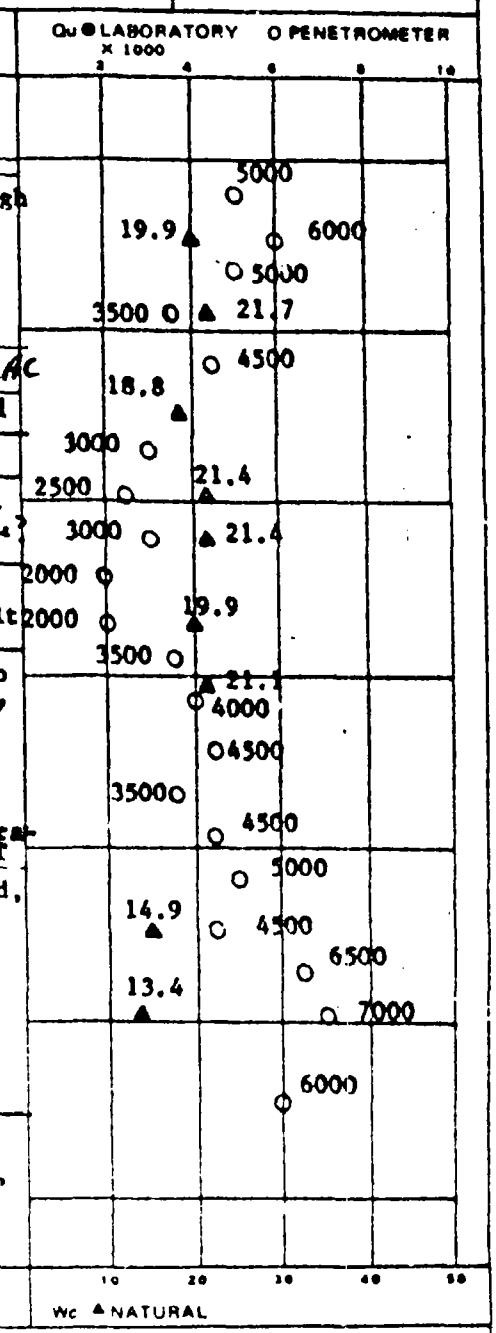
METHOD OF BORING:	HS
SPLIT SPOON SIZE:	2 IN.
WT. OF HAMMER	140 LBS.
INCH DROP	30
SHELBY TUBE SIZE	
CASING USED	

WATER LEVEL READINGS
13.5' W.D. & 23.5'
51.0' B.C.R.
A.C.R.
48.0' @ 20 HRS. AFTER DRILLING
3.9' @ 13 days AFTER DRILLING
2.1' @ 5 months after drilling.

DATE OF BORING:	1- 11 - 72
BY:	BJ&JA:jmt
JOB NO.:	7205-0005
VERTICAL SCALE:	1"=10'

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION
599.0	0.0						Ground surface
598.0	1.0						See note
		1	ss	14			Brown to gray clay, very tough to tough
		2	ss	18			
		3	ss	15			
		4	ss	12			
588.0	11.0						
585.5	13.5	5	ss	11			Gray clay, occasional silt seams, very tough LAC
583.0	16.0	6	ss	31			Gray silt, very dense
580.5	18.5	7	ss	14			Gray clay, tough LAC
		8	ss	9			Gray clay, trace of small gravel, tough TILL? TILL?
575.5	23.5	9	ss	10			
		10	ss	8			Gray silty clay, trace of small gravel, occasional silt seams, tough LAC?
570.5	28.5	11	ss	8			
		12	ss	16			Gray clay, trace of small to medium gravel, tough to very tough TILL
		13	ss	14			
		14	ss	16			
560.5	38.5	15	ss	15			
558.0	41.0	16	ss	16			Gray clay, trace of small gravel, occasional silt seams, VT
		17	ss	18			Gray silty clay, little sand, trace of small gravel, very tough
		18	ss	17			
		19	ss	19			
		20	ss	25			
		21	ss				
544.0	55.0	22	ss	30			
							End of boring

Note: Concrete rubble, clay, brick and gravel fill



ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION

LEGEND
DEPTH - FEET BELOW GROUND SURFACE
SAMPLE NUMBER
TYPE OF SAMPLE
N - PENETRATION BLOWS PER FOOT
SAMPLE LENGTH
LENGTH OF SAMPLE RECOVERED
DRY DENSITY LB PER CU FOOT

WO - WASHOUT
A - AUGER
HS - HOLLOW STEM AUGER
SS - SPLIT SPOON
ST - SHELBY TUBE
FT - FISH TAIL
C - CORE
Wc - WATER CONTENT PERCENT

BCR - BEFORE CASING REMOVAL
ACR - AFTER CASING REMOVAL
WD - WHILE DRILLING
WCI - WET CAVE IN
DCI - DRY CAVE IN
Qu - UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR	Waste Management, Inc.
PROJECT:	Proposed Solid Waste Disposal Site
LOCATION	Lansing, Illinois

SOIL BORING LOG NO. 4

WALTER H. FLOOD & CO., INC.

• Engineers •

• CHICAGO • KALAMAZOO •

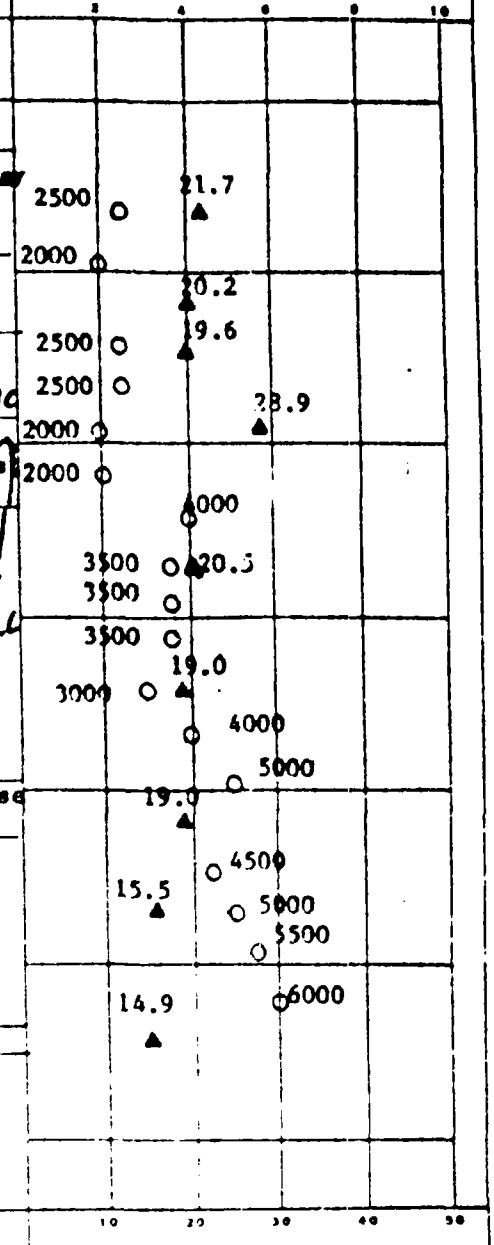
METHOD OF BORING: HS
SPLIT SPOON SIZE: 2 IN.
WT. OF HAMMER 140 LBS.
INCH DROP 30
SHELBY TUBE SIZE
CASING USED 2¼"I.D. -HS

WATER LEVEL READINGS
9.0', W.D. 18.5' dry
Dry B.C.R.
damp A.C.R. 53.5'
7.3'@24 HRS. AFTER DRILLING
4.7'@14 days
2.8'@ 5 months after drilling.

