New River Channelization
Bethany Home Road to Olive Avenue
Phoenix, Arizona
for
Coe and Van Loo
Job No. 2128J068

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REMARKS

WESTERN TECHNOLOGIES INC.

3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 437-3737

Coe and Van Loo
4550 North 12th Street
Phoenix, Arizona 85014-4291

March 2, 1989

Attn: Mr. Ashok C. Patel, P.E., R.L.S.
Senior Vice President

Re: New River Project
Bethany Home Road to Olive Avenue
Phoenix, Arizona

Job No. 2128J068

According to your request, Western Technologies Inc. (WTI) is forwarding to you a combined report for the New River Project between Bethany Home Road and Olive Avenue. This combined report contains the following items:

- Geotechnical Report
- Environmental Report
- Soil Cement Reports

Western Technologies Inc. has appreciated being part of this project and is looking forward to working with you on the construction phase. If you have any questions concerning the contents of these reports, please do not hesitate to contact us.

Sincerely,

WESTERN TECHNOLOGIES INC.
Geotechnical Services

Richard A. Bergquist, P.E.
Director

sfp/7984G

Copies to: Addressee (3)

WESTERN TECHNOLOGIES INC.

3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 437-3737

Coe and Van Loo
4550 North 12th Street
Phoenix, Arizona 85014

November 9, 1988

Attn: Mr. Ashok Patel
Senior Vice President

Re: New River Channelization
Bethany Home Road to Olive Avenue
Phoenix, Arizona

Job No. 2128J068
Inv. No. 21280317

Gentlemen:

Western Technologies Inc. has completed the subsurface exploration for the proposed New River Channelization Project to be implemented between Bethany Home Road and Olive Avenue in the City of Peoria and City of Glendale, Arizona. This study was requested and authorized by Mr. Ashok C. Patel in general accordance with our proposal number 2128A008 dated February 8, 1988.

The results of our study, including the boring location diagram, laboratory test results, test boring records and the geotechnical recommendations needed to aid in the design and construction of the levees, embankments and other earth connected phases of this project are attached.

We have appreciated being of service to you in the subsurface exploration phase of this project and are prepared to assist you during the construction phases as well. If you have any questions concerning this report or any of our testing, inspection, design and consulting services, please do not hesitate to contact us.

Sincerely,

WESTERN TECHNOLOGIES INC.
Geotechnical Services

Enamul Hoque, P.E.

Reviewed by: Richard A. Bergquist, P.E.

sfp/768

Copies to: Addressee (3)

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Coe and Van Loo
Job No. 2128J068

Geotechnical Exploration
New River Channelization
Bethany Home Road to Olive Avenue
Phoenix, Arizona
November 1, 1988

INTRODUCTION

This report contains the results of our geotechnical exploration for the proposed New River Channelization Project to be implemented between Olive Avenue and Bethany Home Road. The purpose of these services is to provide information and recommendations relative to site preparation, levee construction, slope stability and embankment protection.

PROPOSED CONSTRUCTION

Project information has been provided by Mr. Ashok C. Patel of Coe and Van Loo. We have several drawings supplied by Coe and Van Loo. Based on this information, we understand that the project will consist of channelization of the existing New River between Olive Avenue and Bethany Home Road. The channelization will consist of levees on each bank approximately 20 feet above the proposed flow line. The levees will be constructed on 1:1 slope protected by a soil-cement face 4 to 8 feet in thickness. The soil-cement slope protection will extend approximately 15 feet below the flow line to be below the expected scour depth.

SITE CONDITIONS

General: The portion of the river which will be channelized is located about 15 miles northwest of the City of Phoenix. The area is a gently sloping broad alluvial valley typical of the Basin

and Range Province. For simplicity, we divided the project into three sections. The three sections are; Olive Avenue to Northern Avenue, Northern Avenue to Glendale Avenue, and Glendale Avenue to Bethany Home Road. The site conditions within each section are as follows:

- Olive Avenue to Northern Avenue: The river channel flows southward and the bottom contains a moderate growth of local bushes such as mesquite and creosote. An open drainage canal outfalls to the river on the west bank approximately 100 yards south of Olive Avenue. Uncontrolled fill exists on the channel faces between Olive and 99th Avenue.

  South of 99th Avenue, the west bank contains uncontrolled rubble fill. The east bank appears relatively free of debris.

  Evidence of an abandoned gravel mining operation was observed on the west bank north of Northern Avenue. The river channel narrows significantly in this area.

- Northern Avenue to Glendale Avenue: This section has one operating gravel mine on the west bank of the river within the first half mile south of Northern Avenue. Several large, deep open pit excavations associated with the mine exist within the western half of the channel. Some of these pits are approximately 90 feet deep. Several ponds of unknown depth, probably associated with the mining operation, exist in this area.

  North of Glendale Avenue uncontrolled fill was observed on the east and west channel banks. In this vicinity, immediately east of the probable project limits, a large 25 foot deep pit exists. This pit contains junk

automobiles, and construction, and household rubble. No research was done to determine if hazardous materials exist within the pit.

The river bed and channel bank contain a moderate growth of native brush and grass. A large open channel drainage structure empties into the river on the east bank within this section.

- Glendale Avenue to Bethany Home Road: Several, probably illegal, dump sites exist on the west channel bank.

  A storm drain enters the river channel on the east bank. An active gravel mining operation is also located on the east bank.

  Portions of the channel bottom and banks within this section contain a moderate to dense growth of native grasses, brush and trees.

  Location of Uncontrolled Dump Sites: During the field exploration, several areas containing uncontrolled fill material were observed. These dump sites contained construction debris, household rubble and decomposing vegetation. Following is a list of known locations. Other observed sites may also exist.

  - East bank between Station 240+00 and 200+00.
  - West bank between Station 240+00 and 150+00.
  - East bank between Station 150+00 and 100+00.
  - West bank between Station 150+00 and 100+00.

- West bank between Station 75+00 and 60+00.

Within the above listed areas hazardous materials may exist. At several locations, drilling was terminated due to noxious odors and personnel safety.

SCOPE OF SERVICES

Sixty-six borings and 35 test pits were drilled or excavated to depths of 2 to 27 feet. The borings were drilled along the east and west bank on top of the existing river channel banks near the proposed channelization levees. The test pits were excavated along the approximate centerline of the rechannelization. The borings were drilled using truck mounted drilling rig utilizing 7 inch diameter hollow stem auger. The test pits were excavated using large backhoe equipment. During exploration, subsoils were examined visually and sampled at selected intervals.

The following tests were performed on selected soil samples:

- Water content
- Dry density
- Shear strength
- Gradation
- Plasticity
- Permeability
- Soluable Sulfur

Test results were used in development of our recommendations. In addition, trial soil-cement mixtures were tested for appropriate parameters.

INTERPRETATION OF SUBSURFACE CONDITIONS

Exploration: As presented on the Logs of Test Pits, the riverbed materials, are predominantely gravelly sands and sandy gravels with cobbles. The cobbles have a maximum diameter of approximately 9 inches. The fines content varies vertically and laterally along the river bottom. In general, the deeper coarse grained soils are coated with reddish brown medium plasticity clay. Occasional thin layers of clay were encountered in some of the test pits.

As presented in the Logs of Borings, the near surface soils on the banks of the existing river consist predominantly of loose to medium dense gravelly sand fill with varying amounts of silt and clay. The native material below the fill consists of sand with varying amounts of silt and gravel. Below the sand and gravelly sand layer and extending to the full depth of exploration, the materials encountered were predominantly dense sandy gravel. All borings along the banks reached practical auger refusal within depths of 2 to 24 feet. A ground water table was not encountered during the time of our exploration.

Testing: Laboratory test results indicate angles of internal friction ranging from 29 degrees to 46 degrees. These values were determined on 2.5 inch diameter ring samples which eliminates coarse gravel and larger particles. Numerous gradation tests were performed on recovered samples. These tests indicate that in general the subsurface soils are predominantely sandy gravel to gravelly sand.

Permeability tests performed on undisturbed samples indicated a permeability of $2x10^{-5}$ cm/sec. Tests on remolded samples

indicated permeabilities ranging from $1x10^{-3}$ to $6x10^{-5}$ cm/sec. A summary of the laboratory test results is included in Appendix C of this report.

Groundwater: During this exploration, groundwater was not encountered in any of the borings or test pits. Review of well records and groundwater data published by the Arizona Department of Water Resources indicates that the groundwater table within the project area exists at a depth greater than 140 feet below the ground surface. Based on the present recharge and discharge rate, it is our judgement that construction will not be affected by the groundwater.

CONCLUSIONS AND RECOMMENDATIONS

General: Due to the unknown nature of the materials that may be uncovered during construction extreme caution must be exercised. If drums with suspicious odors or liquids are encountered, proper supervision should be obtained prior to continuation of the work.

Site Clearing: In general, rechannelization of the river will require removal of soil from the existing river bottom and banks to achieve the design flow elevation and channel alignment. The cut material will be selectively used to construct channel levees and soil cement slope protection.

Prior to grading the channel, strip and remove existing vegetation, debris and other deleterious material from the river bottom and existing banks. Any existing water-filled ponds should be pumped dry or otherwise drained and cleaned of organic or deleterious matter.

Site Preparation: Several open pit gravel mines and ponds exist within the project limits. These existing excavations will require

proper backfilling prior to construction of the levees, levee protection, and channel bottom. The backfill material should be clean, well graded granular soil, free of vegetation, organic matter, construction rubble and other deleterious material and meet the gradation specification presented in this report.

Backfill above the toe of the embankment protection structure, within the channel area, should meet the gradation requirements presented under the "Materials" section of this report.

All backfill should be placed in accordance with the recommendations presented in the "Placement and Compaction" section of this report.

Levee Construction: The proposed channel levees will either be cut from the existing river banks or constructed with engineered fill. The channel levees to be cut from existing river banks may be cut on a 1:1 slope. However, in some locations local shallow slope failures should be expected. Where these failures are experienced the soil-cement levee protection structure should be constructed to the natural slope angle of the bank soil on the bank side of the channel. If during preparation of cut levees, rubble or uncontrolled fill is encountered, we recommend that these materials be removed. The removal should extend landward from the proposed channel face to natural soil or 50 feet, whichever is least. The levee then should be constructed as recommended below.

Two different conditions exist where construction of the channel levees is required. These conditions are; levees constructed on native, undisturbed soil, and levees constructed on engineered fill.

Where levees are constructed on native undisturbed soil the surface should be cleared as recommended in the site clearing section of this report. The surface should be cut level, scarified to a depth of 10 inches and recompacted to 95 percent of ASTM D698.

Where levees are constructed on engineered fill scarification of the surface is not required.

The material used in the constructed levees should meet the requirement presented in the "Materials" section of the report. Placement and compaction recommendations are also presented in this report.

In some areas levees will be constructed adjacent to landward excavations. In this situation, miscellaneous backfill may be used outside the levee. The levee is defined as the zone between the new channel face and 50 feet landward.

Slope Stability: Stability of the proposed levees were analyzed using the computer program "SB-SLOPE" to determine the critical failure surface. The stability analyses were performed using a 1:1 levee slope, unprotected, and protected by a 4 foot thick and an 8-foot thick soil-cement structure. The stability analyses were based on the following minimum design assumptions:

a. Near surface sandy silt or silty sand material:

Dry unit weight = 115 16/ft^3
Moist unit weight = 124 lb/ft^3
Saturated unit weight = 126 lb/ft^3
Angle of internal friction = 30 degrees
Cohesion = 0
Coefficient of Permeability = 6×10^{-5} cm/sec

b. Levee material (sands with gravel)

Dry unit weight = 120 lb/ft^3
Moist unit weight = 130 lb/ft^3
Saturated unit weight = 136 lb/ft^3

Angle of internal friction = 36 degrees
Cohesion = 0
Coefficient of Permeability = $2x10^{-3}$ cm/sec

c. Levee foundation soil (sand, gravel and cobbles)

Dry unit weight = 130 lb/ft^3
Moist unit weight = 138 lb/ft^3
Saturated unit weight = 140 lb/ft^3
Angle of internal friction = 38 degrees
Cohesion = 0

d. Soil-cement slope protection structures:

Unit weight = 125 lb/ft^3
Unconfined compression strength = 750 psi
Coefficient of friction between soil and soil-cement = 0.3

e. Critical condition at end of construction.

Based on our analysis, the minimum factor of safety against slope failure occurs when the soil above the toe of the slope protection structure is removed by scour. The minimum factor of safety against failure for a 4 foot and 8 foot thick structure is 1.15, 1.28, respectively. The slope stability analysis on a 1:1 slope without soil-cement slope protection indicates shallow slope failures will probably occur in some places. Typical plots of the computer output are presented in Appendix of this report.

These safety factors do not include transient load due to earthquake. Earthquake loading reduces safety factors for such structures. It is our opinion, however, that the likelihood of significant earthquake loads occurring during periods of full scour

are remote. Further, it is our opinion, considering the consequences of failure and the associated construction cost, that designing for absolute worst conditions is not warranted.

Earthwork:

- General:

  1. The conclusions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section.

  2. Although underground facilities such as septic tanks, cesspools, basements, utilities, and dry wells were not observed, such features might be encountered during construction.

- Excavation:

  1. We anticipate that excavations for the proposed construction can be accomplished with conventional equipment.

  2. On-site silty and or clayey (if any) soils may pump or become unworkable at high water contents. Workability may be improved by scarifying and drying. Overexcavation of wet zones and replacement with granular materials may be necessary. The use of lightweight excavation and compaction equipment may be required to minimize subgrade pumping.

- Foundation Preparation: Specialized treatment of existing soils within levee foundation areas is not required. If objectionable material such as loose fill or deleterious

material is encountered it should be removed and replaced with suitable, compacted material.

- Materials:

General: All fill and backfill material should be clean, free of construction debris, rubble and organic matter. The following gradation specifications are recommended:

1. Levee Foundation and Levee

Sieve No. or Size	Percent Passing by Weight
3"	100
No. 4	40 (min)
No. 200	5 (min)

2. Channel Fill and Backfill (not below levee)

Sieve No. or Size	Percent Passing by Weight
6"	100
8"	60-80
No. 4	20-40

3. Miscellaneous Fill and Backfill: Any clean material approved by the project engineer.

Placement and Compaction:

1. All fill and backfill should be placed and compacted in horizontal lifts using equipment and procedures that will

produce recommended densities and suitable water content throughout the lift. Uncompacted fill lifts should not exceed the following:

Description	Loose Lift Thickness (inches)
Levee and Levee Foundation	12
Channel Fill and Backfill	24
Miscellaneous	24

3. Materials should be compacted to the following:

Material	Minimum Percent Compaction (ASTM D698)
Levee & Levee Foundation	95
Channel fill and backfill	90*
Miscellaneous fill and backfill	80*

*Due to the size of the materials a performance specification may be required.

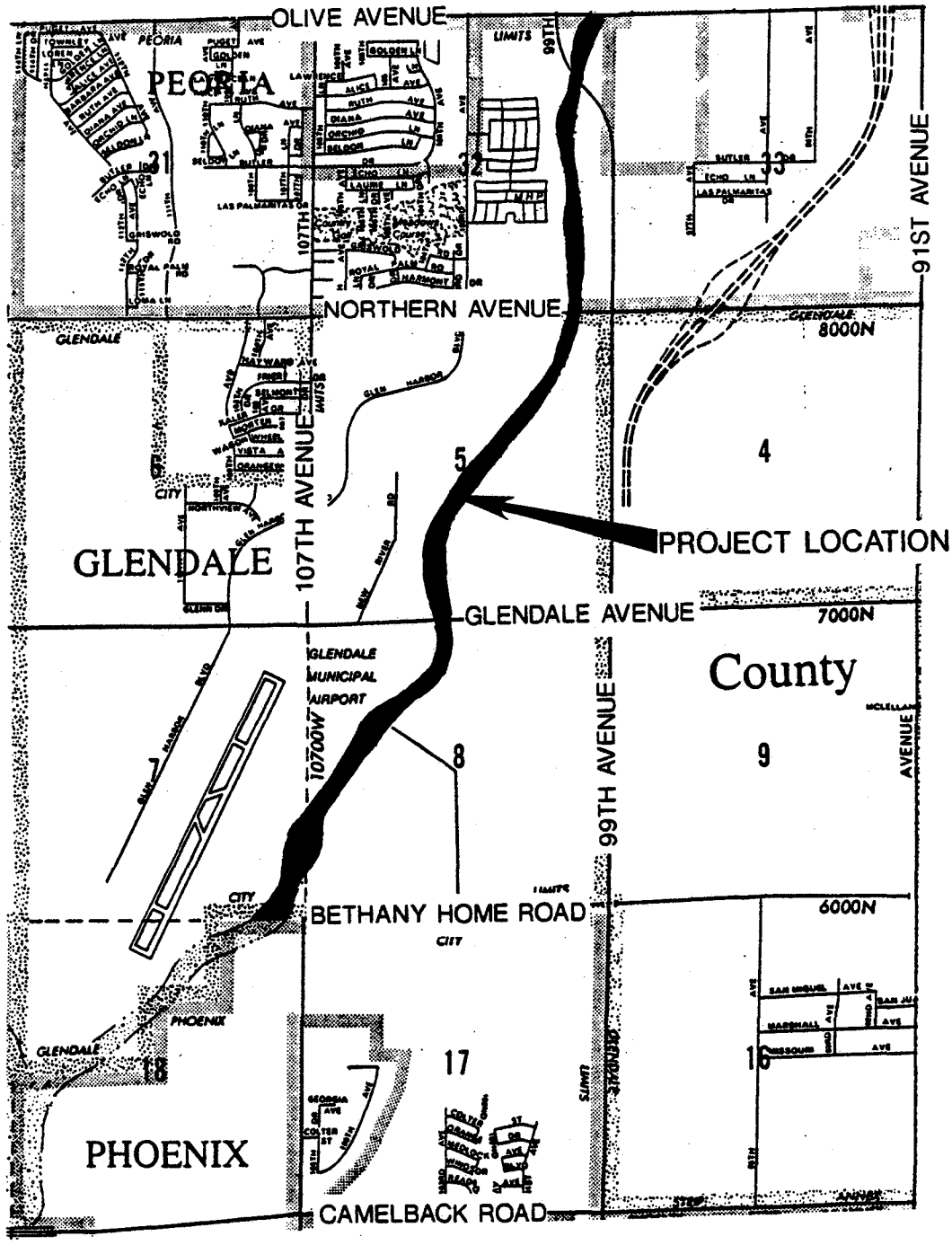
- Compliance: Our recommendations are predicated on proper observation and testing of the construction activities. To assess compliance, observation and testing should be performed under the direction of the geotechnical engineer.

CLOSURE

Our conclusions and recommendations assume observation and testing of the earthwork and foundation preparations by a representative of the engineer. During construction, the engineer will have the responsibility of assuring that construction complies with our recommendations. The engineer also will be responsible for decisions/recommendations should unanticipated conditions occur.

New River Channelization

From Bethany Home Road to Olive Avenue



NOT TO SCALE

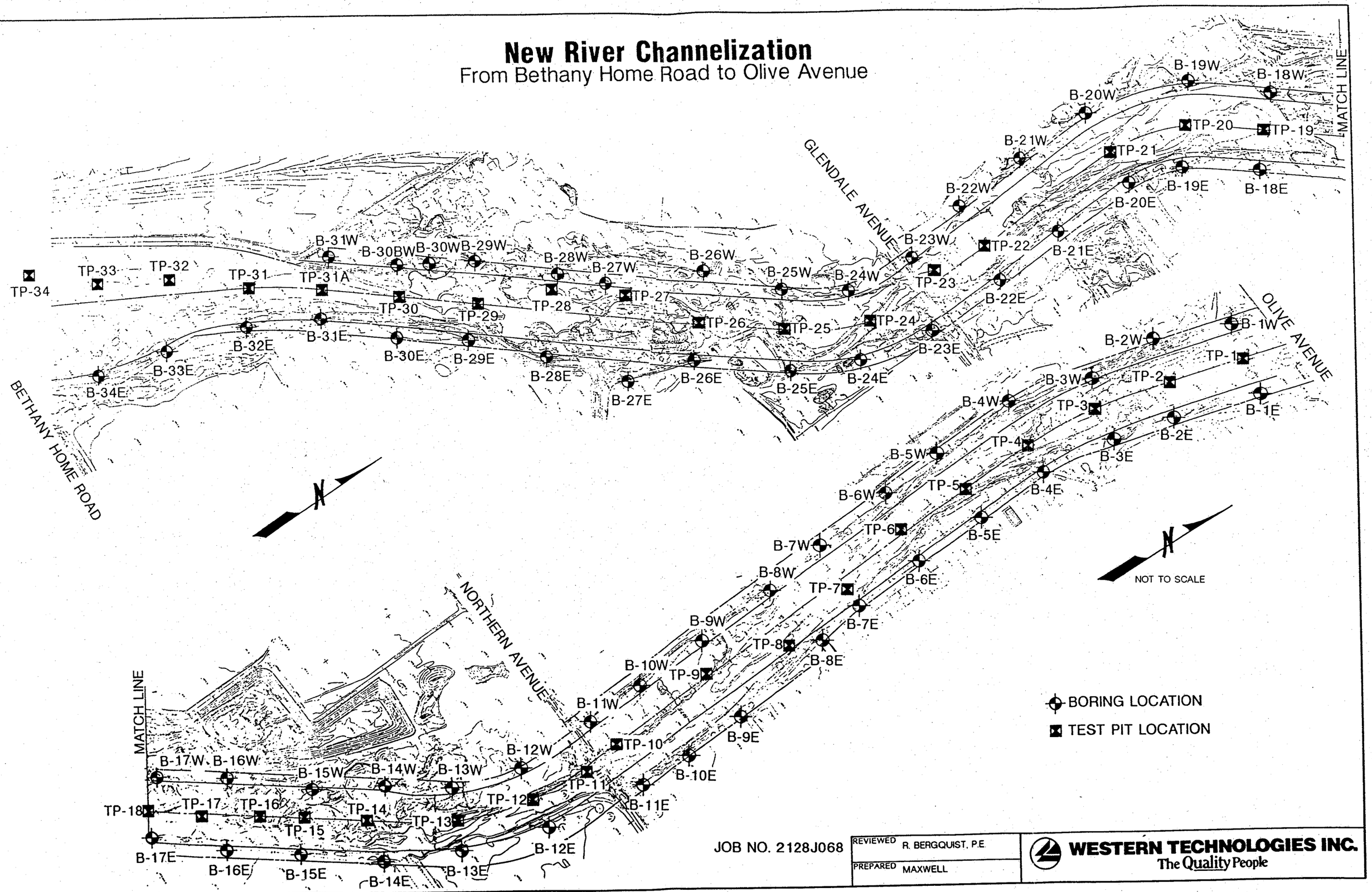
JOB NO. 2128J068

REVIEWED	R. BERGQUIST, P.E.
PREPARED	MAXWELL

WESTERN TECHNOLOGIES INC.
The Quality People

New River Channelization

From Bethany Home Road to Olive Avenue

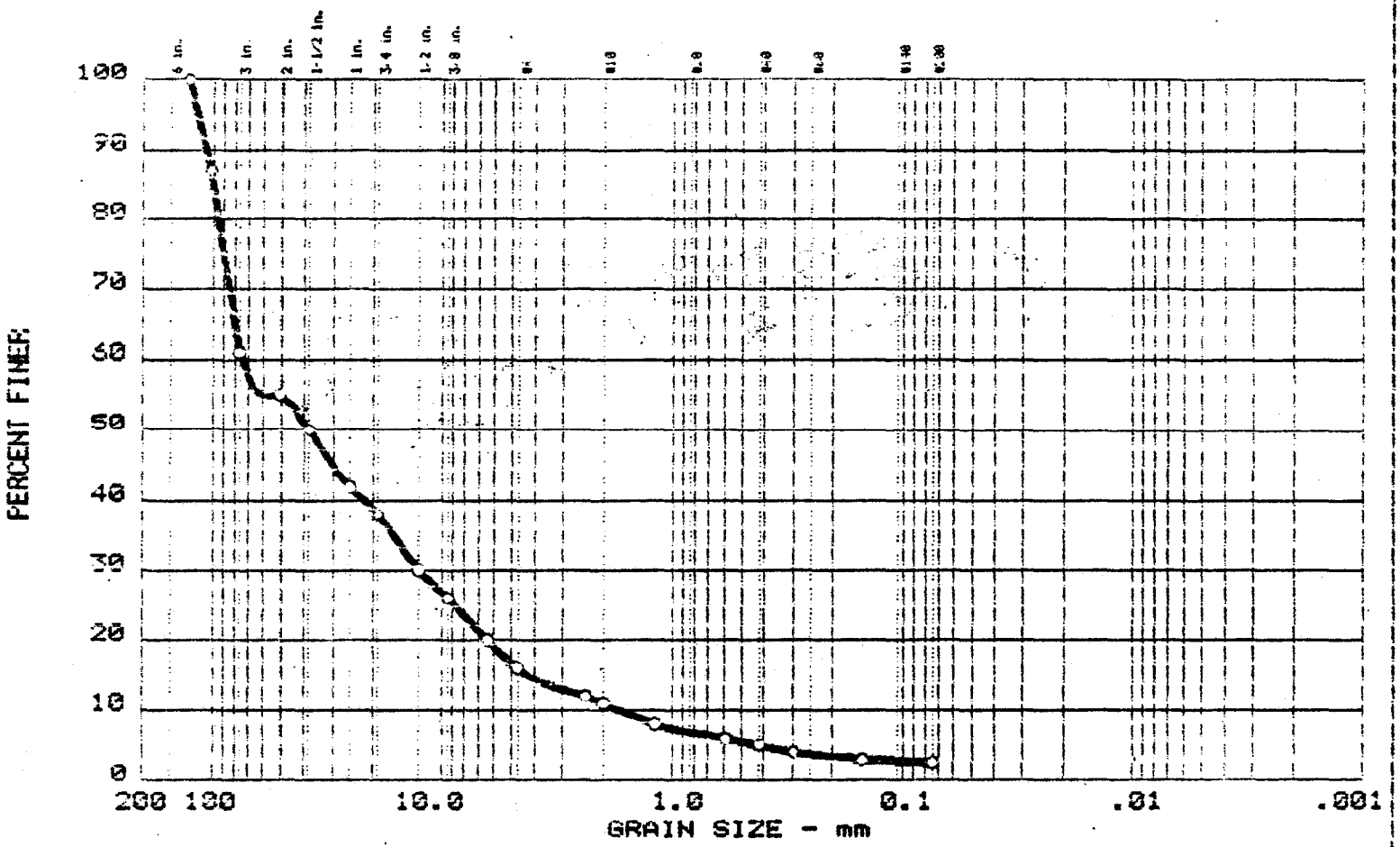


JOB NO. 2128J068

REVIEWED	R. BERGQUIST, P.E.
PREPARED	MAXWELL

WESTERN TECHNOLOGIES INC.
The Quality People

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	3	39.0	45.0	13.5	2.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			99.20	74.90	37.98	12.575	4.2121	1.6963	1.24	44.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELS AND COBBLES; with sand, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 11(18 - 19)

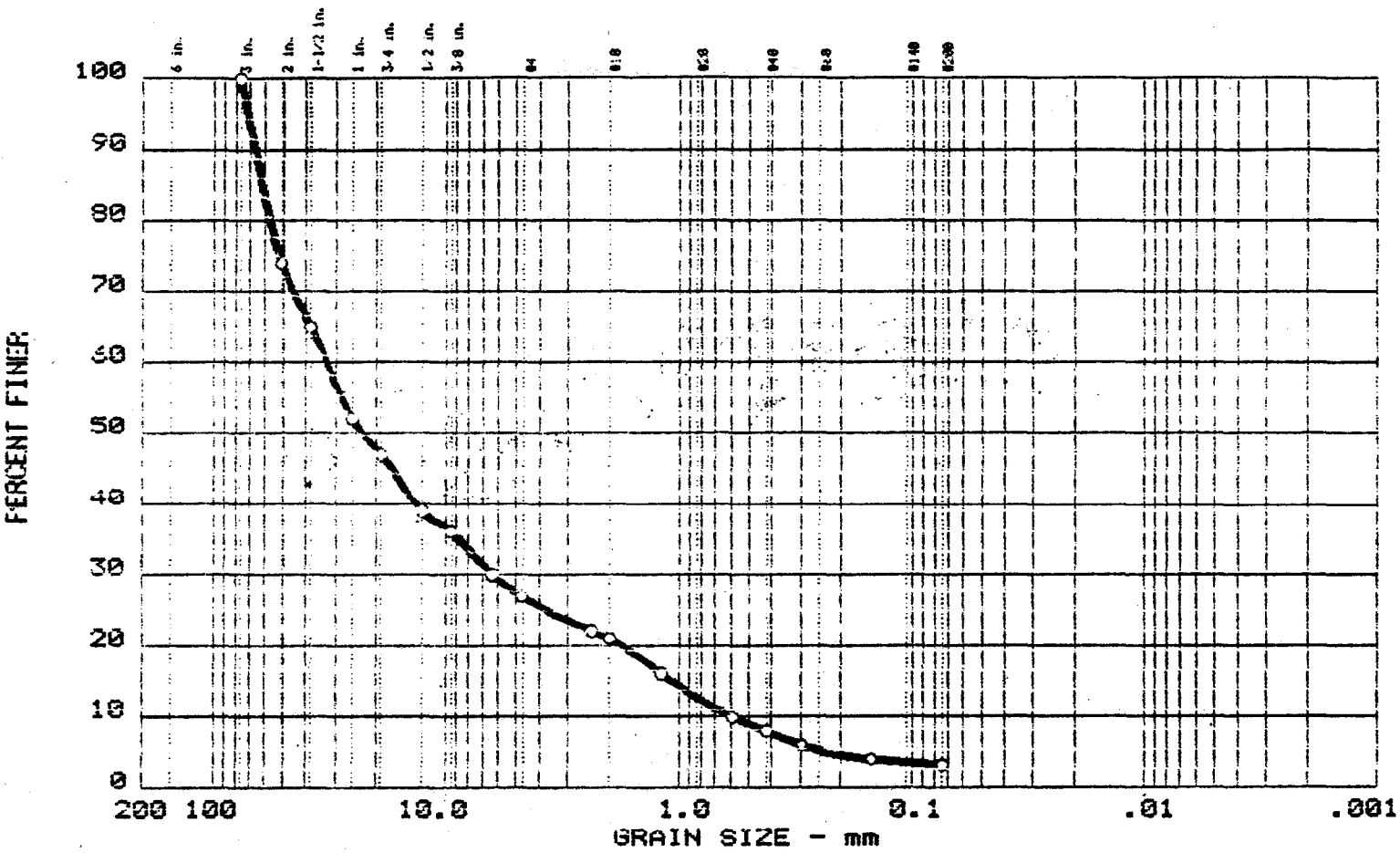
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 30

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	0.0	73.0	23.8	3.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			61.66	32.73	22.91	6.310	1.0593	0.5888	2.07	55.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 12(2 - 4)

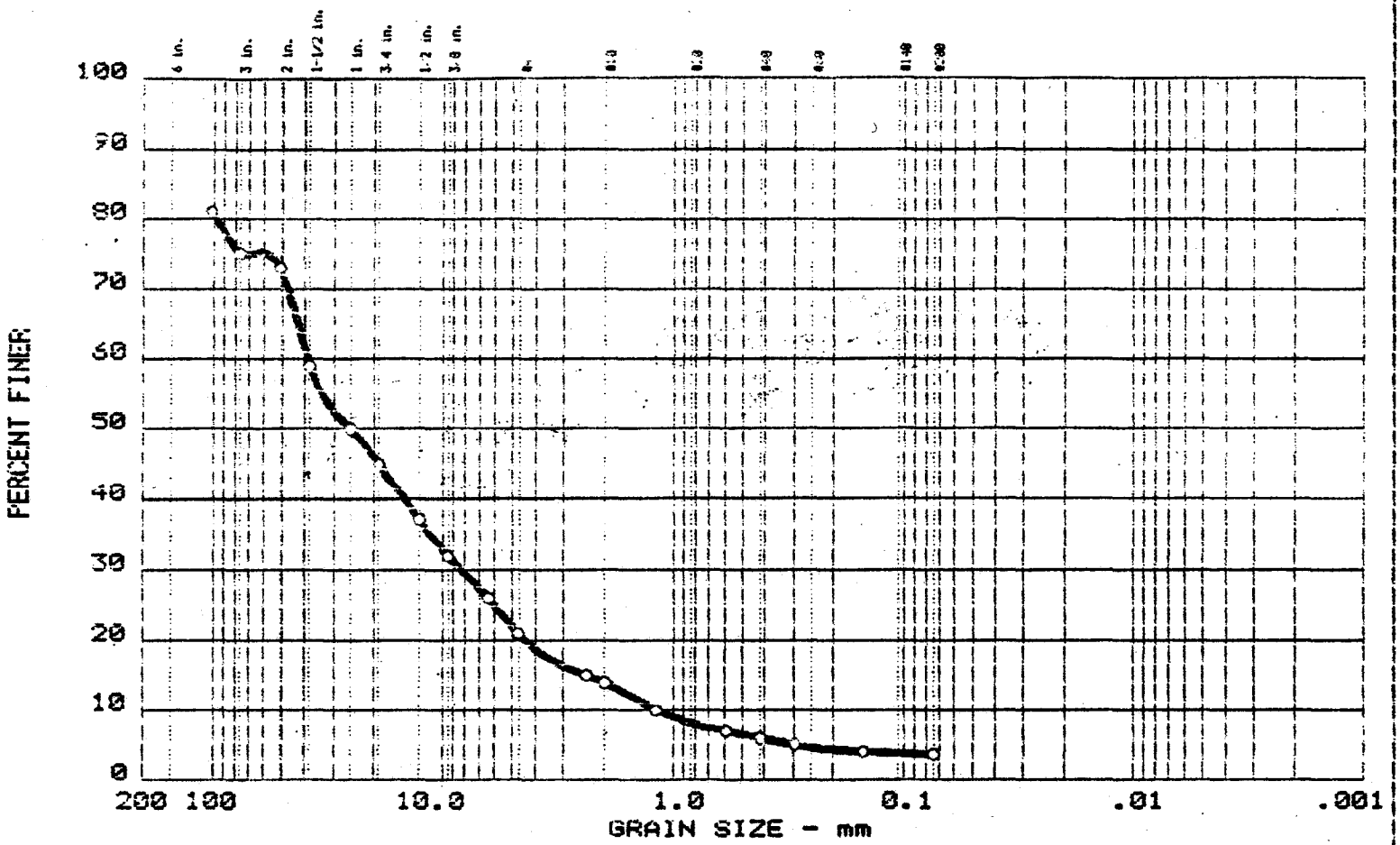
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 31

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	15	25.0	54.0	17.4	3.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			101.60	38.89	25.11	8.220	2.3708	1.1882	1.46	32.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; with cobbles; with sand; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 12(11 - 13)

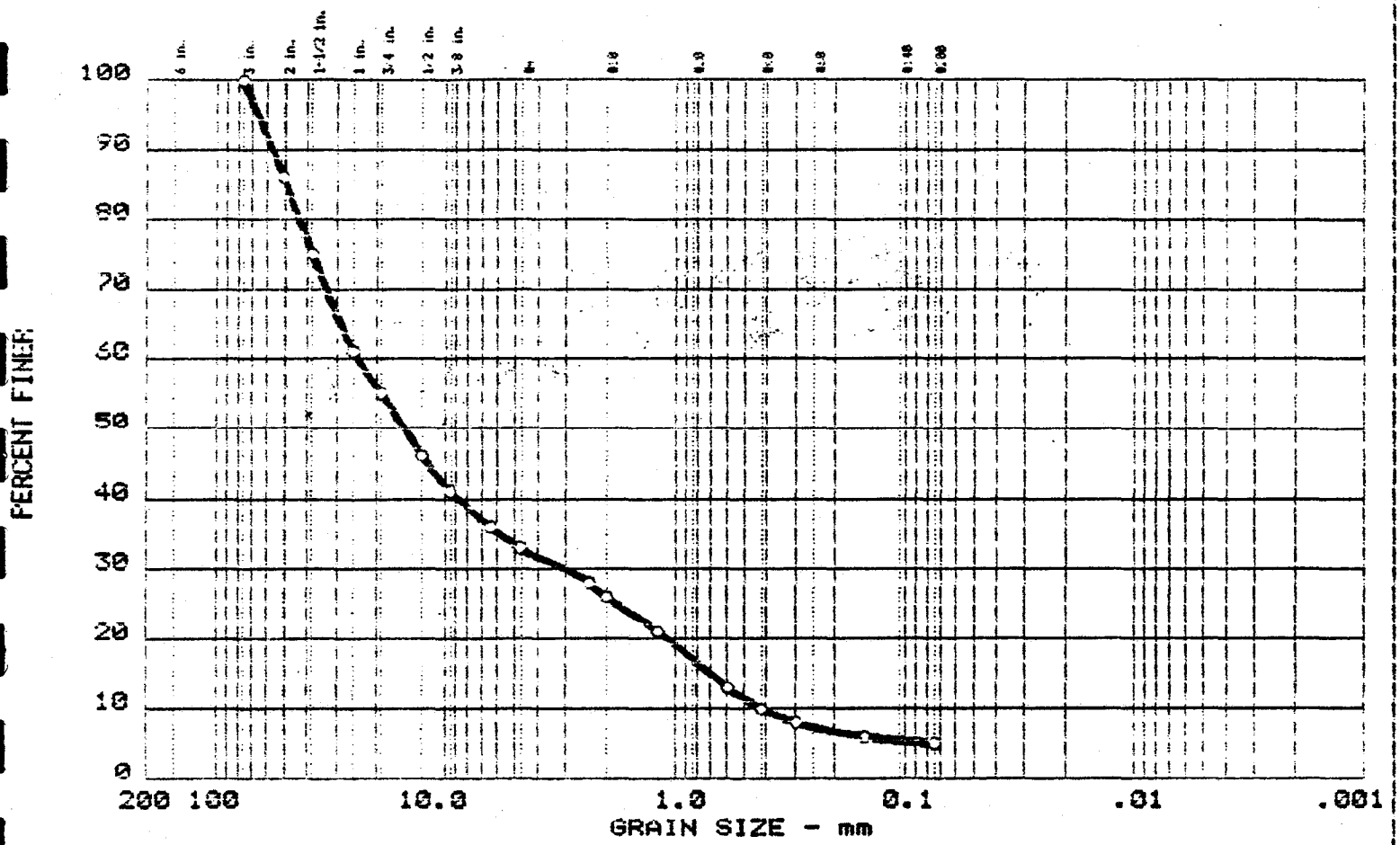
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 32

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	19	0.0	67.0	28.0	5.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			49.43	24.21	15.10	2.979	0.7063	0.4159	0.88	58.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some fines	GP-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 13(2 - 3)

Date: 5/26/88

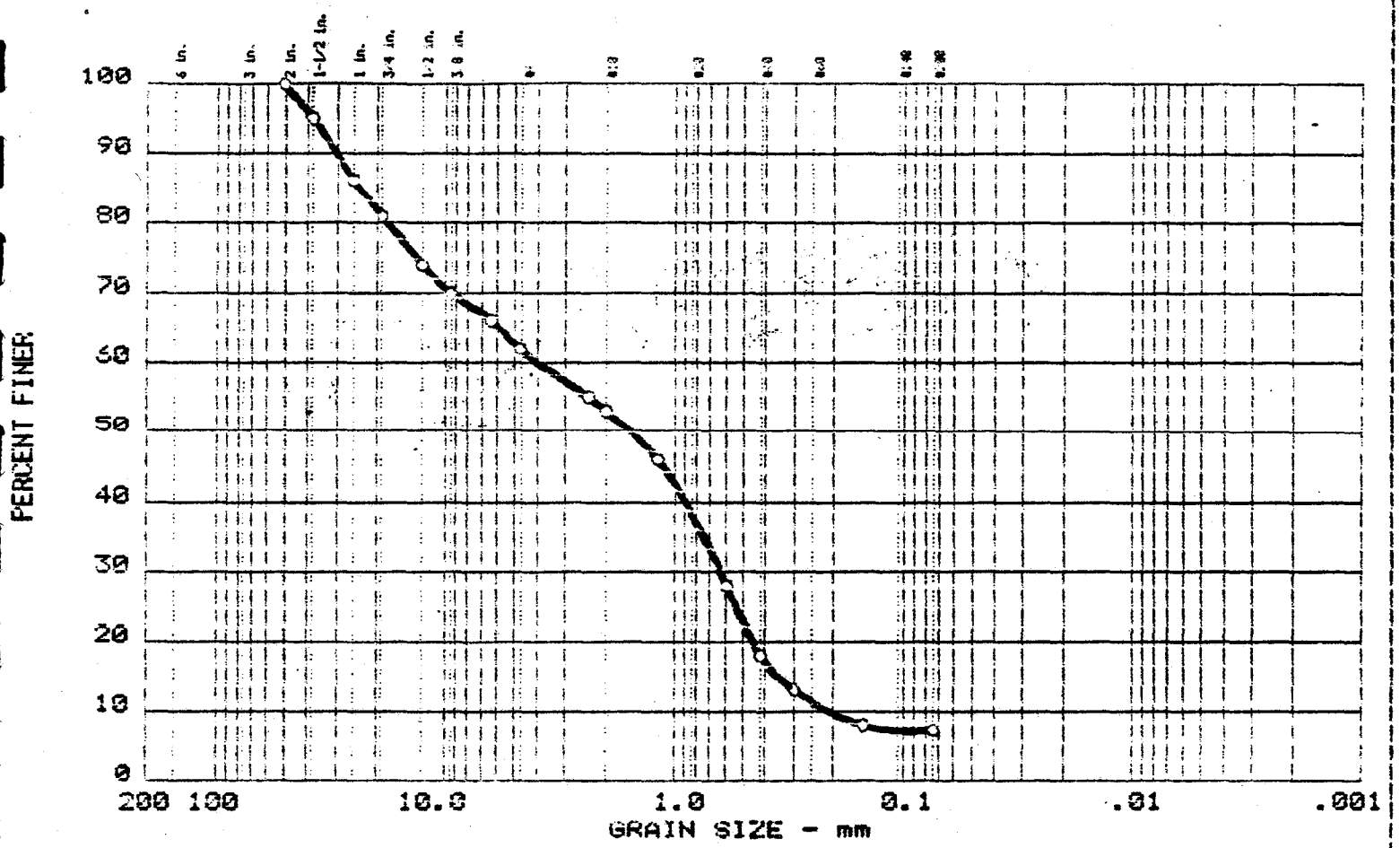
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 33

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	0.0	38.0	54.7	7.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			23.99	3.98	1.55	0.629	0.3536	0.2082	0.48	19.1

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 13(14 - 15)

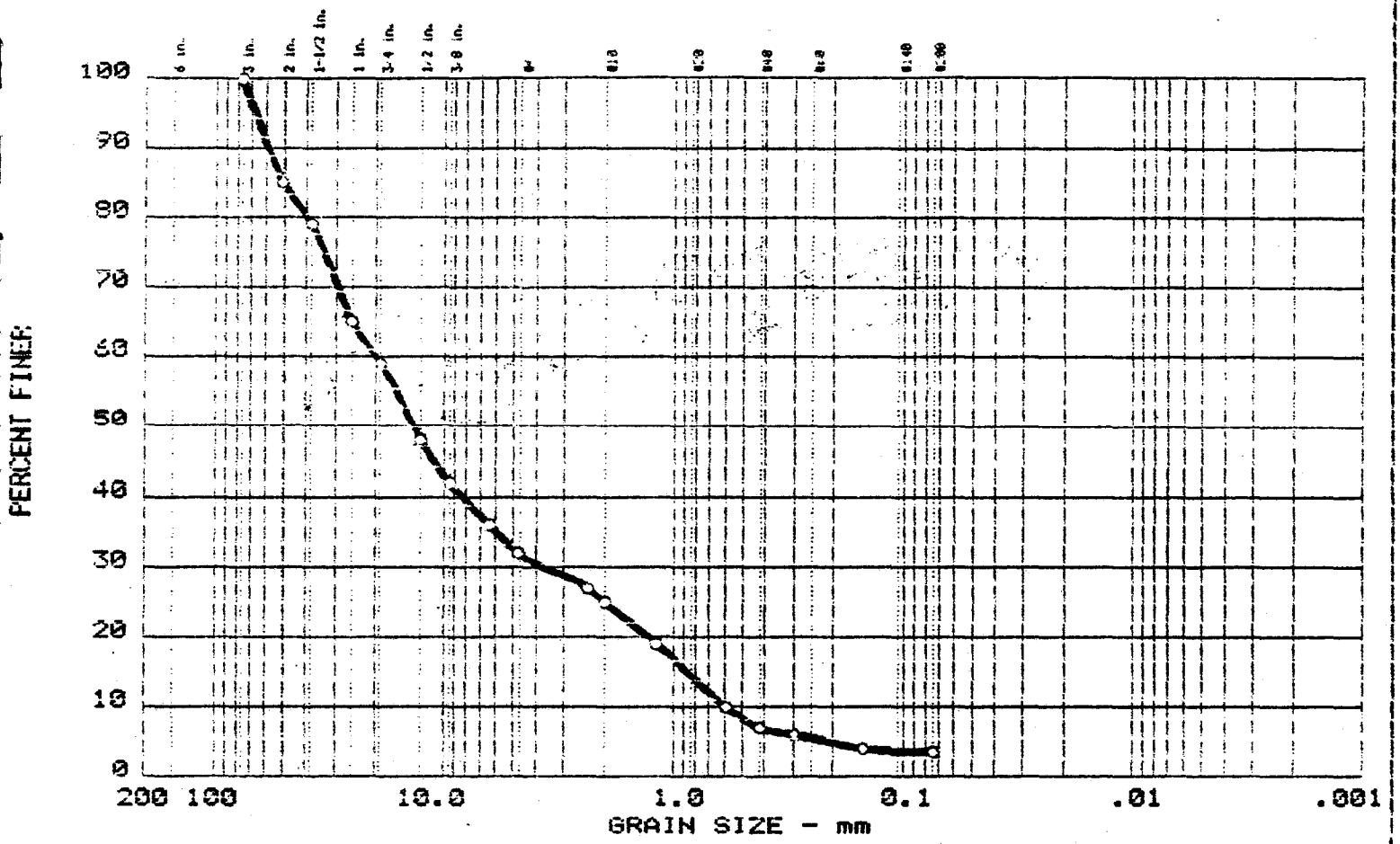
Date: 5/27/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 34

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	0.0	68.0	28.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			50.70	19.95	13.65	3.715	0.8710	0.5888	1.17	33.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 13(21 - 22)

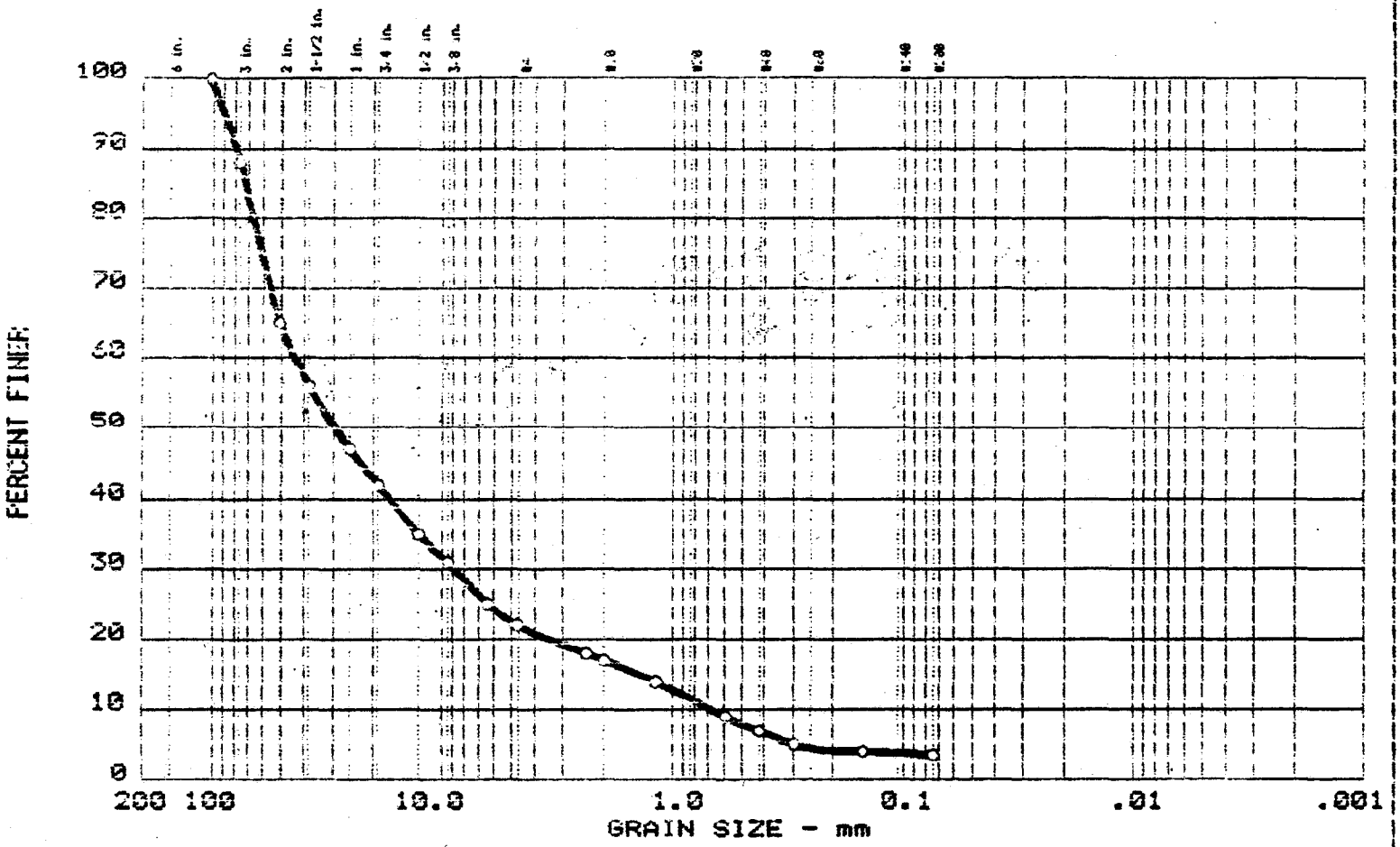
Date: 5/27/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 35

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	12.0	66.0	18.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			72.11	44.31	29.28	9.841	1.3852	0.6784	2.60	65.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 14(2 - 3)

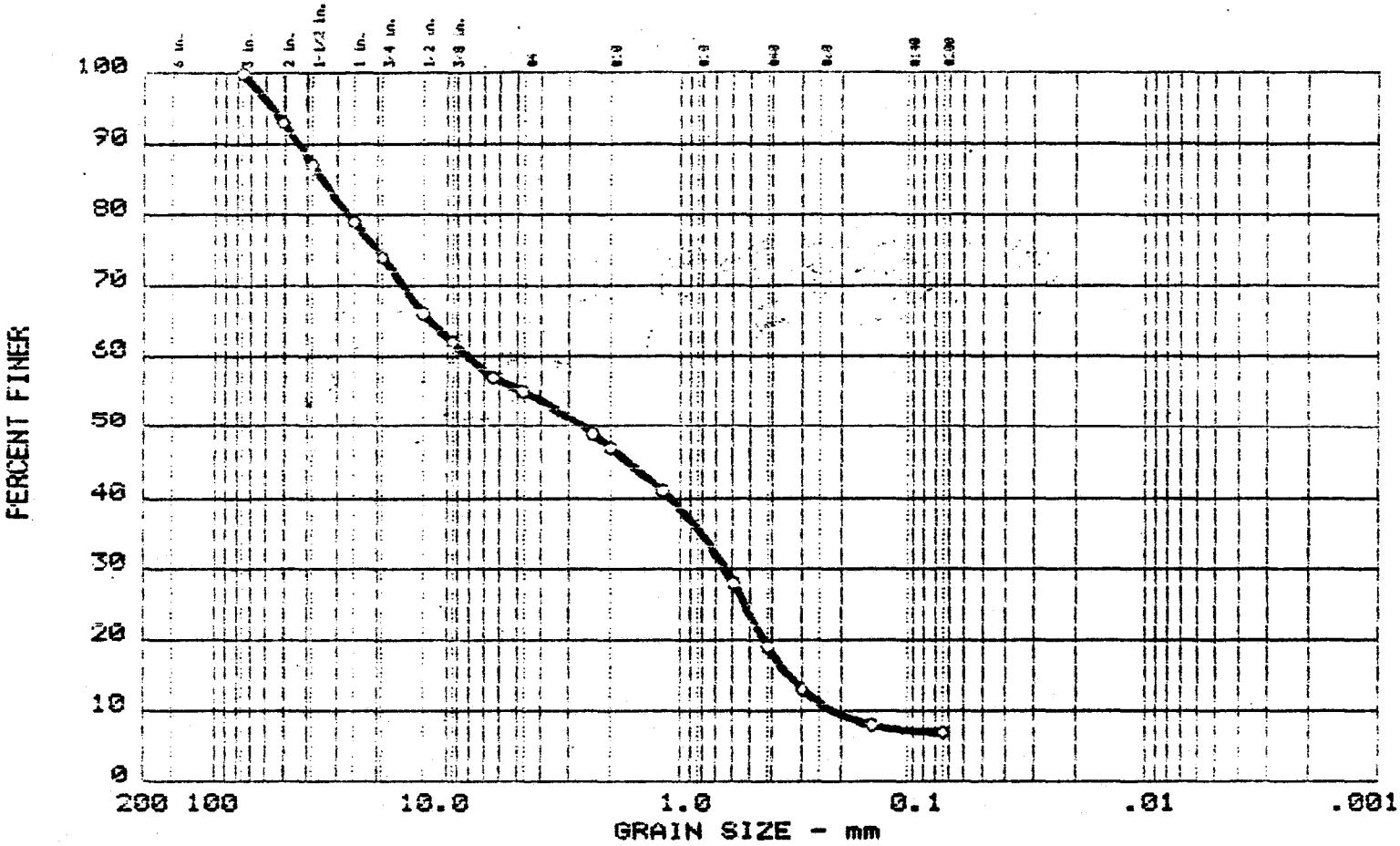
Date: 5/27/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 36

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	0.0	45.0	48.0	7.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			34.63	9.12	2.60	0.638	0.3385	0.2185	0.23	37.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVELS; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP -14(9 - 10)

Date: 5/26/88

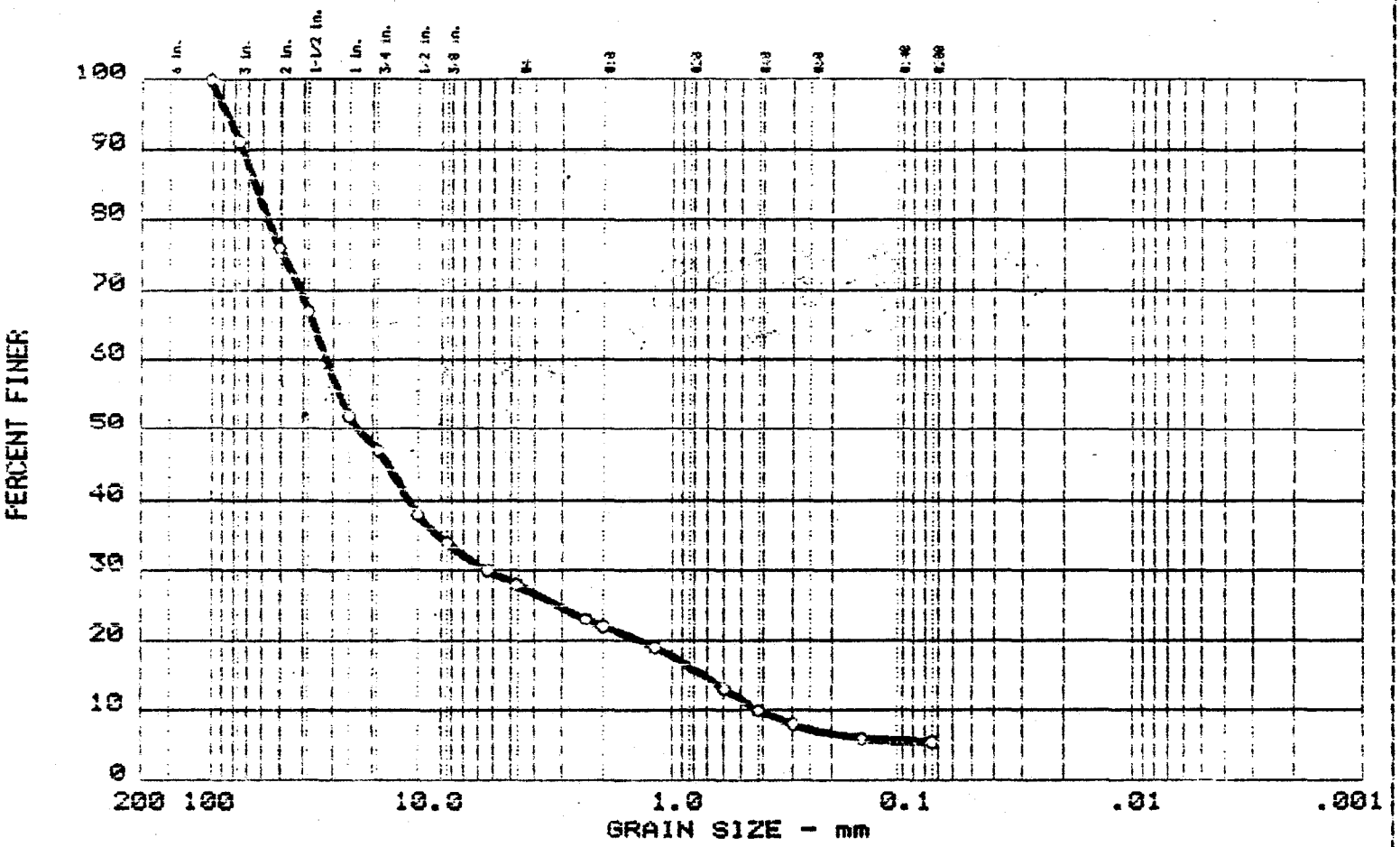
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 37

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	18	9.0	63.0	22.5	5.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			64.57	31.88	23.09	6.288	0.7303	0.4154	2.99	76.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, some fines	GW-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 15(3 - 4)

Date: 5/26/88

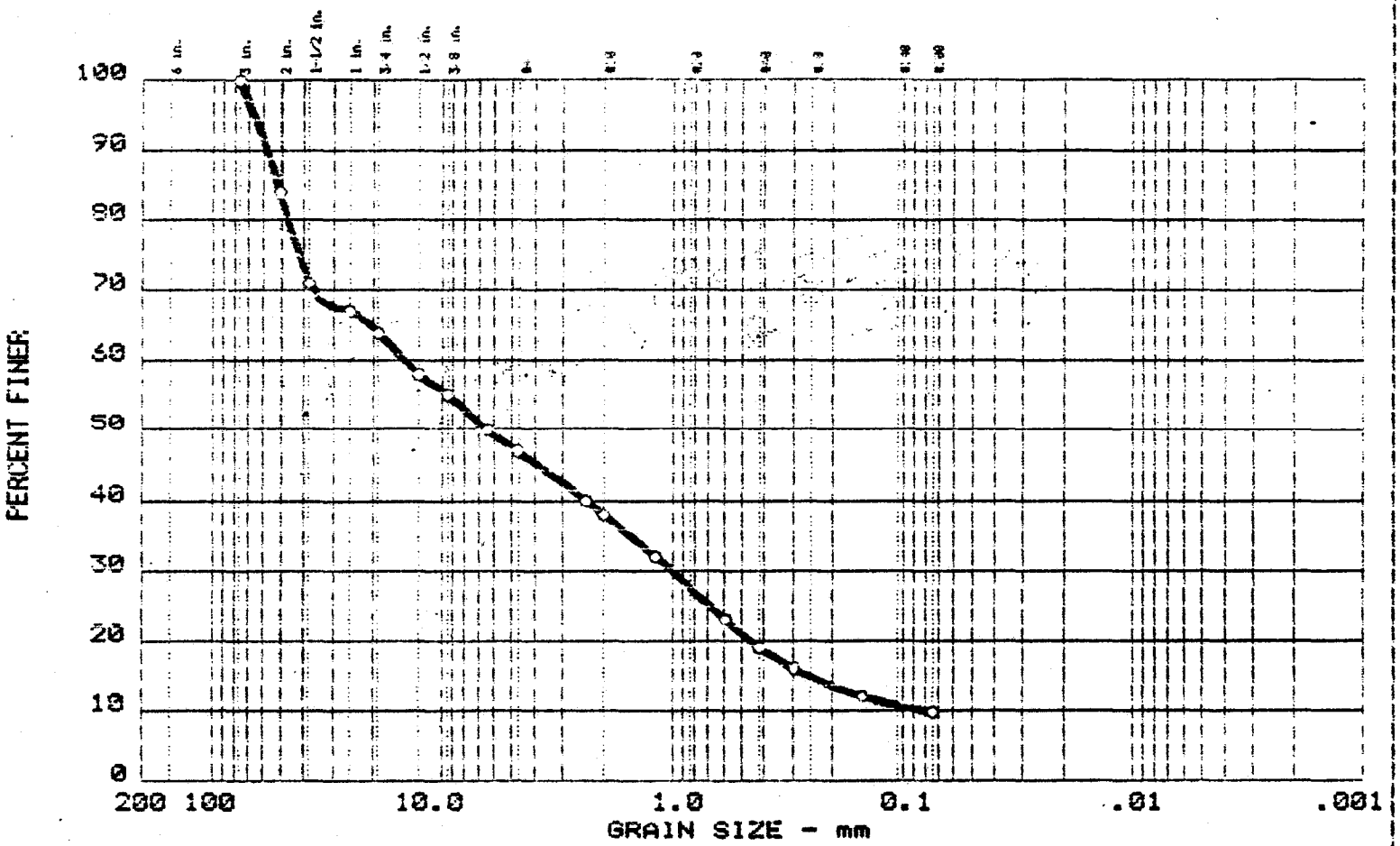
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 38

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	0.0	53.0	37.2	9.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			51.88	14.62	6.31	1.012	0.2570	0.0741	0.94	197.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some fines	GP-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 15(23 - 24)

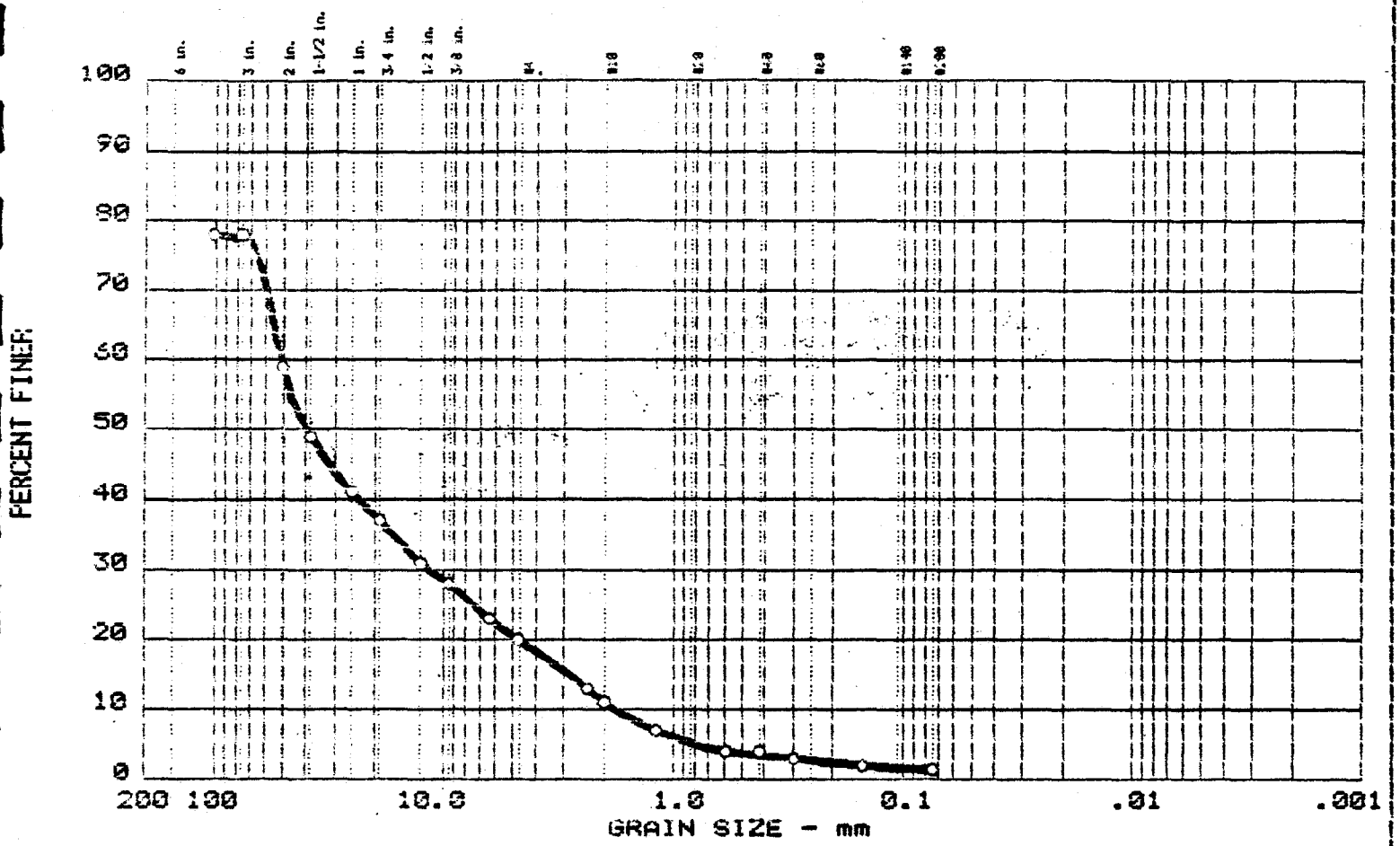
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 39

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	16	22.0	58.0	18.6	1.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			101.60	51.51	39.53	11.532	2.8307	1.8867	1.43	28.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL;with sand, with cobbles,trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 16(1 - 2)

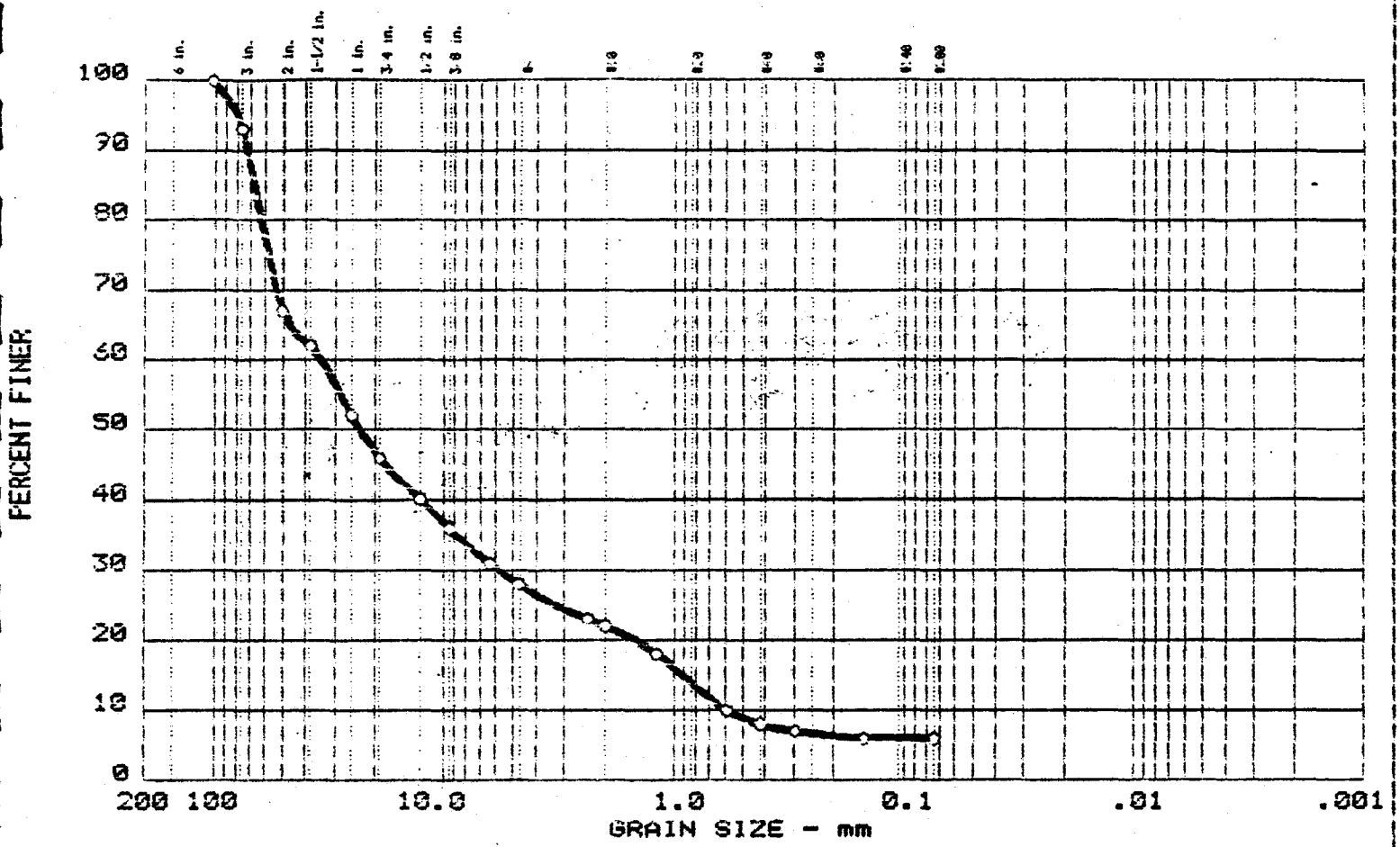
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 40

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	18	7.0	65.0	28.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			66.83	33.88	23.36	5.735	0.9194	0.5868	1.65	57.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; with sand;some cobbles;some fines	GW-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 18(4 - 5)

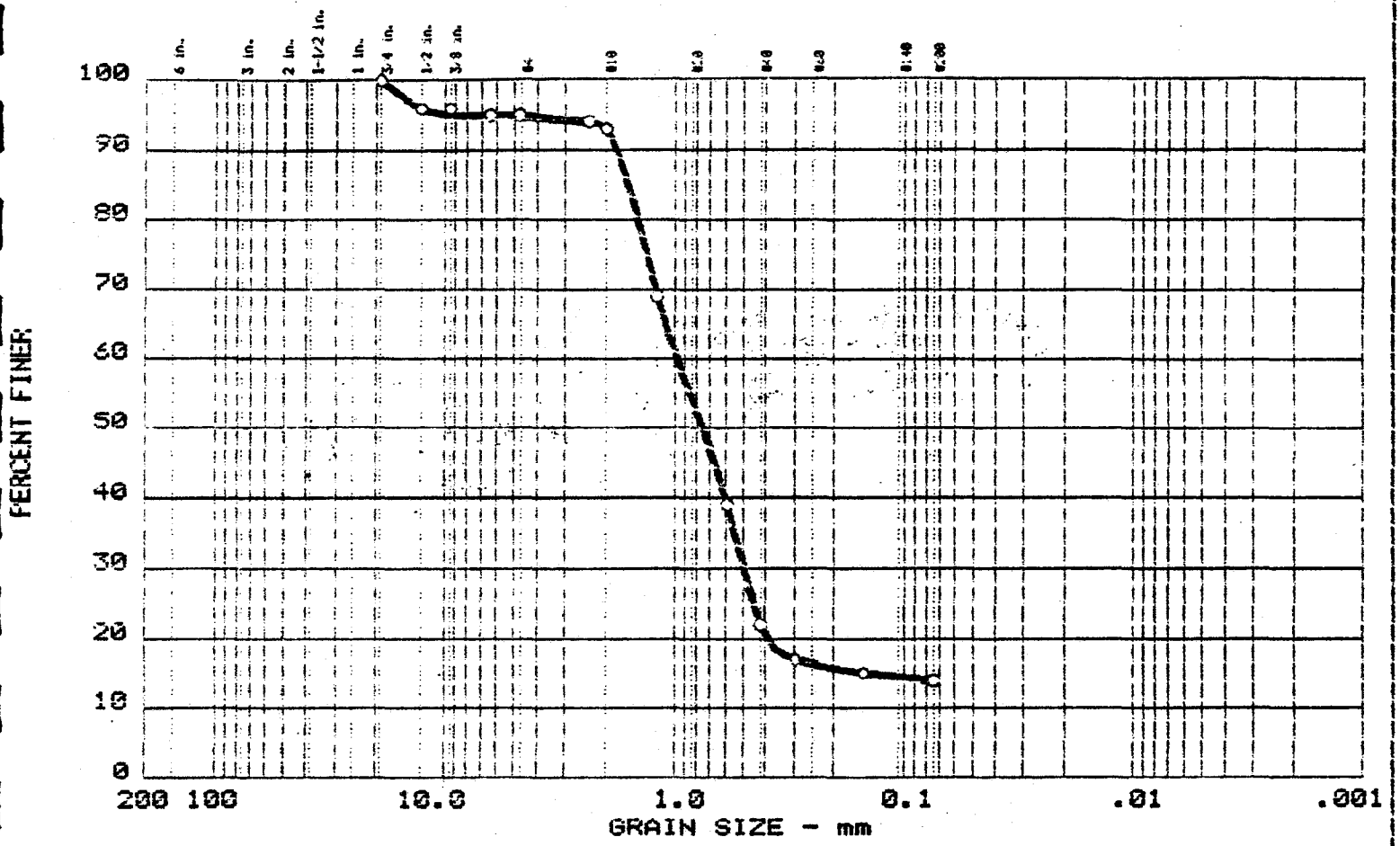
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 41

GRAIN SIZE DISTRIBUTION TEST REPORT



Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○ 19	0.0	5.2	80.8	14.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.60	0.97	0.76	0.499	0.1489			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND;some fines,trace gravels	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 16(9 - 10)

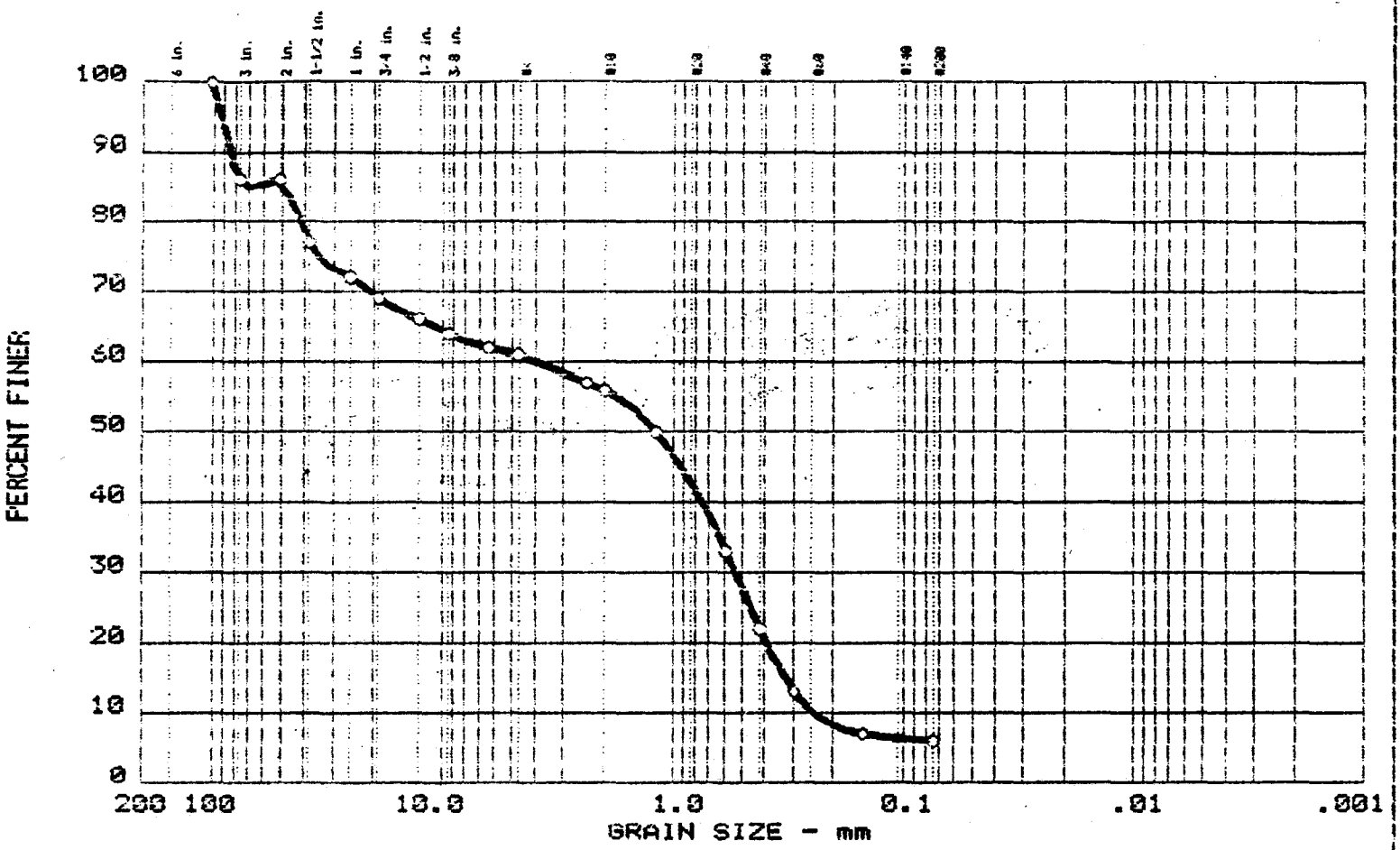
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 42

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	14.0	25.0	55.0	6.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			67.61	3.89	1.19	0.537	0.3236	0.2427	0.31	16.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some cobbles, some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 16(16 - 18)

Date: 5/9/88

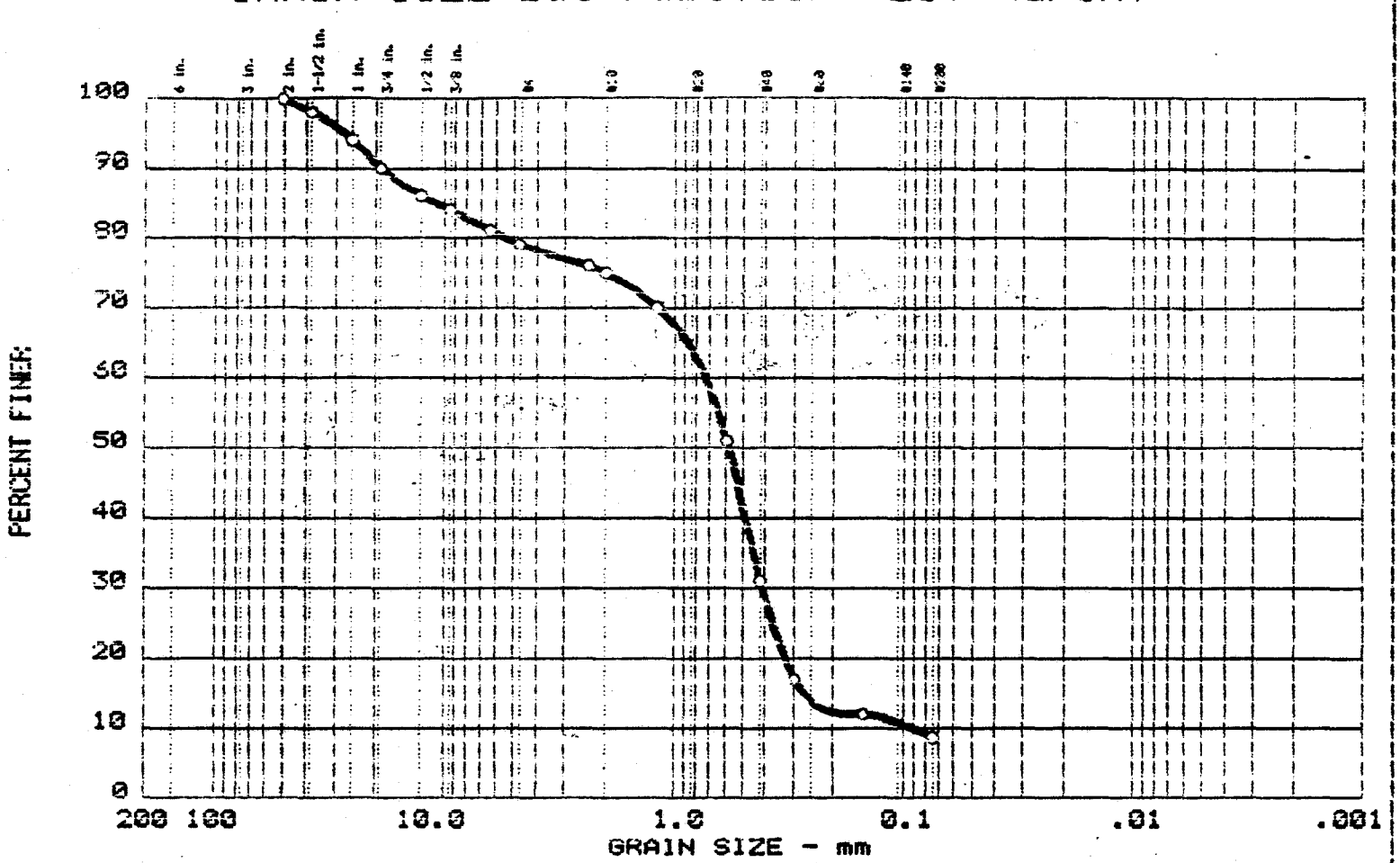
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 43

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	18	0.0	21.0	70.3	8.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	10.96	0.73	0.58	0.412	0.2692	0.0902	2.58	8.1

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, some fines	SW-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP -17(14 - 15)

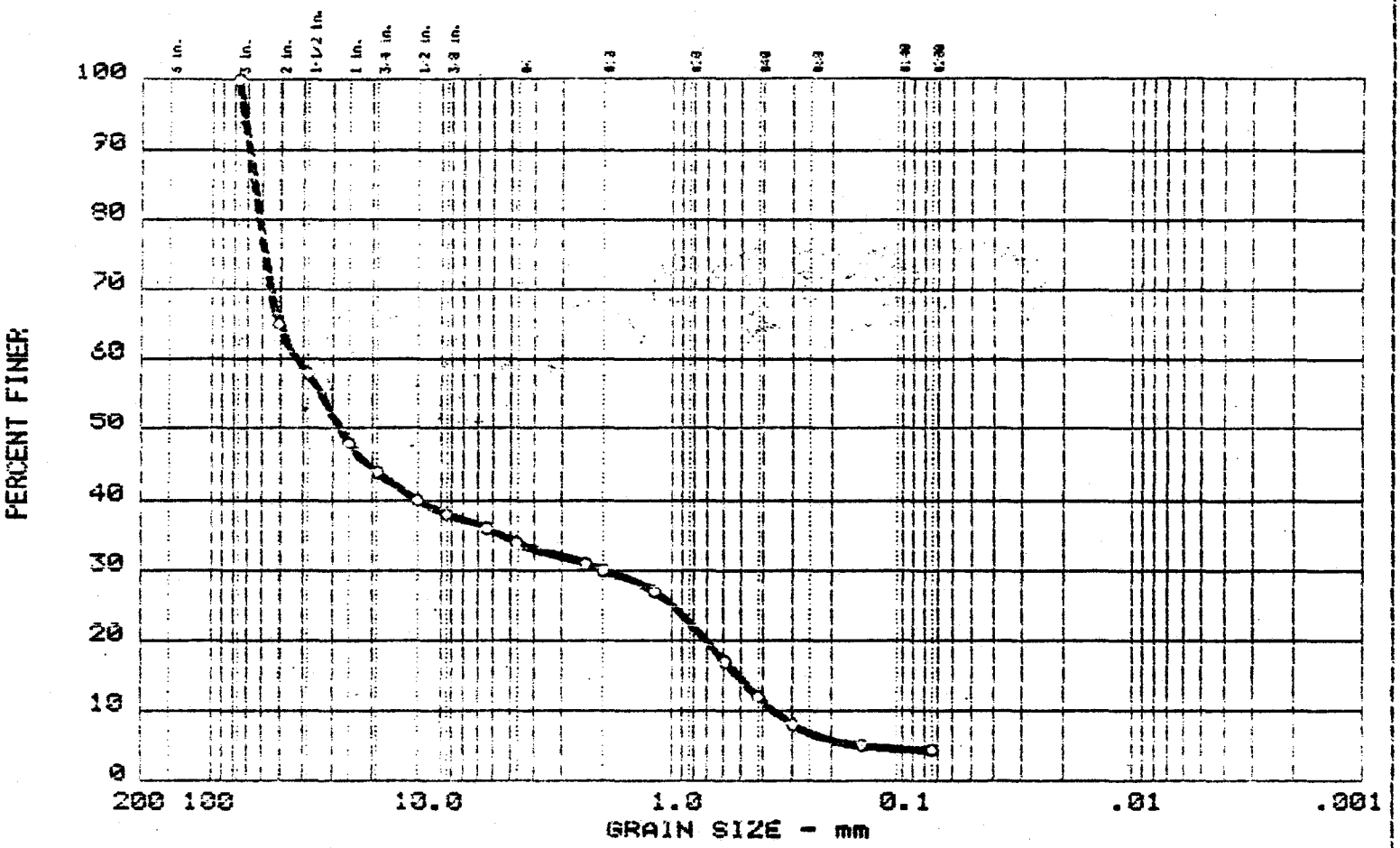
Date: 5/25/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 46

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	16	0.0	66.0	29.6	4.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			65.84	42.51	27.67	1.982	0.5152	0.3565	0.26	119.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 18(3 - 4)

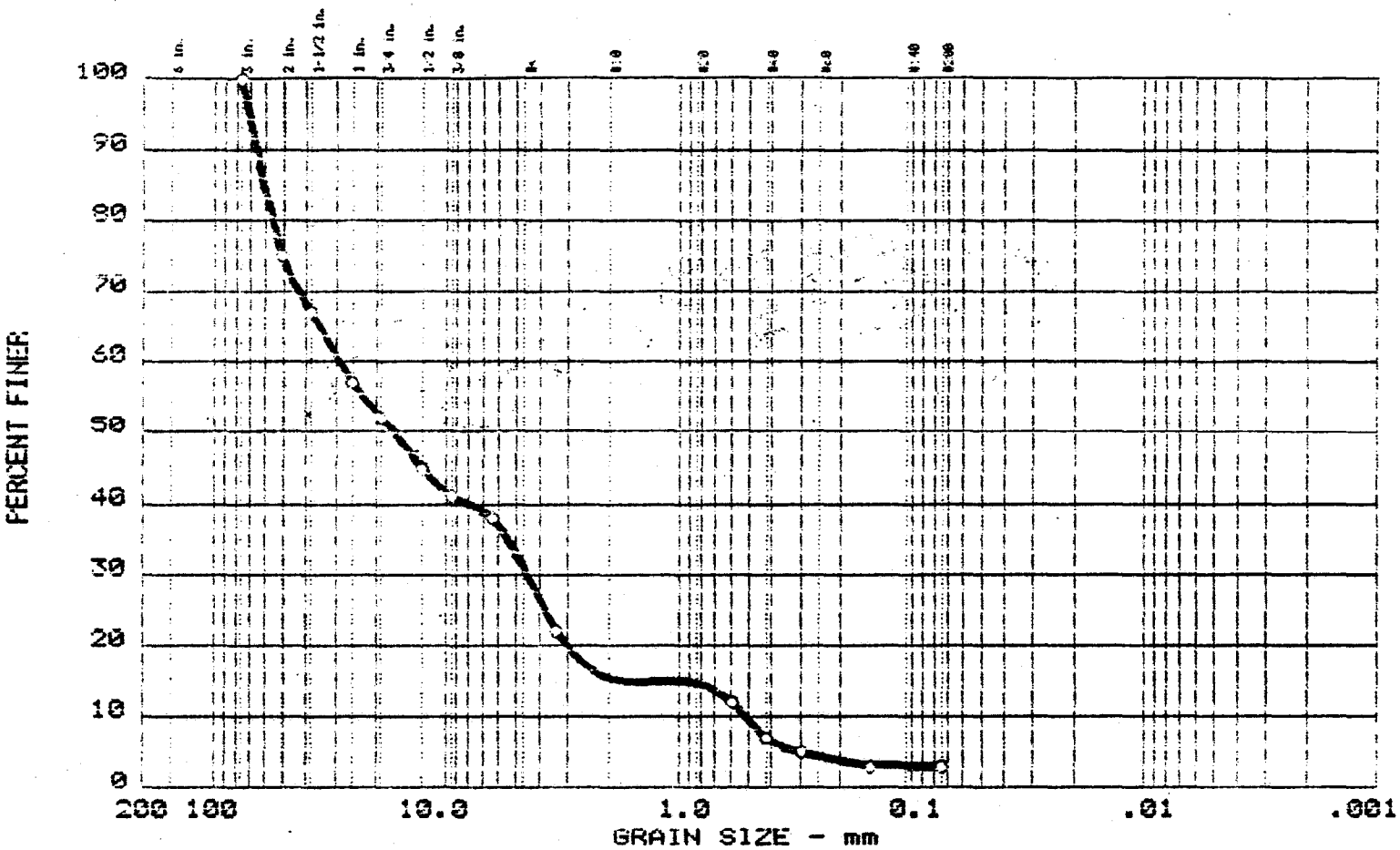
Date: 5/26/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 47

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	0.0	68.5	31.5	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			61.31	28.67	16.88	4.493	1.6692	0.5158	1.36	55.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 18(16 - 17)

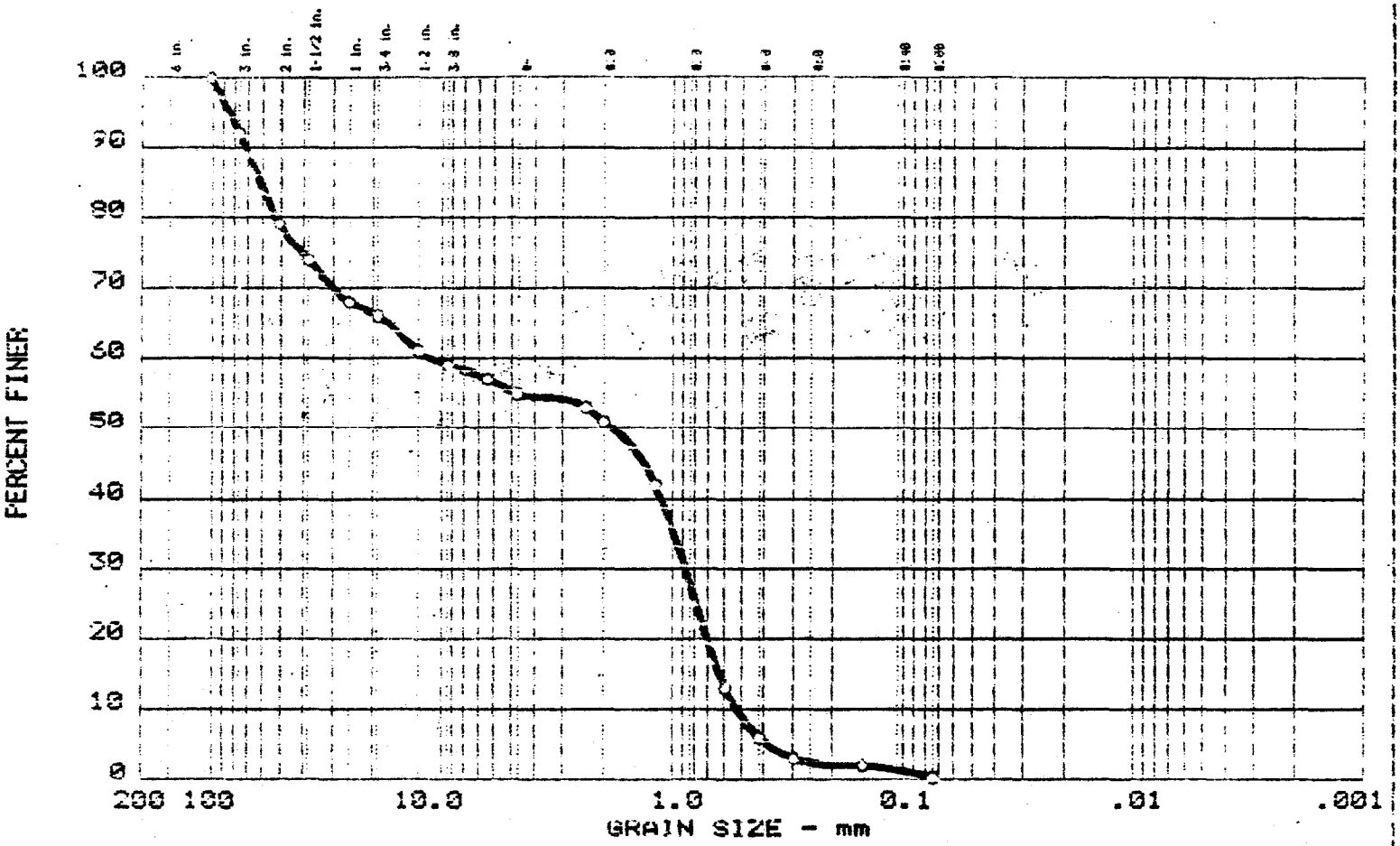
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 48

