BUREAU of MATERIALS and RESEARCH

GEOTECHNICAL UNIT
GEOLOGY SECTION

BRIDGE FOUNDATION GEOLOGY REPORT

24-75 K 2603-01
US-24 OVER DEEP CREEK
BR. NO. 23.68 STATION 212+99.56
POTTAWATOMIE COUNTY

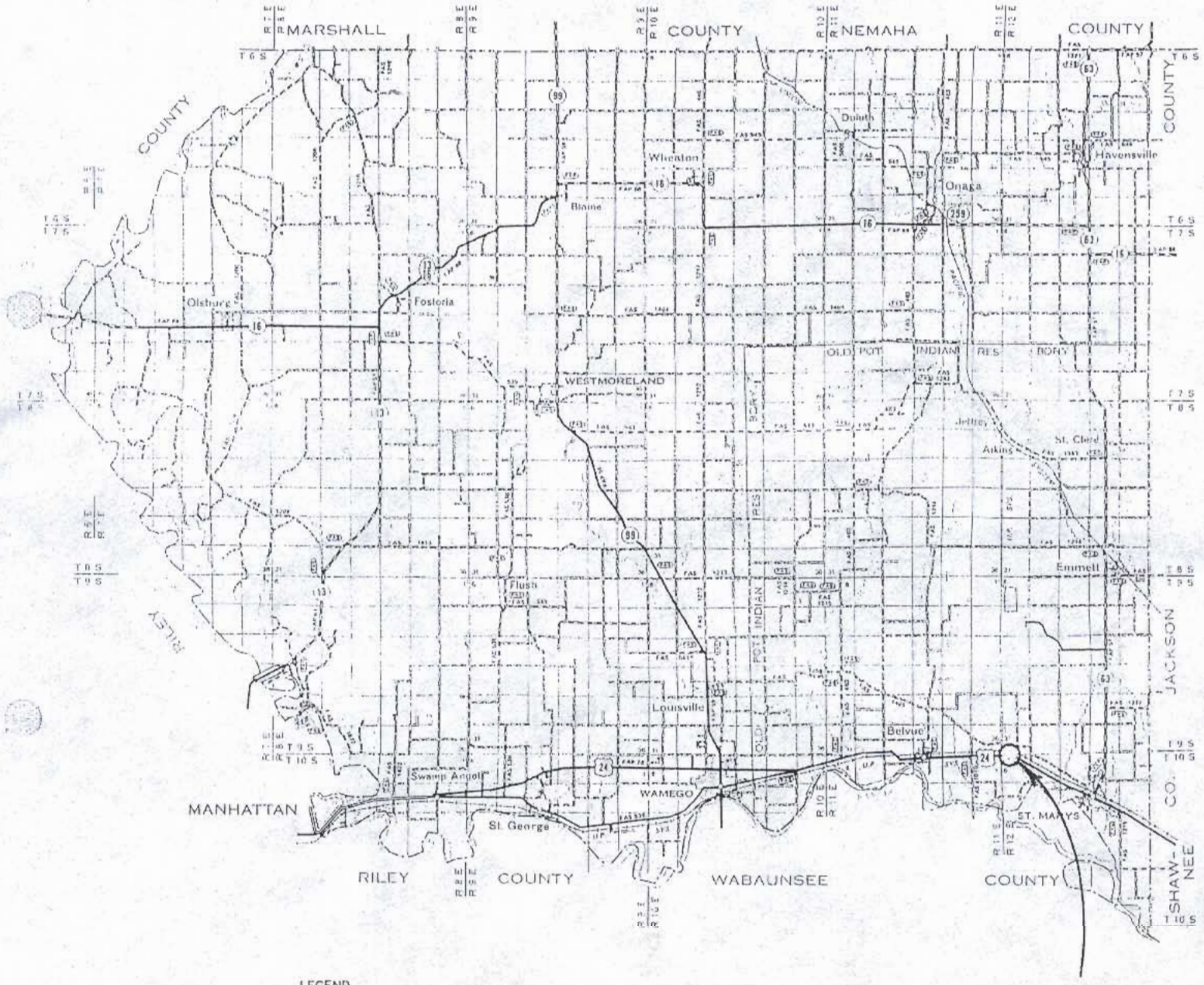
LAWRENCE A. ROCKERS
CHIEF GEOLOGIST

BY

ALEX A. KOTOYANTZ, GEOLOGIST

WALLACE K. TAYLOR, REGIONAL GEOLOGIST

DECEMBER 1987



LEGEND

ROADS AND ROADWAY FEATURES

ROAD SYSTEM DESIGNATION

BRIDGE FOUNDATION GEOLOGY REGPORT

24-75 K 2603-01
US-24 OVER DEEP CREEK
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POTTAWATOMIE COUNTY

GEOLOGY AND FOUNDATION MATERIAL

The alluvium deposits consist predominantly of silty clay, underlain by medium to coarse sand and gravel. A clay deposit, approximately 8.0 feet in thickness, overlies the bedrock.

The casing and air hammer drives penetrated the alluvium deposits with little resistance.

The Pony Creek Shale Member is the bedrock that will provide the foundation material. The shale consists of silty, micaceous particles with fine grained sandstone in the lower part. Locally, the Pony Creek Member appears to be a channel fill deposit.

FIELD TEST PROCEDURES

The footing material was subjected to dynamic testing and laboratory tests for the determination of bearing capacities. Casing drive, standard penetration, and unconfined compression tests were made. The information was supplemented by a core sounding.

The casing drive refused at an elevation of 906.7 with 80 blows per tenth at refusal. It penetrated 0.2 tenths of a foot into the shale.