DATE OF BORING: 1-10-72 BY: BJ&JA:jmt
JOB NO.: 7205-0005 VERTICAL SCALE: 1"=10'

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION
596.5	0.0						Ground surface
593.5	3.0	1	ss	9			Concrete rubble, clay, sand, brick and gravel fill
591.5	5.0	2	ss	17			Brown clay fill, some black clay
		3	ss	9			Brown clay, tough
587.5	9.0	4	ss	22			Gray silt, medium dense to dense
583.0	13.5	5	ss	31			
		6	ss	15			Gray clay, tough
578.0	18.5	7	ss	11			
		8	ss	6			Gray clay, trace of small gravel, occasional silt seams tough
573.0	23.5	9	ss	8			
		10	ss	13			Gray clay, trace of small gravel, tough to very tough
		11	ss	14			
		12	ss	12			
		13	ss	16			
		14	ss	20			
		15	ss	21			
557.2	39.3	16	ss	48			Gray silt, dense to very dense
554.0	42.5	17	ss	51			
		18	ss	22			Gray silty clay, trace of small gravel, very tough
		19	ss	25			
		20	ss	25			
543.0	53.5	21	ss	32			
541.5	55.0	22	ss	44			Gray silt, dense
							End of boring

Qu ● LABORATORY × 1000 O PENETROMETER



Wc ▲ NATURAL

[illegible]	DESCRIPTION		
[illegible]		WASHOUT	BCR - BEFORE CASING REMOVAL
[illegible]		AUGER	ACR - AFTER CASING REMOVAL
[illegible]		HOLLOW STEM AUGER	WD - WHILE DRILLING
[illegible]		SPLIT SPOON	WCI - WET CAVE IN
[illegible]		SHELBY TUBE	DCI - DRY CAVE IN
[illegible]		FISH TAIL	Qu - UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT
[illegible]		CORE	
[illegible]		WATER CONTENT PERCENT	

FOR: Waste Management, Inc.	SOIL BORING LOG NO. 5
PROJECT: Proposed Solid Waste Disposal Site	Sheet 1 of 2
LOCATION: Lansing, Illinois	WALTER H. FLOOD & CO., INC.
	• Engineers •
	• CHICAGO • KALAMAZOO •

METHOD OF BORING: HS	WATER LEVEL READINGS	DATE OF BORING: 5-23-72	BY: BJ&JA&MC:bc
SPLIT SPOON SIZE: 2 IN.	2.0', W.D. 8.5', 13.5'		
WT. OF HAMMER 140 LBS.	None B.C.R.		
INCH DROP 30	64.0' A.C.R.		
SHELBY TUBE SIZE	4.5'@ 48 HRS. AFTER DRILLING	JOB NO.: 7205-0005-1	VERTICAL SCALE: 1"=10'
CASING USED 2½" IDHS	HRS. AFTER DRILLING		

ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu @ LABORATORY × 1000 (2, 4, 6, 8, 10)	O PENETROMETER
597.0	0.0						Ground surface		
595.0	1.0						Sand, gravel & clay fill		
595.0	2.0	1	ss	14			Dark gray to brown clay fill		25.5
593.5	3.5	2	ss	40			Brown and gray clay fill, some concrete rubble & wood frag-ments		22.0
591.0	6.0	3	ss	6			Brown clay, stiff	1500	27.9
588.5	8.5	4	ss	15			Brown silt, medium denac		24.1
586.0	11.0	5	ss	7			Gray clay, stiff	1500	22.0
583.5	13.5	6	ss	13			Gray silt, medium dense	1000	18.8
581.0	16.0	7	ss	3			Gray clay, soft to stiff		20.5
		8	ss	6				LAC 2000	24.1
576.0	21.0	9	ss	9			Gray clay, trace of small gravel, occasional silt seams, tough	2500	19.6
573.5	23.5	10	ss	12			Gray clay, trace of small gravel, tough to very tough	3500	19.3
		11	ss	13				3000	19.0
		12	ss	14				14.9	3500
								T/LC	
		13	ss	13				3500	19.6
		14	ss	15				3500	19.9
		15	ss	16				4000	19.6
		16	ss	16				19.9	4500
556.0	41.0	17	ss	32			Gray silty clay with small to medium gravel, hard	11.6	9000+
553.5	43.5	18	ss	44			Gray silty clay, trace of small gravel, occasional silt seams, hard	12.1	9000+
551.0	46.0	19	ss	32			Gray silty clay, trace of small gravel, hard	12.1	9000+
		20	ss	25				11.6	9000+
		21	ss	27				12.1	9000+
		22	ss	24				11.8	9000+
		23	ss	26				10.8	9000+
		24	ss	52				10.6	9000+
536.0	61.0								

Continued on Sheet 2

Note: Concrete rubble & crushed stone fill

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION	Wc ▲ NATURAL (10, 20, 30, 40, 50)

LEGEND
- DEPTH - FEET BELOW GROUND SURFACE
- S - SAMPLE NUMBER
- T - TYPE OF SAMPLE
- N - PENETRATION BLOWS PER FOOT
- LR - SAMPLE LENGTH
- LR - LENGTH OF SAMPLE RECOVERED
- DD - DRY DENSITY LB PER CU FT
- WO - WASHOUT
- A - AUGER
- HS - HOLLOW STEM AUGER
- SS - SPLIT SPOON
- ST - SHELBY TUBE
- FT - FISH TAIL
- C - CORE
- W - WATER CONTENT PERCENT
- BCR - BEFORE CASING REMOVAL
- ACR - AFTER CASING REMOVAL
- WD - WHILE DRILLING
- WCI - WET CAVE IN
- DCI - DRY CAVE IN
- Qu - UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR: Waste Management, Inc.	SOIL BORING LOG NO. 5 Sheet 2 of 2
PROJECT: Proposed Solid Waste Disposal Site	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION: Lansing, Illinois	
METHOD OF BORING: SPLIT SPOON SIZE: IN. WT. OF HAMMER LBS. INCH DROP See Sheet 1 SHELBY TUBE SIZE CASING USED	WATER LEVEL READINGS W.D. B.C.R. A.C.R. HRS. AFTER DRILLING HRS. AFTER DRILLING
DATE OF BORING: See Sheet 1	BY:
JOB NO.:	VERTICAL SCALE:

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu ● LABORATORY × 1000 / O PENETROMETER (2, 4, 6, 8, 10)
							Continued from Sheet 1	
536.0	61.0	25	ss	[illegible]	[illegible]		Refusal at 61.1' (dolomite fragments recovered)	
531.9	65.1	26	ss	[illegible]	[illegible]		End of boring	

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION	Wc ▲ NATURAL (10, 20, 30, 40, 50)

LEGEND: [illegible]

WD WASHOUT
AUGER
HS HOLLOW STEM AUGER
SS SPLIT SPOON
T SHELBY TUBE
FT FISH TAIL
C CORE
W WATER CONTENT PERCENT

BCR – BEFORE CASING REMOVAL
ACR – AFTER CASING REMOVAL
WD – WHILE DRILLING
WCI – WET CAVE IN
DCI – DRY CAVE IN
Qu – UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR	Waste Management, Inc.
PROJECT	Proposed Solid Waste Disposal Site
LOCATION	Lansing, Illinois

SOIL BORING LOG NO. 6
Sheet 1 of 2

WALTER H. FLOOD & CO., INC.
• Engineers •
• CHICAGO • KALAMAZOO •

METHOD OF BORING:	HS
SPLIT SPOON SIZE:	2 IN.
WT. OF HAMMER	140 LBS.
INCH DROP	30
SHELBY TUBE SIZE	
CASING USED	2¼" IDHS

WATER LEVEL READINGS
53.5' W.D.
B.C.R.
A.C.R.
2.0' @ 48 HRS. AFTER DRILLING
HRS. AFTER DRILLING

DATE OF BORING:	5-23-72	BY:	BJ&JA&MC:bc
JOB NO.:	7205-0005-1	VERTICAL SCALE:	1"=10'

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu ● LABORATORY × 1000 / O PENETROMETER (2, 4, 6, 8, 10)	Wc ▲ NATURAL (10, 20, 30, 40, 50)
599.0	0.0						Ground surface		
597.7	1.3						Brown clay & large gravel fill		
		1	ss	15			Brown clay, very tough	21.7 ▲ O 5000	
		2	ss	12					
593.0	6.0	3	ss	13			Brown clay, occasional silt seams, tough	O 4000	
590.5	8.5	4	ss	16			Gray layered silt & clay, medium dense	19.9 ▲ 14.4	
588.0	11.0	5	ss	15			Gray clay, occasional silt seams, very tough to tough	17.6 ▲ O 5000	
		6	ss	12				18.5 ▲ O 6000	
		7	ss	9				4000 O ▲ 24.1	
580.5	18.5	8	ss	7			Gray clay, trace of small gravel, tough to very tough	3000 O ▲ 23.2	
		9	ss	13				3500 O ▲ 19.3	
		10	ss	11				3500 O ▲ 19.9	
		11	ss	12				3000 O ▲ 20.2	
		12	ss	13				2500 O ▲ 19.6	
		13	ss	16				O 4000	
		14	ss	14				19.9 ▲ 4000 O ▲ 20.8	
		15	ss	14				19.0 ▲ O 4500	
		16	ss	18				18.8 ▲ O 5000	
558.0	41.0	17	ss	22			Gray clay, trace of small gravel, occasional silt seams, very tough	18.5 ▲ O 6000	
555.5	43.5	18	ss	21			Gray silty clay, trace of small gravel, very tough to hard	▲ 11.8 O 8000	
		19	ss	25				▲ 12.1 9000+ O	
		20	ss	25				▲ 13.1 9000+ O	
		21	ss	23				▲ 12.9 9000+ O	
545.5	53.5	22	ss	23			Gray silty clay, trace of small gravel, occasional sand seams, hard	▲ 13.1 9000+ O	
543.0	56.0	23	ss	25			Gray silty clay, trace of small gravel, very tough to tough	▲ 13.1 O 8500	
[illegible]	[illegible]	24	ss	29				▲ 13.9 O 8000	