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	3	8.0	37.0	54.7	0.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			61.66	11.22	1.82	0.881	0.6237	0.5248	0.13	21.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some cobbles, none to trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 19(3 - 4)

Date: 5/26/88

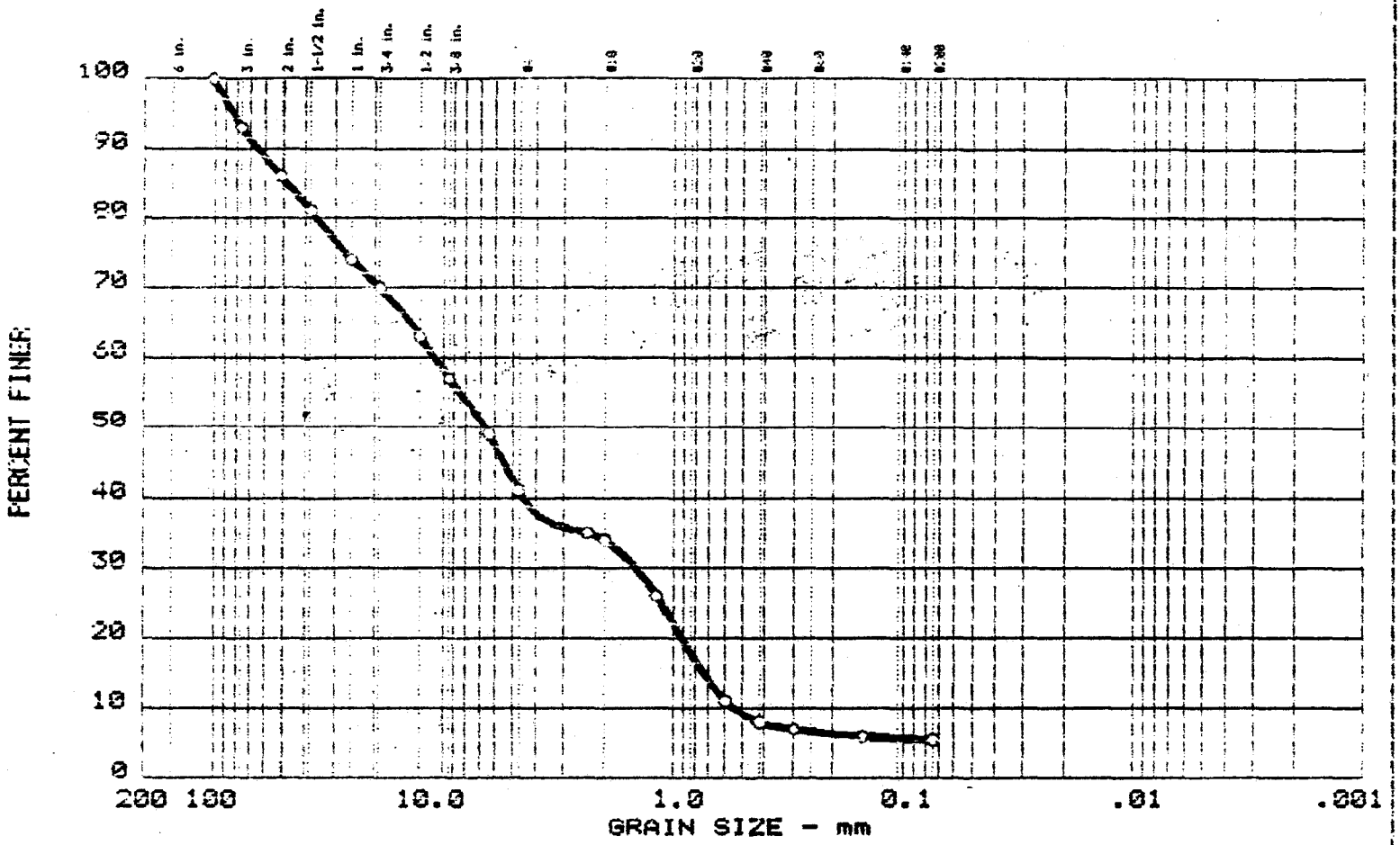
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 49

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	4	7.0	52.0	35.5	5.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			47.32	10.96	6.61	1.462	0.7328	0.5433	0.36	20.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL, some cobbles, some fines	GP-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 19(8 - 10)

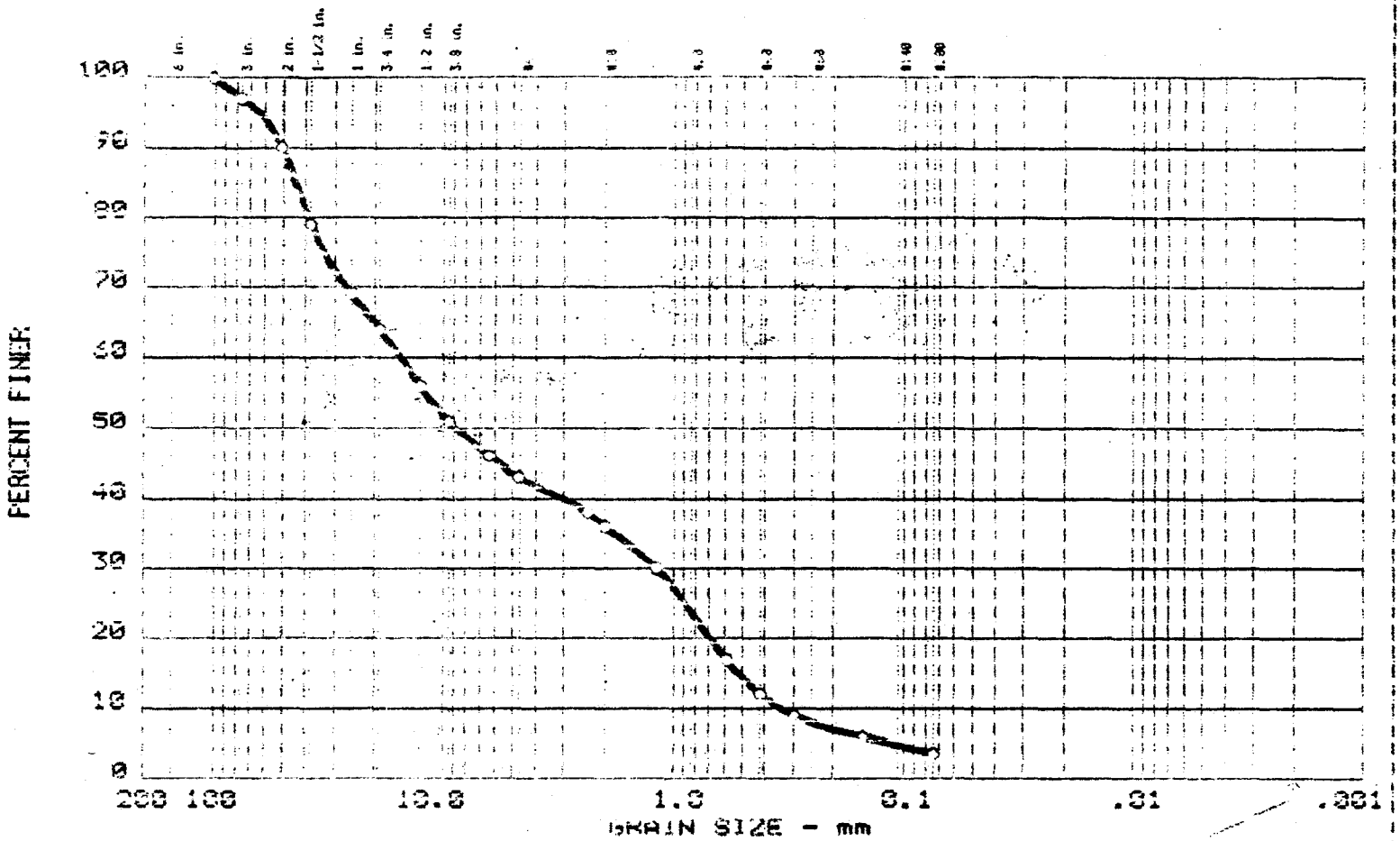
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 50

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	3.0	54.0	39.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			44.16	15.49	8.01	1.189	0.5188	0.3388	0.27	45.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVELS; trace fines, trace cobbles	SP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 19(18 - 19)

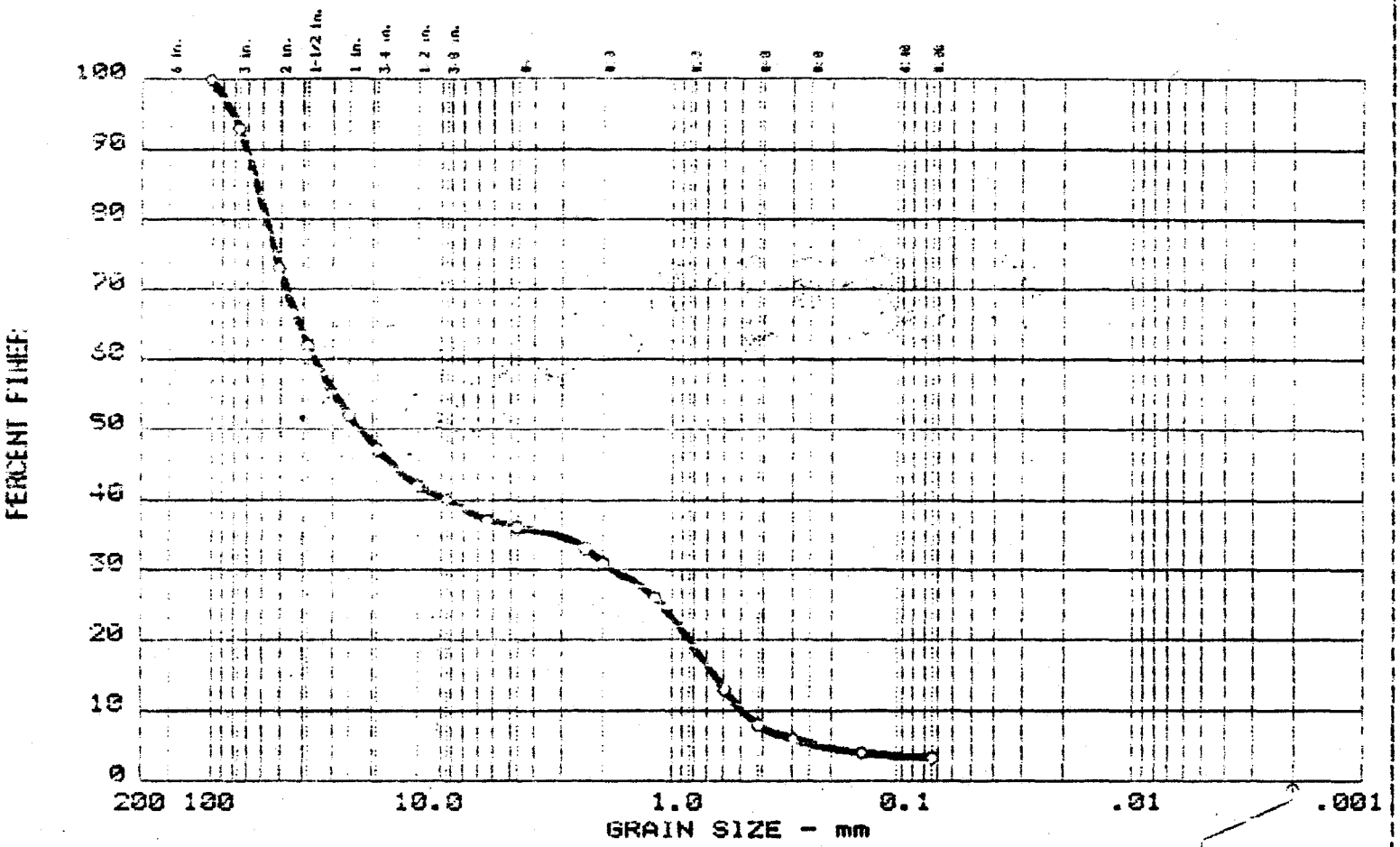
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 51

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	18	7.0	57.0	32.7	3.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			63.83	35.48	22.65	1.779	0.6531	0.4898	0.18	72.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 28(3 - 4)

Date: 5/28/88

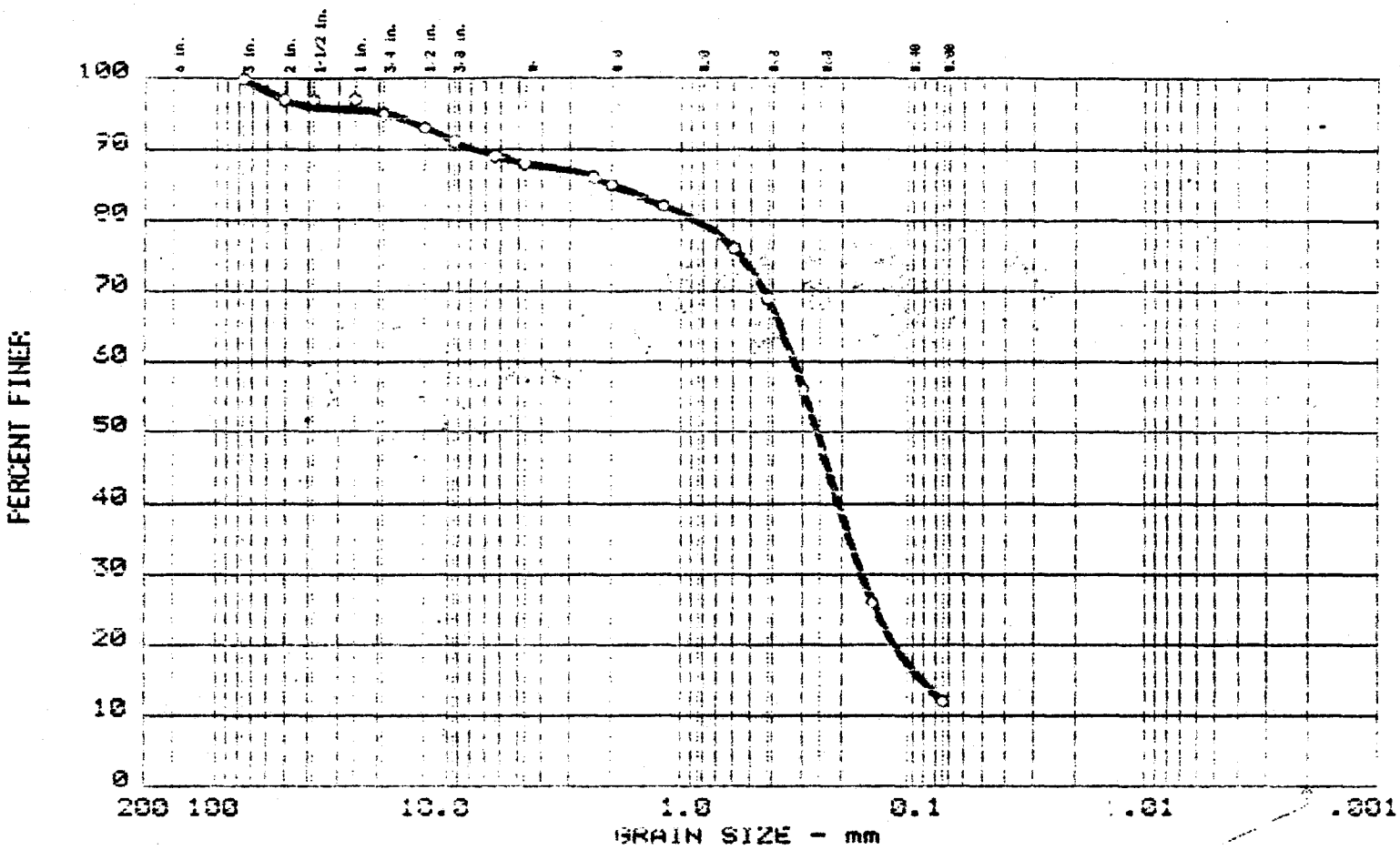
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 52

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	19	0.0	12.0	76.0	12.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.00	0.33	0.26	0.166	0.0912			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some fines, some gravel	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION
○ Location: TP - 28(21 - 22)

Date: 5/28/88

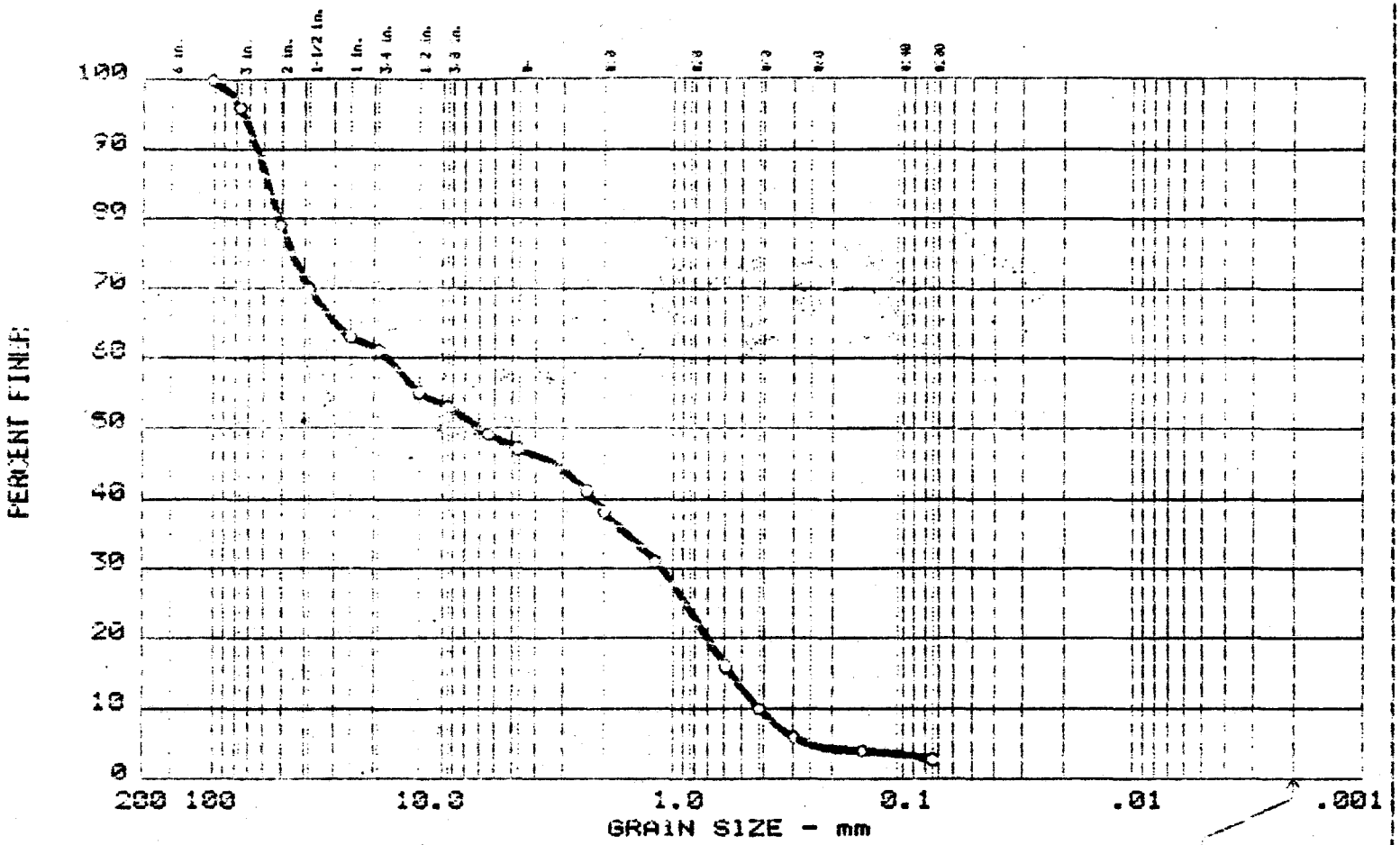
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 53

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	4.0	49.0	44.2	2.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			58.88	17.54	6.98	1.119	0.5610	0.4159	0.17	42.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVELS; trace cobbles, trace fines	SP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 21(1 - 3)

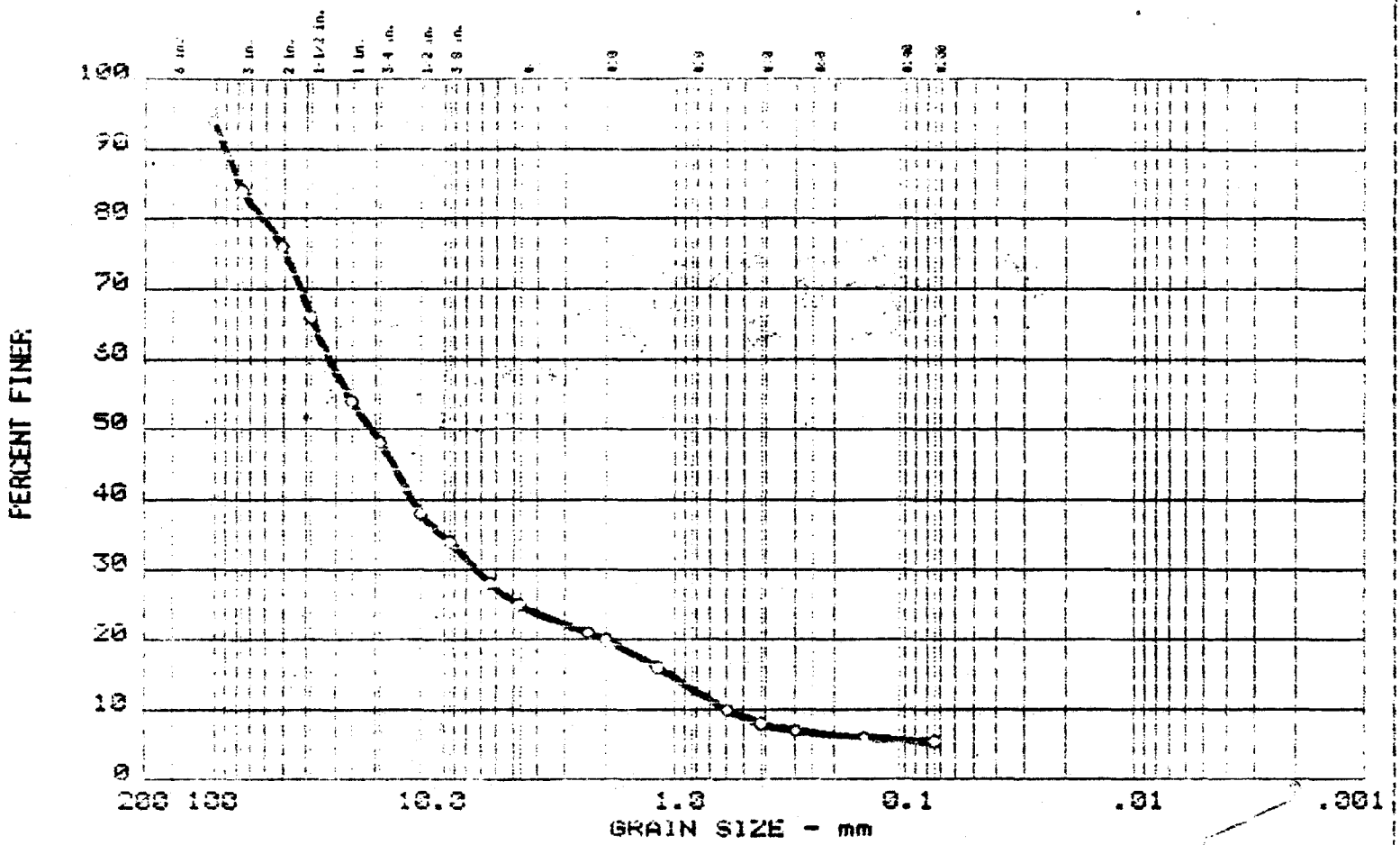
Date: 5/28/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 54

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	4	16.0	59.0	19.6	5.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			78.52	31.84	20.00	7.211	1.0544	0.5861	2.79	54.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVELS; with cobbles, some fines	GW-GM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 21(7 - 8)

Date: 5/28/88

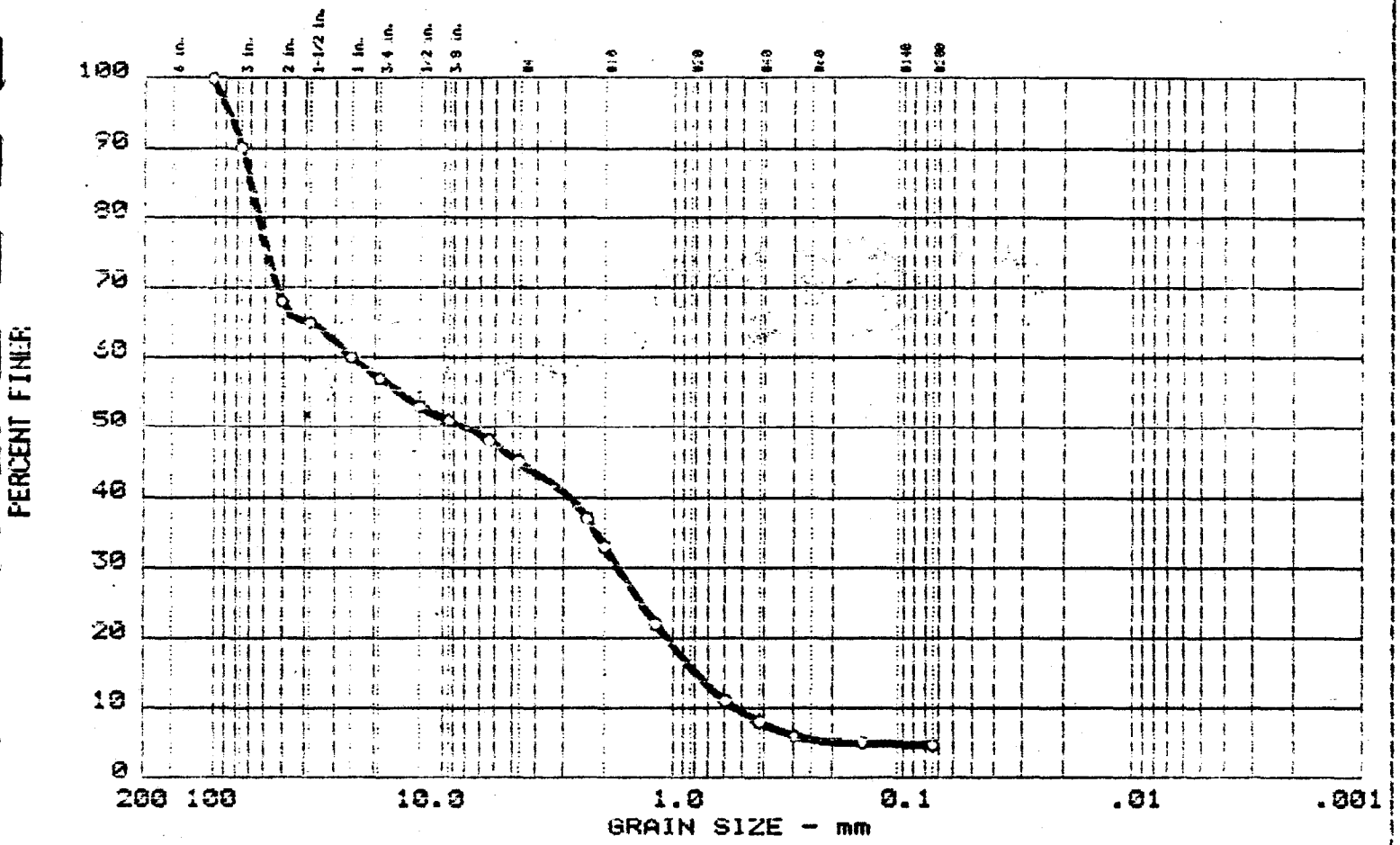
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 55

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	15	10.0	45.0	40.3	4.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	33	14	69.58	25.26	8.08	1.748	0.7898	0.5339	0.23	47.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL AND SAND; some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 22(1 - 2)

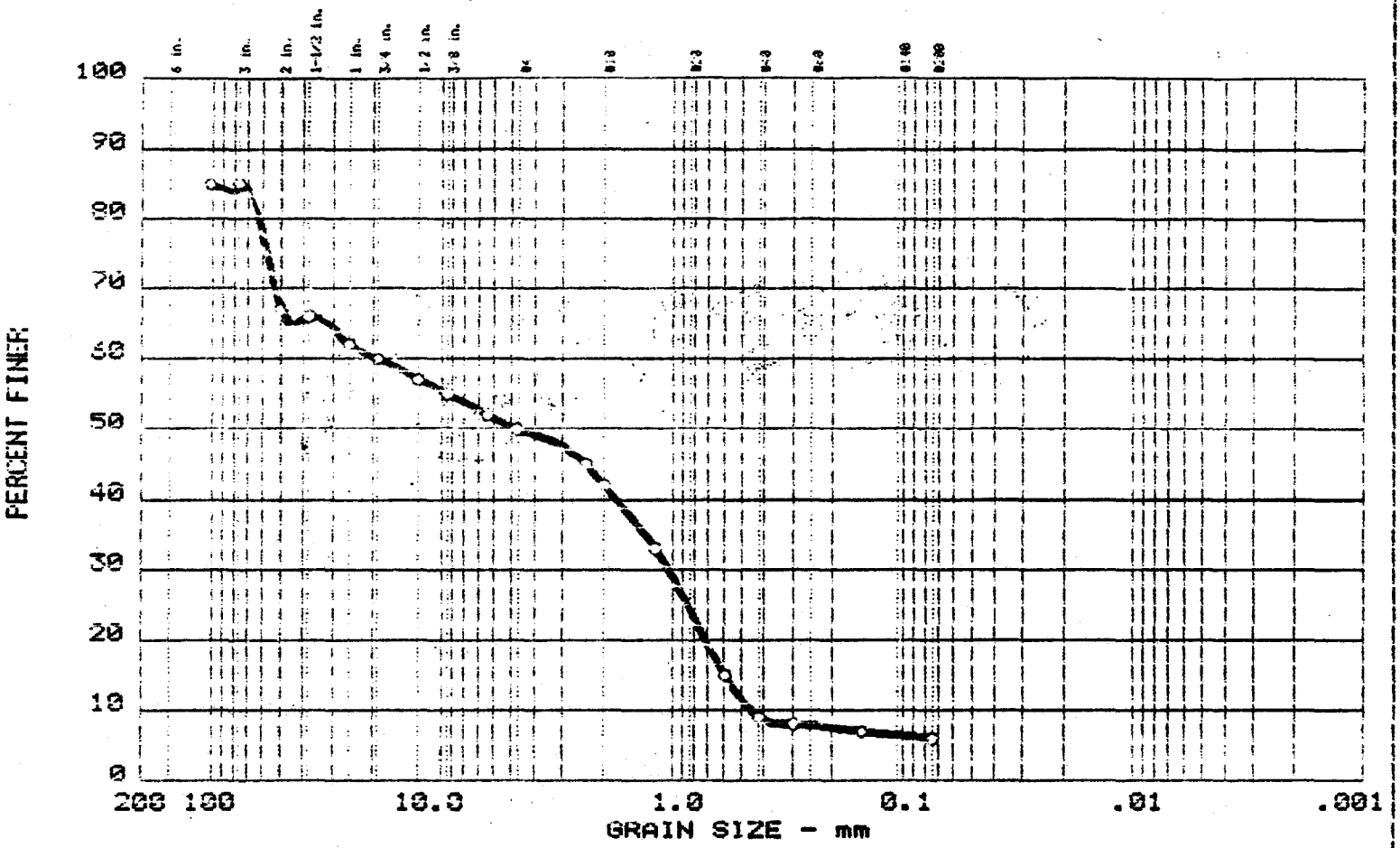
Date: 5/26/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 56

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	15.7	34.3	44.0	6.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			100.00	18.94	4.73	1.044	0.5868	0.4555	0.13	41.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL AND SAND; with cobbles, some fines	SP-GM	

Project No.: POPHJRMH
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 22(4 - 5)

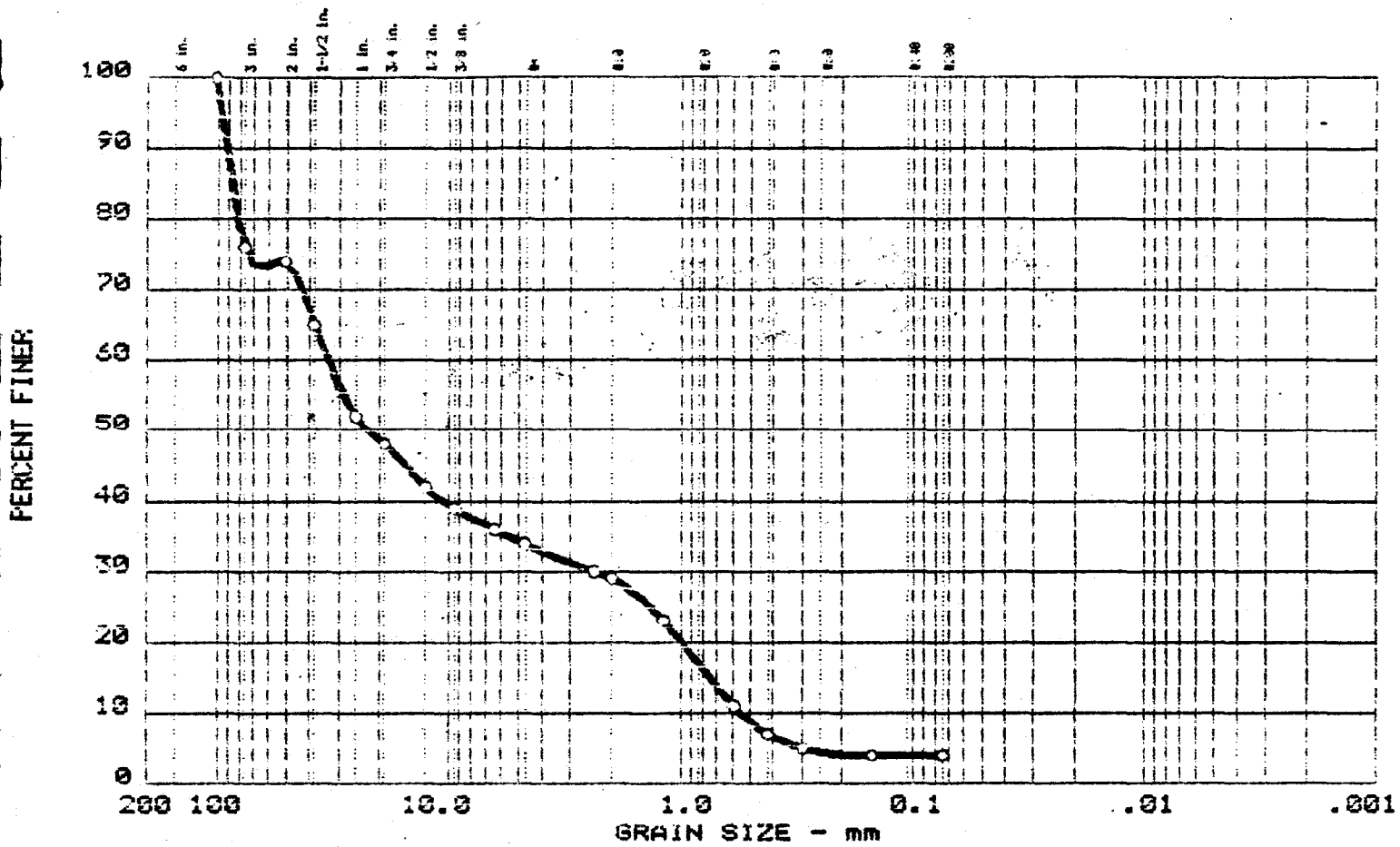
Date: /PM/HH

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 57

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	24.0	42.0	34.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			87.10	33.46	22.36	2.369	0.7490	0.5489	0.31	61.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 23(5 - 7)

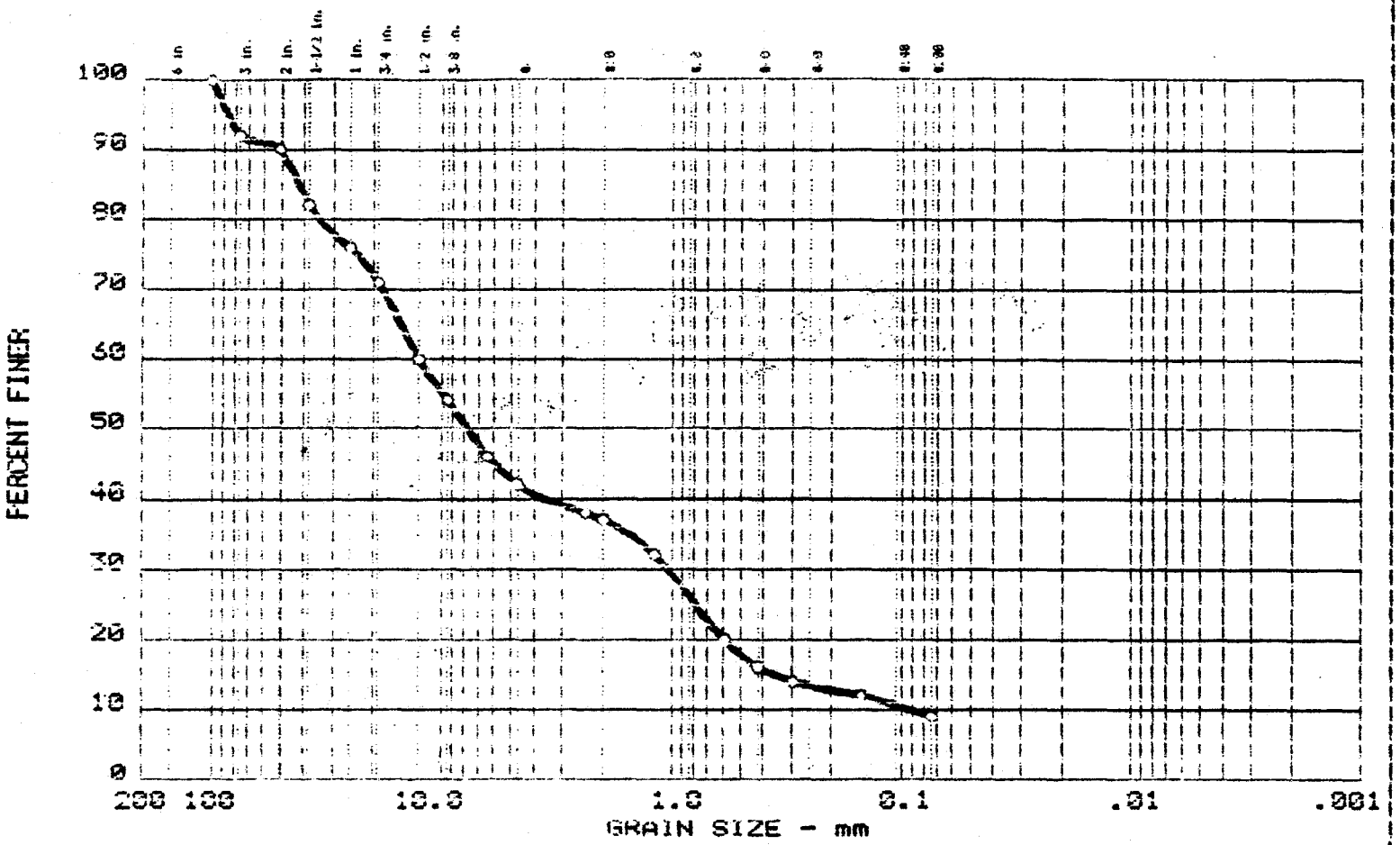
Date: 5/26/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 58

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	8.0	50.0	33.0	9.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			42.12	12.69	7.83	1.044	0.3618	0.0909	0.94	139.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL AND SAND; some fines, some cobbles	GP-GM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 23(13 - 17)

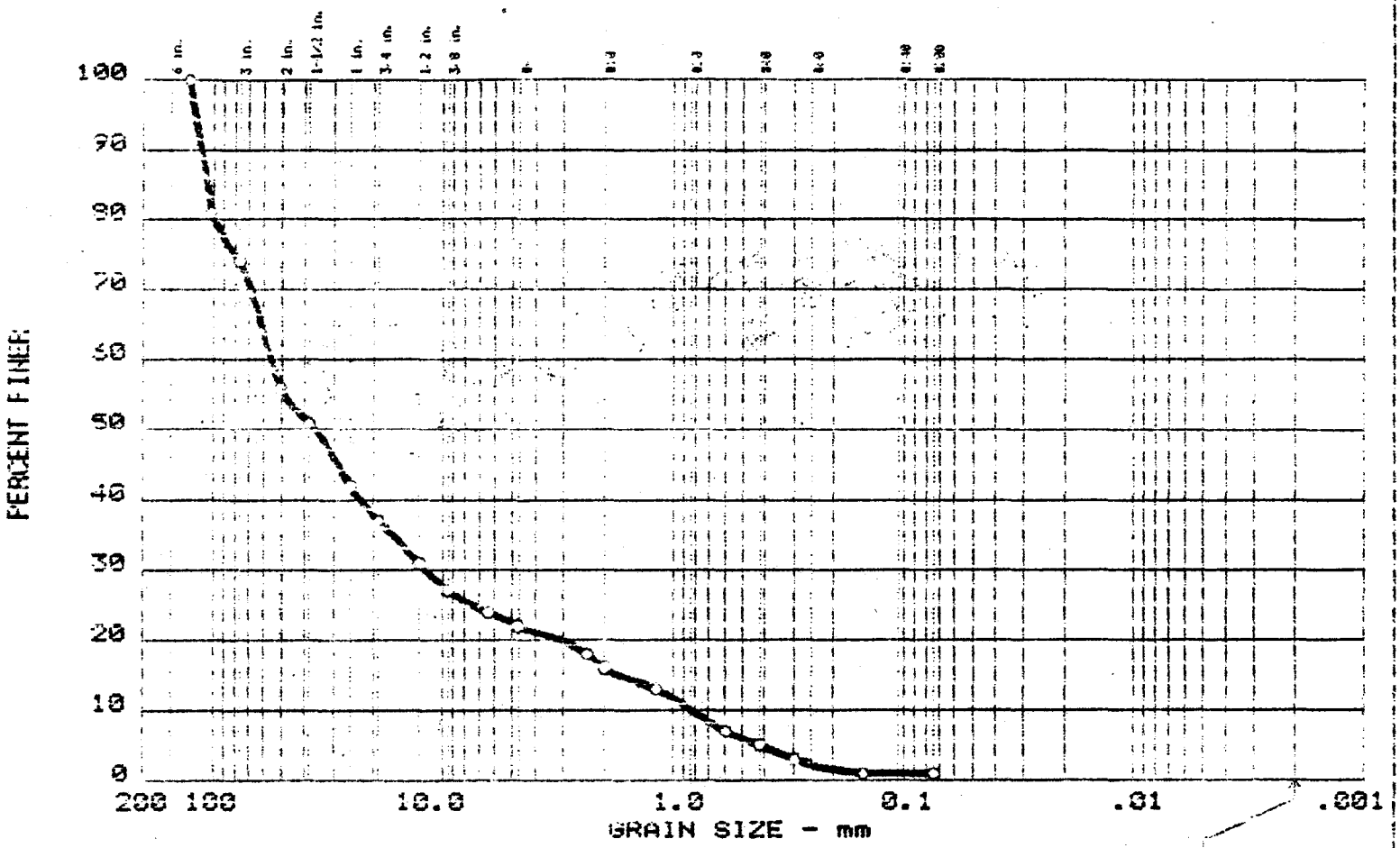
Date: 5/26/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 59

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	5	26.0	52.0	22.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			107.89	55.98	35.73	11.830	1.7701	0.8185	3.05	68.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELS AND COBBLES; with sand, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 24(2 - 3)

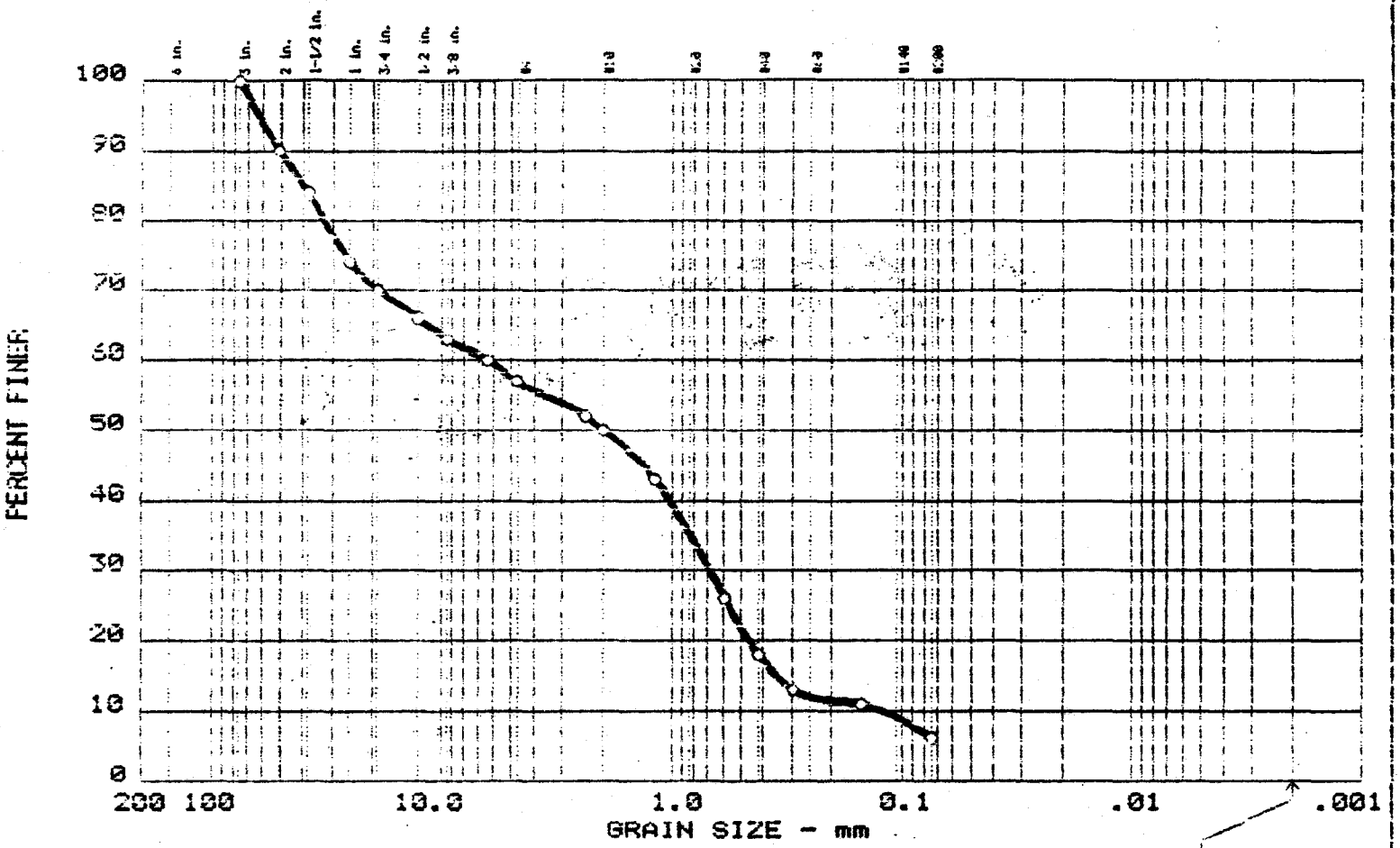
Date: 5/28/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 60

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	7	0.0	43.0	50.8	6.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			39.81	6.31	2.00	0.684	0.3508	0.1175	0.63	53.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 25(2 - 3)

Date: 5/28/88

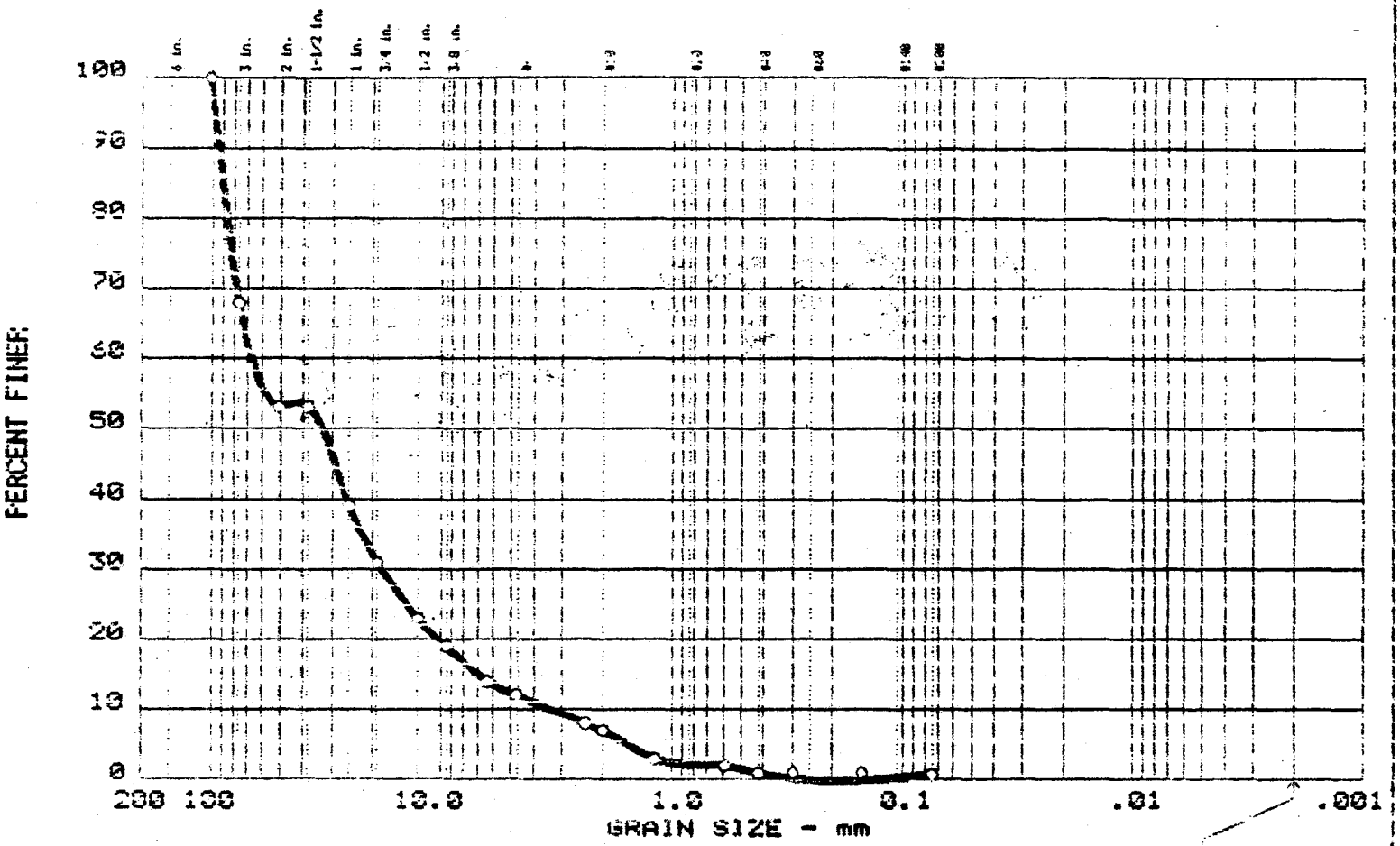
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 61

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	6	32.0	56.0	11.3	0.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			89.85	67.69	32.77	18.197	6.9183	3.3497	1.46	20.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELS AND COBBLES; some sand; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 24(9 - 10)

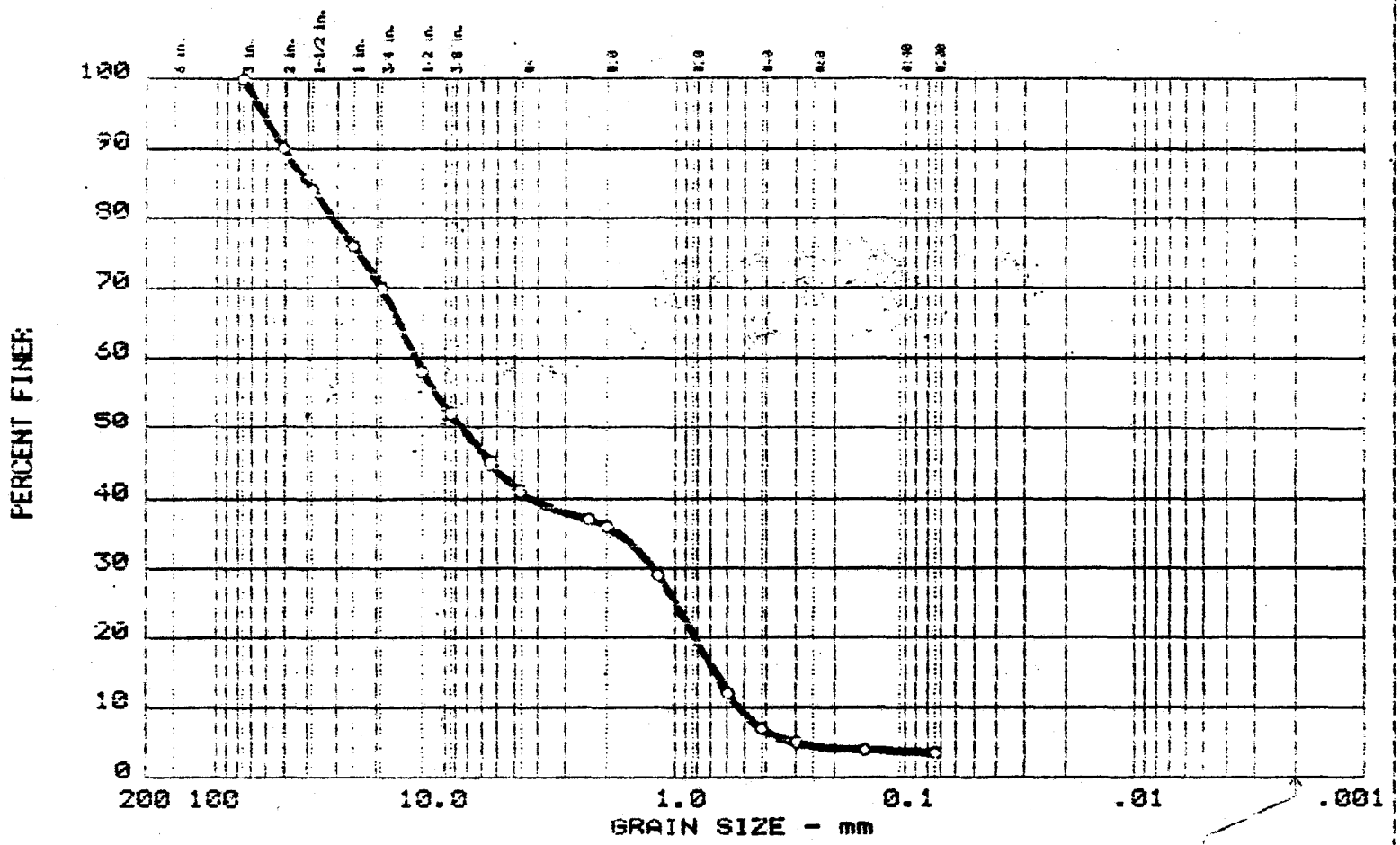
Date: 5/28/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 62

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	8	0.0	59.0	37.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			39.81	13.65	8.51	1.245	0.6753	0.5242	0.22	26.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVELS; trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 25(6 - 7)

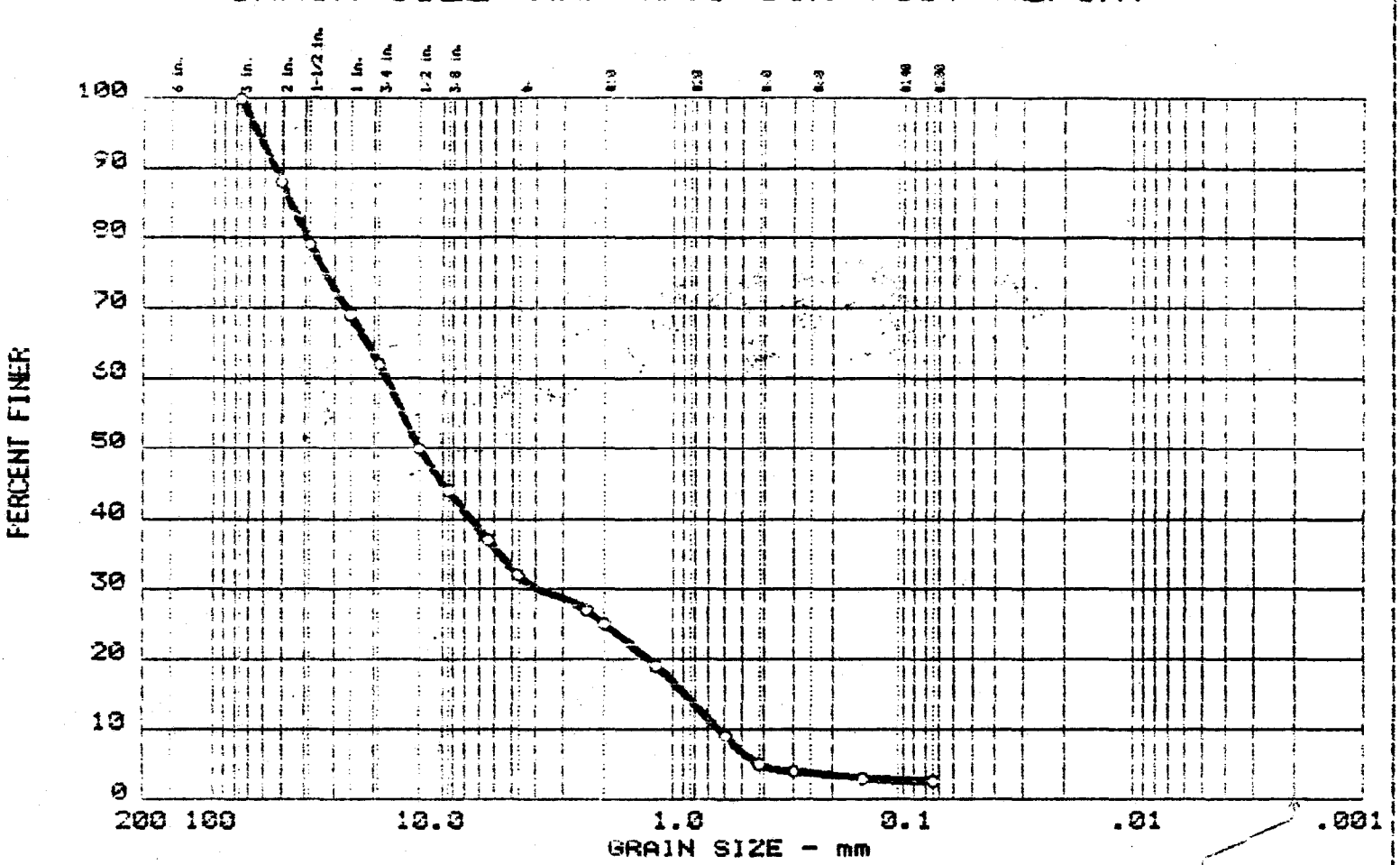
Date: 5/28/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 63

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	0.0	68.0	29.4	2.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			46.24	17.76	12.69	3.877	0.8780	0.6288	1.35	28.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 25(17 - 18)

Date: 5/29/88

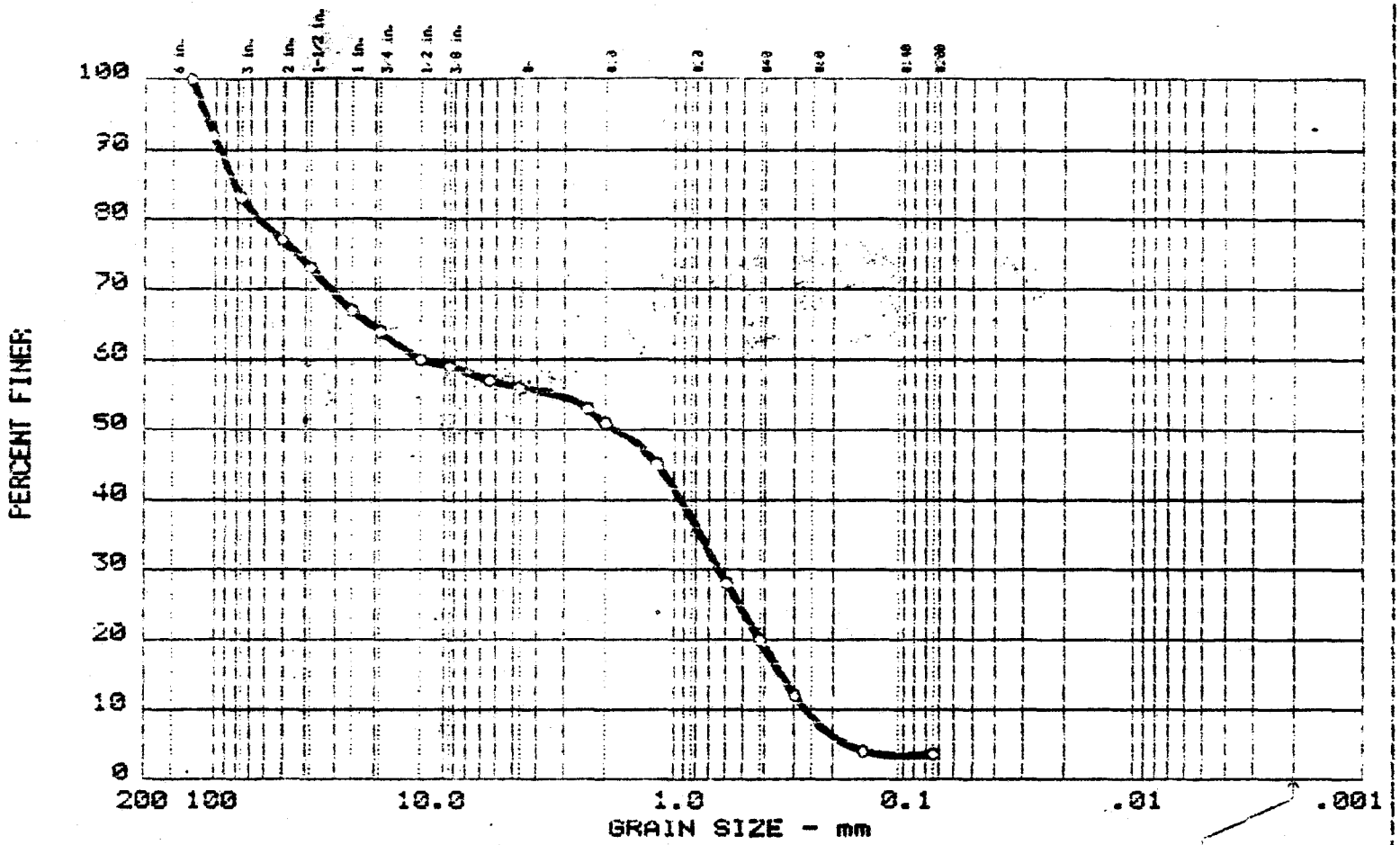
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 64

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	12	17.0	27.0	52.4	3.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			82.13	12.57	1.82	0.638	0.3385	0.2658	0.12	47.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND, with cobbles, trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 26(0 - 1)

Date: 5/29/88

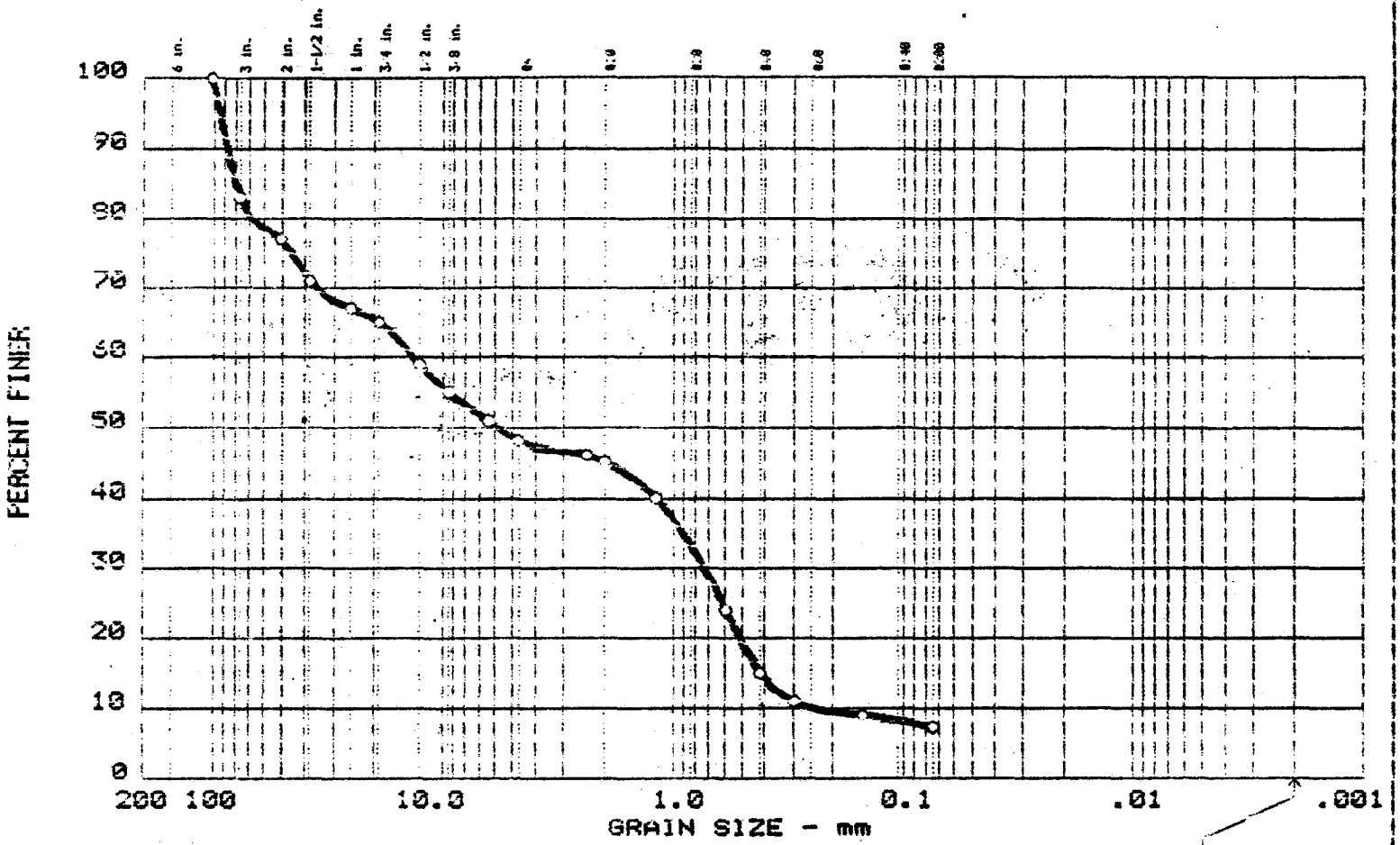
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 65

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	11	17.0	35.0	40.6	7.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			79.80	13.40	5.78	0.735	0.4178	0.2350	0.17	57.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVEL; with cobbles, some fines	GP-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 25(22 - 23)

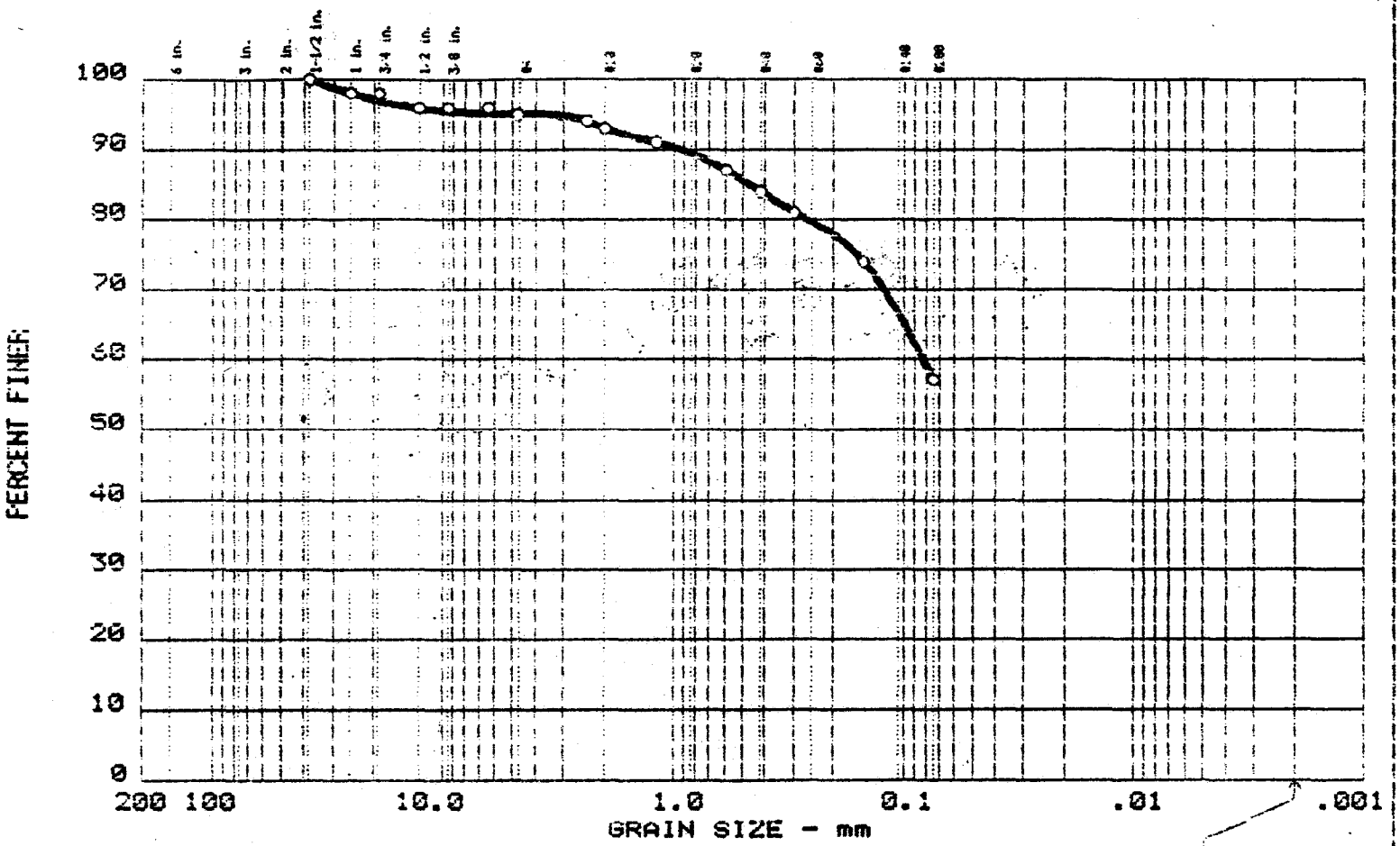
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 66

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	0.0	5.0	38.0	57.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.47	0.08						

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY CLAY; trace gravel	CL	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 26(3 - 4)

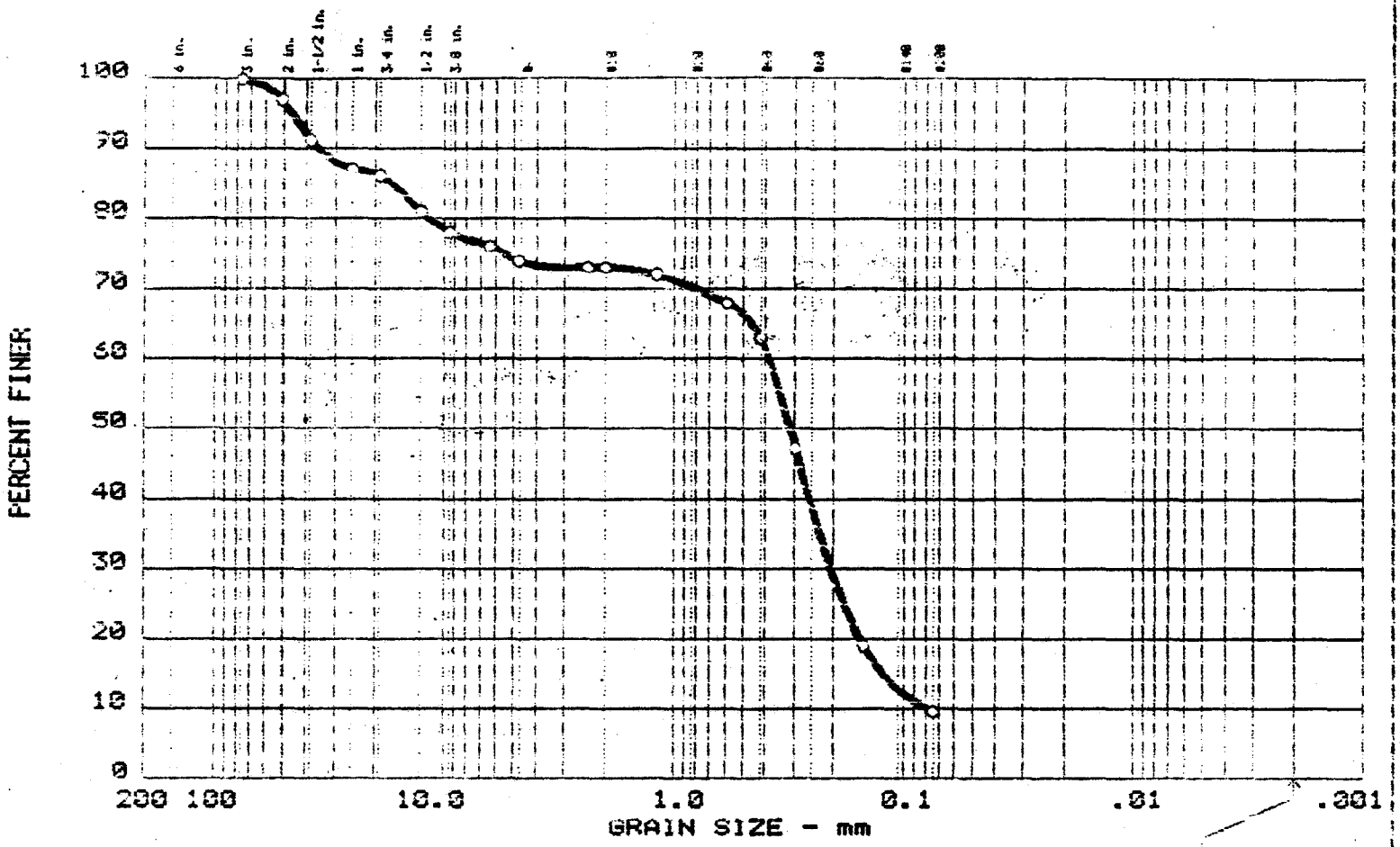
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 67

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	0.0	26.0	64.4	9.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			16.98	0.39	0.31	0.207	0.1230	0.0776	1.42	5.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 26(7 - 8)

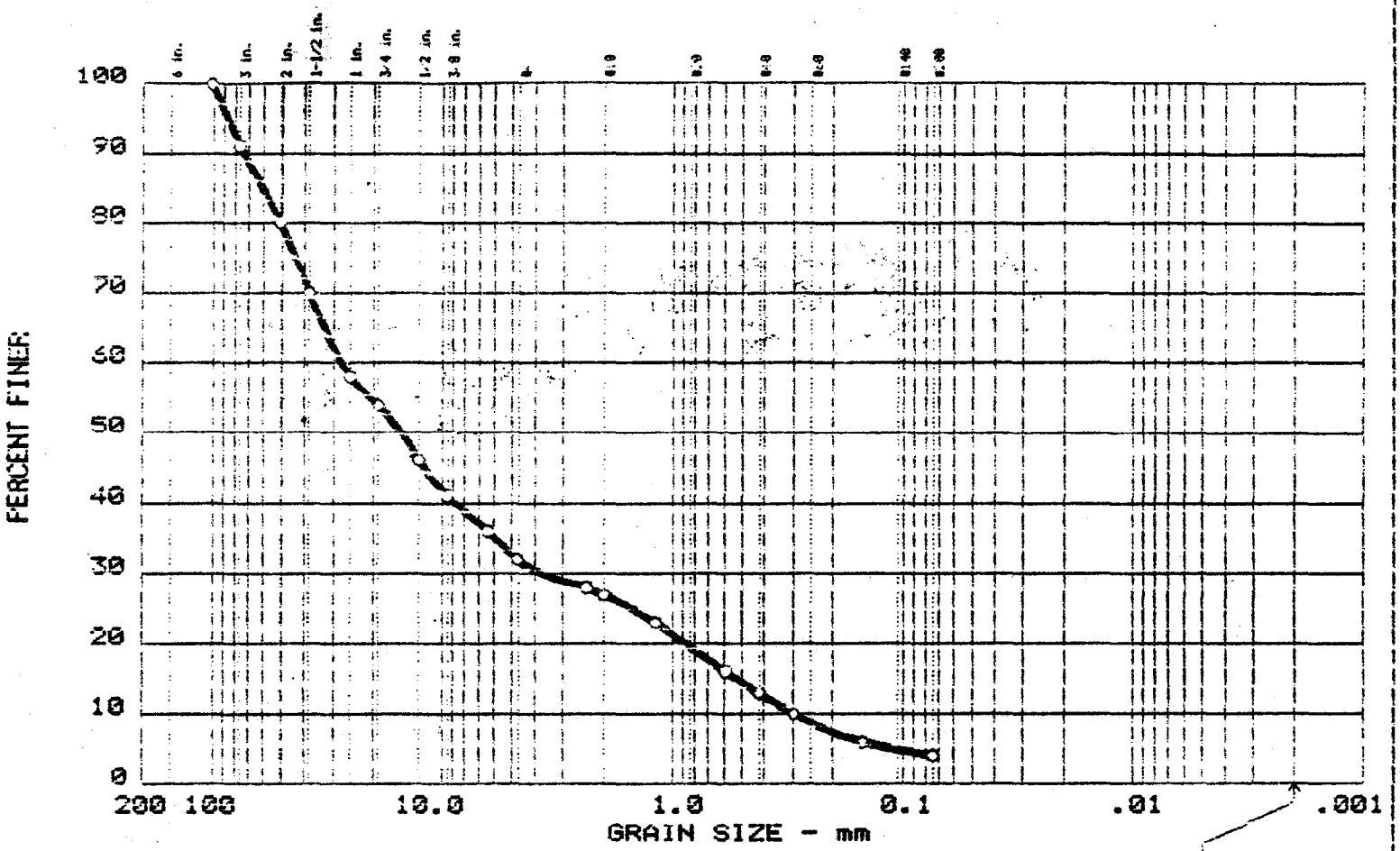
Date: 5/28/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 68

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	9.0	59.0	28.0	4.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			60.26	27.80	15.28	3.750	0.5236	0.2944	1.72	94.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles; trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 26(13 - 14)

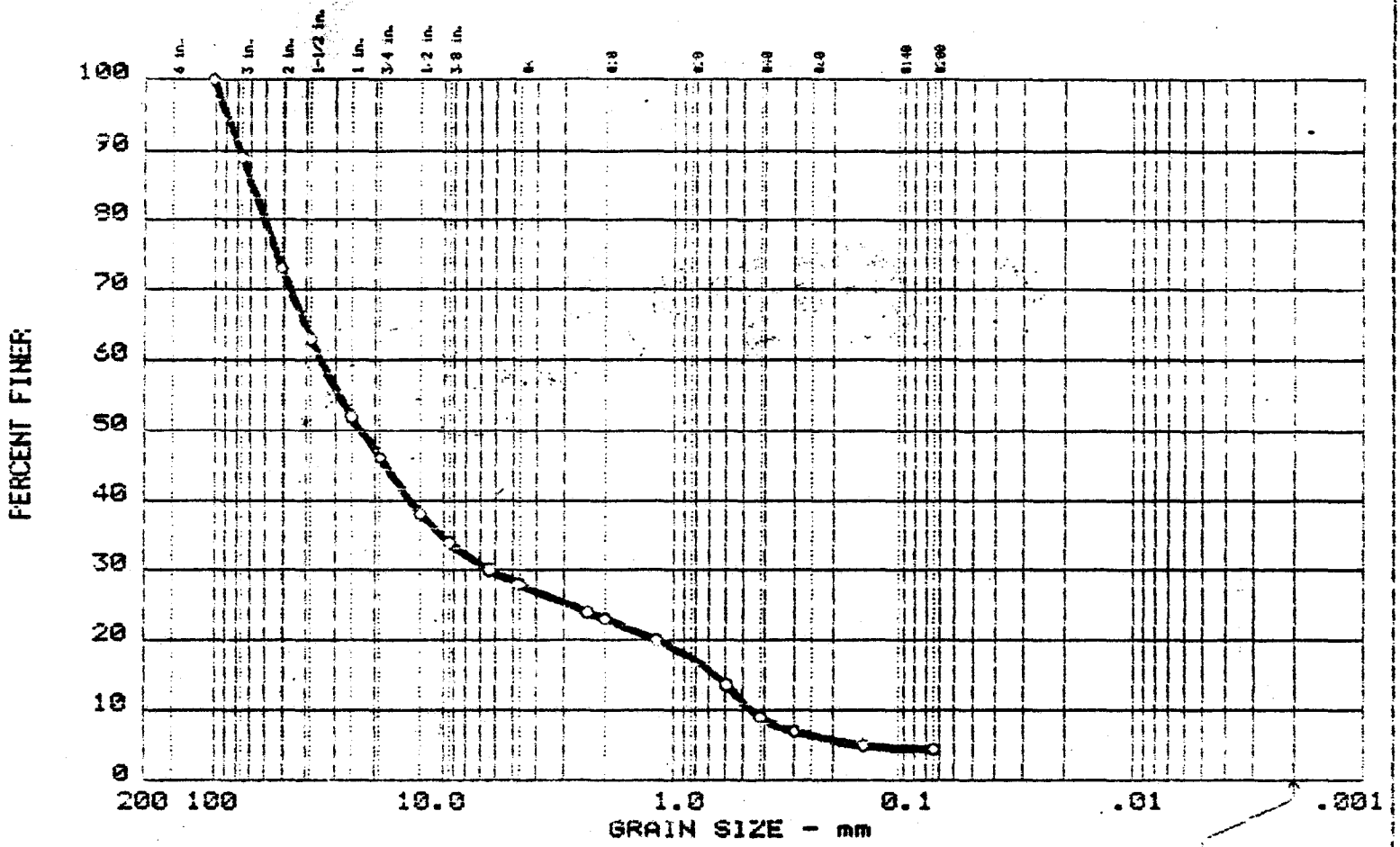
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 69

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	4	11.0	61.0	23.5	4.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			68.87	34.51	23.07	6.281	0.6577	0.4550	2.51	75.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 27(3 - 4)

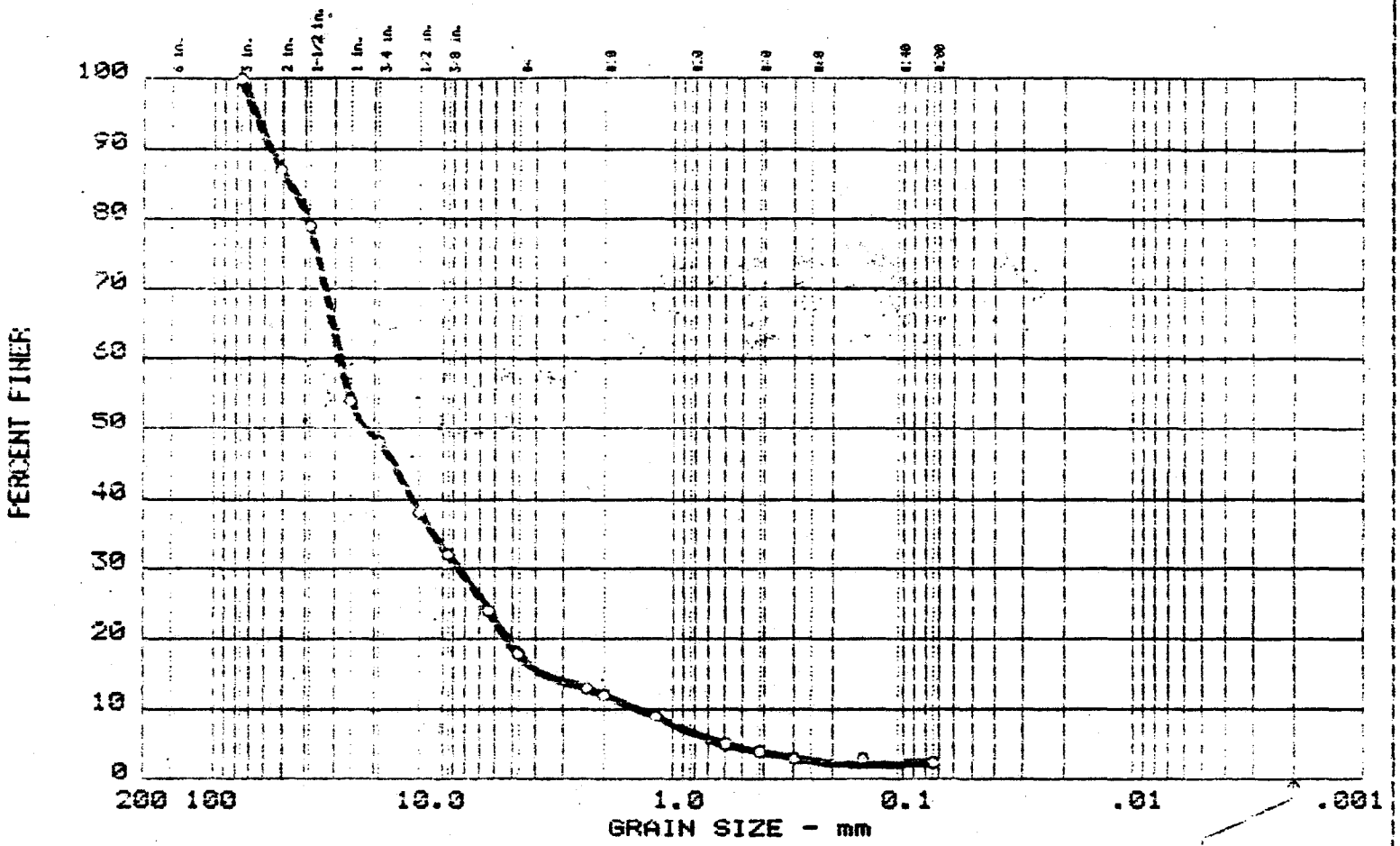
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 70

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	5	0.0	82.0	15.6	2.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			46.24	28.35	21.75	8.561	3.6517	1.4044	1.84	20.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; with sand, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 27(16 - 17)

Date: 5/29/88

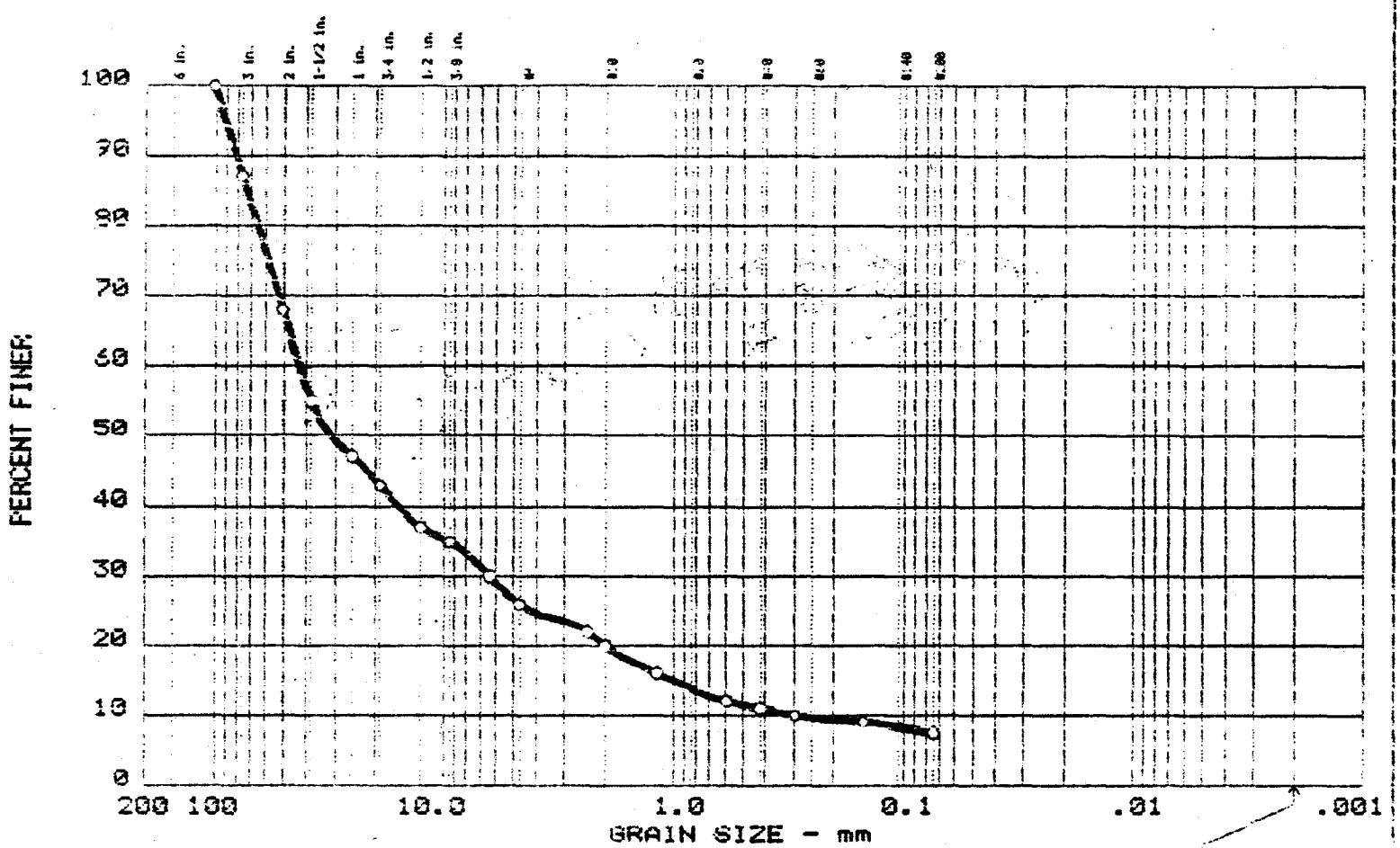
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 71

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	6	13.0	61.0	18.5	7.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	27	8	72.86	42.90	31.08	6.346	1.0058	0.2968	3.16	144.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; **some cobbles,** some clay	GP-GC	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 28(0 - 2)

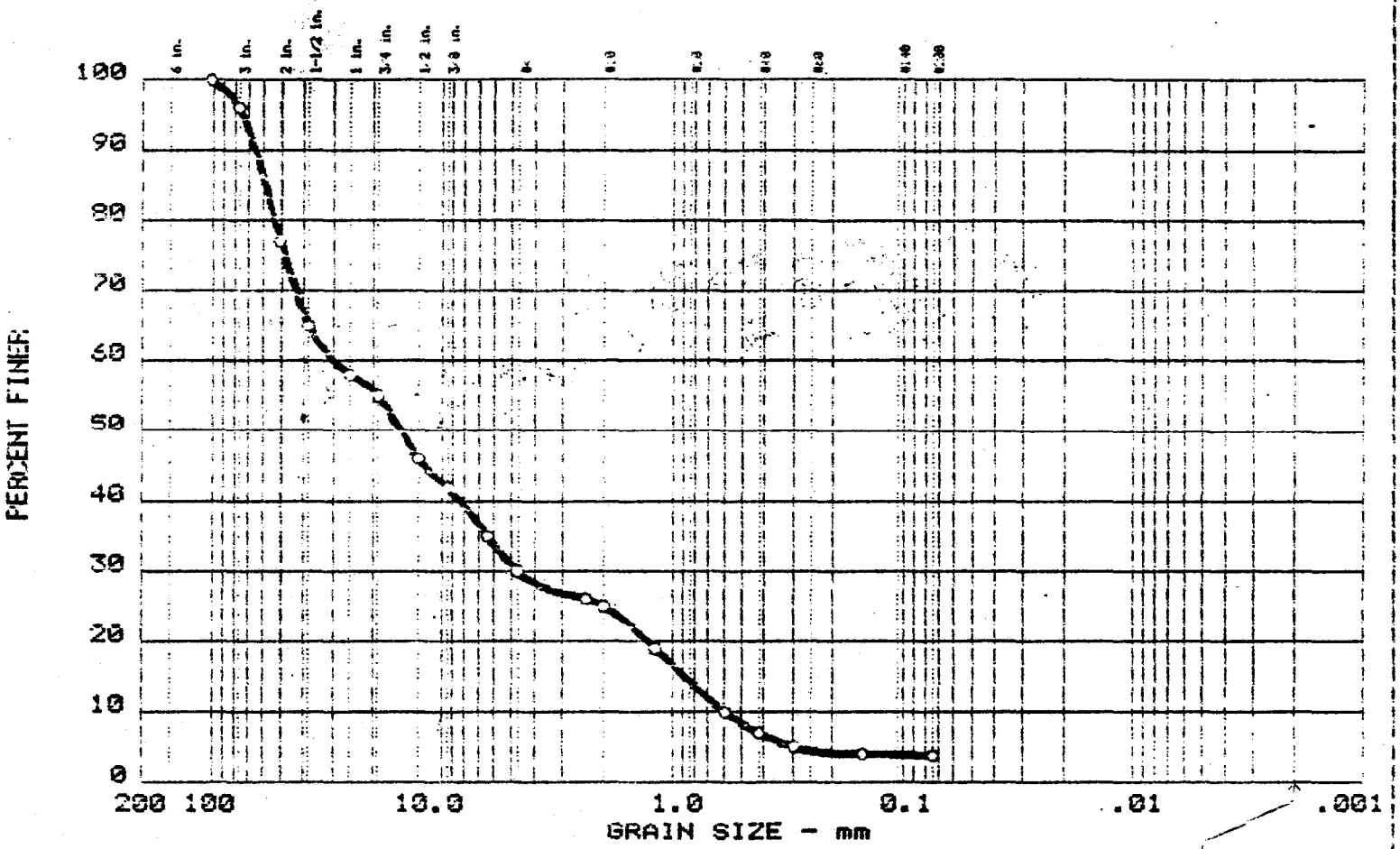
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 72