The air hammer drive refused at an elevation of 905.6. It penetrated 2.2 feet into the silty, micaceous shale.

The average unconfined compression test taken in soil mantle from an elevation of 964.4 to 957.9 is 1.06 tons per square feet.

The average standard penetration test taken in soil mantle from an elevation of 962.9 to 956.4 is 8.5 blows per foot.

The unconfined compression tests taken from an elevation of 905.4 to 893.2 shows the average compressive strength of the Pony Creek Member to be 10.34 tons per square feet.

FOOTING RECOMMENDATION

We recommend H-pile be used at the abutment and pier footings to insure satisfactory penetration of the alluvium deposits and obtain the necessary point bearing in the bedrock.

Design pile tip elevations and mantle-bedrock contacts at each location are listed below in tabulated form.

LOCATION	BEDROCK CONTACT	DESIGN PILE TIP ELEVATION H-PILE
Abutment No. 1 212+29.65	907.8	900.6
Pier No. 1 212+71.56	907.5	900.6
Pier No. 2 213+27.56	907.3	901.6
Abutment No. 2 213+69.56	906.9	901.6

If sufficient bearing and penetration into bedrock are achieved before the design pile tip elevation is reached, the pile should be cut off to avoid damage by overdriving.

HYDROLOGY

The groundwater was found to have a hydrostatic level at an elevation of 944.8.

INVESTIGATION PROCEDURES

One core drill sounding and one penetro-hammer drive were made to determine geologic setting at this bridge site.

ROUTE NO. US-24 SOUNDING NO. CD#1 (cont.) SHEET 2 OF 2

KANSAS DEPARTMENT OF TRANSPORTATION

COUNTY Pottawatomie PROJECT NO. 24-75-K-2603-01 BRIDGE NO. 23.68

DESCRIPTION STA.