Continued on Sheet 2

ELEV	DEPTH	S	T	N	LR	DD	DESCRIPTION

LEGEND
[illegible] FEET BELOW [illegible] SURFACE
SAMPLE NUMBER
TYPE OF SAMPLE
PENETRATION BLOWS PER FOOT
SAMPLE LENGTH
LENGTH OF SAMPLE RECOVERY
DRY DENSITY LB PER CU FOOT

WO WASHOUT
A AUGER
HS HOLLOW STEM AUGER
SS SPLIT SPOON
ST SHELBY TUBE
FT FISH TAIL
C CORE
Wc WATER CONTENT PERCENT

BCR BEFORE CASING REMOVAL
ACR AFTER CASING REMOVAL
WD WHILE DRILLING
WCI WET CAVE IN
DCI DRY CAVE IN
Qu UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR: Waste Management, Inc.	SOIL BORING LOG NO. 6 Sheet 2 of 2
PROJECT: Proposed Solid Waste Disposal Site	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION: Lansing, Illinois	
METHOD OF BORING: SPLIT SPOON SIZE: IN. WT. OF HAMMER LBS. INCH DROP See Sheet 1 SHELBY TUBE SIZE CASING USED	WATER LEVEL READINGS W.D. B.C.R. A.C.R. HRS. AFTER DRILLING HRS. AFTER DRILLING
DATE OF BORING: See Sheet 1	BY:
JOB NO.:	VERTICAL SCALE:

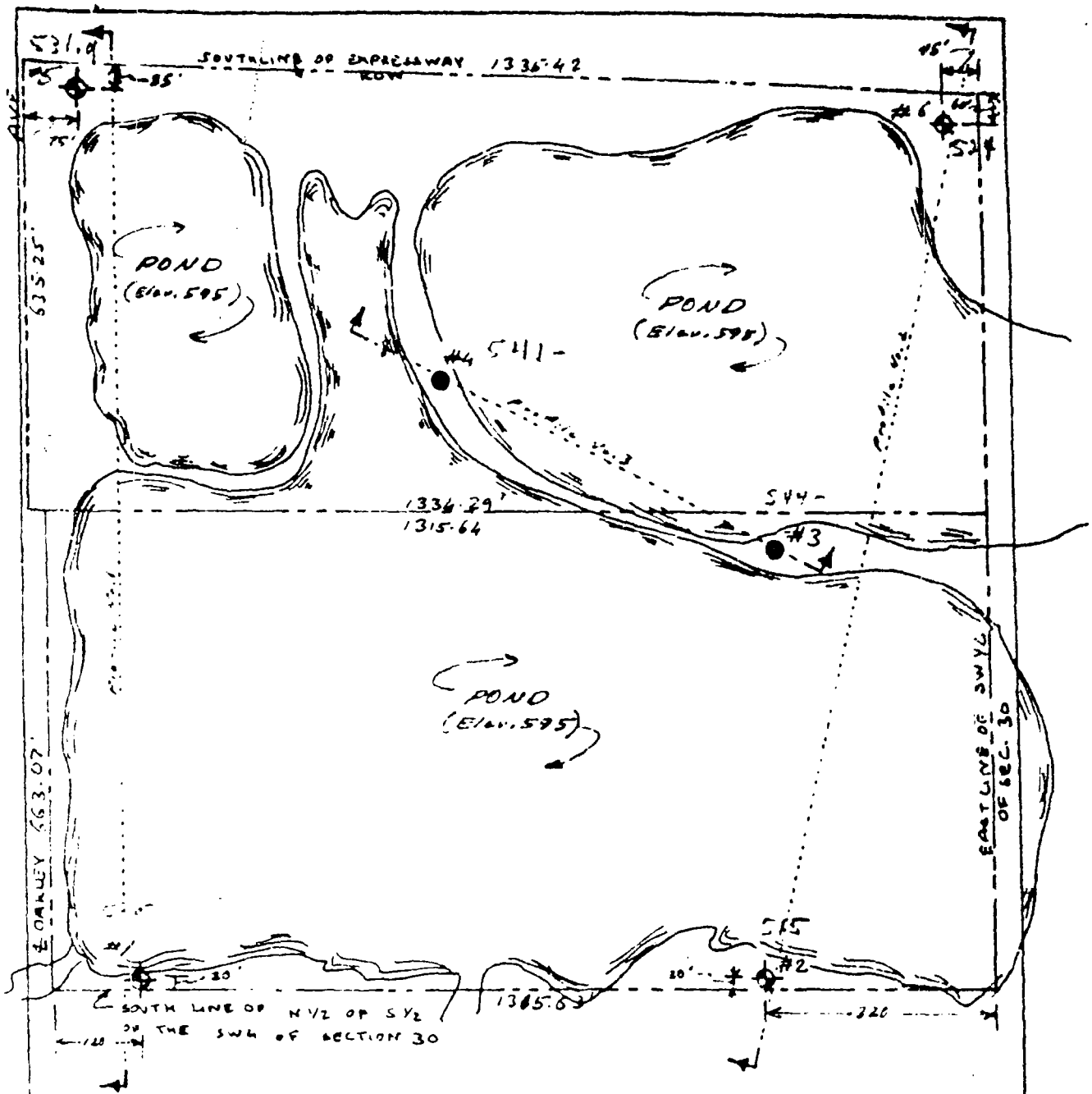
ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION	Qu ● LABORATORY X 1000	O PENETROMETER
							Continued from Sheet 1		
539.0	60.0						Gray silty clay, trace of small gravel, very tough to tough		
		25	ss	26				▲ 13.6	8000 O
		26	ss	36				▲ 12.3	9000+ O
533.0	66.0	27	ss	77			Gray clayey silt, trace of small to medium gravel, very dense	▲ 12.1	9000+ O
		28	ss	[illegible]				▲ 16.0	9000+ O
		29	ss	[illegible]					
525.5	73.5	30	ss	[illegible]			Refusal at 73.5'		
524.0	75.0						End of boring		

ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION	Wc ▲ NATURAL

LEGEND: DEPTH FEET BELOW GROUND SURFACE; SAMPLE NUMBER; TYPE OF SAMPLE; PENETRATION BLOWS PER FOOT; SAMPLE LENGTH; LENGTH OF SAMPLE RECOVERED; DRY DENSITY LB PER CU FOOT

WO WASHOUT; A AUGER; HS HOLLOW STEM AUGER; SS SPLIT SPOON; ST SHELBY TUBE; FT FISH TAIL; C CORE; Wc WATER CONTENT PERCENT