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	7	4.0	66.0	26.2	3.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	55	34	59.09	29.96	15.17	4.742	0.8831	0.5834	1.29	51.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace clay, trace cobbles	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 28(4 - 5)

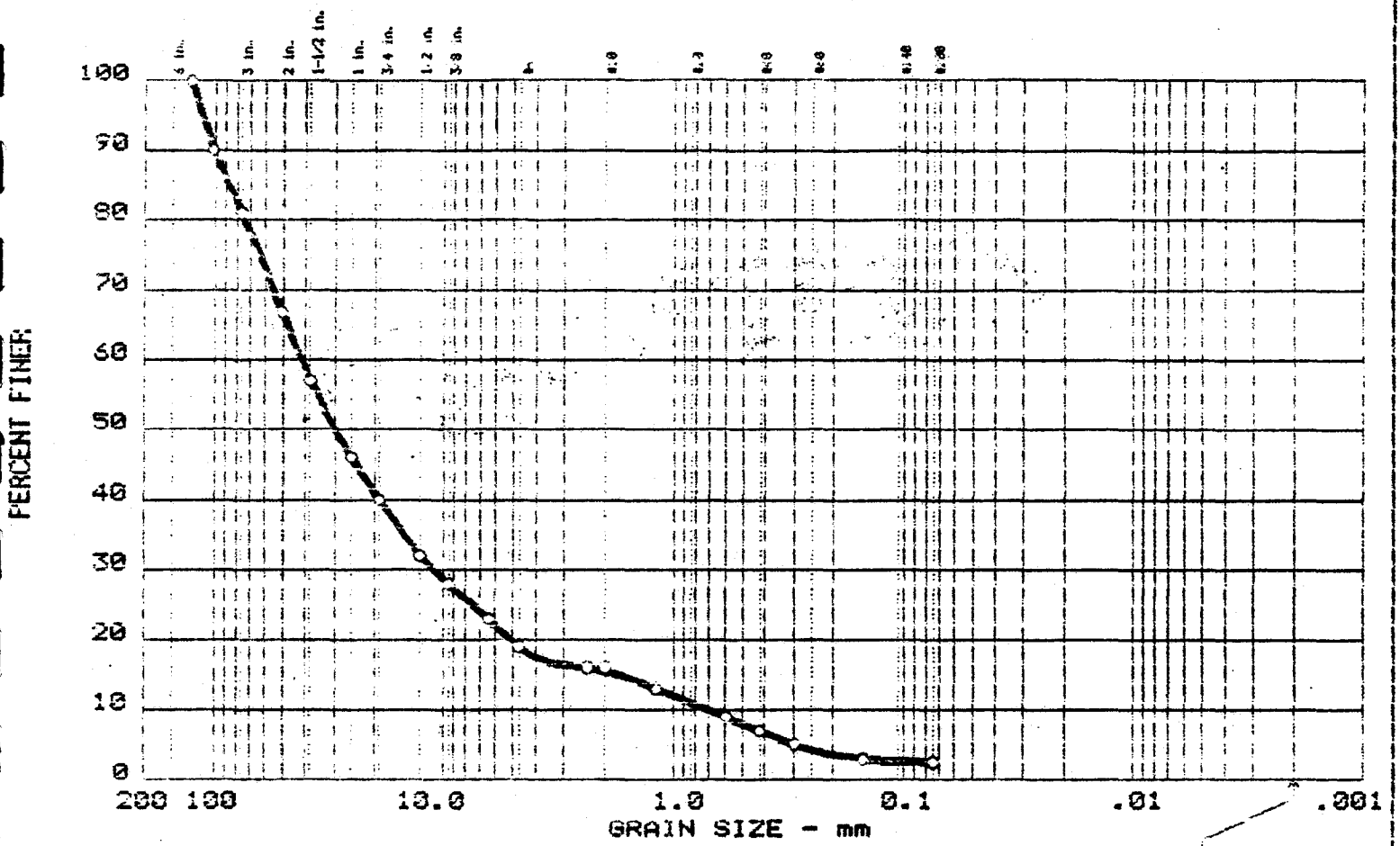
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 73

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	8	19.0	62.0	16.5	2.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	48	25	87.10	41.69	29.85	11.092	1.7579	0.6998	4.22	59.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY-COBBLY GRAVEL; trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 28(11 - 13)

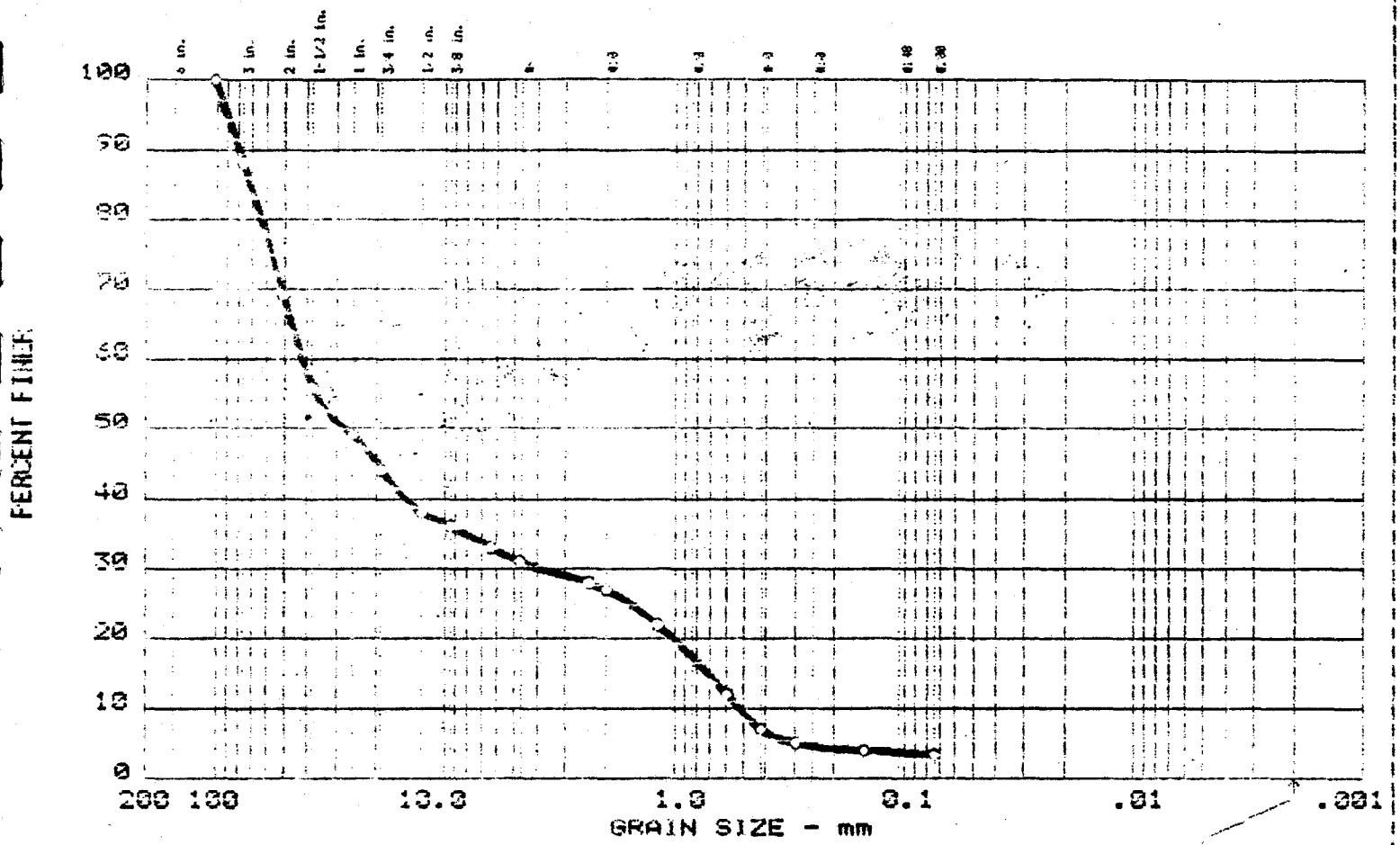
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 74

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	12.0	57.0	27.6	3.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			71.12	42.22	27.26	3.763	0.7888	0.5194	0.65	81.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 29(2 - 3)

Date: 5/30/88

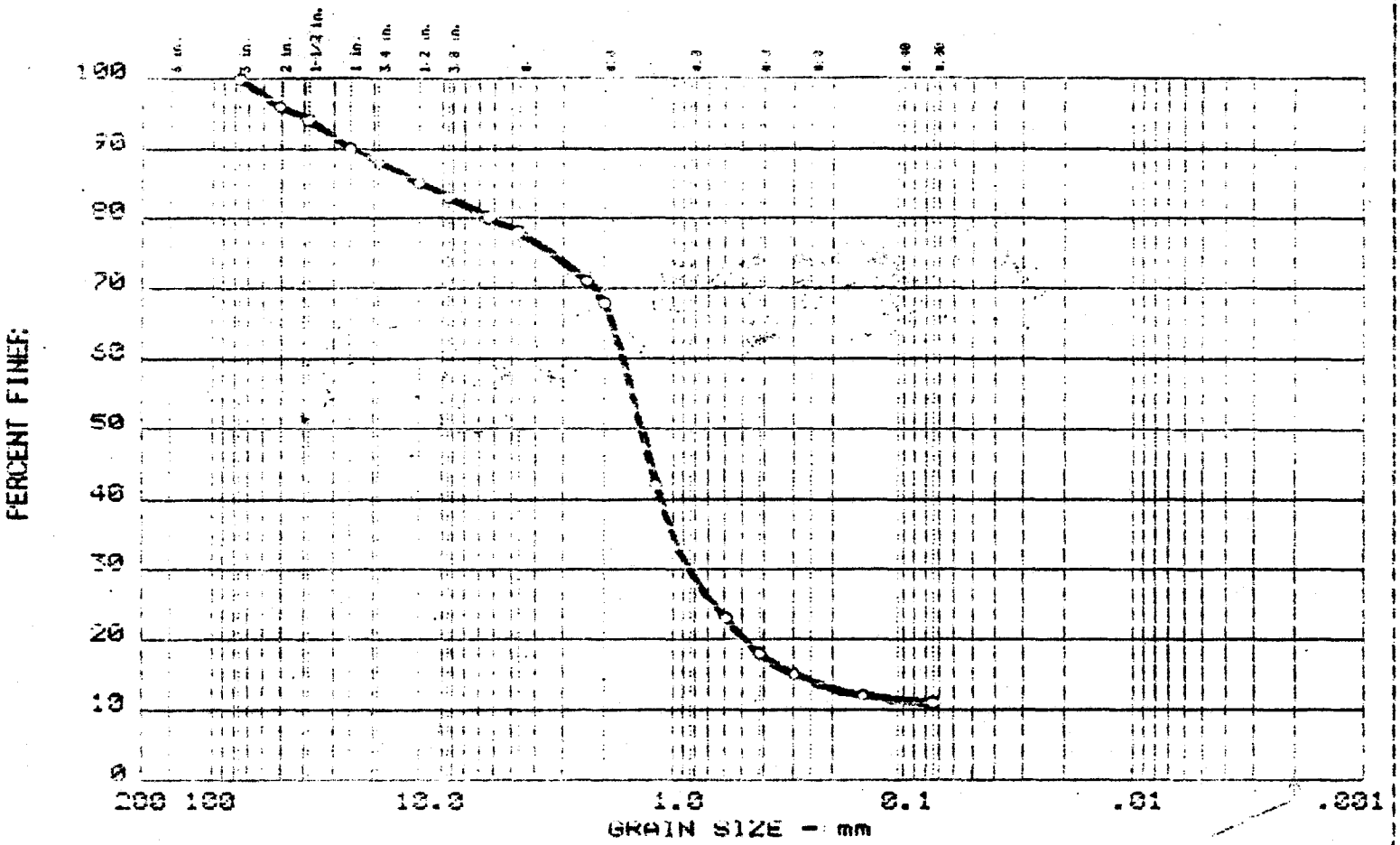
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 75

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	0.0	22.0	67.0	11.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			12.59	1.65	1.38	0.850	0.2948			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 29(9 - 10)

Date: 5/30/88

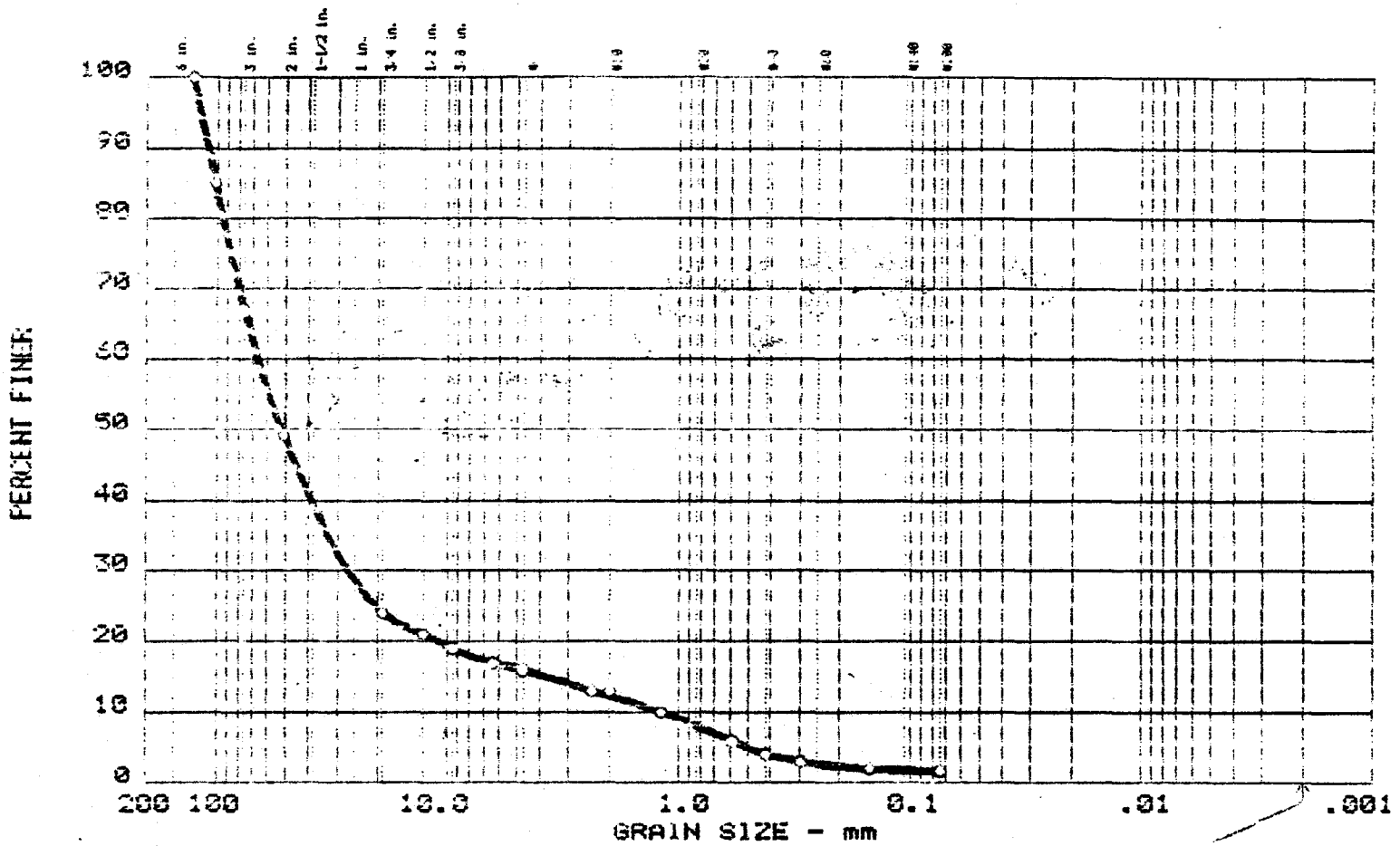
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 76

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	11	33.0	51.0	14.3	1.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			181.51	66.30	52.86	27.088	3.6855	1.1790	9.33	56.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ COBBLY GRAVEL, with sand, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 30(2 - 3)

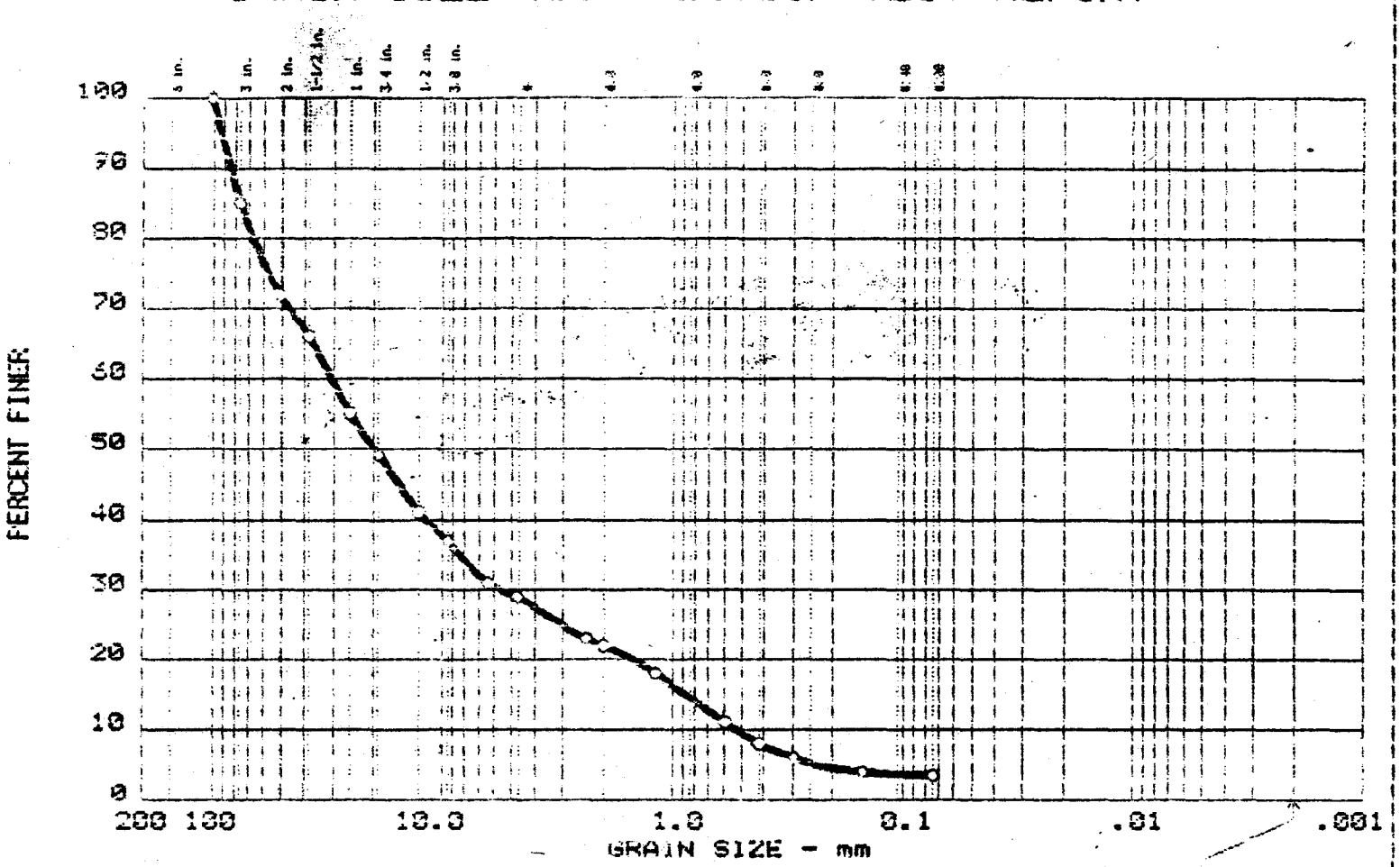
Date: 5/30/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 77

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	12	15.0	56.0	25.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			76.12	30.51	19.93	5.617	0.8700	0.5242	1.97	58.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles, trace fines	SW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 38(4 - 5)

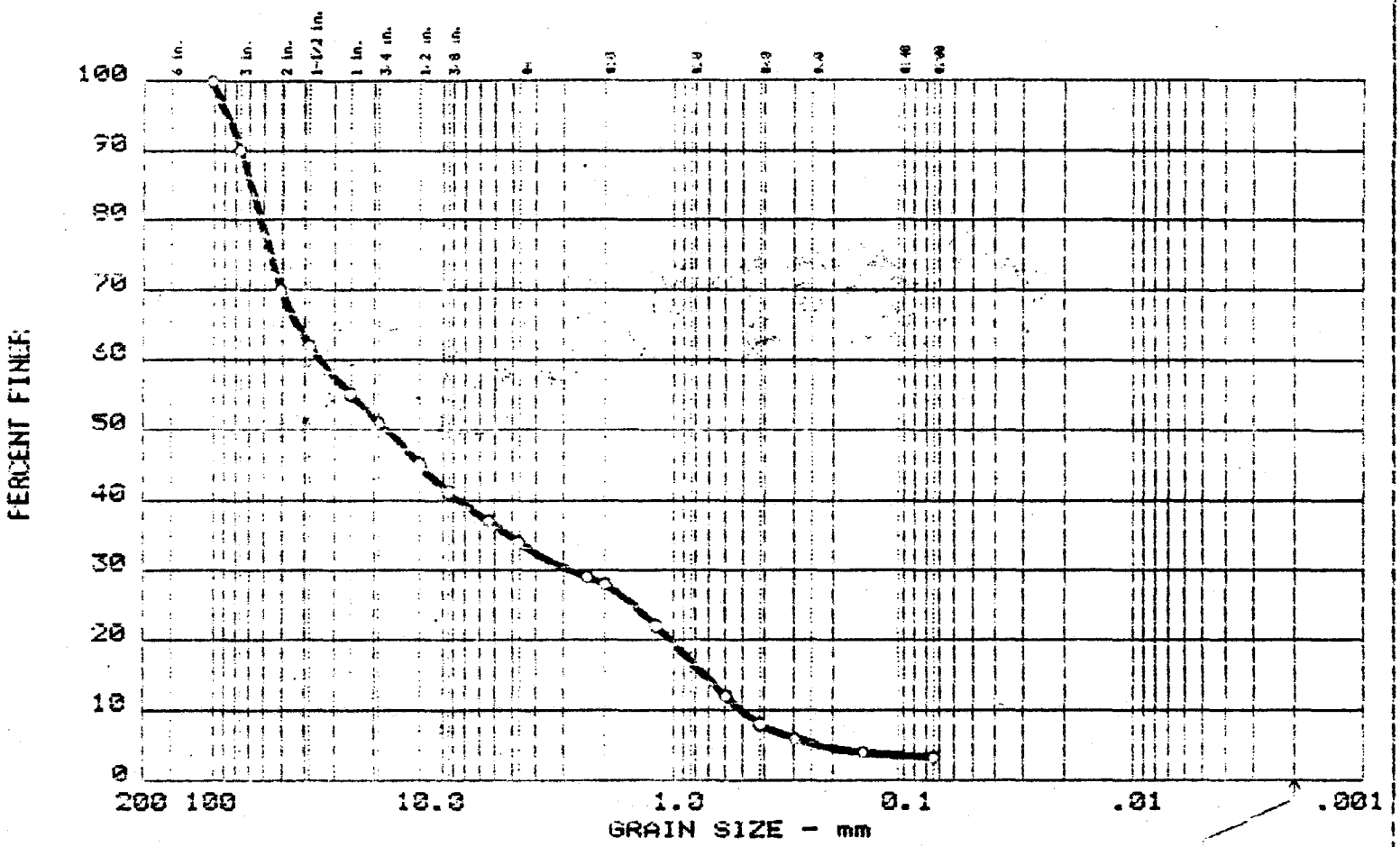
Date: 5/30/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 78

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	10.0	56.0	30.7	3.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			68.63	34.36	17.62	2.825	0.7261	0.5023	0.46	68.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 38(20 - 21)

Date: 5/30/88

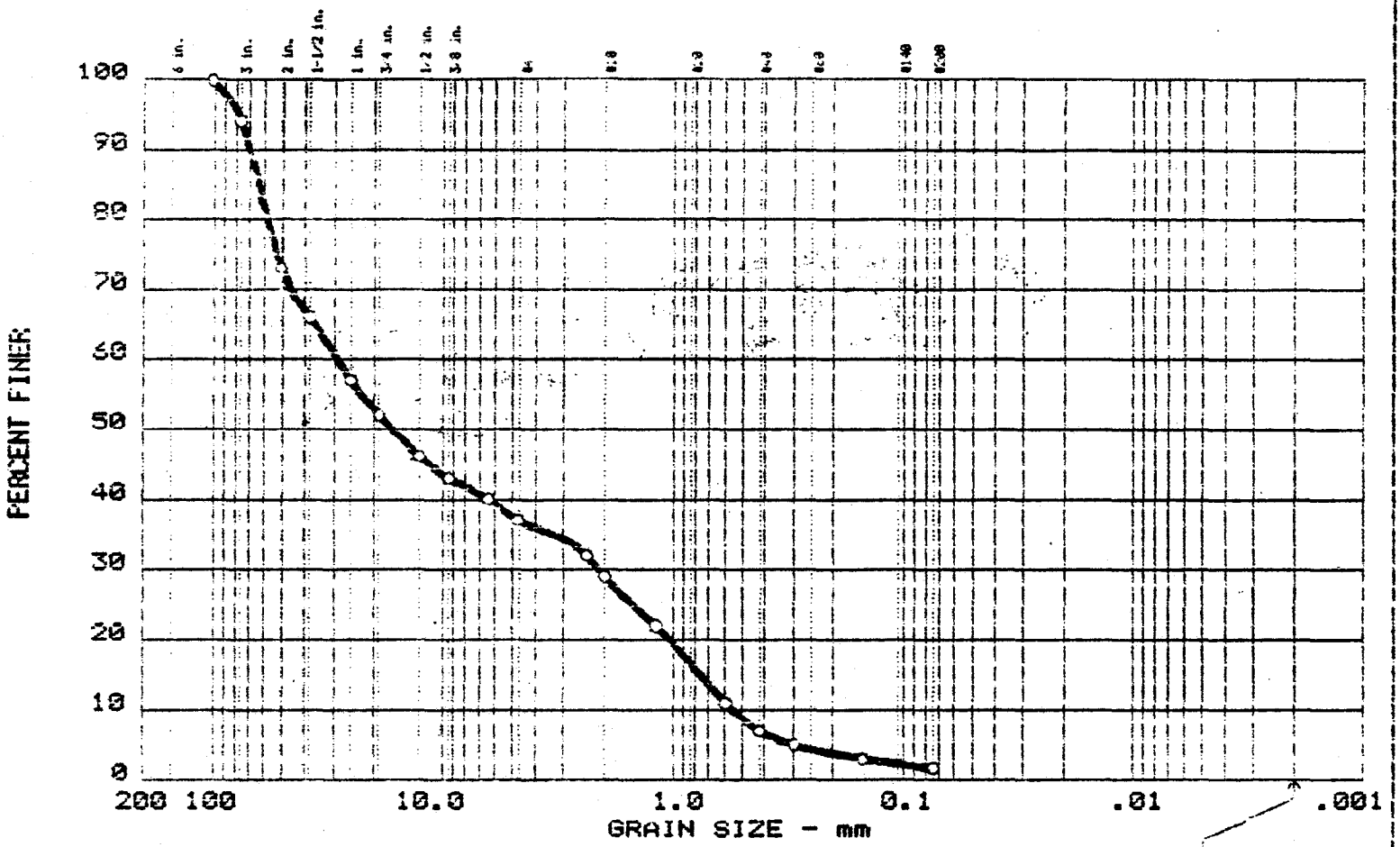
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 79

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	15	6.0	57.0	35.3	1.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			63.75	29.07	16.73	2.106	0.7560	0.5476	0.28	53.1

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL, some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 30A(1 - 2)

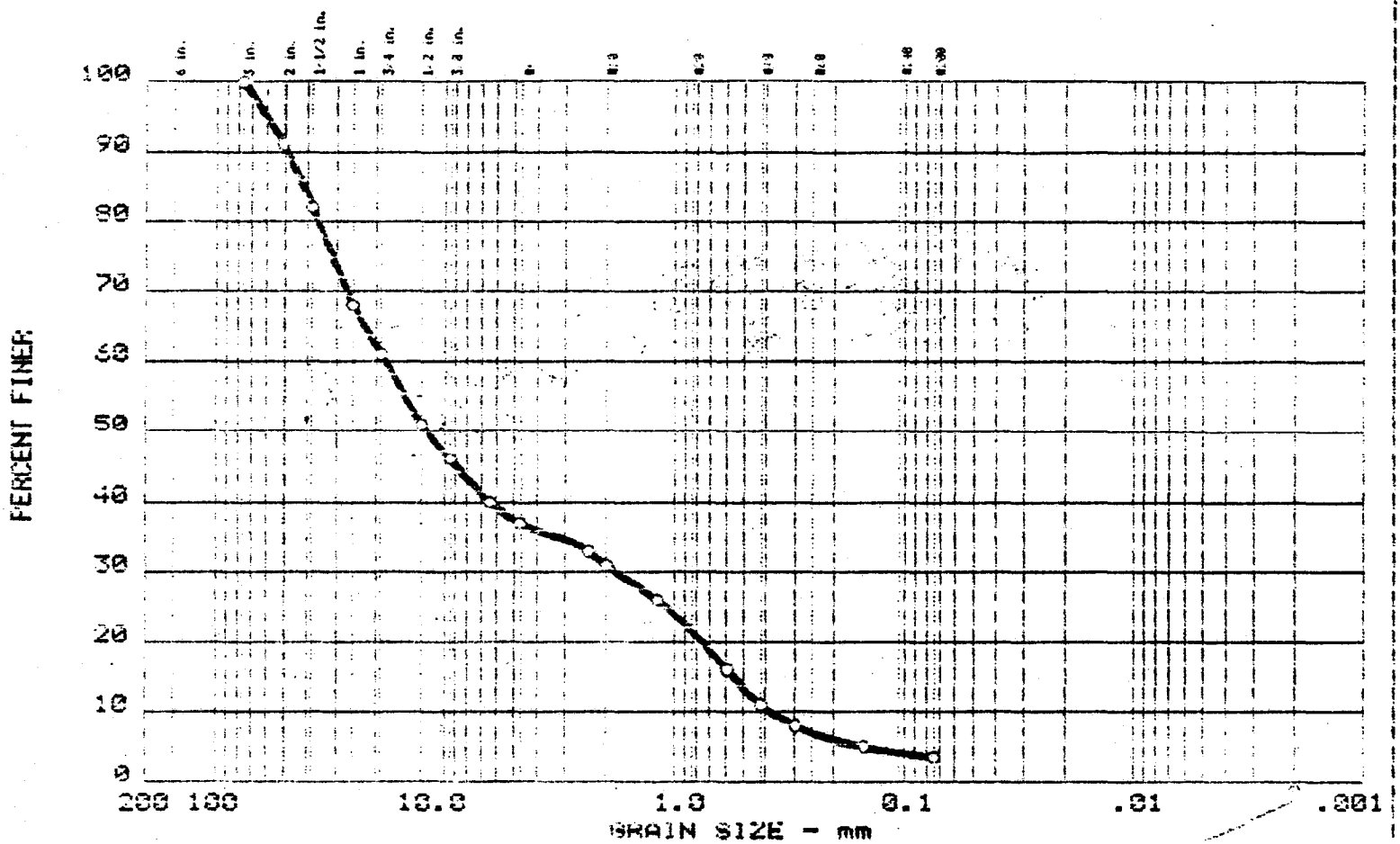
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 80

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	16	0.0	63.0	33.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			41.59	18.16	11.99	1.816	0.5483	0.3793	0.48	47.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 30A(14 - 16)

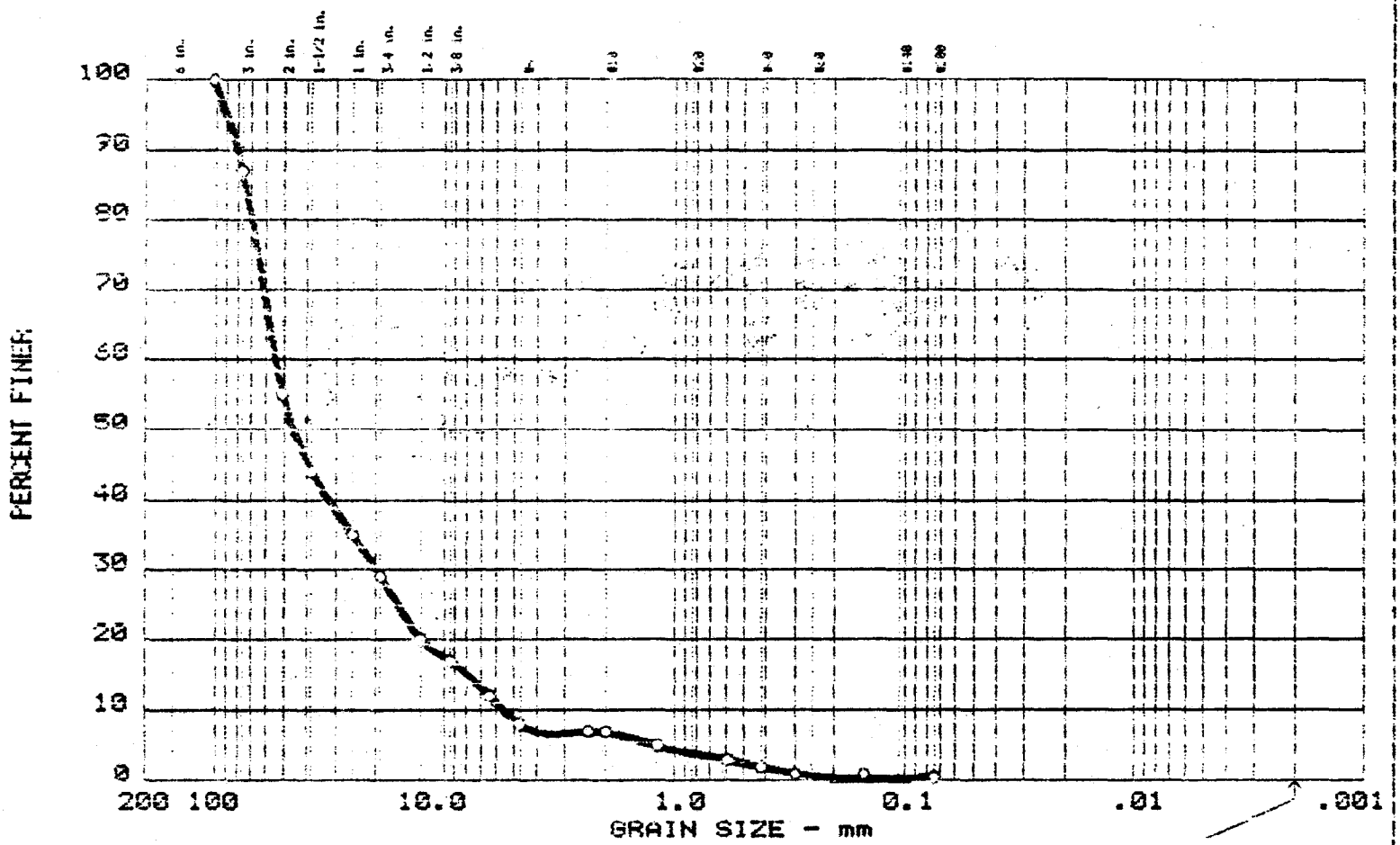
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 81

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	13.0	79.0	7.5	0.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			73.96	54.58	45.92	19.815	7.8886	5.5208	1.30	9.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; some cobbles, some sand, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 31(3 - 4)

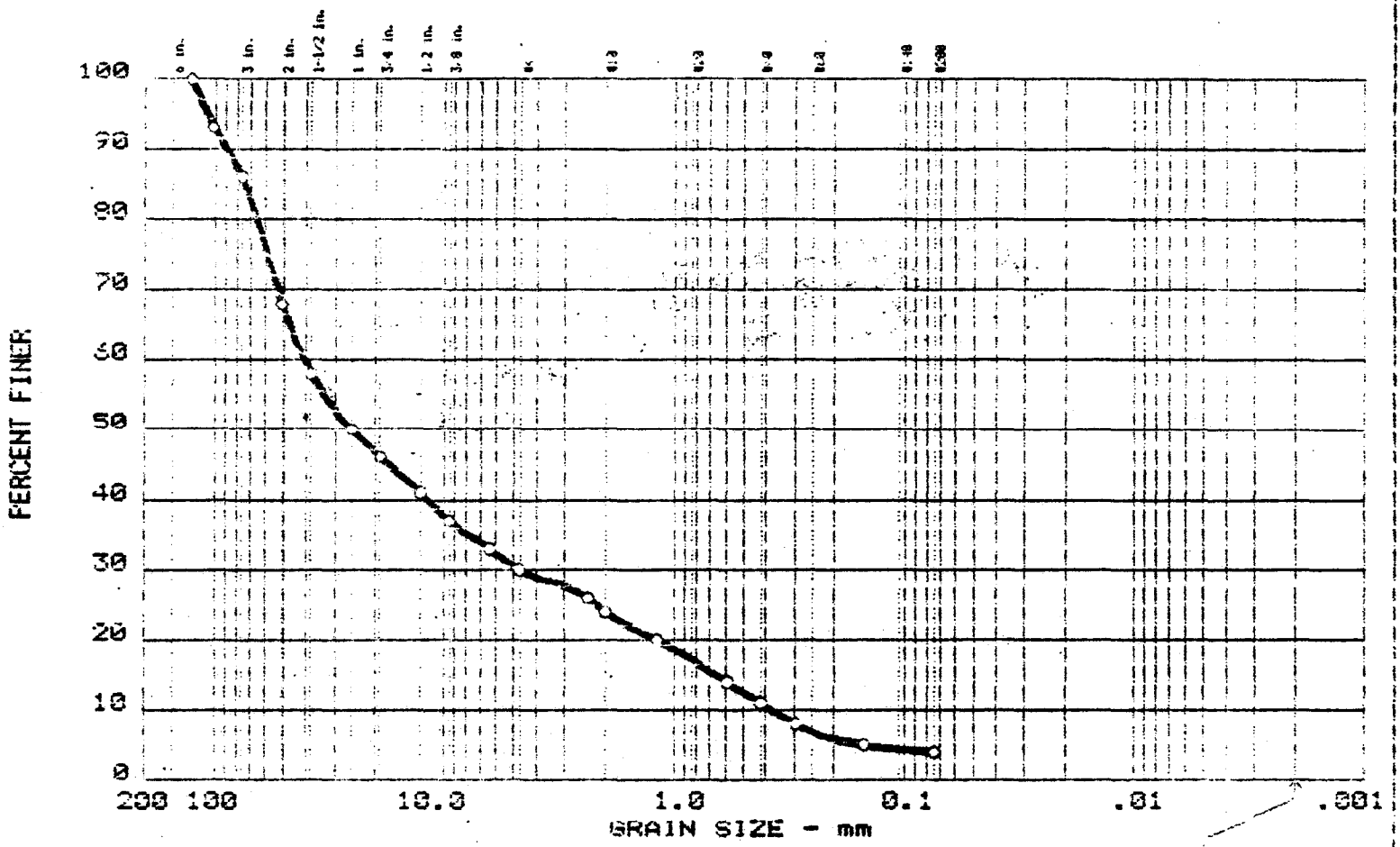
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 82

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	18	14.0	56.0	26.0	4.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			73.96	40.64	25.35	4.721	0.6516	0.3707	1.43	109.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles, trace fines	GW	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 31(11 - 12)

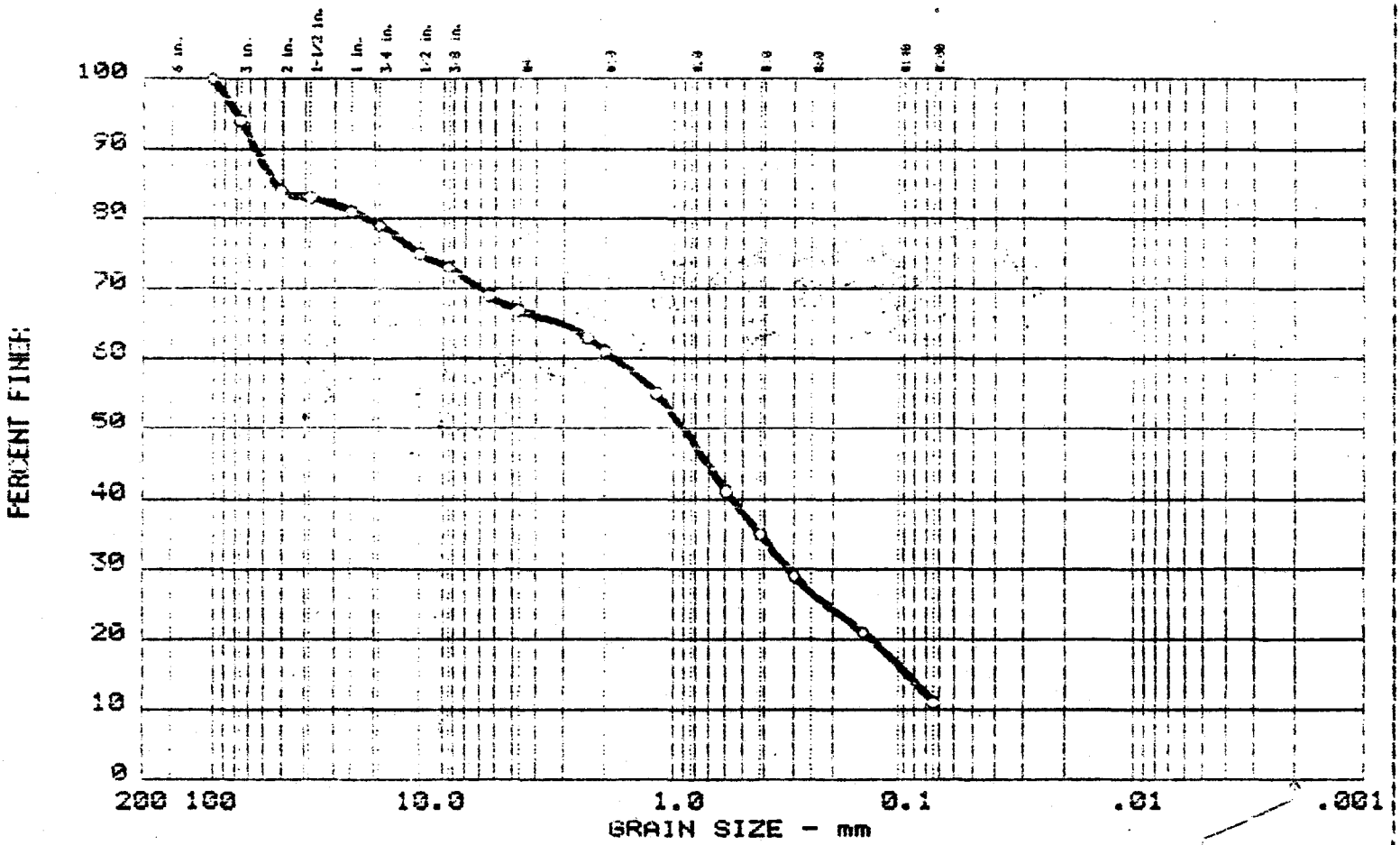
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 83

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	19	6.0	27.0	56.0	11.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			53.70	1.82	0.90	0.316	0.0955			

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines, some cobbles	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 31(22 - 23)

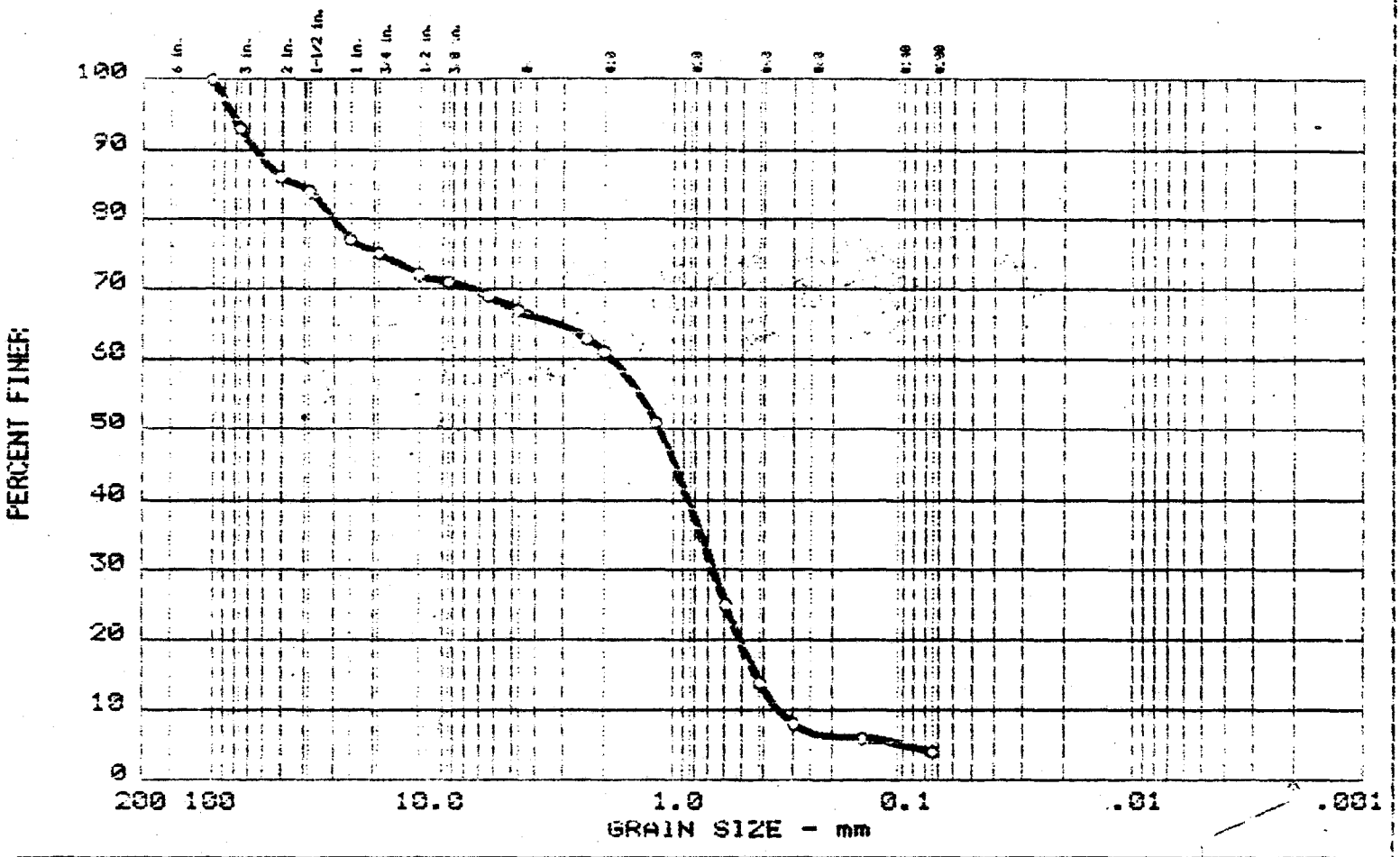
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 84

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	7.0	26.0	63.0	4.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			42.66	1.84	1.15	0.668	0.4360	0.3424	0.71	5.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some cobbles, trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 32(4 - 6)

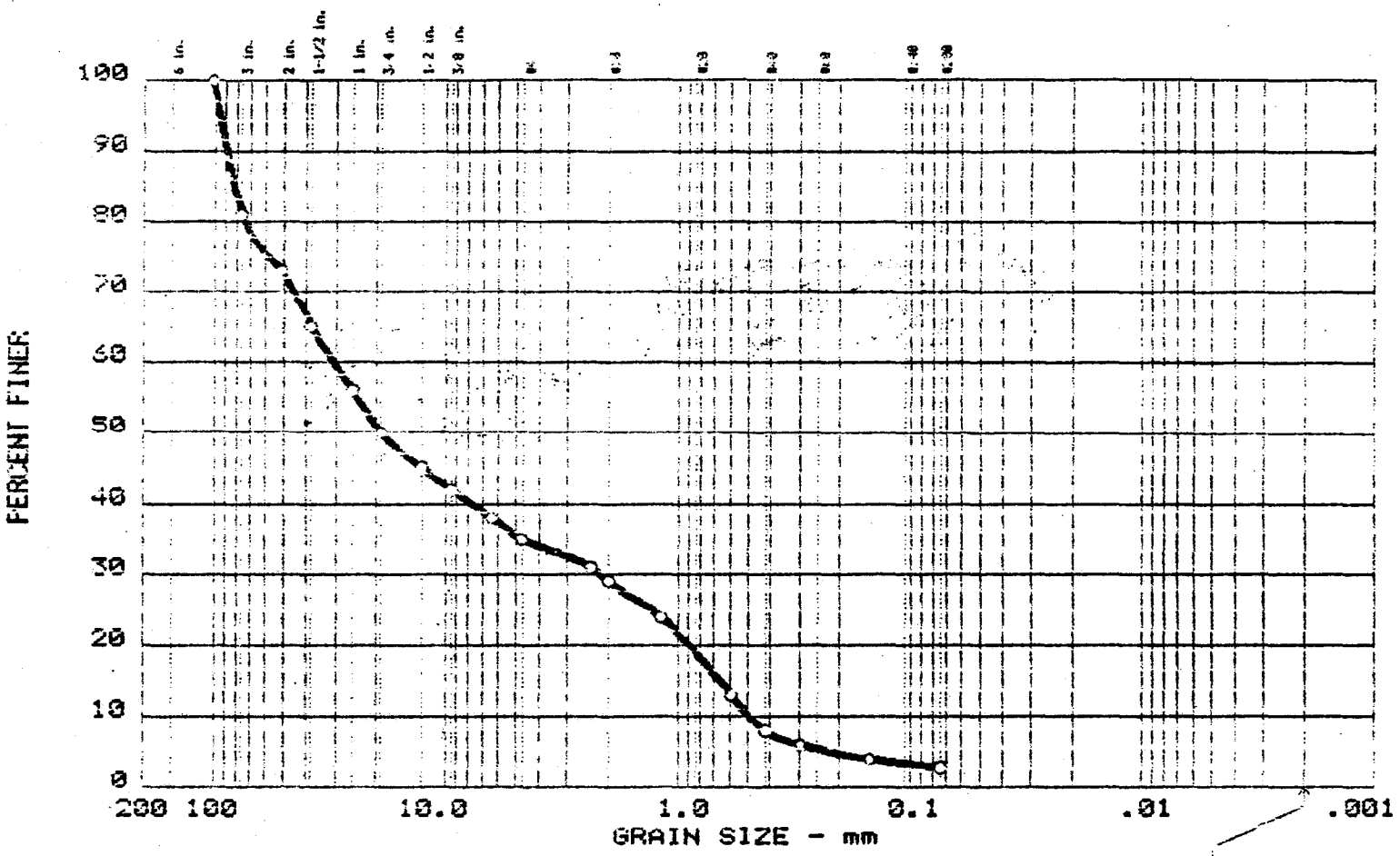
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 85

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	1	19.0	46.0	32.2	2.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			32.22	30.87	19.03	2.160	0.6599	0.4892	0.31	63.1

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 32(15 - 16)

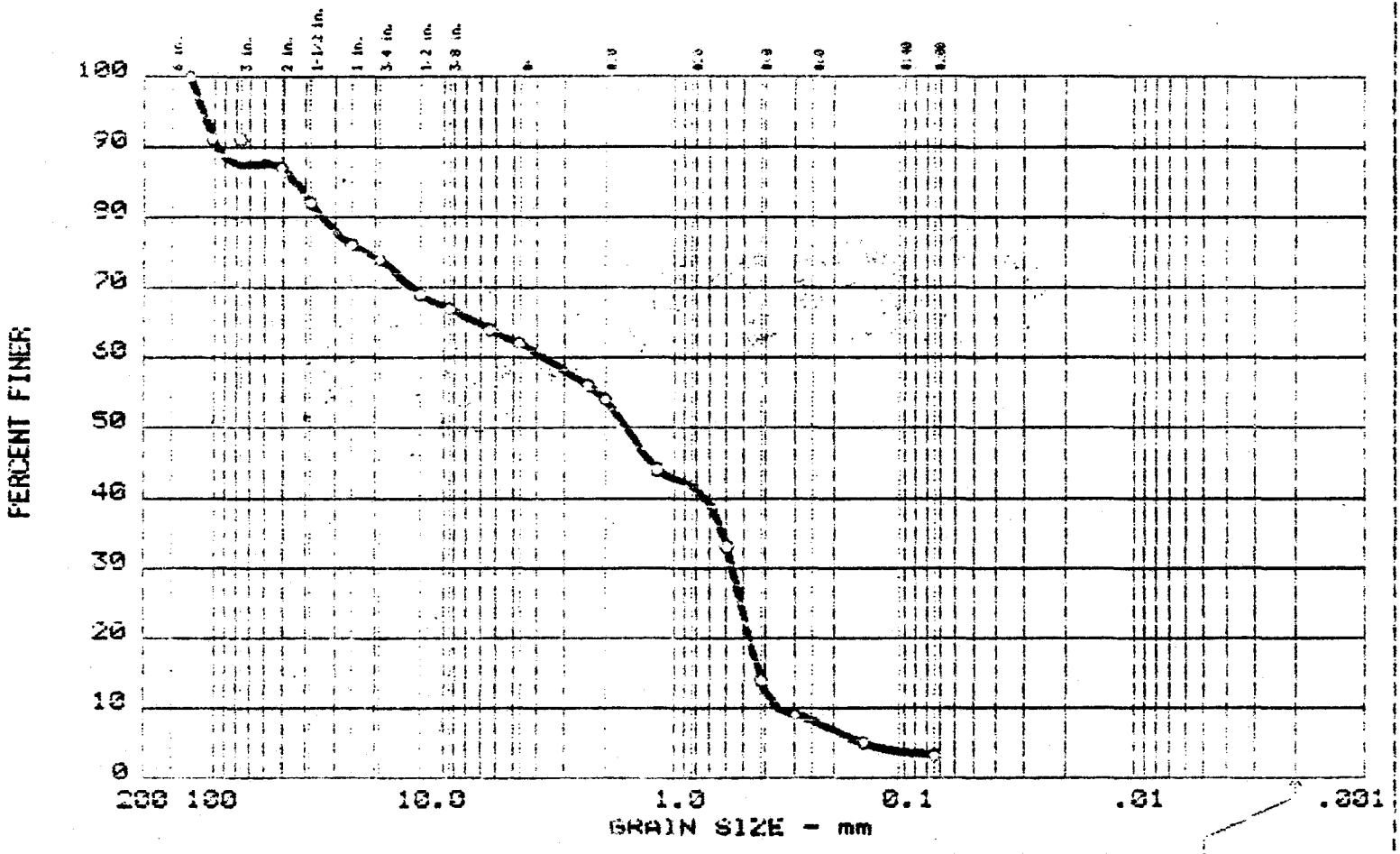
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 86

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	2	12.7	25.3	58.7	3.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			44.16	3.67	1.62	0.556	0.4295	0.3532	0.24	10.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some cobbles, trace fines	SP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 33(3 - 4)

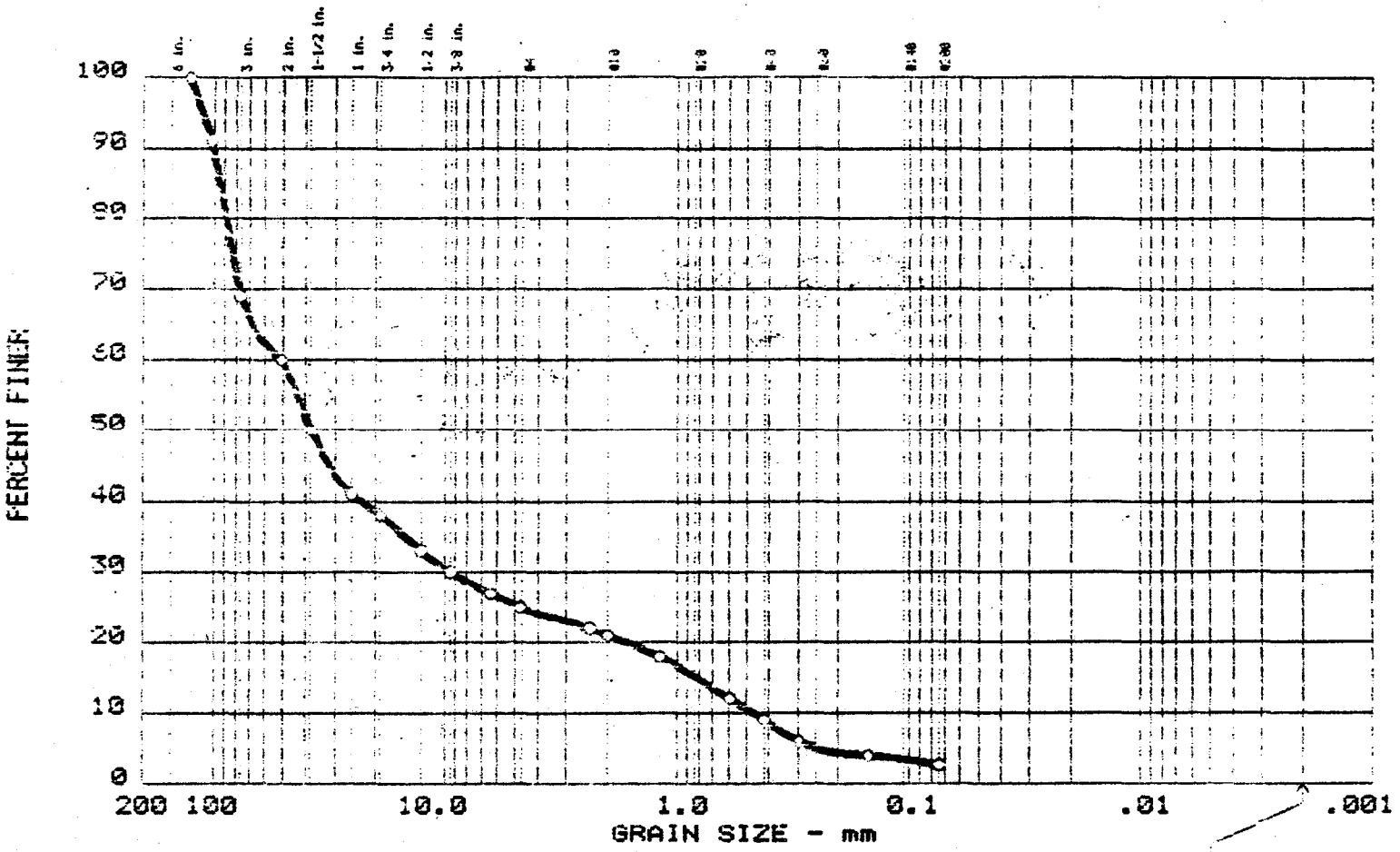
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 87

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	3	31.0	44.0	22.3	2.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			93.54	50.76	38.06	9.451	0.8138	0.4683	3.76	108.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY-COBBLEY GRAVEL; trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 33(16 - 17)

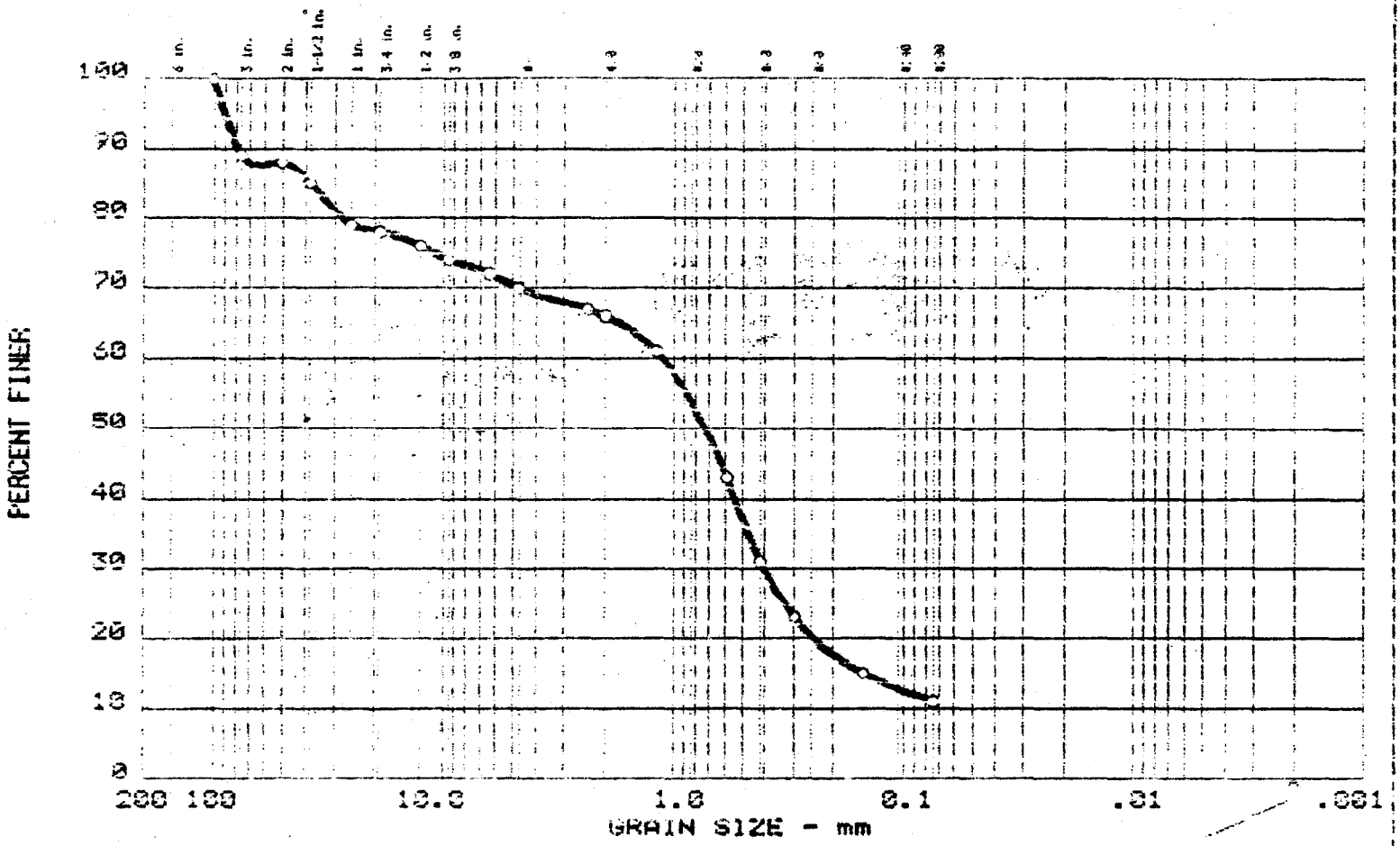
Date: 5/29/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 88

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	11.0	19.0	59.0	11.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	38.02	1.11	0.73	0.406	0.1474			

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some cobbles, some fines	SP-SM	

Project No.: 21260068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 34(8 - 1)

Date: 5/30/88

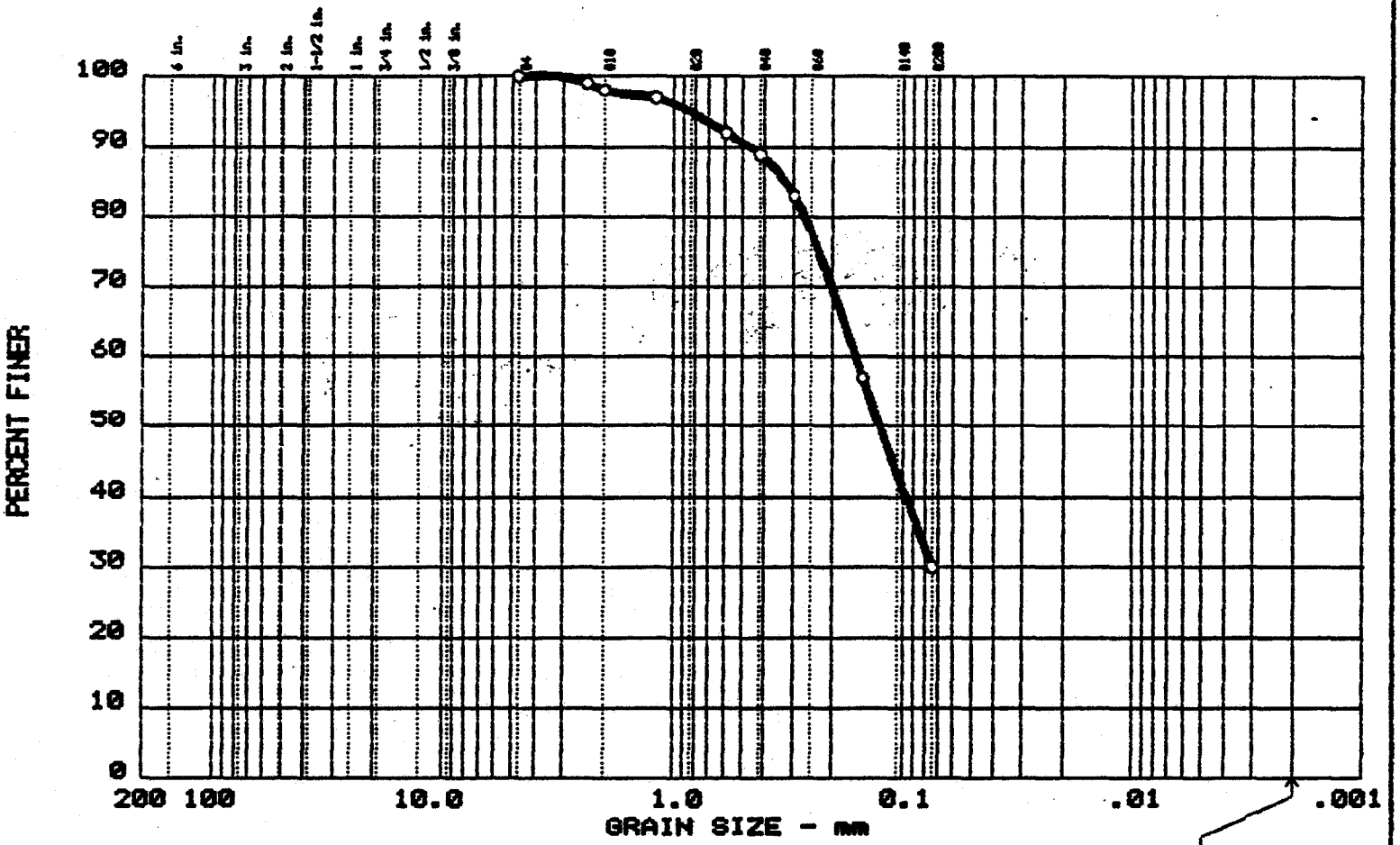
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 89

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	0.0	0.0	70.0	30.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.32	0.16	0.13					

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILTY SAND	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 34(4 - 5)

Date: 6/14/88

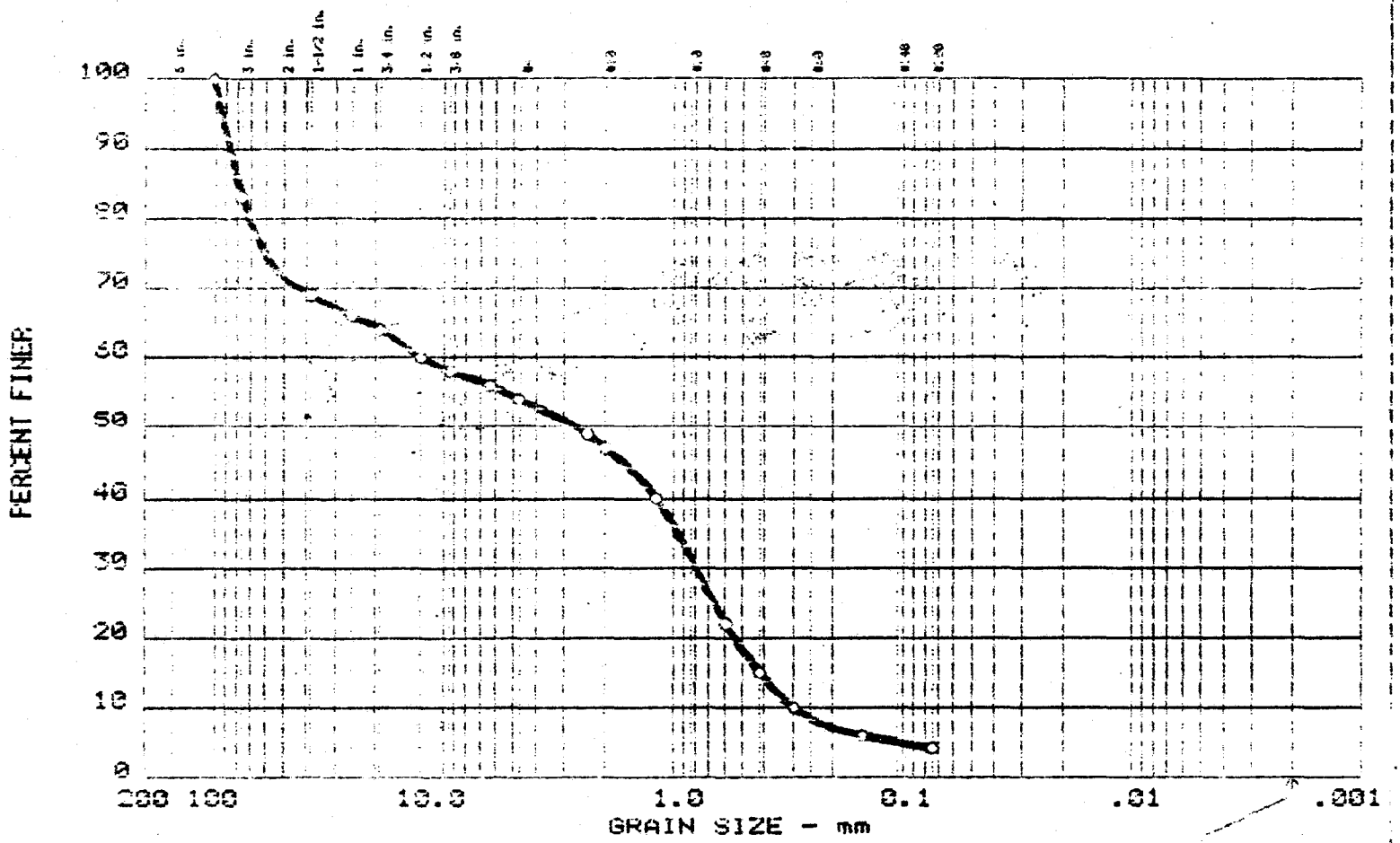
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 90

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	17.0	29.0	49.8	4.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	79.25	12.56	2.62	0.793	0.4159	0.2944	0.17	42.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; with cobbles, trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 34(7 - 8)

Date: 5/30/88

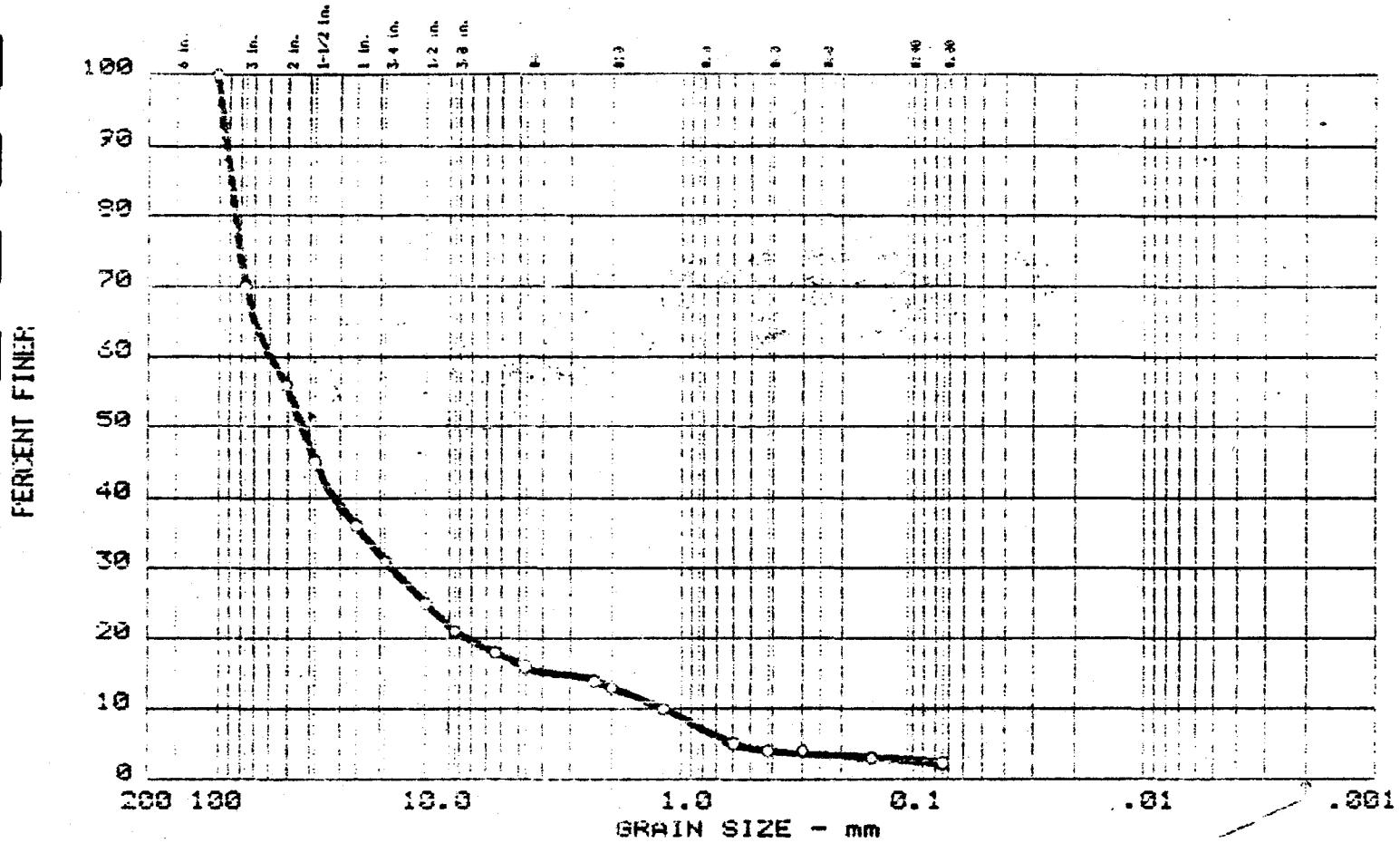
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 91

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	18	30.0	54.0	13.8	2.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			89.33	59.70	43.25	17.824	3.3574	1.1776	4.52	50.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; with cobbles, with sand; trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 34(11 - 12)

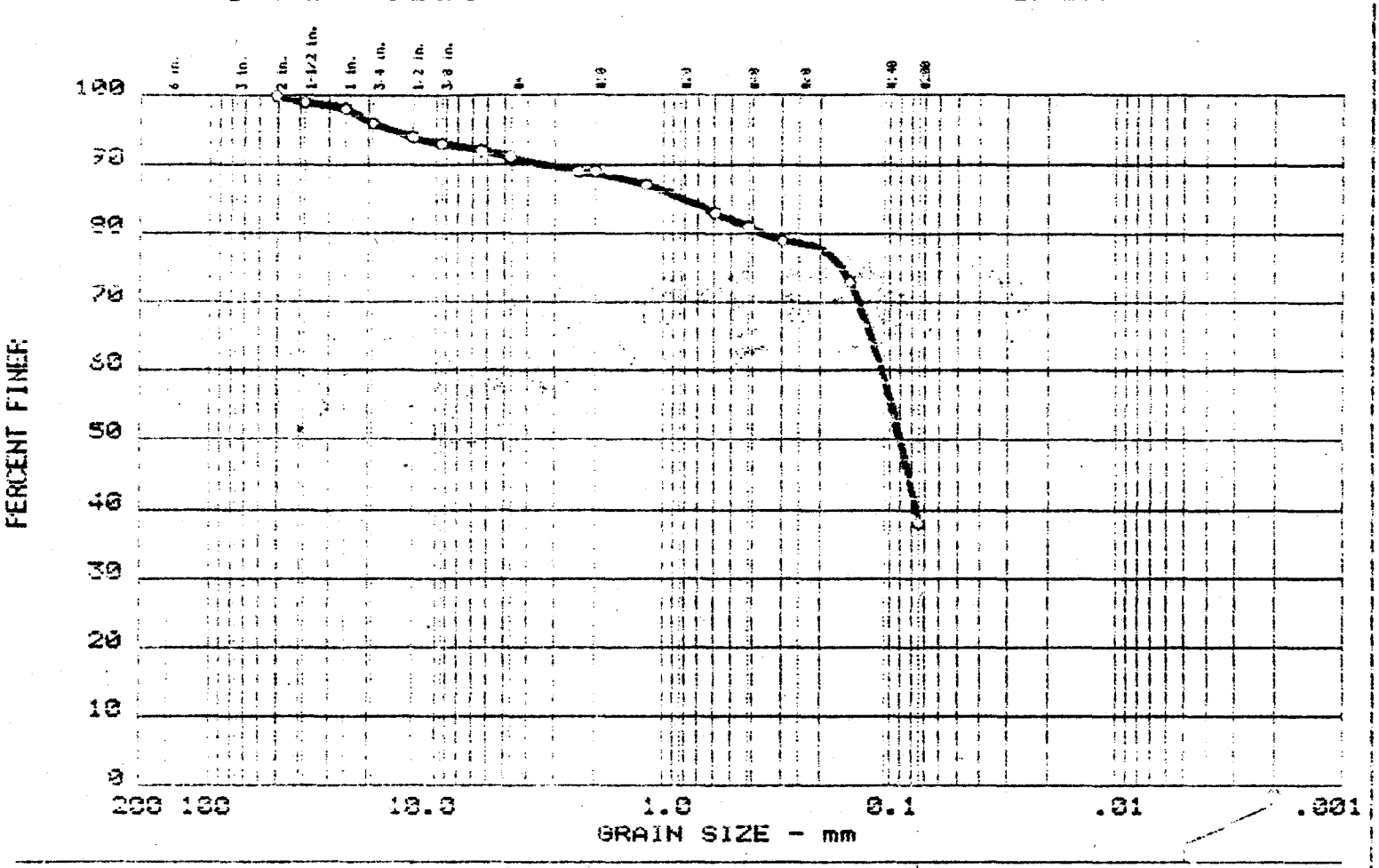
Date: 5/30/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 92

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	19	0.0	9.0	53.0	38.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.81	0.11	0.09					

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILTY SAND; some gravel	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-1W (0 - 2)

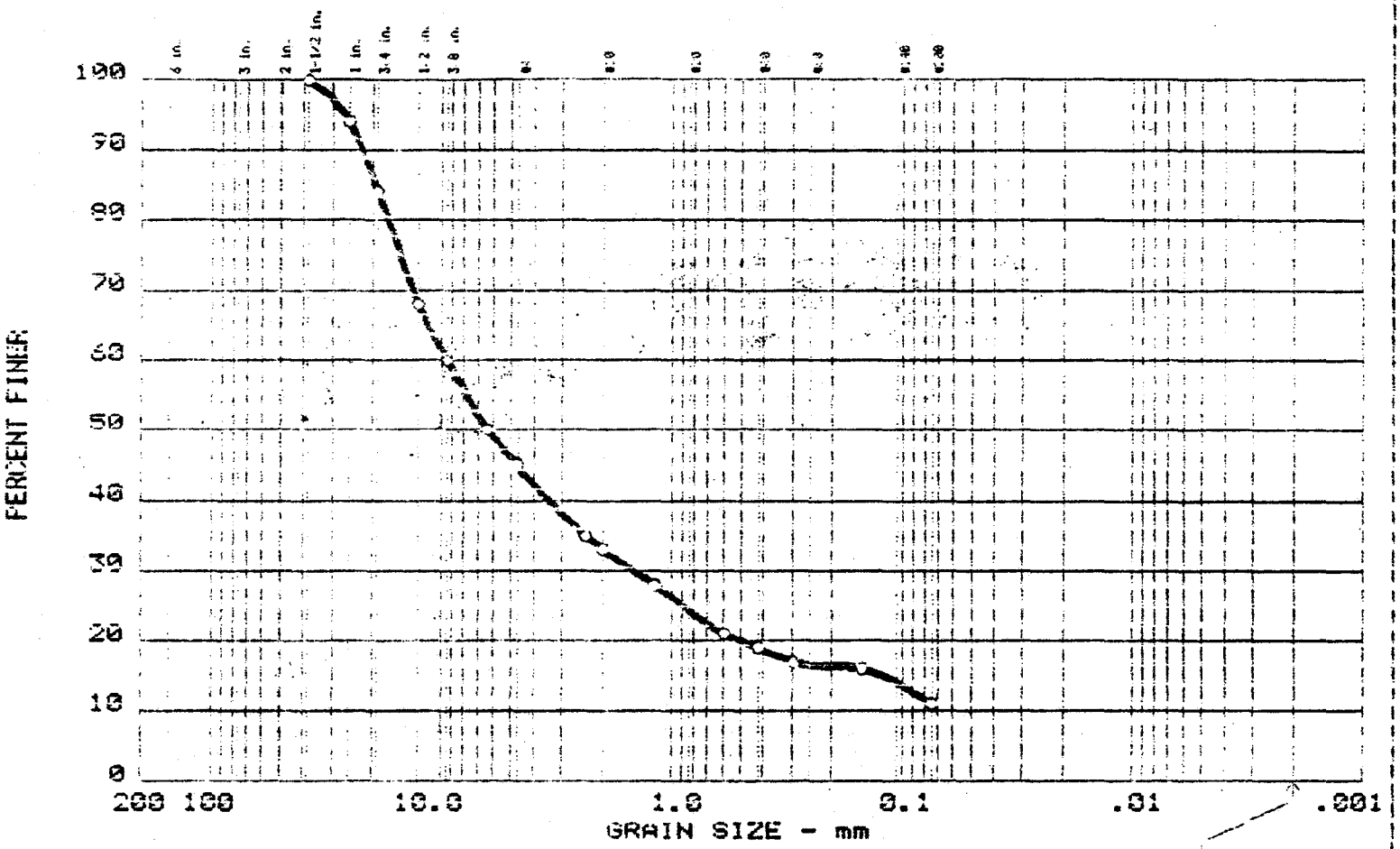
Date: 5/30/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	0.0	55.0	34.0	11.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	19.50	9.52	6.35	1.454	0.1182			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some fines	GP-GM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B -1W (3 - 10)

Date: 5/30/88

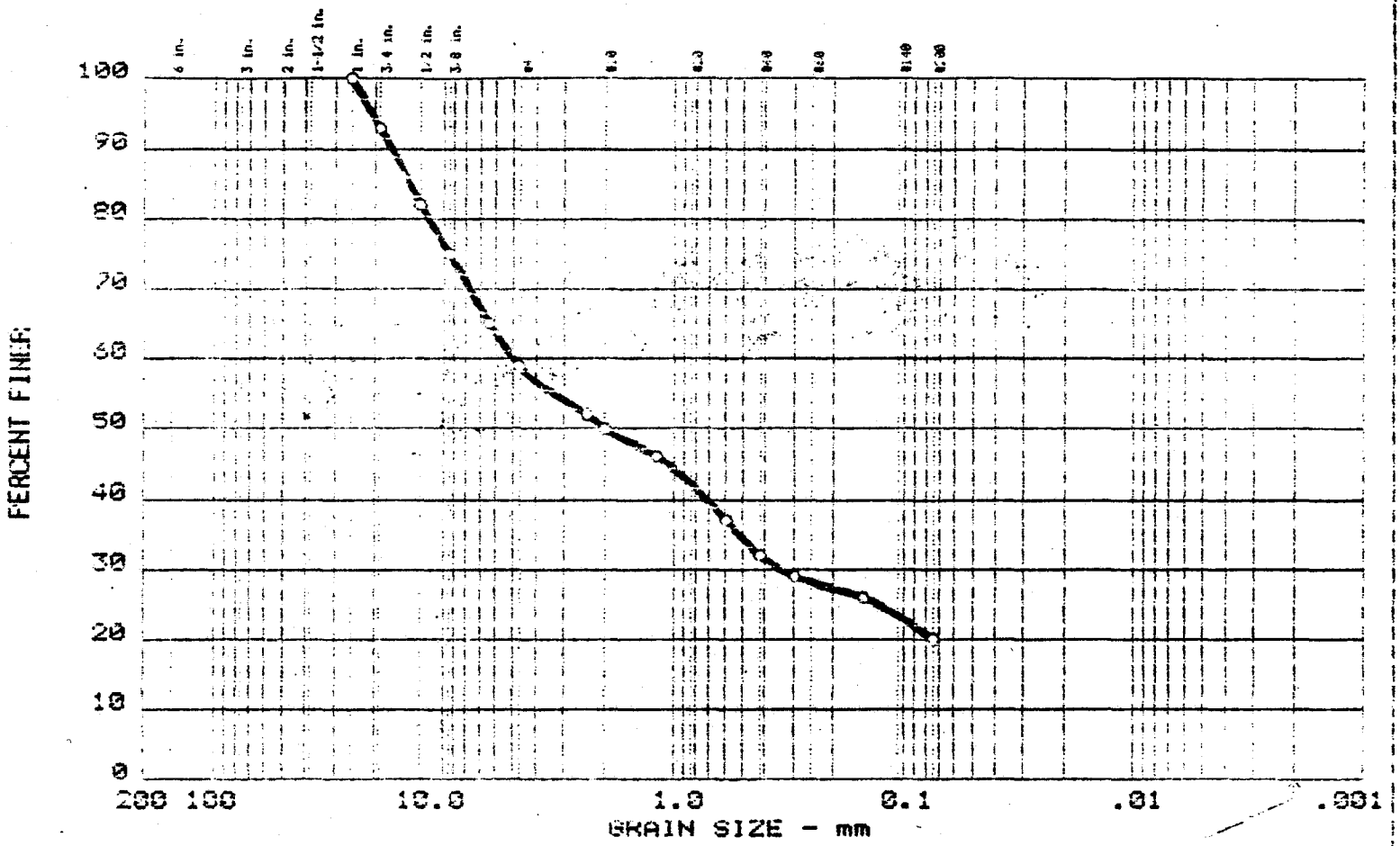
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 94

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	1	0.0	41.0	39.0	20.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	27	10	14.13	5.01	2.00	0.343				

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVEL; with fines	GC	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B -1W (20 - 22)

Date: 5/30/88

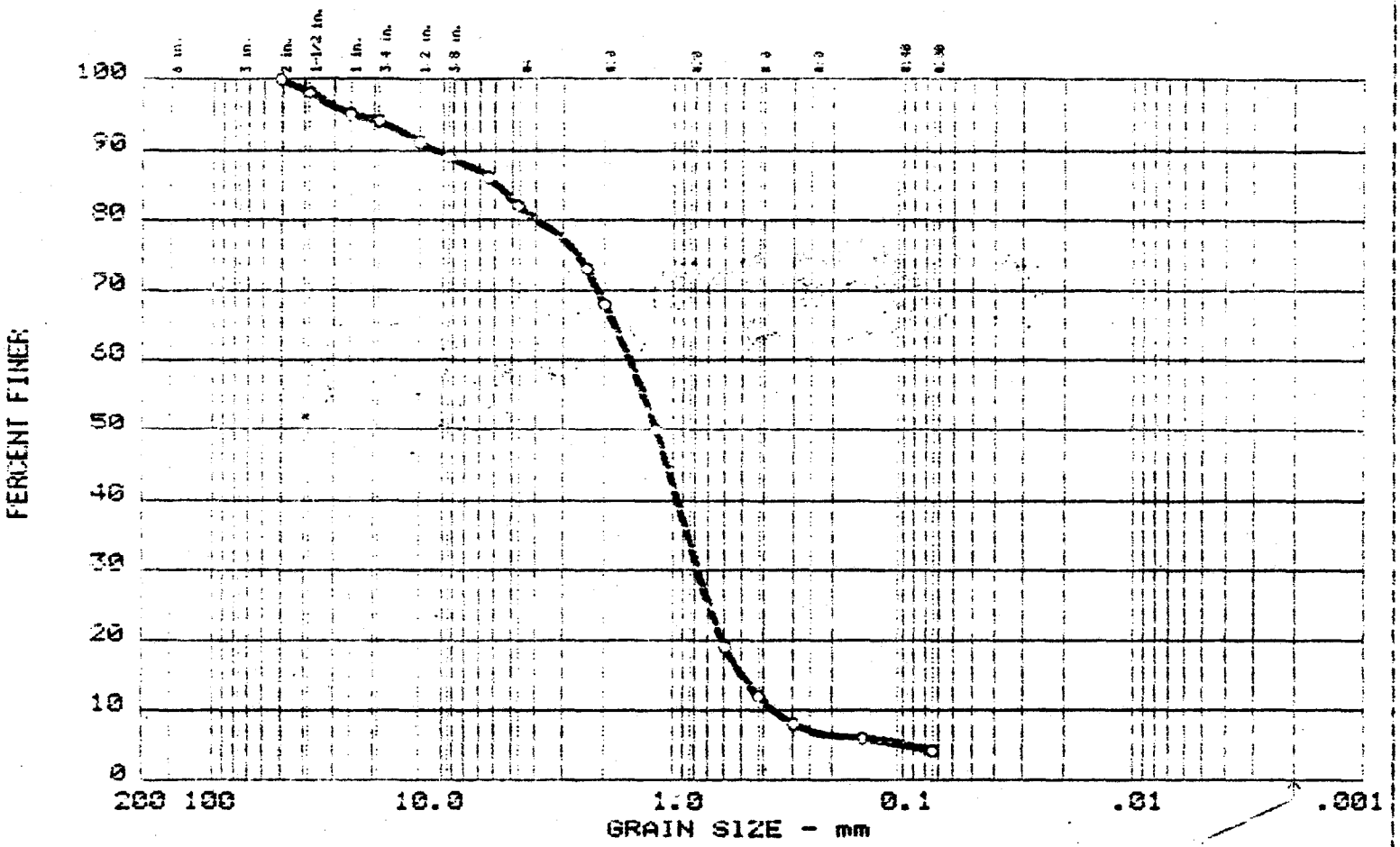
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 95

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	2	0.0	18.0	77.8	4.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	5.82	1.55	1.19	0.776	0.5012	0.3589	1.08	4.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, trace fines	SP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-3W (0 - 6)