GEOLOGIST VERTICAL SCALE DATE

BIT TYPE & NO.	GEOLOGIC NAME	GEOLOGIC COLUMN	GROUNDWATER ELEVATION	DEPTH	ELEVATION	GEOLOGIC DESCRIPTION AND REMARKS	UNCONFINED COMPRESSION	STANDARD PENETRATION OR CASING DRIVE BLOWS	STANDARD PENETRATION OR CASING DRIVE ELEV.
						Core #1, 63'-67' (906.4-901.7) Cut 4' Rec. 4' R.Q.D. 89 % Core Rec. 100 % Core #2, 67'-72' (901.7-896.7) Cut 5' Rec. 5' R.Q.D. 98 % Core Rec. 100 % Core #3, 72'-77' (896.7-891.7) Cut 5' Rec. 4.8' R.Q.D. 81 % Core Rec. 96 % Core #4, 77'-82' (891.7-886.7) Cut 5' Rec. 5' R.Q.D. 67 % Core Rec. 100 % Core #5, 82'-87' (886.7-881.7) Cut 5' Rec. 3.8' R.Q.D. 43 % Core Rec. 76 % Core #6, 87'-92' (881.7-876.7) Cut 5' Rec. 5' R.Q.D. 69 % Core Rec. 100 %			

KANSAS DEPARTMENT OF TRANSPORTATION

GEOLOGY SECTION

DATE 9-30-87
WEATHER Clear pleasant
COUNTY Pottawatomie
BR. NO. 23.68

PARTY
Koteygantz
Strickland
Chapman

DIV. 1 ROUTE 24 SEC __ CL 75 PROJ K-2603 SEC 01 AGR ___ CL. ___

T.H. EL. 968.35 STA. 212+29.56, Lt 22' SDG. NO. 1

DEPTH	0 - 1		1 - 2		2 - 3		3 - 4		4 - 5	
0-5										
5-10										
10-15										
15-20		13	16	29	18	47	22	69	31	100
20-25		25	24	49	25	74	30	104	36	140
25-30		34	33	67	33	100	29	129	23	152
30-35		27	28	65	35	100	34	134	36	170
35-40		31	31	62	32	94	33	127	38	165
40-45		40	33	73	34	107	31	138	30	168
45-50		27	32	59	34	93	32	125	40	165
50-55		64	86	150	56	206	64	270	54	324
55-60		48	50	98	42	140	40	180	75	255
60-65		102	528	630	722	1352				
65-70										
70-75										
75-80										
80-85										
85-90										
90-95										
95-100										
100-105										
105-110										
110-115										
115-120										
120-125										

Ref. 62^{8} (905.55)

NO. 2 McK. & T. AIR HAMMER TIMED AT SECONDS PER FT.

REMARKS: 24^{0} some firmness, 34^{5} firm (933^{9}), 50^{9} very firm (917^{5}), 60^{6} hard (907^{8}),
906^{8} → 61^{6} - 61^{7} (1 min.), 61^{8} - 61^{9} (1 min. 22 sec.), 62^{2} - 62^{3} (2 min. 5 sec.),
62^{20} - 62^{25} (3 min. 32 sec) Ref.

COMPRESSOR TIME - BEGINNING _______ COMPLETION _______

KANSAS DEPARTMENT OF TRANSPORTATION

REPORT OF SAMPLE OF Soil - Routine Analysis & Unconfined Compression & Geology Cores