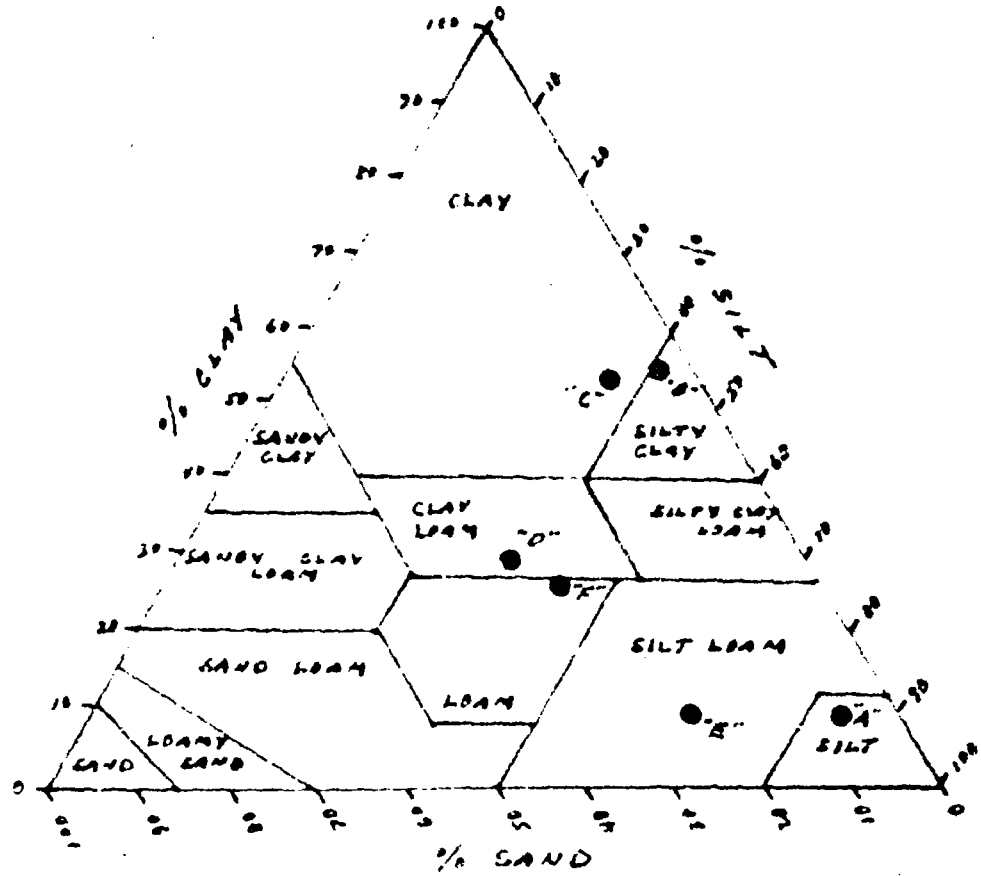
BCR BEFORE CASING REMOVAL; ACR AFTER CASING REMOVAL; WD - WHILE DRILLING; WCI - WET CAVE IN; DCI - DRY CAVE IN; Qu UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT



SOIL BORING LOCATIONS
PROPOSED SOLID WASTE DISPOSAL SITE
LANSING, ILLINOIS

WALTER H. FLOOD & CO. INC.

SCALE 1" = 200'	BY KCN
JOB/LAB NO 7205005	DATE 1-7-72



NOTES:

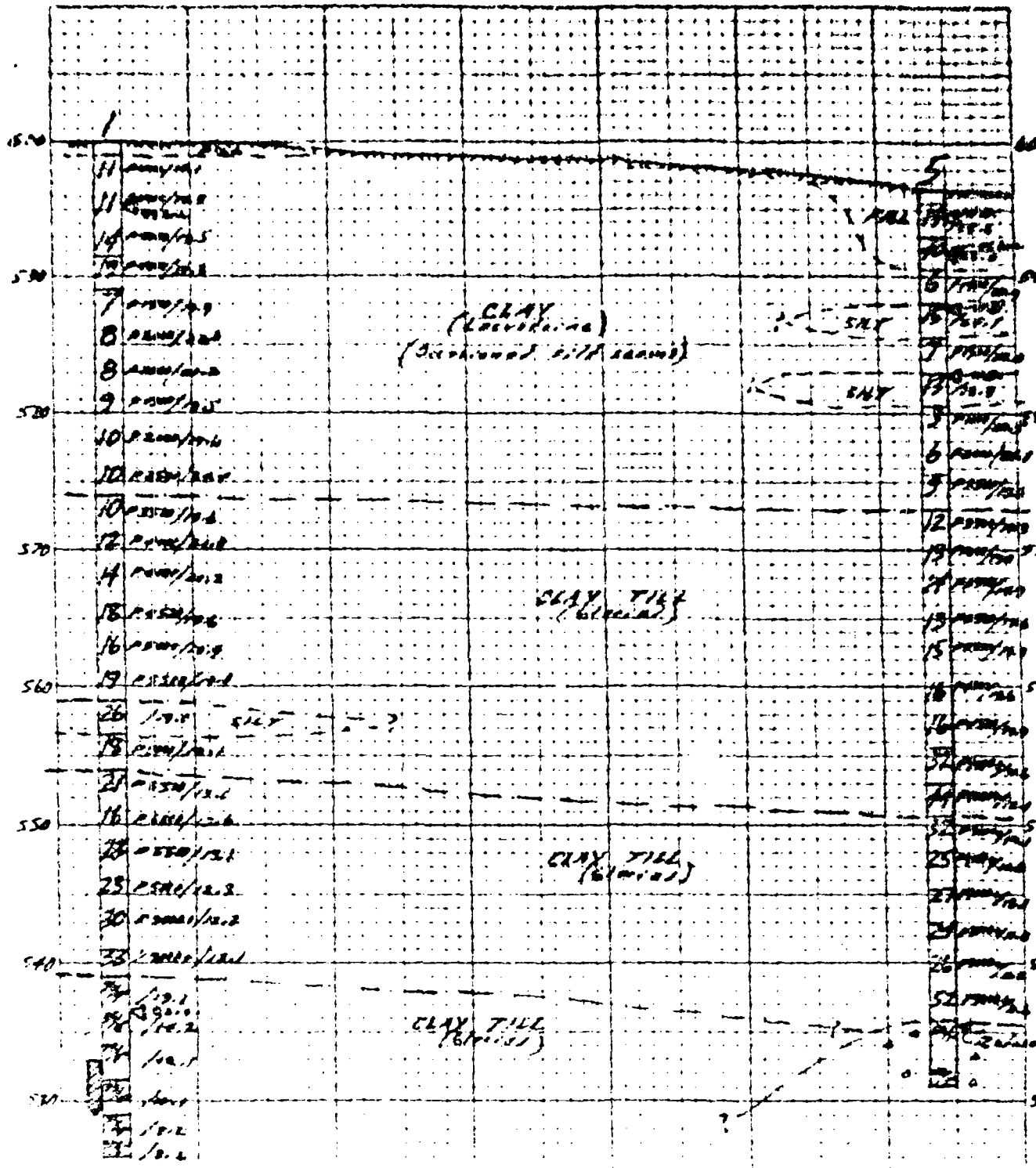
- ● Test Results
- "A" = Lacustrine Silt
- "B" = Lacustrine Clay
- "C" = Glacial Till (Park Ridge)
- "D" = Glacial Till (Tinley)
- "E" = Glacial Till (Valparaiso)
- "F" = Glacial Till (Pre-Valpo)

where from which borings

SOIL TEXTURAL CLASSIFICATION
U.S. DEPARTMENT OF AGRICULTURE
SOLID WASTE DISPOSAL SITE
NOVA TORREBOLE STRI-STATE EXPY.
LANSING, ILLINOIS

WALTER H. FLOOD & CO. INC.

SCALE	BY [illegible]
JOB/LAB NO [illegible]	DATE 6/29/72



SOIL PROFILE 1

PROPOSED SOLID WASTE DISPOSAL SITE

JUNE 1972

HORIZONTAL SCALE: 1" = 200'