Date: 5/30/88

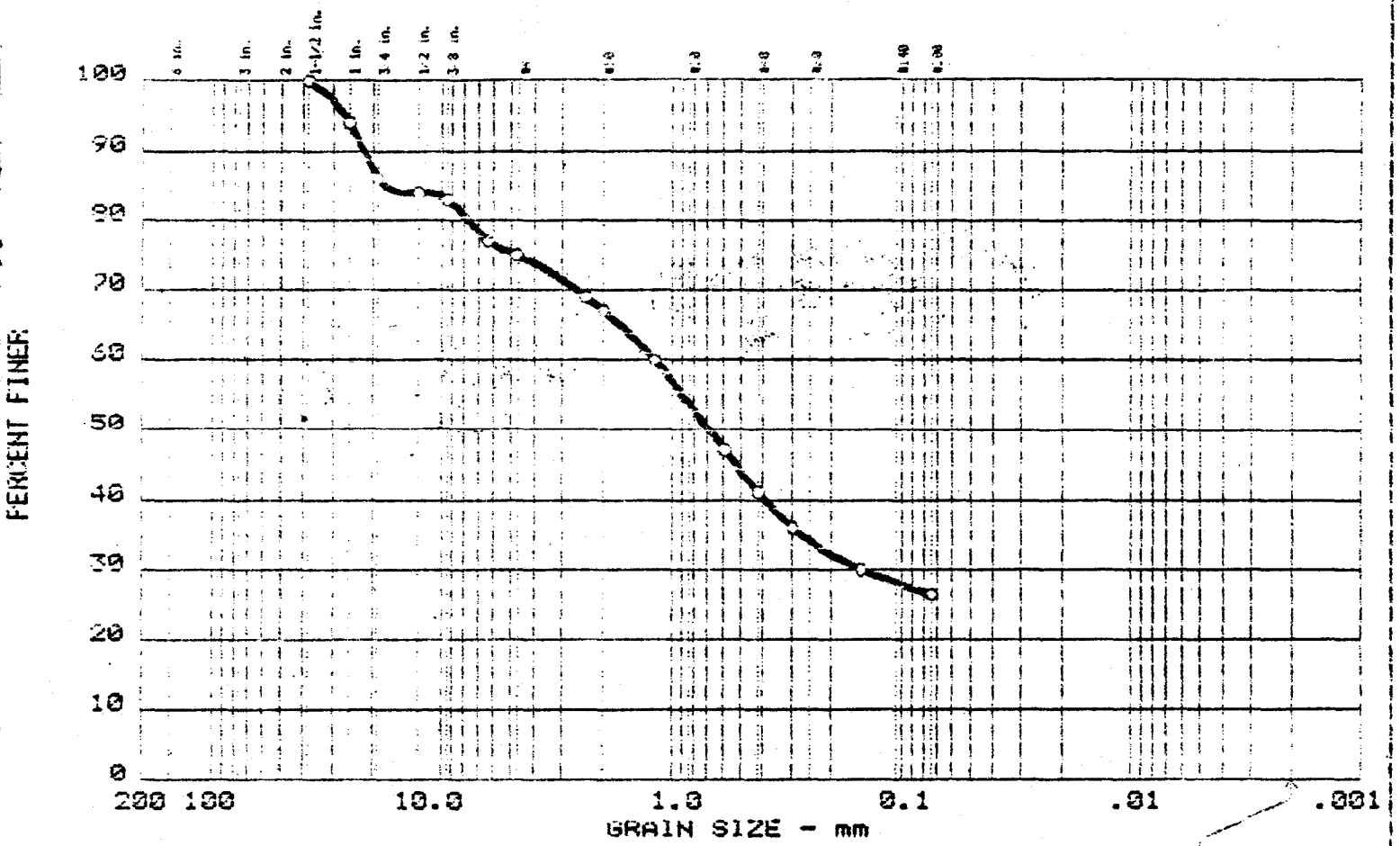
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 96

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	4	0.0	25.0	48.5	26.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	36	17	17.78	1.19	0.68	0.148				

MATERIAL DESCRIPTION	USCS	AASHTO
○ CLAYEY SAND; with gravel	SC	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B -19W (2 - 3.5)

Date: 5/30/88

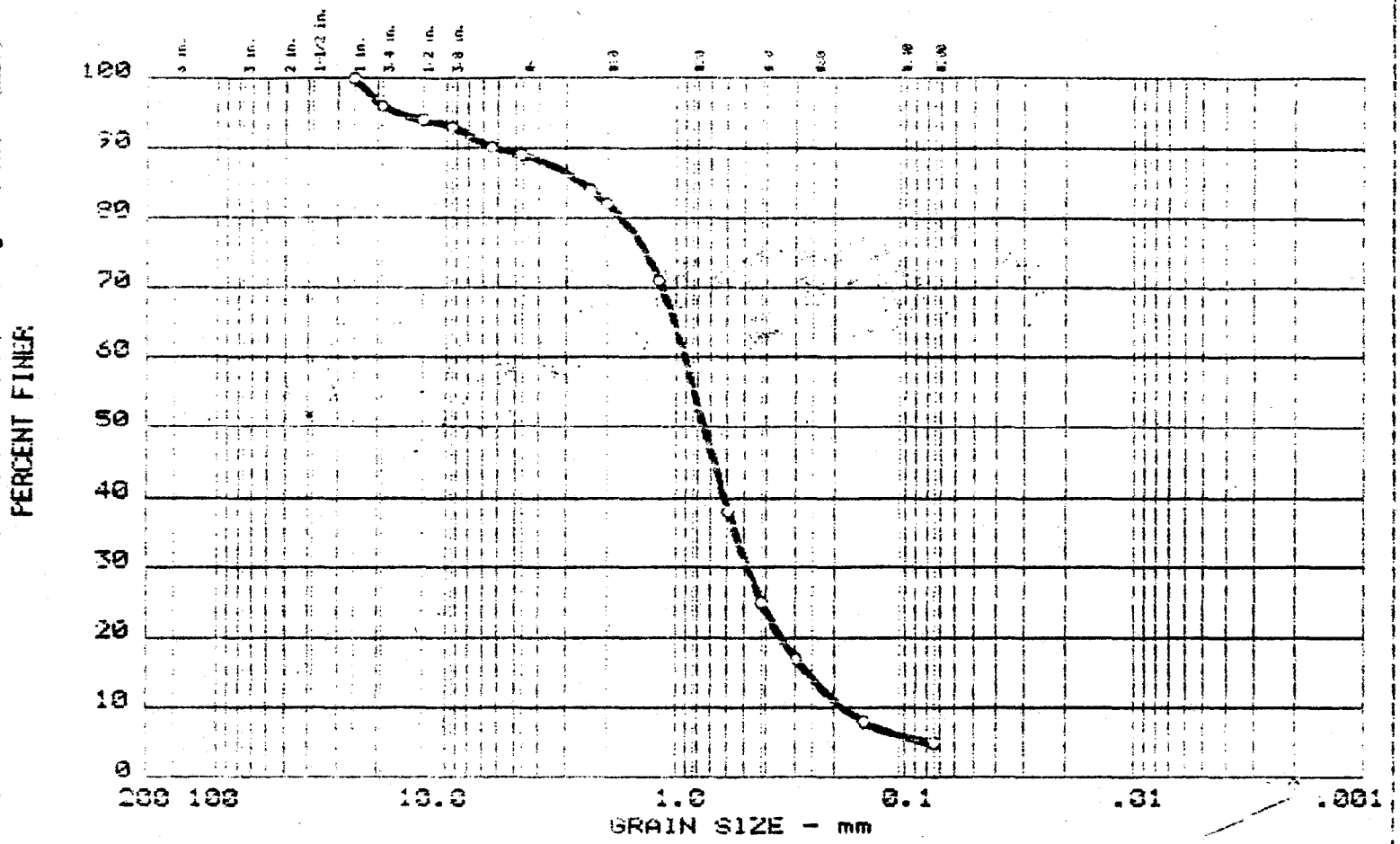
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 98

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	5	0.0	11.0	84.1	4.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.60	0.92	0.75	0.486	0.2639	0.1826	1.41	5.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some gravel, trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-21W (4 - 5.5)

Date: 5/30/88

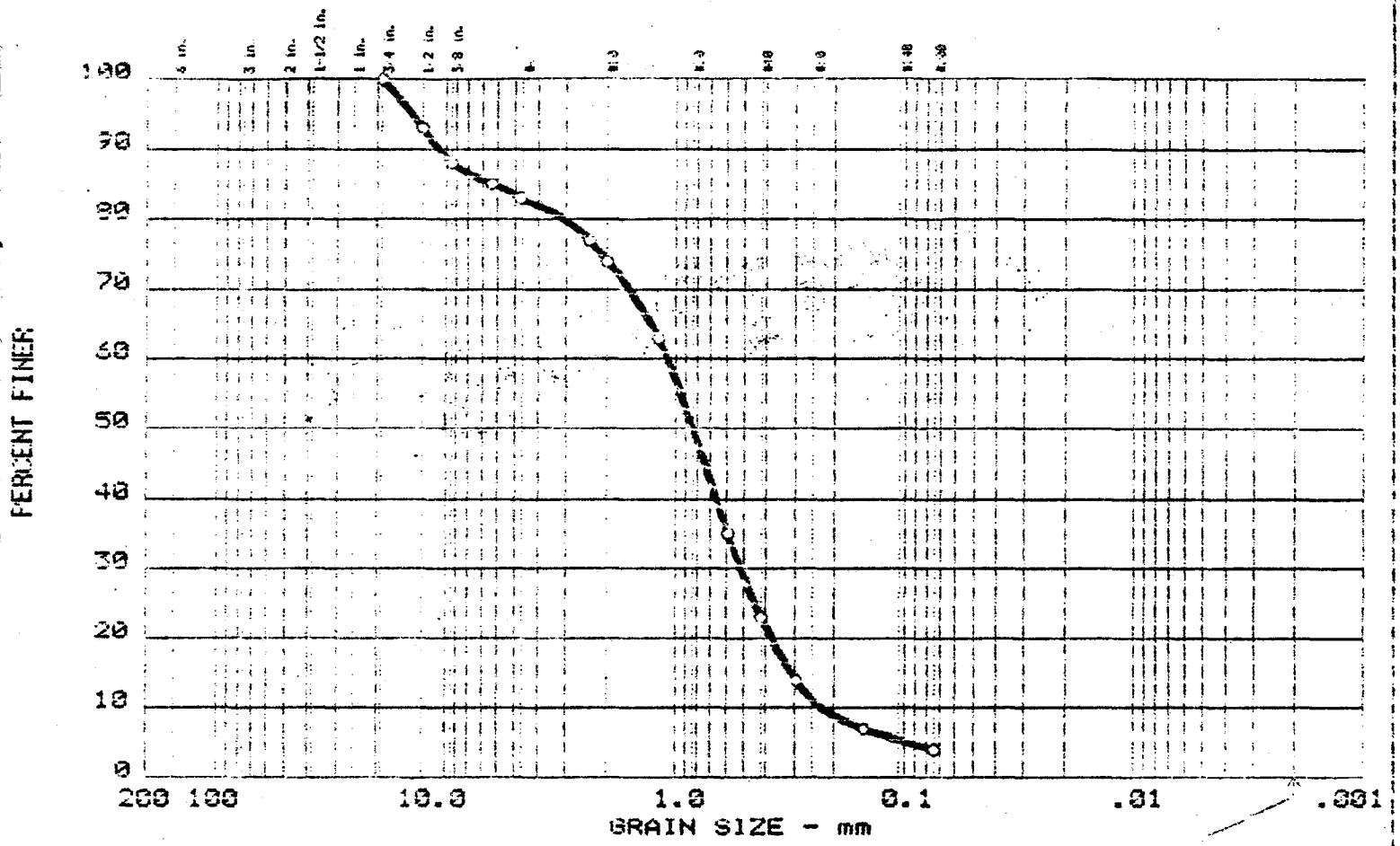
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 99

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	6	0.0	17.0	79.0	4.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			6.31	1.08	0.84	0.517	0.3115	0.2257	1.09	4.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-23W (4 - 5.5)

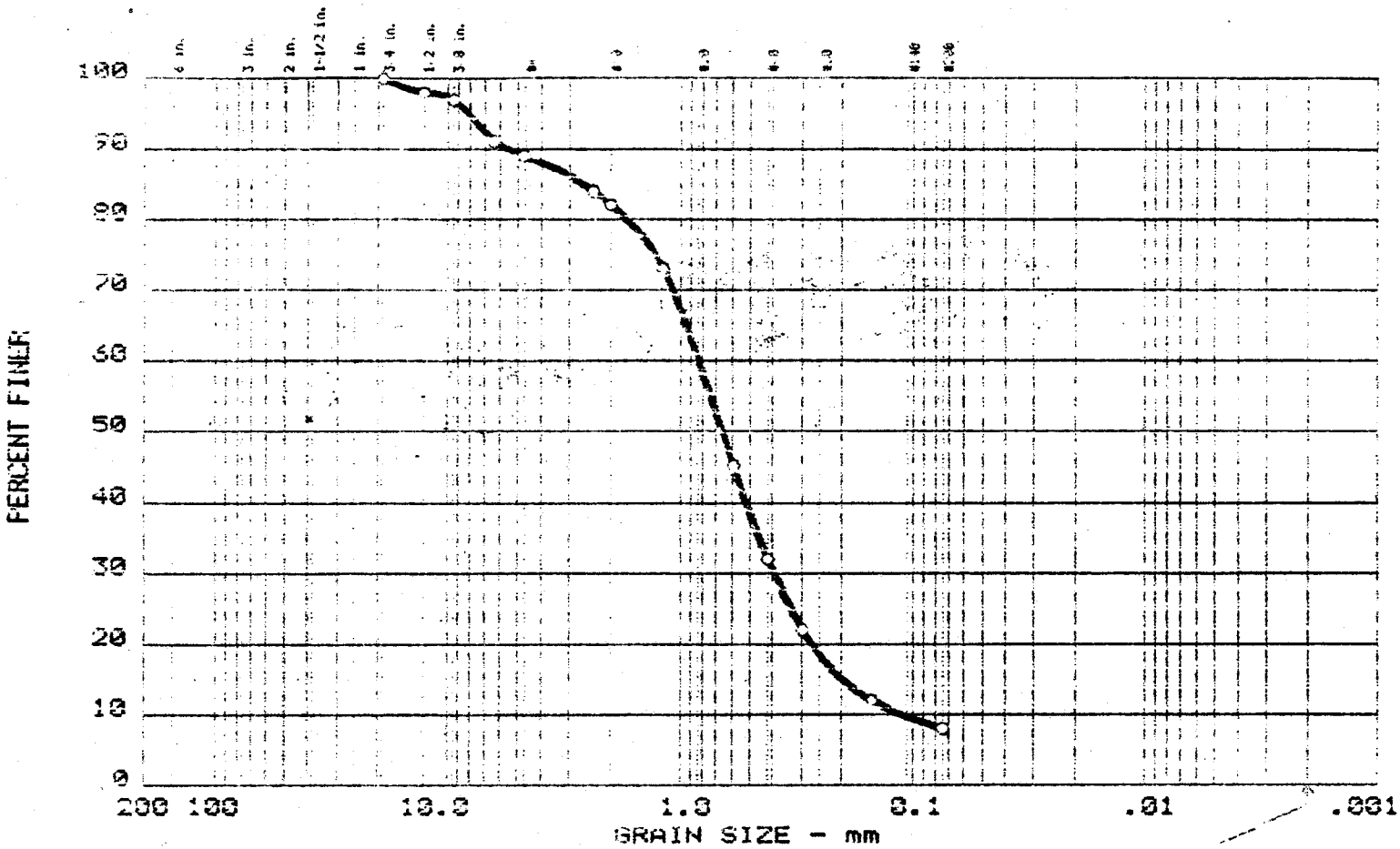
Date: 5/30/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 100

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	7	0.0	11.0	81.0	8.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.60	0.83	0.66	0.394	0.1995	0.1189	1.68	7.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some gravel, some fines	SW-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-24W (2 - 3)

Date: 5/30/88

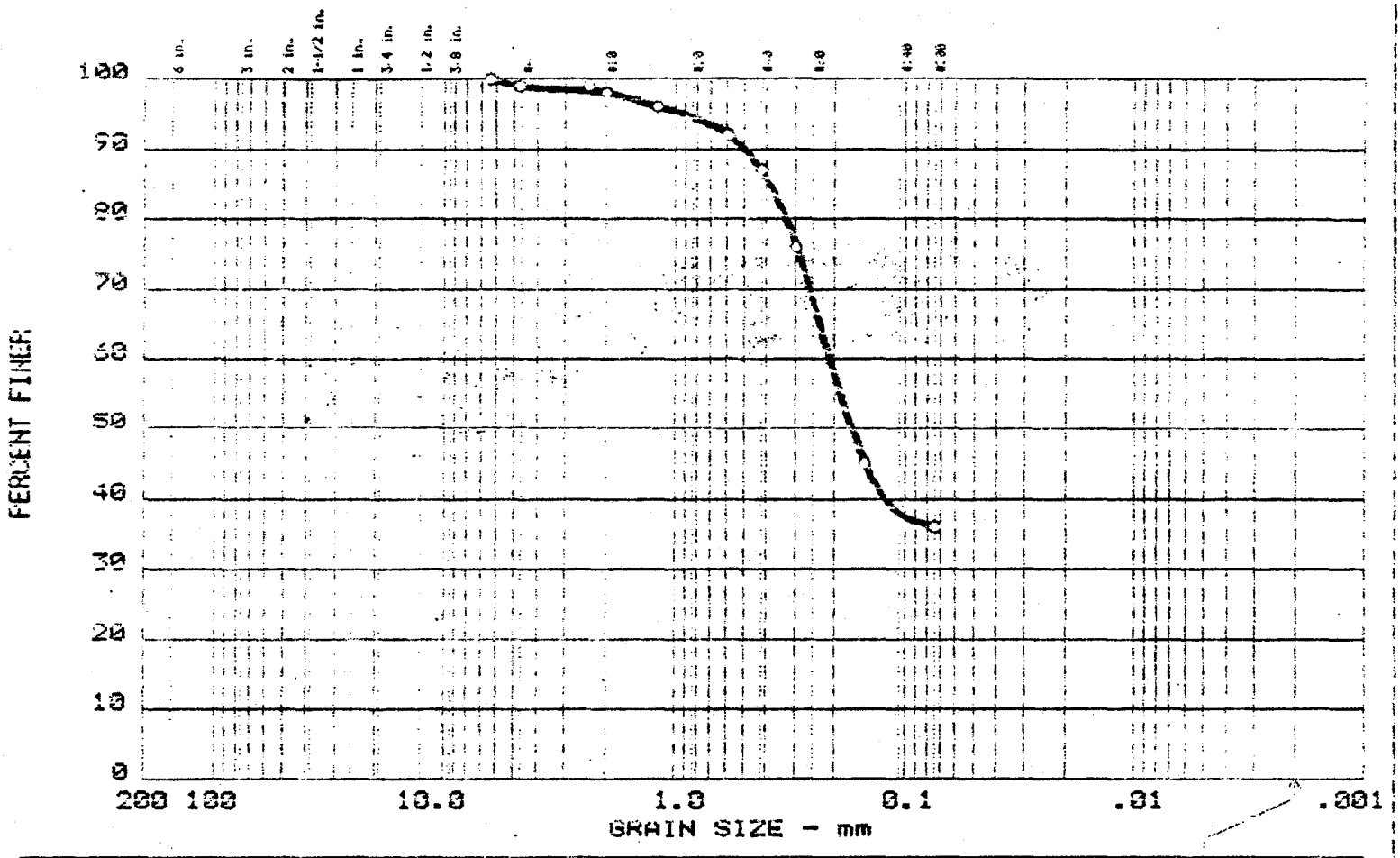
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 101

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	8	0.0	1.0	63.0	36.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.38	0.21	0.17					

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILTY; trace gravel	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-25W (4 - 5.5)

Date: 5/30/88

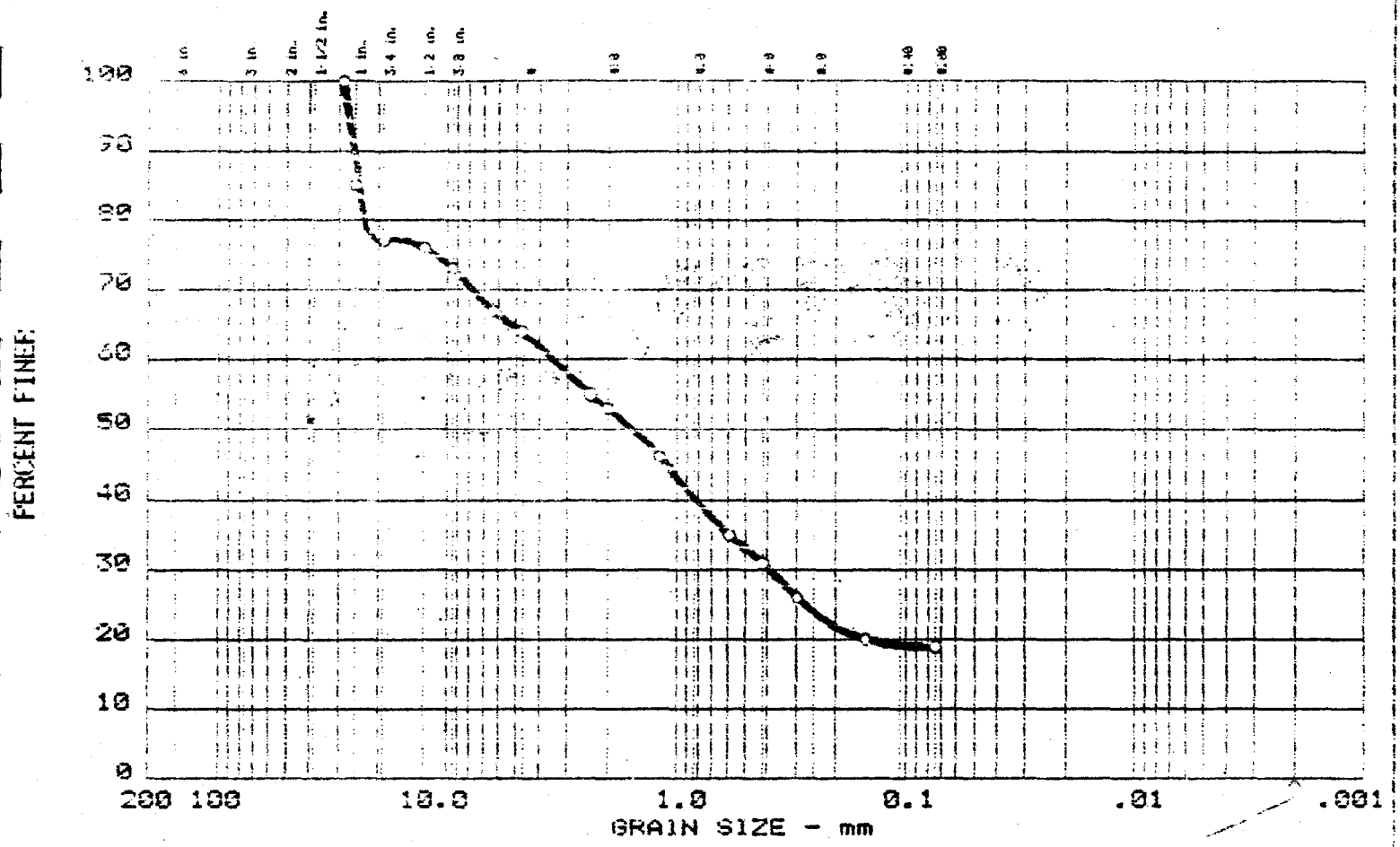
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 102

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	0.0	36.0	45.1	18.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			25.38	3.42	1.56	0.389				

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; with clay	SC	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B-26W (4 - 5.5)

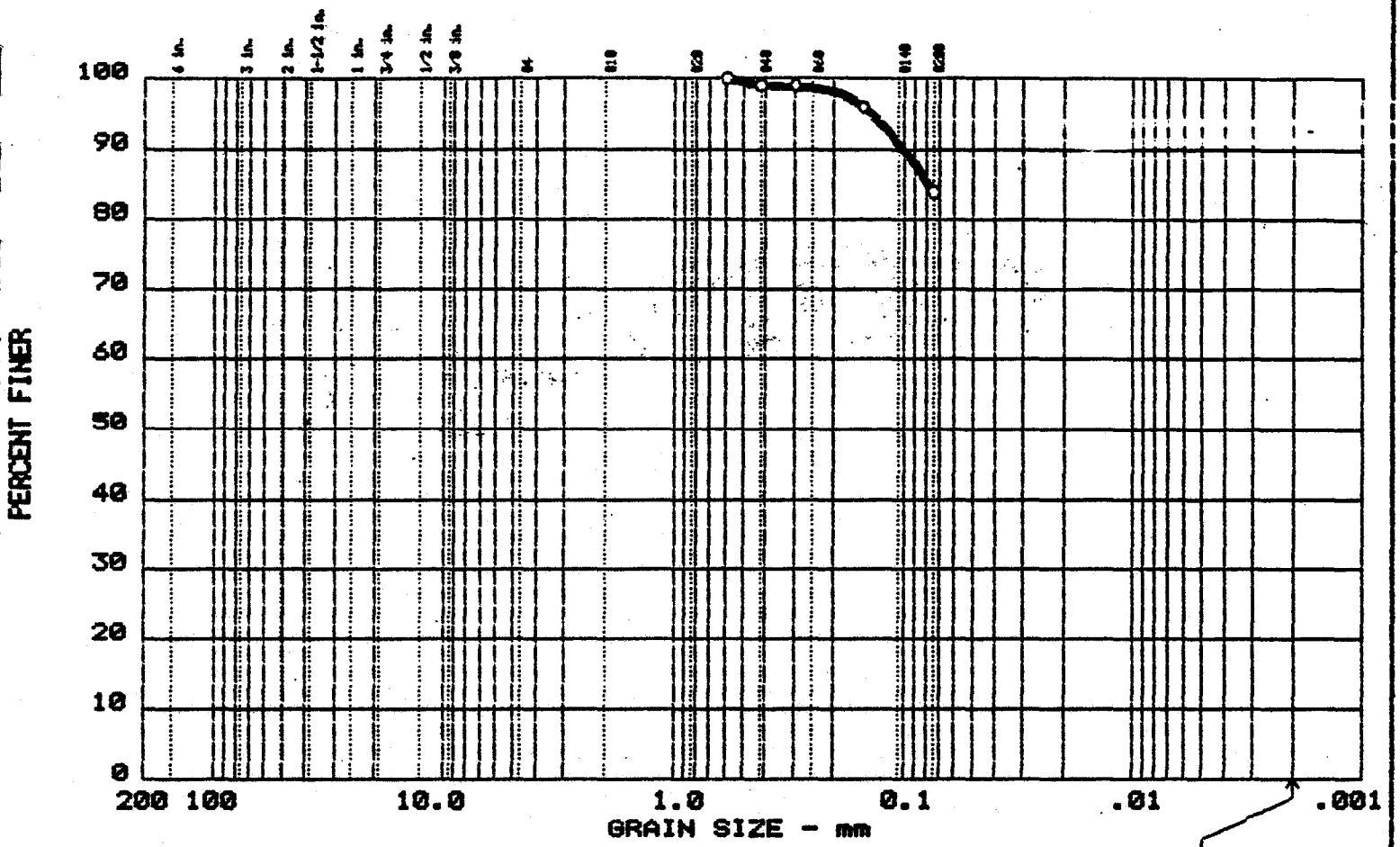
Date: 5/30/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 103

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
o	19	0.0	0.0	16.0	84.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o	26	4	0.08							

MATERIAL DESCRIPTION	USCS	AASHTO
o CLAY AND SILT; with sand	ML	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
o Location: B -31W.(2 - 3)

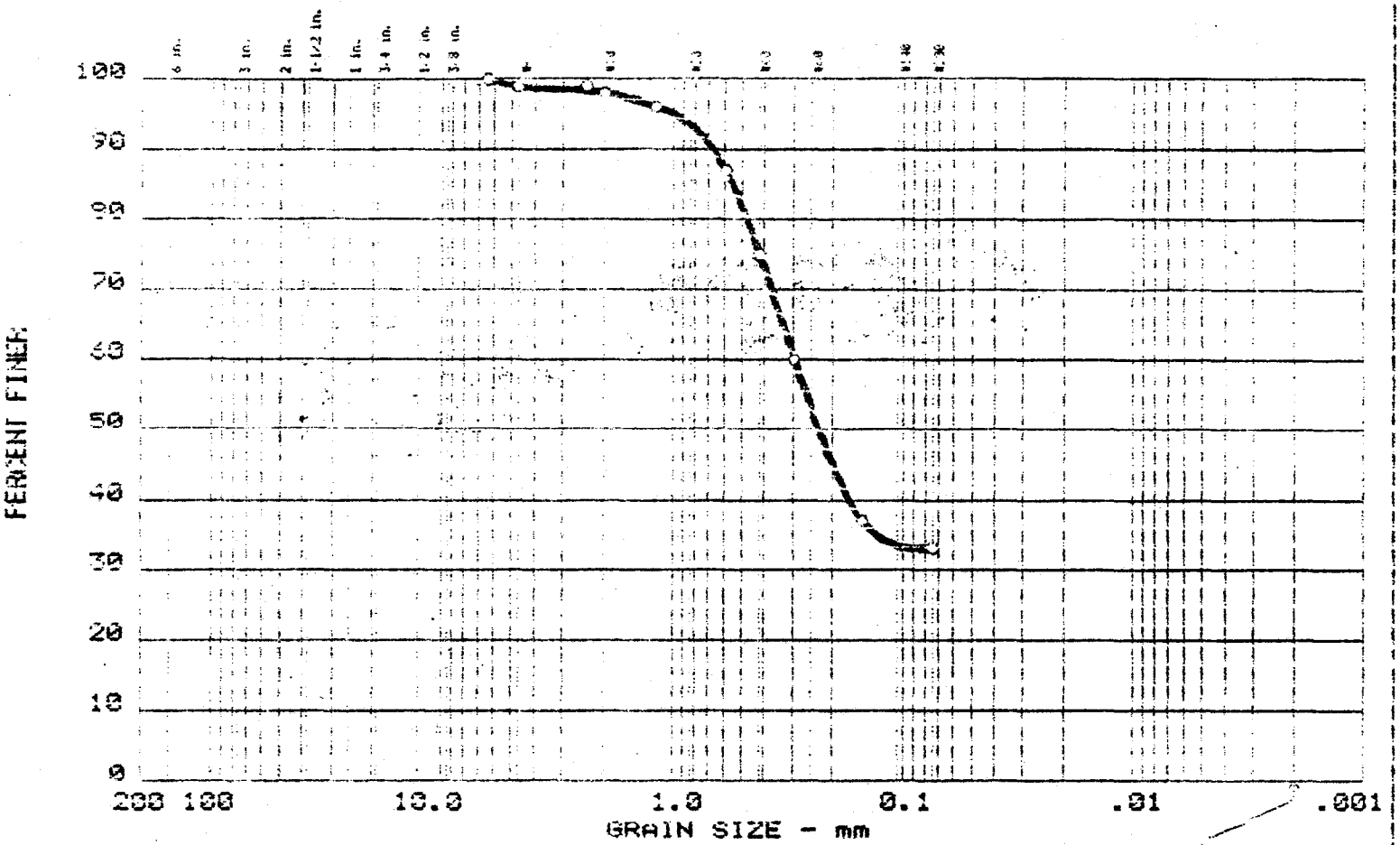
Date: 6/14/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 104

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	0.0	1.0	66.0	33.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.55	0.30	0.23					

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILTY-CLAYEY SAND; trace gravel	SC-SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B -31W (5 - 6)

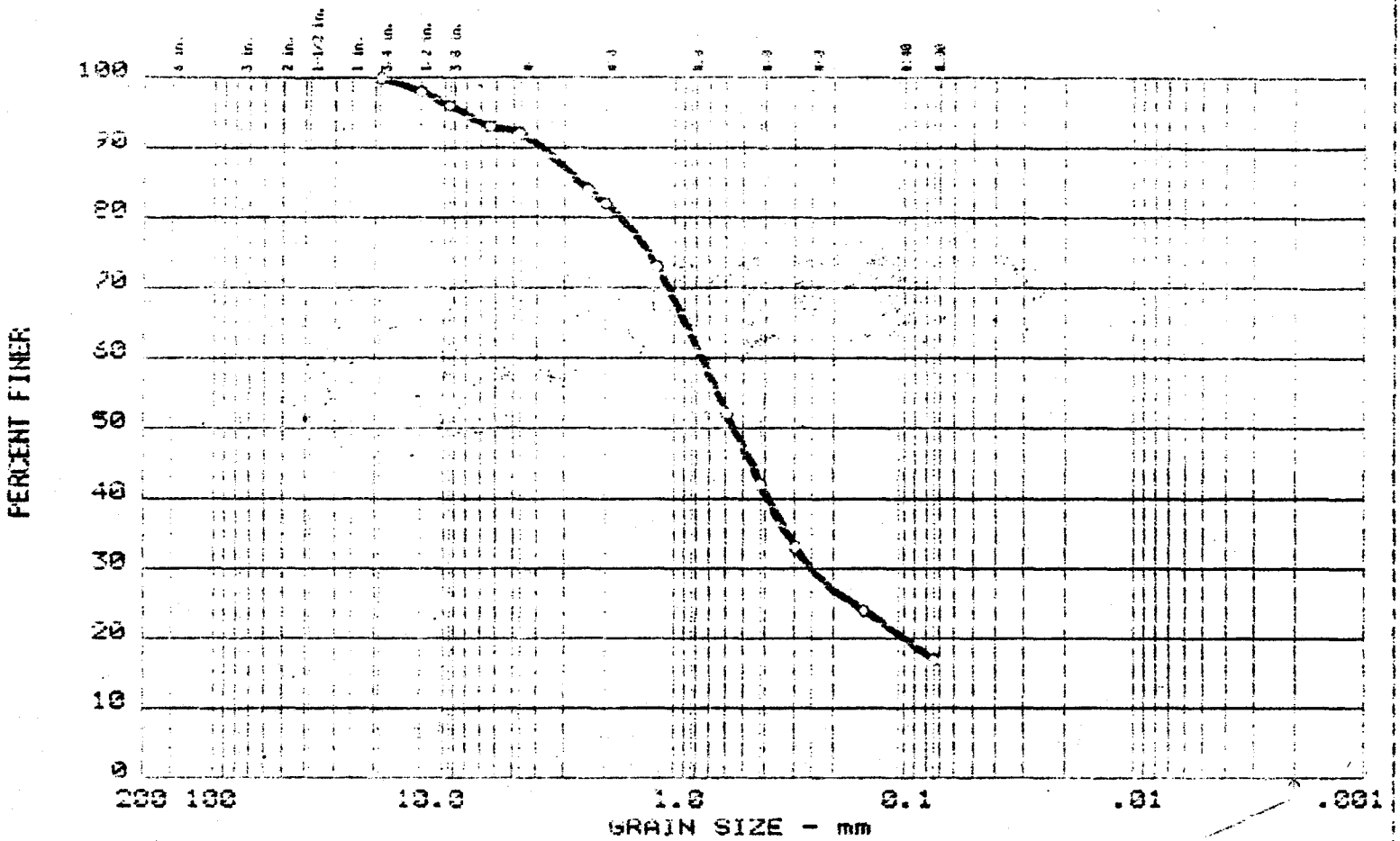
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 105

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	15	0.0	8.0	75.0	17.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.57	0.76	0.55	0.251				

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with silt, some gravel	SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: 3 - 3E(2 - 3.5)

Date: 5/31/88

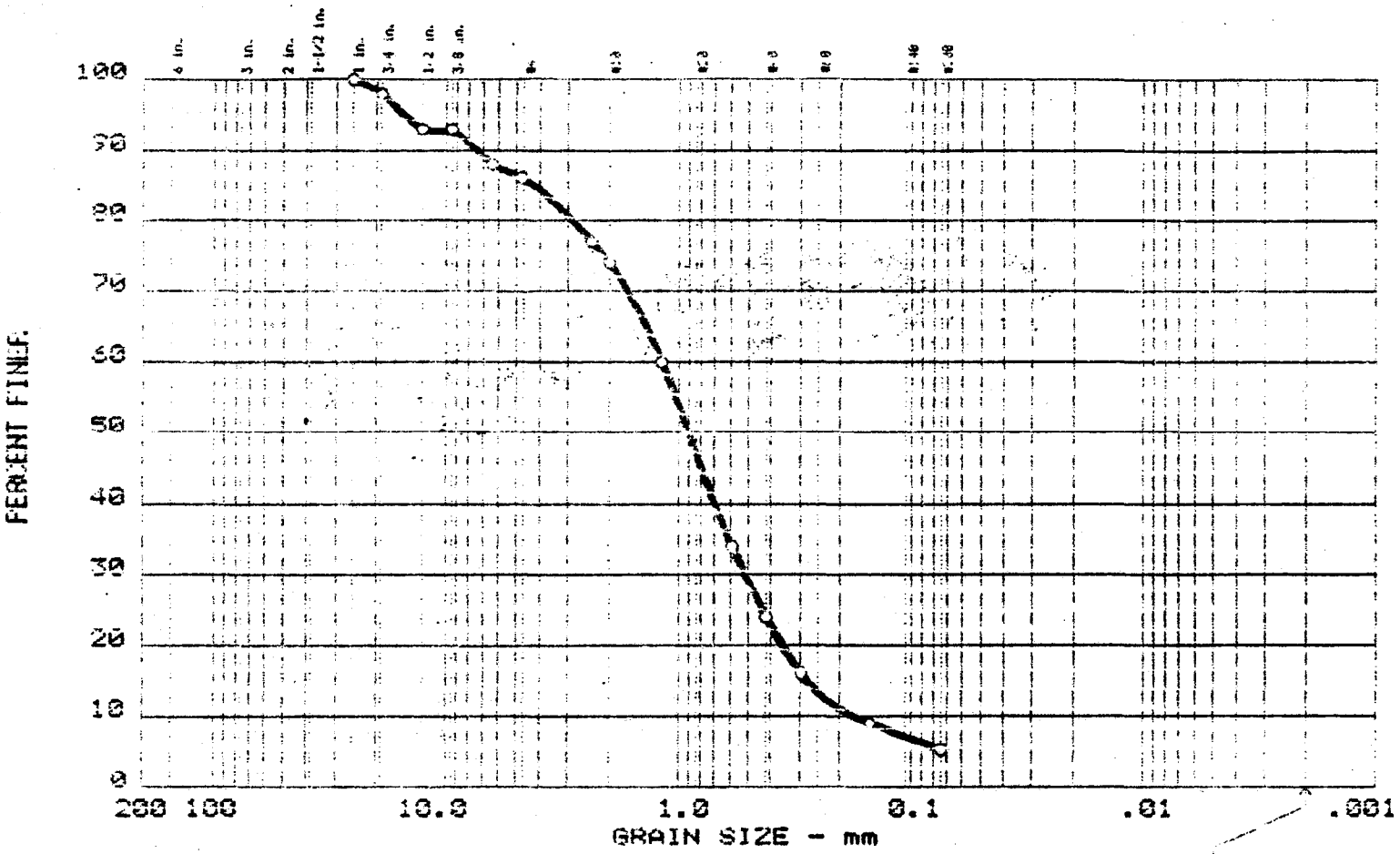
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

FIG. No. 106

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	16	0.0	14.0	80.7	5.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.22	1.19	0.91	0.520	0.2793	0.1742	1.31	6.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, some fines	SW-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 4E(3 - 4.5)

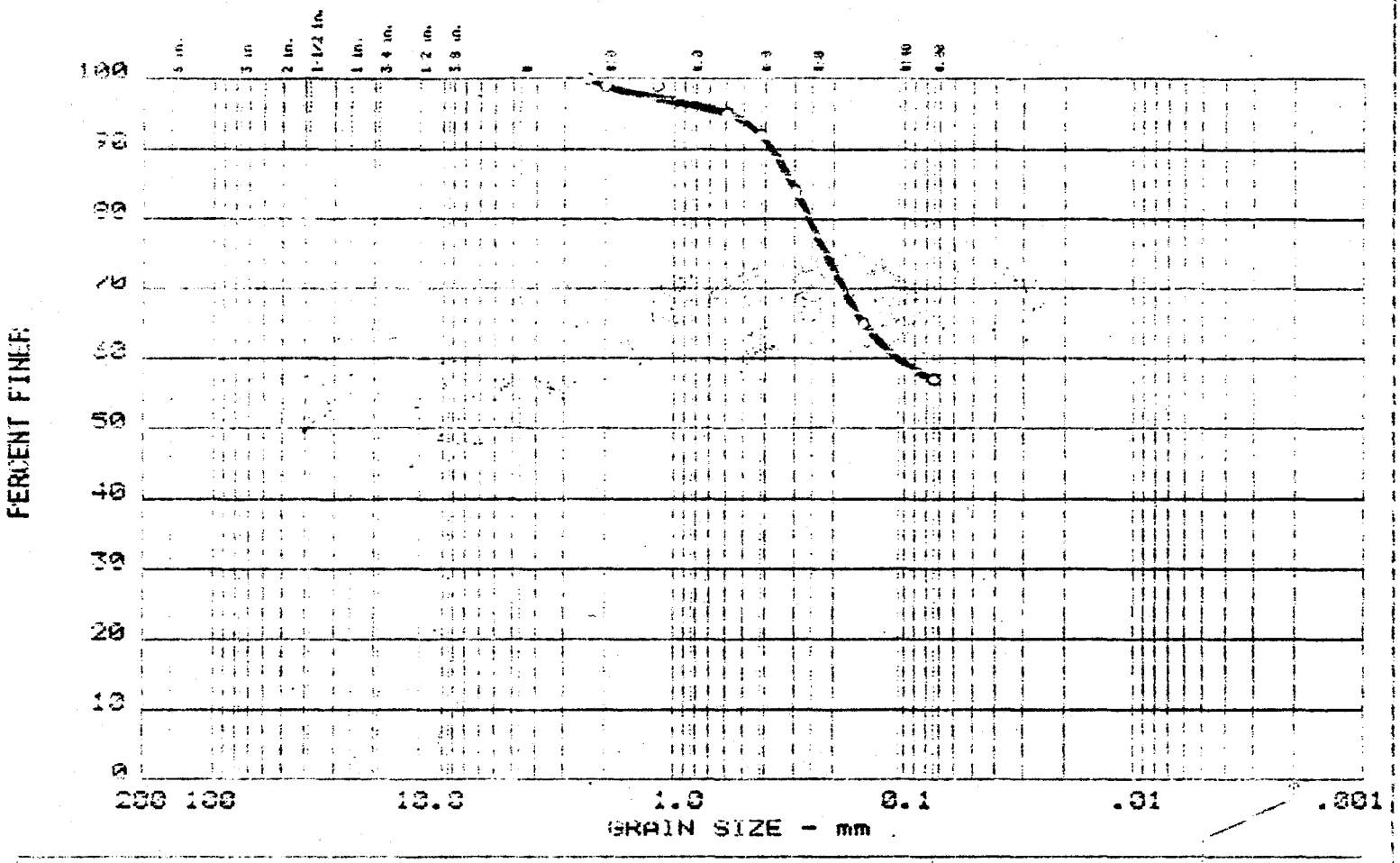
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 107

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	0.0	0.0	43.0	57.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	27	7	0.31	0.11						

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY SILT	CL-ML	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 5E(0 - 2)

Date: 6/6/88

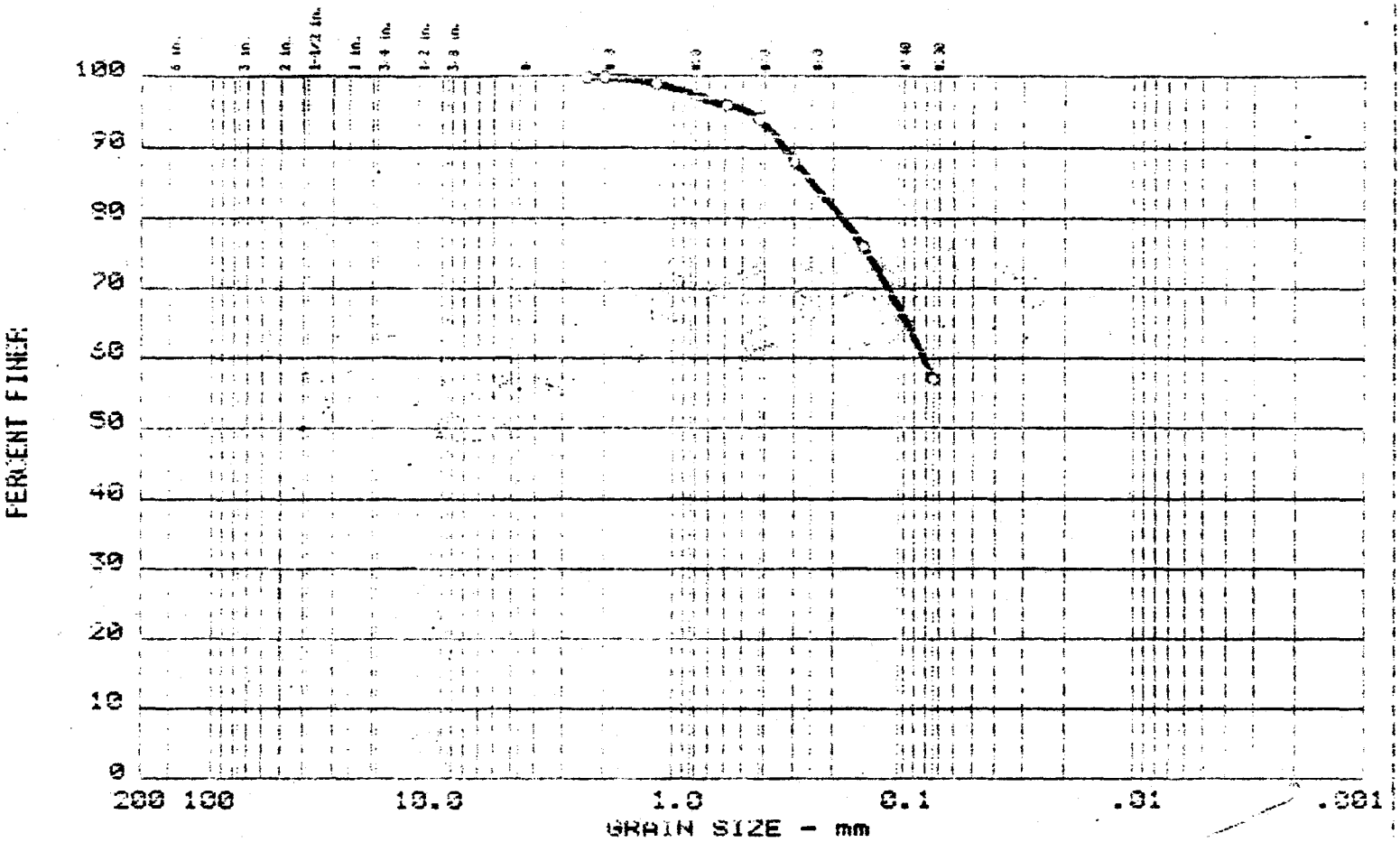
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 108

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	0.0	0.0	43.0	57.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23	3	0.25	0.08						

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY SILT	ML	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 5E(2 - 3)

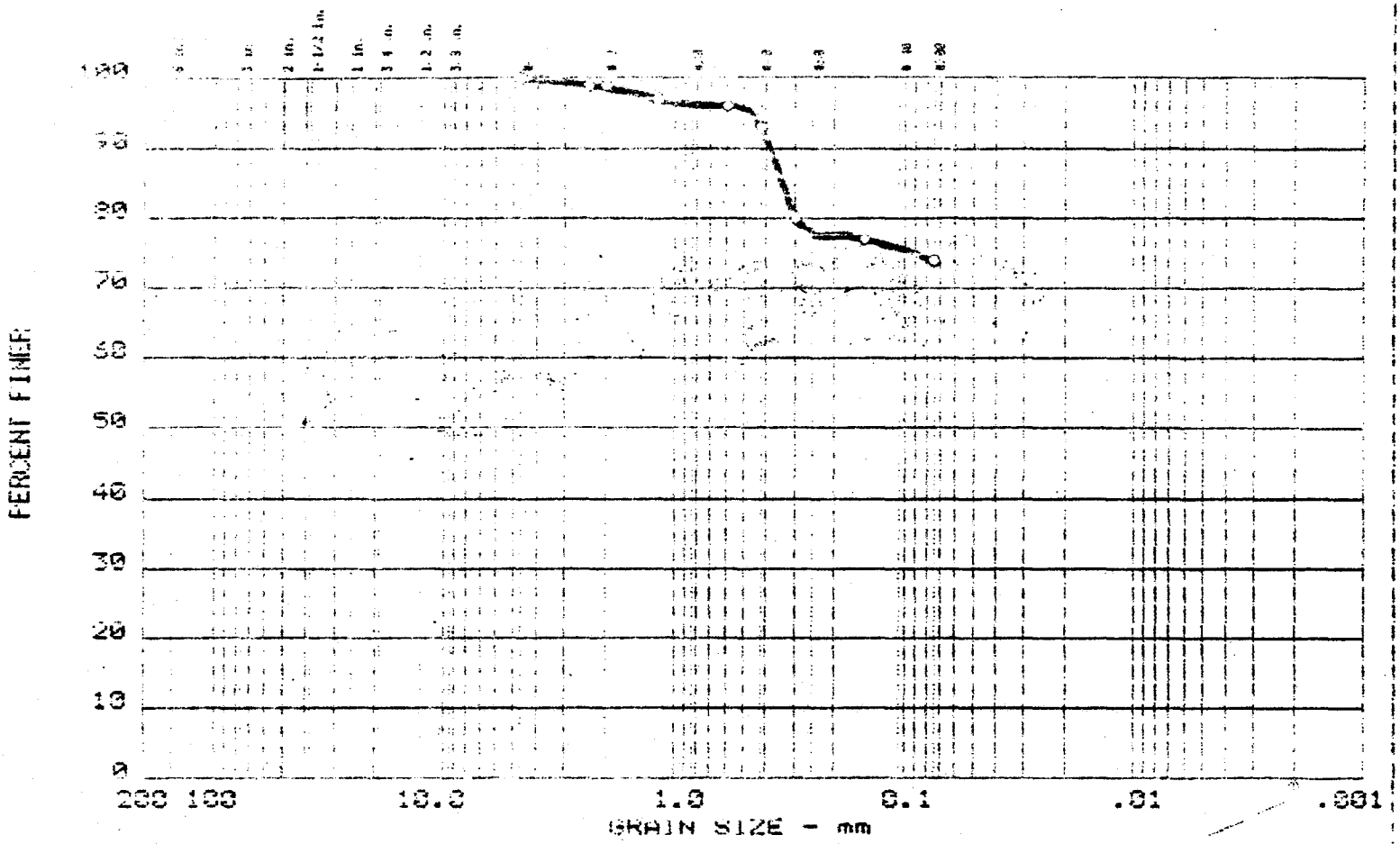
Date: 6/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 109

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
C	10	0.0	0.0	26.0	74.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
C	29	7	0.34							

MATERIAL DESCRIPTION	USCS	AASHTO
C SANDY SILT	CL-ML	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
C Location: B - 6E(0 - 2)

Date: 8/7/88

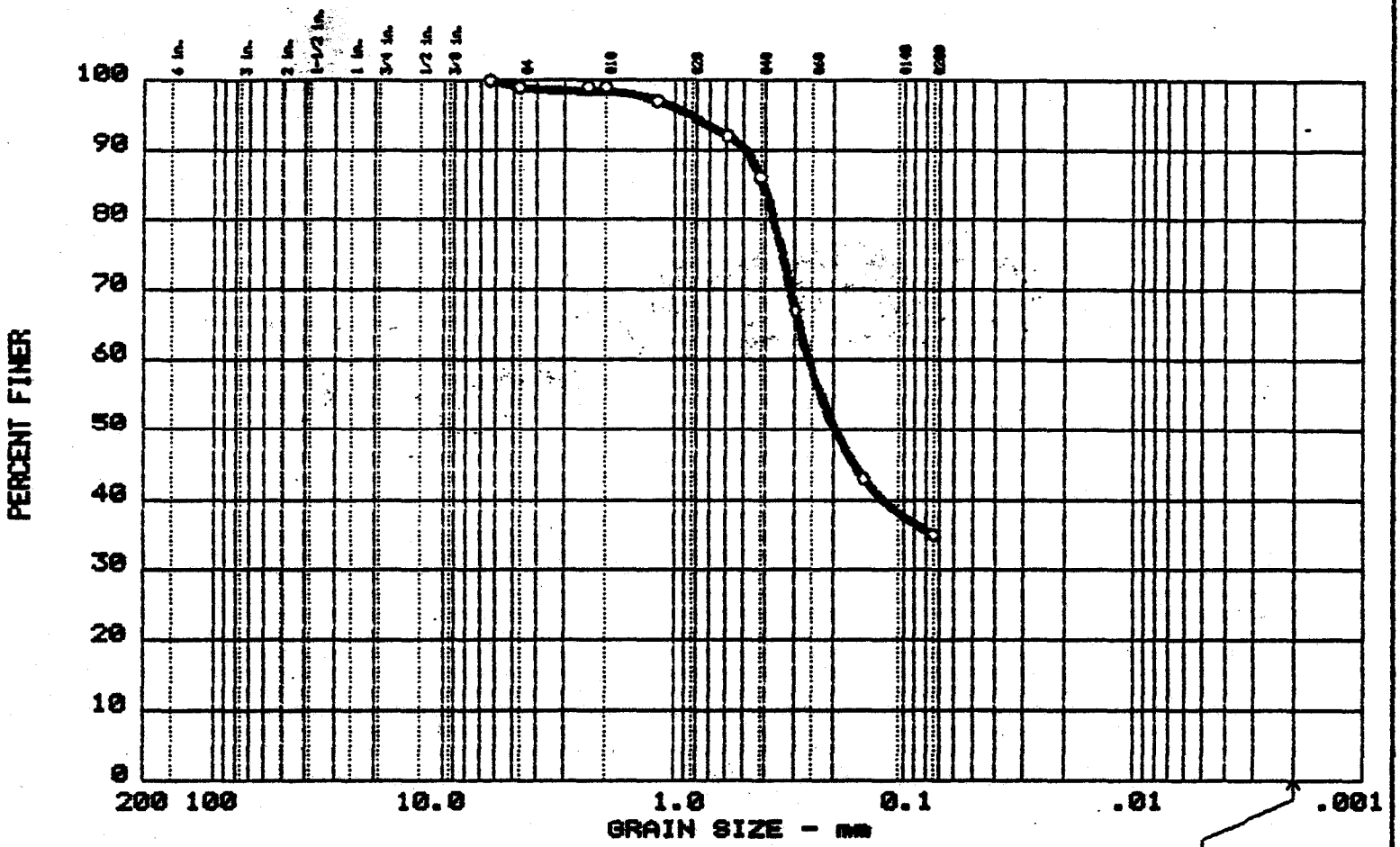
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 110

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
o	12	0.0	1.0	64.0	35.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o		NP	0.41	0.26	0.20					

MATERIAL DESCRIPTION	USCS	AASHTO
o SILTY SAND; trace gravel	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
o Location: B - 7E(0 - 2)

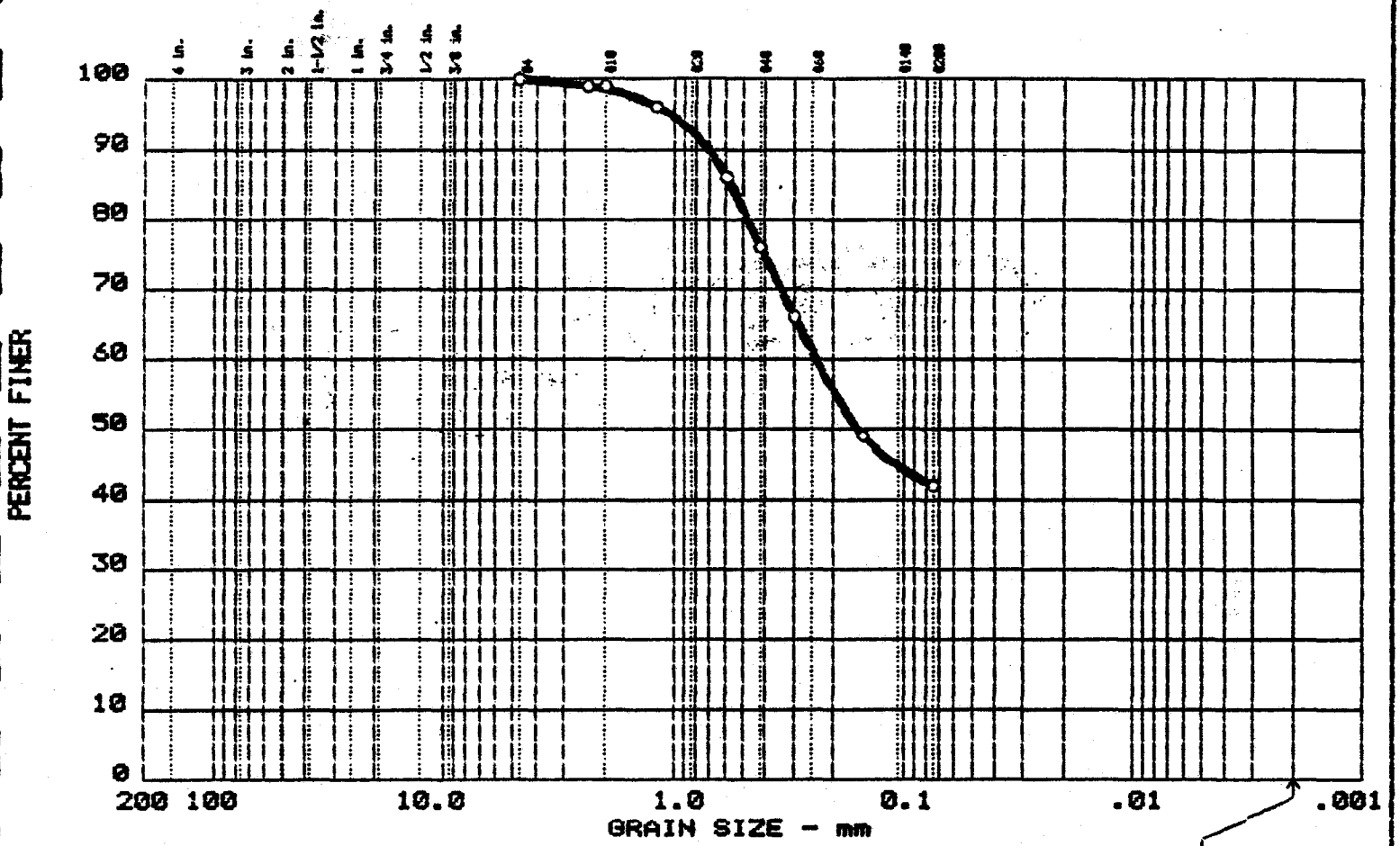
Date: u6/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 111

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
O	13	0.0	0.0	58.0	42.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
O	21	3	0.57	0.24	0.16					

MATERIAL DESCRIPTION	USCS	AASHTO
O SILT AND SAND	SM	

Project No.: 2128j068
Project: NEW RIVER CHANNELIZATION PROJECT
O Location: B - SE(0 - 2)

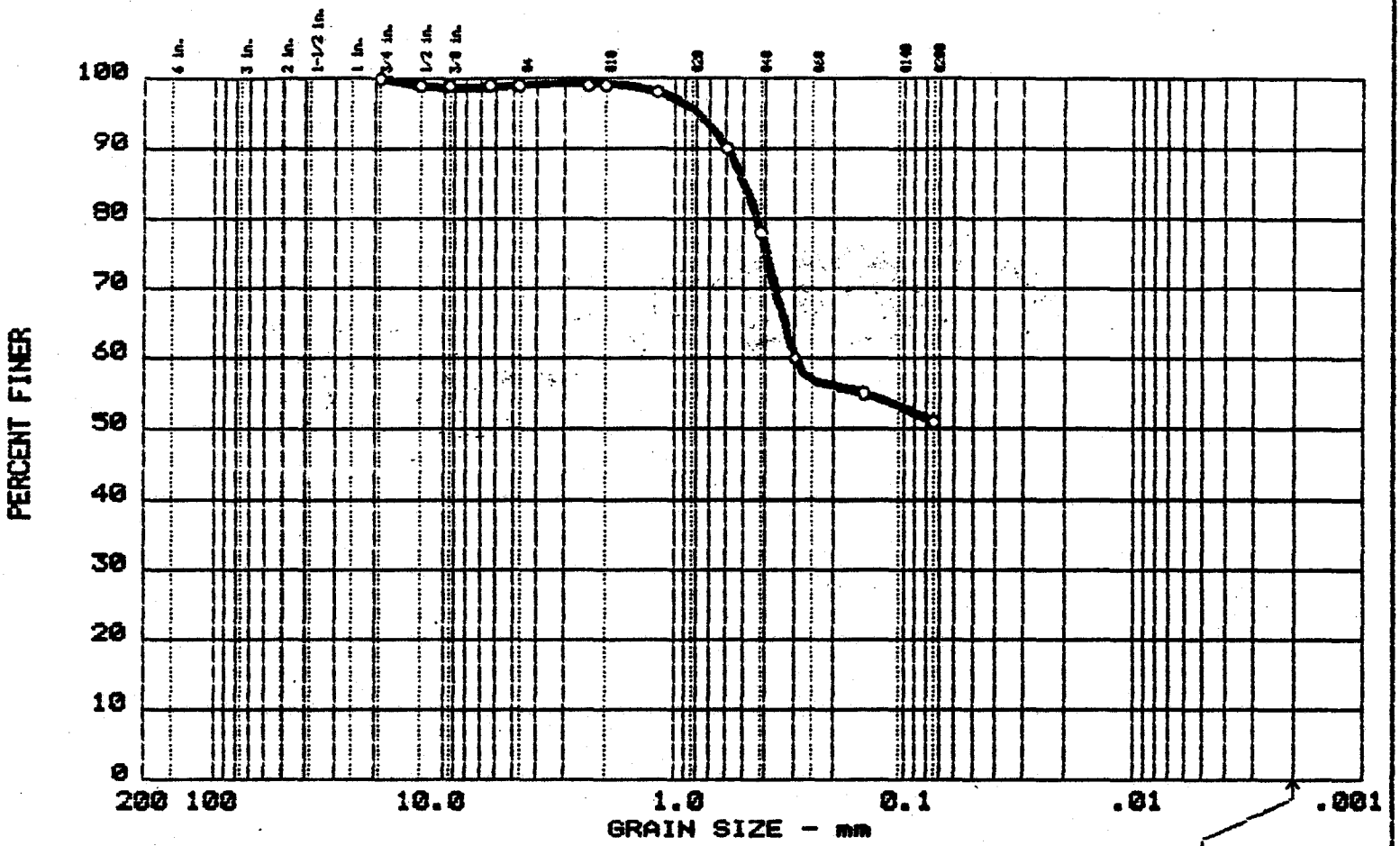
Date: 6/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 112

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	0.0	1.0	48.0	51.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25	4	0.49	0.30						

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILT AND SAND; some clay, trace gravel	CL-ML	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 9E(0 - 2)

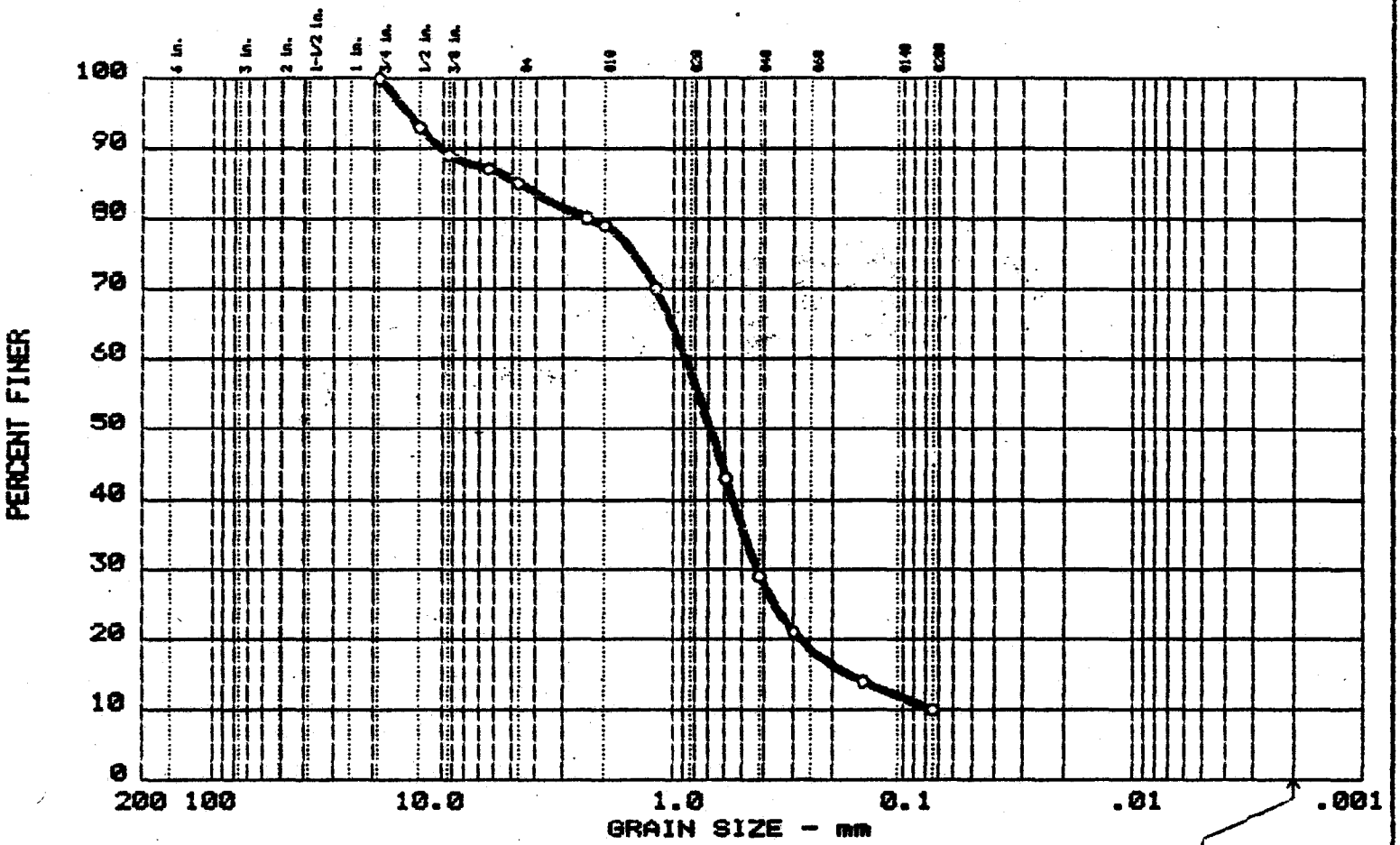
Date: 6/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 113

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	16	0.0	15.0	75.0	10.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	4.73	0.88	0.69	0.431	0.1716			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 11E(0 - 2)

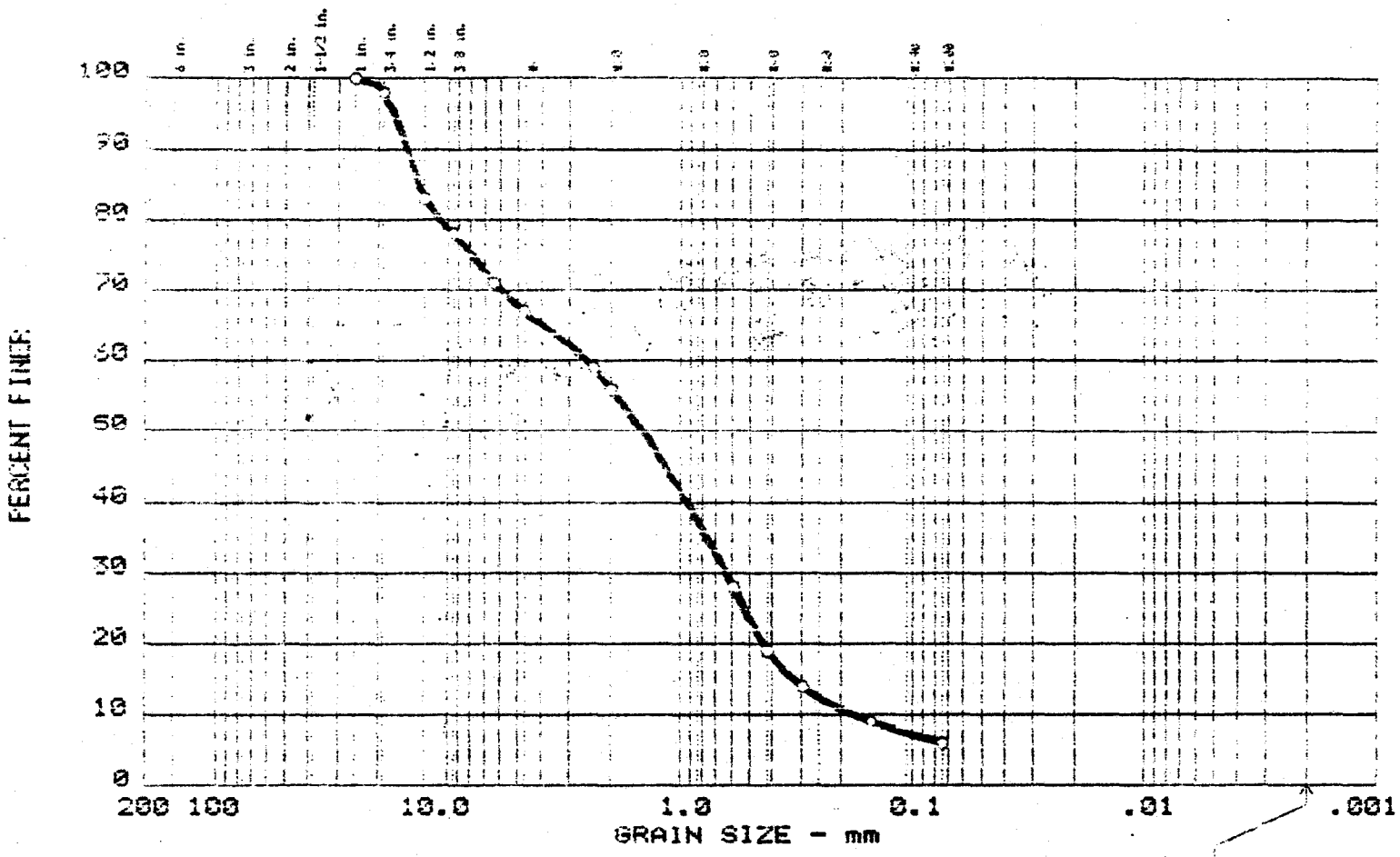
Date: 6/14/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 114

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
O	6	0.0	33.0	61.0	6.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
O			13.47	2.54	1.46	0.633	0.3232	0.1776	0.88	14.3

MATERIAL DESCRIPTION	USCS	AASHTO
O GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
O Location: B - 13E(5 - 6.5)

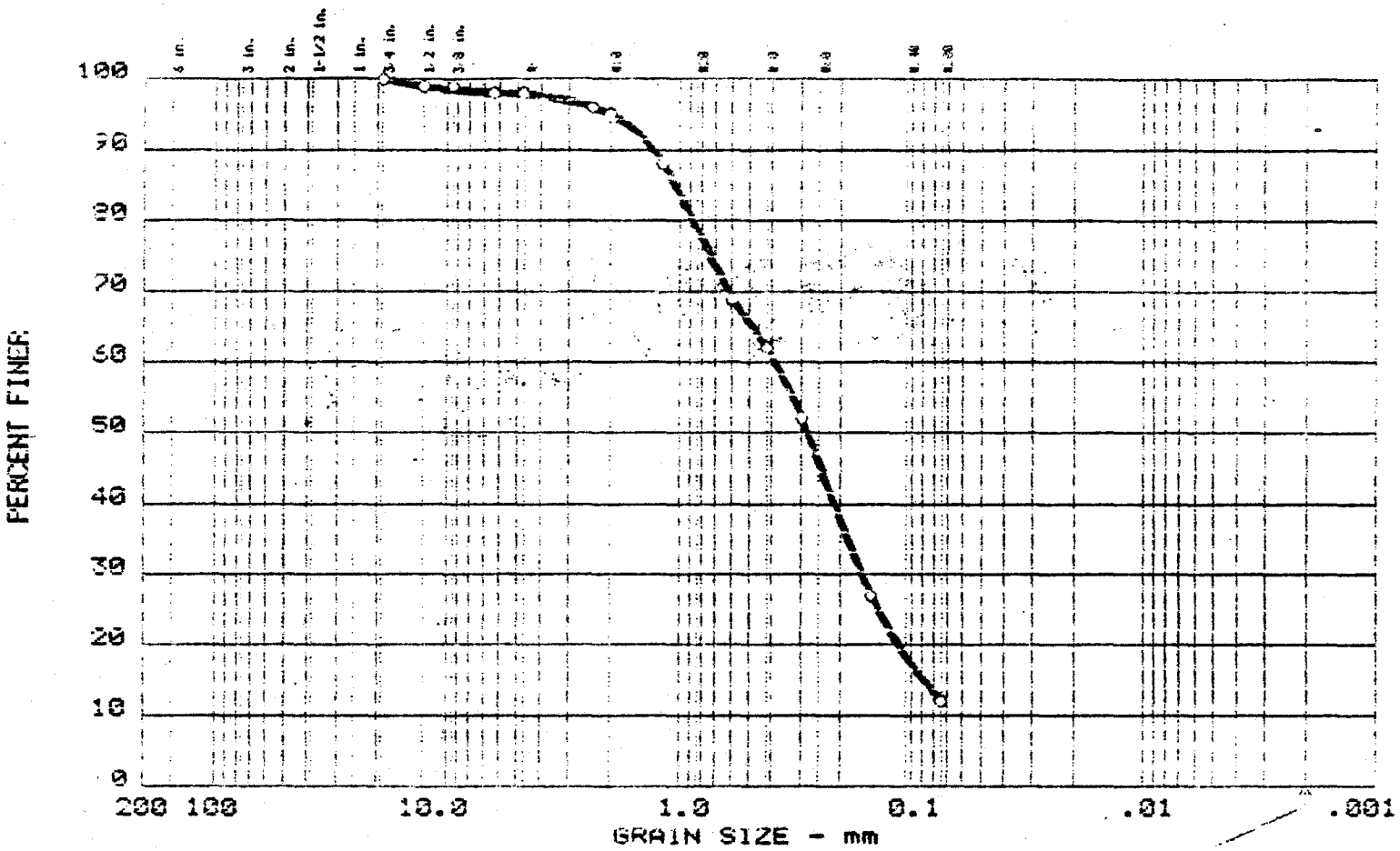
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 115

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	0.0	2.3	85.7	12.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.05	0.38	0.28	0.163	0.0876			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some silt, trace gravel	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 15E(2 - 3.5)

Date: 5/31/88

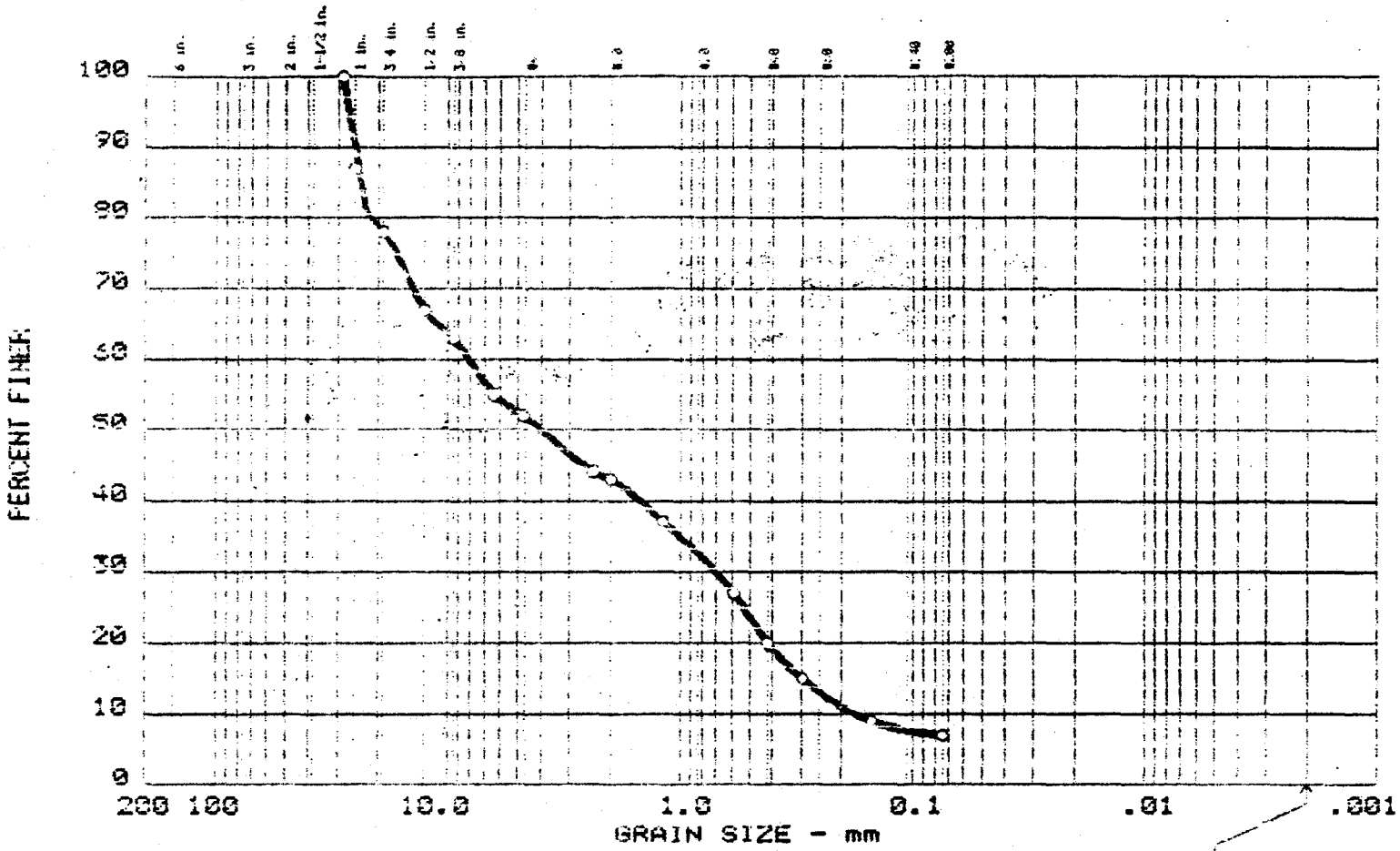
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 116

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	19	0.0	48.0	45.0	7.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			24.75	8.18	3.97	0.697	0.2941	0.1732	0.35	46.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVEL; some fines	GP-GM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 13E(10 - 11.5)

Date: 5/31/88

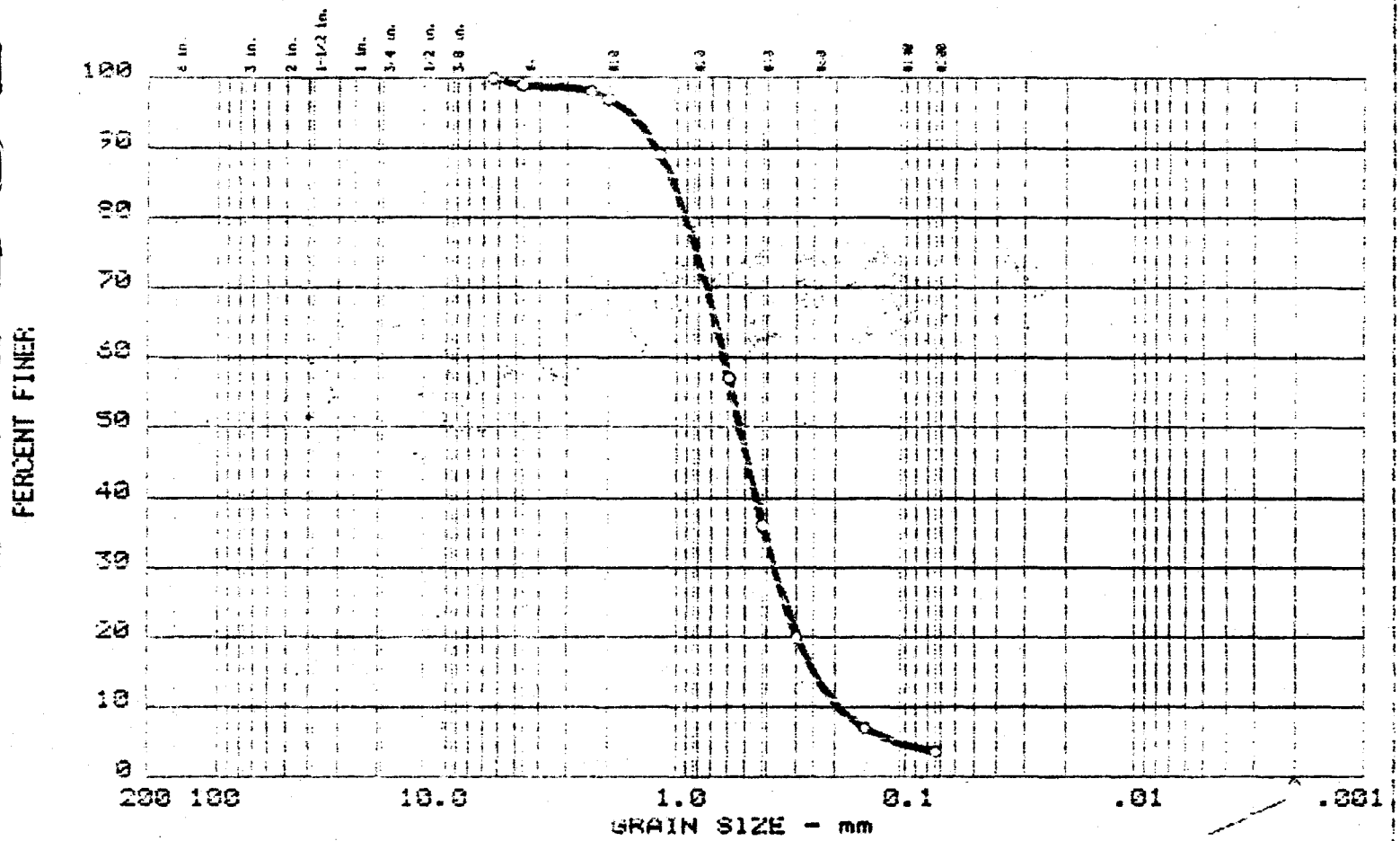
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 117

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	19	0.0	1.0	95.4	3.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.05	0.62	0.53	0.375	0.2509	0.1948	1.17	3.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; trace fines, trace gravel	SP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION
○ Location: B - 16E(5 - 6.5)

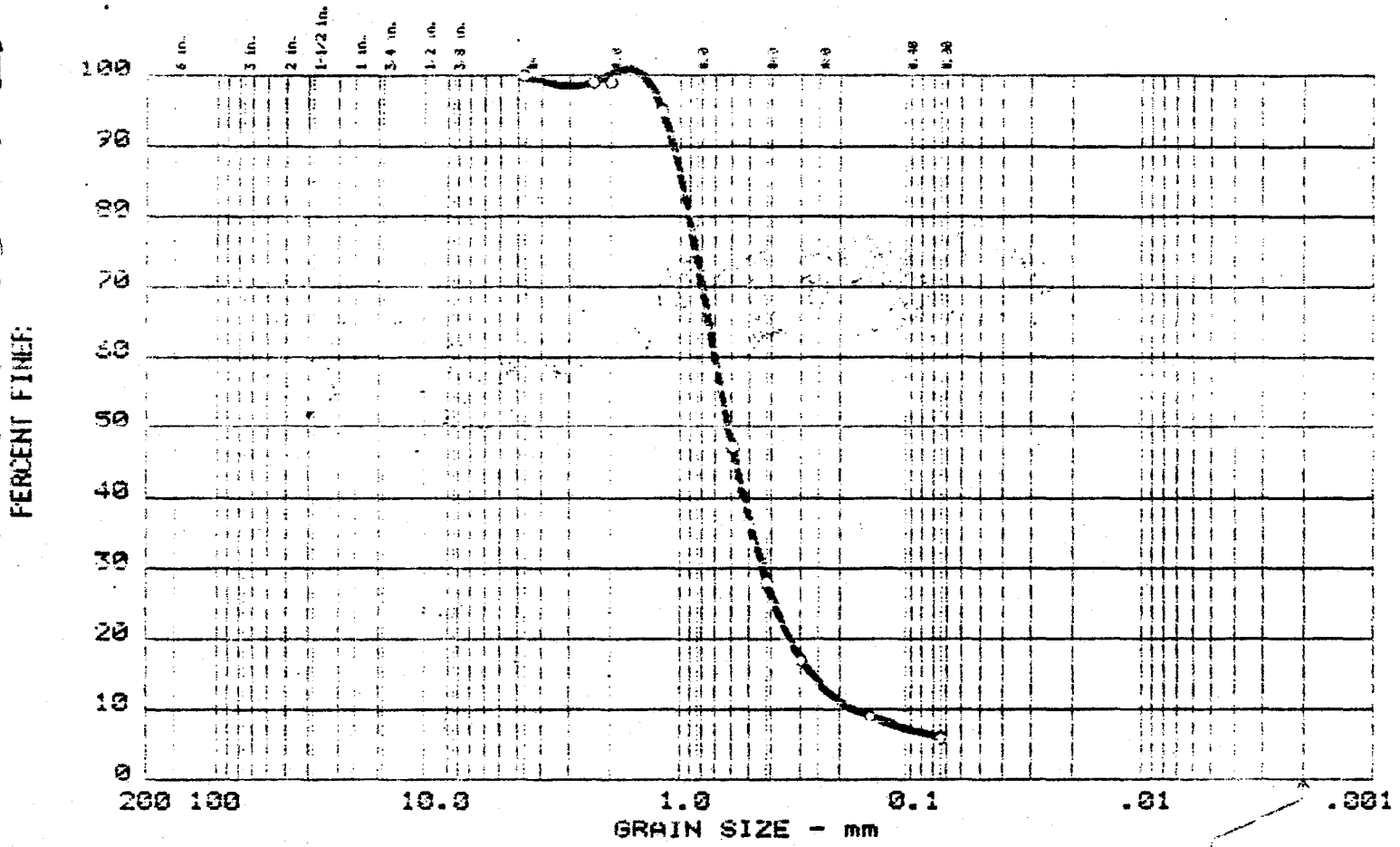
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 118

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	4	0.0	0.0	94.0	6.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.99	0.70	0.62	0.439	0.2676	0.1748	1.57	4.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; somefines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 17E(5 - 6.5)

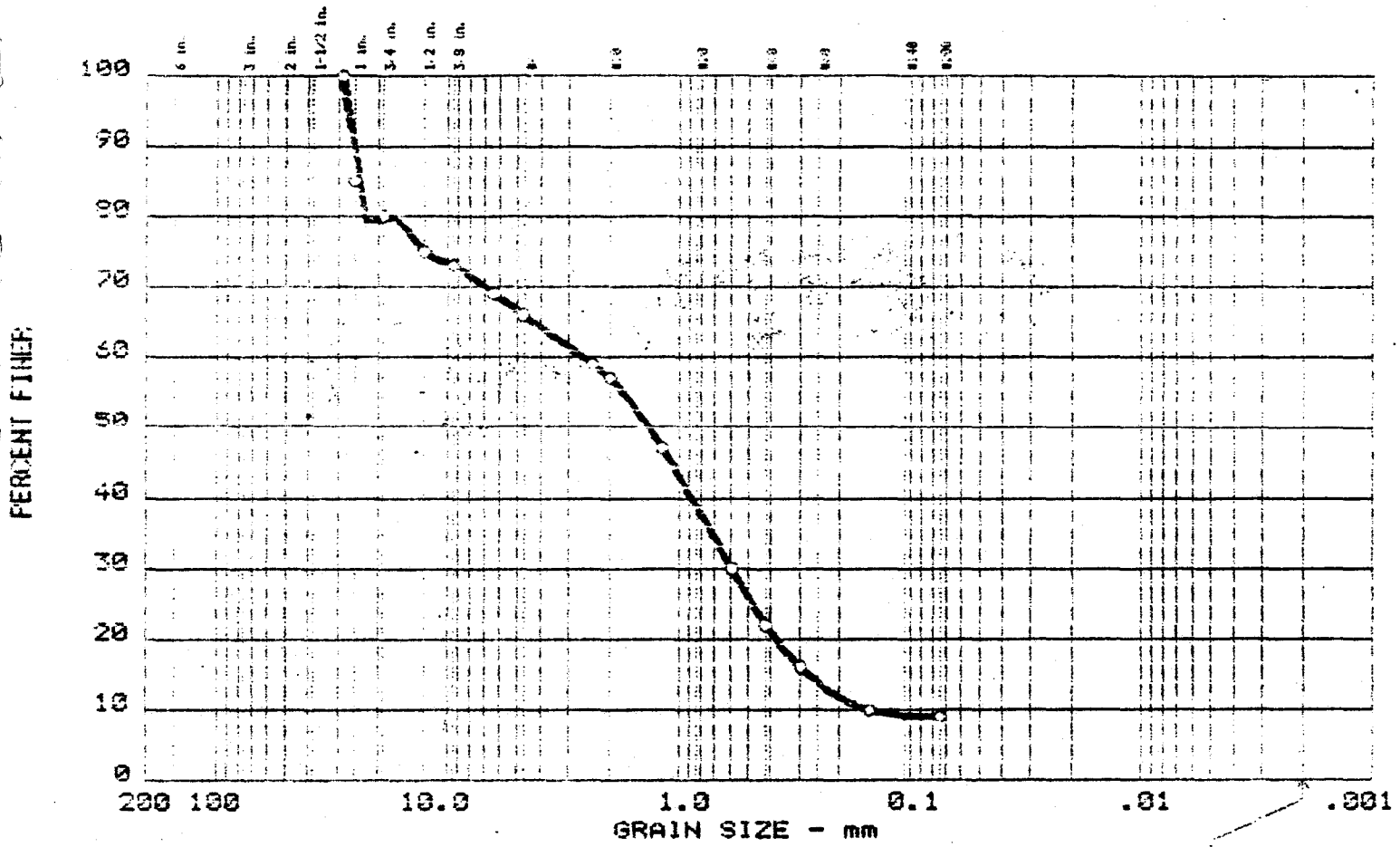
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 119

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	0.0	34.0	57.0	9.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			25.38	2.60	1.36	0.587	0.2745	0.1474	0.90	17.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 19E(5 - 6.5)

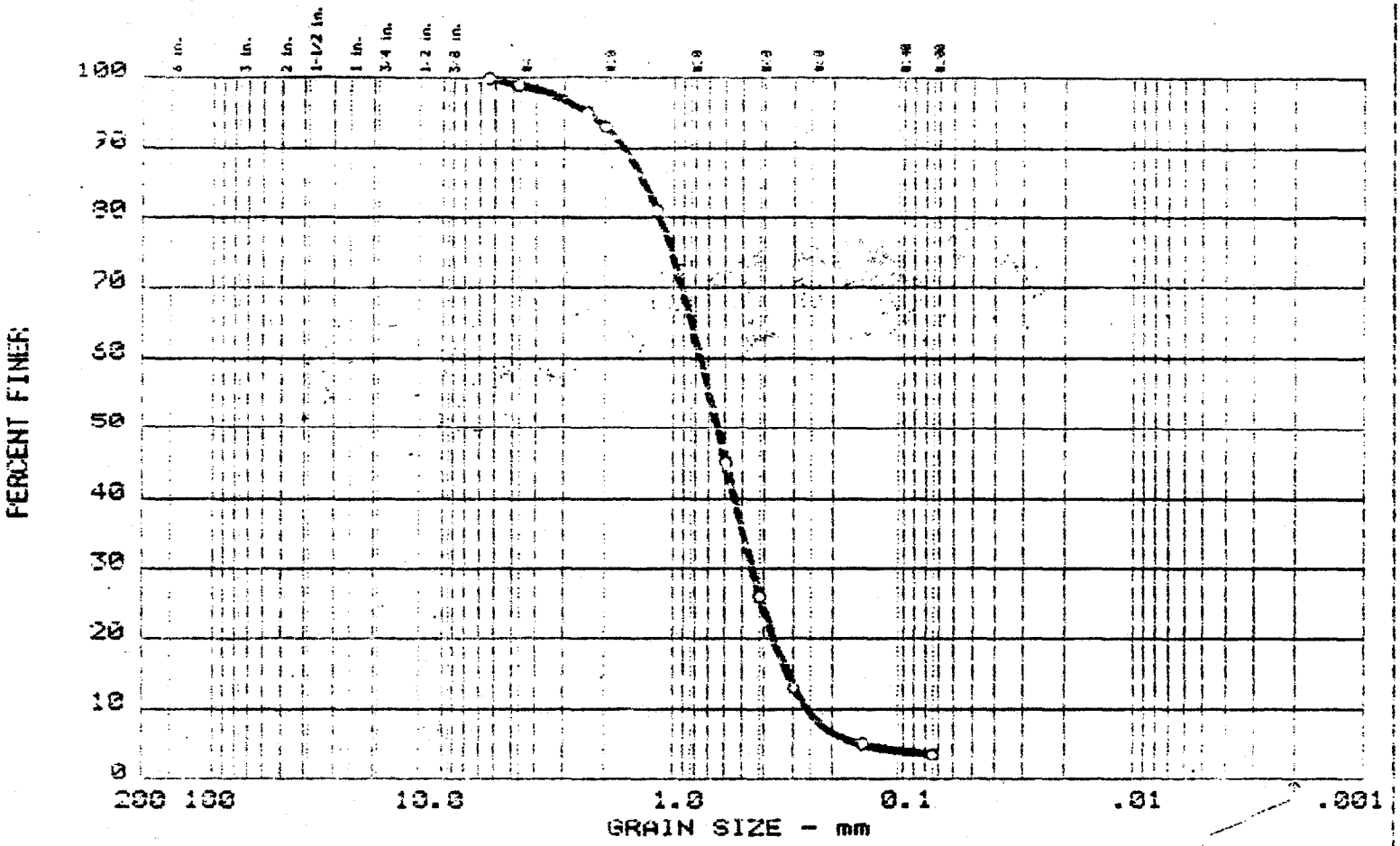
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 120

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	1	0.0	1.0	95.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.35	0.76	0.64	0.454	0.3177	0.2582	1.04	3.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; trace fines, trace gravel	SP	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 20E(2 - 3)