Laboratory No. 87-4263

November 20 19 87

Received November 13 19 87

Specification No. ----- Quantity Represented -----

Source of material Project

Sample from Project

Submitted by Wallace K. Taylor, Manhattan Regional Geologist

Identification marks -----

Project or POV 24-75-K-2603-01 Pottawatomie Co. Dist. #1

Type of Construction Br. No. 24-75-23.68 Replacement

Contractor -----

TEST RESULTS

Sample No.	Station	Dist. ft. ℄	Depth ft.	Description	Qu. t.s.f.	Sample p.c.f.by Dry wt.	Moisture (% of Dry wt.)
ST-1	213+92	Rt 20	5^{0}-6^{5}	Si L	0.61	89.8	27.5
ST-2	213+92	Rt 20	10^{0}-11^{5}	Si C	1.50	98.2	25.0
CD 1-1	213+92	Rt 20	64^{0}-64^{2}	Shale	10.8	124.9	12.9
CD 1-2	213+92	Rt 20	66^{8}-67^{5}	Shale	1.4	122.0	14.0
CD 1-3	213+92	Rt 20	67^{9}-68^{7}	Shale	8.5	126.9	12.6
CD 1-4	213+92	Rt 20	71^{4}-72^{2}	Shale	19.7	129.7	11.2
CD 1-5	213+92	Rt 20	75^{4}-76^{2}	Shale	11.3	129.7	11.3

See attached Routine Analysis of Samples ST-1, St-2, and Split Spoon Samples 1 and 2 (SS-1 from 6^{5}-8^{0} and SS-2 from 11^{5}-13^{0}).