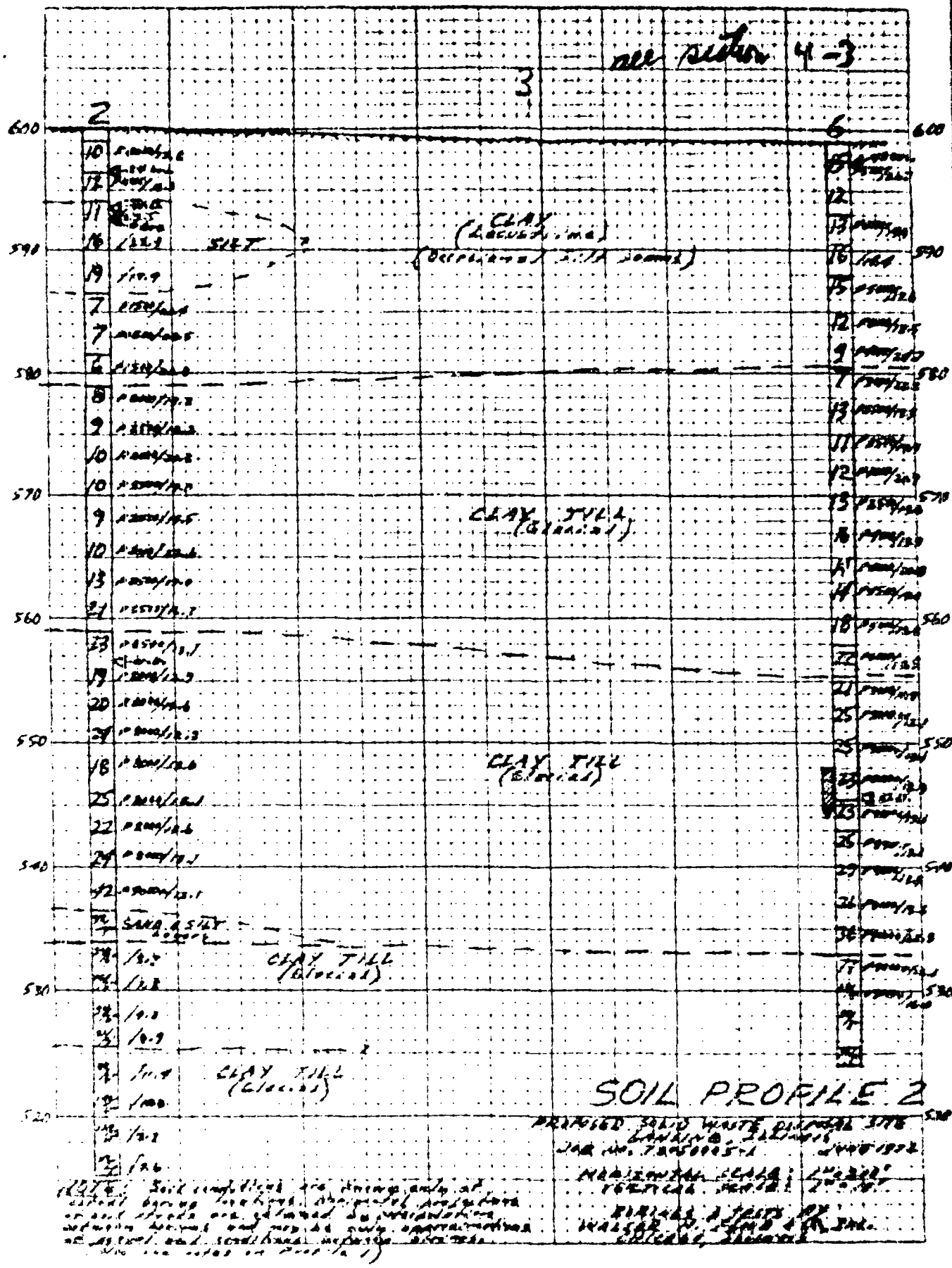
VERTICAL SCALE: 1" = 10'

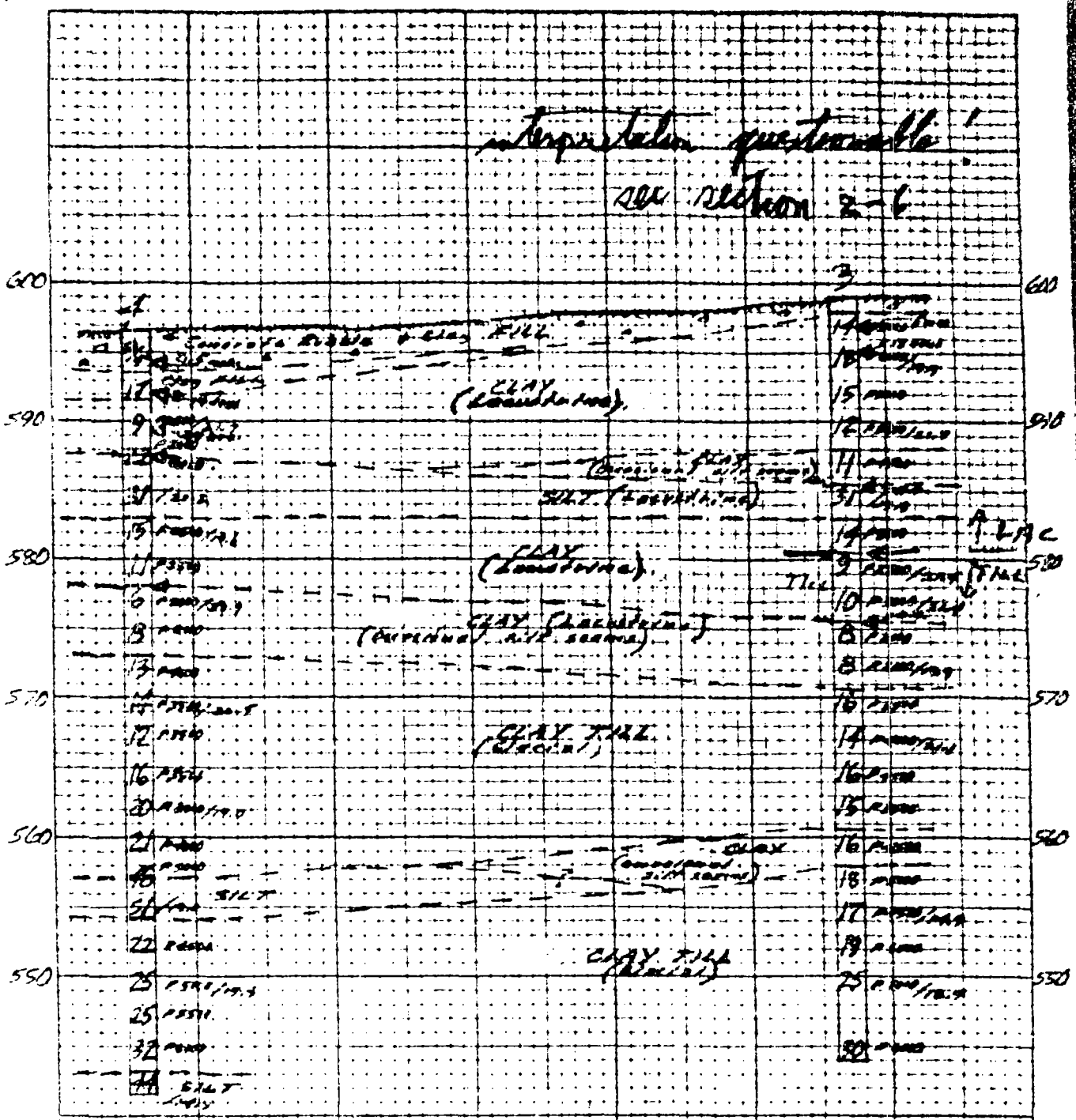
NOTE: Soil conditions are known only at [illegible]

[illegible]

[illegible]

[illegible]


see section 4-3
3
2
6
600
590
580
570
560
550
540
530
520
SILT
CLAY
CLAY TILL (Glacial)
CLAY TILL (Glacial)
CLAY TILL (Glacial)
SAND & SILT
SOIL PROFILE 2
PROPOSED SOLID WASTE DISPOSAL SITE
LANSING, ILLINOIS