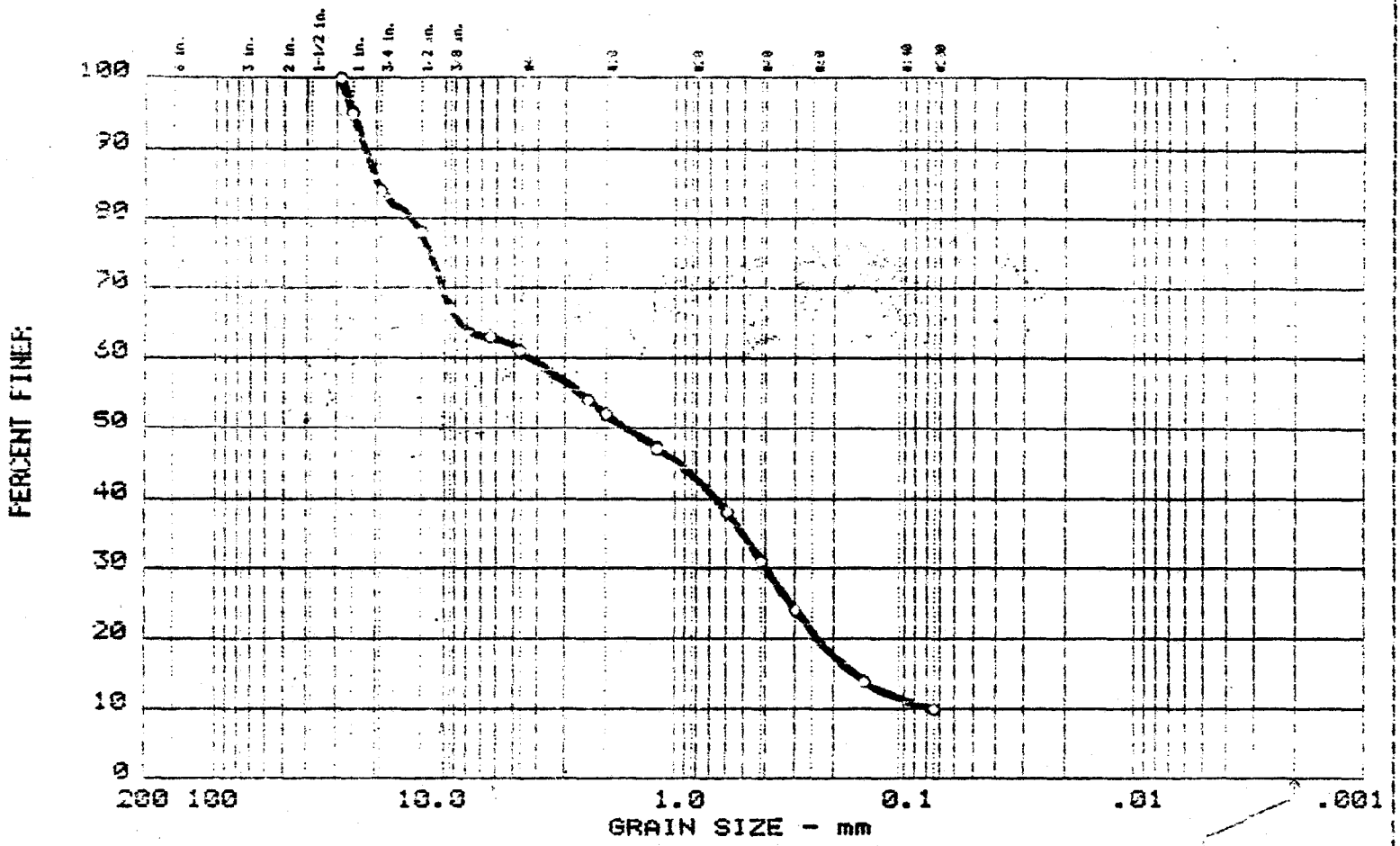
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 121

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	2	0.0	39.0	51.0	10.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			19.72	4.22	1.64	0.398	0.1641			

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 22E(5 - 6.5)

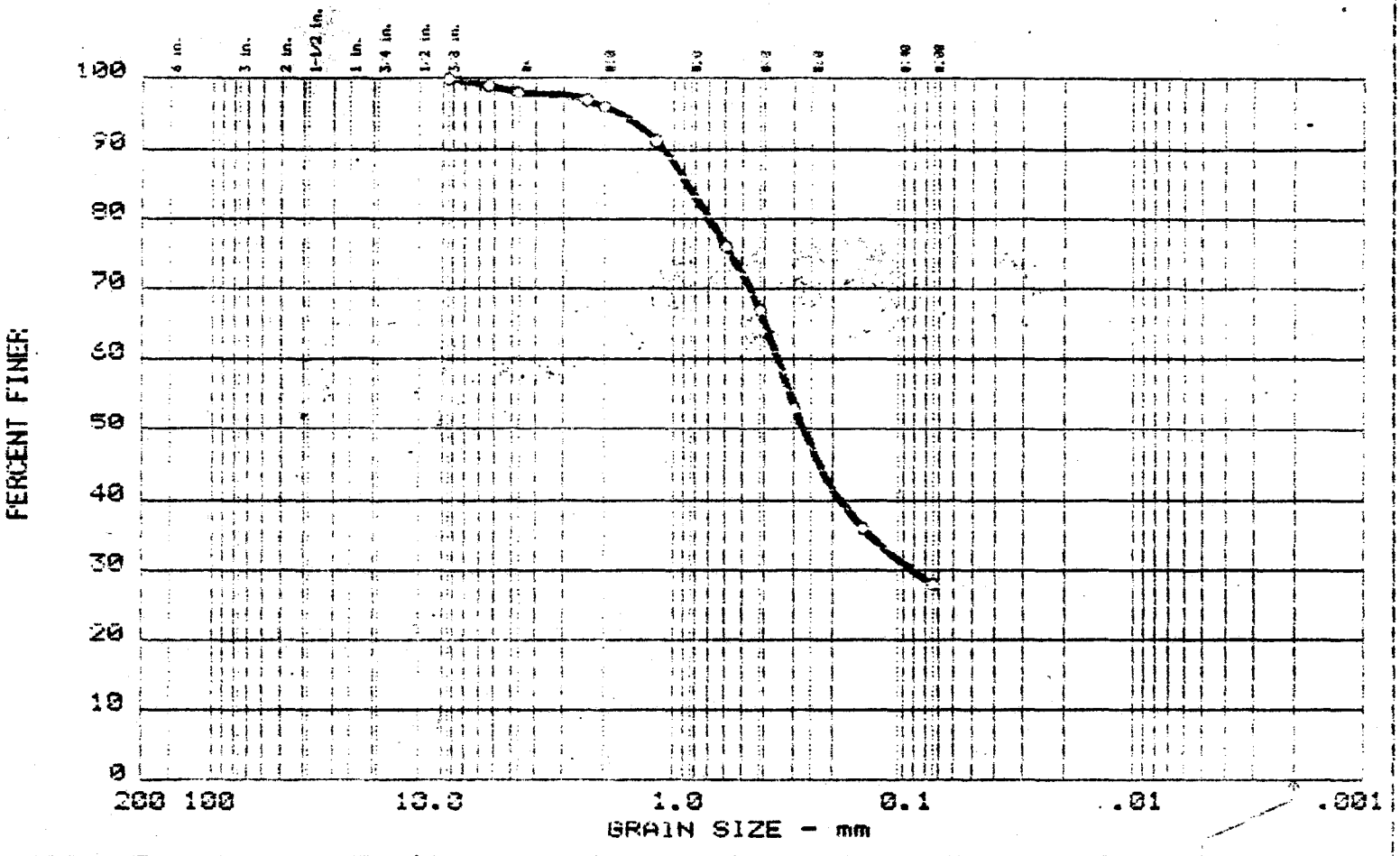
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 122

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	3	0.0	2.0	70.0	28.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.86	0.35	0.27	0.090				

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILTY SAND; trace gravel	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 25E(2 - 3.5)

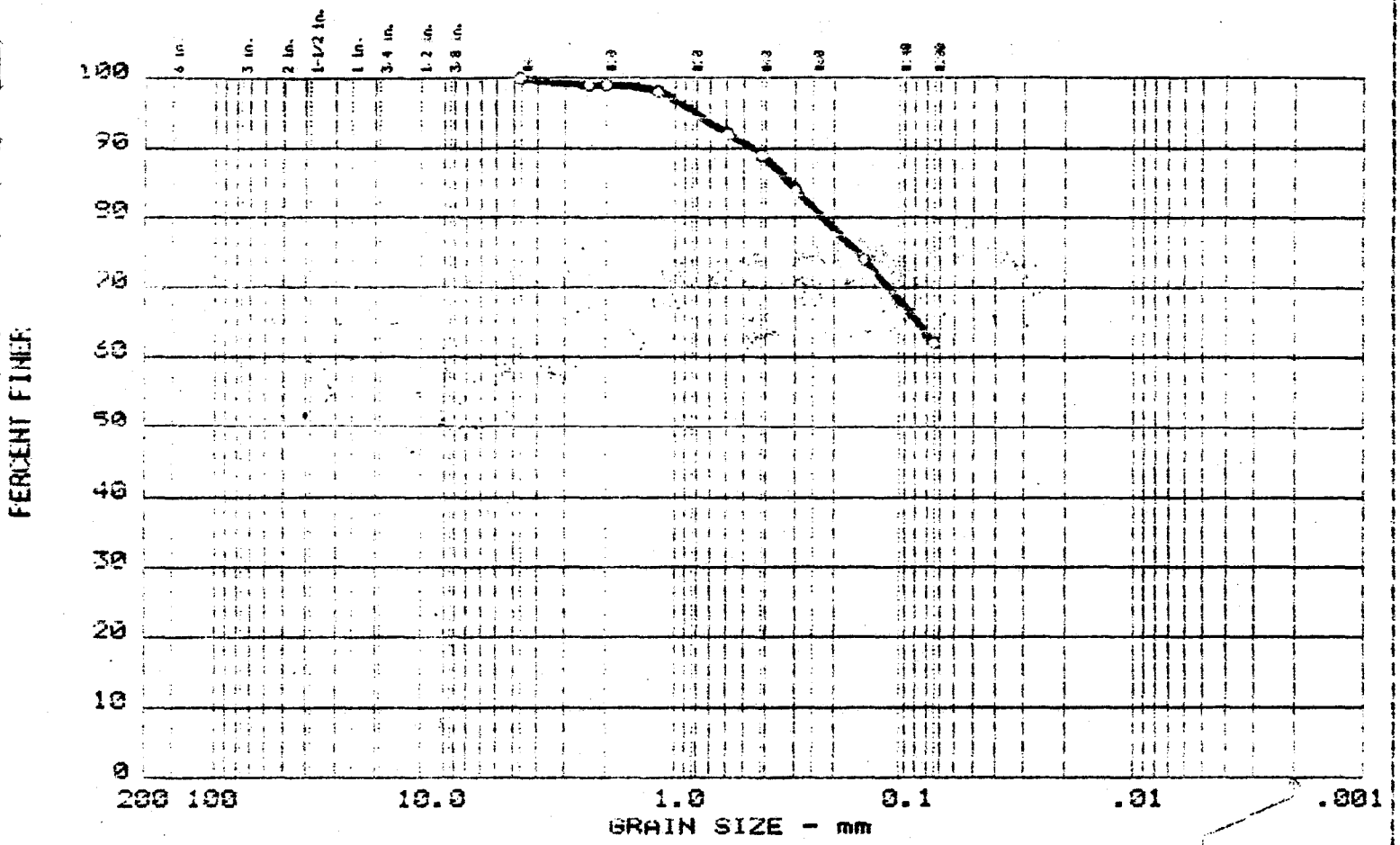
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 123

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	12	0.0	0.0	38.0	62.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.32							

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY CLAY; with silt	CL	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 26E(2 - 3.5)

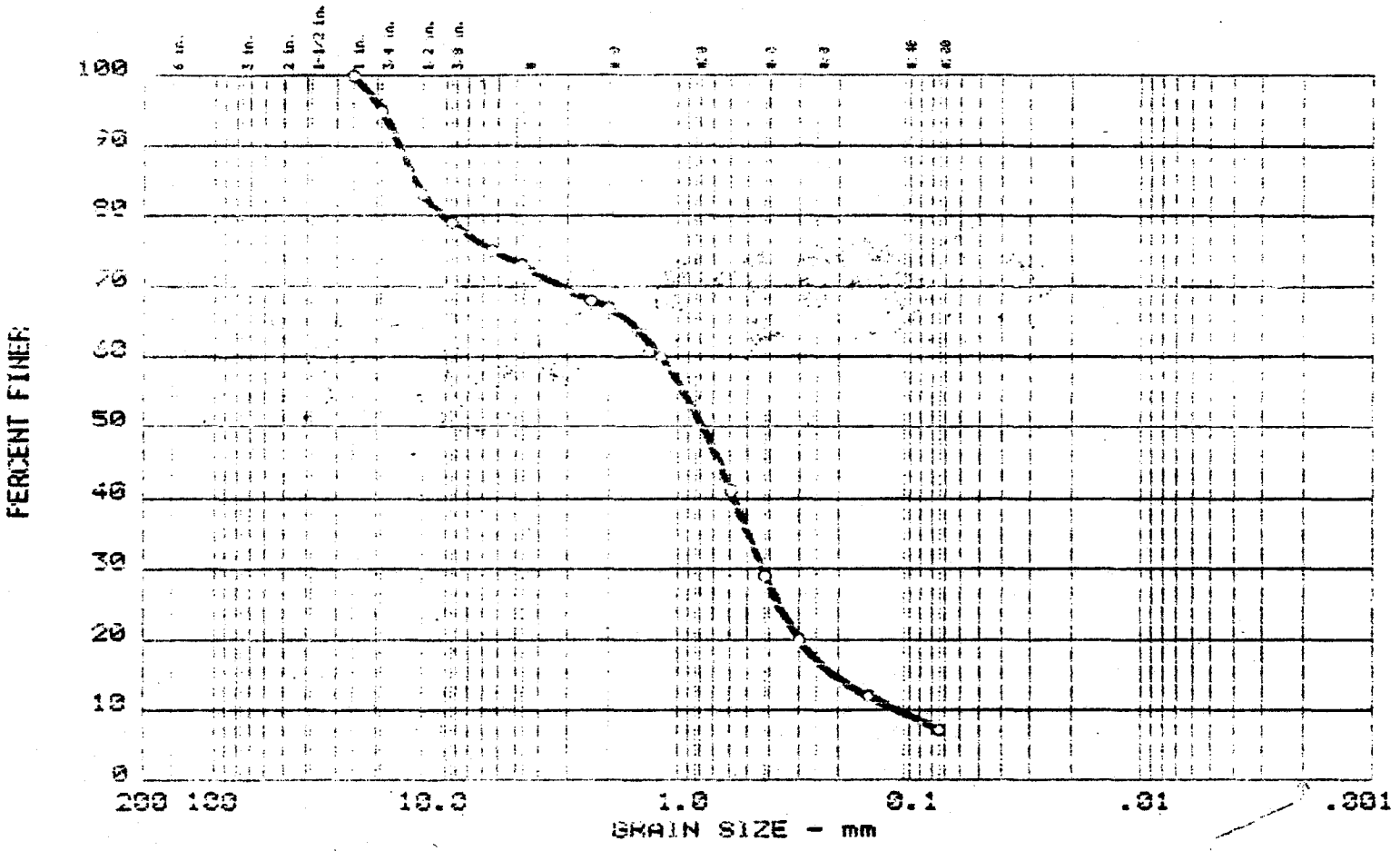
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 124

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	7	0.0	27.0	65.8	7.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			13.65	1.19	0.78	0.431	0.2084	0.1119	1.39	10.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SW-SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 27E(10 - 11.5)

Date: 6/1/88

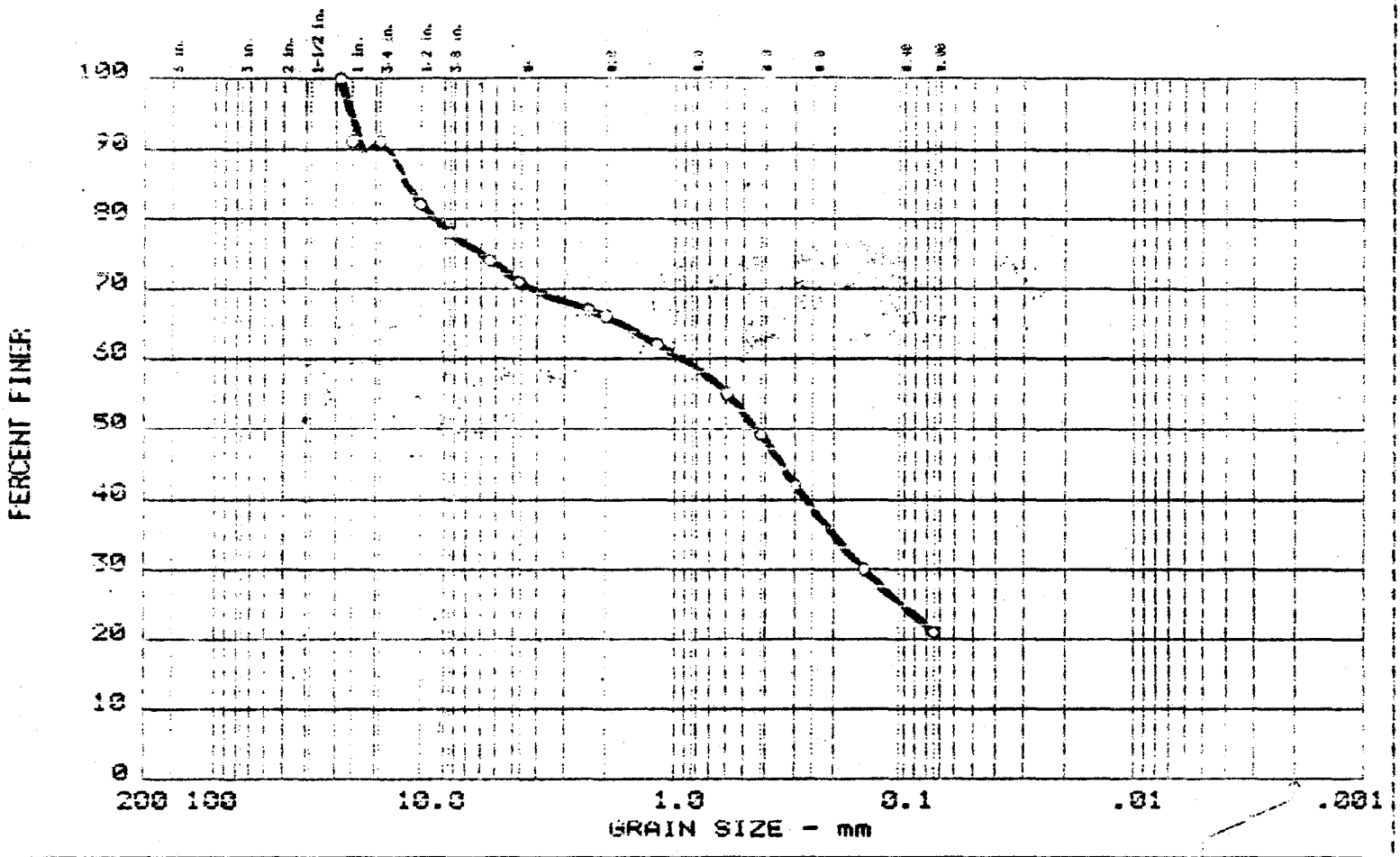
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 125

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	8	0.0	29.0	50.0	21.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	14.74	0.92	0.44	0.147				

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND with fines	SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 28E(2 - 3.5)

Date: 6/1/88

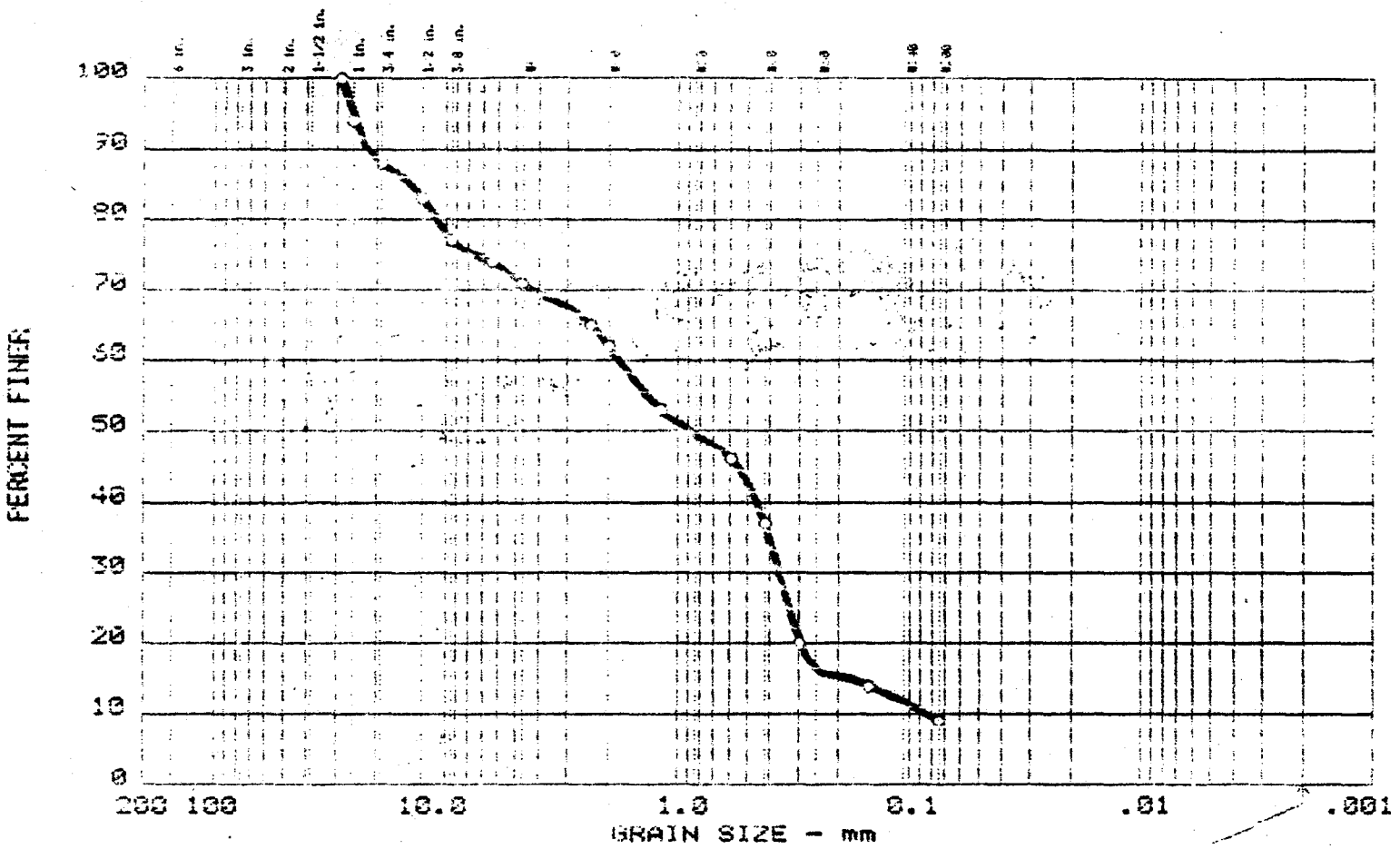
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 126

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	7	0.0	29.0	62.0	9.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			14.29	1.88	0.87	0.366	0.1811	0.0838	0.89	21.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 28E(5 - 6.5)

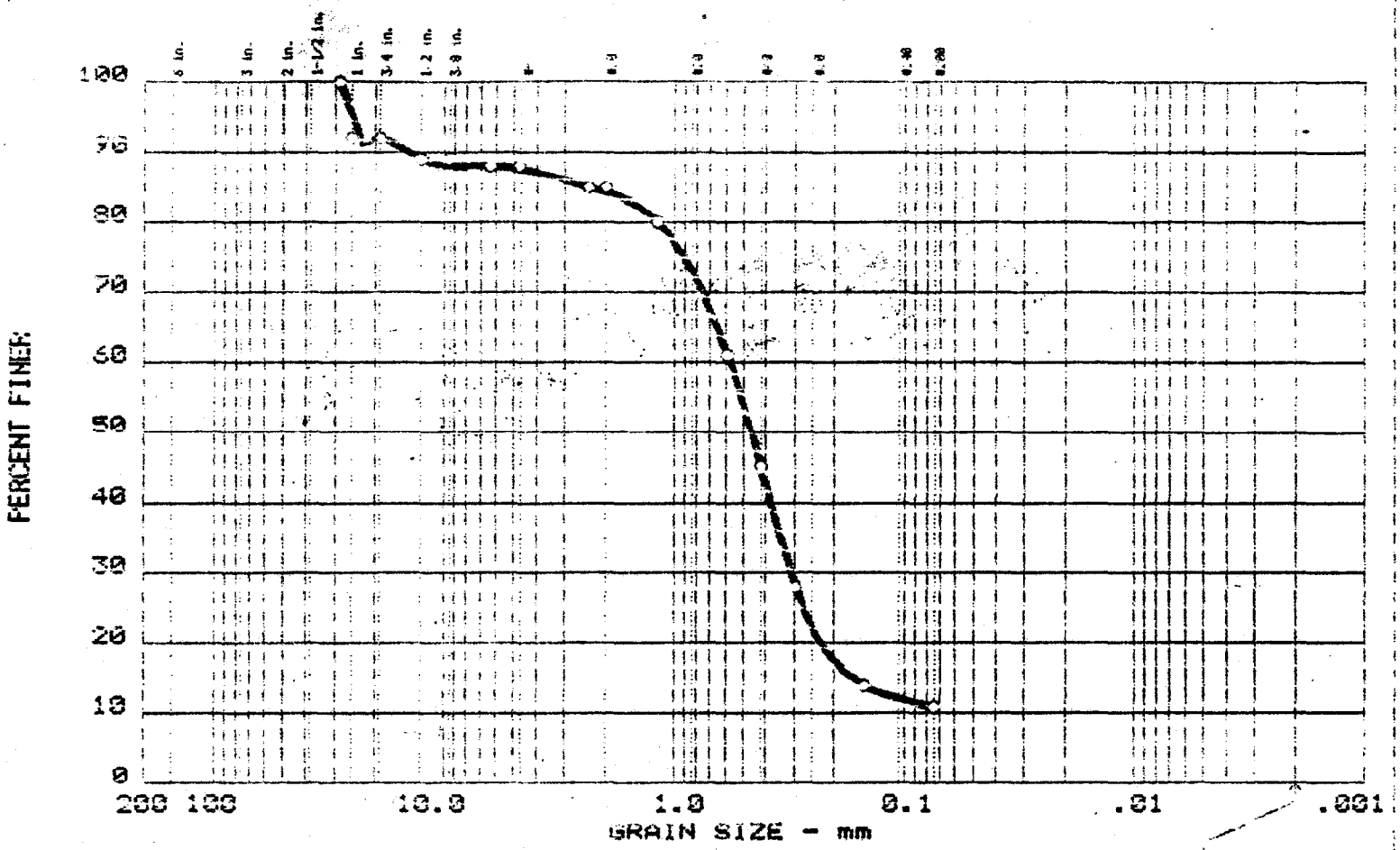
Date: 6/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 127

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	0.0	12.5	76.7	10.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.37	0.58	0.46	0.311	0.1652			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some fines, some gravel	SP-SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 29E(2 - 3.5)

Date: 5/31/88

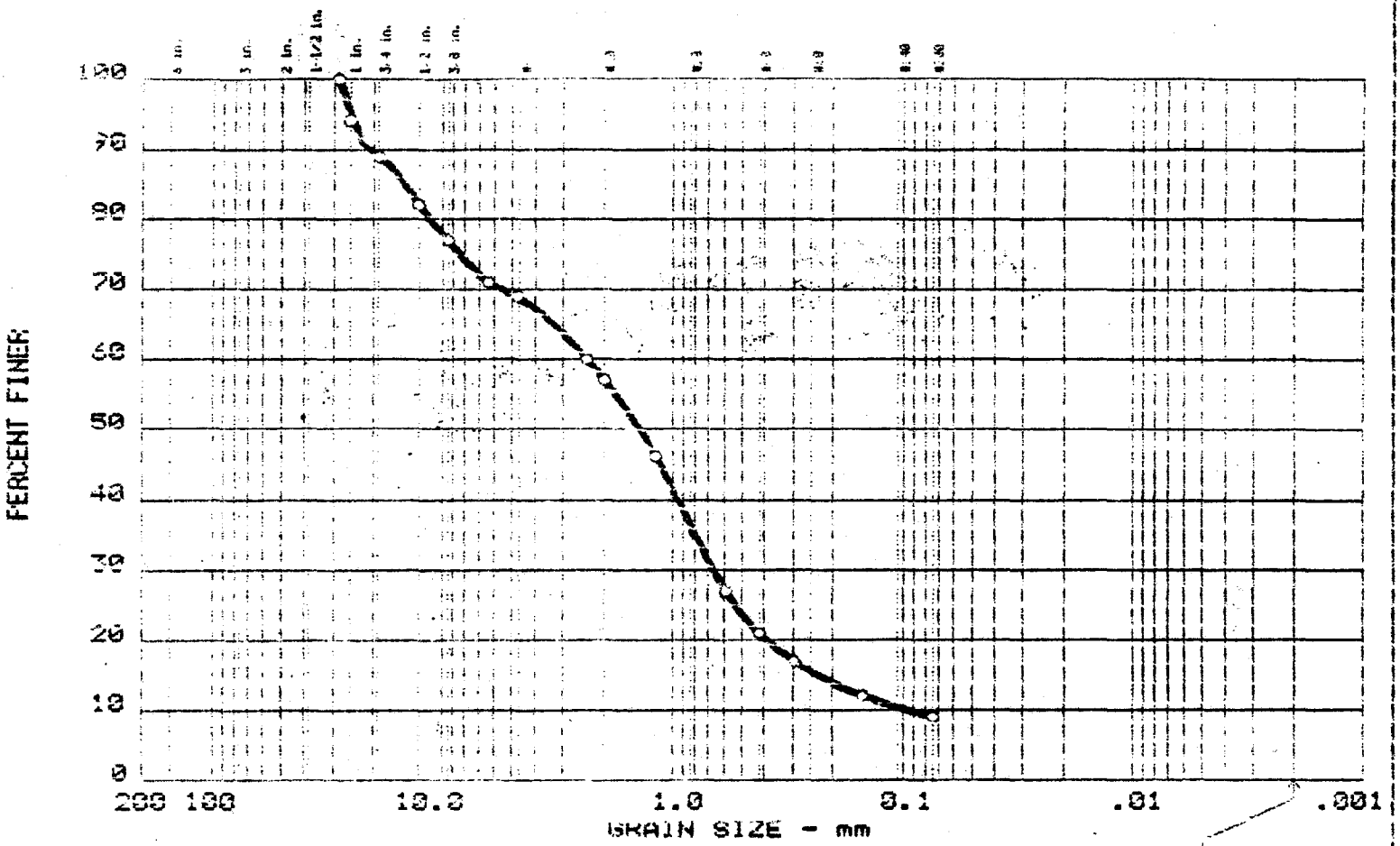
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 128

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	11	0.0	31.0	60.0	9.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			14.79	2.37	1.40	0.668	0.2344	0.0933	2.02	25.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SW-SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 29E(10 - 11.5)

Date: 05/31/88

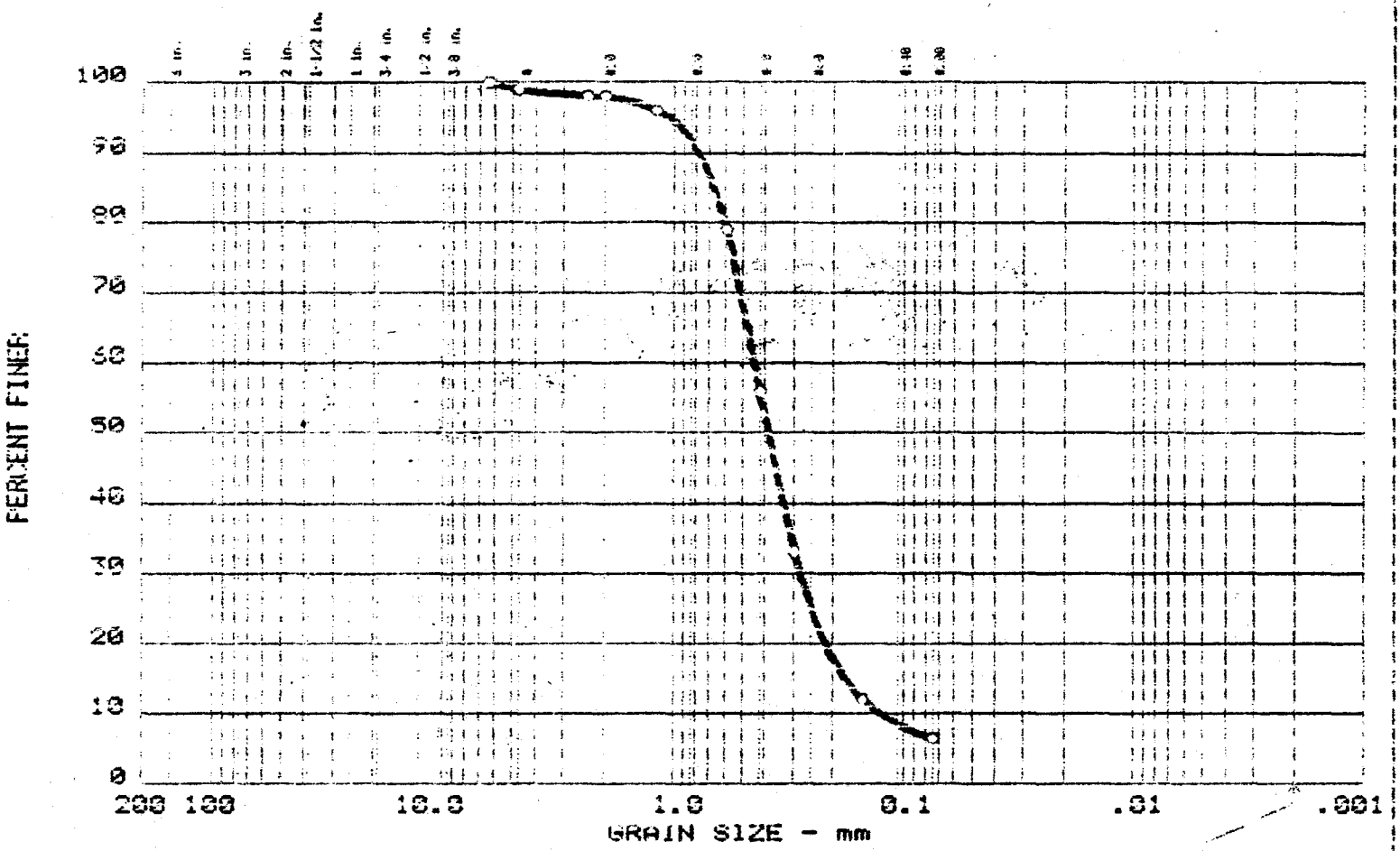
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 129

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	0.0	1.0	92.6	6.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.67	0.44	0.39	0.280	0.1782	0.1247	1.41	3.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some fines, trace gravel	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: 9 - 30E(2 - 3.5)

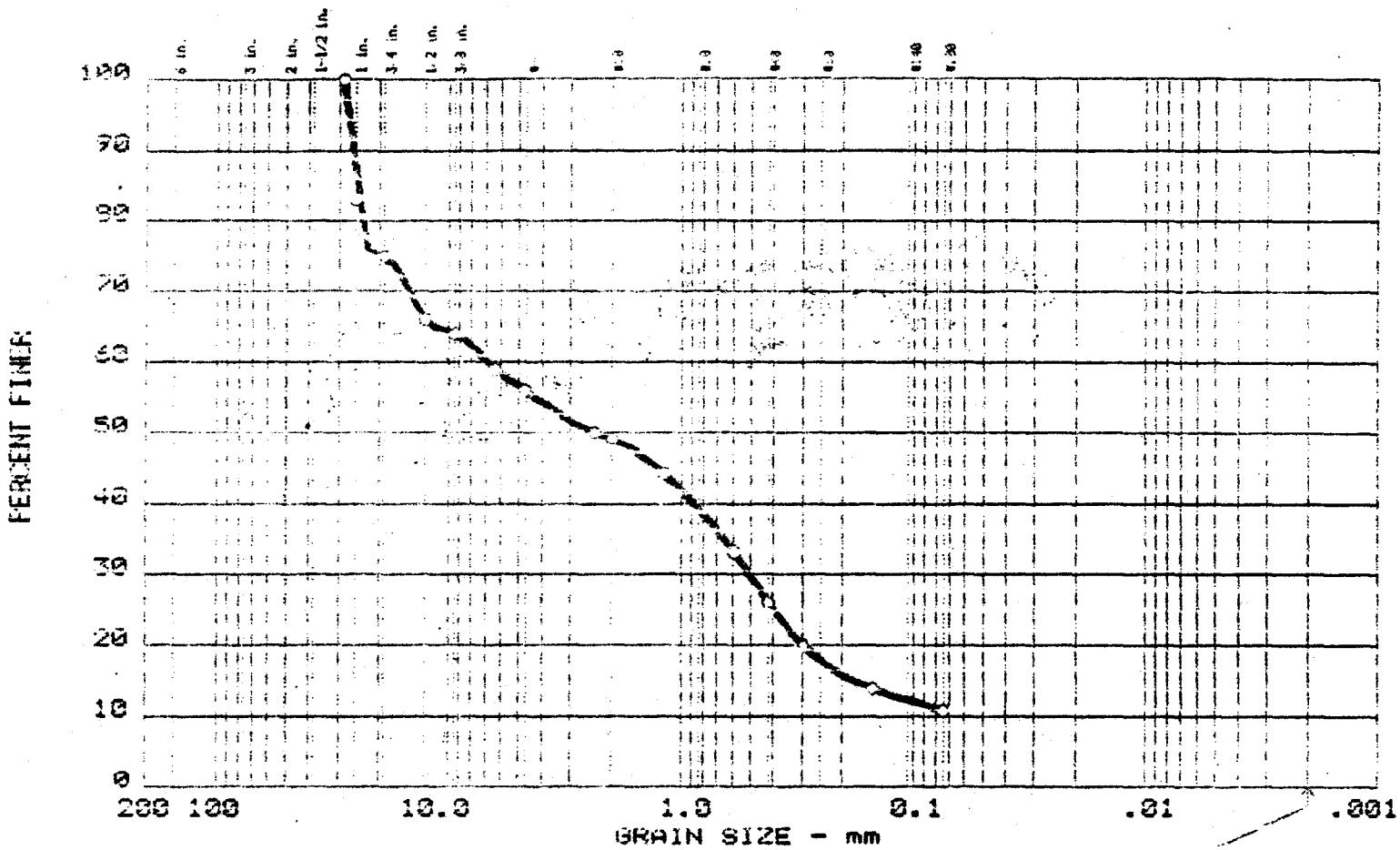
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 130

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	0.0	44.0	45.2	10.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			25.82	6.79	2.36	0.589	0.1766			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVEL; some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 38E(10 - 11.5)

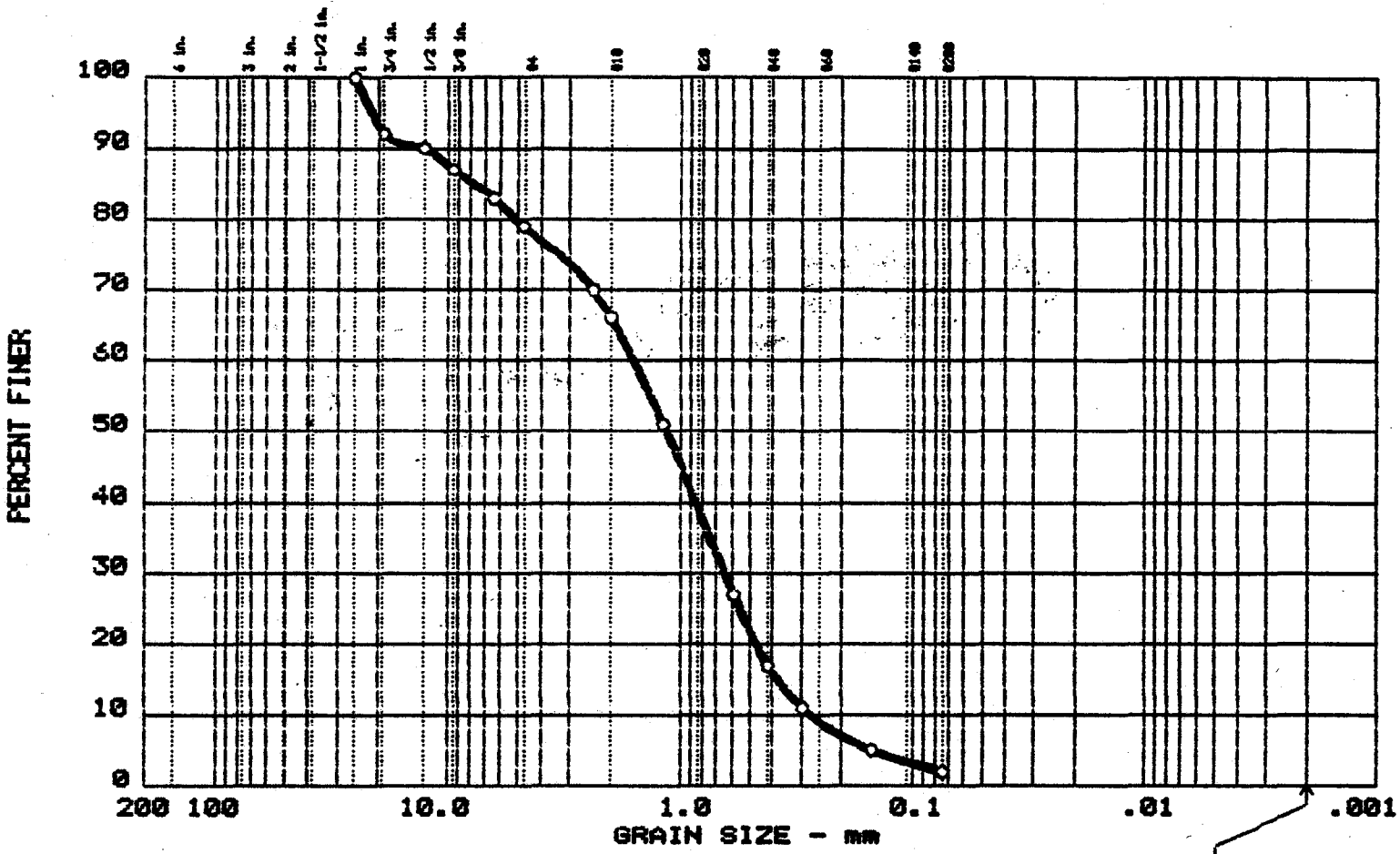
Date: 5/31/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 131

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	0.0	21.0	77.0	2.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.67	1.60	1.15	0.641	0.3819	0.2735	0.94	5.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 33E(2 - 3)

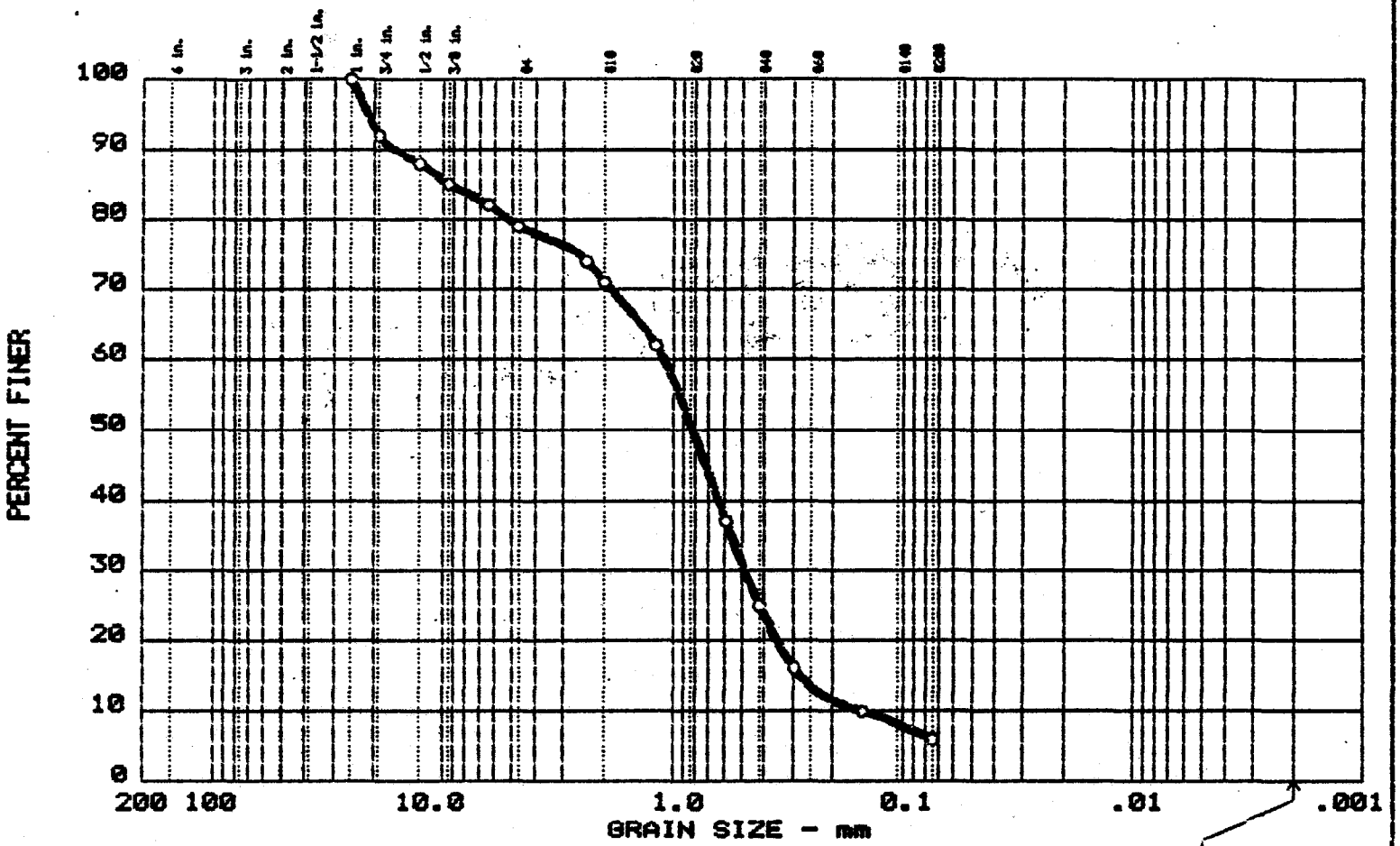
Date: 6/14/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 132

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	0.0	21.0	73.0	6.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			9.44	1.10	0.82	0.488	0.2805	0.1489	1.46	7.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; some fines	SW-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: B - 34E(2 - 3)

Date: 6/14/88

Remarks:

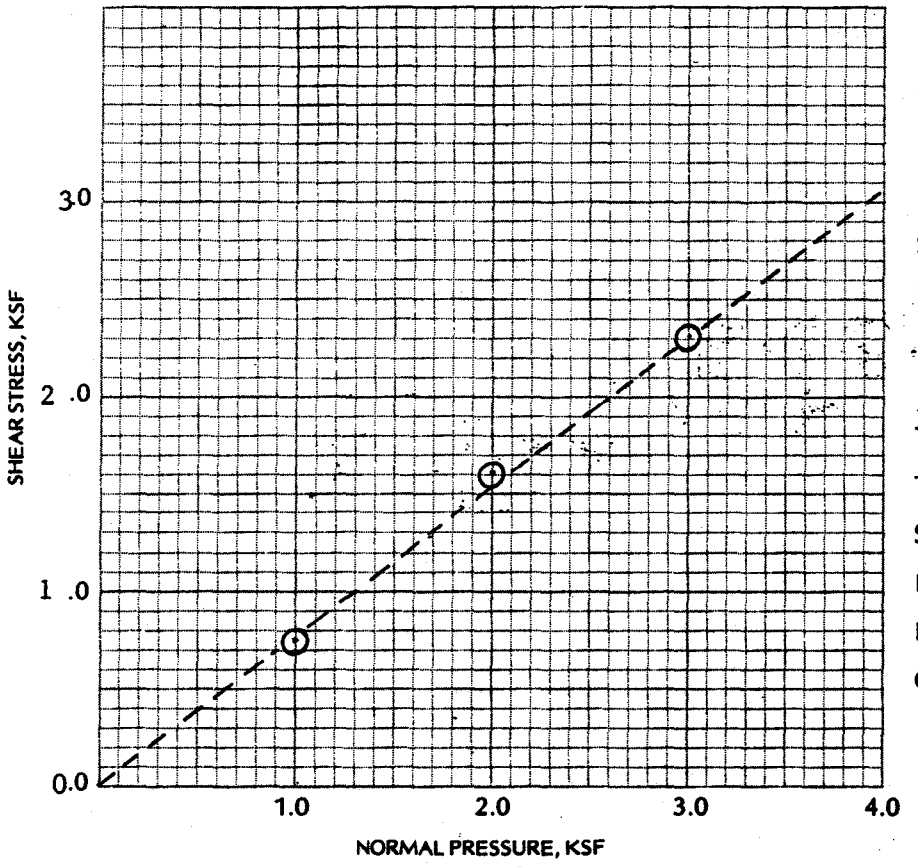
GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 133

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SM

Source of Material B-3E 5' - 6.5'

Sampled By J. Waldner Date 5-10-88

Submitted By M. Ali Date 7-8-88

Reviewed By E. Hoque Date 8-4-88

Test Procedure ASTM D3080- Single Shear

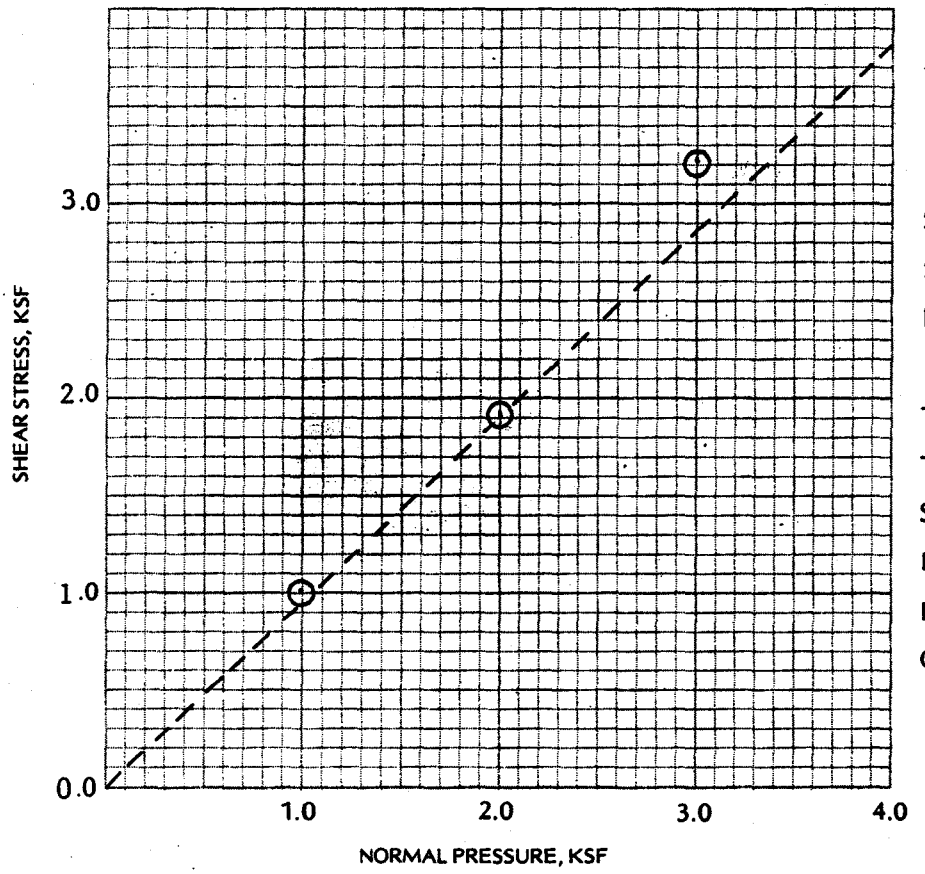
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 100

Initial Moisture Content, % 4.9

ϕ = 38 ° C = 0 Kips/Sq. Ft.



Type of Material SP

Source of Material B-9E 10' - 11.5'

Sampled By J. Waldner Date 5-10-88

Submitted By M. Ali Date 7-8-88

Reviewed By E. Hoque Date 8-4-88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 120

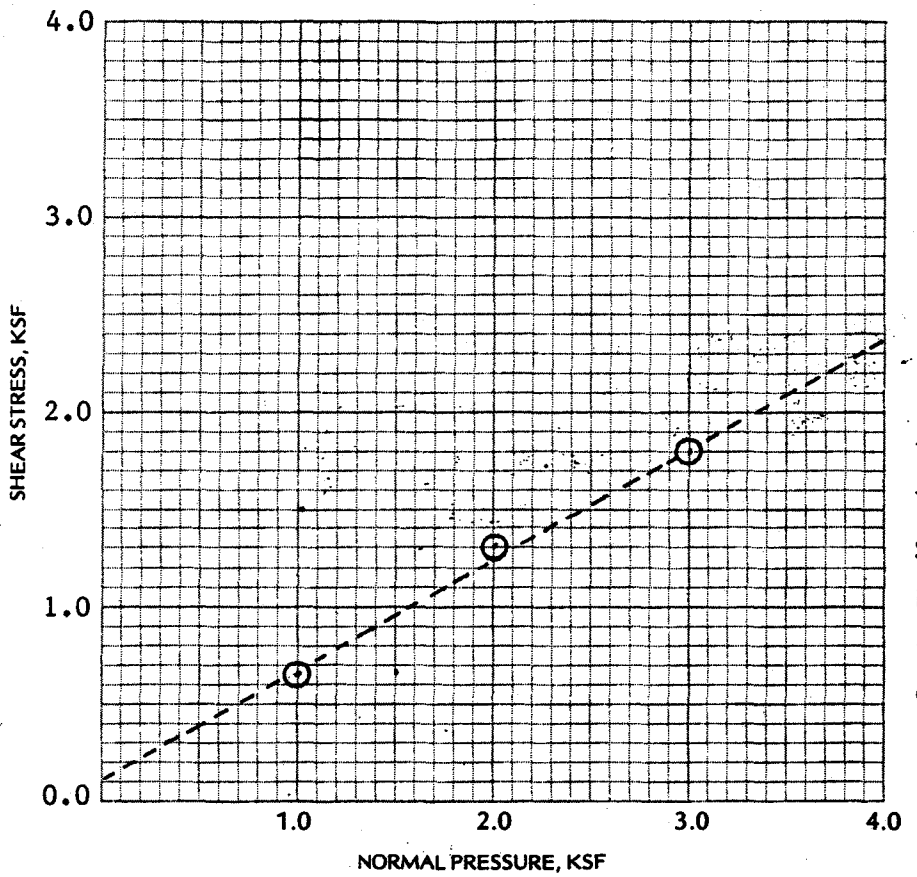
Initial Moisture Content, % 3

ϕ = 46 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SC

Source of Material B-5E 2' - 3'

Sampled By J. Waldner Date

Submitted By Ali Date 5/25/88

Reviewed By E. Hoque Date 6/04/88

Test Procedure ASTM D3080- Single Shear

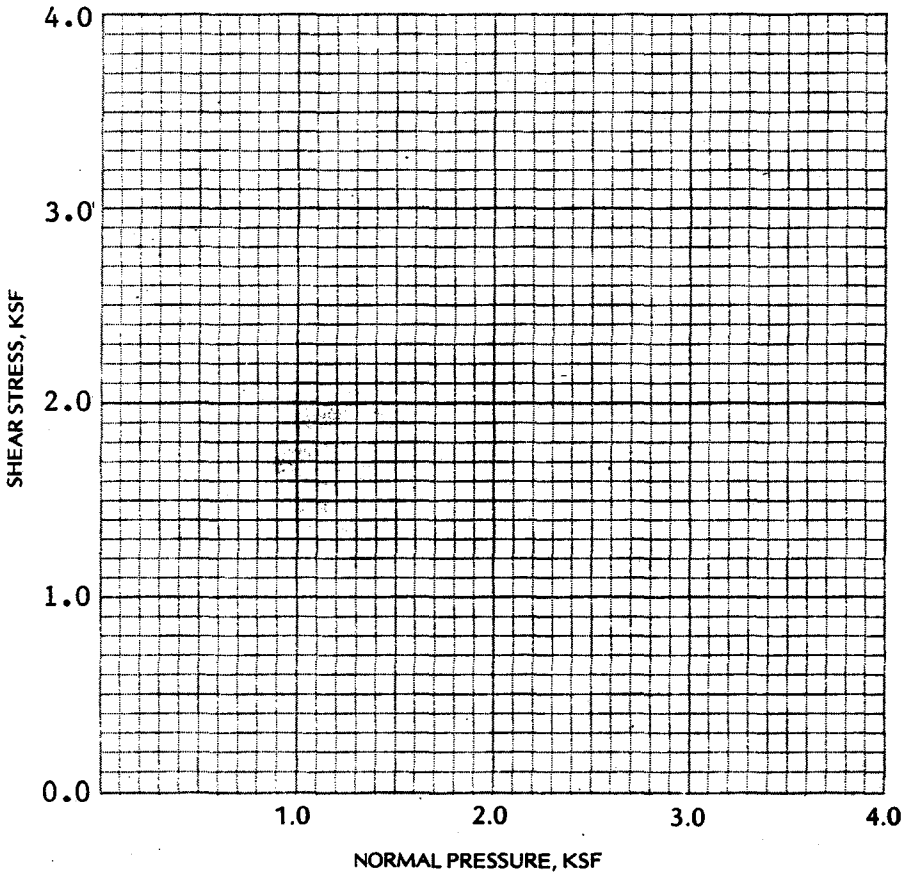
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 102

Initial Moisture Content, % 3.6

ϕ = 29 ° C = 0.1 Kips/Sq. Ft.



Type of Material SP

Source of Material B-10E (2'-3')

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/25/88

Reviewed By E. Hoque Date 6/9/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 100

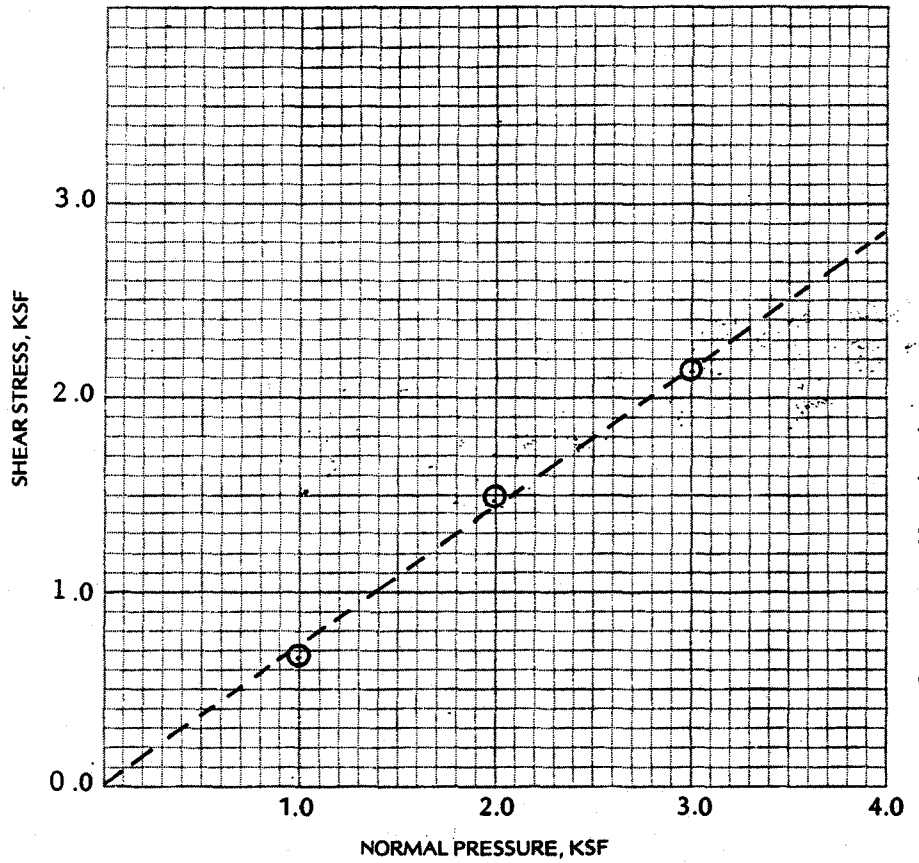
Initial Moisture Content, % 7.7

ϕ = 34 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP

Source of Material B-7E 2' - 3'

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/16/88

Reviewed By E. Hoque Date 5/27/88

Test Procedure ASTM D3080- Single Shear

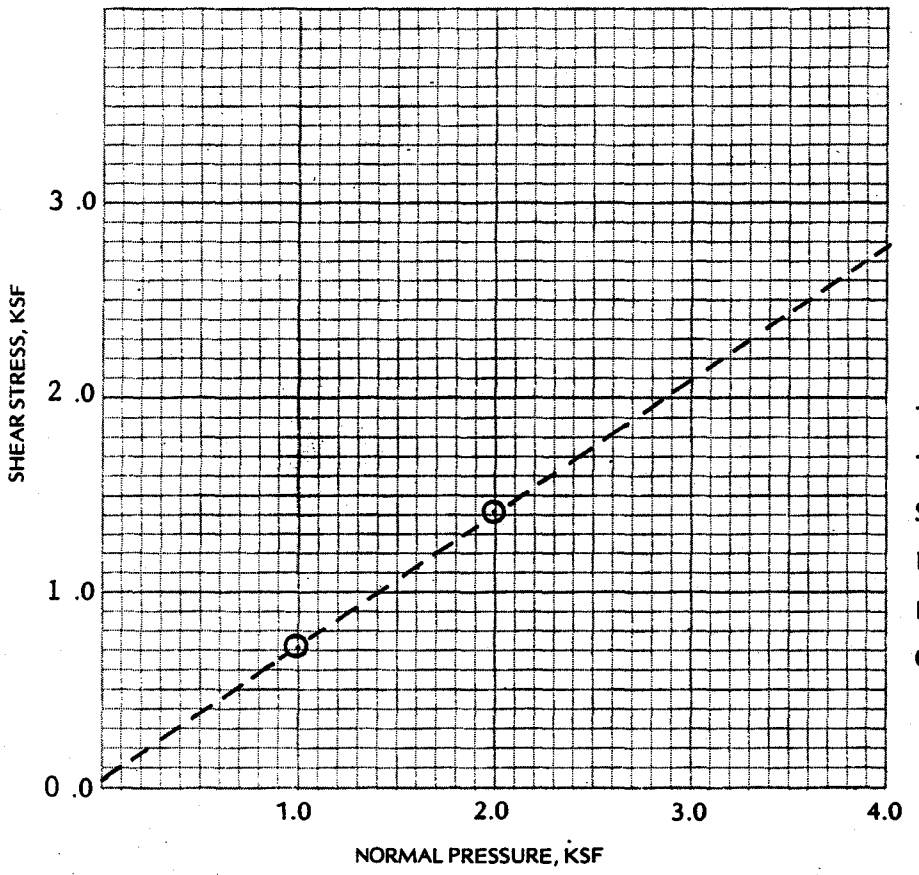
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 105

Initial Moisture Content, % 3.3

ϕ = 35 ° C = 0 Kips/Sq. Ft.



Type of Material SC

Source of Material B-8E 2' - 3'

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/16/88

Reviewed By E. Hoque Date 5/27/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 101

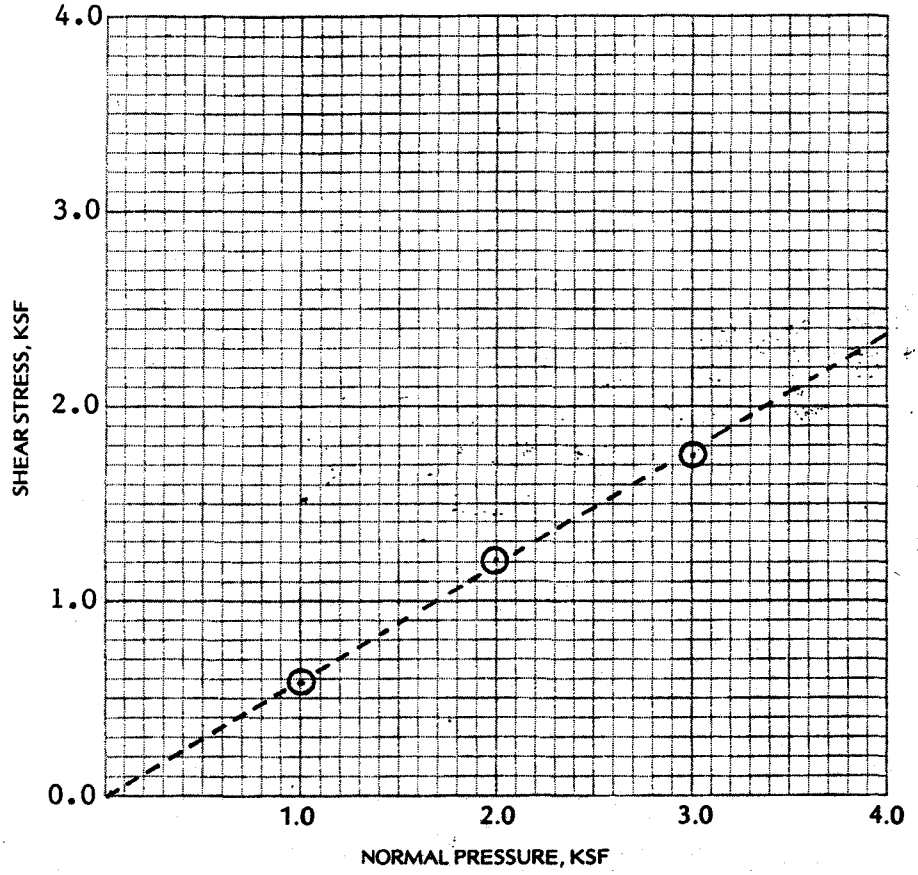
Initial Moisture Content, % 5.4

ϕ = 34 ° C = 0.1 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP

Source of Material B-14E (2'-3')

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/26/88

Reviewed By E. Hoque Date 6/9/88

Test Procedure ASTM D3080- Single Shear

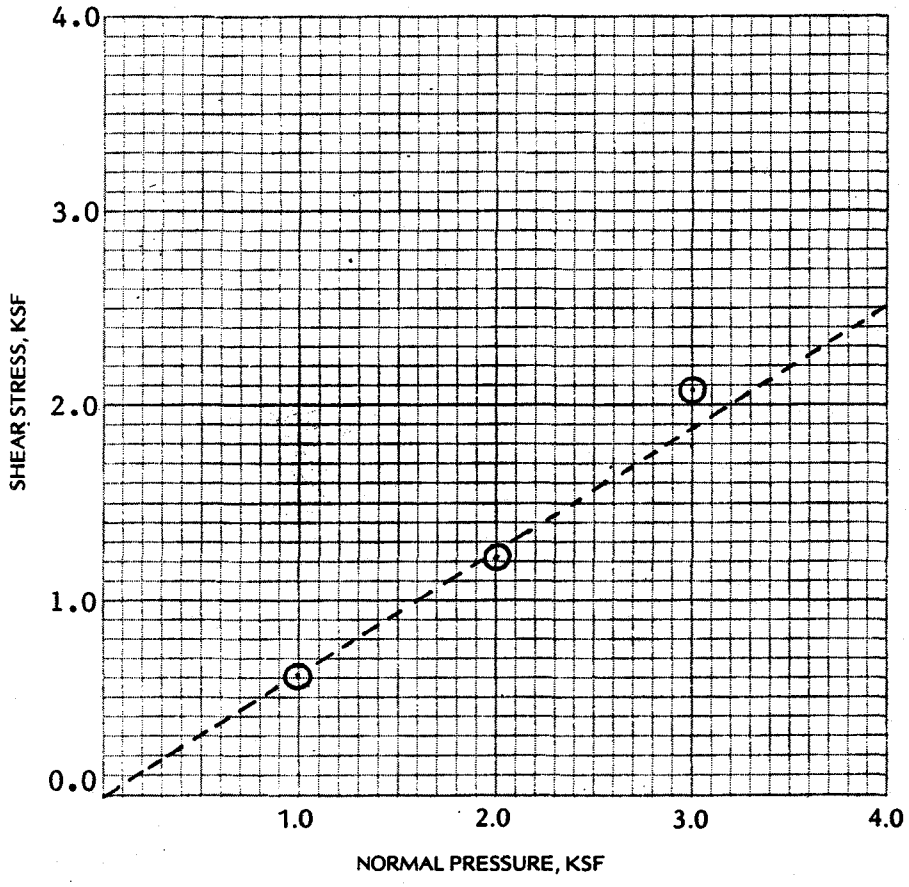
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 93

Initial Moisture Content, % 6.5

ϕ = 31 ° C = 0 Kips/Sq. Ft.



Type of Material SP

Source of Material B-15E (5'-6')

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/28/88

Reviewed By E. Hoque Date 6/9/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 98

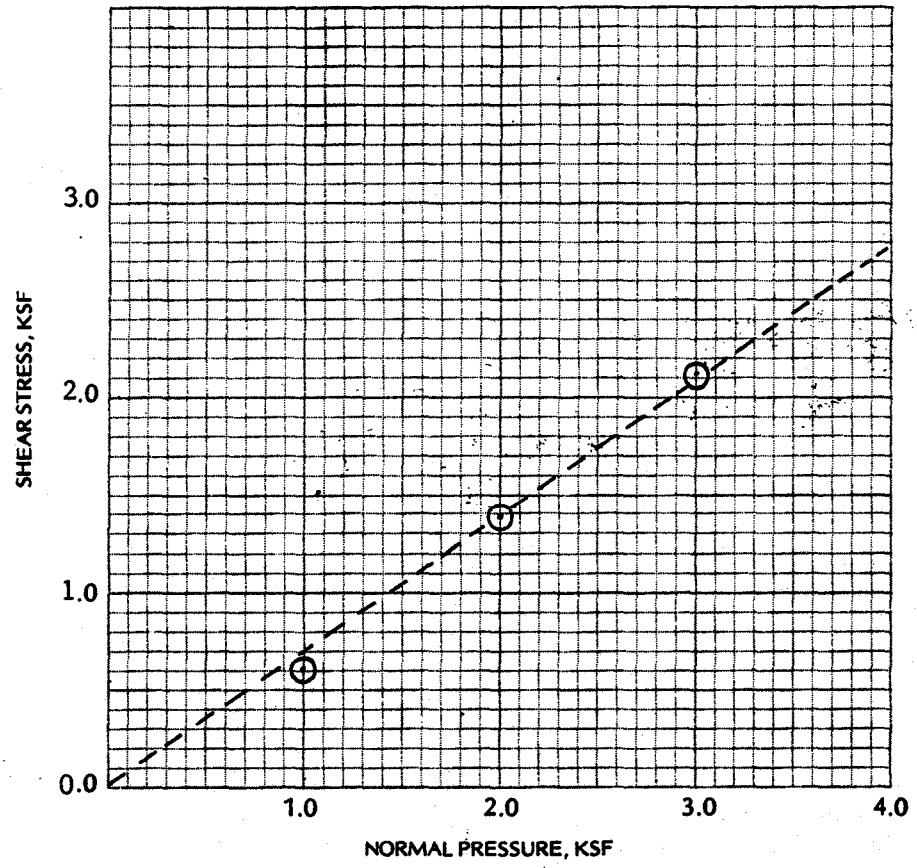
Initial Moisture Content, % 2.0

ϕ = 33 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP

Source of Material B-11E (2' - 3.5')

Sampled By J. Waldner Date 5-10-88

Submitted By M. Ali Date 7-21-88

Reviewed By Date 9-30-88

Test Procedure ASTM D3080- Single Shear

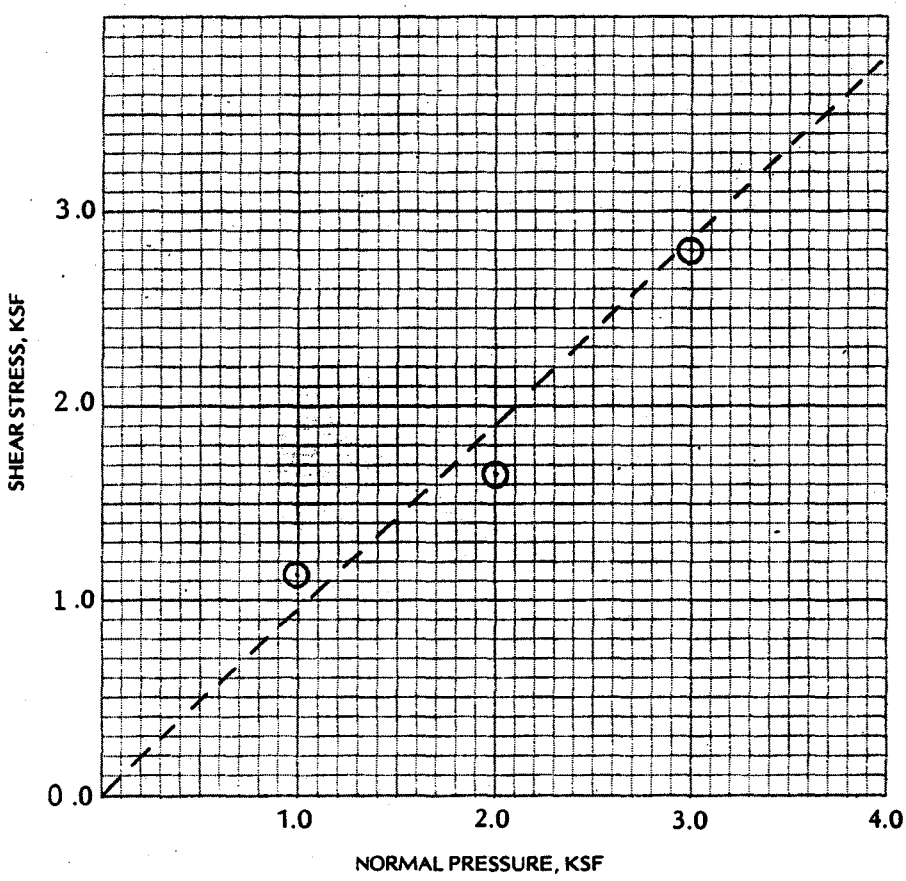
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 105

Initial Moisture Content, % 3.8

ϕ = 35 ° C = 0 Kips/Sq. Ft.



Type of Material SP

Source of Material B-18E (10' - 11.5')

Sampled By J. Waldner Date 5-9-88

Submitted By M. Ali Date 7-19-88

Reviewed By E. Hoque Date 9-30-88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 115

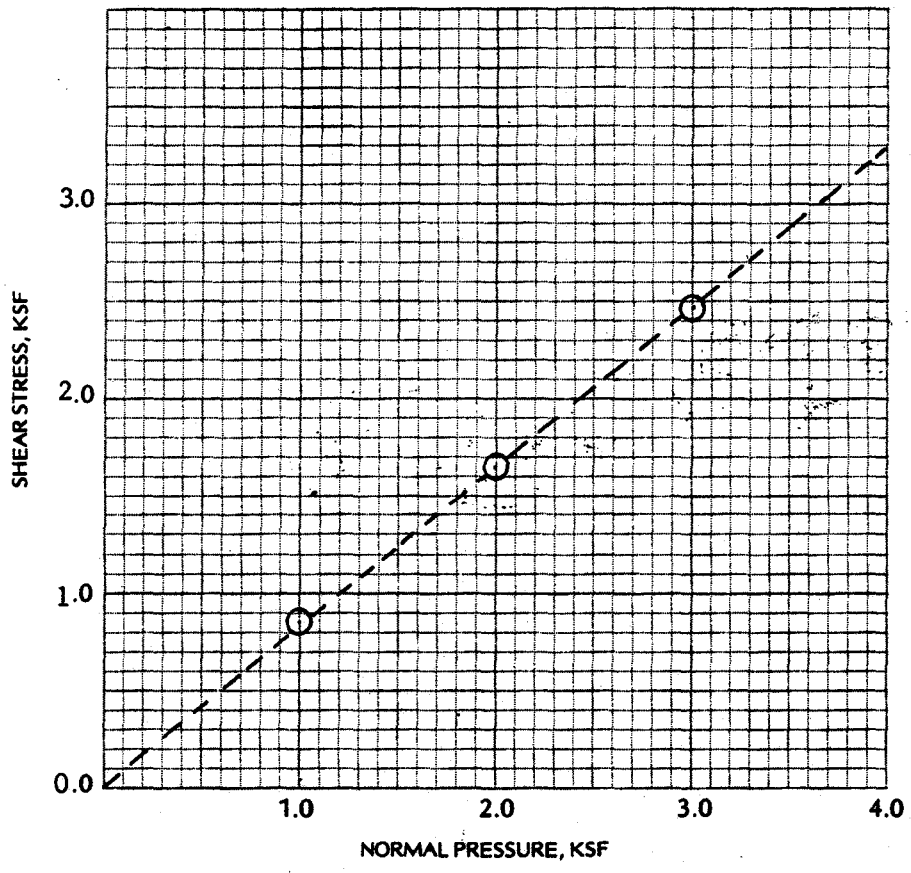
Initial Moisture Content, % 2.5

ϕ = 44 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP

Source of Material B-19E (2' - 3.5')

Sampled By J. Waldner Date 5-9-88

Submitted By M. Ali Date 7-28-88

Reviewed By E. Hoque Date 7-30-88

Test Procedure ASTM D3080- Single Shear

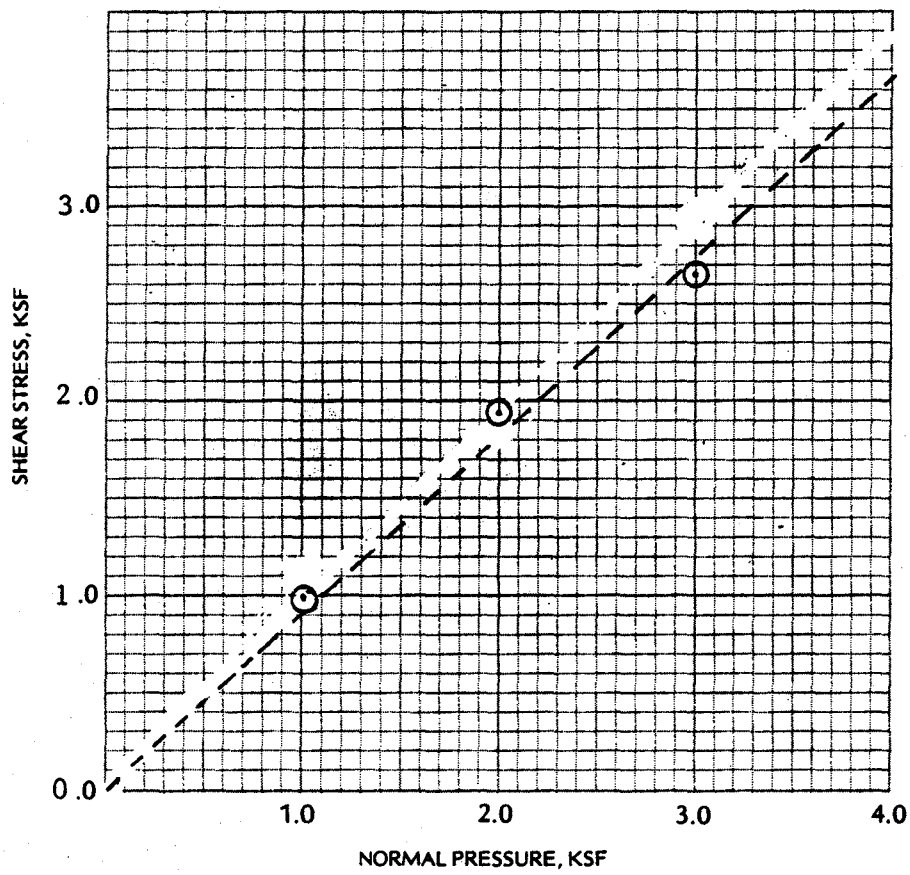
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 105

Initial Moisture Content, % 2.5

ϕ = 40 ° C = 0 Kips/Sq. Ft.



Type of Material SP

Source of Material B-20E (5' - 6.5')

Sampled By J. Waldner Date 5-9-88

Submitted By M. Ali Date 7-19-88

Reviewed By E. Hoque Date 8-31-88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 110

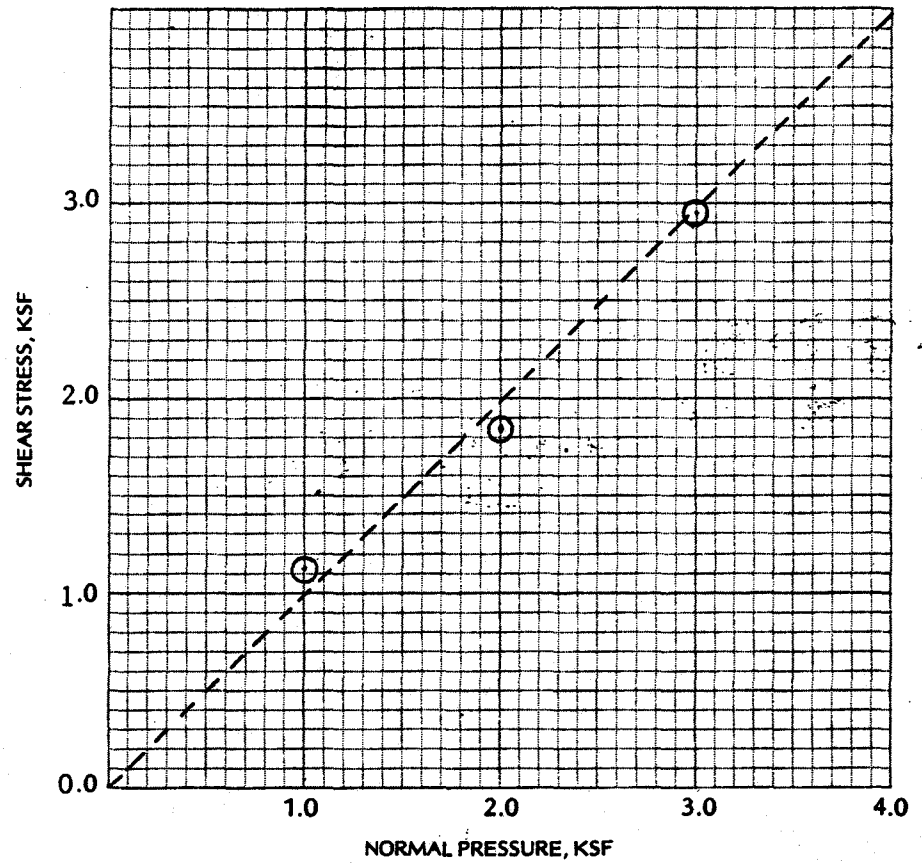
Initial Moisture Content, % 1.0

ϕ = 42 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP

Source of Material B-20E 10' - 11')

Sampled By J. Waldner Date 5-19-88

Submitted By M. Ali Date 7-20-88

Reviewed By E. Hoque Date 8-31-88

Test Procedure ASTM D3080- Single Shear

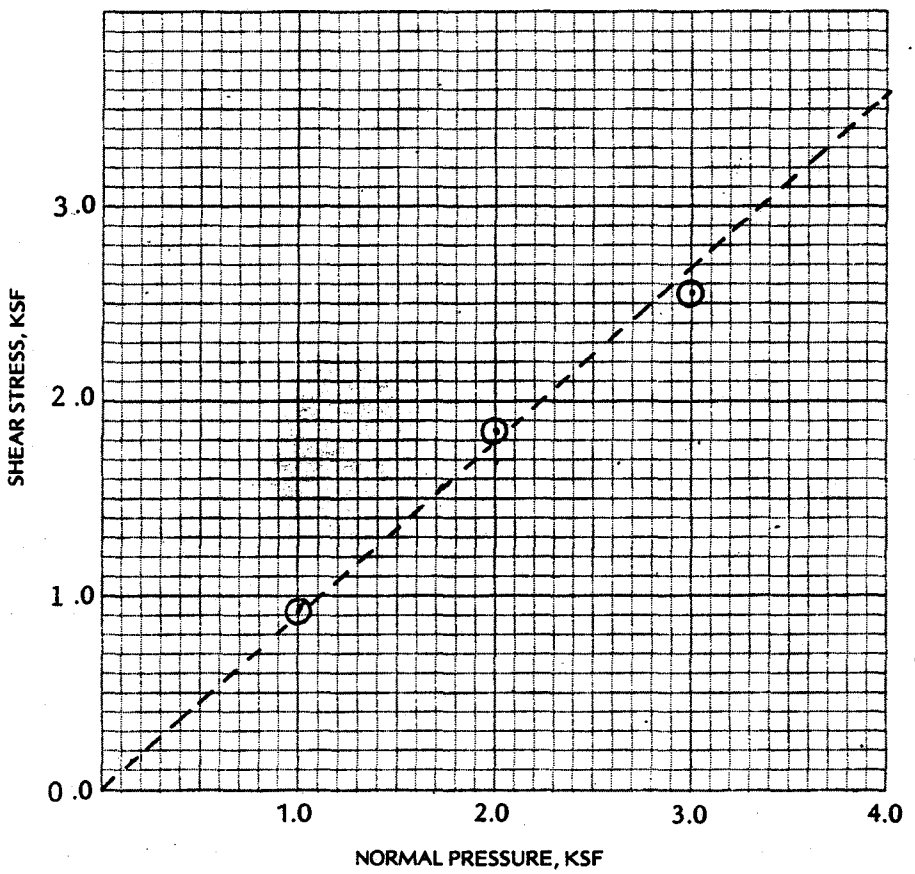
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 120

Initial Moisture Content, % 1.0

ϕ = 44 ° C = 0 Kips/Sq. Ft.



Type of Material SP

Source of Material B-21E (2' - 3.5')

Sampled By J. Waldner Date 5-9-88

Submitted By M. Ali Date 7-20-88

Reviewed By E. Hoque Date 8-31-88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 105

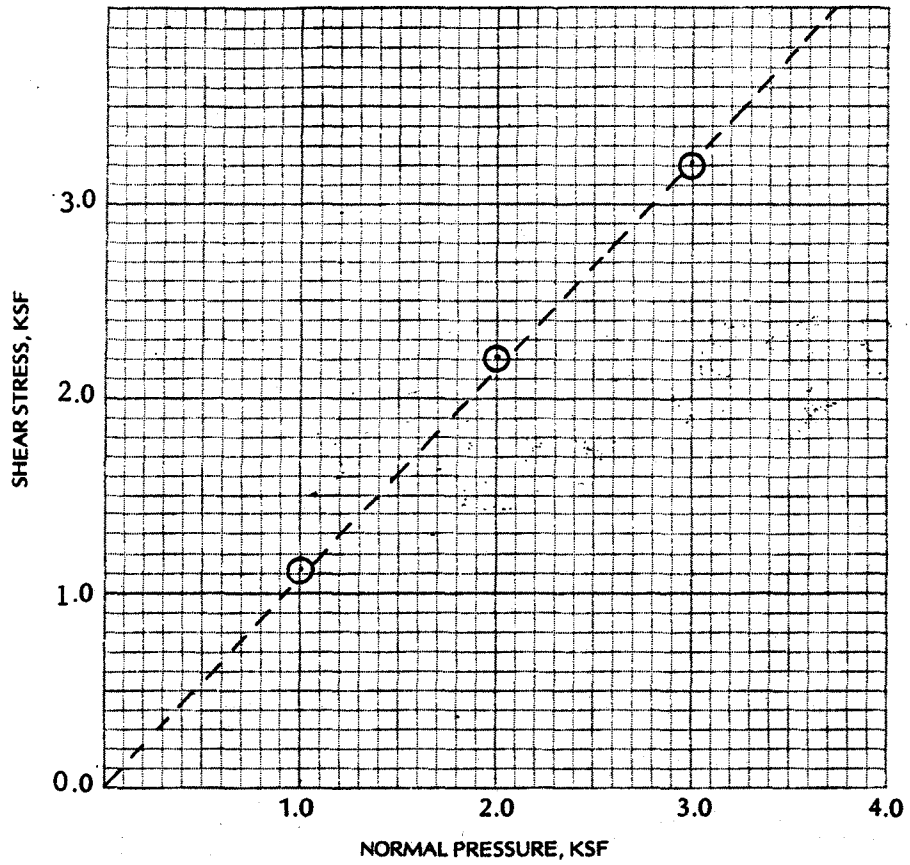
Initial Moisture Content, % 2.0

ϕ = 42 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material GP

Source of Material B-24E (10' - 11')

Sampled By J. Waldner Date 5-9-88

Submitted By M. Ali Date 7-20-88

Reviewed By E. Hoque Date 8-31-88

Test Procedure ASTM D3080- Single Shear

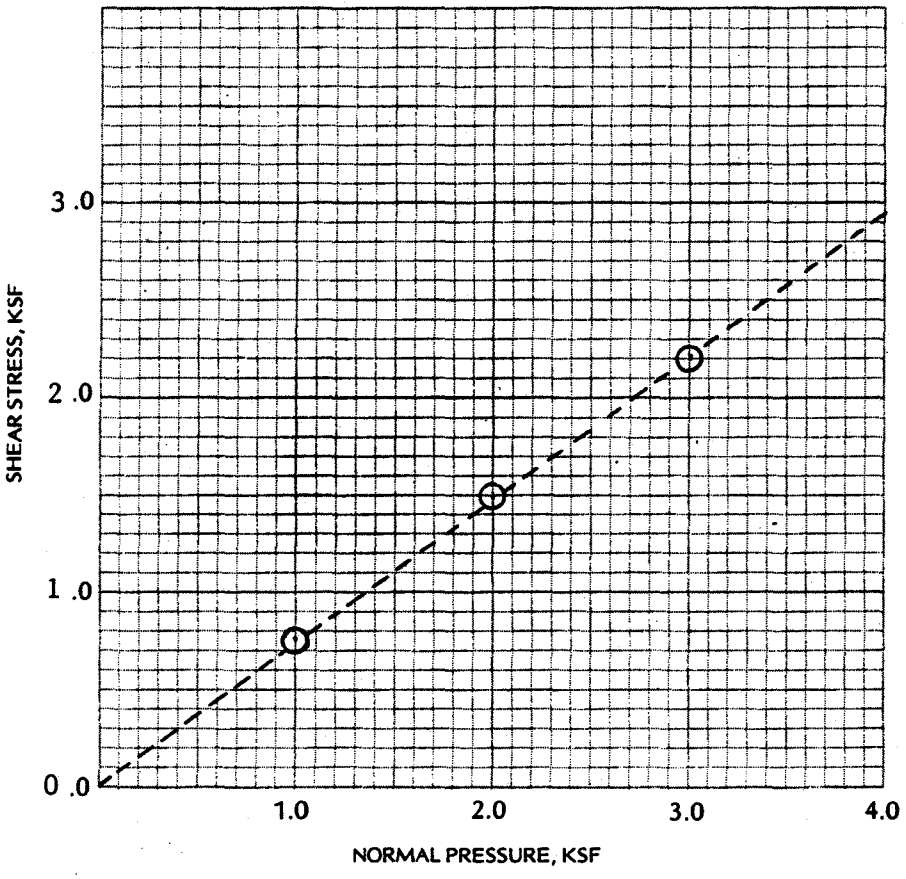
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 125

Initial Moisture Content, % 2.0

ϕ = 46 ° C = 0 Kips/Sq. Ft.