CC: D. L. Jarboe
L. Rockers
bc: 5-76 W. Taylor
Jeff Frantzen
Soils Section
File

Reported by James J. Brennan for

Title Jeff Frantzen, Soils Engineer

D. O. T. Form No. 623

ks

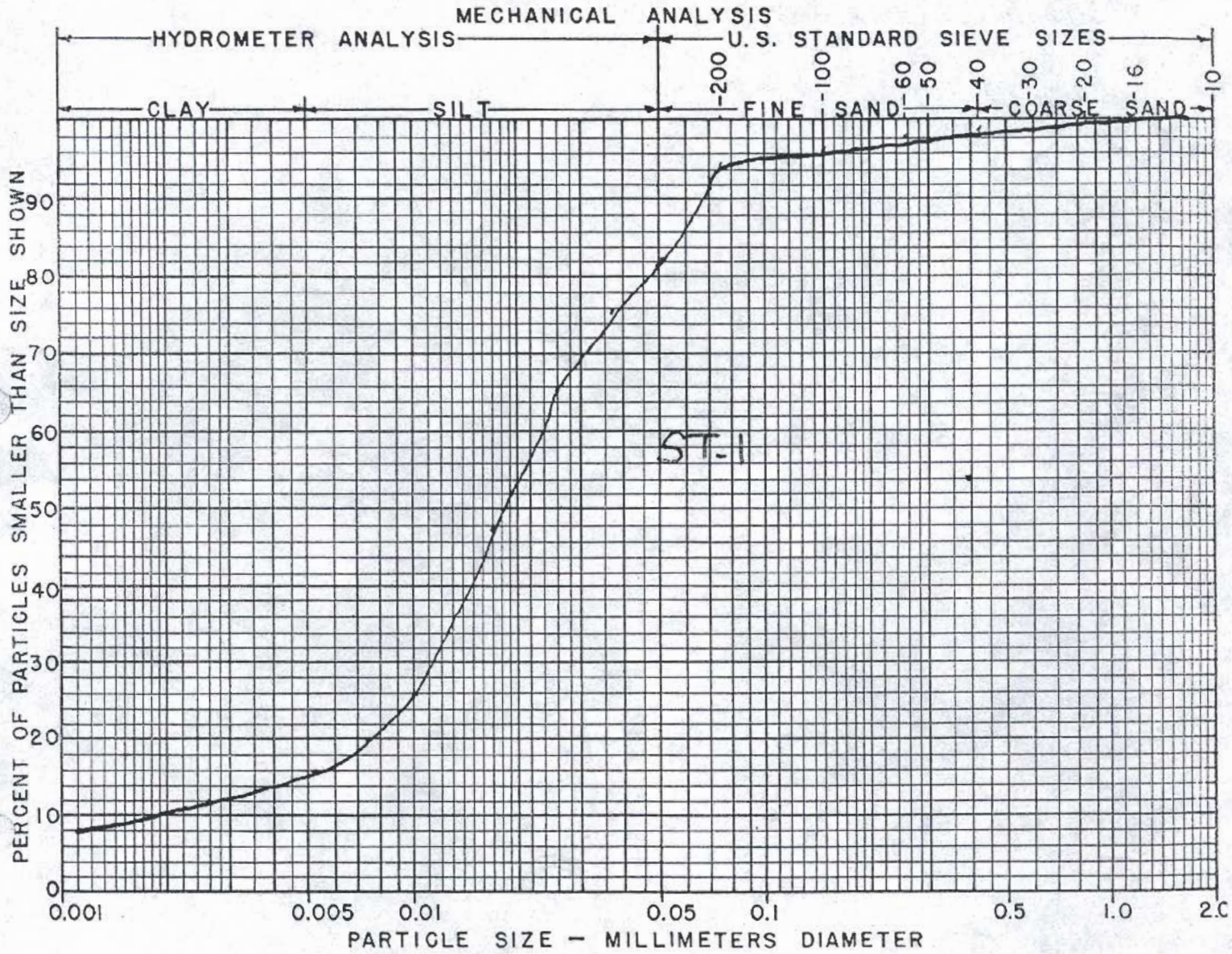
STATE HIGHWAY COMMISSION OF KANSAS

REPORT OF SOIL TESTS

4263
S.T. 1

SUBMITTED BY Wallace Taylor ADDRESS Manhattan LAB. NO. 87-4263

PROJECT 24-75-K-2603-01 COUNTY Pottawatomie DATE 11-20-87



PHYSICAL PROPERTIES OF PORTION PASSING NO. ___ SIEVE

SAMPLE NUMBER	STATION	DIST. ℄	DEPTH	L.L.L.	L.P.L.	P.I.	% RET. ON NO.10	SPEC. GRAV. (PASS. NO.10)	CLASSI-FICATION
ST-1	213+92	Rt 20	5^{0}-6^{5}	37	23	14		2.63	Si L