SOIL PROFILE 3

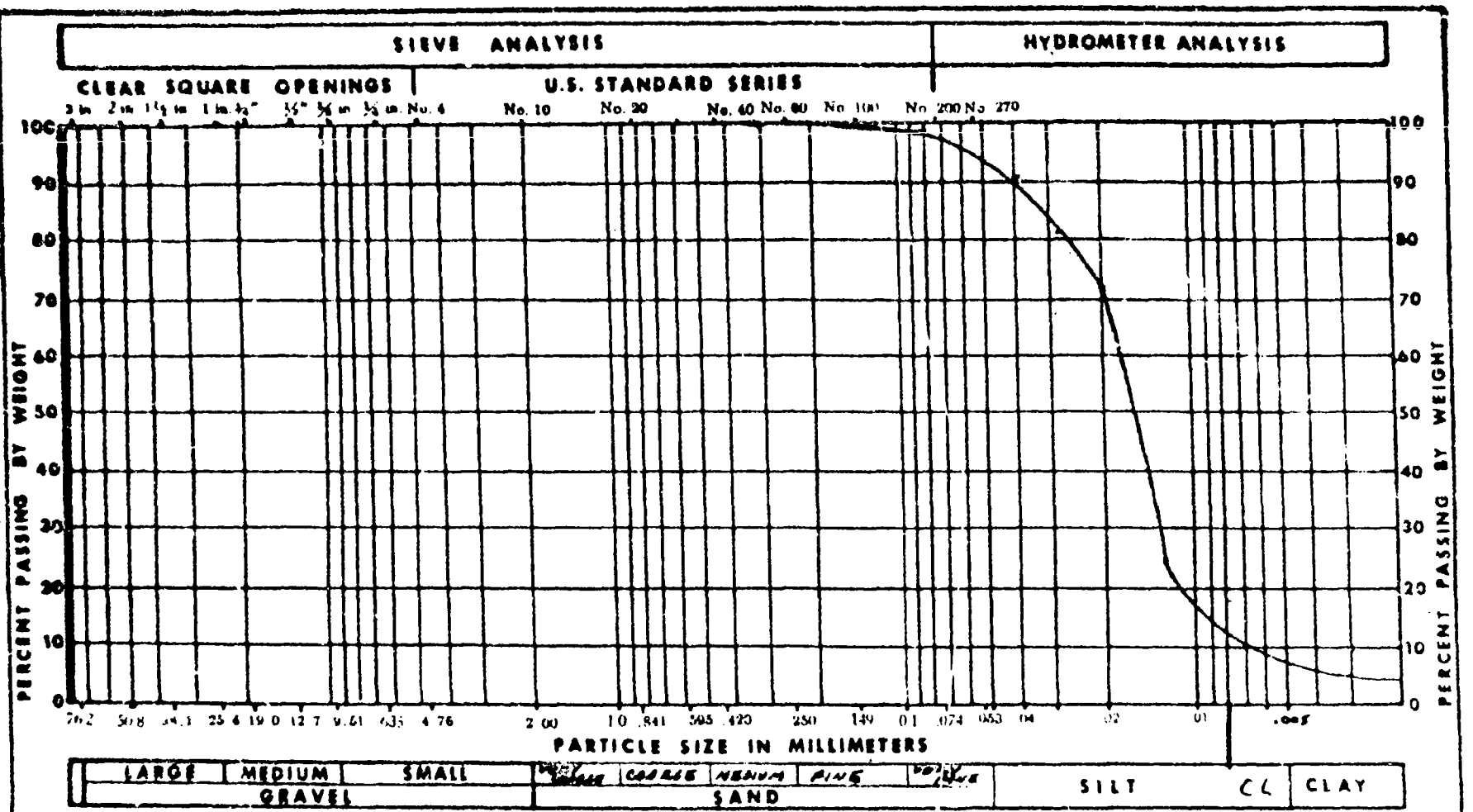
PROPOSED SOLID WASTE DISPOSAL SITE
LANSING, ILLINOIS

NOTE: Actual soil conditions are [illegible]

[illegible] 1972

HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

[illegible]



BORE NO.	SAMPLE NO. "A"
DESCRIPTION	SILT
CLASSIFICATION	Lacustrine Silt

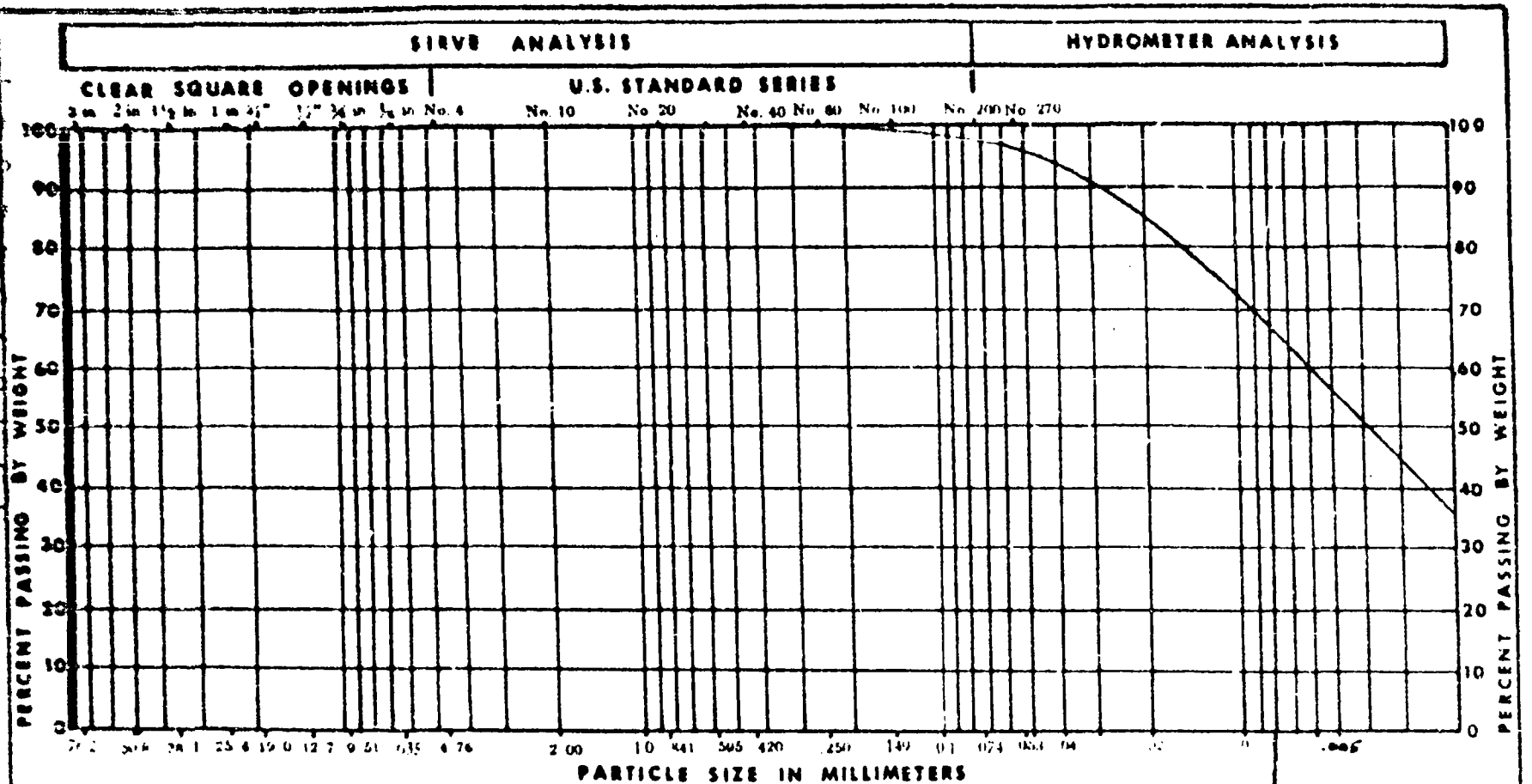
DRY DENSITY	112.9 pcf
MOISTURE CONTENT	17.9%
DEGREE OF SAT.	97.5%
VOID RATIO	0.500
SPEC. GRAVITY	2.71