Type of Material SP

Source of Material B-32E (5' - 6.5')

Sampled By J. Waldner Date 5-11-88

Submitted By M. Ali Date 7-20-88

Reviewed By E. Hoque Date 8-31-88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 110

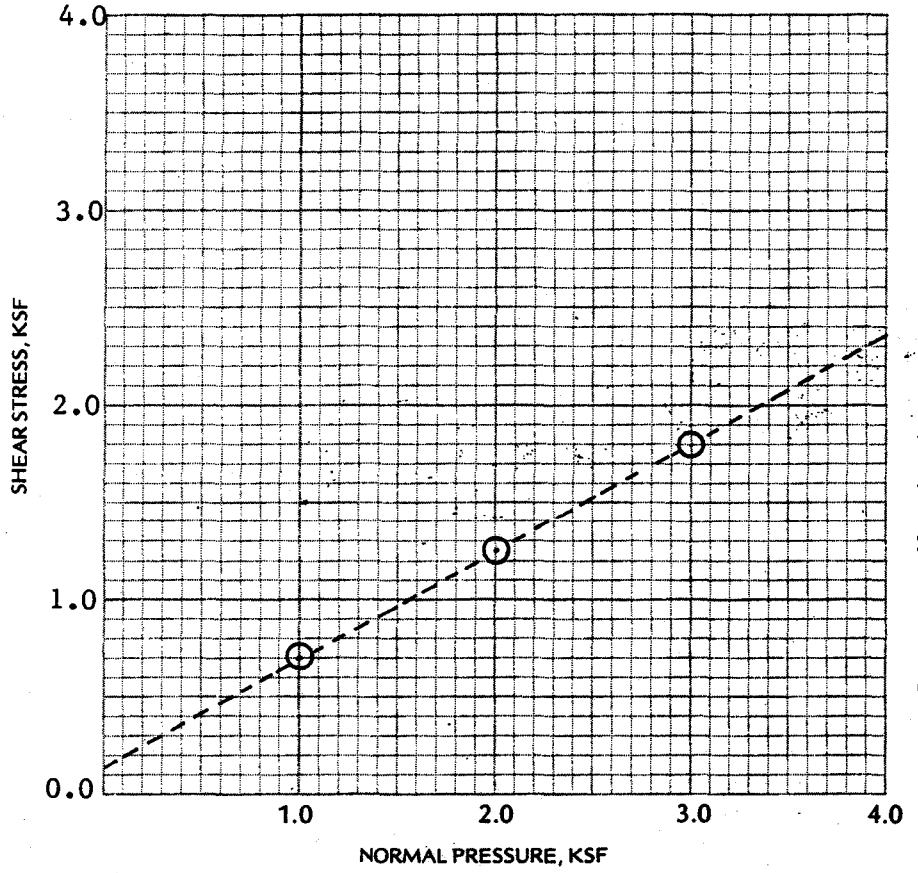
Initial Moisture Content, % 3.5

ϕ = 44 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SC

Source of Material B-27E (2'-3')

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/31/88

Reviewed By E. Hoque Date 6/9/88

Test Procedure ASTM D3080- Single Shear

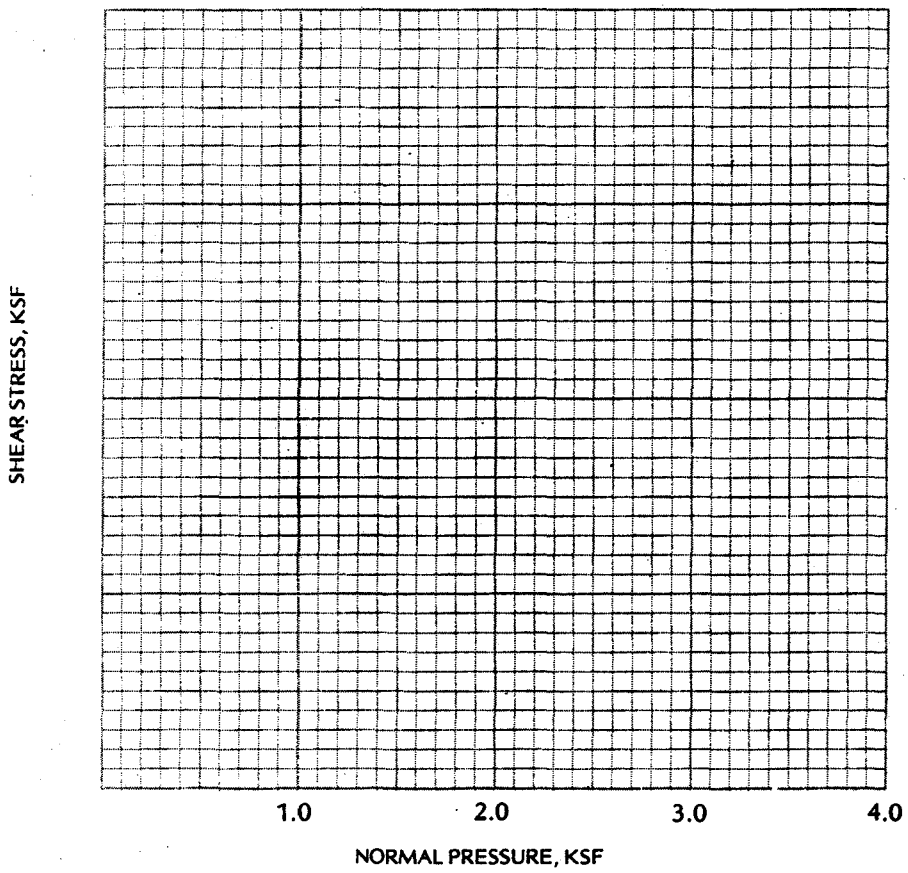
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 103

Initial Moisture Content, % 9.2

ϕ = 29 ° C = 0.1 Kips/Sq. Ft.



Type of Material

Source of Material

Sampled By Date

Submitted By Date

Reviewed By Date

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☐ Remolded

Initial Dry Density, pcf

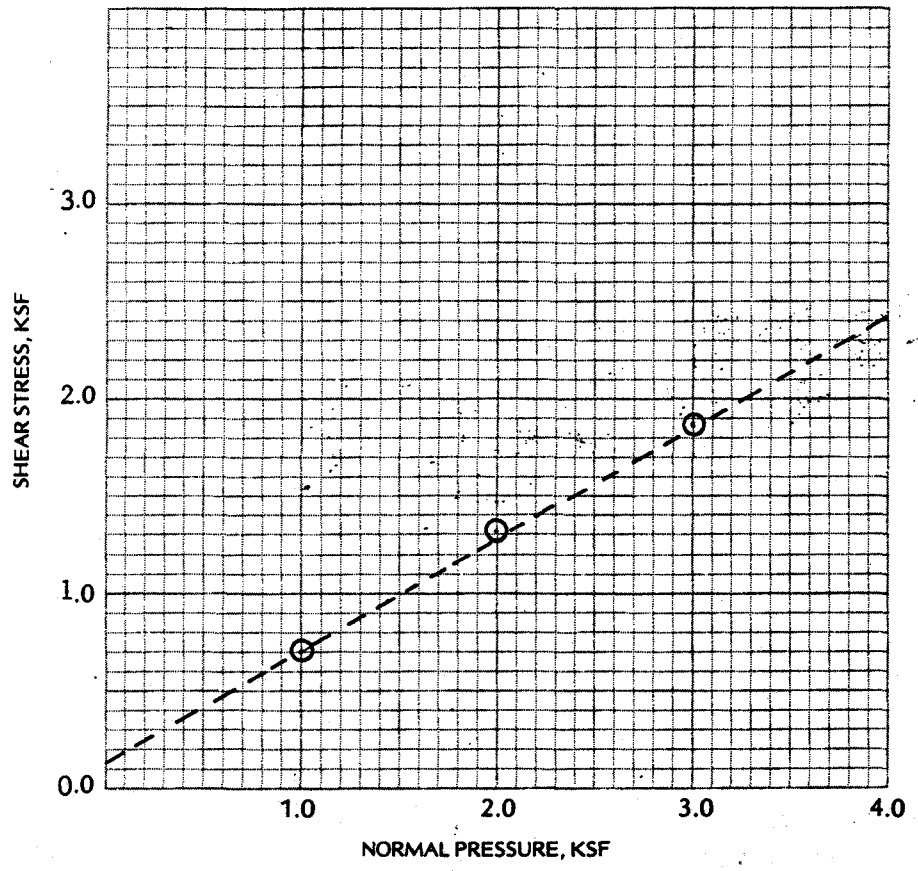
Initial Moisture Content, %

ϕ = ° C = Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SC

Source of Material B-6W (4' - 5')

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/06/88

Reviewed By E. Hoque Date 5/27/88

Test Procedure ASTM D3080- Single Shear

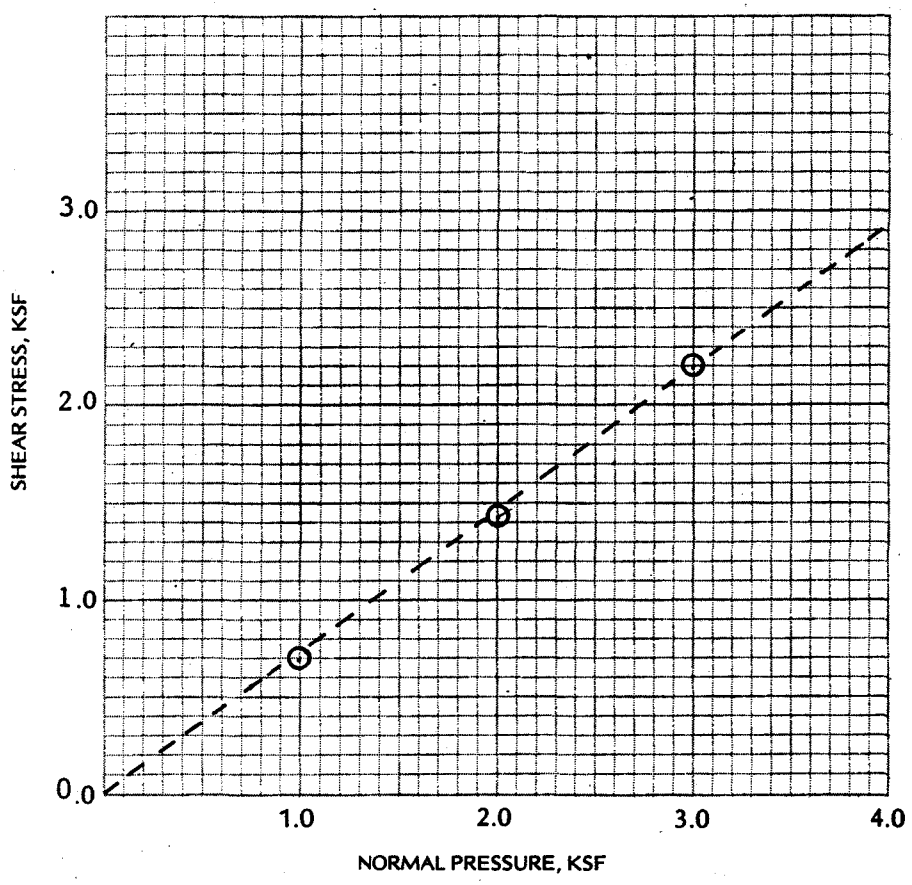
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 99

Initial Moisture Content, % 9.5

ϕ = 30 ° C = 0.1 Kips/Sq. Ft.



Type of Material SP

Source of Material B-8W (5' - 6')

Sampled By J. Waldner Date

Submitted By M. Ali Date 5/06/88

Reviewed By E. Hoque Date 5/27/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 108

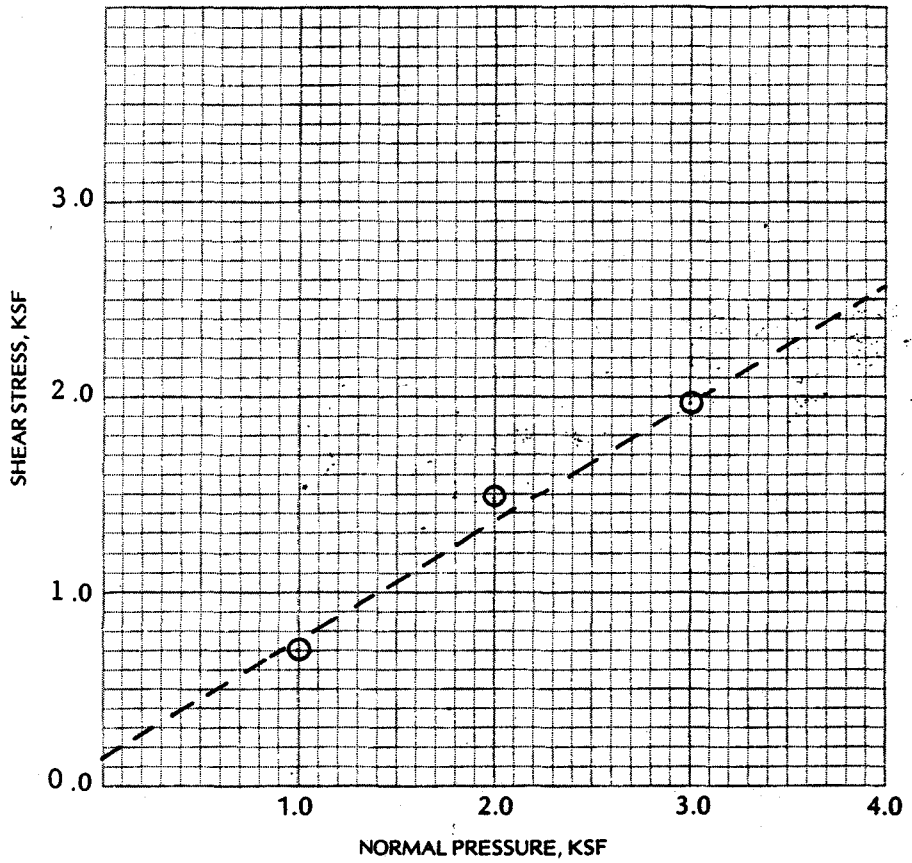
Initial Moisture Content, % 2.0

ϕ = 36 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP-SC

Source of Material B-12W (5' - 6')

Sampled By J. Waldner Date

Submitted By E. Hoque Date 5/06/88

Reviewed By E. Hoque Date 5/27/88

Test Procedure ASTM D3080- Single Shear

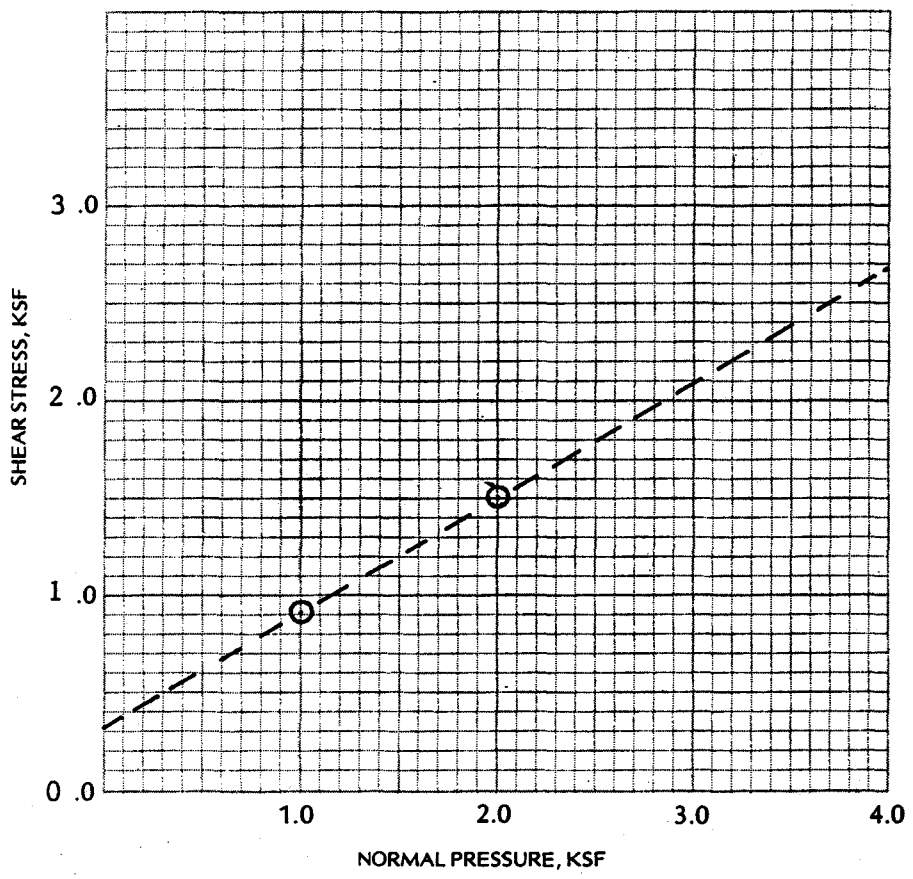
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 102

Initial Moisture Content, % 3.8

ϕ = 32 ° C = 0.1 Kips/Sq. Ft.



Type of Material SC

Source of Material 20W (2' - 3')

Sampled By J. Waldner Date

Submitted By E. Hoque Date 5/06/88

Reviewed By E. Hoque Date 5/27/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 107

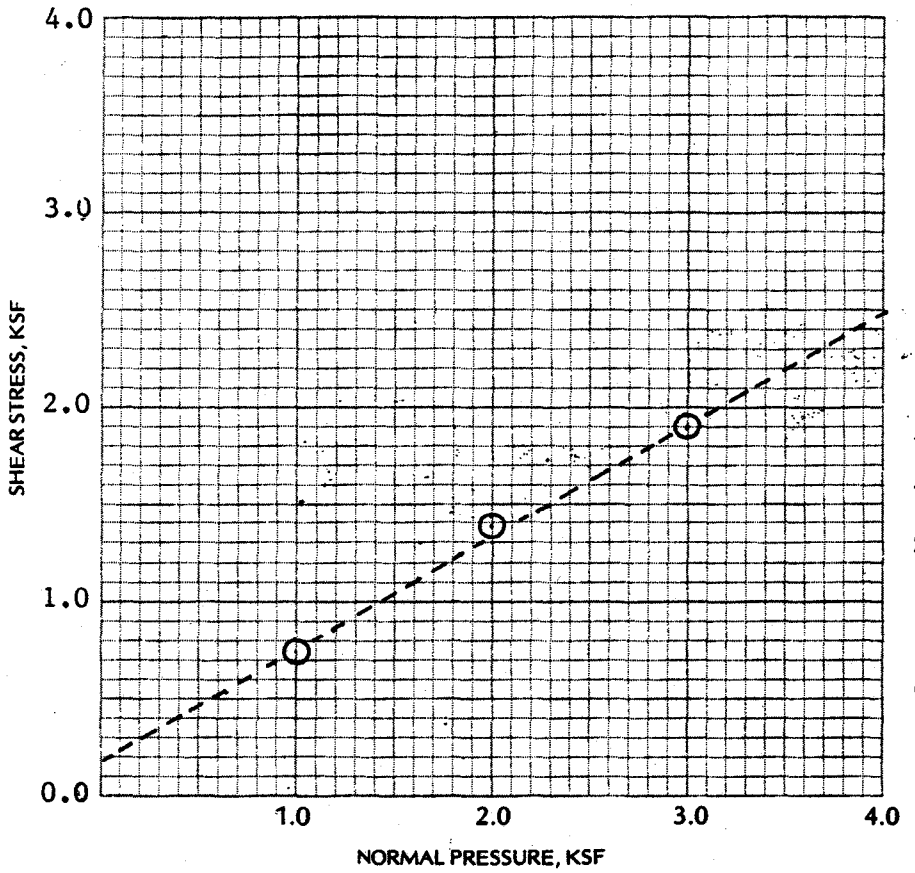
Initial Moisture Content, % 10.2

ϕ = 32 ° C = 0.3 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SC

Source of Material B-22W (4' - 5')

Sampled By J. Waldner Date 5/5/88

Submitted By M. Ali Date 5/23/88

Reviewed By E. HOque Date 6/4/88

Test Procedure ASTM D3080- Single Shear

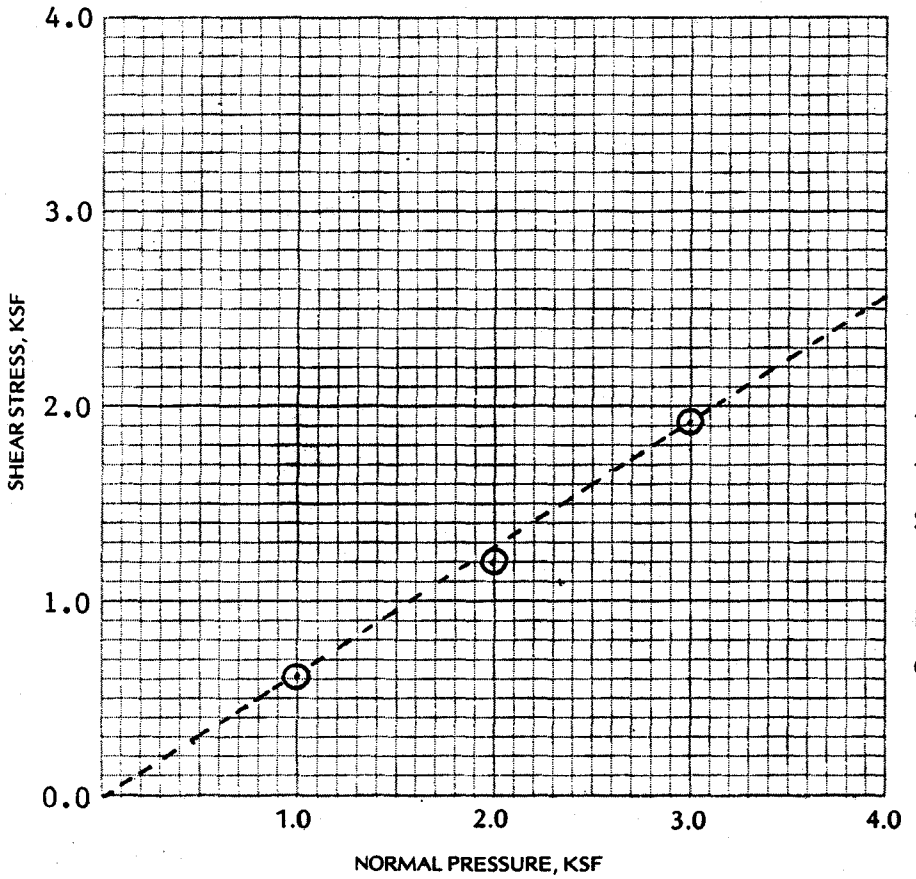
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 107

Initial Moisture Content, % 5.9

ϕ = 29 ° C = 0.2 Kips/Sq. Ft.



Type of Material SC

Source of Material B-25W (2' - 3')

Sampled By J. Waldner Date 5/5/88

Submitted By M. Ali Date 5/23/88

Reviewed By E. HOque Date 6/4/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 85

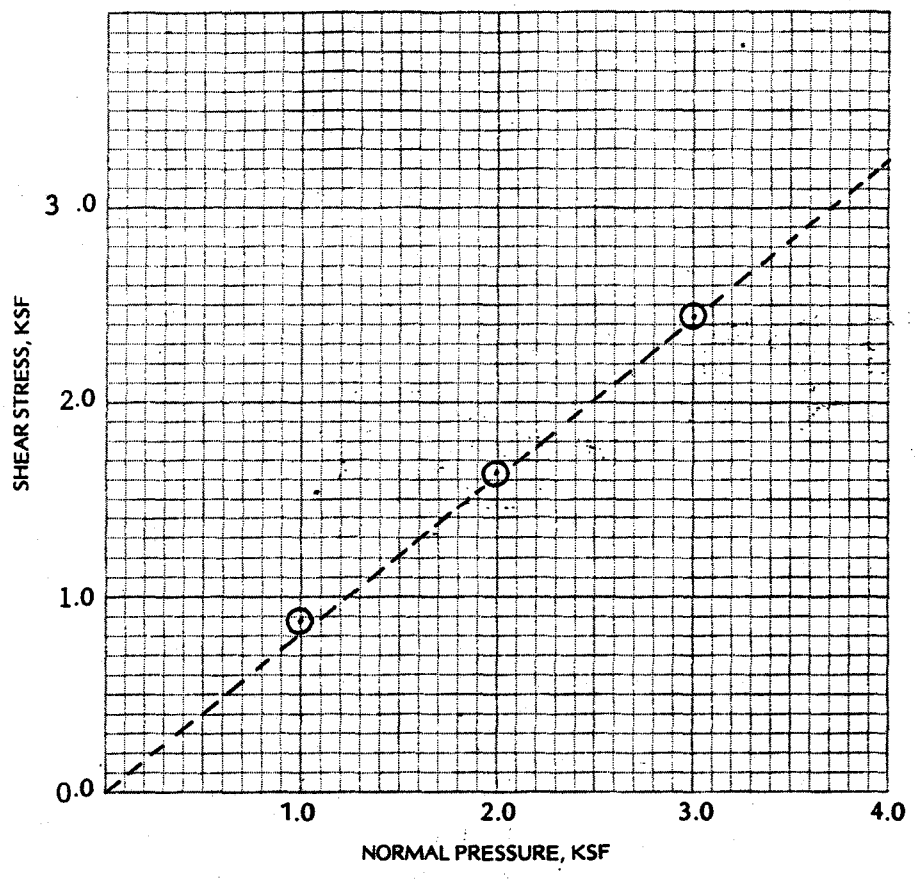
Initial Moisture Content, % 8.4

ϕ = 32 ° C = 0 Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SP

Source of Material B-30BW (2' - 3.5')

Sampled By J. Waldner Date 5-6-88

Submitted By M. Ali Date 7-28-88

Reviewed By E. Hoque Date 8-4-88

Test Procedure ASTM D3080- Single Shear

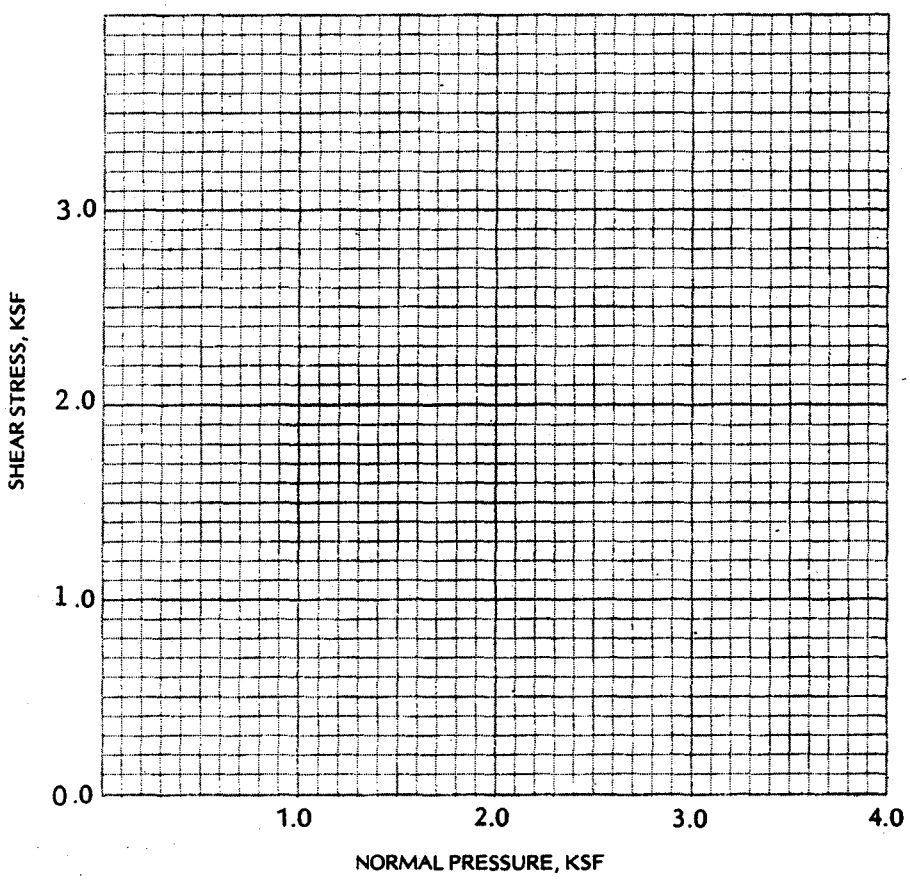
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☒ Remolded

Initial Dry Density, pcf 105

Initial Moisture Content, % 2.0

ϕ = 40 ° C = 0 Kips/Sq. Ft.



Type of Material

Source of Material

Sampled By Date

Submitted By Date

Reviewed By Date

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☐ Undisturbed ☐ Remolded

Initial Dry Density, pcf

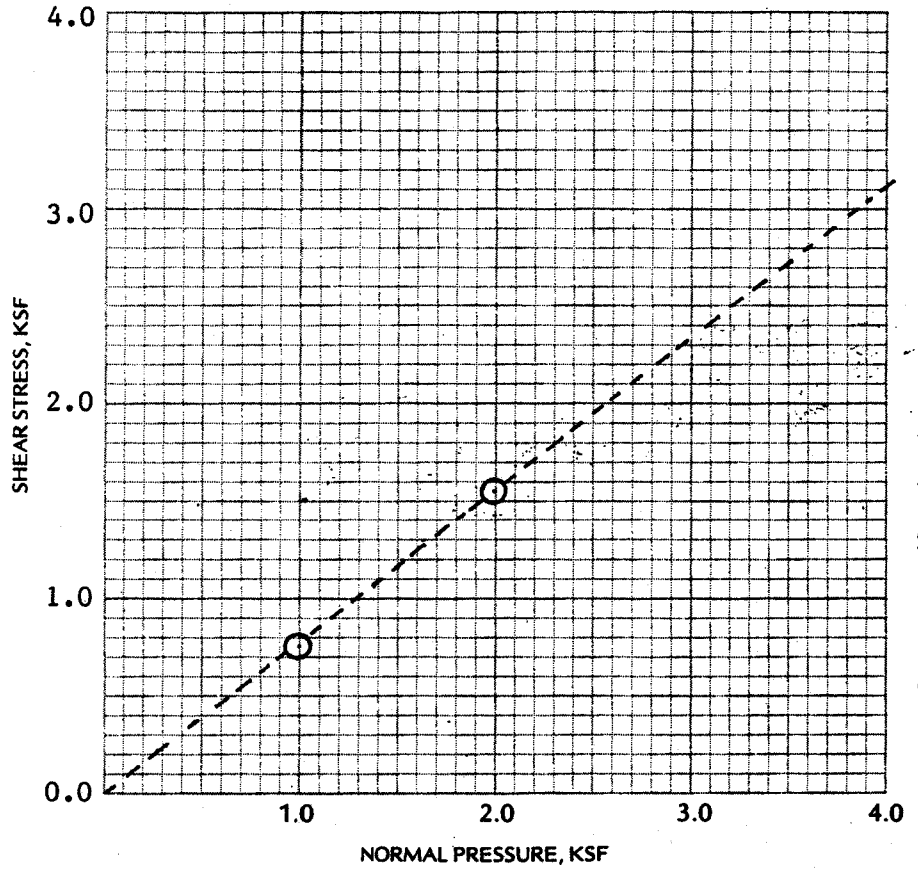
Initial Moisture Content, %

ϕ = ° C = Kips/Sq. Ft.

DIRECT SHEAR TEST

Job No. 2128J068

Lab/Invoice No.



Type of Material SC

Source of Material B-30W (2' - 3')

Sampled By J. Waldner Date 5/6/88

Submitted By M. Ali Date 5/24/88

Reviewed By E. Hoque Date 6/4/88

Test Procedure ASTM D3080- Single Shear

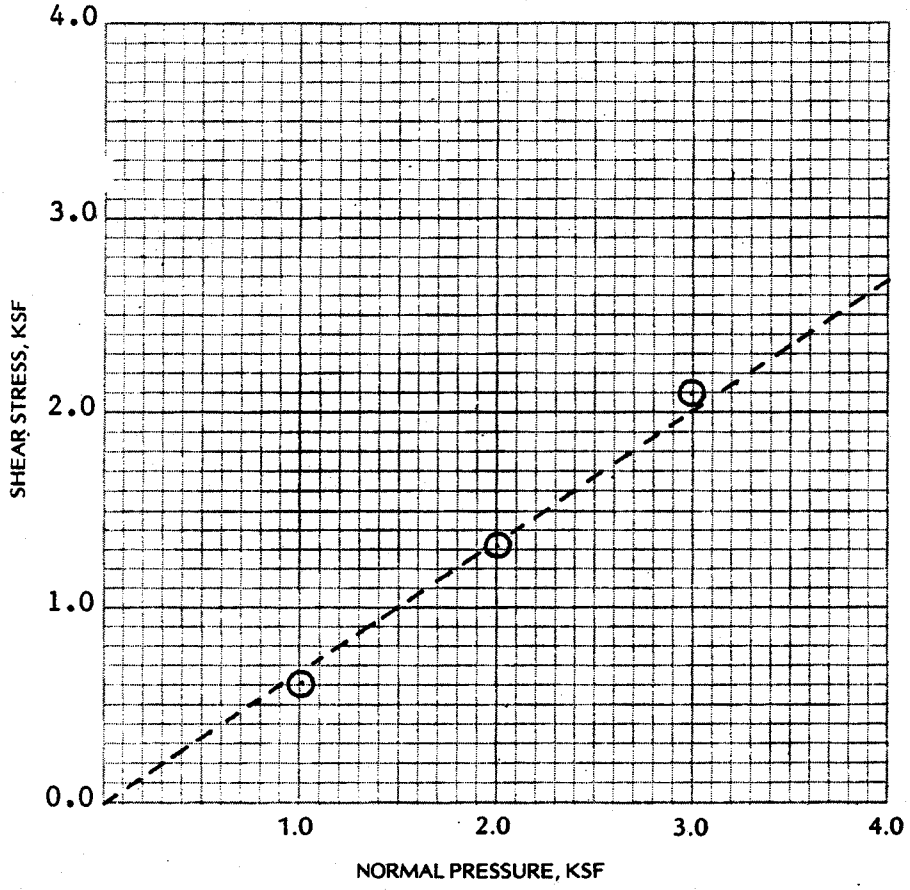
Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 73

Initial Moisture Content, % 11.6

ϕ = 0 ° C = 38 Kips/Sq. Ft.



Type of Material CL-ML

Source of Material B-31W (2' - 3')

Sampled By J. Waldner Date 5/6/88

Submitted By M. Ali Date 5/24/88

Reviewed By E. Hoque Date 6/4/88

Test Procedure ASTM D3080- Single Shear

Test Condition: —— InSitu ---- Saturated

Sample Condition: ☒ Undisturbed ☐ Remolded

Initial Dry Density, pcf 80

Initial Moisture Content, % 7.9

ϕ = 37 ° C = 0 Kips/Sq. Ft.

Coe and Van Loo
Job No. 2128J068

COEFFICIENT OF PERMEABILITY

Sample Identification		Soil Class.	Initial Density (pcf)	Moisture Content %	Coefficient of Permeability (cm/sec)
Boring No.	Depth (feet)				
B-7W	2-3	SC	102	6.8	$2X10^{-5}$
B-21W	2-3	SP	105	3.8	$3X10^{-3}$
B-22W	2-3	SC	98	6.2	$2X10^{-5}$
B-6E	2-3	SM	129	4.8	$6X10^{-5}$
B-9E	5-6	SP	95	1.2	$3X10^{-3}$
B-11E	5-6	SP	92	2.9	$6X10^{-3}$
B-14E	5-6	SP	106	1.5	$4X10^{-3}$
B-23E	2-3	SP	95	2.0	$1X10^{-3}$
B-27E	5-6	SP	108	2.4	$4X10^{-3}$

Coe and Van Loo
Job No. 2128J068

SOLUBLE SULFUR CONTENT

Boring No.	Depth (foot)	Soil Class.	Sulfur (ppm)
7W	2-3	SC	29
12W	2-3	SC	20
21W	2-3	SM	165
9E	5-6	SP	170
14E	5-6	SP	9
23E	2-3	SP	50
27E	5-6	SP	13

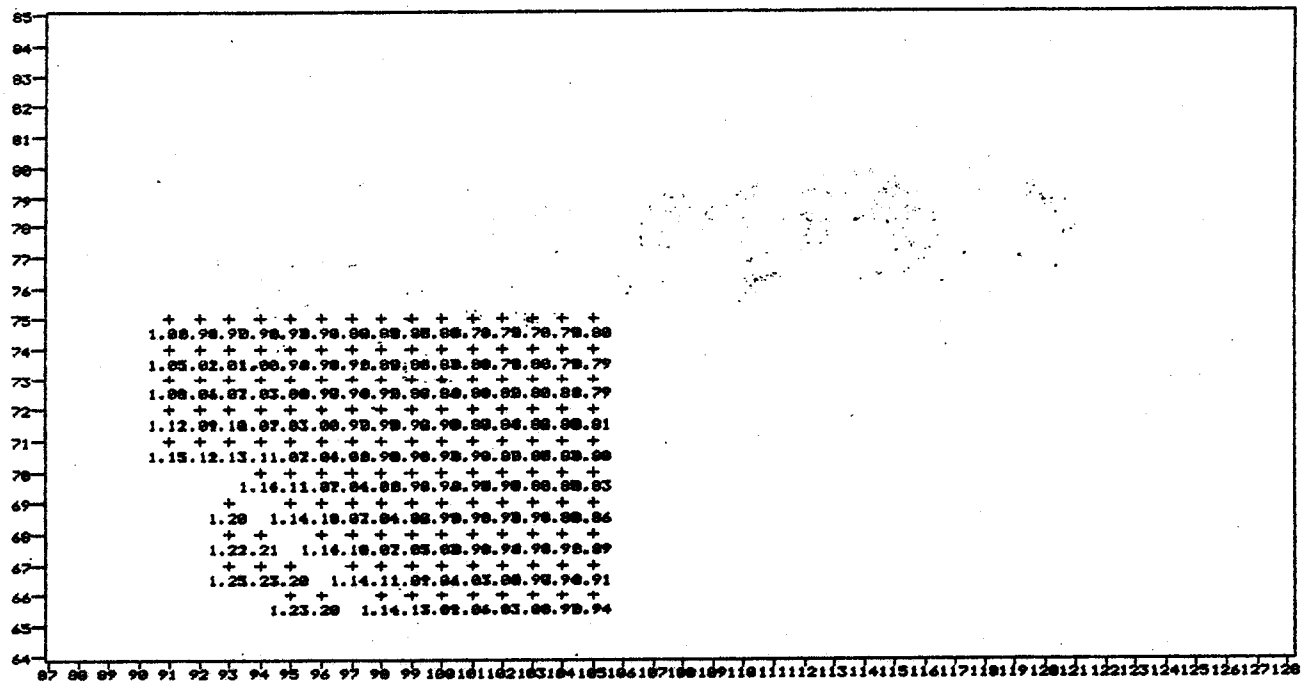
SB-SLOPE

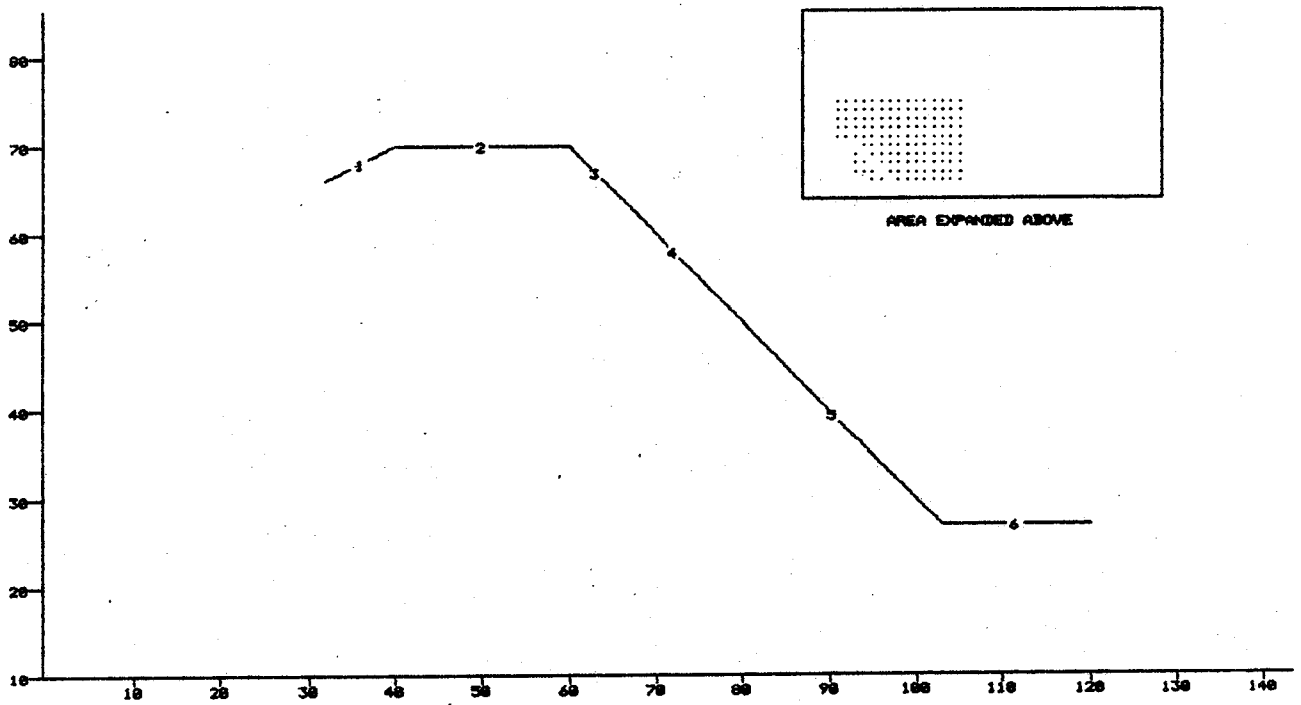
Simplified Bishop Slope Stability Analysis

PROJECT: NEW RIVER

LOCATION: OLIVE AVENUE TO BETHANY HOME ROAD

FILE: SLOPE





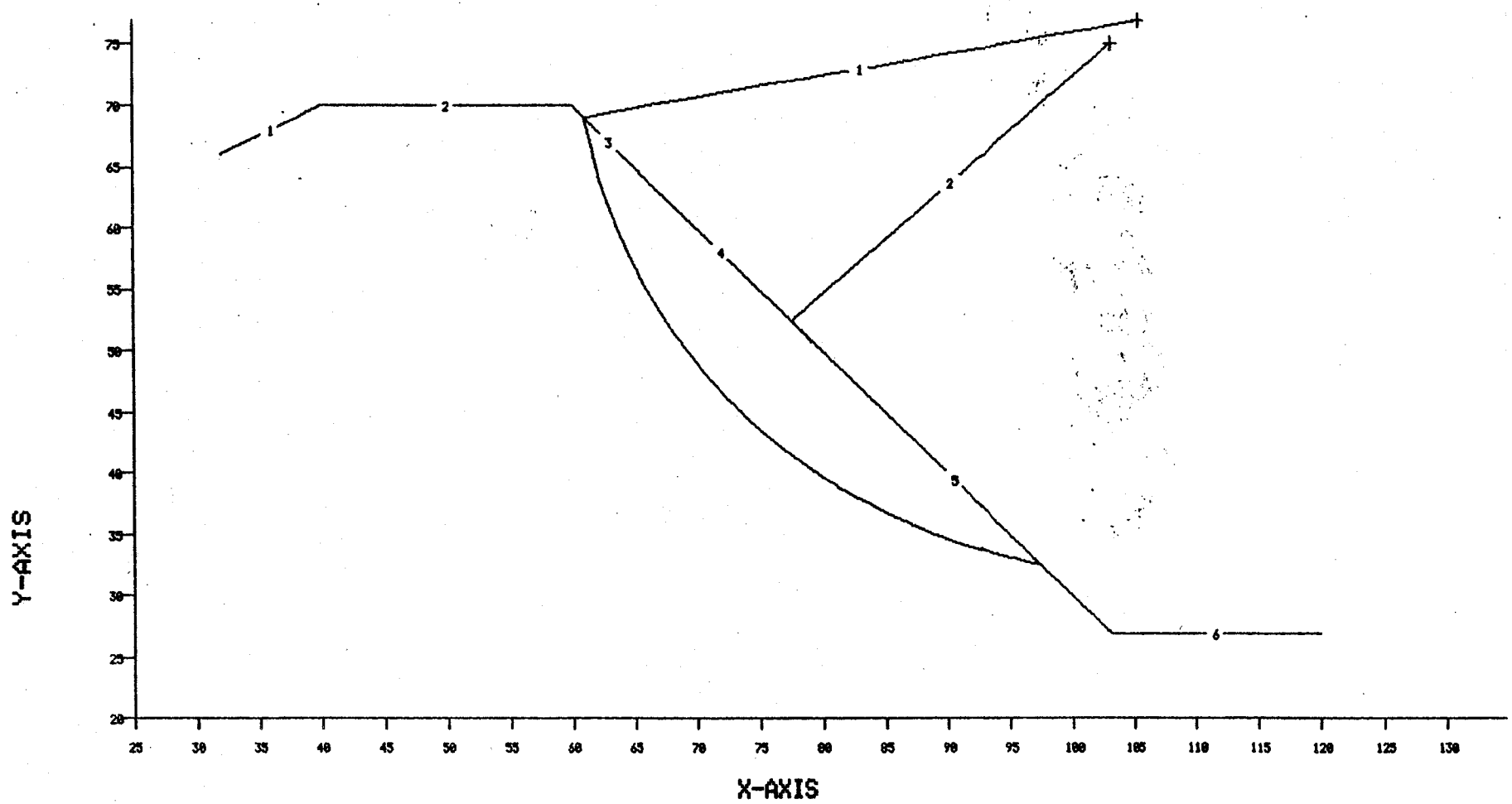
Western Technologies Inc. - Phoenix, AZ

SB-SLOPE

Simplified Bishop Slope Stability Analysis

PROJECT: NEW RIVER
LOCATION: OLIVE AVENUE TO BETHANY HOME ROAD
FILE: SLOPE
COMPLETE SLOPE CROSS SECTION

CIRCLE	X	Y	RADIUS	FS
1	105.3	76.9	45.0	1.00
2	103.0	75.0	34.0	0.78



Western Technologies Inc. - Phoenix, AZ

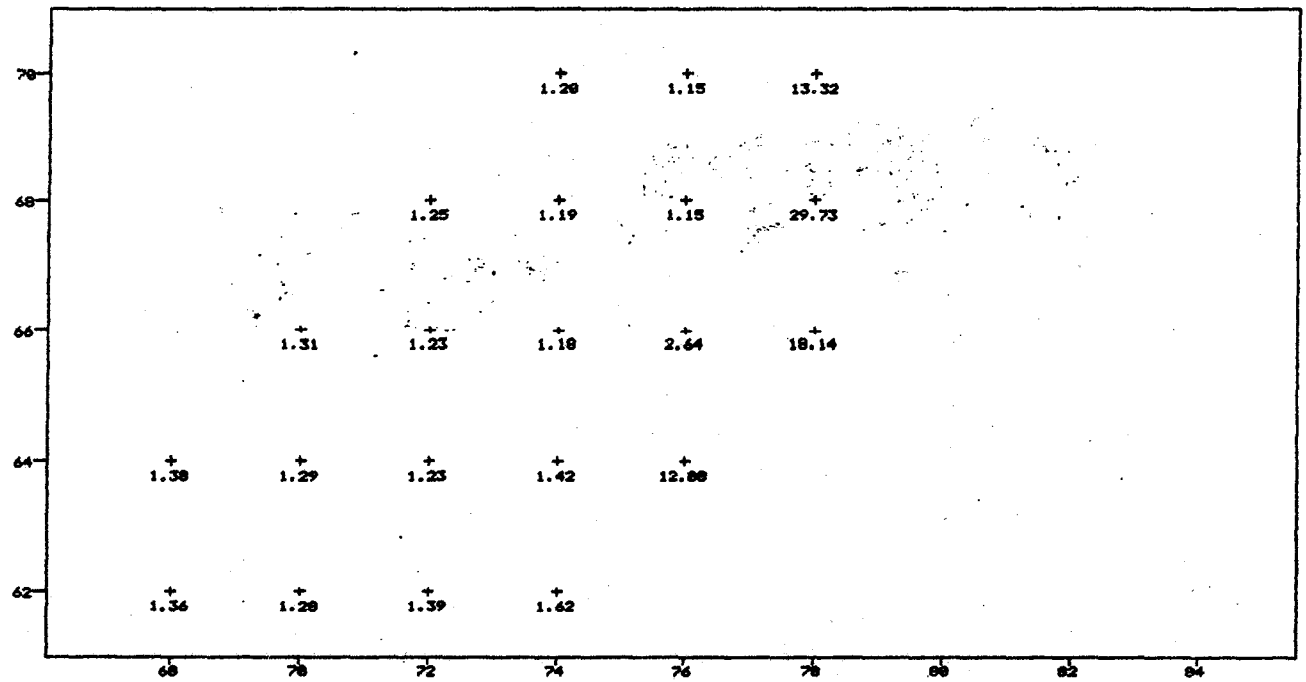
SB-SLOPE

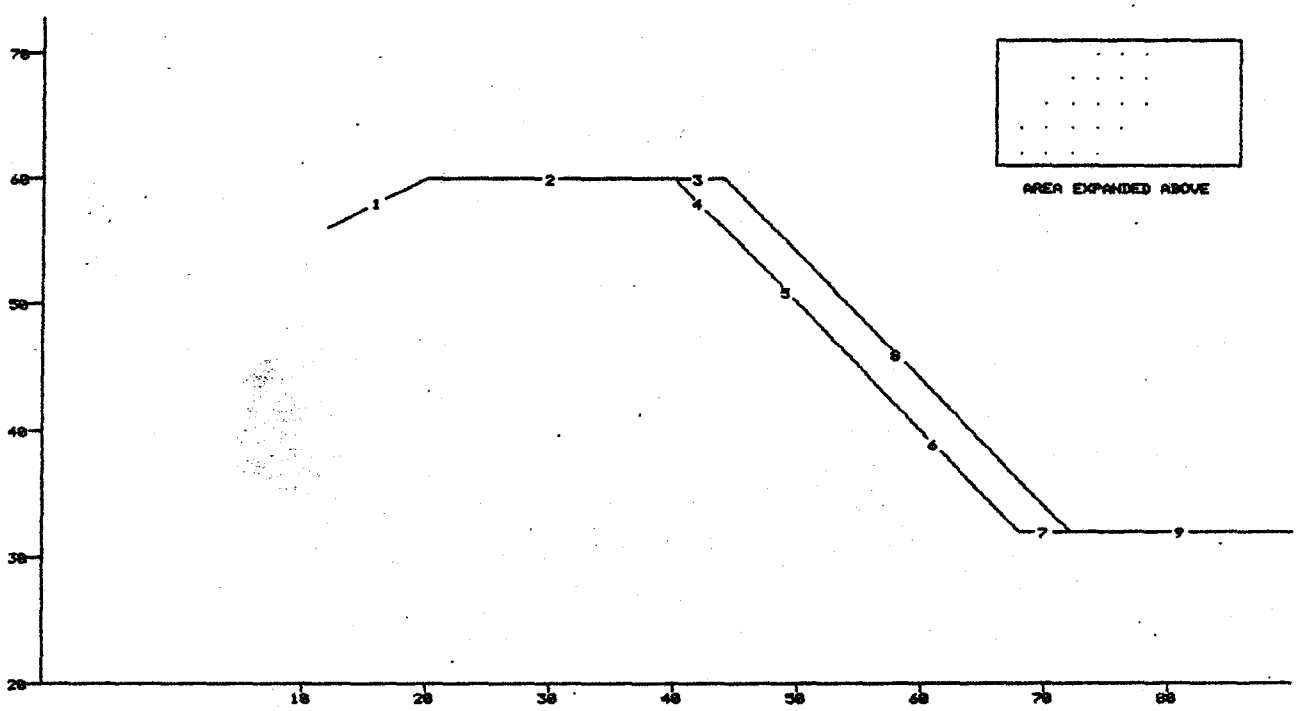
Simplified Bishop Slope Stability Analysis

PROJECT: NEW RIVER

LOCATION: OLIVE AVENUE TO BETHANY HOME ROAD

FILE: SUR4





SB-SLOPE

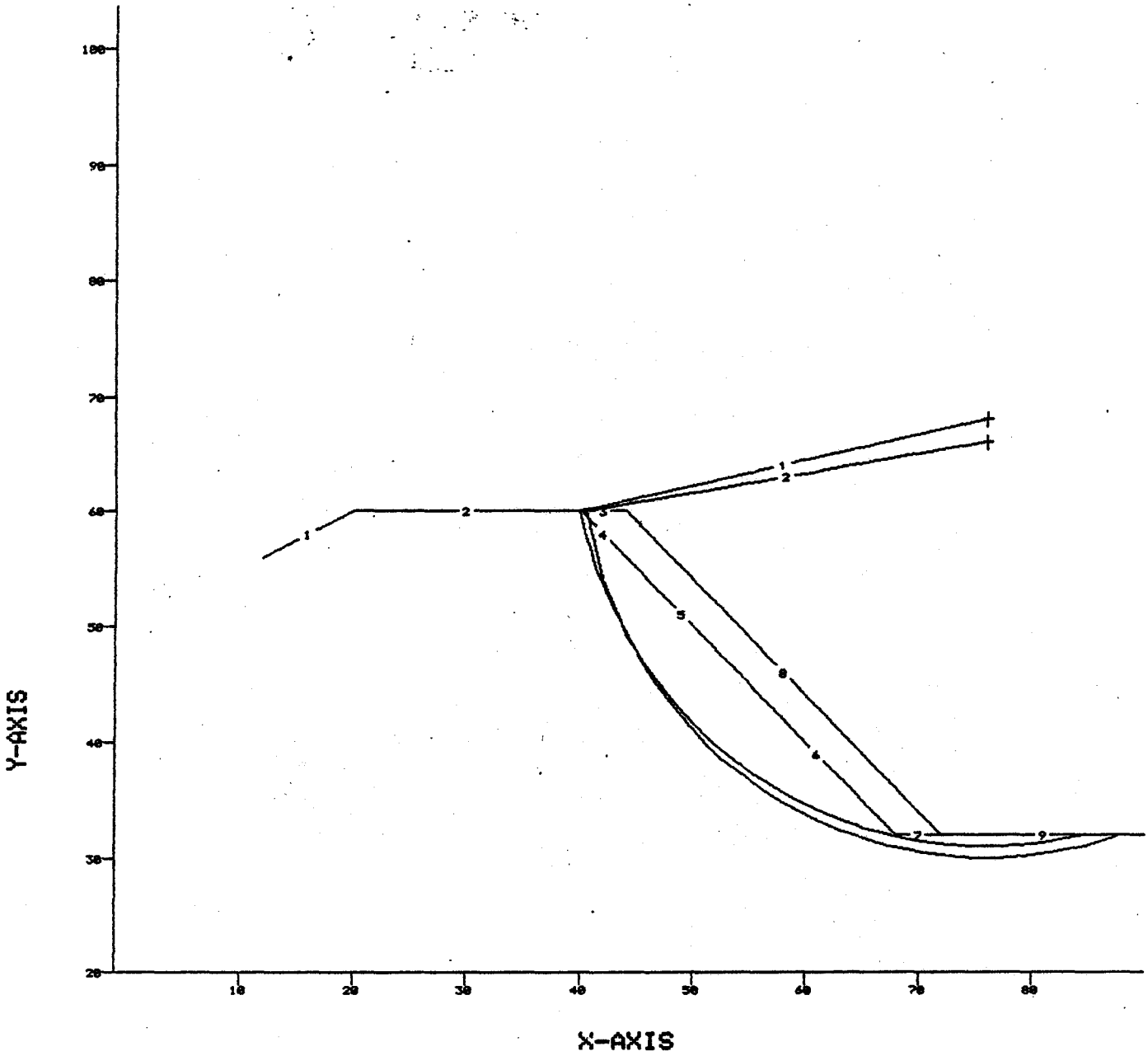
Simplified Bishop Slope Stability Analysis

PROJECT: NEW RIVER

LOCATION: OLIVE AVENUE TO BETHANY HOME ROAD

FILE: SUR4 COMPLETE SLOPE CROSS SECTION

CIRCLE	X	Y	RADIUS	FS
1	76.0	68.0	37.0	1.15
2	76.0	66.0	36.0	2.64



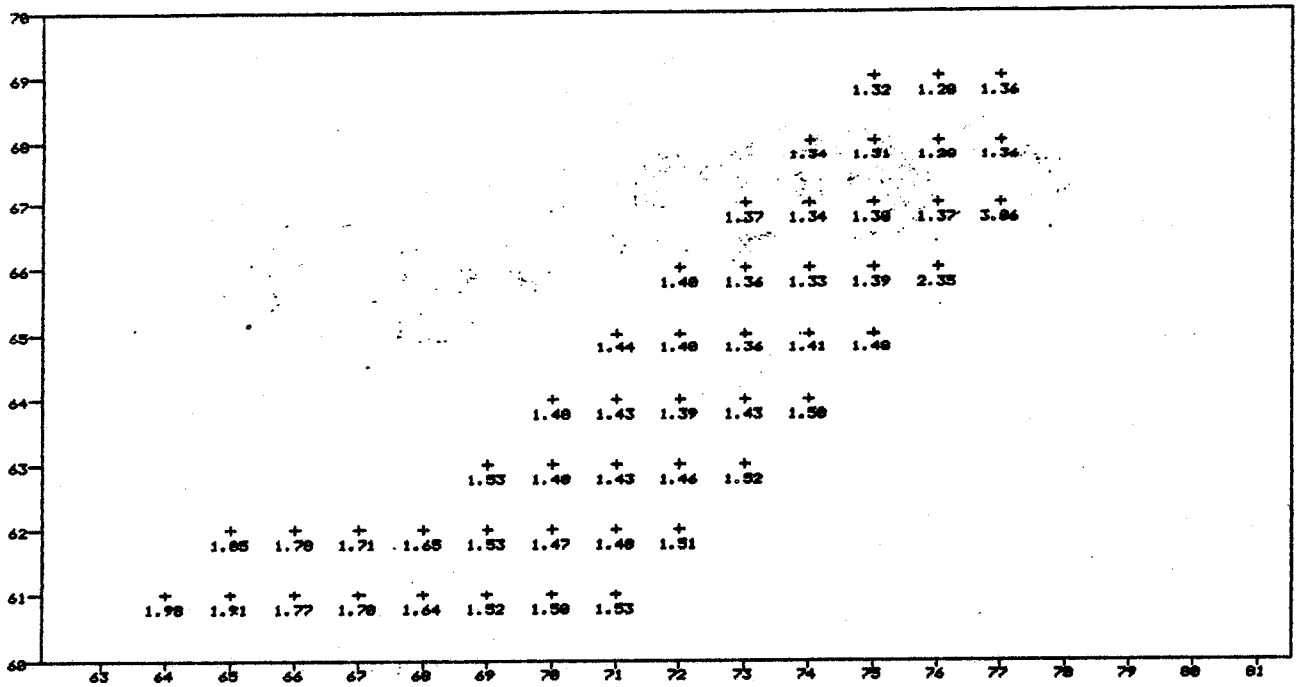
SB-SLOPE

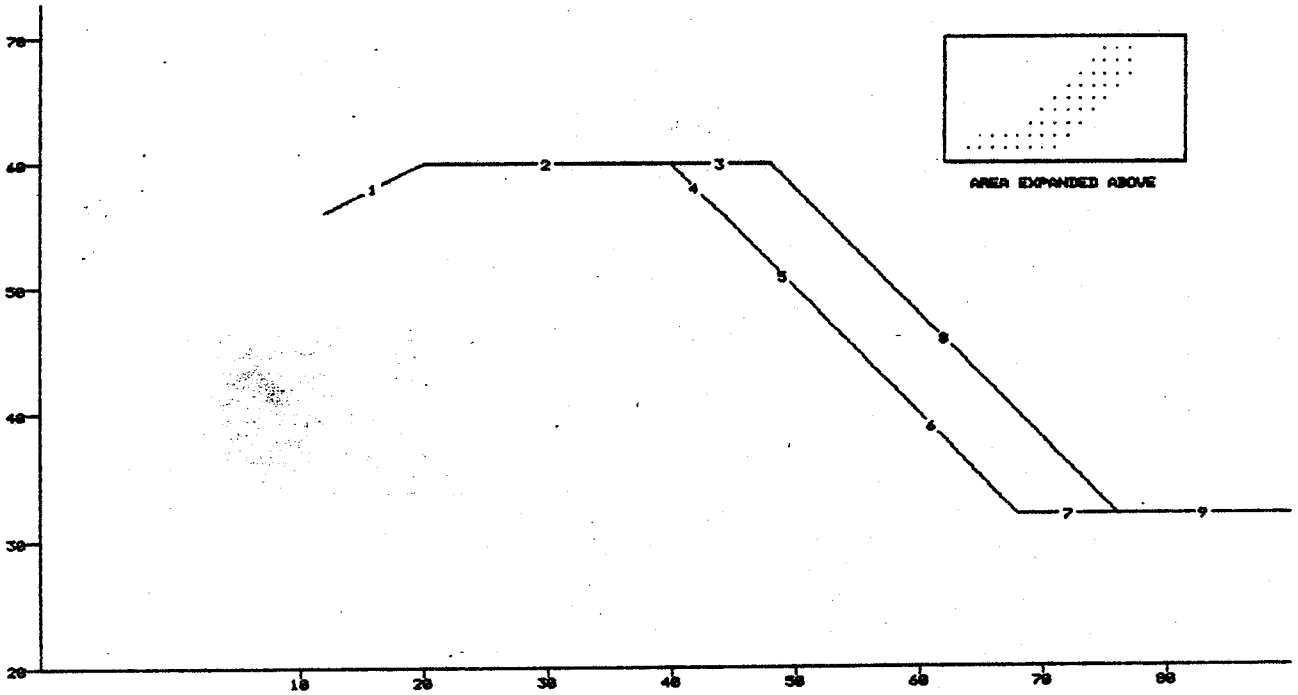
Simplified Bishop Slope Stability Analysis

PROJECT: NEW RIVER

LOCATION: OLIVE AVE. TO BETHANY HOME ROAD

FILE: SUR2





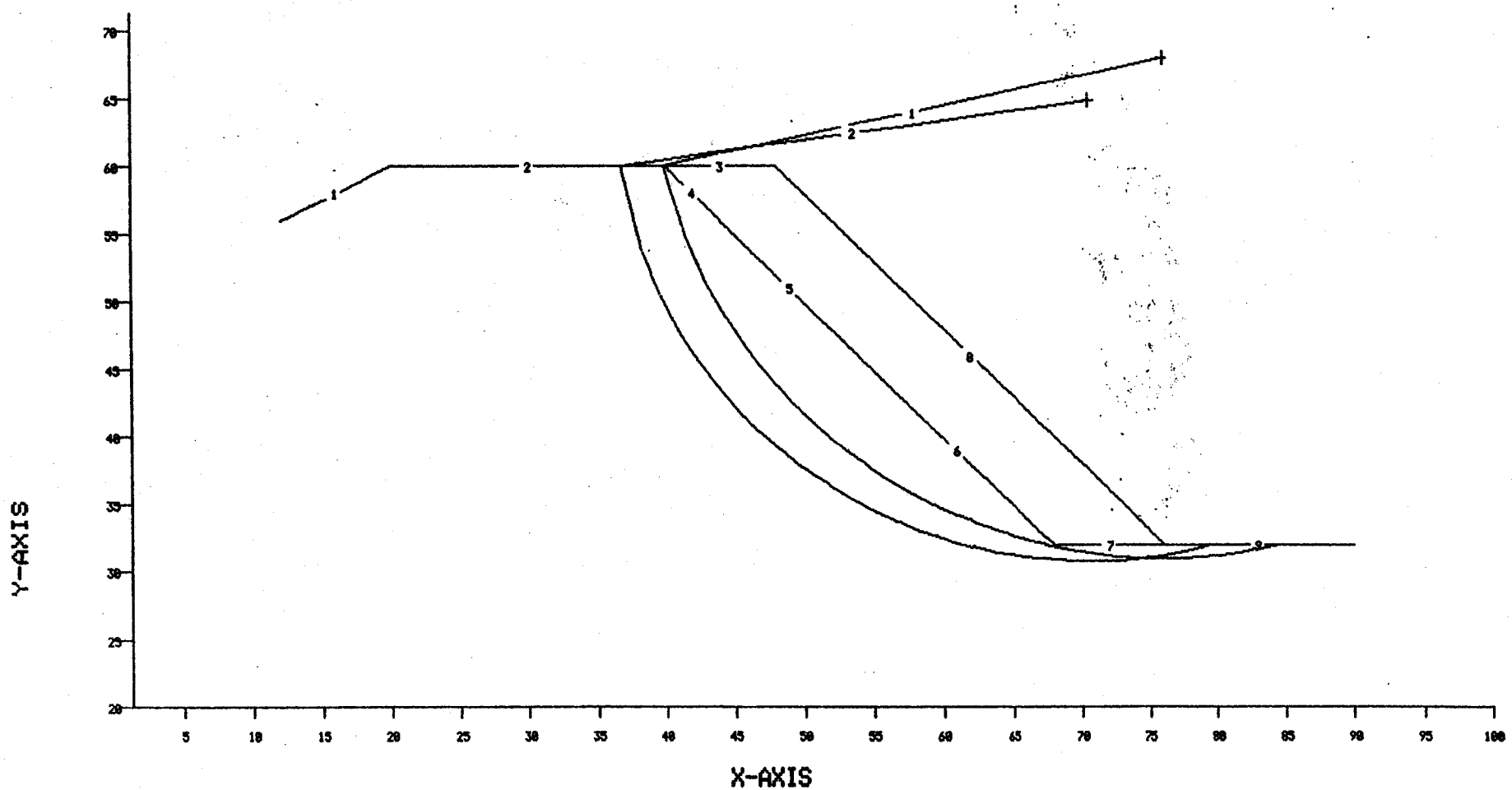
Western Technologies Inc. - Phoenix, AZ

SB-SLOPE

Simplified Bishop Slope Stability Analysis

PROJECT: NEW RIVER
LOCATION: OLIVE AVE. TO BETHANY HOME ROAD
FILE: SUR2
COMPLETE SLOPE CROSS SECTION

CIRCLE	X	Y	RADIUS	FS
1	76.0	68.0	37.0	1.28
2	70.5	64.9	34.1	1.48



Western Technologies Inc. - Phoenix, AZ

EVALUATION OF LANDFILLS FOR THE NEW RIVER PROJECT COE & VAN LOO FLOOD CONTROL DISTRICT OF MARICOPA COUNTY PHOENIX, ARIZONA

JOB NO. 2178J440

WESTERN TECHNOLOGIES INC.
The Quality People

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WESTERN TECHNOLOGIES INC.

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(602) 437-3737

Coe & Van Loo
4550 North 12th Street
Phoenix, Arizona 85014-4291

January 5, 1989

Attn: Mr. Ash C. Patel, P.E., R.L.S.
Senior Vice President

Re: Evaluation of Landfills for
The New River Project
Flood Control District of Maricopa County
Phoenix, Arizona

Job No. 2178J440

Western Technologies Inc. (WTI) is pleased to present their report entitled "Evaluation of Landfills for The New River Project". This study was verbally requested and authorized by Mr. Ash C. Patel in a telephone conversation on December 1, 1988.

Five areas of the proposed New River Rechannelization were investigated for the presence of hazardous or toxic wastes. Three of these areas exhibited noxious odors during the geotechnical portion of this project. These areas were studied for the presence of volatile organic compounds (VOCs) by soil gas analysis. None of the areas showed the presence of VOCs. Additionally in two of these three areas, soil samples were obtained and analyzed for the presence of possible hazardous or toxic wastes. Neither of the samples obtained exhibited hazardous waste characteristics as defined by Arizona Administrative Code (A.A.C.) R9-8-1861.A (40 CFR Part 261).

Based on the limited number of samples obtained and analyzed, and the soil gas study, there does not appear to be any characteristic hazardous or toxic chemicals present in the areas studied. However, this does not imply that the suspect illegal landfills are free of hazardous or toxic waste. In WTI's opinion a safety plan should be developed for the removal and closure of the illegal landfills within the rechannelization at the New River Project.

Coe & Van Loo
Job No. 2178J440

If you have any further questions, or if WTI may be of further assistance, please call us at your earliest convenience at (602) 437-3737.

Sincerely,
WESTERN TECHNOLOGIES INC.

Chris J. Christian
Project Manager
Environmental Engineering Services

Wesley A. Shonerd, P.E.
Technical Manager
Environmental Engineering Services

/dl

Attachment

Copies to: Addressee (3)

TABLE OF CONTENTS

		PAGE
1.0	INTRODUCTION	1
2.0	RECORDS REVIEW	2
3.0	ON-SITE RECONNAISSANCE	3
4.0	SUBSURFACE MATERIAL SAMPLING	5
5.0	SOIL GAS ANALYSES	6
6.0	ESTIMATION OF VOLUME OF LANDFILLS	8
7.0	CONCLUSIONS	10
8.0	RECOMMENDATIONS	10

Table I Soil Gas Measurements

Figure 1 Vicinity Map
Figure 2 Area Site Plan
Figure 3 Soil Gas Location Diagram
Figure 4 Soil Gas Location Diagram
Figure 5 Investigation Area

Appendix A Photo Log
Appendix B Analytical Chemistry Data and Chain-of-Custody

EVALUATION OF LANDFILLS FOR
THE NEW RIVER PROJECT
COE & VAN LOO
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA

JOB NO. 2178J440

1.0 INTRODUCTION

1.1 BACKGROUND

This report presents the results of an investigation and evaluation of landfills identified by WTI during the geotechnical phase for the New River Rechannelization Project near west Phoenix, Arizona. The geotechnical report (Job No. 2128J068) dated November 9, 1988 listed areas which may contain hazardous or toxic materials.

1.2 PROJECT DESCRIPTION

The objective of this investigation is to further identify and characterize wastes of five landfill areas located in the existing New River channel. WTI understands that Coe & Van Loo is designing the rechannelization of the New River.

The landfills will be evaluated based on waste characterizations, testing, and operational records for the presence of hazardous or toxic wastes. The results of this evaluation will establish the criteria for removal and/or closure of the landfills.

The limited scope-of-services for the project included the following activities.

- Review WTI geotechnical report for past and present suspect landfill operations
- On-site reconnaissance
- Subsurface soil sampling
- Chemical analysis of soil samples
- Soil gas monitoring within suspect landfills which exhibited noxious odors
- Written report with recommendations and conclusions

2.0 RECORDS REVIEW

A previous report prepared by WTI was reviewed for specific locations of illegal landfills and possible hazardous or toxic waste. Five areas were identified and are listed below.

- East bank near Station 210+00
- West bank near Station 205+00
- West bank near Station 120+00
- East bank near Station 125+00
- West bank between Station 60+00 and 75+00

Upon review of the report and conversations with the WTI field engineer, Mr. Enamul Hoque, P.E., the following investigative methodology was decided upon.

1) Survey all five areas for possible hazardous waste activities.

2) Use a backhoe to dig trenches at two locations where noxious odors and brown fill material were present during drilling operations. Obtain samples within the trenches.
3) Submit samples to WTI's chemistry laboratory for analysis of hazardous/toxic wastes.
4) Perform soil gas surveys in vicinity of noxious odors discovered during geotechnical operations.

3.0 ON-SITE RECONNAISSANCE

3.1 GENERAL

The portion of the New River which will be channelized is located about 15 miles northwest of the City of Phoenix (see Figure 1). The area is a gently sloping broad alluvial valley typical of the Basin and Range Province. For simplicity, the project has been divided into three sections (see Figure 2). The three sections are: Olive Avenue to Northern Avenue, Northern Avenue to Glendale Avenue, and Glendale Avenue to Bethany Home Road. The site conditions within each section are as follows.

3.1.1 Olive Avenue to Northern Avenue

Abandoned illegal landfills appear to exist between Olive Avenue and 99th Avenue on both the east and west banks of the channel. These areas were discovered during drilling operations of the geotechnical phase of this project. No evidence of these landfills are present due to surface cover in the area (see Figure 3 and Photograph 5).

South of 99th Avenue, the west bank contains uncontrolled rubble fill. The east bank appears relatively free of debris.

No evidence of hazardous waste generation or disposal activities were observed in this section.

3.1.2 Northern Avenue to Glendale Avenue

North of Glendale Avenue uncontrolled fill was observed on the east and west channel banks. Along the east bank, a large 25-foot deep pit exists. This pit contains abandoned automobiles, construction debris and household rubble. Additionally, piles of household rubble and abandoned automobiles exist in an area approximately 1,200-feet by 800-feet just north of Glendale Avenue (see Photograph 7). No evidence of hazardous waste generation or disposal activities were observed in this section.

3.1.3 Glendale Avenue to Bethany Home Road

Glendale Airport is located west of, and parallel to, the New River channel. Approximately one-quarter mile south of Glendale Avenue, between the airport and the channel, are a sandblasting operation and a trucking company. Between the businesses assorted construction debris (concrete, asphalt, etc.), junk automobiles and junk trailers are located (see Photograph 9). Three pits are located east of the businesses. These pits also contain construction debris. The center pit appears to be a current dumping place for the trucking company. The newer appearing materials being placed in this pit were also construction debris and soil (see Photograph 8). The northernmost pit has 3 empty, rusted 55-gallon drums in it.

4.0 SUBSURFACE MATERIAL SAMPLING

4.1 GENERAL

During the geotechnical phase of this project, drilling operations were halted due to unidentified noxious odors emanating from boring holes at three locations. Two of these locations were investigated for the presence of hazardous and/or toxic substances by subsurface material sampling (see Figure 3). The first exploration trench (Trench No. 1) is located at boring B-2W along the west bank near Station 205+00. Trench No. 2 is located at boring B-1E along the east bank near Station 210+00.

4.2 EXCAVATION

A Case Model 680 backhoe was used to dig a trench at each boring location. The trenches were approximately 30-inches wide, 12-feet long, and 6-feet deep.

In Trench No. 1, the first 2 to 4 feet of material removed consisted of general construction debris which included concrete, asphalt and wood pieces. At a depth of approximately 4-feet, dark brown material was removed which was emanating noxious odors (see Photograph No. 2). The debris appeared to be domestic waste which consisted of newspapers, glass, grass and tree clippings and other household waste. The odors emanating from the trench could not be specifically identified by field methods. However, negative readings were observed on both the HNU photoionization meter and combustible gas meter which indicate volatile organics (hazardous) and methane. The odors do appear to be the result of biodegradation of organic matter from the waste material.

Trench No. 2 was much the same as Trench No. 1. The material from 0 to 3 feet appeared to be a soil cap. Construction debris was encountered

at depths of 3 to 6 feet. Noxious odors emanated from materials starting at a depth of 6-feet (see Photographs No. 3 and 4). This debris was similar to the material encountered at 4-feet in Trench No. 1. Again, negative readings were observed on the combustible gas meter and HNU photoionization meters.

4.3 SAMPLING AND ANALYSIS

One soil sample was obtained from each trench when excavation revealed the material with noxious odors. Each sample was collected using an aluminum soil scoop and placed in a 500 gram wide mouth jar with a teflon lid. The jar was then sealed, labeled, and placed in an ice chest. The samples were then transported, under Chain-of-custody, to WTI's chemistry laboratory for analysis.

Both samples were analyzed for the following parameters: pH, flash point, physical description, reactivity (water, sulfides), total cyanide, EP toxicity metals, and GC/MS solvent screen.

All samples were collected and analyzed in general accordance with US EPA Document SW-846 "Test Methods for Evaluating Solid Waste". All laboratory data was reported (see Appendix B).

5.0 SOIL GAS ANALYSES

5.1 GENERAL

Three areas where noxious odors were present during drilling of the geotechnical phase of this project were investigated with gas probes for the presence of volatile and combustible gases. The areas investigated were: the west bank of the channel near Station 205+00, the east bank of the channel near Station 210+00, and the west bank of the channel near Station 120+00.

Attempts to drive the probes into the ground with a hammer were ineffective because of the sand and cobble cover over the waste fill. Next, a pilot hole for the probe was attempted using a two-man gas powered auger. This also proved ineffective because of the sand and cobble cover. Finally, a Case 580 backhoe was used to dig a hole to the appropriate depth. At each area four 4.5-foot sections of one-half inch copper tubing was placed in the ground to a depth of approximately 4-feet. The tubing was placed in the hole. The hole was backfilled and allowed to remain until ambient soil gas levels stabilized. After several days, WTI returned and made measurements of gases at each location. Figures 3 and 4 show sampling identifications and locations.

5.2 OBSERVATIONS DURING EXCAVATION OF TEST HOLES

5.2.1 Station 205W

All four test holes encountered the same type of debris which was previously observed in Trench No. 1 at approximately the same depth (see Figure 3). All four copper tubes were placed, such that, the bottom end of the tube was within the area of decomposing matter.

5.2.2 Station 210E

Test holes 1 through 3 encountered the same types of debris at approximately the same depth as Trench No. 2 (see Figure 3). Test Hole No. 4 encountered only construction rubble to a depth of 5-feet where the digging was stopped. All four tubes were placed with the bottom of the tubing at 4 feet below the surface. However, this was just above the top of the decomposing material.

5.2.3 Station 120W

None of the four test holes encountered decomposing material. Sand, gravel, and cobbles were encountered to a depth of approximately 3.5-feet. Below that depth construction debris was unearthed at all locations. Excavation was terminated five feet below the surface.

5.3 TESTING AND RESULTS

An HNU Model PI 101 photoionization meter and combustible gas meter were used to measure volatile aromatic (hazardous) and flammable gases, respectively, at each sampling location. Both instruments were placed in the top of each sampling tube and allowed to operate for two minutes. Measurements were then recorded for both instruments at each sampling location. Table I lists the results of the testing.

6.0 ESTIMATION OF VOLUME AT LANDFILL

Calculations on the estimation of foreign material in the investigated areas are presented below. Due to the limited scope of WTI's investigation, some assumptions were made as to the depths and widths of material to be removed.

Assumptions:

- All areas are uniform in the amount of debris throughout the depth, width and height.
- Length of area is based on visual observations of surface debris and, in some cases where subsurface excavations took place, subsurface debris height.

- Width of area is based on visual observations and is assumed to be between 40 to 60 feet.

Calculations are as follows:

Length (ft) X Width (ft) X Height (ft) X .0370 ($yard^3/feet^3$) = Volume

Station 205W

700 X 44 X 8 X .0370 = 9117. yds^3 estimated

Station 210 E

1200 X 44 X 8 X .0370 = 15360. yds^3 estimated

Station 125 E

600 X 50 X 8 X .0370 = 11840. yds^3 estimated

Station 120W

1000 X 10 X 40 X .0370 = 14800. yds^3 estimated

Station 60-75W

2400 X 60 X 10 X .0370 = 53280. yds^3 estimated

Total Volume = 104700. yds^3 estimated

7.0 CONCLUSIONS

The following conclusions are based on WTI records review and on-site and off-site evaluations.

- Construction debris (concrete, asphalt, wood, etc.) is present at all five areas investigated.

- The east and west banks of the channel near stations 210+00 to 205+00 also contain material which appears to be decomposing household waste. This material was tested for possible hazardous and toxic waste characteristics. Based on the limited number of samples taken, the waste may be classified as non-hazardous as defined by the Arizona Administrative Code (A.A.C.) R9-8-1861.A (40 CFR Part 261) and disposed in a municipal landfill.

- Based on observations of the areas investigated, estimations of the volume of material which may need to be removed for the rechannelization of the New River is approximately 100,000 cubic yards. This estimated volume is based on having to totally remove all materials.

8.0 RECOMMENDATIONS

Based on the results of our studies and evaluations, WTI recommends that the material found in the abandoned landfills be disposed in municipal landfills. This does not imply that all areas are free of hazardous or toxic waste. In WTI's opinion, a safety plan should be developed and implemented during the rechannelization of the New River. This safety plan should include, but not be limited to, the following:

- An outline of procedures to be used during the removal of the landfills. This should include on-site monitoring of all materials removed by an on-site safety officer during excavation.

- Hazardous waste handling procedures should such material be found during excavation of the landfills.

- Job site safety and health requirements for the removal process.

Coe & Van Loo
Job No. 2178J440

TABLE I

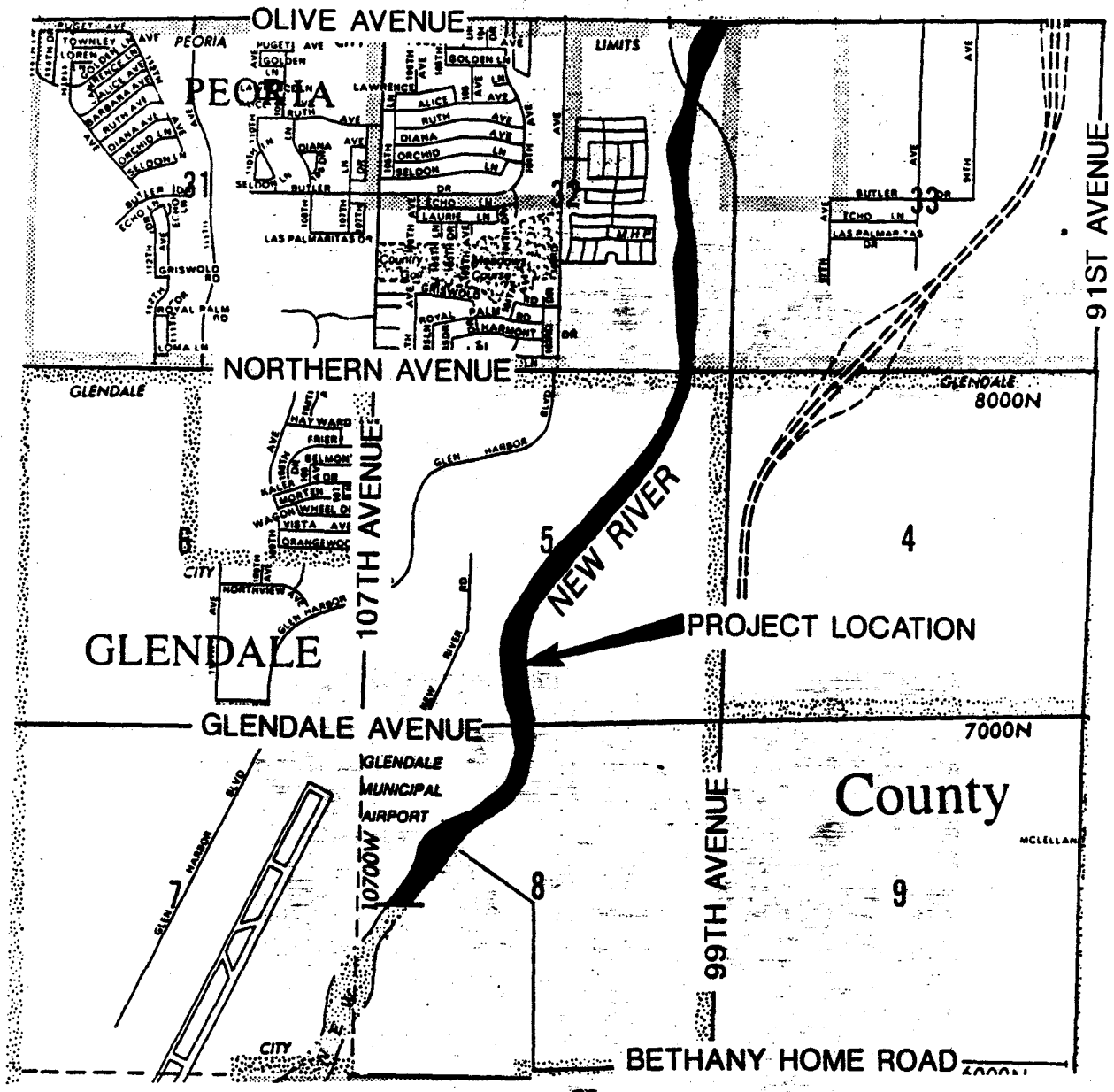
Sample ID	HNU meter(ppm as benzene)	Combustible Gas Meter (% Natural Gas)
205W-1	<1	ND
205W-2	<1	ND
205W-3	<1 (tr)	ND
205W-4	<1 (tr)	ND
210E-1	<1	ND
210E-2	<1	ND
210E-3	<1	ND
210E-4	<1	ND
120W-1	<1	ND
120W-2	<1	ND
120W-3	<1	ND
120W-4	<1	ND

ND = None Detected

tr = trace

Coe & Van Loo

Vicinity Map
Figure 1



NOT TO SCALE

JOB NO. 2178J440

REVIEWED	W. SHONERD, P.E.
PREPARED	MAXWELL

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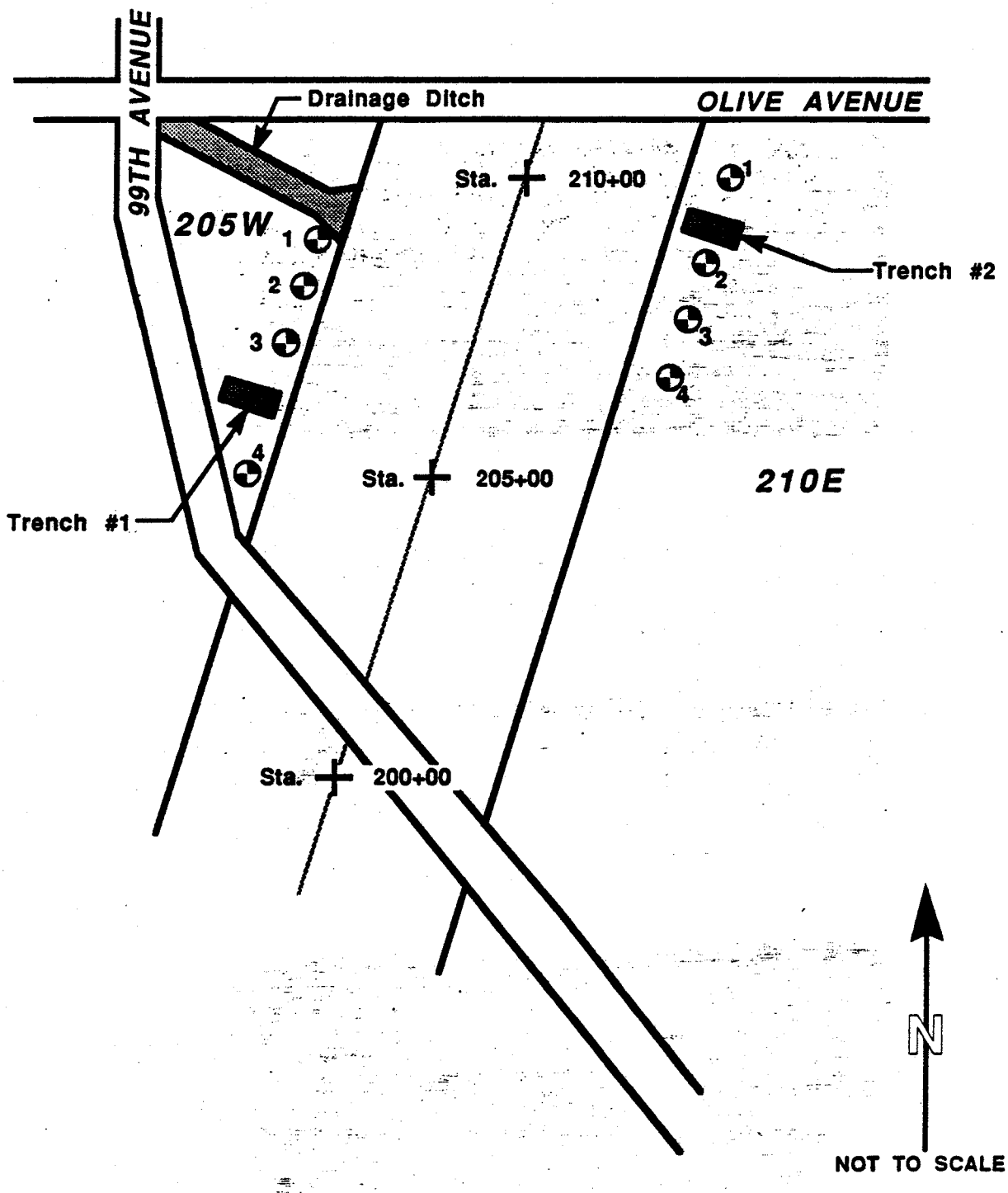
Soil Gas Location Diagram

Figure 3



SOIL GAS LOCATION

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PREPARED	MAXWELL

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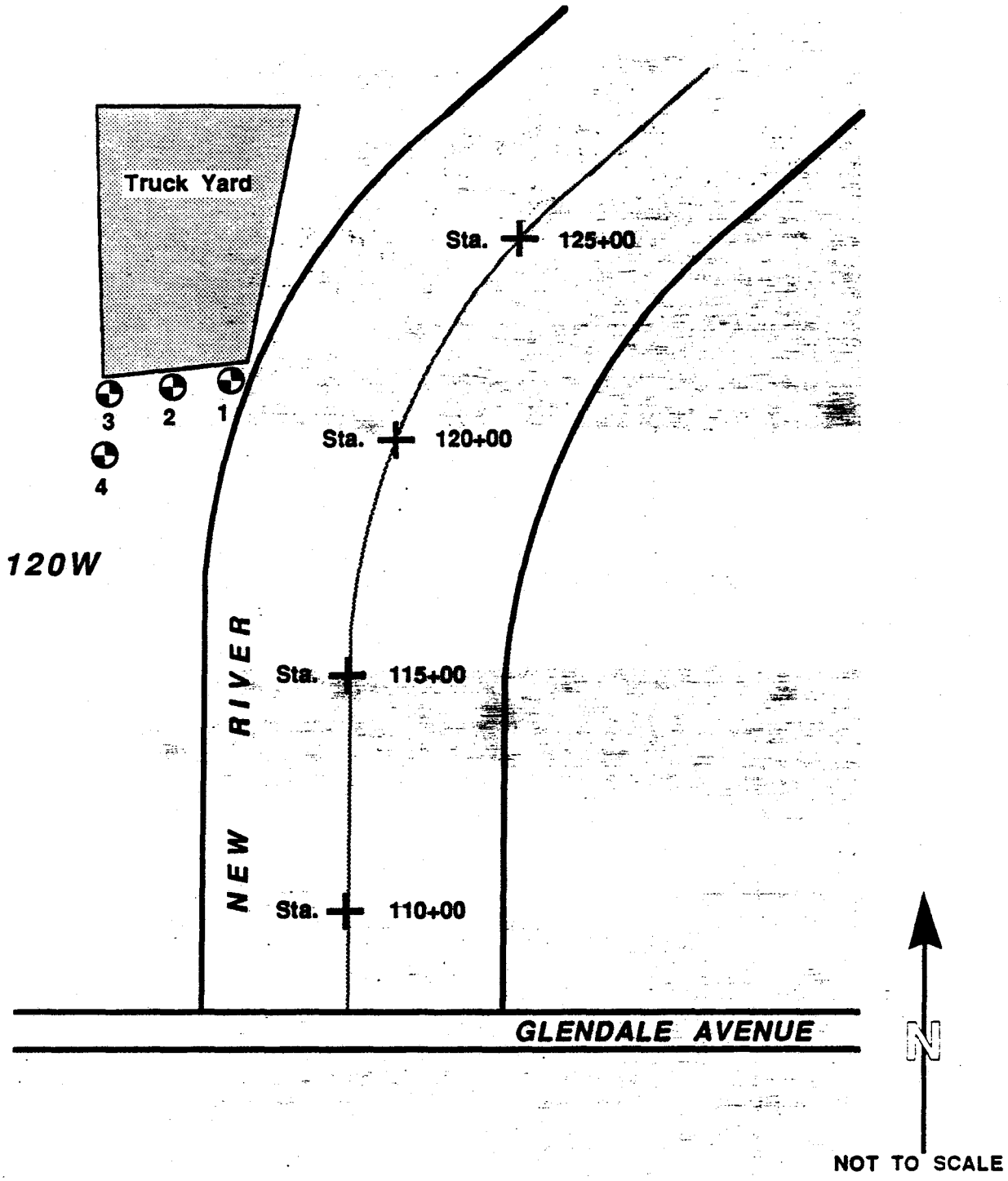
Soil Gas Location Diagram

Figure 4



SOIL GAS LOCATION

JOB NO. 2178J440

REVIEWED W. SHONERD, P.E.	**WESTERN TECHNOLOGIES INC.**
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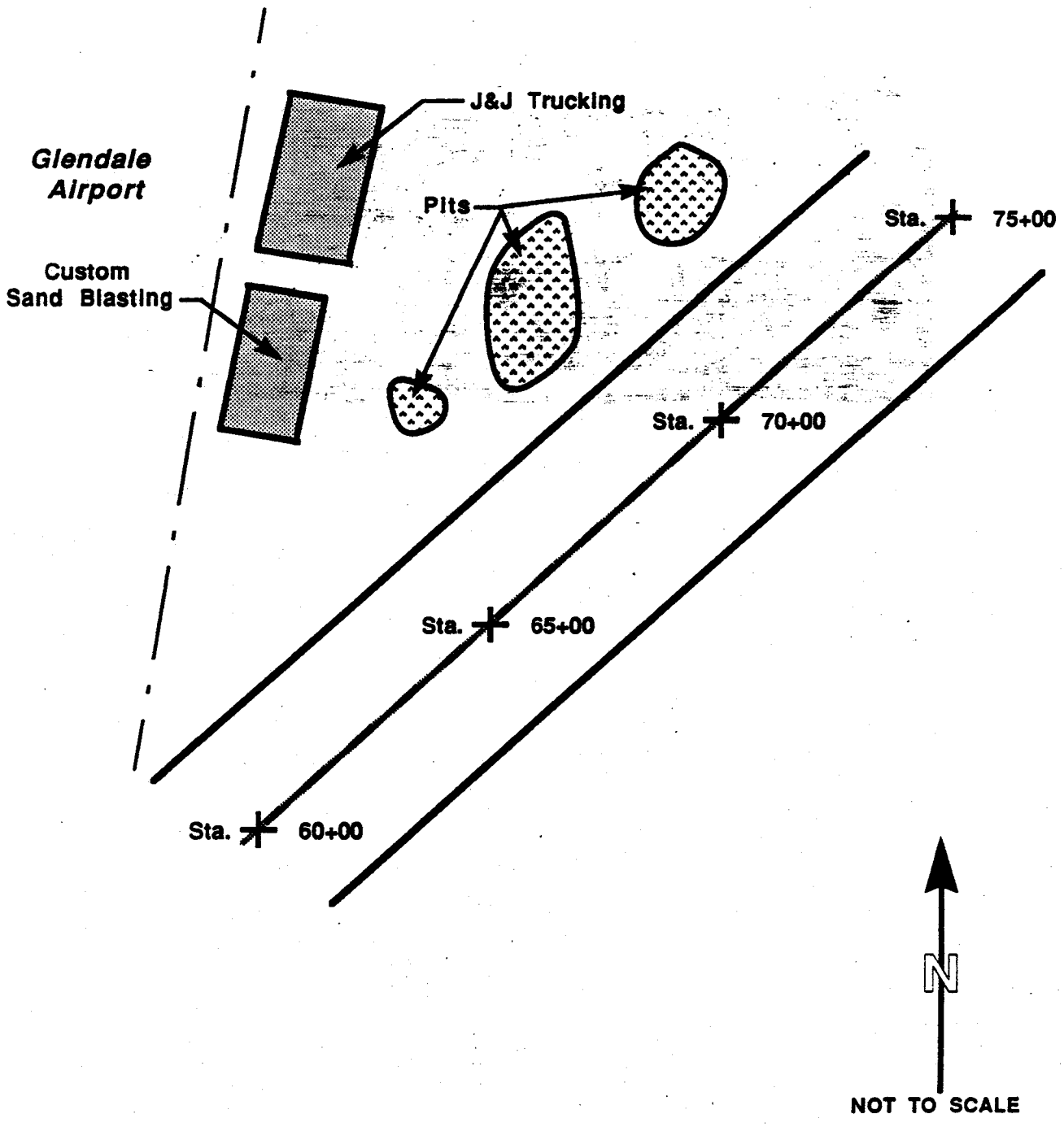
Coe & Van Loo
Investigation Area
Figure 5



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Photograph No. 1
Excavation of Trench #1 Using a Backhoe.