REMARKS

D. L. Jarboe
ENG'R. OF MATERIALS

BY James J. Brennan for
Jeff Frantzen, Soils Engineer

STATE HIGHWAY COMMISSION OF KANSAS

REPORT OF SOIL TESTS

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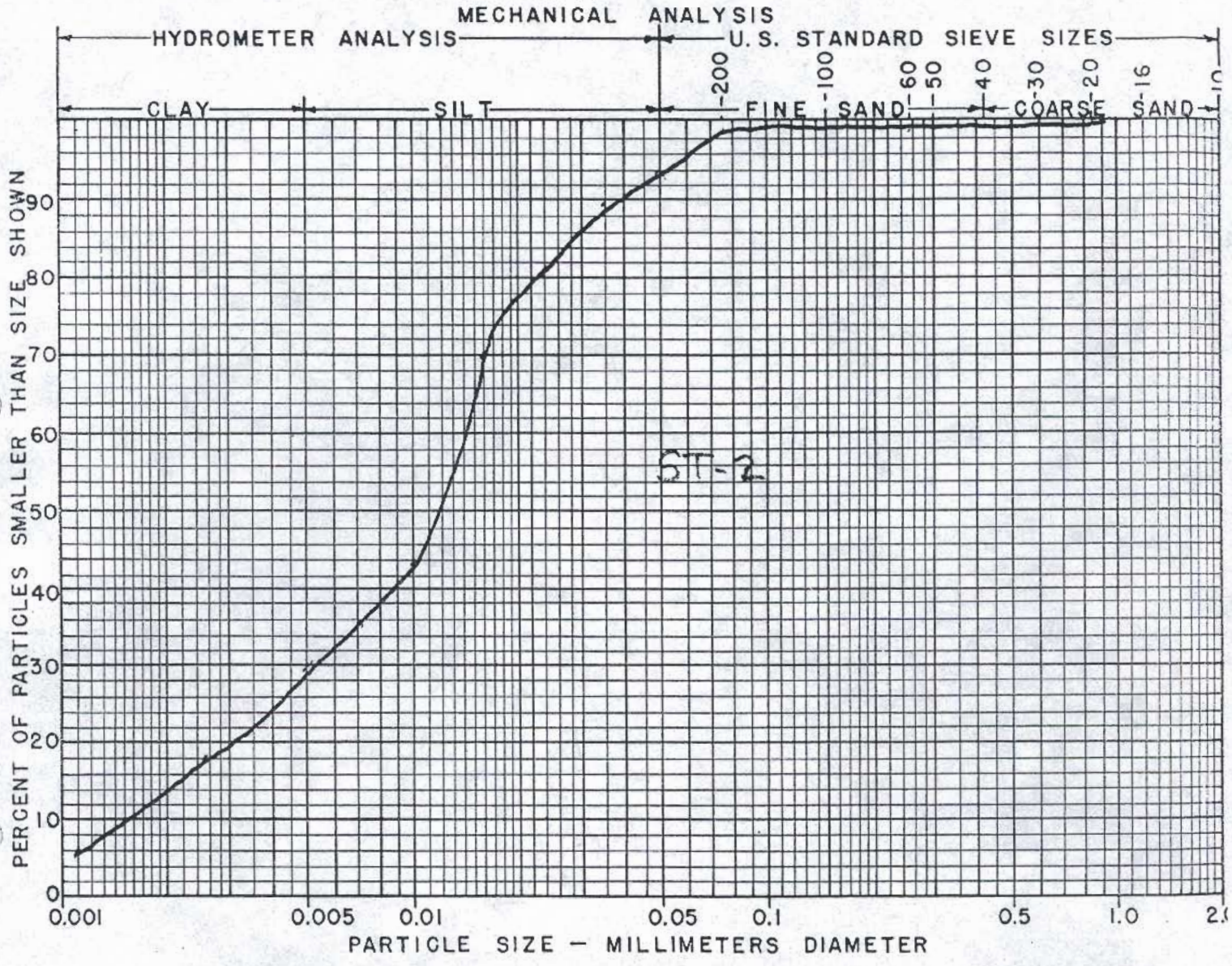

PHYSICAL PROPERTIES OF PORTION PASSING NO. ___ SIEVE

SAMPLE NUMBER	STATION	DIST. ℄	DEPTH	L.L.L.	L.P.L.	P.I.	% RET. ON NO.10	SPEC. GRAV. (PASS. NO.10)	CLASSI-FICATION
ST-2	213+92	Rt 20	10^{0}-11^{5}	41	22	19		2.65	Si C