SOIL GRADATION ANALYSIS

SOLID WASTE DISPOSAL SITE
Vicinity of
TORRENCE AVE. & TRI-STATE EXPY.
LANSING, ILLINOIS

JOB NO. 72050005-1 DATE 6/29/74

WALTER H. FLOOD AND COMPANY INC
CHICAGO ILLINOIS 60627



% MOIST BY VOL = .337

BORE NO.	SAMPLE NO. "B"
DESCRIPTION	SILTY CLAY
CLASSIFICATION	Lacustrine Clay

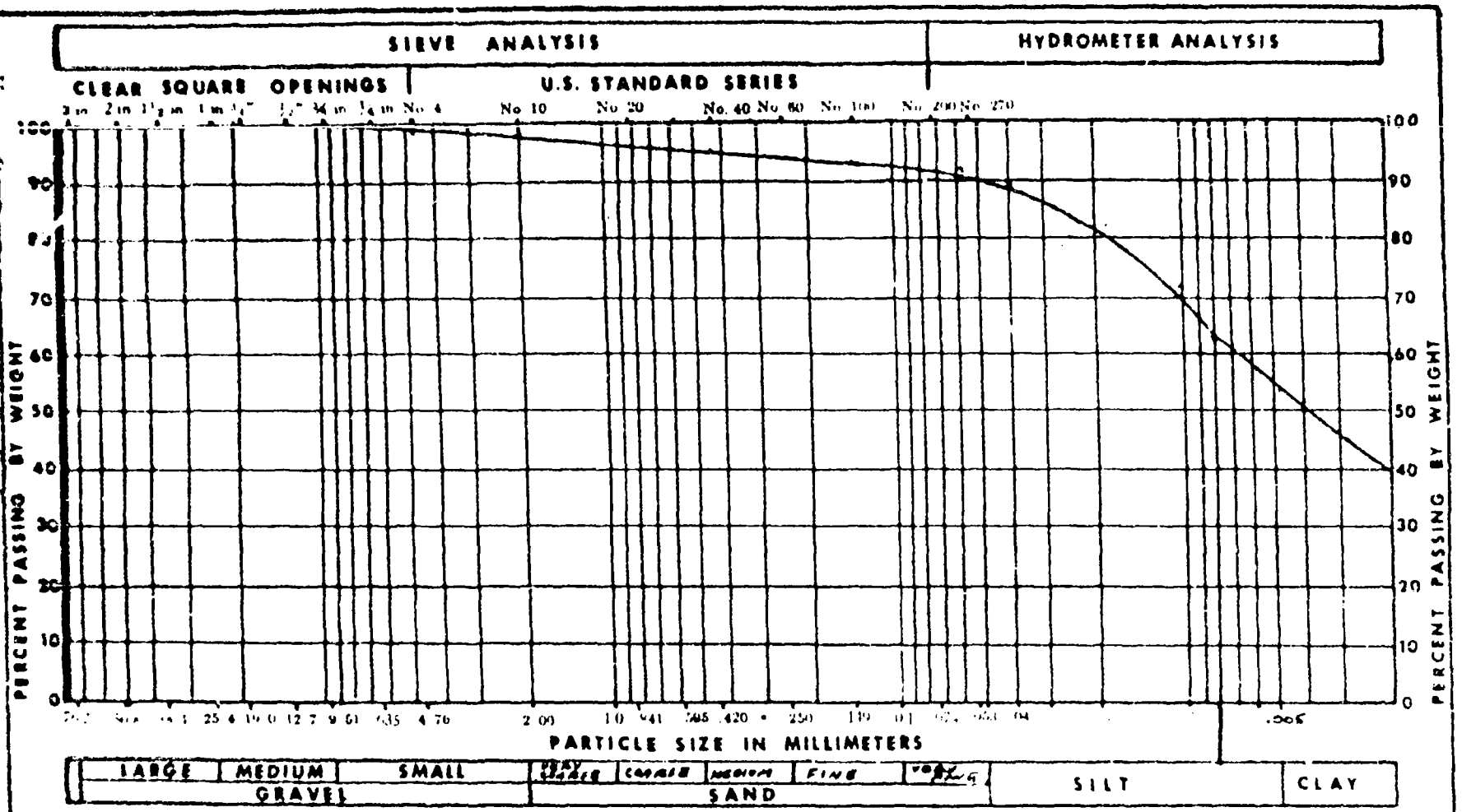
DRY DENSITY	108.8 p.c.f.
WATER MOISTURE CONTENT	19.9 %
DEGREE OF SAT.	100.0 %
VOID RATIO	0.509
SPEC. GRAVITY	2.63

SOIL GRADATION ANALYSIS

SOLID WASTE DISPOSAL SITE
VICINITY OF
TORRENCE AVE. & TRI-STATE EXPY.
LANSING, ILLINOIS

JOB NO [illegible] DATE [illegible]

WALTER H. FLOOD AND COMPANY INC
CHICAGO ILLINOIS 60637



BORE NO.	SAMPLE NO. "C"
DESCRIPTION	CLAY
CLASSIFICATION	Glacial Till (Park Ridge)

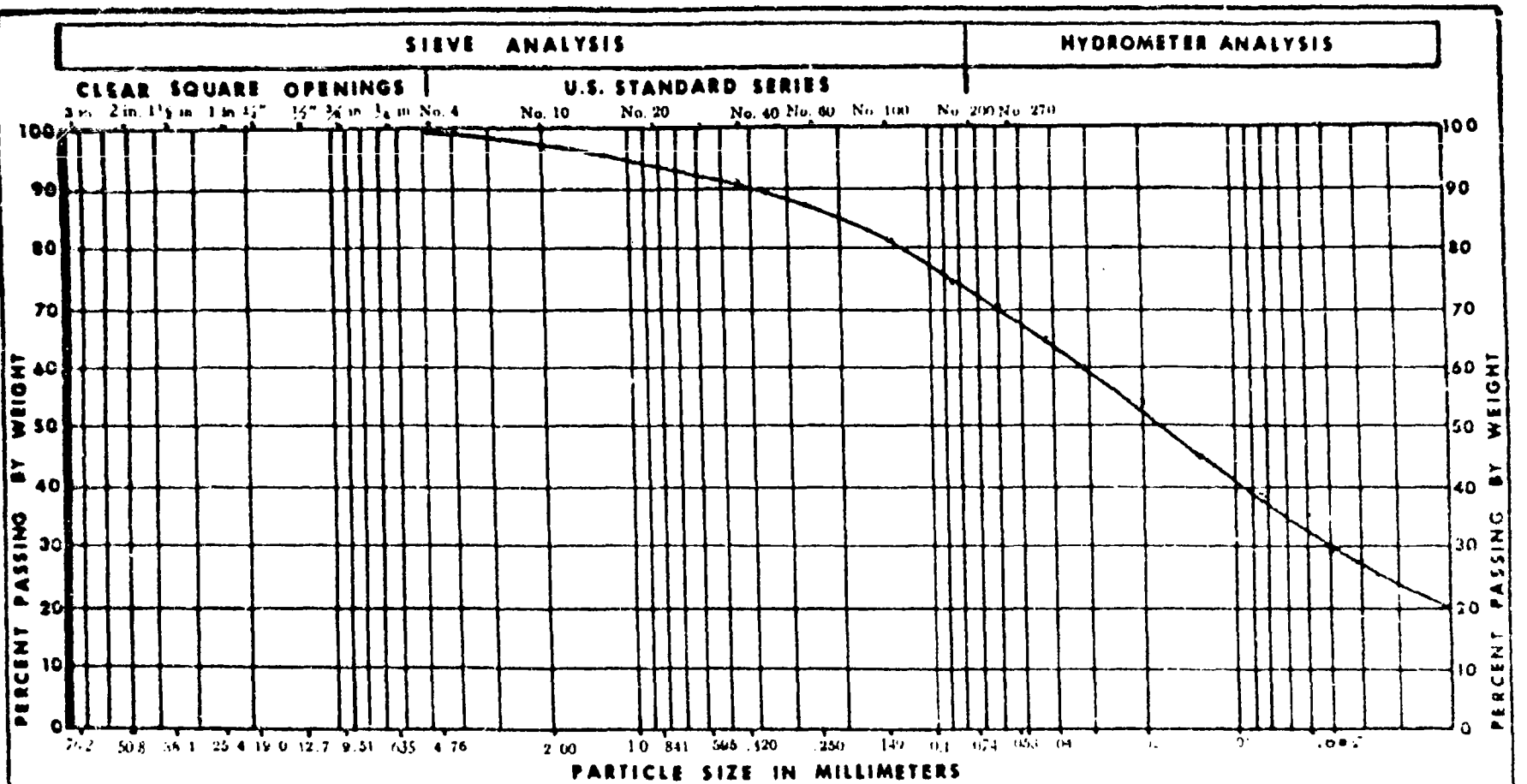
DRY DENSITY	113.0 pcf
MOISTURE CONTENT	17.9%
DEGREE OF SAT.	100.0%
VOID RATIO	0.401
SPEC. GRAVITY	2.54

SOIL GRADATION ANALYSIS

SOLID WASTE DISPOSAL SITE
Vicinity of
TORRENCE AVE. & TRI-STATE EXPY.
LANSING, ILLINOIS

JOB NO. 72050005-1 DATE 6/29/72

WALTER H FLOOD AND COMPANY INC
CHICAGO ILLINOIS 60637



BORE NO.	SAMPLE NO. "D"
DESCRIPTION	CLAY LOAM
CLASSIFICATION	Glacial Till
	(Tinley)