Photograph No. 2
Biodegradation Material Removed From Trench #1.

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Photograph No. 3
Trench #2, Darkened Biodegradation Material at a Depth of 5-feet.

Photograph No. 4
Material From Trench #2.

Photograph No. 5
Station 210+00 to 205+00 Along the West Bank.

Photograph No. 6
Station 120+00 Along the West Bank.

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Photograph No. 7
Station 125+00 Along the East Bank.
Construction Debris and Assorted Rubble.

Photograph No. 8
Station 60+00 to 75+00.
Center Pit Where Trucking Company is Dumping Debris.

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Photograph No. 9
Station 60+00 to 75+00.
Construction Debris Typical of Area Along East Bank.

WESTERN TECHNOLOGIES INC.

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Coe and Van Loo
4550 North 12th Street
Phoenix, Arizona 85014-4291

July 5, 1988

Attn: Mr. Ashok C. Patel
Senior Vice President

Re: Proposed Channelization of the New River Between Olive Avenue and Bethany Home Road
Maricopa County, Arizona

Job No. 2128J068

Dear Mr. Patel:

This preliminary report provides information for estimating the quantities of cement and fly ash necessary to produce soil cement for embankment protection and grade-control structures on the referenced project. Four mix designs have been performed, using soils obtained from the geotechnical investigation test pits. The soils used in the mix designs were proportioned and blended in the laboratory on the basis of the gradations and plasticity indices of the channel excavation soils. Soils with a Plasticity Index higher than five (5) were not used in the mix design.

MIX DESIGN AGGREGATE GRADATIONS

Soil cement mix design aggregate was blended in order to evaluate the soils relative to the following requirements which were specified for Reach No. 3 of the Agua Fria River Improvements:

Maximum plasticity index of five (5)

Sieve Size	Percent Passing
1 1/2 in.	98 - 100
No. 4	60 - 90
No. 200	5 - 15

The aggregate gradations for each of the four soil cement mixes are shown on the attached Table 1. The blends were adjusted to provide the following variations in gradation:

	Screen Size/Percent Passing		
Mix Number	3/4 in.	No. 4	No. 200
1	100	82	6
2	100	83	15
3	100	61	6
4	100	65	16

MIX DESIGN METHOD

Test equipment, sample preparation with the blended aggregates, compaction of the test specimens, and determination of compressive strength were in accordance with Section 221.11, Testing Procedure for Determination of Cement Content Required for Soil-Cement Mixtures (A Modification of Arizona 220 Test Method) of the Construction Special Provisions for Agua Fria River Improvements, Buckeye Road to Interstate 10, Contract No. FCD 85-37.

Figure 1, attached, presents a strength versus cementitious material content curve for each of the four mixes. Each curve involved the following steps:

1) Aggregate was combined to the desired gradation.

2) Cementitious material contents of 7%, 10% and 13% (by weight) were used to establish curve points. Cementitious material was composed of 82.5 parts Type II portland cement to 17.5 parts Type "F" fly ash.

3) A batch of soil cement was mixed for each of the three cement contents. The maximum density and optimum moisture were determined for each of the three batches by AASHTO Test T99, Method C. Three compressive strength test specimens were then molded at optimum moisture content from each batch.

4) Strength specimens were cured as required by the Agua Fria River Reach No. 3 specifications and were tested for compressive strength at an age of seven days. The average strength of each set of three specimens determined one point to be plotted on the mix design curve. The mix design curve was drawn through the resulting three points.

TEST RESULTS

Table 1, attached, summarizes each design curve's aggregate gradation, and the maximum density and optimum moisture of the twelve strength specimen batches.

Figure 1, attached, shows the four mix design curves.

CONCLUSIONS AND RECOMMENDATIONS

The mix design curves indicate that varying the percentage of aggregate retained on the No. 4 sieve has minor effect on the strength of the soil cement. The curves show that increasing the percentage passing the No. 200 sieve increases the amount of cementitious material necessary to attain both 700 psi and 1000 psi. Therefore, revision of the gradation requirements from the Agua Fria River Reach No. 3 specifications is not recommended.

The mix design curves indicate that variations within the required aggregate gradation bands will produce the following range of demands for cementitious material:

Strength	Percent Cementitious Material by Weight of Total Dry Mix
700 psi	8.1 to 9.0
1000 psi	10.9 to 12.9

Specifications from the Agua Fria River projects require adding two (2) percent cementitious material to the above percentages. Western Technologies Inc.'s experience on two previous Agua Fria River Projects has been that approximately another one (1) percent is necessary to offset production variations in soil cement moisture content and the differences between field conditions and a laboratory blending process. Therefore, for estimating purposes, we recommend that 12 percent be used for 700 psi mix and 16 percent be used for 1000 psi mix.

We recommend that 133 pounds per cubic foot be used as the compacted dry weight of soil cement for estimating purposes. The dry weight of soil cement would be 1.7955 tons per cubic yard. Twelve percent cementitious material is 9.9% cement and 2.1% fly ash. Sixteen percent is 13.2% cement and 2.8% fly ash. Therefore:

Mix Strength	Estimated Weight per Cubic Yard	
	Cement	Fly Ash
700 psi	0.1778 ton	0.0377 ton
1000 psi	0.2370 ton	0.0503 ton

Please do not hesitate to call if you have any questions.

Sincerely,

WESTERN TECHNOLOGIES INC.

Registered Professional Engineer (Civil) CERTIFICATE NO. 7661 DAL N. WAKEFIELD Date Signed 7/5/89 ARIZONA, U.S.A.

Dal N. Wakefield, P.E.

Reviewed by: M. Kent Hamm, P.E.

kw/2798C

Copies to: Addressee (5)

Coe and Van Loo
Job No. 2128J068

TABLE NO. 1

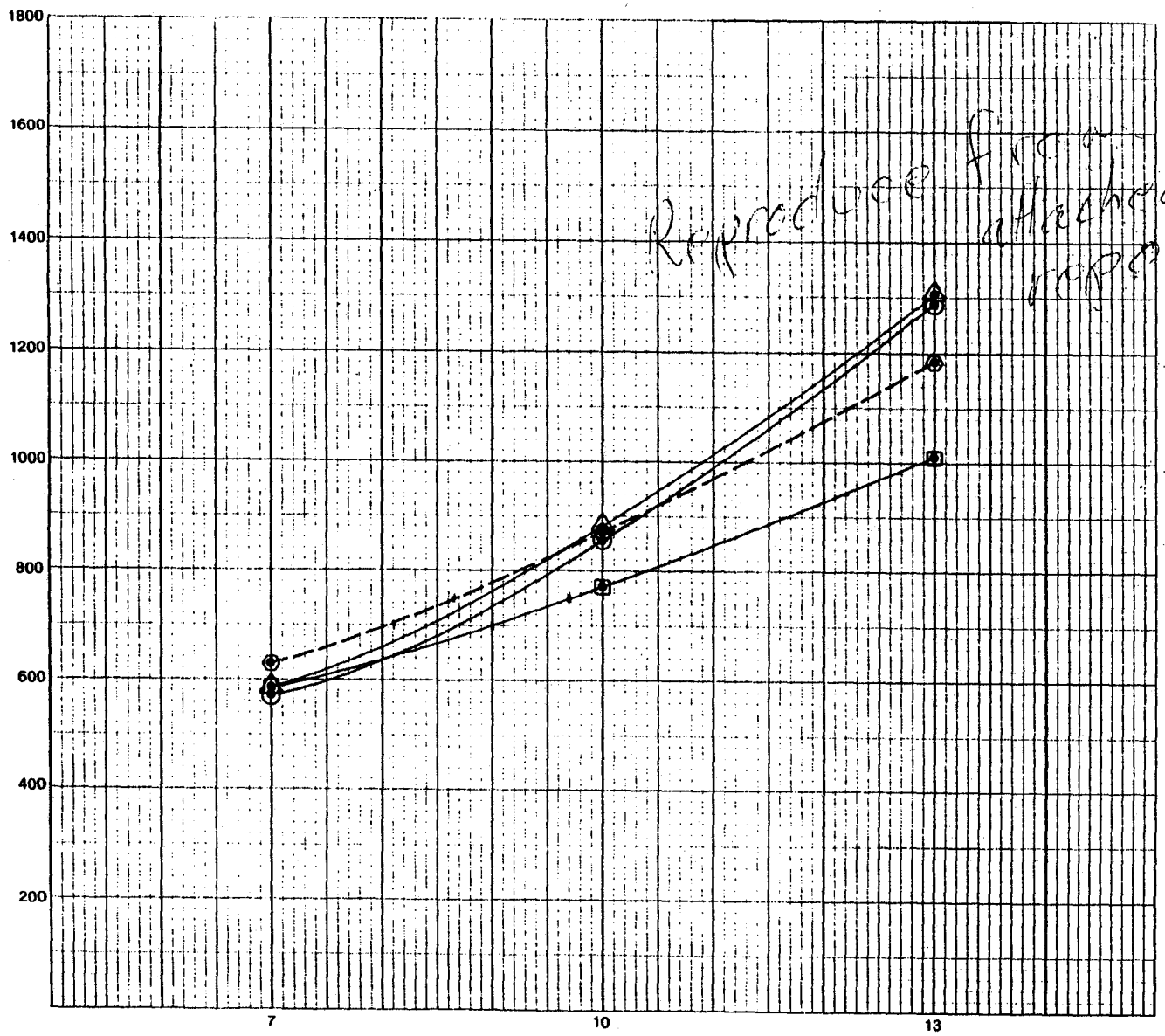
PHYSICAL PROPERTIES OF SOIL-CEMENT COMBINATIONS

Aggregate Gradations (% Passing)

Screen Size	Curve 1	Curve 2	Curve 3	Curve 4
3/4"	100	100	100	100
1/2"	95	95	85	80
No. 4	82	83	61	65
8	72	74	54	58
10	68	70	51	55
16	59	62	43	49
30	37	41	26	33
40	28	32	23	26
50	22	27	17	22
100	14	19	10	17
200	6	16	6	15

Moisture/Density per AASHTO T99, Meth. C.

With 7% Cementitious Material:				
Maximum Dry Density, pcf	128.0	129.5	131.1	132.0
Optimum Moisture, %	9	9	9	8
With 10% Cementitious Material:				
Maximum Dry Density, pcf	128.0	129.7	130.7	132.2
Optimum Moisture, %	10	9	9	9
With 13% Cementitious Material:				
Maximum Dry Density, pcf	130.0	130.6	131.6	132.0
Optimum Moisture, %	9	9	8	8



Reproduce from attached report

orig! - see orig! of July 5th

New River Channelization

7 Day Compressive Strength vs. Cementitious Content

JOB NO. 2128J068

FIGURE NO. 1

- Gradation Curve No. 1
- Gradation Curve No. 2
- Gradation Curve No. 3
- Gradation Curve No. 4

NOTE: Specimen cured 6 days in moist cabinet then soaked in water for 24 hours.

REVIEWED R BERGQUIST, P.E.
PREPARED SANTIAGO

WESTERN TECHNOLOGIES INC.
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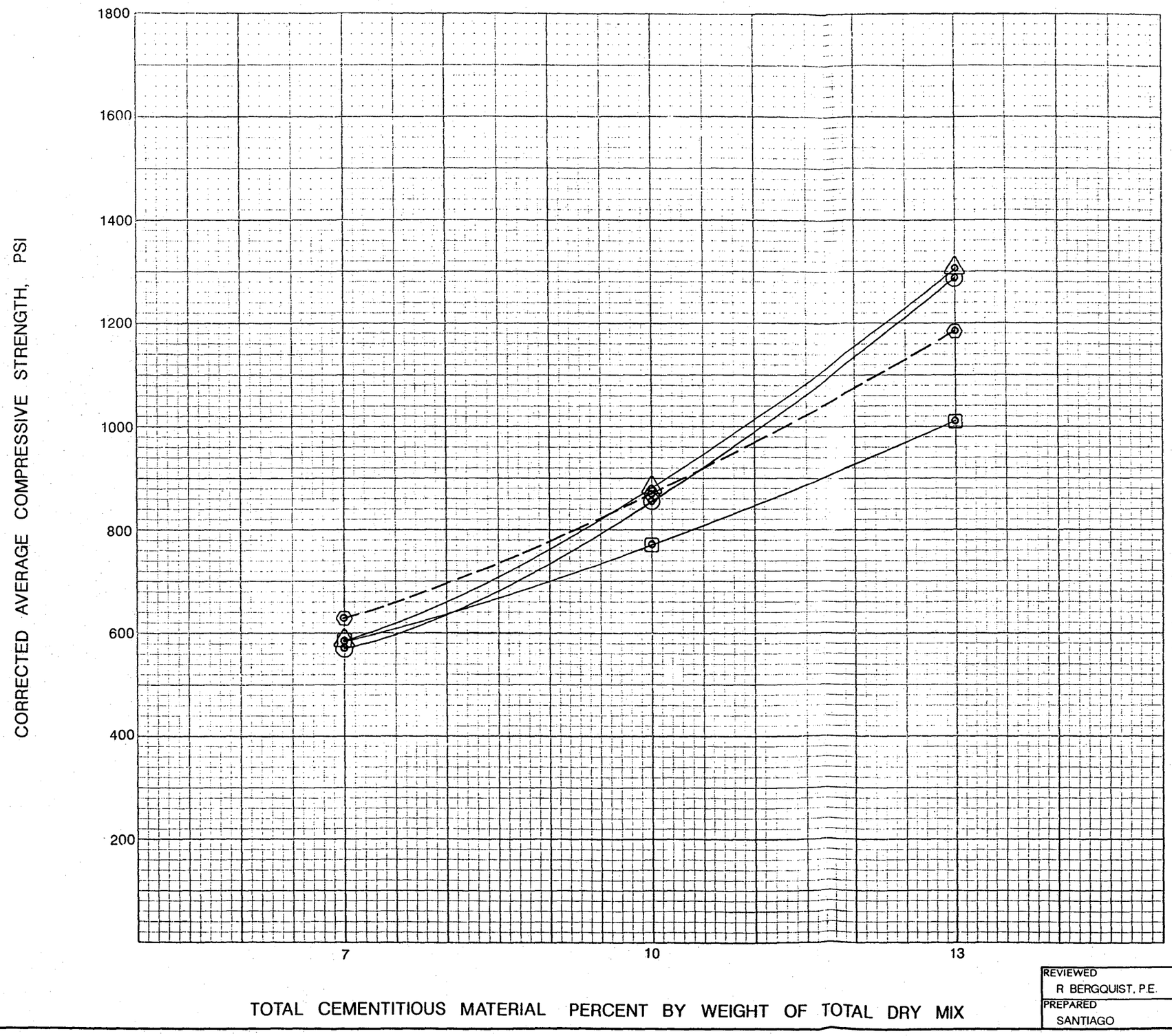

New River Channelization

7 Day Compressive Strength vs. Cementitious Content

JOB NO. 2128J068

FIGURE NO. 1

- Gradation Curve No. 1
- Gradation Curve No. 2
- Gradation Curve No. 3
- Gradation Curve No. 4

NOTE: Specimen cured 6 days in moist cabinet then soaked in water for 24 hours.

REVIEWED	R BERGQUIST, P.E.
PREPARED	SANTIAGO

WESTERN TECHNOLOGIES INC.
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WESTERN TECHNOLOGIES INC.

3737 East Broadway Road
P.O. Box 21387
Phoenix, Arizona 85036
(602) 437-3737

Coe and Van Loo
4550 North 12th Street
Phoenix, Arizona 85014-4291

October 10, 1988

Attn: Mr. Ashok C. Patel
Senior Vice President

Re: Proposed Channelization of the New River Between Olive Avenue and Bethany Home Road
Maricopa County, Arizona
SOIL-CEMENT MIX PROPORTIONS

Job No. 2128J068
(A revision of the report of July 5, 1988)

Dear Mr. Patel:

This report is a revision of our preliminary report dated 7/5/88. This report provides information for estimating the quantities of cement and fly ash necessary to produce soil cement for embankment protection and grade-control structures on the referenced project. Four soil-cement mix designs have been performed, using soils obtained from the geotechnical investigation test pits. The soils used in the mix designs were proportioned and blended in the laboratory on the basis of the gradations and plasticity indices of the channel excavation soils. Soils with a Plasticity Index higher than five (5) were not used in the mix design.

RECOMMENDED SOIL-CEMENT AGGREGATE GRADATIONS

The aggregates for soil-cement mixes were blended from the soil samples obtained from the test pits within the zones of proposed channel bottom excavation.

The following gradation limits and plasticity index limit are recommended to be specified for soil cement aggregate:

Maximum plasticity index of five (5)

Sieve Size	Percent Passing
1 1/2 inch	98 - 100
No. 4	60 - 80
No. 200	5 - 15

The above gradation limits and plasticity index are considered appropriate for the following reasons:

1. Review of Portland Cement Associations publication, Dam Construction and Facing with Soil-Cement, by P.J. Nussbaum and B.E. Colley. This research and development bulletin evaluates cement content of soil-cement versus resistance to abrasion by water-borne particles, permeability, and strength. The paper compares the results of tests on three soils. A granular soil, non-plastic, with ten (10) percent passing the No. 200 sieve was found to provide superior erosion resistance with lower cement content, in comparison to the other soils tested. The other soils contained more material passing the No. 200 sieve and less gravel retained on the No. 4 sieve.

2. The PCA bulletin concludes that, "When soil-cement is used in areas exposed to rapid stream flow carrying sand or gravel or other debris, the cement content should be 2 percentage points greater than the minimum required by standard tests. In addition, the soil selected should have a gravel component exceeding 20 percent."

3. The gradations of the New River samples show that the 1 1/2" sieve is the largest screen size at which any of the channel excavation soils can be scalped to provide aggregate meeting the other gradation requirements. Most of the channel excavation soils would have to be scalped on a smaller screen size to meet these requirements.

4. The PCA bulletin shows that, for a given cement content, soil-cement using granular soils with non-plastic, low fines content has a higher angle of internal friction under triaxial load testing, in comparison to soils with more fines content.

MIX DESIGN AGGREGATE GRADATIONS

Four soil-cement mixes, each with different aggregate gradations, were tested. The aggregate gradations for each of the four soil cement mixes are shown on the attached Table 1. The blends were adjusted to provide the following variations in gradation:

	Screen Size/Percent Passing		
Mix Number	3/4 in.	No. 4	No. 200
1	100	82	6
2	100	83	15
3	100	61	6
4	100	65	16

MIX DESIGN METHOD

The following procedures were used to mold the soil-cement test specimens and to determine their compressive strengths:

1. Type F fly ash was combined with Arizona Type II cement by ratio of 17.5:82.5 (fly ash:cement). This cementitious material was then blended with each of the mix design aggregates. Separate blends were mixed with each aggregate, using 7.0%, 10.0% and 13.0%, respectively of cementious material. Percentage of cementitious material was calculated by:

$$\frac{\text{(Weight of Cem. Mat'l)} \times 100}{\text{(Weight of Cem. Mat'l)} + \text{(Dry Weight of Aggregate)}}$$

2. The maximum density and optimum moisture content for each blend of soil-cement was determined in accordance with ASTM D558, Method B. All test compaction was performed between forty and sixty minutes after water was added to the blends.

3. Three compressive strength test cylinders were molded at optimum moisture content from each blend, and all cylinders were tested for compressive strength at the age of seven days. All test cylinders were compacted within forty and sixty minutes after water was mixed into the blend. The specimens were molded, cured and tested for strength in accordance with ASTM D1633, Method A.

4. Strength correction factors, conforming to Section 6.7.2 of ASTM, C42, for ratios of cylinder lengths to diameters (l/d) were applied to the test results. The corrected strengths were used thereafter.

5. The average strength for each soil-cement blend was calculated from the three strengths which had been determined for each blend. These average strengths are shown plotted for the 7-day compressive strength versus cementitious material content graph shown on attached Figure 1.

It may be of interest to note that, except for reporting optimum moisture contents to the nearest 0.1%, all test methods used also conform to the testing procedures required for determining of cement content for soil-cement at the Agua Fria River from Buckeye Road to north of Indian School Road.

TEST RESULTS

Table 1, attached, summarizes each design curve's aggregate gradation, and the maximum density and optimum moisture of the twelve strength specimen batches.

Figure 1, attached, shows the four mix design curves.

CONCLUSIONS AND RECOMMENDATIONS

The mix design curves indicate that variations within the required aggregate gradation bands will produce the following range of demands for cementitious material:

Strength	Percent Cementitious Material by Weight of Total Dry Mix
750 psi	8.5 to 9.4
1000 psi	10.9 to 12.9

The Portland Cement Association's research publications and common practice call for adding two (2) percent cementitious material to the above percentages. Western Technologies' experience on two previous Agua Fria River Projects has been that approximately another one (1) percent is necessary to offset production variations in soil cement moisture content and the differences between field conditions and a laboratory blending process.

Therefore, for estimating purposes, we recommend that 12 percent be used for 750 psi mix and 16 percent be used for 1000 psi mix.

We recommend that 133 pounds per cubic foot be used as the compacted dry weight of soil cement for estimating purposes. The dry weight of soil cement would be 1.7955 tons per cubic yard. Twelve percent cementitious material is 9.9% cement and 2.1% fly ash. Sixteen percent is 13.2% cement and 2.8% fly ash. Therefore:

	Estimated Weight per Cubic Yard	
Mix Strength	Cement	Fly Ash
750 psi	0.1778 ton	0.0377 ton
1000 psi	0.2370 ton	0.0503 ton

Please call if you have any questions.

Sincerely,
WESTERN TECHNOLOGIES INC.

Registered Professional Engineer (Civil) CERTIFICATE NO. 7661 DAL N. WAKEFIELD Date Signed 10/1/88 ARIZONA, U.S.A.

Dal N. Wakefield, P.E.

Reviewed by: M. Kent Hamm, P.E.

cc/2984C

Copies to: Addressee (5)
R. Bergquist (1)
D. Wakefield (1)

TABLE NO. 1

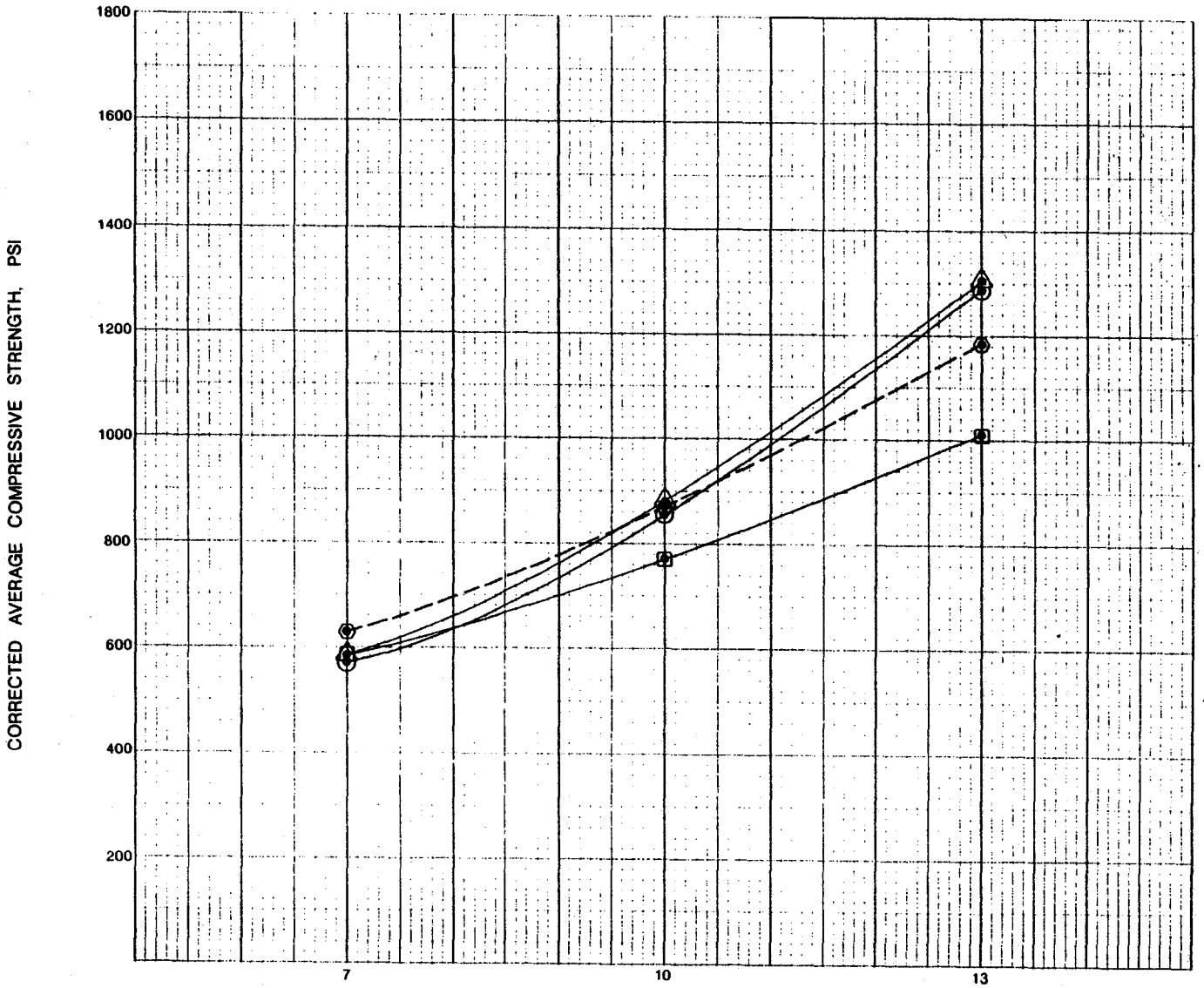
PHYSICAL PROPERTIES OF SOIL-CEMENT COMBINATIONS

Aggregate Gradations (% Passing):

Screen Size	Curve 1	Curve 2	Curve 3	Curve 4
3/4"	100	100	100	100
1/2"	95	95	85	80
No. 4	82	83	61	65
8	72	74	54	58
10	68	70	51	55
16	59	62	43	49
30	37	41	26	33
40	28	32	23	26
50	22	27	17	22
100	14	19	10	17
200	6	16	6	15

Moisture/Density per ASTM D558, Method B:

With 7% Cementitious Material:				
Maximum Dry Density, pcf	128.0	129.5	131.1	132.0
Optimum Moisture, %	9.3	9.5	8.7	8.5
With 10% Cementitious Material;				
Maximum Dry Density, pcf	128.5	129.7	130.7	132.2
Optimum Moisture, %	9.6	8.7	9.0	8.7
With 13% Cementitious Material:				
Maximum Dry Density, pcf	130.0	130.6	131.6	132.0
Optimum Moisture, %	8.8	9.0	8.2	8.3



New River Channelization

7 Day Compressive Strength vs. Cementitious Content

JOB NO. 2128J068

FIGURE NO. 1

- Gradation Curve No. 1
- Gradation Curve No. 2
- Gradation Curve No. 3
- Gradation Curve No. 4

NOTE: Specimen cured 6 days in moist cabinet then soaked in water for 24 hours.

[redacted]TAL [redacted]ENTI[redacted] MA[redacted] P[redacted]T B[redacted]IGHT[redacted] TOT[redacted]Y M[redacted]

REVIEWED
R BERGQUIST PE

WESTERN TECHNOLOGIES INC.

Coe and Van Loo
Job No. 2128J068

TEST PIT LOG NOTES

The number shown in "LOG OF TEST PIT." refers to the approximate location of the same number indicated on the "Site Plan" as positioned in the field by pacing from existing features.

"STA" refers to the approximate stationing of the test pit along the proposed New River Channelization alignment according to Coe and Van Loo.

"ELEVATION" refers to ground surface elevation at the test pit location relative to the indicated "DATUM" established by interpolation from contours on the "Site Plan".

"TYPE/SIZE PIT" refers to the exploratory equipment and size of the bucket used during the excavation.

"Sample Type" refers to the form of sample recovery, in which G = Grab sample.

"Unified Classification" refers to the soil type as defined by "Method of Soil Classification". The soils were classified visually in the field and, where appropriate, classifications were modified by visual examination of samples in the laboratory and/or by appropriate tests.

These notes and test pit are intended for use in conjunction with the purposes of our services defined in the text. Test pit data should not be construed as part of the construction plans nor as defining construction conditions.

Test pit depict our interpretations of subsurface conditions at the locations and on the date(s) noted. Variations in subsurface conditions and soil characteristics may occur between borings. Groundwater levels may fluctuate due to seasonal variations and other factors.

In general, terms and symbols on the test pit conform with "Standard Definitions of Terms and Symbols Relating to Soil and Rock Mechanics" (ASTM D653).

LOG OF TEST PIT NO. TP-1

Project New River Channelization (Sta. 210+00) Job No. 2128J068

Elevation 1079.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/28/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GW	GRAVEL; with sand, with cobbles, trace fines, brown
			B			GP-GC	SANDY GRAVEL; with cobbles, some clay, brown
5			B				
							minor water seepage
10							
15							
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-2

Project New River Channelization (Sta. 205+00) Job No. 2128J068

Elevation 1079.3 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/28/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GP	SANDY GRAVEL; with cobbles, trace fines, light brown
5							
			B			GP	SANDY GRAVEL; trace fines, reddish brown
10							
15							
20							Excavation stopped at 19 feet
25							
30							

LOG OF TEST PIT NO. TP-3

Project New River Channelization (Sta. 200+00) Job No. 2128J068

Elevation 1072.5 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/28/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
5						GP	SANDY GRAVEL; with cobbles, trace fines, brown
10			B			GP-GC	GRAVELLY SAND; with clay
15							
20							
25							Excavation stopped at 20 feet
30							

LOG OF TEST PIT NO. TP-5

Project New River Channelization (Sta. 190+00) Job No. 2128J068

Elevation 1072.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/28/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GP	GRAVEL AND SAND; trace to some fines, brown
5			B			GW	GRAVEL; with sand, some cobbles, trace fines, reddish brown
10							
15							
			B			GP	SANDY GRAVELS; some cobbles, trace clay, reddish brown
20							Excavation stopped at 18 feet
25							
30							

LOG OF TEST PIT NO. TP-6

Project New River Channelization (Sta. 185+00) Job No. 2128J068

Elevation 1071.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/28/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP	GRAVELLY SAND; trace fines, brown
			B			SC	SAND; with clay, some gravel, reddish brown
5			B			SP	GRAVELLY SAND; trace fines, brown
10							
15							
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-7

Project New River Channelization (Sta. 180+00) Job No. 2128J068

Elevation 1070.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/29/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP	SAND AND GRAVEL; trace fines, brown
5							minor seepage
10							
			B			GP	GRAVEL; with cobbles, with sand, trace fines, reddish brown
15							
			B			SP-SM	SAND; with gravels, some fines, trace cobbles, reddish brown
20							
25							Excavation stopped at 24 feet
30							

LOG OF TEST PIT NO. TP-8

Project New River Channelization (Sta. 175+00) Job No. 2128J068

Elevation 1069.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/29/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP	SAND; with gravels, trace fines, greyish brown
			B				one foot thick layer of silt and sand (SM)
5							
10							
			B			GP	SANDY GRAVEL; with cobbles, trace fines, reddish brown
15							
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-9

Project New River Channelization (Sta. 169+00) Job No. 2128J068

Elevation 1077.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 4/29/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP	SAND; trace fines, gray to brown
5			B			SM	SAND; with silt, gray to brown
10							
						GW	SANDY GRAVEL; with cobbles, trace to some fines, reddish brown
15			B				
							minor seepage
20							
25							Excavation stopped at 24 feet
30							

LOG OF TEST PIT NO. TP-9A

Project New River Channelization (Sta. 170+00) Job No. 2128J068

Elevation 1068.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
5			B			GP	SAND AND GRAVEL; some cobbles, trace fines, gray
10			B			GW	COBBLY GRAVEL; with sand, trace fines, reddish brown
15, 20, 25			B			GP	SANDY GRAVEL; some cobbles, trace fines, reddish brown
30							Excavation stopped at 28 feet

LOG OF TEST PIT NO. TP-10

Project New River Channelization (Sta. 162+00) Job No. 2128J068

Elevation 1075.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GP-GM	SANDY GRAVEL; some cobbles, some fines, grayish brown
			B				
5							
						GW	SANDY GRAVEL; some cobbles, trace fines, reddish brown
			B				
10							
15							
20							
25							
							Excavation stopped at 25 feet
30							

LOG OF TEST PIT NO. TP-11

Project New River Channelization (Sta. 159+00) Job No. 2128J068

Elevation 1063.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SM	SILTY SAND; with gravel, brown
5			B			GP	COBBLY GRAVEL; with sand, trace fines, reddish brown
10							
15							
20			B			GW	GRAVELS AND COBBLES; with sand, trace fines, dark brown
25							
30							Excavation stopped at 25 feet

LOG OF TEST PIT NO. TP-12

Project New River Channelization (Sta. 155+00) Job No. 2128J068

Elevation 1062.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GW	SANDY GRAVEL; trace cobbles, trace fines
			B				
5							minor seepage
						GW	COBBLY-SANDY GRAVEL; trace fines, reddish brown
10							
			B				
15							
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-13

Project New River Channelization (Sta. 150+00) Job No. 2128J068

Elevation 1066.5 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
5, 10			B			GP-GM	SANDY GRAVEL; some fines, reddish brown
15, 20			B			SP-SM	GRAVELLY SAND; some fines, reddish brown
25			B			GW	SANDY GRAVEL; trace fines, brown
30							Excavation stopped at 27 feet

LOG OF TEST PIT NO. TP-14

Project New River Channelization (Sta. 144+00) Job No. 2128J068

Elevation 1072.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GW	SANDY GRAVEL; with cobbles, trace fines, reddish brown
			B				
5							
						SP-SM	SAND AND GRAVEL; some fines, reddish brown
10			B				
15							
20							light cementation
25							
							Excavation stopped at 26 feet
30							

LOG OF TEST PIT NO. TP-15

Project New River Channelization (Sta. 140+00) Job No. 2128J068

Elevation 1056.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GW-GM	SANDY GRAVEL; some cobbles, some fines, reddish brown
			B				
5							
10							
15							
20							
						GP-GM	SANDY GRAVEL; some fines, brown
25			B				
							Excavation stopped at 27 feet
30							

LOG OF TEST PIT NO. TP-16

Project New River Channelization (Sta. 137+00) Job No. 2128J068

Elevation 1055.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GW	COBBLY GRAVEL; with sand, trace fines, brown
5			B			GW-GM	SANDY GRAVEL; some cobbles, some silts, reddish brown
10 15			B			SC	SAND; with clay, some gravel, reddish brown
			B			SP-SM	GRAVELLY SAND; with silt; brown
20						GW	GRAVELS AND COBBLES; with sand, trace fines, brown
25 30							Excavation stopped at 20 feet

LOG OF TEST PIT NO. TP-17

Project New River Channelization (Sta. 134+00) Job No. 2128J068

Elevation 1058.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP	SAND; with gravels, some cobbles at surface, trace fines, brown
5			B			SP-SM	SAND AND GRAVEL; some silts, reddish brown
10			B				more gravel, some cobbles
15			B			SP-SM	SAND; with gravels, some silts, reddish brown
20			B			GP	SANDY GRAVELS; with cobbles, trace fines, brown
25							Excavation stopped at 20 feet
30							

LOG OF TEST PIT NO. TP-18

Project New River Channelization (Sta. 130+00) Job No. 2128J068

Elevation 1057.5 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GP	SANDY GRAVEL; trace fines, brown
			B				
5							
10							
15						GW	SANDY GRAVEL; trace fines, brown
			B				
20							
25							
							Excavation stopped at 26 feet
30							

LOG OF TEST PIT NO. TP-19

Project New River Channelization (Sta. 125+00) Job No. 2128J068

Elevation 1060.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
5			B			SP	GRAVELLY SAND; some cobbles, trace fines, brown
10, 15			B			GP-GM	SANDY GRAVEL; some cobbles, some fines, reddish brown
20, 25			B			GP	SAND AND GRAVEL; trace fines, trace cobbles, brown
30							Excavation stopped at 25 feet

LOG OF TEST PIT NO. TP-20

Project New River Channelization (Sta. 120+00) Job No. 2128J068

Elevation 1057.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	GRAVELLY SAND; some cobbles, trace fines, brown
						GP	SANDY GRAVEL; some cobbles, trace fines, reddish brown
			B				
5							
10							
15							
20							
						SP-SM	SAND; some fines, some gravel, brown
			B				
25							
							Excavation stopped at 25 feet
30							

LOG OF TEST PIT NO. TP-21

Project New River Channelization (Sta. 115+00) Job No. 2128J068

Elevation 1054.2 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GP	SAND AND GRAVEL; trace cobbles, trace fines, brown
5			B			GW-GM	SANDY GRAVELS; with cobbles, some fines, reddish brown
10							
15							
20							
25							
							Excavation stopped at 25 feet
30							

LOG OF TEST PIT NO. TP-22

Project New River Channelization (Sta. 106+00) Job No. 2128J068

Elevation 1048.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GP	SAND AND GRAVEL; some cobbles, trace fines, brown
5			B			GP-GM	SAND AND GRAVEL; with cobbles, some fines, reddish brown
10							
			B				
15							
			B			SP	GRAVELLY SAND; trace fines, trace cobbles, grayish brown
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-23

Project New River Channelization (Sta. 102+00) Job No. 2128J068

Elevation 1048.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
5			B			GP	SANDY GRAVEL; with cobbles, trace fines, reddish brown
10							
15							
20			B			GP-GC	SAND AND GRAVEL; some clay, some cobbles, reddish brown, trace to light cementation
25							Excavation stopped at 20 feet
30							

LOG OF TEST PIT NO. TP-24

Project New River Channelization (Sta. 96+00) Job No. 2128J068

Elevation 1043.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GP	GRAVELS AND COBBLES; with sand, trace fines, brown
			B				
5							
						GW	GRAVELS AND COBBLES; some sand, trace fines, reddish brown
10			B				
15							
20							
25							
30							Excavation stopped at 28 feet

LOG OF TEST PIT NO. TP-25

Project New River Channelization (Sta. 90+00) Job No. 2128J068

Elevation 1042.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP-SM	GRAVELLY SAND; some fines, brown
5			B			GP	SANDY GRAVEL; trace fines, reddish brown
10							
15							
			B			GW	SANDY GRAVEL; trace fines, reddish brown
20							
			B			GP-GM	SAND AND GRAVEL; with cobbles, some fines, reddish brown
25							
30							Excavation stopped at 27 feet

LOG OF TEST PIT NO. TP-26

Project New River Channelization (Sta. 85+00) Job No. 2128J068

Elevation 1051.5 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP	GRAVELLY SAND; with cobbles, trace fines, gray and brown
5			B			CL-ML	SANDY-SILTY CLAY; trace gravels, dark gray, with odor
10			B			SP-SM	GRAVELLY SAND; some fines, brown
15			B			GW	SANDY GRAVEL; some cobbles, trace fines, reddish brown
20							
25							
30							Excavation stopped at 27 feet

LOG OF TEST PIT NO. TP-27

Project New River Channelization (Sta. 80+00) Job No. 2128J068

Elevation 1036.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GW	SANDY GRAVEL; some cobbles, trace fines, reddish brown
			B				
5							
10							
15							
							no cobbles, less sand
			B				
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-28

Project New River Channelization (Sta. 75+00) Job No. 2128J068

Elevation 1035.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GP-GC	SANDY GRAVEL; some cobbles, some clay, grayish brown
5			B			GW	SANDY GRAVEL; trace fines, trace cobbles, reddish brown
10							
15			B			GP	SANDY-COBBLY GRAVEL; trace fines, reddish brown
20							
25							Excavation stopped at 20 feet
30							

LOG OF TEST PIT NO. TP-29

Project New River Channelization (Sta. 70+00) Job No. 2128J068

Elevation 1036.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
5			B			GP	SANDY GRAVEL; some cobbles, trace fines, reddish brown
10			B			SP-SM	SAND; with gravel, some fines, reddish brown
15 20						GP	SANDY GRAVEL; some cobbles, trace fines, reddish brown
25 30							Excavation stopped at 20 feet

LOG OF TEST PIT NO. TP-30

Project New River Channelization (Sta. 65+00) Job No. 2128J068

Elevation 1035.5 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 24" Rig Type Ford 555

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			GP	COBBLY GRAVEL; with sand, trace fines, grayish brown
5			B			GW	SANDY GRAVEL; with cobbles, trace fines, reddish brown
10							
15							
20			B			GP	SANDY GRAVEL; some cobbles, trace fines, grayish brown
25							Excavation stopped at 23 feet
30							

LOG OF TEST PIT NO. TP-30A

Project New River Channelization (Sta. 60+00) Job No. 2128J068

Elevation 1036.6 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GP	SANDY GRAVEL; some cobbles, trace fines, brown
			B				
5							no cobbles, reddish brown
10							
15			B				
							construction debris at 18 feet (4" x 8" x 16" concrete block)
20							
25							
							Excavation stopped at 25 feet
30							

LOG OF TEST PIT NO. TP-31

Project New River Channelization (Sta. 55+00) Job No. 2128J068

Elevation 1036.5 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GW	GRAVEL; some cobbles, some sand, trace fines, brown
			B				
5							
							more sand, more cobbles, reddish brown
10							
			B				
15							
20							
						SP-SM	GRAVELLY SAND; some fines, some cobbles, brown
			B				
25							
							Excavation stopped at 25 feet
30							

LOG OF TEST PIT NO. TP-32

Project New River Channelization (Sta. 50+00) Job No. 2128J068

Elevation 1034.0 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	GRAVELLY SAND; some cobbles, trace fines, brown
5			B				
10							
						GP	SANDY GRAVEL; with cobbles, trace fines, reddish brown
15			B				
20							
25							
							Excavation stopped at 25 feet
30							

LOG OF TEST PIT NO. TP-33

Project New River Channelization (Sta. 45+00) Job No. 2128J068

Elevation 1033.6 Datum MEAN SEA LEVEL

Type/Size Boring Backhoe 30" Rig Type Mitsubishi

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	GRAVELLY SAND; some cobbles, trace fines, brown
			B				
5							
10							
15						GP	SANDY-COBBLY GRAVEL; trace fines, reddish brown
			B				
20							
							Excavation stopped at 20 feet
25							
30							

LOG OF TEST PIT NO. TP-34

Project: New River Channelization (Sta. 40+00) Job No. 2128J068

Elevation: 1033.0 Datum: MEAN SEA LEVEL

Type/Size Boring: Backhoe 24" Rig Type: Ford 555

Groundwater Conditions: None Encountered Date: 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP-SM	GRAVELLY SAND; some cobbles, some fines, grayish brown
5			B			SM	SILTY SAND; grayish brown
10			B			SP	GRAVELLY SAND; with cobbles, trace fines, brown
15			B			GP	COBBLY GRAVEL; with sand, trace fines, reddish brown
20							
25							Excavation stopped at 20 feet
30							

BORING LOG NOTES

The number shown in "LOG OF BORING NO." refers to the approximate location of the same number indicated on the "Site Plan" as positioned in the field by pacing from existing features.

"STA" refers to the approximate stationing of the boring along the proposed New River Channelization alignment according to Coe and Van Loo.

"ELEVATION" refers to ground surface elevation at the boring location relative to the indicated "DATUM" established by interpolation from contours on the "Site Plan".

"TYPE/SIZE BORING" refers to the exploratory equipment used in the boring wherein HSA = hollow-stem auger.

"N" in "Blows/Foot" refers to the number of blows of a 140-pound weight, dropped 30 inches, required to advance a two-inch-outside-diameter split-barrel sampler a distance of 1 foot, Standard Penetration Test (ASTM D1586). Refusal to penetration is defined as more than 100 blows per foot.

"R" in "Blows/Foot" refers to the number of blows of a 140-pound weight, dropped 30 inches, required to advance a 2.42-inch-inside-diameter ring sampler a distance of 1 foot. Refusal to penetration is considered more than 50 blows per foot.

"Sample Type" refers to the form of sample recovery, in which N = Split-barrel sample, R = Ring sample, G = Grab sample.

"Dry Density, pcf" refers to the laboratory-determined dry density in pounds per cubic foot. The symbol "NR" indicates that no sample was recovered. The symbol "*" indicates that determination of dry density was not possible.

"Water Content, %" refers to the laboratory-determined moisture content in percent (ASTM D2216).

"Unified Classification" refers to the soil type as defined by "Method of Soil Classification". The soils were classified visually in the field and, where appropriate, classifications were modified by visual examination of samples in the laboratory and/or by appropriate tests.

These notes and boring logs are intended for use in conjunction with the purposes of our services defined in the text. Boring log data should not be construed as part of the construction plans nor as defining construction conditions.

Coe and Van Loo
Job No. 2128J068

Boring logs depict our interpretations of subsurface conditions at the locations and on the date(s) noted. Variations in subsurface conditions and soil characteristics may occur between borings. Groundwater levels may fluctuate due to seasonal variations and other factors.

In general, terms and symbols on the boring logs conform with "Standard Definitions of Terms and Symbols Relating to Soil and Rock Mechanics" (ASTM D653).

LOG OF BORING NO. B-1E

Project New River Channelization (Sta. 210+00) Job No. 2128J068

Elevation 1081.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM-SC	GRAVELLY SAND FILL; with silt, some clay, brown
5		34	N			GM	SANDY GRAVEL FILL; some silt, some cobbles, brown noxious odor
10							Boring stopped at 5 feet
15							
20							
25							
30							

LOG OF BORING NO. B-2E

Project New River Channelization (Sta. 205+00) Job No. 2128J068

Elevation 1090.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GM	SANDY GRAVEL FILL; some silt, brown
			G				
		19	N		2.6		less gravel, more sand
							some cobbles
5							Auger refusal at 4 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-3E

Project New River Channelization (Sta. 200+00) Job No. 2128J068

Elevation 1080.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SANDY FILL; with gravel, trace silt, brown
		6	N		3.9	SM	SAND FILL; with silt, some gravel, brown
5		14	N		4.9		
						SP	SAND; with gravel, trace silt, brown
10		25/0"	N				some cobbles
							Auger refusal at 10½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-4E

Project New River Channelization (Sta. 195+00) Job No. 2128J068

Elevation 1087.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SILTY SAND; trace gravel, brown
		16	R	NR		SW-SM	SAND; some silt, trace gravel, brown
		41	N		1.5		
5						GP	GRAVEL; with sand, some cobbles, trace silt, brown
		58	N		1.8		
							Auger refusal at 6½ feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-5E

Project New River Channelization (Sta. 190+00) Job No. 2128J068

Elevation 1086.5 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			ML	SILT AND SAND; with clay, trace gravel, brown
		16	R	104	3.6		
5						SP	SAND; trace silt, trace gravel, brown
		33	N			GP	GRAVEL; with sand, trace cobbles, trace silt, brown
10						SP	GRAVELLY SAND; trace silt, brown
		21	N		2.6		
15							
		50/3"	N			SC	GRAVELLY SAND; some clay, some cobbles, brown
20							Auger refusal at 17 feet
25							
30							

LOG OF BORING NO. B-6E

Project New River Channelization (Sta. 185+00) Job No. 2128J068

Elevation 1085.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM-SC	CLAYEY SAND; with silt, trace gravel, brown
		14	R				
5		11	N		4.6	SP	SAND; trace silt, trace gravel, brown
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
10							Auger refusal at 9 feet
15							
20							
25							
30							

LOG OF BORING NO. B-7E

Project New River Channelization (Sta. 180+00) Job No. 2128J068

Elevation 1084.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SAND; with silt, trace gravel, brown
		9	R	107	3.3	SP	SAND; trace silt, trace gravel, brown
5		10	N				
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
10							Auger refusal at 9 feet
15							
20							
25							
30							

LOG OF BORING NO. B-8E

Project New River Channelization (Sta. 176+00) Job No. 2128J068

Elevation 1082.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SILTY SAND; trace clay, trace gravel, brown
		12	R	102	5.4	SP	SAND; some gravel, trace silt, brown
5						GP	GRAVEL; with sand, some cobbles, trace silt, brown
							Auger refusal at 5 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-9E

Project New River Channelization (Sta. 170+00) Job No. 2128J068

Elevation 1080.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SILTY SAND; some clay, brown
		13	R				with silt
5							
		10	R			SP	SAND; trace silt, trace gravel, brown
10		59	N				
						GP	GRAVEL; with sand, some cobbles, trace clay, brown
15							Auger refusal at 13 feet
20							
25							
30							

LOG OF BORING NO. B-10E

Project New River Channelization (Sta. 165+00) Job No. 2128J068

Elevation 1078.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; trace gravel, trace silt, brown
		23	R	110	7.7		interbedded layer of silty sand
5							interbedded layer of gravelly sand
		32	N		3.9		
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
							Auger refusal at 8 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-11E

Project New River Channelization (Sta. 161+00) Job No. 2128J068

Elevation 1077.5 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	SAND; with gravel, trace silt, brown
			G				
		13	N		3.8		trace gravel
5							
		12	R				
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
10							Auger refusal at 9½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-12E

Project New River Channelization (Sta. 155+00) Job No. 2128J068

Elevation 1073.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL FILL; trace cobbles, trace silt, brown
		25/0"	N				
5							Auger refusal at 3½ feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-13E

Project New River Channelization (Sta. 150+00) Job No. 2128J068

Elevation 1070.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SILTY SAND; trace clay, trace gravel, brown
		20	N			SP	SAND; with gravel, trace silt, brown
5							
		18	N		3.7	SP-SM	GRAVELLY SAND; some silt, brown
							interbedded layers of SP
10							
		50/3"	N	NR			some cobbles, trace clay
							Auger refusal at 11 feet
15							
20							
25							
30							

LOG OF BORING NO. B-14E

Project New River Channelization (Sta. 145+00) Job No. 2128J068

Elevation 1070.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SAND; some silt, trace gravel, brown
		12	R	96	6.5	SP	SAND; some gravel, trace silt, brown
5		14	R				
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
							Auger refusal at 7 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-15E

Project New River Channelization (Sta. 140+00) Job No. 2128J068

Elevation 1070.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/10/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SAND; some silt, trace gravel, brown
		9	N		2.4	SP-SM	SAND; some gravel, some silt, brown
5		9	R	99	2.0		
10		26	N			GP	GRAVEL; with sand, some cobbles, trace silt, brown
						SP-SM	SAND; with gravel, some silt, brown
15		56	N			GP	GRAVEL; with sand, trace clay, brown some cobbles Auger refusal at 17 feet
20							
25							
30							

LOG OF BORING NO. B-16E

Project New River Channelization (Sta. 135+00) Job No. 2128J068

Elevation 1069.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; trace silt, trace gravel, brown
		6	N				interbedded layer of silty sand
5		5	N		2.2		
10							
		44	N			GP	GRAVEL; with sand, some cobbles, brown
							Auger refusal at 12 feet
15							
20							
25							
30							

LOG OF BORING NO. B-17E

Project New River Channelization (Sta. 130+00) Job No. 2128J068

Elevation 1068.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SAND; with silt, trace gravel, brown
		9	N		2.5		
5						SP-SM	SAND; some silt, trace gravel, brown
		8	N		2.3		
							Auger refusal at 6 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-18E

Project New River Channelization (Sta. 125+00) Job No. 2128J068

Elevation 1065.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; some gravel, trace silt, brown
		7	N				
5							
		13	N			SM	SAND; with silt, some gravel, brown
10						SP	SAND; with gravel, trace silt, brown some cobbles
		40	N				
							Auger refusal at 11½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-19E

Project New River Channelization (Sta. 120+00) Job No. 2128J068

Elevation 1068.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	SAND; with gravel, trace silt, brown
			G				
		9	N		2.5		trace gravel
5							
		47	N		1.1	SP-SM	SAND; some silt, with gravel, brown
10							
		52	N		2.7		interbedded layer of sandy gravel
							some cobbles
							Auger refusal at 13 feet
15							
20							
25							
30							

LOG OF BORING NO. B-19E

Project New River Channelization (Sta. 115+00) Job No. 2128J068

Elevation 1068.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; with gravel, trace silt, brown
		9	N		2.5		trace gravel
5							
		47	N		1.1	SP-SM	SAND; some silts, with gravel, brown
10							
		52	N		2.7		interbedded layer of sandy gravel some cobbles
15							Auger refusal at 13 feet
20							
25							
30							

LOG OF BORING NO. B-20E

Project New River Channelization (Sta. 110+00) Job No. 2128J068

Elevation 1062.5 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; some gravel, trace silt, brown
		6	N		1.0		trace gravel
5		7	N		1.1		
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
10		50/3½"	N				
							Auger refusal at 10½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-21E

Project New River Channelization (Sta. 105+00) Job No. 2128J068

Elevation 1060.0 Datum: MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; some gravel, trace silt, brown
		7	N				
5		4	N				
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
10							Auger refusal at 9½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-22E

Project New River Channelization (Sta. 105+00) Job No. 2128J068

Elevation 1057.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; trace silt, trace gravel, brown
		32	N				
5		38	N			SP-SM	SAND AND GRAVEL; some silt, brown interbedded layer of sand (SP)
10							Auger refusal at 9 feet
15							
20							
25							
30							

LOG OF BORING NO. B-23E

Project New River Channelization (Sta. 99+00) Job No. 2128J068

Elevation 1057.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	SILTY SAND; some gravel, trace clay, brown
		30	R	*			
						GP	GRAVEL; with sand, some cobbles, trace silt, brown
5							Auger refusal at 4½ feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-24E

Project New River Channelization (Sta. 95+00) Job No. 2128J068

Elevation 1056.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/09/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL FILL; trace silts, brown, sample contains wood, concrete and metal debris
		19	N				
5							wood debris
		22	N				concrete debris
							wire
10							
		48	N		2.0	GP	GRAVEL; with sand, some cobbles, trace silt, brown
							Auger refusal at 11½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-25E

Project New River Channelization (Sta. 90+00) Job No. 2128J068

Elevation 1067.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL FILL; trace cobbles, trace silt, brown
5		8	N		11.3	SM	SILTY SAND; trace gravel, brown
		16	N		2.9	SP	SAND; trace silt, trace gravel, brown
10		50/5"	N			GP	SANDY GRAVEL; with cobbles, trace silt, brown
15 20 25 30							Auger refusal at 12 feet

LOG OF BORING NO. B-26E

Project New River Channelization (Sta. 85+00) Job No. 2128J068

Elevation 1055.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	GRAVELLY SAND FILL; trace silt, brown
5		5	N		13.9	ML	SANDY SILT; some clay, trace gravel, brown
		16	N		2.7	SP	GRAVELLY SAND; trace cobbles, trace silt, brown
10		36	N			GP	SANDY GRAVEL; with cobbles, trace silt, brown
15							Auger refusal at 13½ feet
20							
25							
30							

LOG OF BORING NO. B-27E

Project New River Channelization (Sta. 80+00) Job No. 2128J068

Elevation 1052.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
		9	G R	105	9.2	SC-SM	CLAYEY SAND-SILTY SAND; trace gravel, brown
5		11	R			SP	SAND; some gravel, trace silt, brown interbedded layers of gravel
10		37	N		2.8	SW-SM	GRAVELLY SAND; trace cobbles, some silt, brown
15 20 25 30							Auger refusal at 11½ feet

LOG OF BORING NO. B-28E

(Sta. 75+00)

Project New River Channelization Job No. 2128J068

Elevation 1050.0 Datum MEAN SEA LEVEL

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SM	GRAVELLY SAND FILL; with silt, trace clay, brown
		10	N		4.9		sample contained wood, asphalt and concrete debris
5							
		65/8"	N		1.8	GP	SANDY GRAVEL; some cobbles, trace silt, brown
							Auger refusal at 7 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-29E

Project New River Channelization (Sta. 70+00) Job No. 2128J068

Elevation 1047.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP-SM	SAND; some gravel, some silt, brown
		19	N		1.3		interbedded layer of gravels
5		47	N		1.2		
10						GP	SANDY GRAVEL; some cobbles, trace silt, brown
		67	N		1.2	SW-SM	GRAVELLY SAND; some silt, trace cobbles
15							Auger refusal at 13 feet
20							
25							
30							

LOG OF BORING NO. B-30E

Project New River Channelization (Sta. 65+00) Job No. 2128J068

Elevation 1046.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP-SM	SAND; trace gravel, some silt, brown
		13	N		1.2		
5							interbedded layer of gravel (thin)
		47	N		1.3		
						GP	SANDY GRAVEL; some cobbles
10						SP-SM	SAND AND GRAVEL; some silt, brown
		75	N		1.0		
							Auger refusal at 12 feet
15							
20							
25							
30							

LOG OF BORING NO. B-31E

Project New River Channelization (Sta. 60+00) Job No. 2128J068

Elevation 1048.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	SAND; trace gravel, trace silt, brown
			G				
		17	N		2.7		
5							
		37	N				
							interbedded layer of gravel
10							
		52	N				small thin layer of gravel
							some cobbles
15							Auger refusal at 14½ feet
20							
25							
30							

LOG OF BORING NO. B-32E

Project New River Channelization (Sta. 55+00) Job No. 2128J068

Elevation 1041.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	GRAVELLY SAND; trace silt, brown
			G				
		11	N		3.5		with gravel, interbedded layer of silty sand
5							
		44	N				
						GP	SANDY GRAVEL; some cobbles, trace silt, brown
10		25/0"	N				
							Auger refusal at 10½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-33E

Project New River Channelization (Sta. 50+00) Job No. 2128J068

Elevation 1039.5 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SP	SAND; trace gravel, trace silt, brown
			G				
		28	N		2.2		
							GRAVELLY SAND; with cobbles, trace silt
5							
		25/0"	N	NR			
							trace cobbles
10		78	N		2.2		
							Auger refusal at 10½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-34E

Project New River Channelization (Sta. 45+00) Job No. 2128J068

Elevation 1040.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP-SM	GRAVELLY SAND; some silt, brown
		22	N		2.5		interbedded layer of gravel
5		61	N				
10		25/0"	N	NR			
							Boring stopped at 10½ feet
15							
20							
25							
30							

LOG OF BORING NO. B-1W

Project New River Channelization (Sta. 210+00) Job No. 2128J068

Elevation 1081.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SM	SILTY SAND; with gravels, brown
		40	N			GP-GM	SANDY GRAVEL; some fines, brown
5		92/8"	N				some clay
			B				
10		50/3"	N	NR		GW	SAND AND GRAVEL; with cobbles, trace fines, brown
15		50/1"	N	NR			
		89	N			SP-SC	GRAVELLY SAND; some clay, mottled red, brown, and dark gray
							thin lenses of brown clayey sand (SC)
						GC	SAND AND GRAVEL; with clay
20		78	N				
			B				
		10/0"	N				
							Boring stopped at 22½ feet
25							
30							

LOG OF BORING NO. B-2W

Project New River Channelization (Sta. 205+00) Job No. 2128J068

Elevation 1094.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SW-SC	GRAVELLY SAND FILL; some clay, brown
		26	N				dark gray, some organics, rotten odor
5		27	N				Boring stopped at 4 feet due to possible hazardous material
10							
15							
20							
25							
30							

LOG OF BORING NO. B-3W

Project New River Channelization (Sta. 200+00) Job No. 2128J068

Elevation 1083.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SP-SM	GRAVELLY SAND; some fines, brown
		12	N	NR		SP	GRAVELLY SAND; trace fines, brown
5		48	N				
							Auger refusal at 6 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-4W

Project: New River Channelization (Sta. 195+00) Job No. 2128J068

Elevation: 1093.0 Datum: Mean Sea Level

Type/Size Boring: 7" HSA Rig Type: CME 45

Groundwater Conditions: None Encountered Date: 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SM	GRAVELLY SAND FILL; with silt, brown
							reddish brown
		26	N				more gravel
5		23	N				
						GP-GM	SANDY GRAVEL FILL; some cobbles, some fines, brown
10		35	N				more sand
							less sand
15		50/5"	N				
							ball point pen and brick piece came with soil
							Auger refusal at 18 feet
20							
25							
30							

LOG OF BORING NO. B-5W

Project New River Channelization (Sta. 190+00) Job No. 2128J068

Elevation 1091.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/02/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			B			SW-SC	GRAVELLY SAND; some clay, brown
		50/9"	R	*	4.6		
5		90/3"	N	NR			
						GC/SC	SAND AND GRAVEL; with clay, brown
10		77	N		3.3		
						GW-GC	SANDY GRAVEL; some clay, brown
15		37	N		5.3	SP-SM	SAND; with silt and clay, brown
20		37	N		3.6		
						GW	GRAVEL; with sand, some cobbles, trace silt, brown
		25/0"	N	NR			
25							Auger refusal at 24 feet
30							

LOG OF BORING NO. B-6 W

Project New River Channelization (Sta. 185+00) Job No. 2128J068

Elevation 1088.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SC	GRAVELLY SAND FILL; some clay, brown
			G			SM	SILTY SAND; some clay, brown
		6	N		6.8		
5		9	R	96	5.5		trace clay
							interbedded layers of sandy gravel
10		45	R		1.5		
						SP	GRAVELLY SAND; trace silt
15		45	N		2.1		
							some cobbles
							Auger refusal at 18 feet
20							
25							
30							

LOG OF BORING NO. B-7W

Project New River Channelization (Sta. 180+00) Job No. 2128J068

Elevation 1086.5 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/07/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SC	CLAYEY SAND FILL; with gravel, brown
		30	R	102	6.8		light to moderate cementation
5		17	N		4.3	SP	SAND; some silt, trace clay, brown
							interbedded layers of gravel
10		17	N		1.1	GP	SANDY GRAVEL; trace silt, brown
							trace cobbles
15		63	N		2.2		
							Boring stopped at 17 feet
20							
25							
30							

LOG OF BORING NO. B-8W

Project New River Channelization (Sta. 175+50) Job No. 2128J068

Elevation 1082.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL FILL; with cobbles, trace fines, brown
		30	R	NR		SP	SAND; some silt, trace clay, brown some gravel
5		14	R	106	2.0		
10		10	N		2.2		GRAVELLY SAND; trace silt some cobbles
15							Auger refusal at 14 feet
20							
25							
30							

LOG OF BORING NO. B-9W

Project New River Channelization (Sta. 170+00) Job No. 2128J068

Elevation 1079.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL FILL; trace silt, brown
		30	N		2.1	SP	SAND; some gravel, trace silt, trace clay, brown
5		33	R	119	2.1		interbedded layers of GP
10		66/6"	N		2.1		some cobbles
15							Auger refusal at 13½ feet
20							
25							
30							

LOG OF BORING NO. B-10W

Project New River Channelization (Sta. 165+00) Job No. 2128J068

Elevation 1078.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	GRAVELLY SAND FILL; trace fines, brown
		33	N		3.2	SP	SAND; some gravel, trace silt, brown
5							interbedded layers of gravels
		8	N		2.7		
10		25/0"	R	NR			
15							Auger refusal at 13½ feet
20							
25							
30							

LOG OF BORING NO. B-11W

Project New River Channelization (Sta. 161+00) Job No. 2128J068

Elevation 1078.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/03/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						GP	SANDY GRAVEL FILL; trace silt, brown
			G			GP	SANDY GRAVEL; trace silt, brown
		46	N		2.3		
5							
		29	N		2.7		
						SP	SAND; some gravel, trace silt, brown
10		25/0"	N	NR			
							Auger refusal at 10 feet
15							
20							
25							
30							

LOG OF BORING NO. B-12 W

Project New River Channelization (Sta. 155+00) Job No. 2128J068

Elevation 1076.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
		17	G R	85	7.8	SC-SM	SAND; with clay, with silt, trace gravel, brown
5		12	G R	103	5.6	SP	SAND; trace silt, trace gravel, brown interbedded layers of gravel
10		15	N		2.2		
15							
		17	R		3.5	GP	SANDY GRAVEL; some cobbles, trace silt, brown
20							
							Auger refusal at 20 feet
25							
30							

LOG OF BORING NO. B-13 W

Project New River Channelization (Sta. 150+00) Job No. 2128J068

Elevation 1040.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL; some cobbles, trace silt, brown
							Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-14 W

Project New River Channelization (Sta. 145+00) Job No. 2128J068

Elevation 1036.8 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL; some cobbles, trace silt, brown
							Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-15W

Project New River Channelization (Sta 140+00) Job No. 2128J068

Elevation 1063.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL; trace silt, trace cobbles, brown
		50/3½"	N		2.6		
5							Auger refusal at 3½ feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-16 W

Project New River Channelization (Sta. 135+00) Job No. 2128J068

Elevation 1038.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP-GC	SANDY GRAVEL; some clay, brown trace cobbles
							Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-17 W

Project New River Channelization (Sta. 130+00) Job No. 2128J068

Elevation 1048.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL; some cobbles, trace clay, brown
							Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-18 W

Project New River Channelization (Sta. 125+00) Job No. 2128J068

Elevation 1056.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SAND AND GRAVEL; with cobbles, trace silt, brown
							Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-19 W

Project New River Channelization (Sta. 120+00) Job No. 2128J068

Elevation 1073.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP-GC	SANDY GRAVEL FILL; some clay, trace cobbles, brown
		52	N		10.1	SM	GRAVELLY SAND FILL; some fines, brown
5		58	N		7.8		dark gray, with asphalt debris
10		28	N		2.8		
15							noxious odor
							Boring stopped at 15 feet
20							
25							
30							

LOG OF BORING NO. B-20 W

Project New River Channelization (Sta. 115+00) Job No. 2128J068

Elevation 1070.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 75

Groundwater Conditions None Encountered Date 5/04/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SC	CLAYEY SAND FILL; with gravel, brown
		7	R	108	10.2	SC-SM	CLAYEY SAND-SILTY SAND FILL; some gravel, brown
5		2	N		14.1		with asphalt and concrete debris
10		31	N		3.4		
15		16	N		2.7		
20		90	N		2.6		
						GP	SANDY GRAVEL; trace clay, brown
25							Auger refusal at 24 feet
30							

LOG OF BORING NO. B-21W

Project New River Channelization (Sta. 110+00) Job No. 2128J068

Elevation 1061.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/05/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SC	GRAVELLY SAND FILL; with clay, brown
		17	R			SP-SM	GRAVELLY SAND; trace silt, brown
			G				
5		15	N		2.9		interbedded layers of gravel
10		29	N		2.0		
							some cobbles
							Auger refusal at 12 feet
15							
20							
25							
30							

LOG OF BORING NO. B-22W

Project New River Channelization (Sta. 105+00) Job No. 2128J068

Elevation 1060.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/05/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SC	CLAYEY SAND; some gravel, brown
		10	R	98	6.2		
5		18	R	105	5.9		
			G			GP	SANDY GRAVEL; some cobbles, trace silt, brown
10		49	N	NR			
15		50/5"	N		11.9		
							Auger refusal at 16 feet
20							
25							
30							

LOG OF BORING NO. B-23W

Project New River Channelization (Sta. 100+00) Job No. 2128J068

Elevation 1057.5 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/05/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; trace gravel, trace silt, brown
		16	N		2.8		some gravel
5		24	N		1.7		
10		95/10"	N		1.2	GP	SANDY GRAVEL; some cobbles, trace silt, brown
15							Auger refusal at 10½ feet
20							
25							
30							

LOG OF BORING NO. B-24W

Project New River Channelization (Sta. 95+00) Job No. 2128J068

Elevation 1055.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/05/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP-SM	SAND; some gravel, some silt, brown
		12	N		2.1		
5		14	N		2.8		
10		92/11"	N		1.8	GP	SANDY GRAVEL; some cobbles, trace silt, brown
15							Auger refusal at 11 feet
20							
25							
30							

LOG OF BORING NO. B-25 W

Project New River Channelization (Sta. 90+00) Job No. 2128J068

Elevation 1051.5 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/05/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						CL	SANDY CLAY; trace gravel, brown
		17	R	84	8.4	SC	CLAYEY SAND; trace gravel, brown
5		13	N		4.4		
							less clay
							interbedded layers of gravel
10		12	N		1.1		
							trace cobbles
							Auger refusal at 11 feet
15							
20							
25							
30							

LOG OF BORING NO. B-26.W

Project New River Channelization (Sta. 85+00) Job No. 2128J068

Elevation 1049.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/05/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
						SC	GRAVELLY SAND FILL; with clay, brown
		16	N		5.5	SC	GRAVELLY SAND FILL; with clay, brown
5		11	N		6.9		
10		12	N		8.5		
						GC	SANDY GRAVEL; some clay, brown
							some cobbles
15		35	N		4.7		
							Auger refusal at 16 feet
20							
25							
30							

LOG OF BORING NO. B-27 W

Project New River Channelization (Sta. 79+00) Job No. 2128J068

Elevation 1035.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	SANDY GRAVEL; some cobbles, trace silt, brown
		25/0"	N	NR			Auger refusal at 2½ feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-28 W

Project New River Channelization (Sta. 75+00) Job No. 2128J068

Elevation 1038.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/11/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	GRAVEL; with cobbles, some sand, trace silt, brown
		25/0"	N	NR			Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-29 W

Project New River Channelization (Sta. 70+00) Job No. 2128J068

Elevation 1046.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			GP	GRAVEL FILL; with cobbles, with sand, trace silt, brown
							Auger refusal at 2 feet
5							
10							
15							
20							
25							
30							

LOG OF BORING NO. B-30 W

Project New River Channelization (Sta. 67+00) Job No. 2128J068

Elevation 1037.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SC	SAND FILL; with gravel, with clay
		10	R	70	11.6		with wood debris
5							concrete debris
		25/0"	N				
							Auger refusal at 6 feet
10							
15							
20							
25							
30							

LOG OF BORING NO. B-30B

Project New River Channelization (Sta. 65+00) Job No. 2128J068

Elevation 1047.0 Datum Mean Sea Level

Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			SP	SAND; trace gravel, trace silt, brown
		16	N				
5							
		12	N				
10							
		25/0"	N			GP	GRAVEL; with cobbles, with sand, trace silt, brown
							Auger refusal at 11 feet
15							
20							
25							
30							

LOG OF BORING NO. B-31W

Project New River Channelization (Sta. 60+00) Job No. 2128J068

Elevation 1046.5 Datum Mean Sea Level

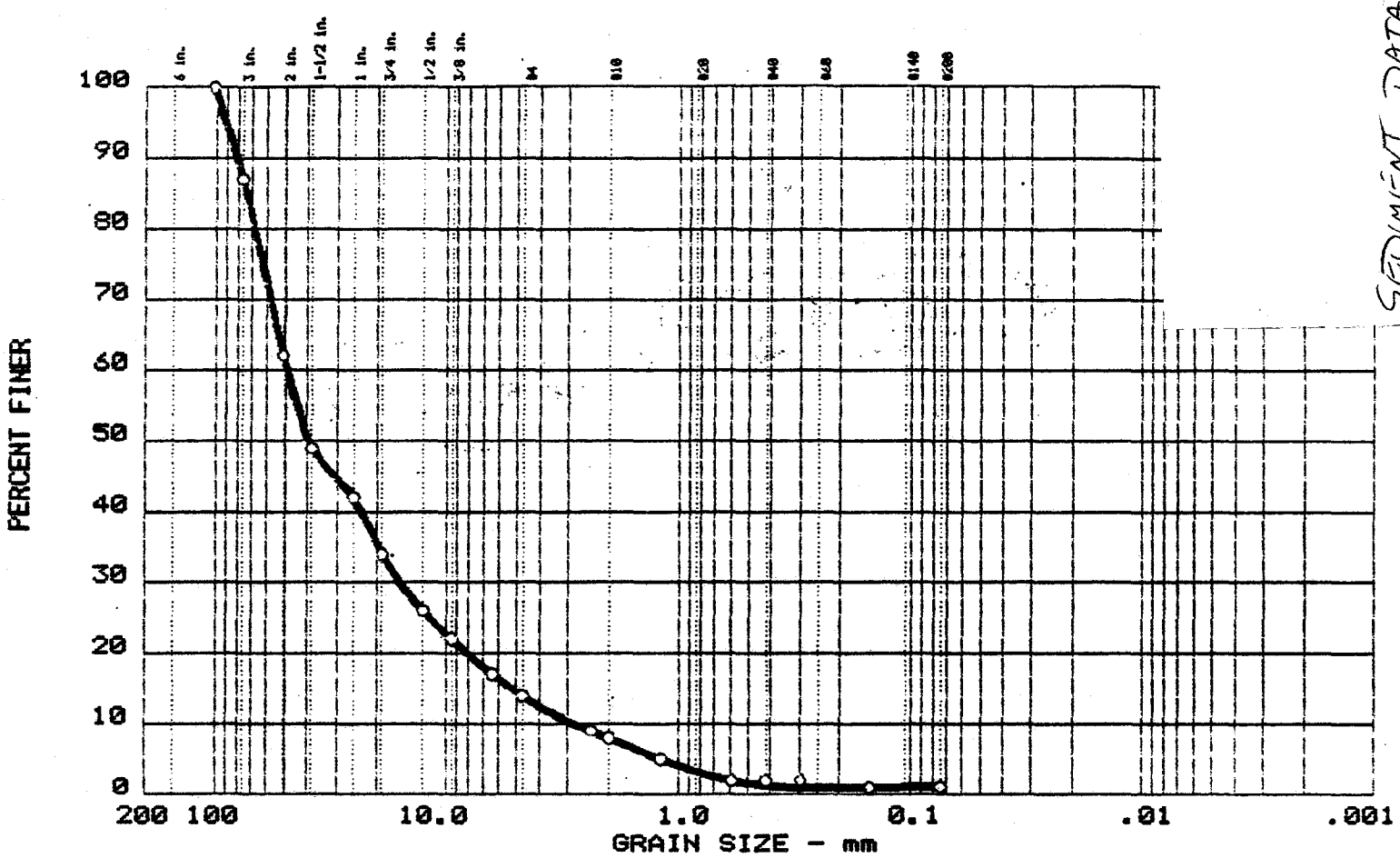
Type/Size Boring 7" HSA Rig Type CME 45

Groundwater Conditions None Encountered Date 5/06/88

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description
			G			CL-ML	SANDY CLAY-SANDY SILT; brown
		11	R	80	7.9		
5							
		12	R	101	3.8	SC	CLAYEY SAND; trace gravel, brown
10		14	R	NR			
		30/0"	N			GP	GRAVEL; with cobbles, with sand, brown
							Auger refusal at 11½ feet
15							
20							
25							
30							

GRAIN SIZE DISTRIBUTION TEST REPORT

SEDIMENT DATA



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	13.0	73.0	14.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	0	NP	73.28	48.98	39.31	16.014	5.2420	2.7829	1.88	17.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; some cobbles, some sand	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TEST PIT, TP-1 (0 - 2)

Date: 5/8/88

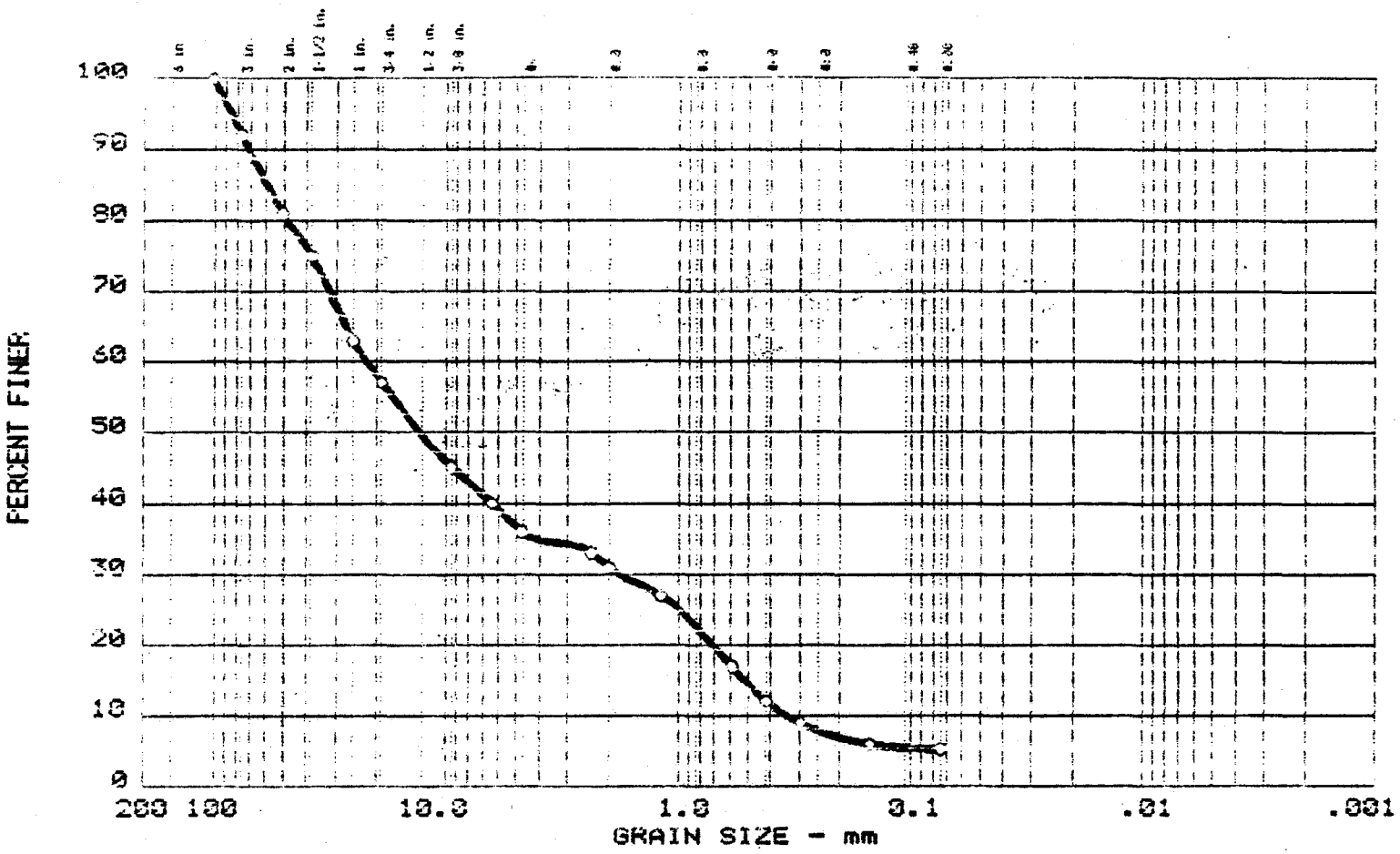
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 1

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	8.0	56.0	30.7	5.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			59.57	22.13	13.83	1.778	0.5188	0.3388	0.42	65.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GP-GM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 1 (6 - 7)

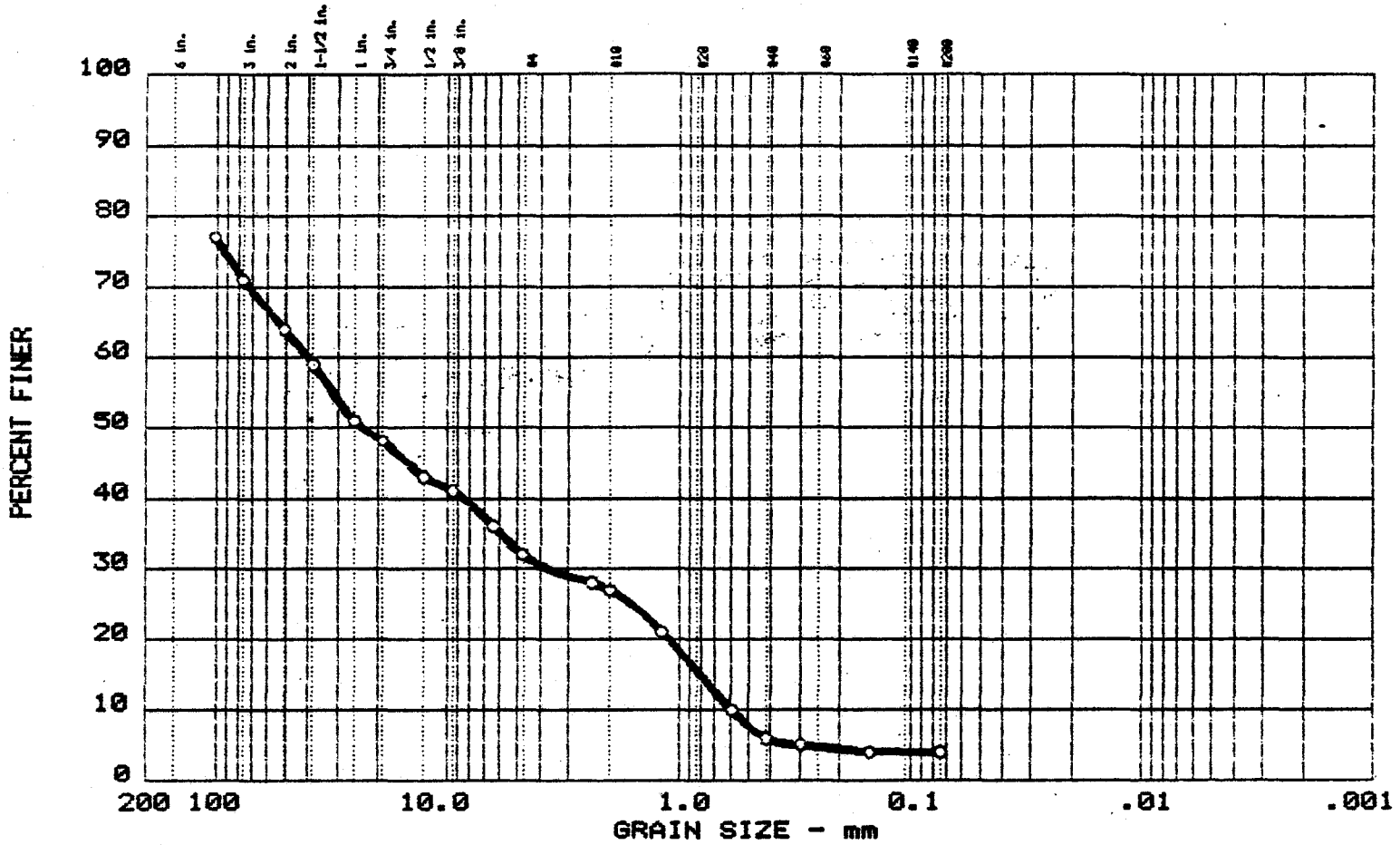
Date: 5/25/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 2

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	29.0	39.0	32.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	48	28	101.60	39.98	23.28	3.732	0.8070	0.5846	0.60	68.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; with sand, with cobbles	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 1 (2 - 3)

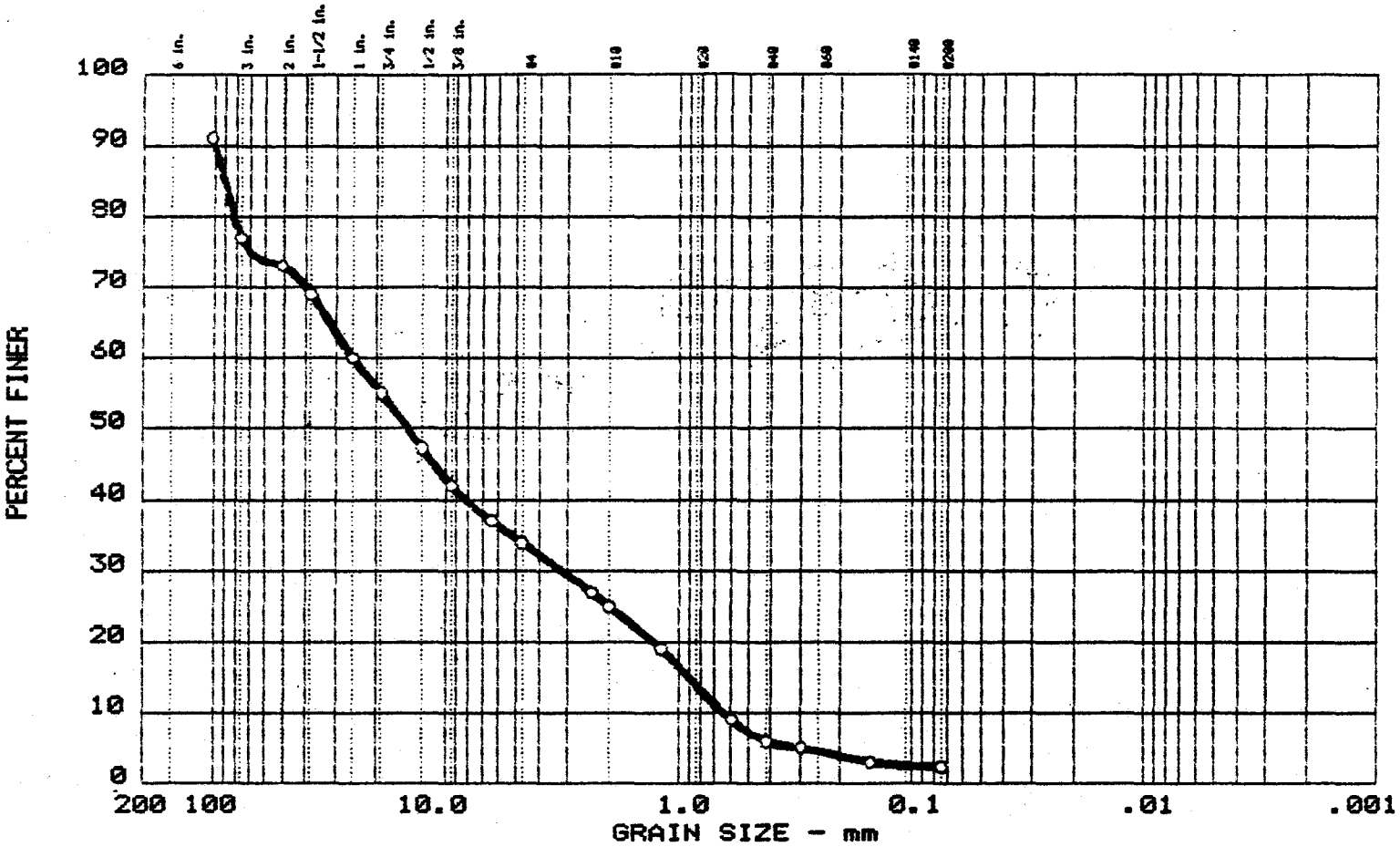
Date: 5/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	11	23.0	43.0	31.7	2.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	91.20	25.38	14.60	3.159	0.9005	0.6375	0.62	39.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 2 (2 - 3)

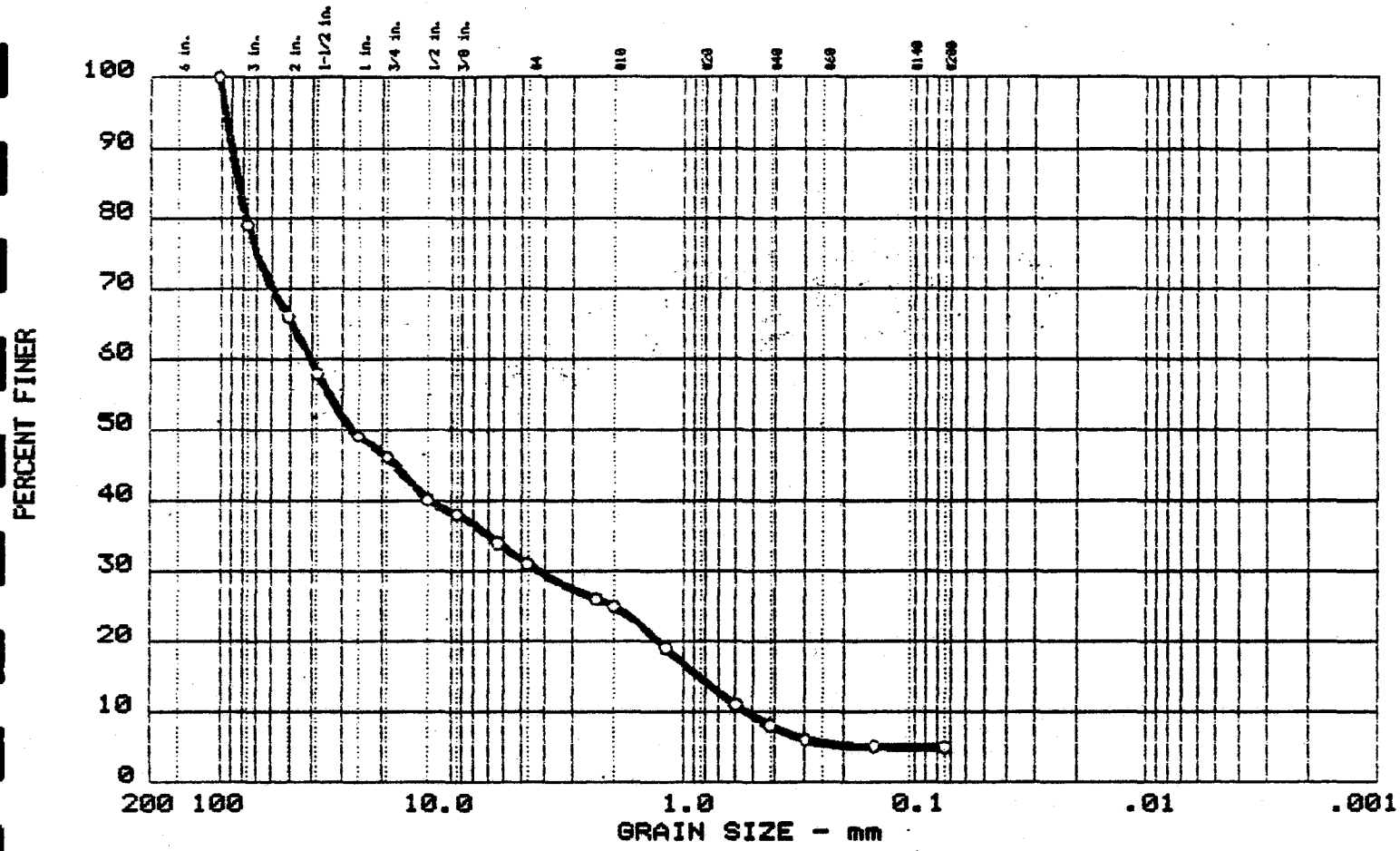
Date: 5/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 4

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	12	21.0	48.0	26.1	4.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	42	21	83.75	40.83	26.98	4.227	0.8531	0.5260	0.83	77.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 2(6 - 7)