REMARKS

D. L. Jarboe
ENG'R. OF MATERIALS

BY James J. Bowman for
Jeff Frantzen, Soils Engineer

STATE HIGHWAY COMMISSION OF KANSAS

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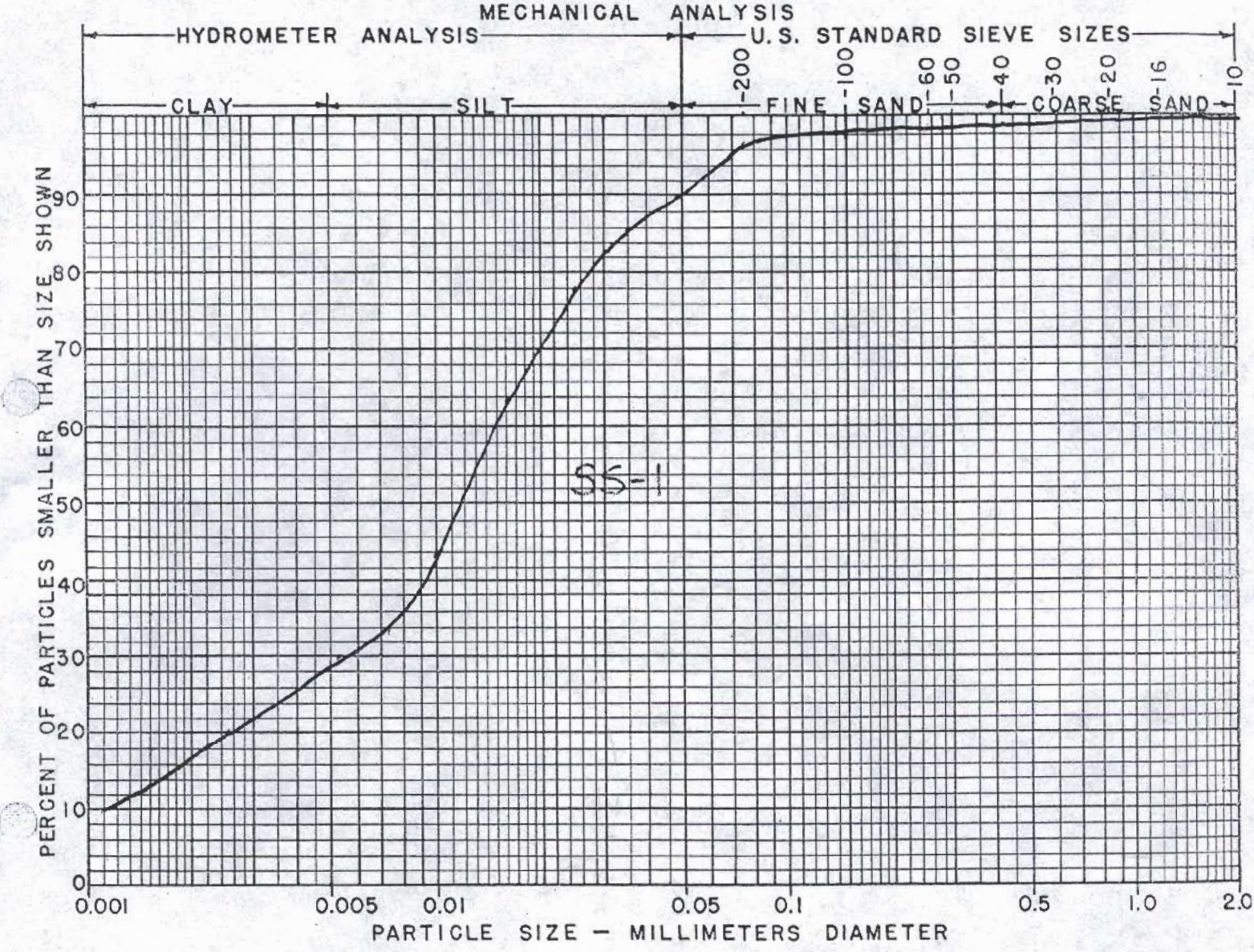

PHYSICAL PROPERTIES OF PORTION PASSING NO. ___ SIEVE

SAMPLE NUMBER	STATION	DIST. ℄	DEPTH	L.L.L.	L.P.L.	P.I.	% RET. ON NO.10	SPEC. GRAV. (PASS. NO.10)	CLASSI-FICATION
SS-1	213+92	Rt. 20	6^{5}-8^{0}	43	24	19		2.62	S CL

REMARKS

D. L. Jarboe
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BY James J. Brennan for
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STATE HIGHWAY COMMISSION OF KANSAS