DRY DENSITY	116.3 pcf
MOISTURE CONTENT	15.2 %
DEGREE OF SAT.	92.5 %
VOID RATIO	0.443
SPEC. GRAVITY	2.69

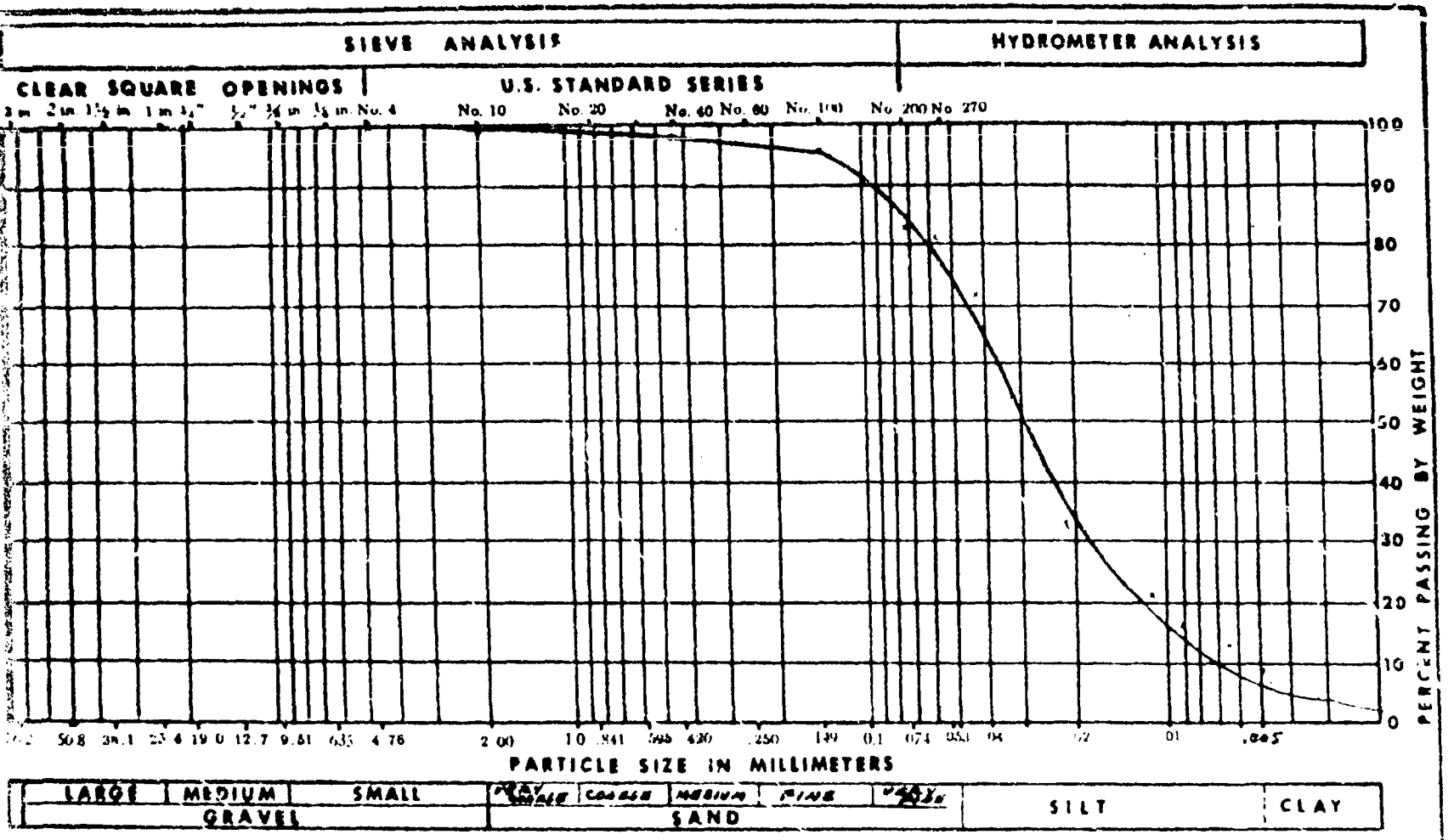
SOIL GRADATION ANALYSIS

WASTE DISPOSAL SITE

LANSING, ILLINOIS

JOB NO. [illegible] DATE [illegible]

WALTER H. FLOOD AND COMPANY INC
CHICAGO ILLINOIS 60637



BORE NO.	SAMPLE NO. "E"
DESCRIPTION	SILT LOAM
CLASSIFICATION	Glacial Till (Valparaiso)

DRY DENSITY	125.8 pcf
MOISTURE CONTENT	12.1 %
DEGREE OF SAT.	99.5 %
VOID RATIO	0.324
SPEC. GRAVITY	2.67

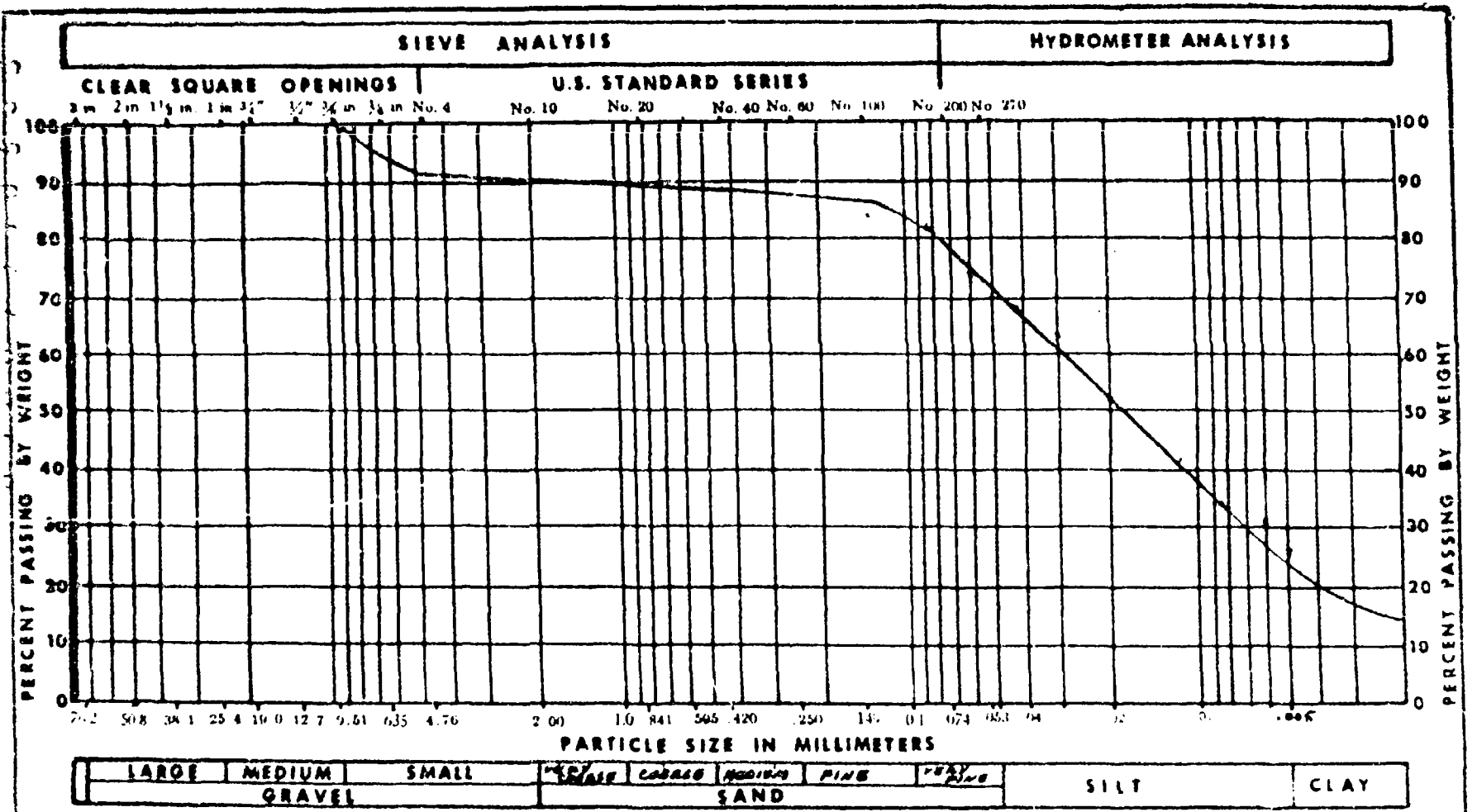
SOIL GRADATION ANALYSIS

WASTE DISPOSAL SITE

LANSING, ILLINOIS

JOB NO. [illegible] DATE 6/[illegible]/[illegible]

WALTER H. FLOOD AND COMPANY INC
CHICAGO ILLINOIS 60637



BORE NO.	SAMPLE NO. "F"
DESCRIPTION	LOAM
CLASSIFICATION	Glacial Till
	(Pre-Valparaiso)

DRY DENSITY	133.8 p.c.f.
MOISTURE CONTENT	9.9 %
DEGREE OF SAT.	100.5 %
VOID RATIO	0.181
SPEC. GRAVITY	2.53

SOIL GRADATION ANALYSIS

WASTE DISPOSAL SITE

LANSING, ILLINOIS

JOB NO. [illegible] DATE [illegible]

WALTER H. FLOOD AND COMPANY INC
CHICAGO ILLINOIS 60637