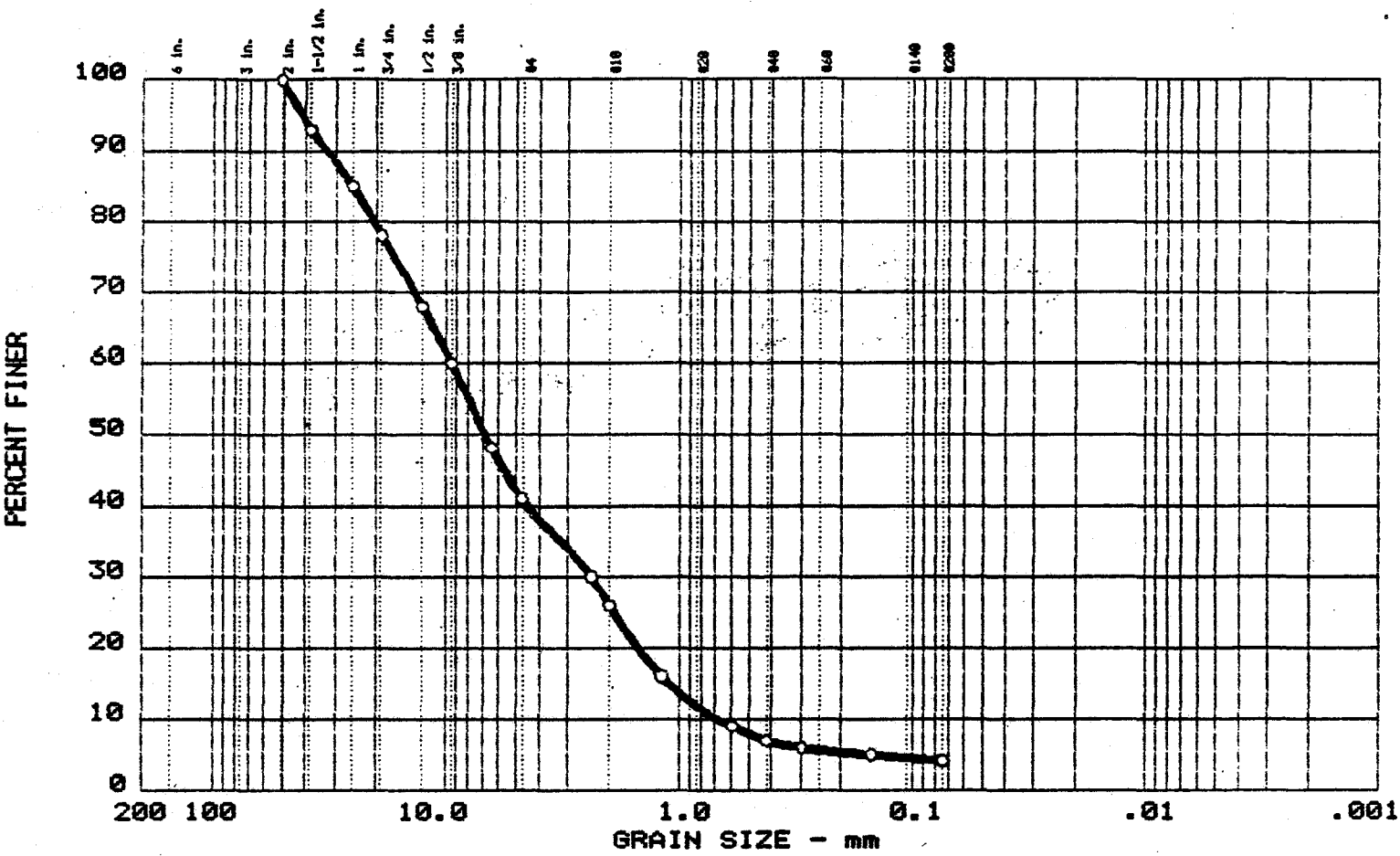
Date: 5/8/22

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 5

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	0.0	59.0	36.8	4.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	54	24	25.38	9.52	6.81	2.360	1.1041	0.6730	0.87	14.1

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL ; trace clay	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 4 (5 - 6)

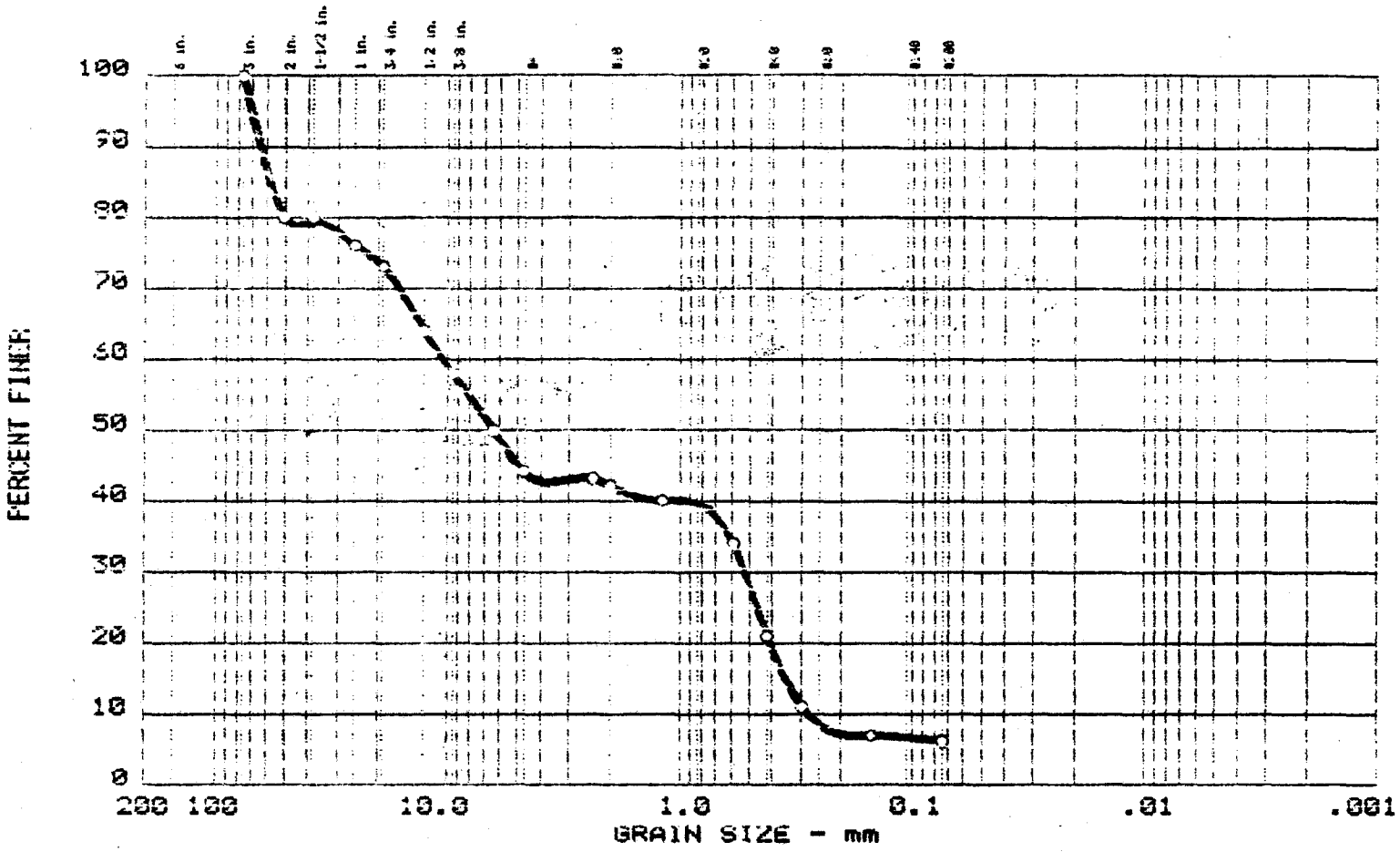
Date: 5/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 6

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	0.0	56.0	37.8	6.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	26	6	58.82	10.46	6.30	0.524	0.3503	0.2783	0.09	37.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVEL; some fines	GP-GM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 4 (8 - 9)

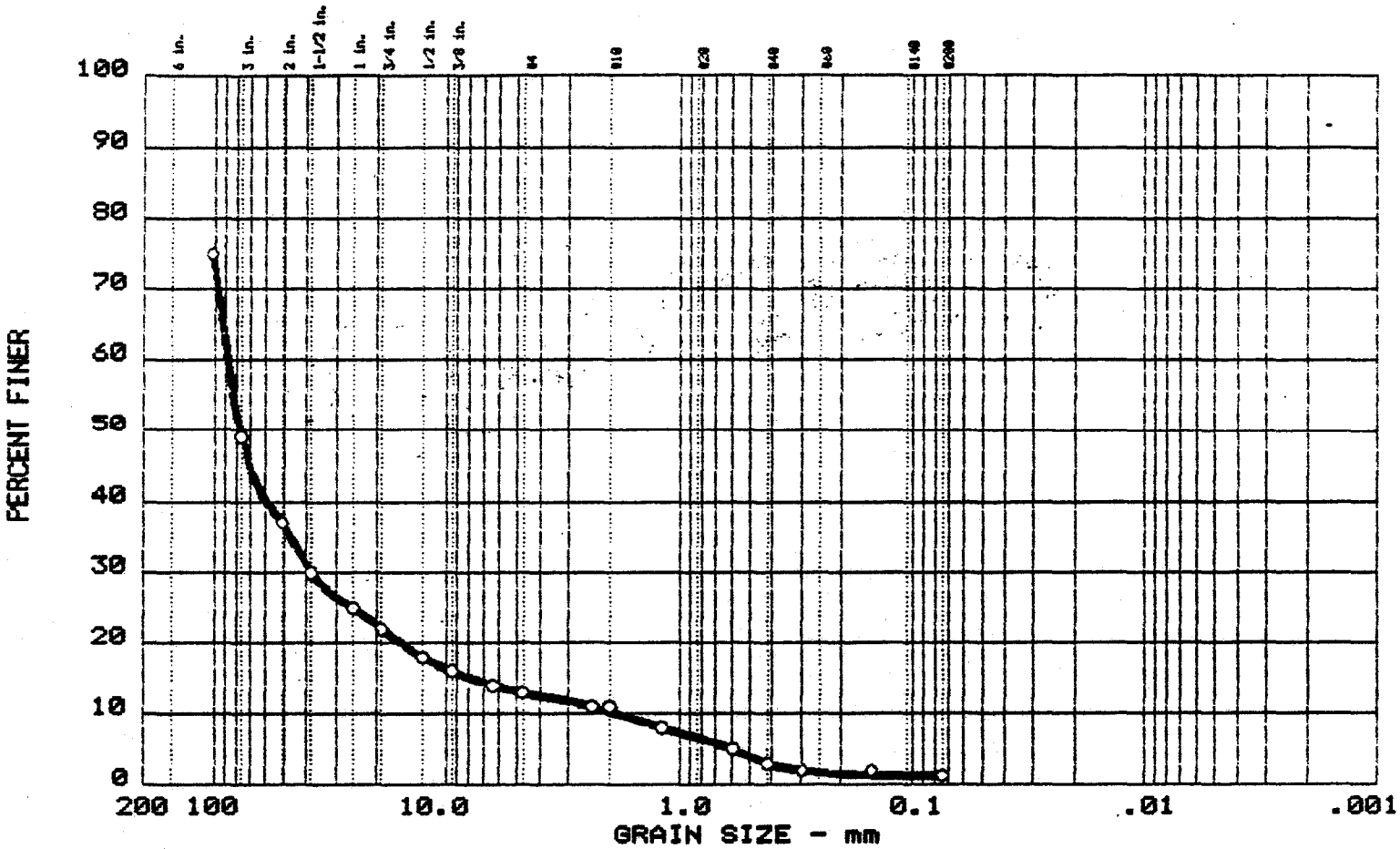
Date: 5/25/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 7

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	14	51.0	36.0	11.7	1.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			101.60	87.48	77.34	37.878	7.9139	1.8552	8.84	47.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY COBBLES; some sand	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 4 (14 - 16)

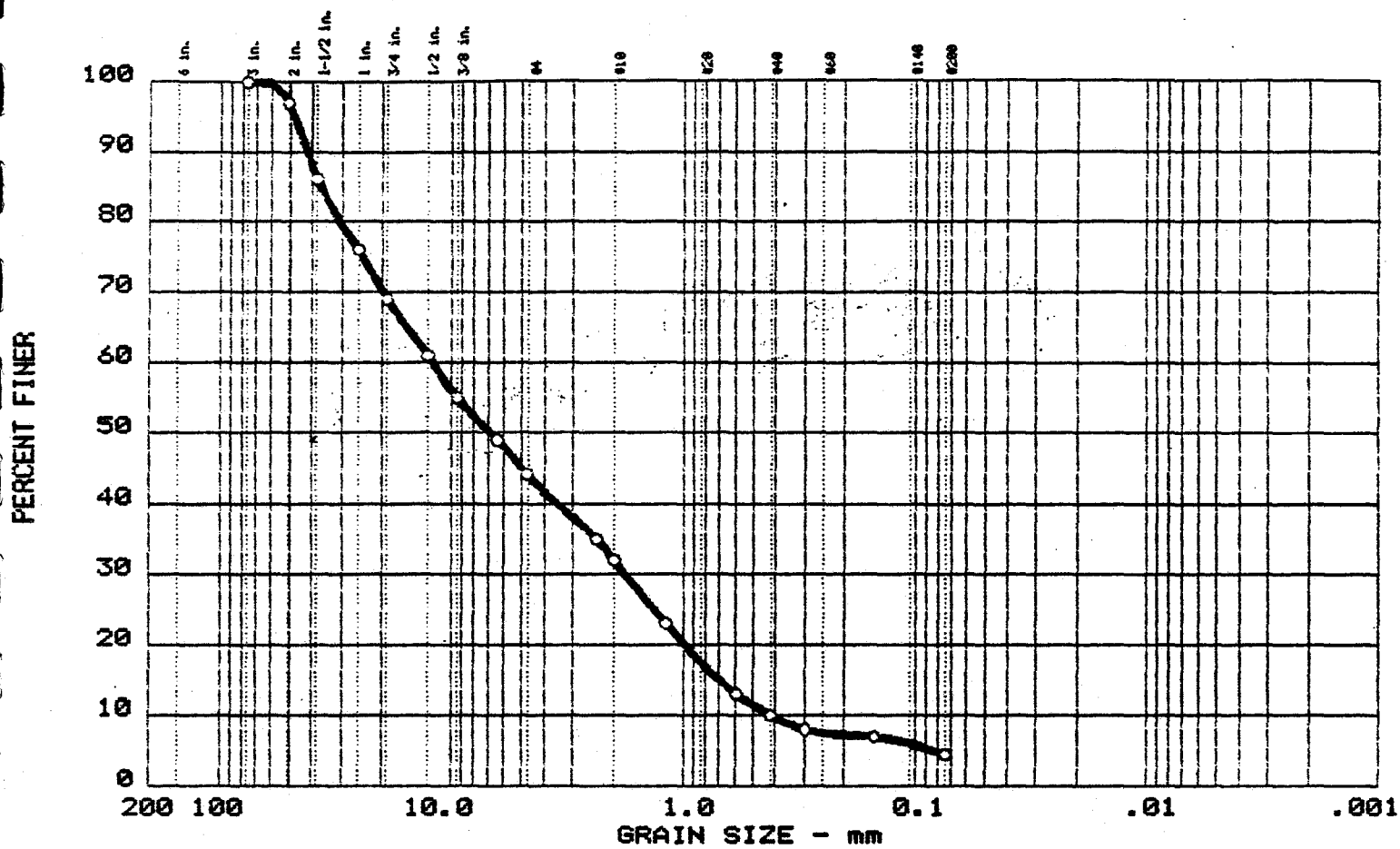
Date: 5/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 8

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	8	0.0	56.0	39.5	4.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	36.98	12.11	6.73	1.770	0.6966	0.4198	0.62	28.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP -5(0 - 1)

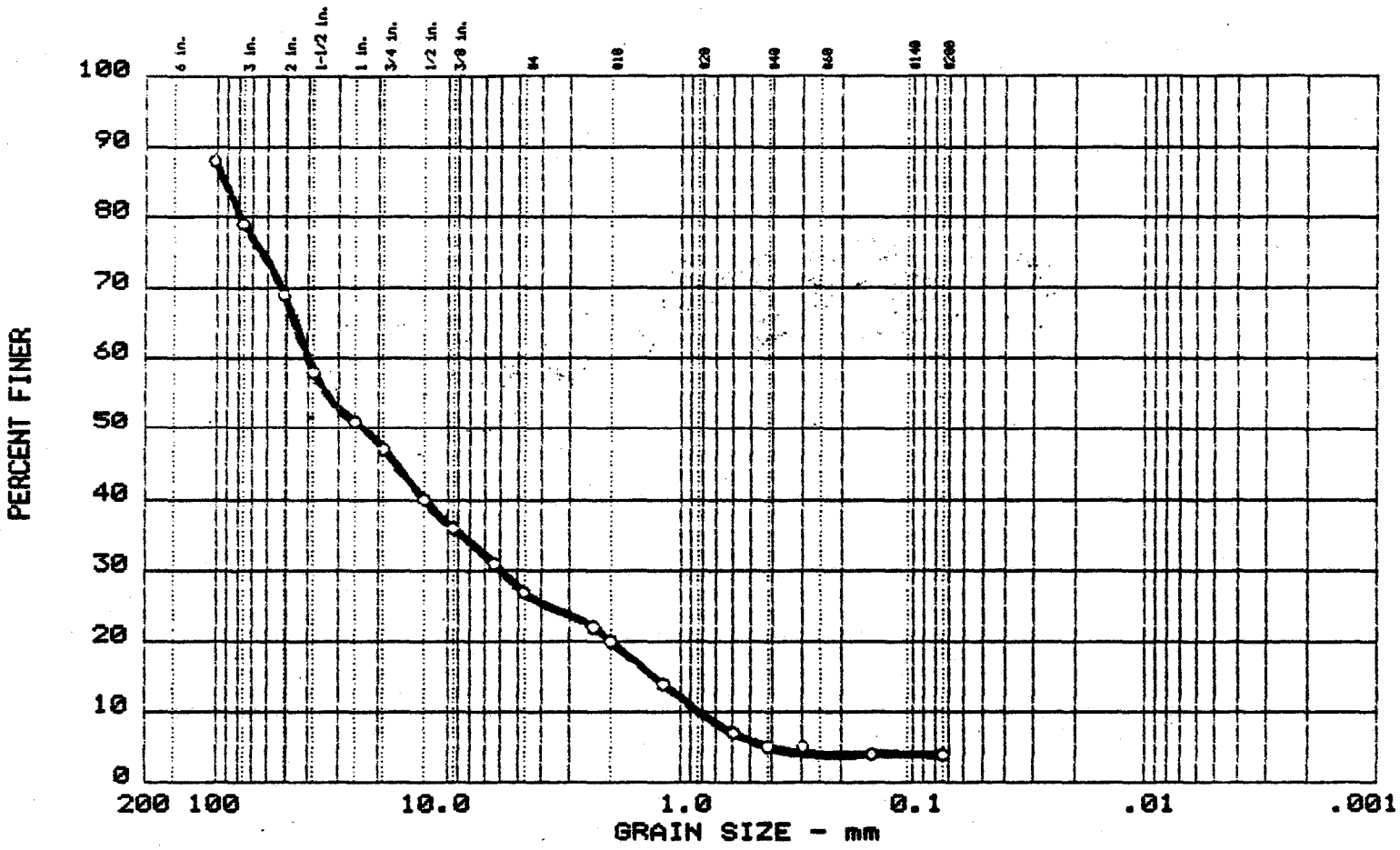
Date: 5/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 9

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	15	21.0	52.0	23.1	3.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	52	29	92.90	40.32	23.20	5.895	1.2897	0.8138	1.06	49.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL; with sand, with cobbles, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 5(5 - 6)

Date: 5/8/88

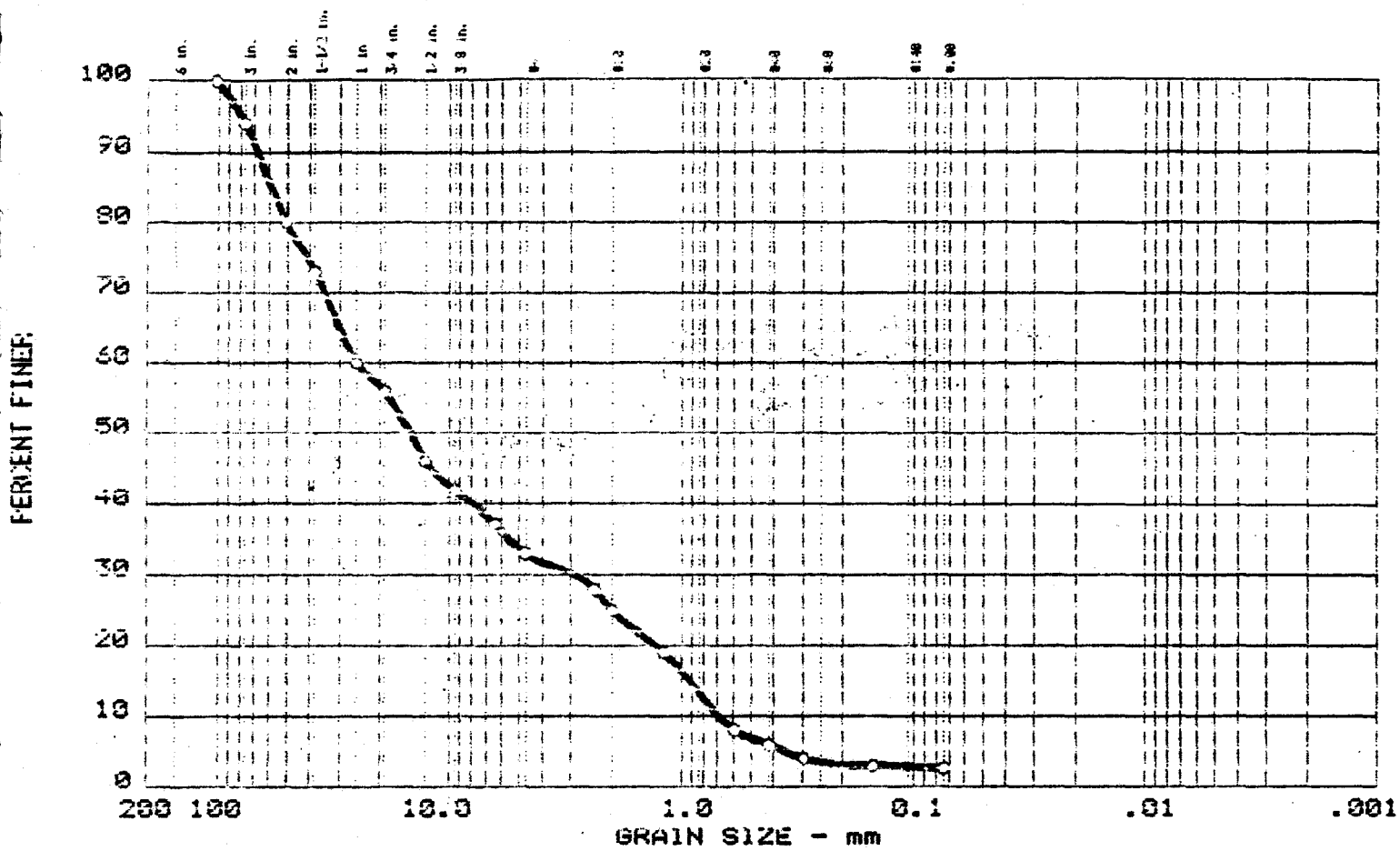
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 10

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	8	6.0	61.0	30.4	2.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	45	20	58.88	25.38	14.39	2.938	0.9183	0.6887	0.46	36.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 5 (17 - 18)

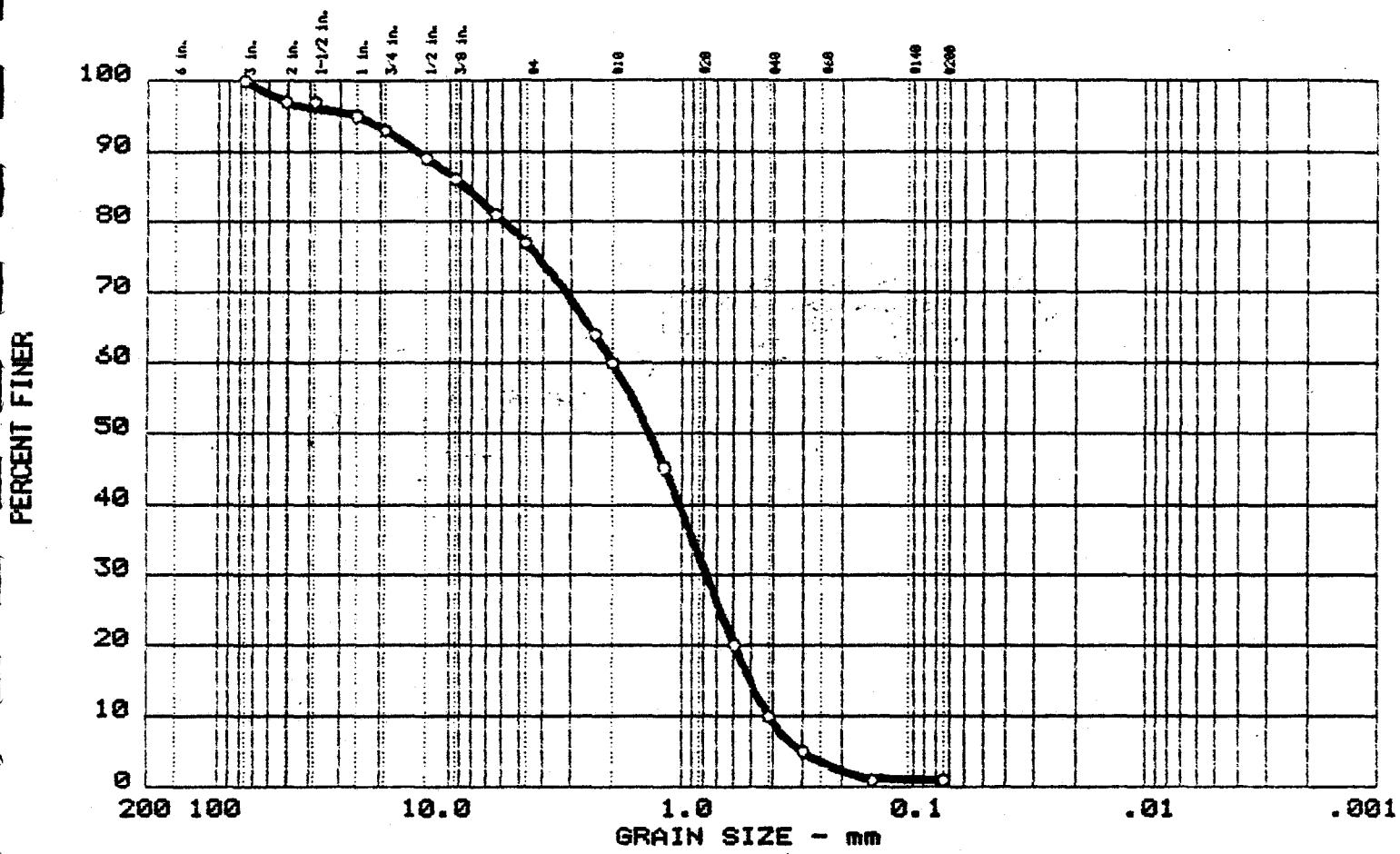
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 11

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	0.0	23.0	77.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	8.71	2.00	1.39	0.781	0.5041	0.4193	0.73	4.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with gravel, trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 6(0 - 1)

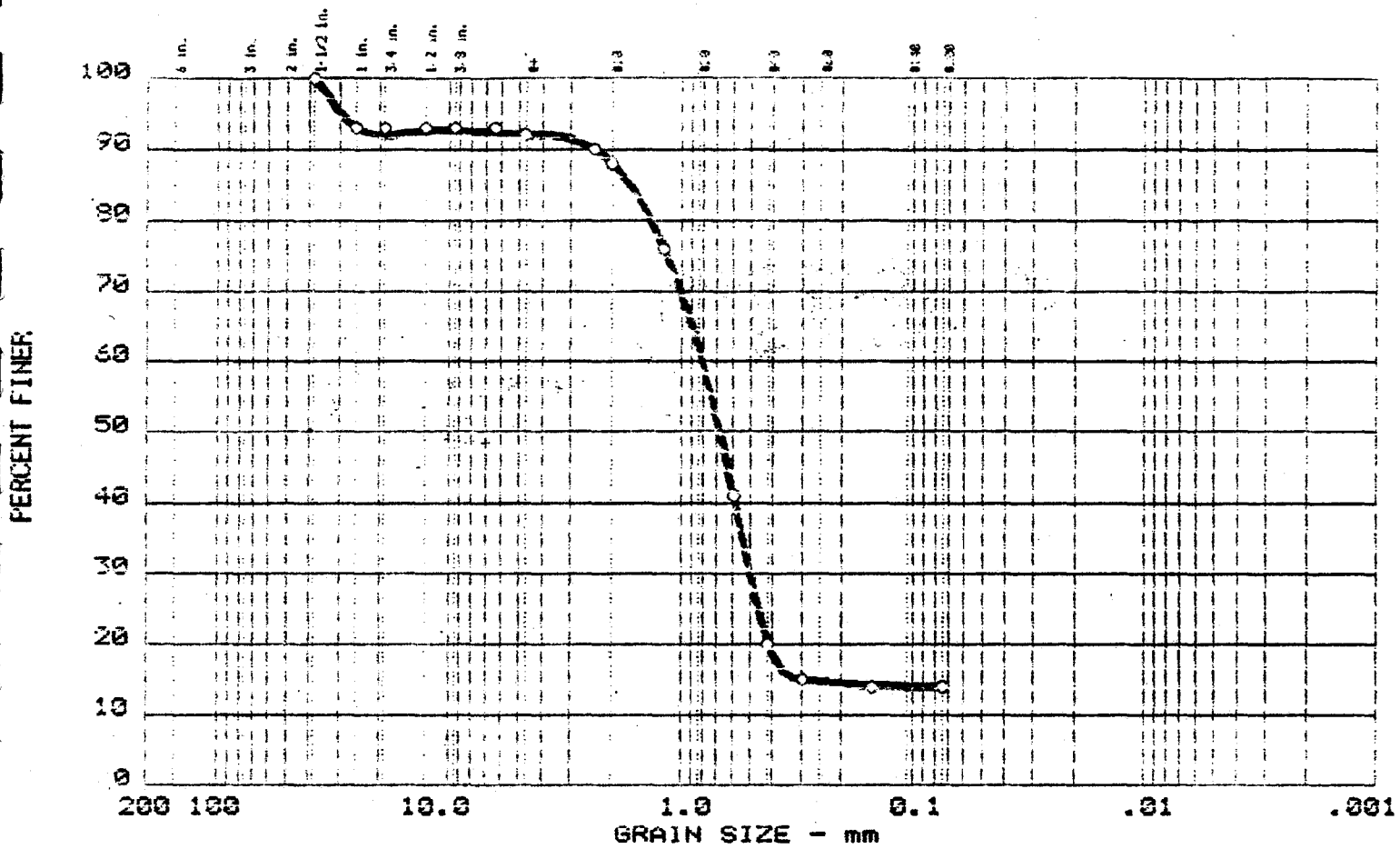
Date: 5/8/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 12

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	15	0.0	8.0	92.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	62	37	1.66	0.81	0.68	0.503	0.2961			

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some clay, some gravel	SC	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 6(2.5 - 5)

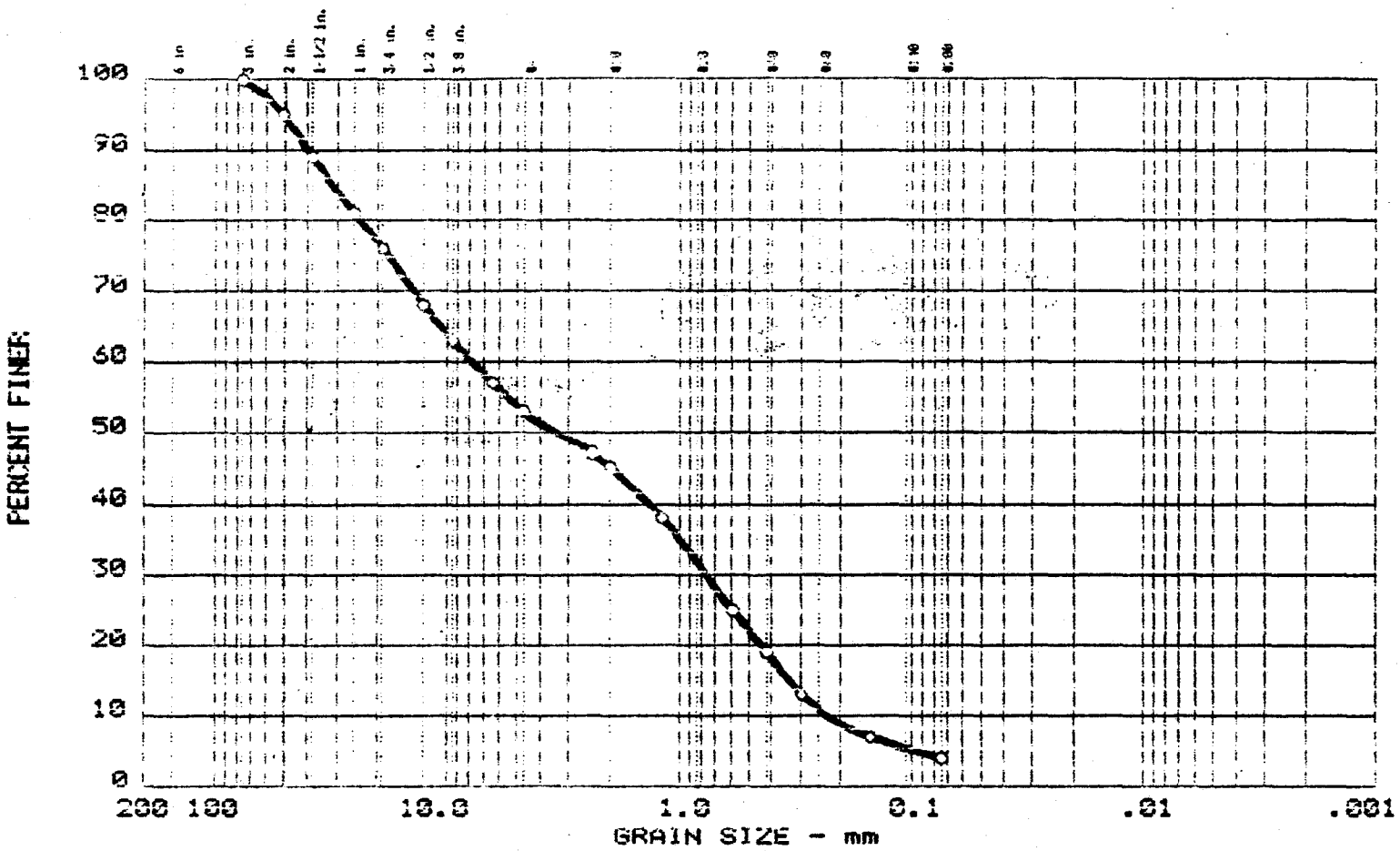
Date: 5/25/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 13

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	9	0.0	47.0	49.0	4.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	31.26	7.76	3.35	0.767	0.3350	0.2291	0.33	33.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVELLY SAND; trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 7(1 - 2)

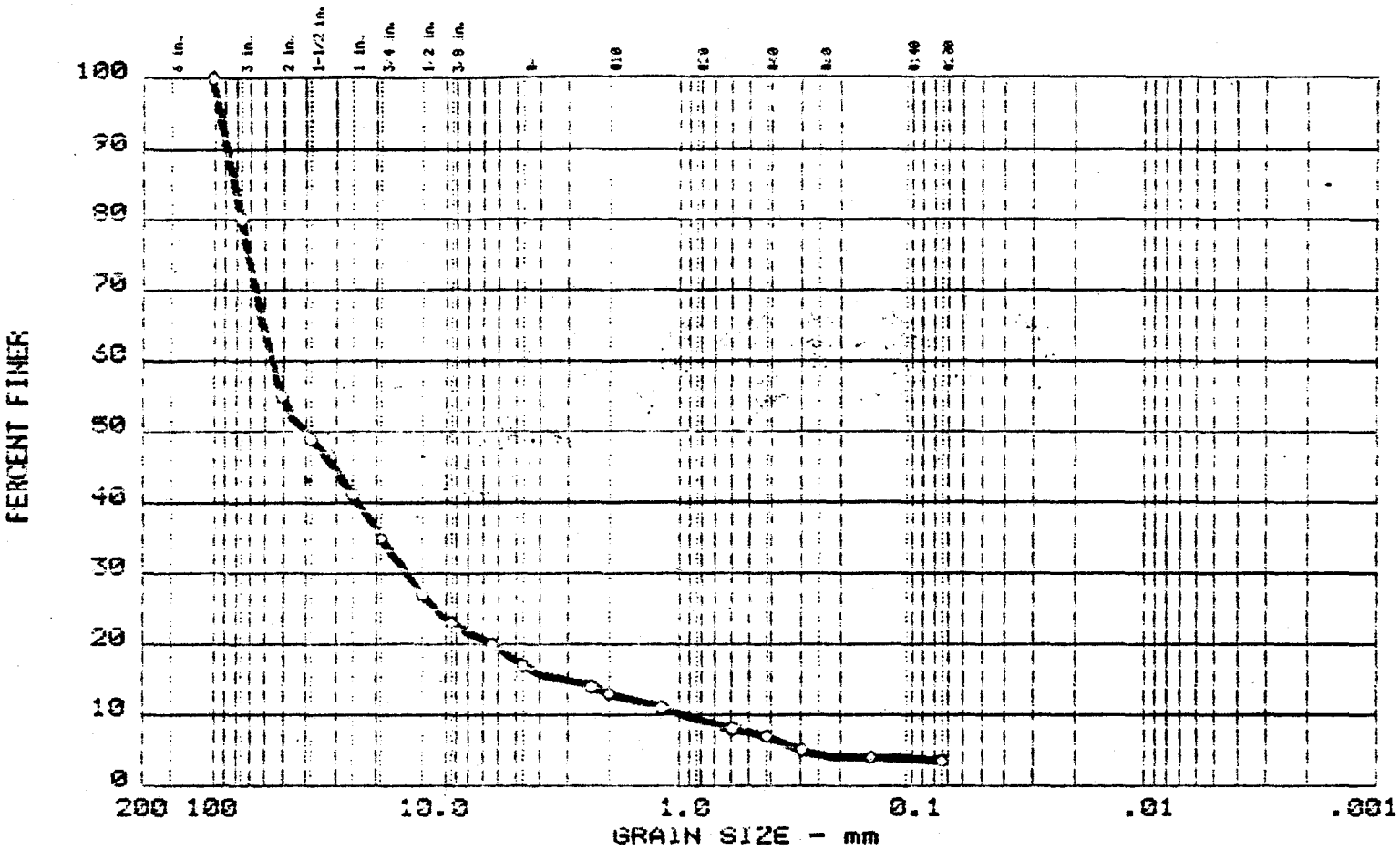
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 14

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	10	20.0	63.0	13.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			91.75	56.49	48.46	14.859	2.9992	0.9376	4.17	60.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ GRAVEL;with sand, with cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 7(10 - 12)

Date: 5/9/88

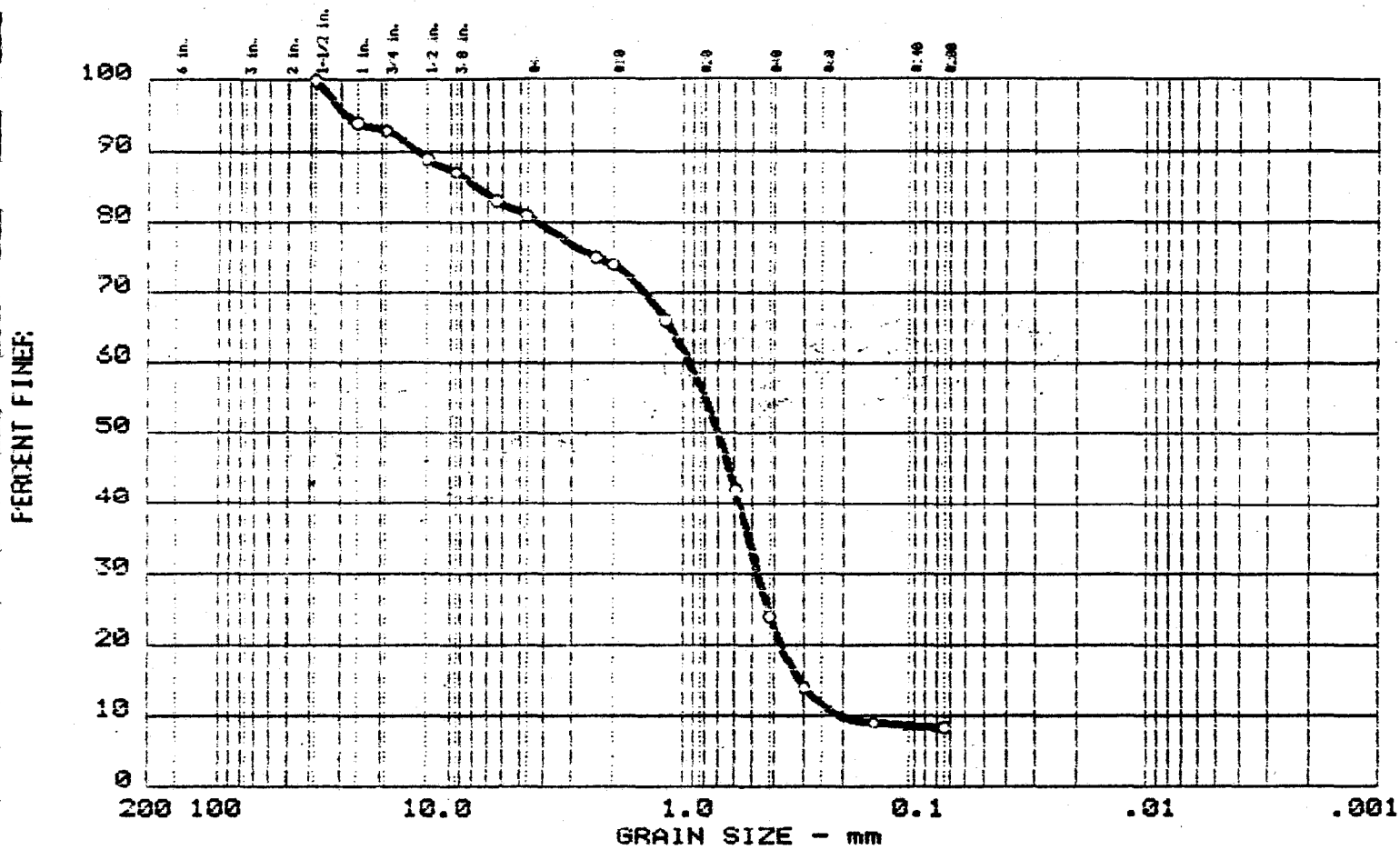
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

Fig. No. 15

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	0.0	19.0	72.6	8.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			7.67	0.93	0.70	0.473	0.3126	0.2042	1.17	4.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND;with gravel, some fines	SP-SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 7(18 - 20)

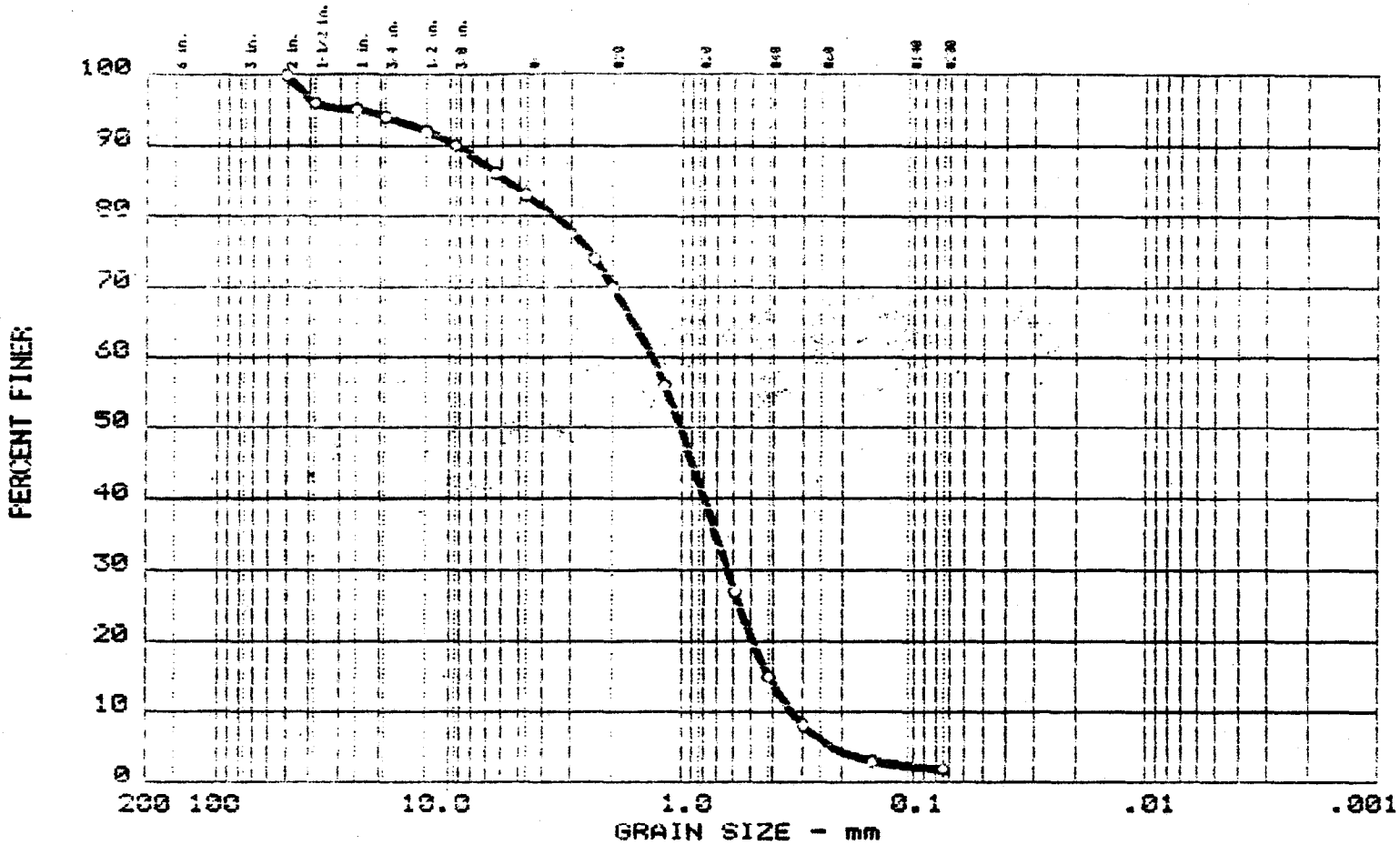
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 16

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	11	0.0	17.0	81.1	1.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	5.75	1.35	1.01	0.634	0.4188	0.3365	0.89	4.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; some gravel, trace fines.	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 8(0 - 2)

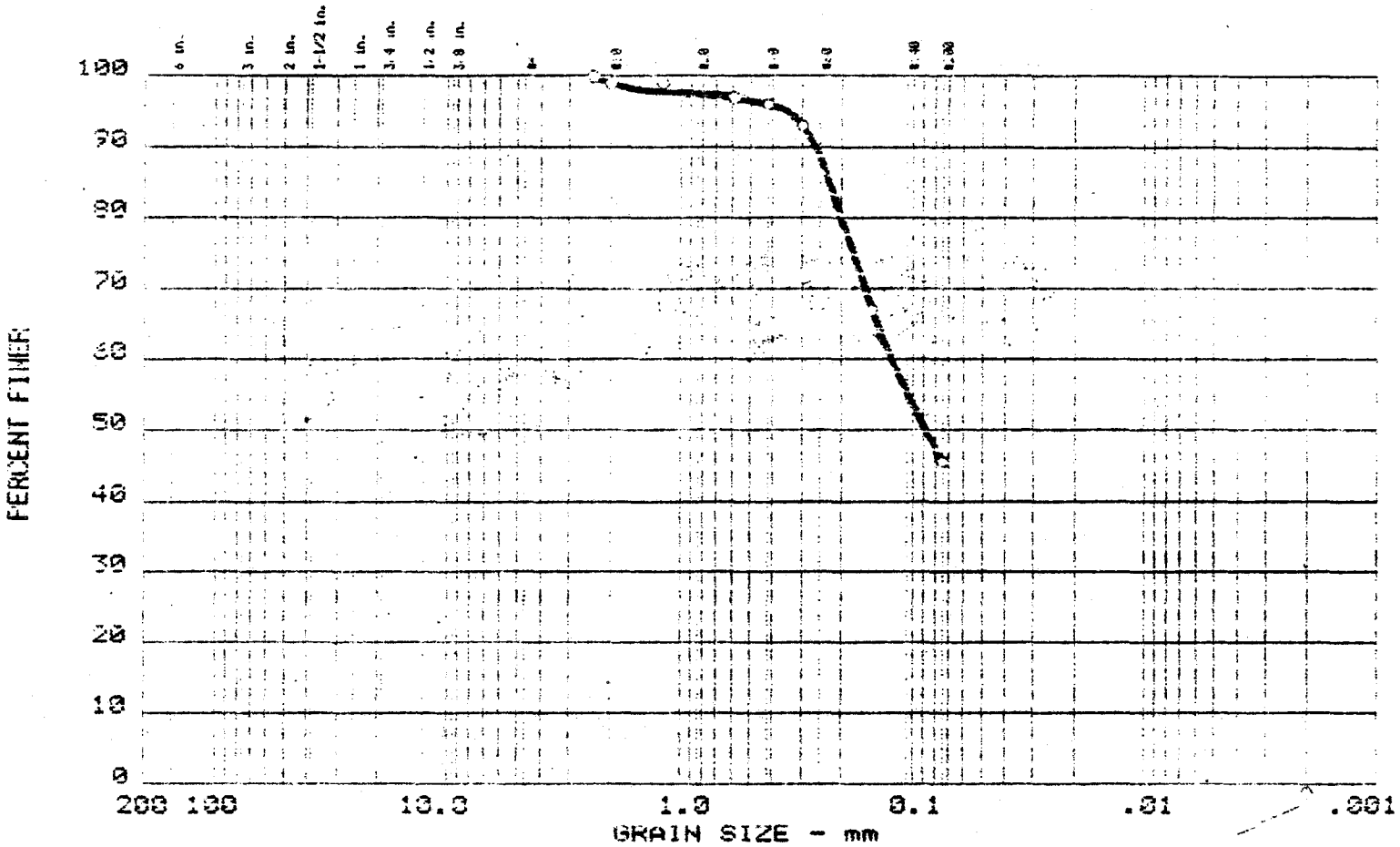
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 17

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	5	0.0	0.0	54.6	45.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.23	0.12	0.09					

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILT AND SAND; some clay	SM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 8(2 - 3)

Date: 5/31/88

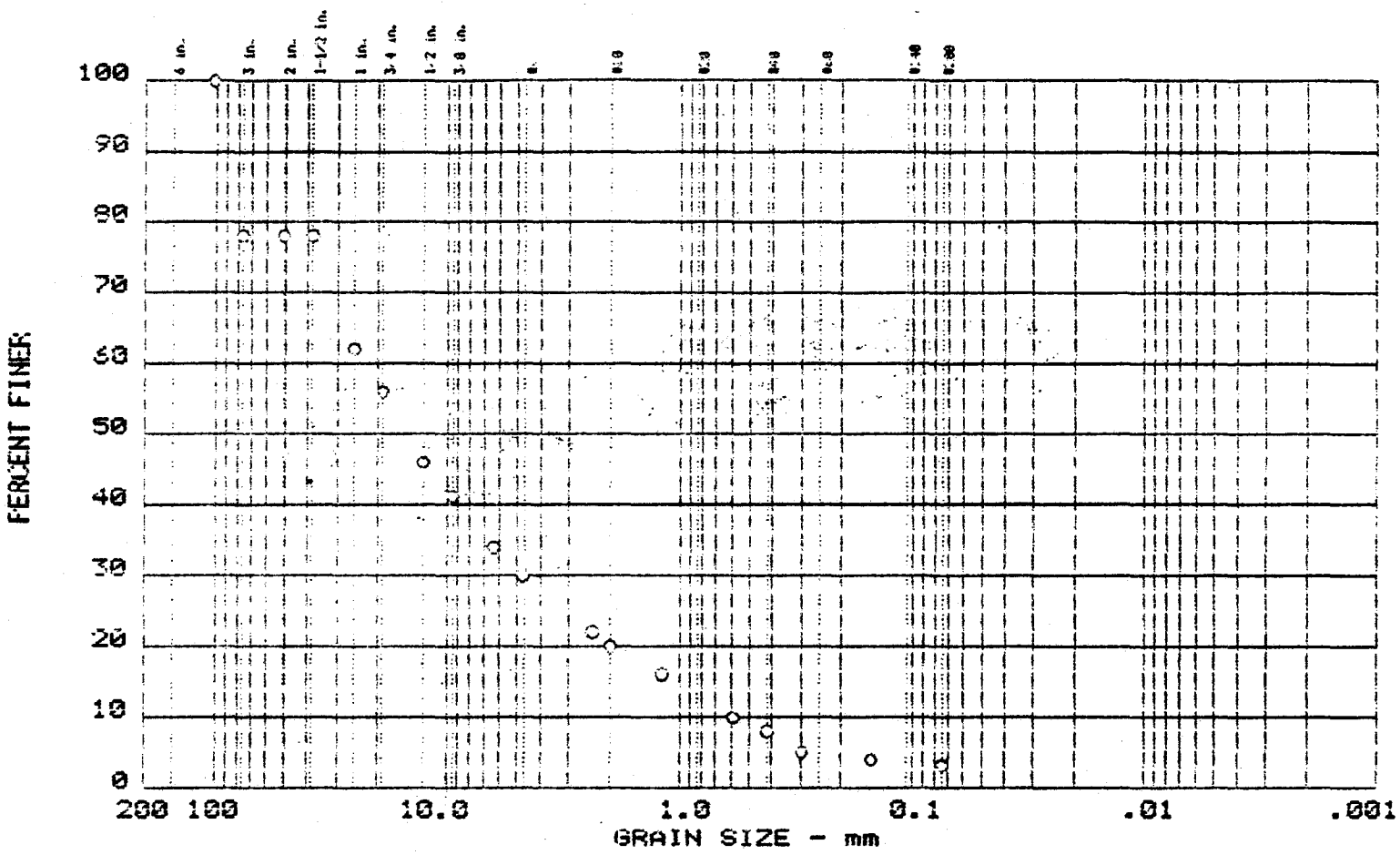
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

WESTERN TECHNOLOGIES INC.

FIG. NO. 18

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	12					

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○										

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; with cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 8(10 - 12)

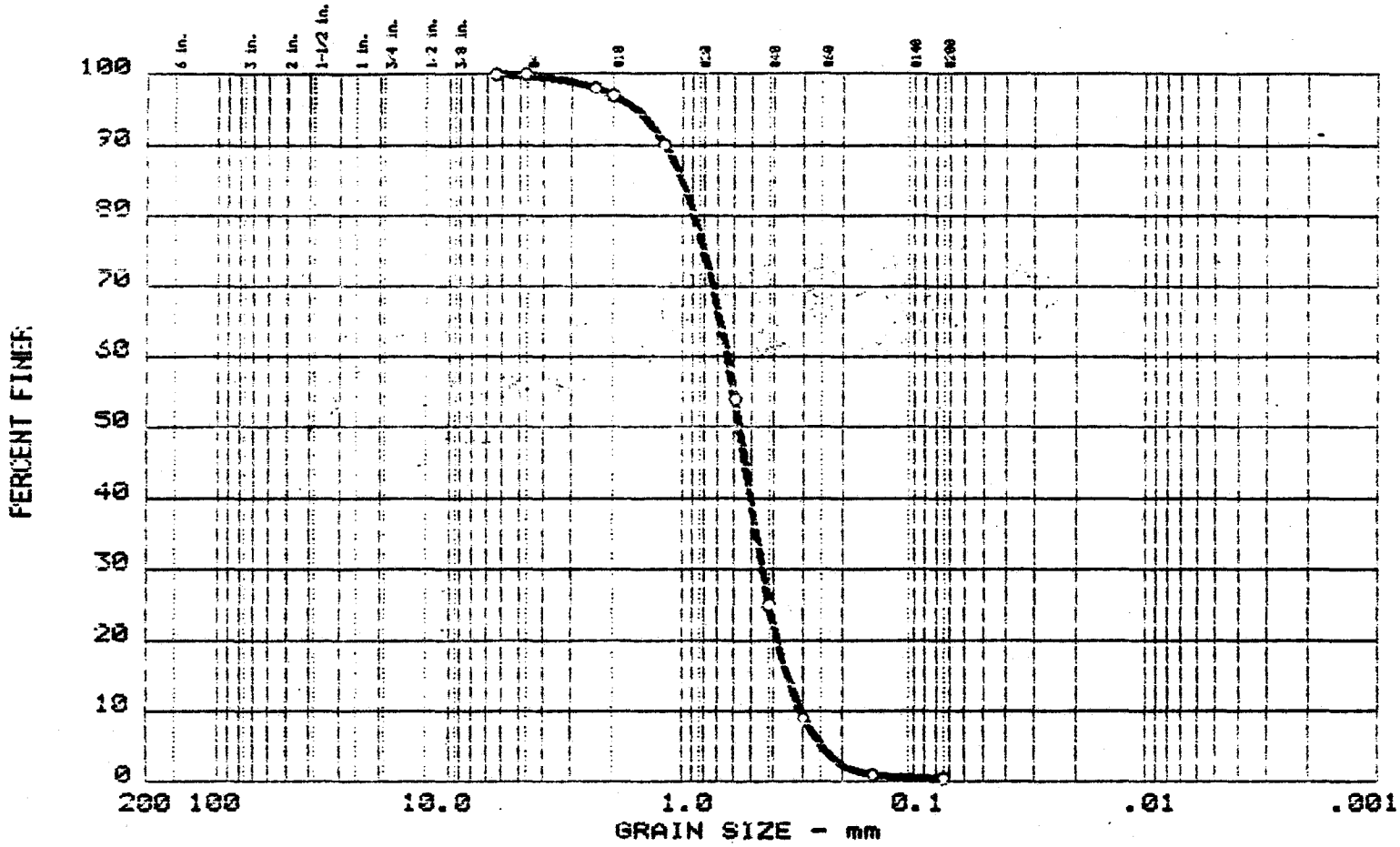
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 19

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	16	0.0	0.2	99.3	0.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	1.01	0.64	0.56	0.448	0.3520	0.3065	1.03	2.1

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; trace gravels,trace fines	SP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 9(0 - 3)

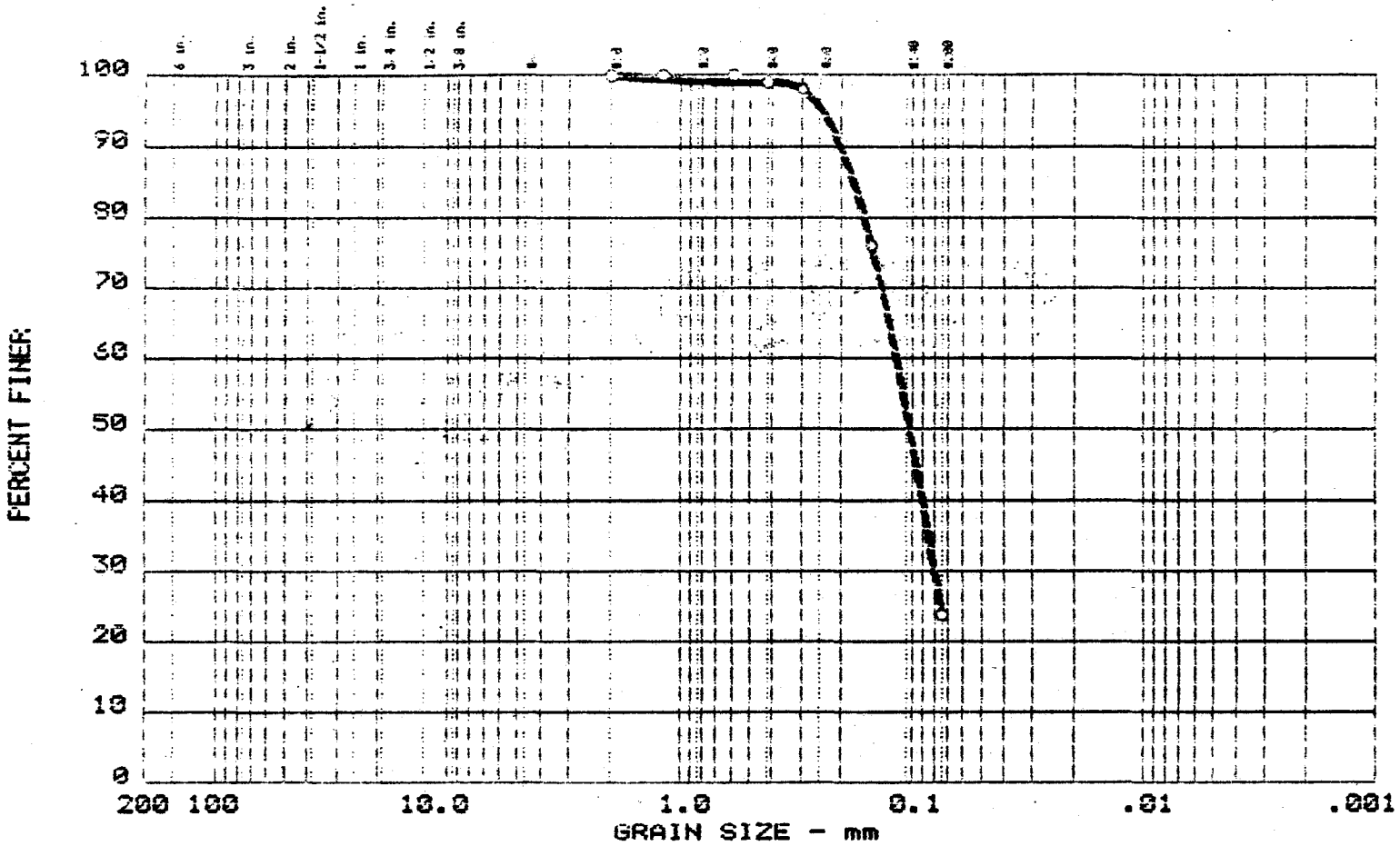
Date: 5/25/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 20

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	17	0.0	0.0	76.3	23.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.18	0.12	0.10	0.080				

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND; with silt	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 9(4 - 5)

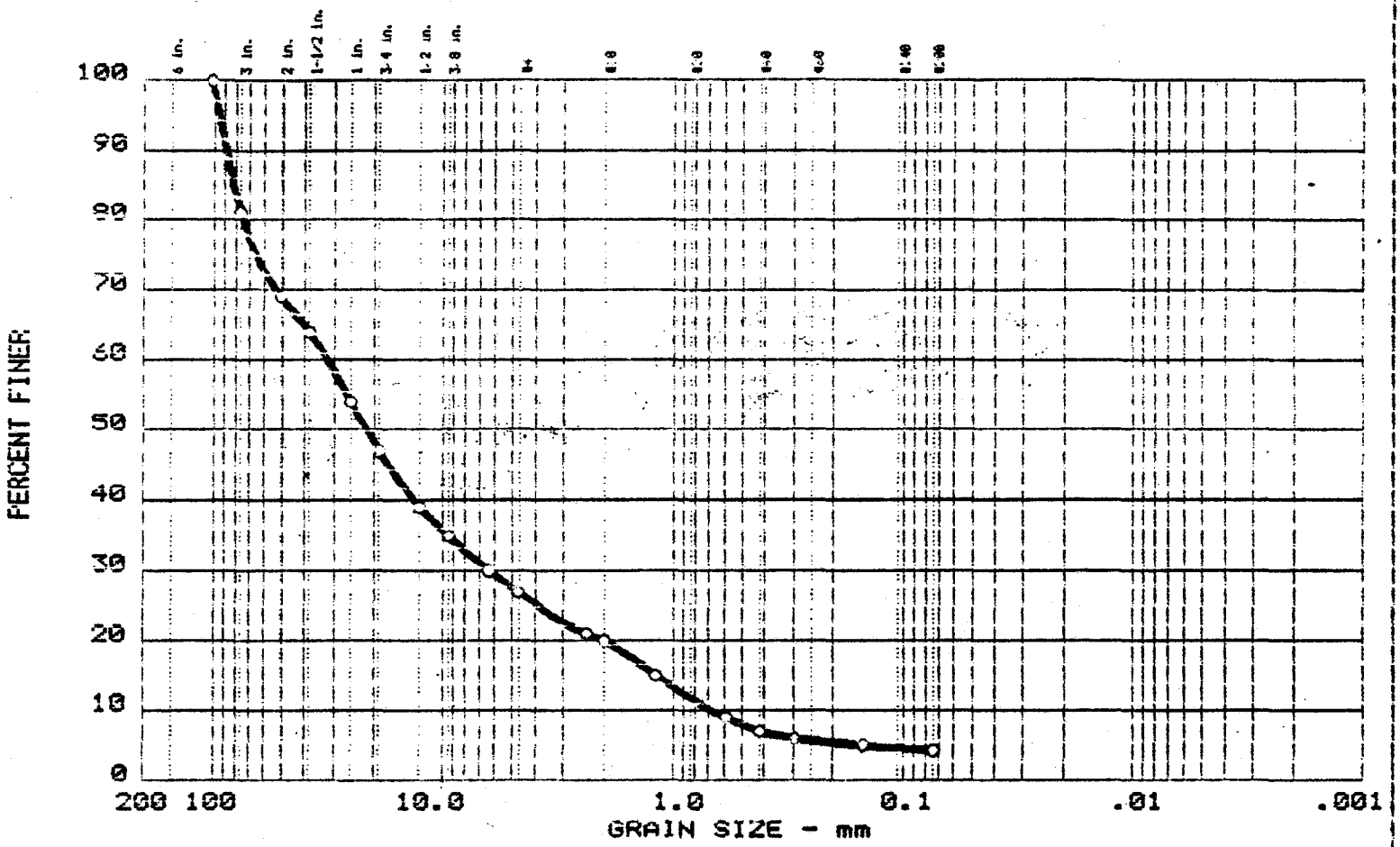
Date: 5/25/88

Remarks:
ASTM D 4221

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 21

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	13	19.0	54.0	22.7	4.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			81.75	31.81	21.50	6.346	1.1817	0.6645	1.91	47.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 9(15 - 16)

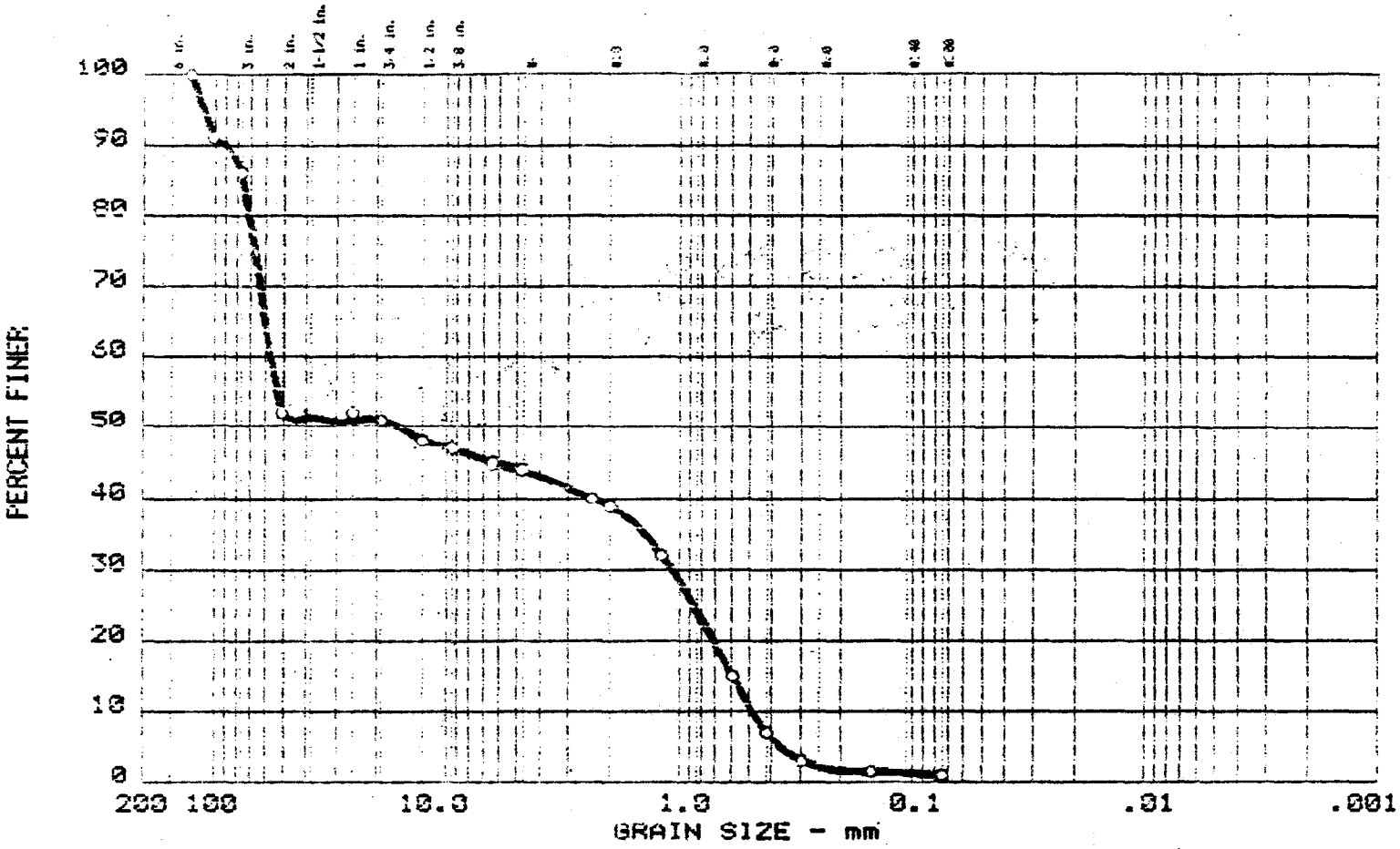
Date: 5/9/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 22

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	4	14.0	42.0	43.0	1.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			74.82	57.15	16.11	1.076	0.5895	0.4842	0.04	118.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ SAND AND GRAVEL; some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 9A(1 - 3)

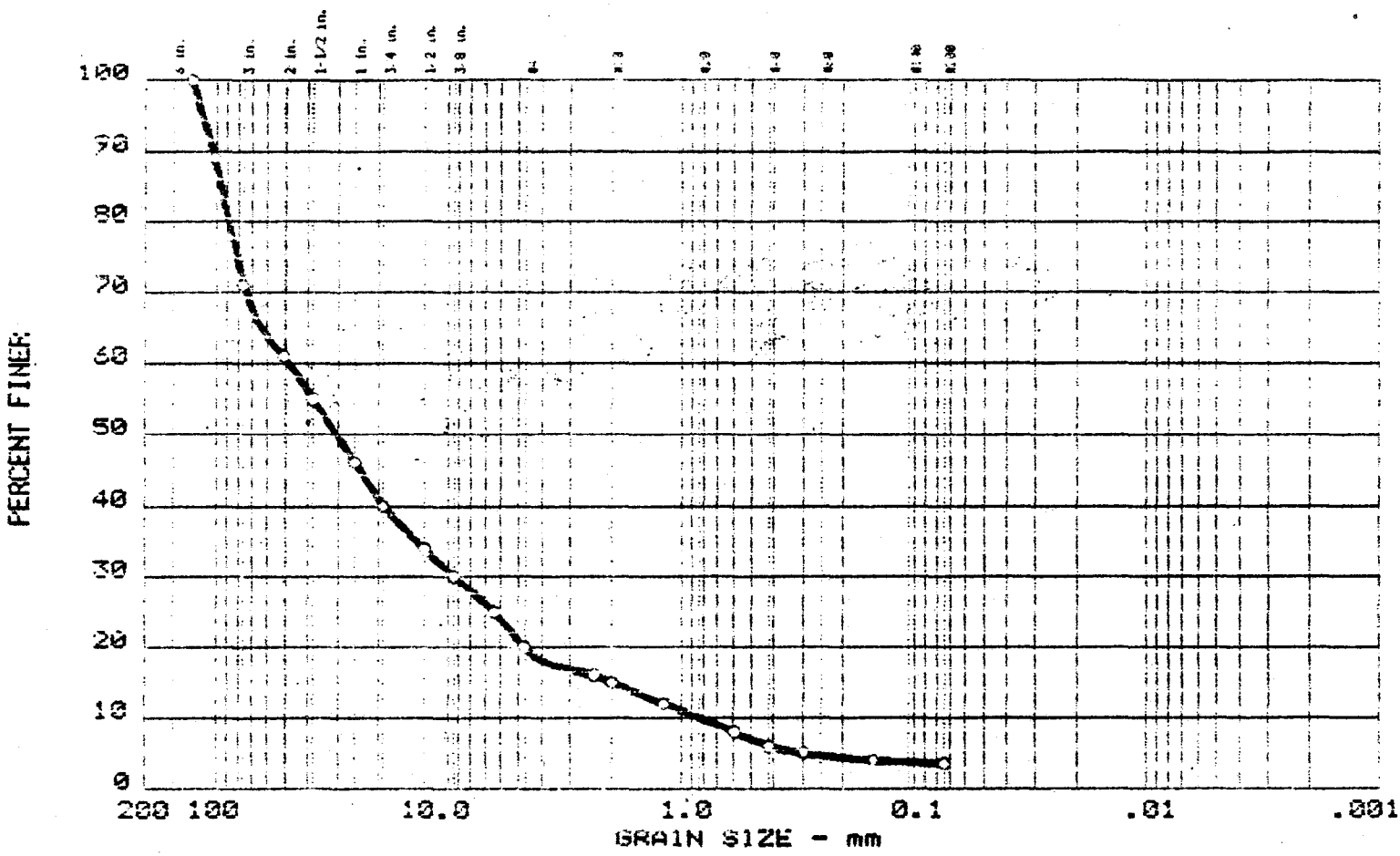
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 23

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	5	29.0	51.0	16.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			95.28	47.75	38.44	9.517	1.9884	0.8194	2.31	58.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ COBBLY GRAVEL; with sand, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 9A(6 - 7)

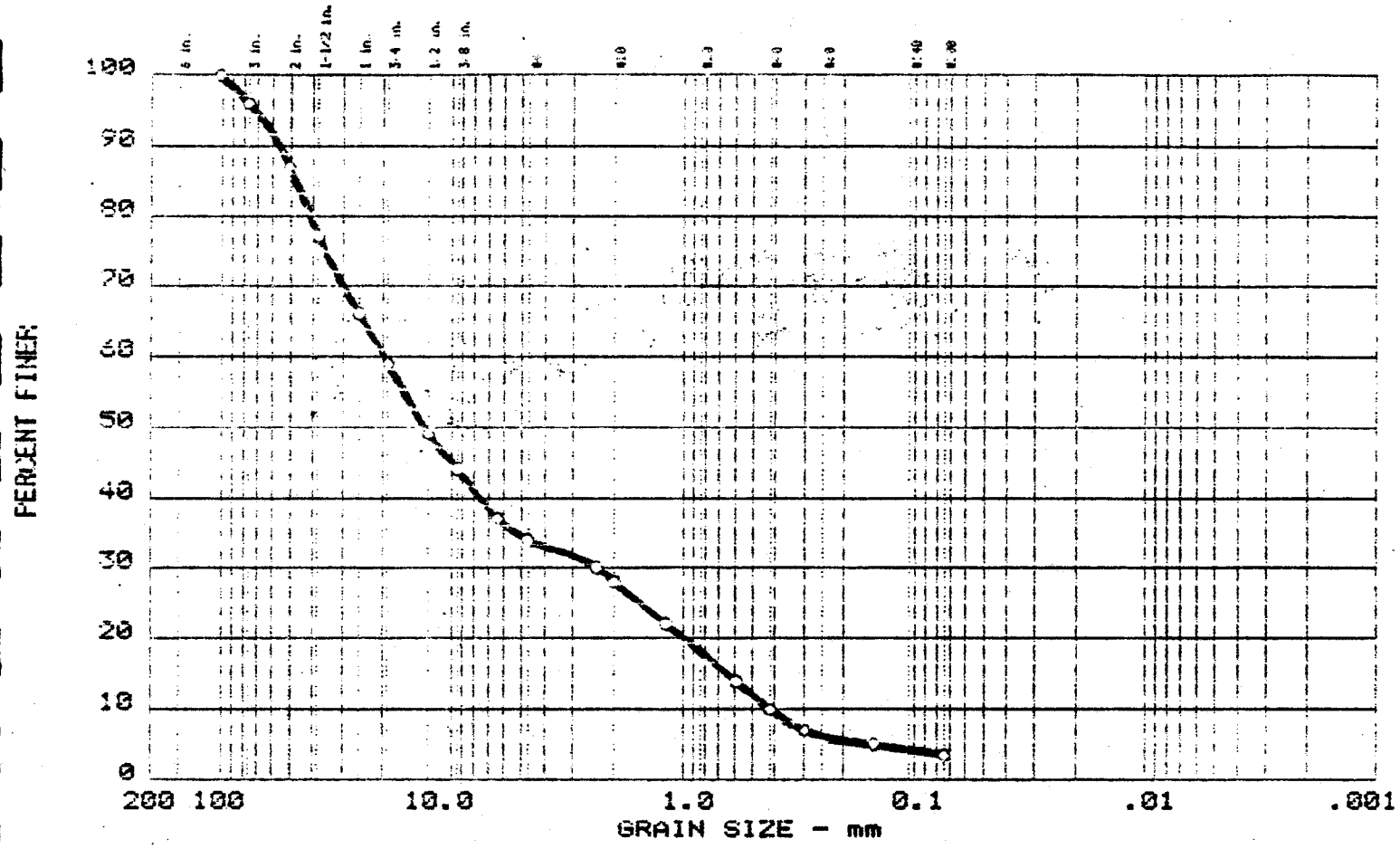
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 24

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	6	4.0	62.0	30.5	3.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			47.75	19.68	13.30	2.366	0.6368	0.4159	0.68	47.3

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 9A(15 - 17)

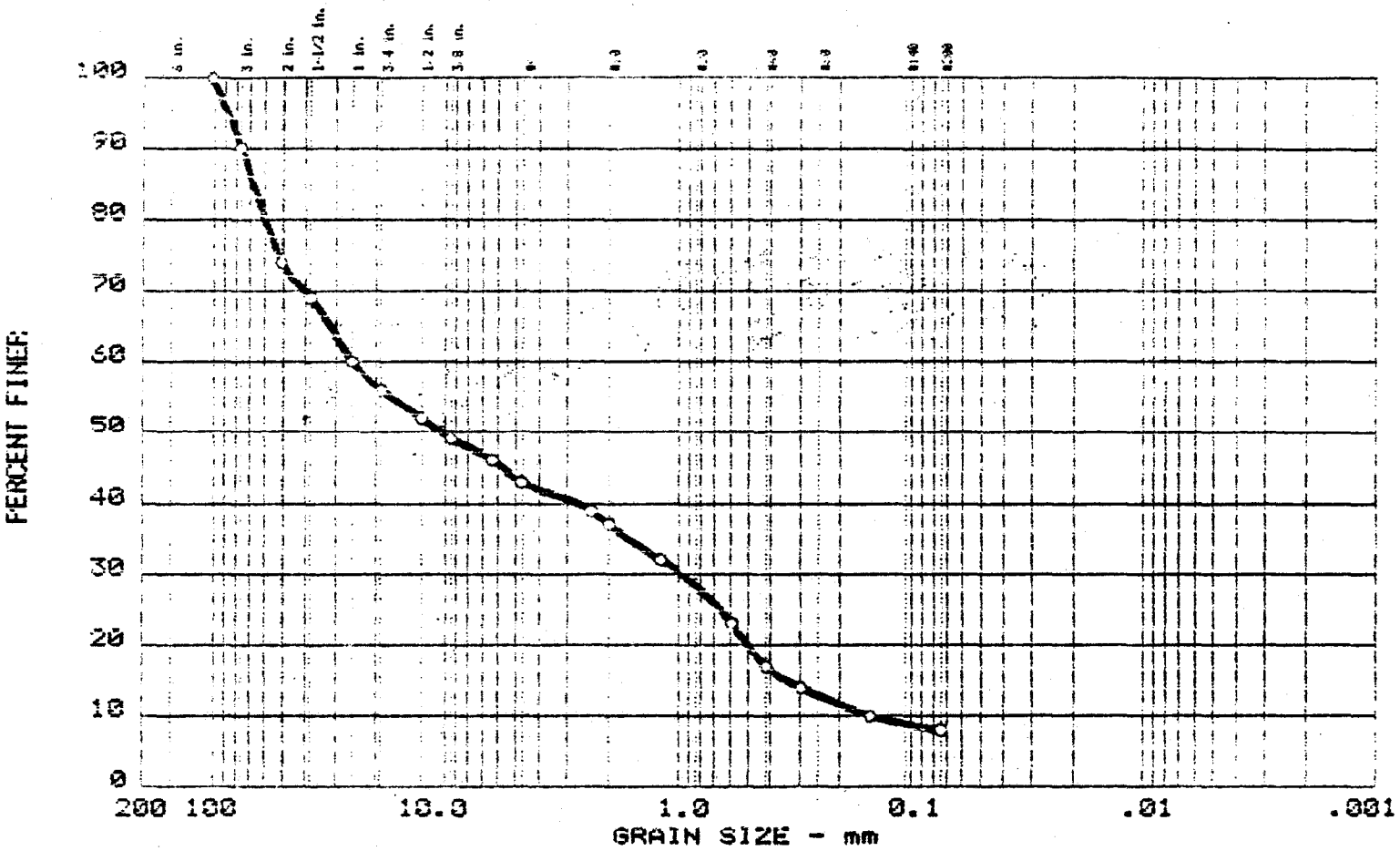
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 25

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	1	10.0	47.0	35.0	8.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			67.61	25.38	18.46	0.965	0.3424	0.1477	0.25	171.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, some fines	GP-GM	

Project No.: 21280068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 18(2 - 3)

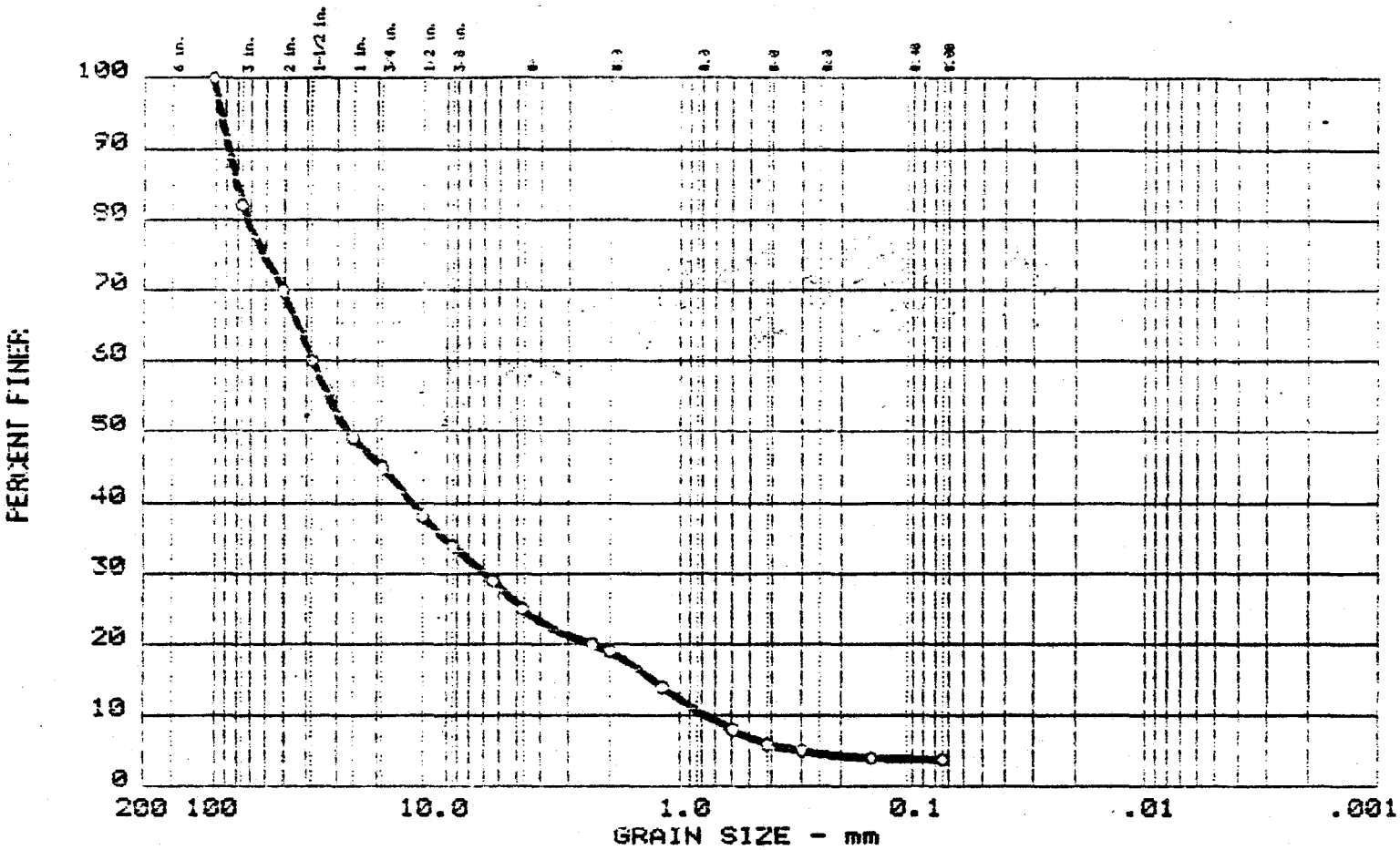
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 26

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	2	18.0	57.0	21.2	3.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			80.72	38.06	26.64	6.847	1.3047	0.7508	1.64	50.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ SANDY GRAVEL; some cobbles, trace fines	GW	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 18(7 - 8)

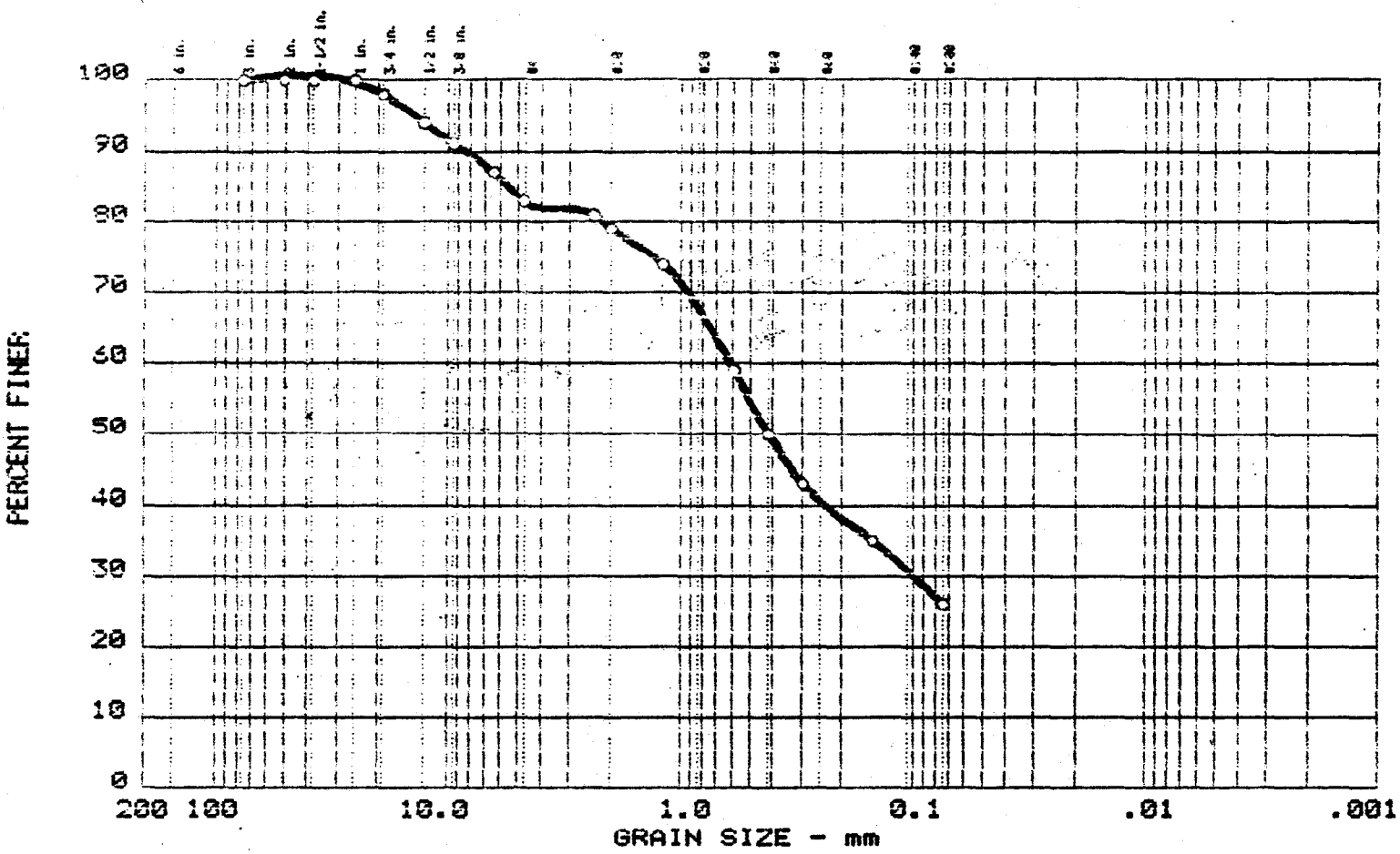
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 27

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	20	0.0	17.0	57.0	26.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			5.50	0.61	0.42	0.099				

MATERIAL DESCRIPTION	USCS	AASHTO
○ SILTY SAND; with gravel	SM	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 11(1 - 2)

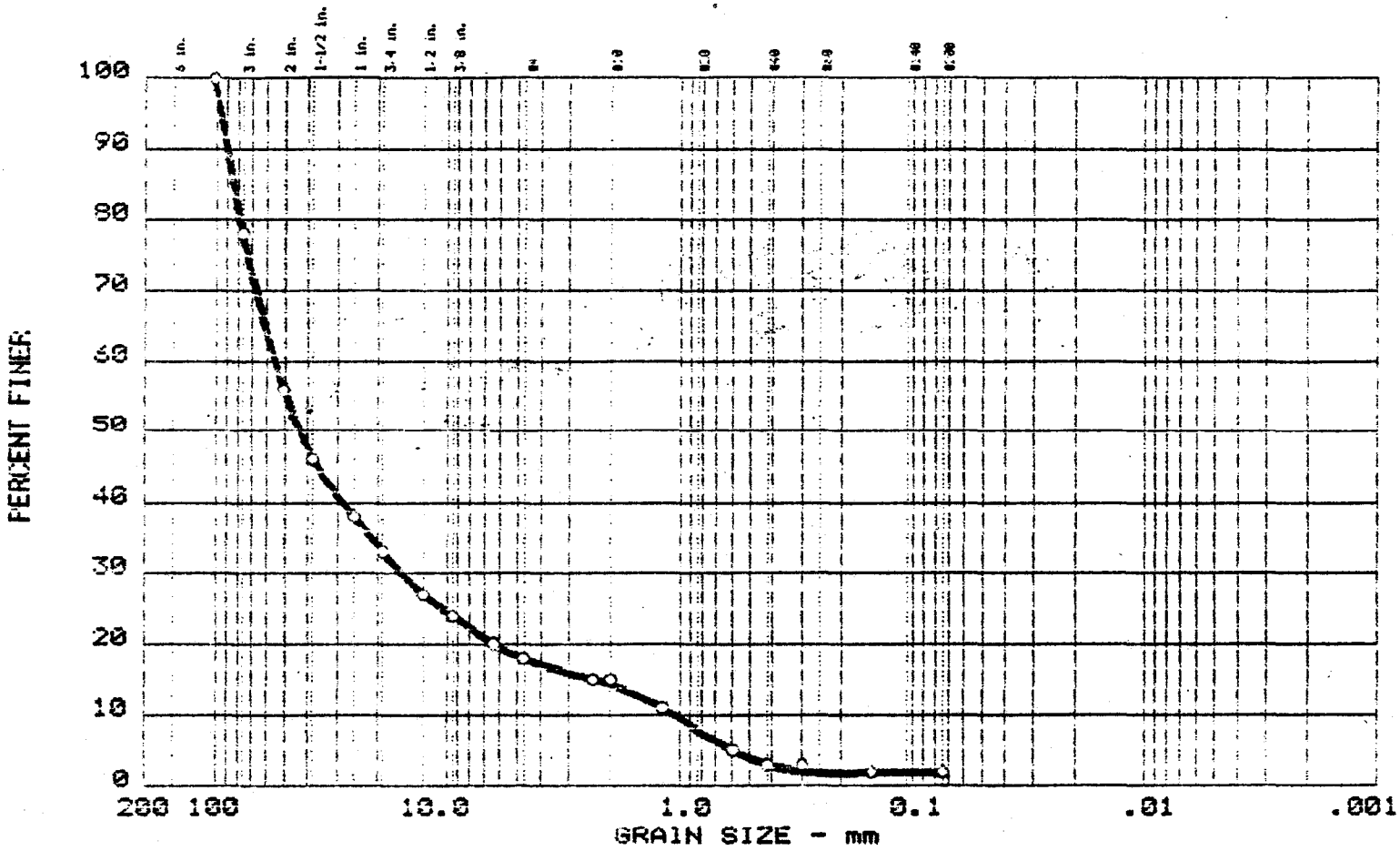
Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 28

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+3"	% GRAVEL	% SAND	% SILT	% CLAY
○	2	22.0	60.0	18.0	0.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			83.95	55.46	43.40	15.758	2.3578	1.0532	4.25	52.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ COBBLY GRAVEL; with sand, trace fines	GP	

Project No.: 2128J068
Project: NEW RIVER CHANNELIZATION PROJECT
○ Location: TP - 11(6 - 7)

Date: 5/26/88

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
WESTERN TECHNOLOGIES INC.

Fig. No. 29