REPORT OF SOIL TESTS

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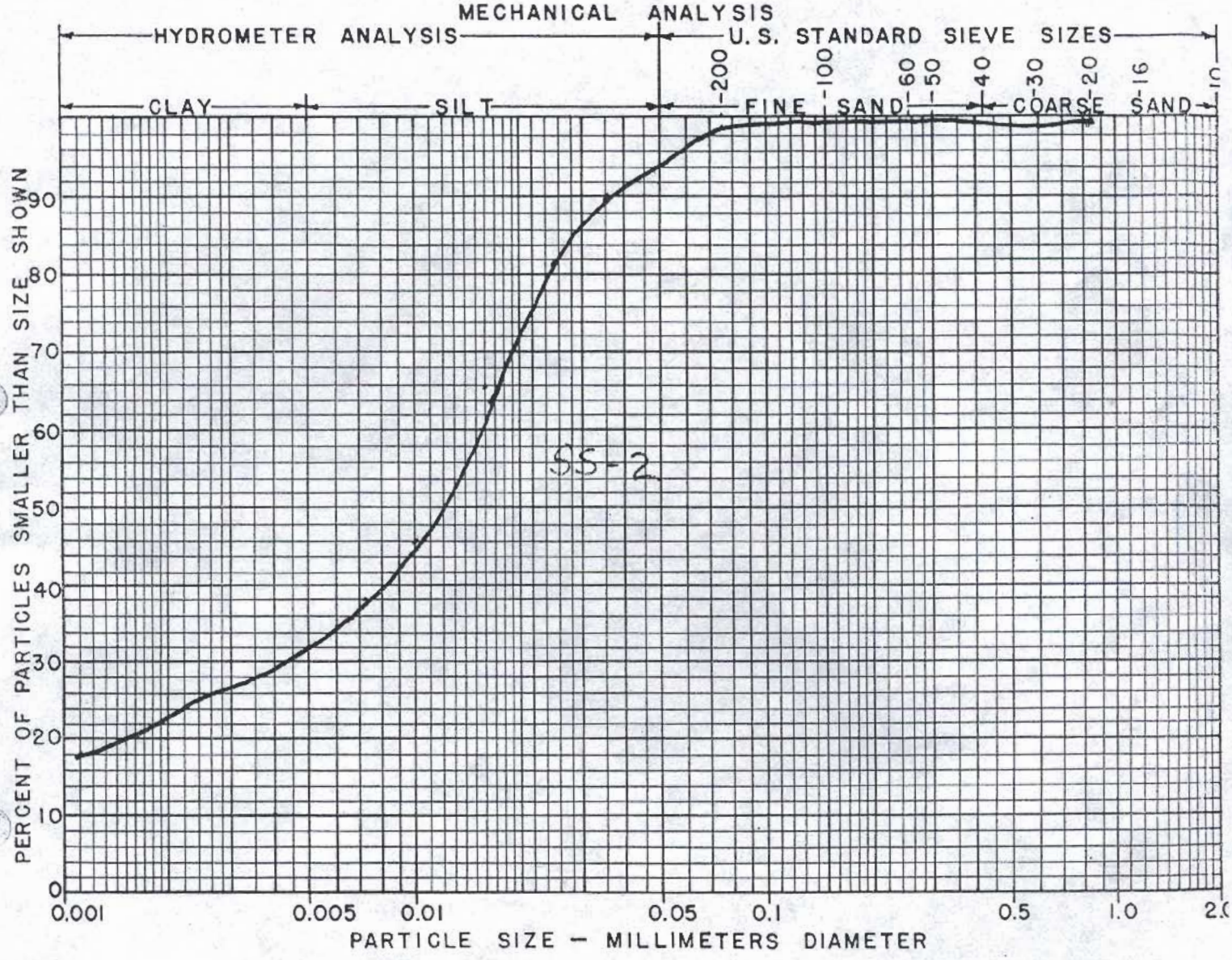

PHYSICAL PROPERTIES OF PORTION PASSING NO. ___ SIEVE

SAMPLE NUMBER	STATION	DIST. ℄	DEPTH	L.L.L.	L.P.L.	P.I.	% RET. ON NO.10	SPEC. GRAV. (PASS. NO.10)	CLASSIFICATION
SS-2	213+92	Rt 20	11^{5} - 13^{0}	42	22	20		2.62	Si CL

REMARKS

D. L. Jarboe
ENG'R. OF MATERIALS

BY James D. Brennan for
Jeff Frantzen, Soils Engineer