

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



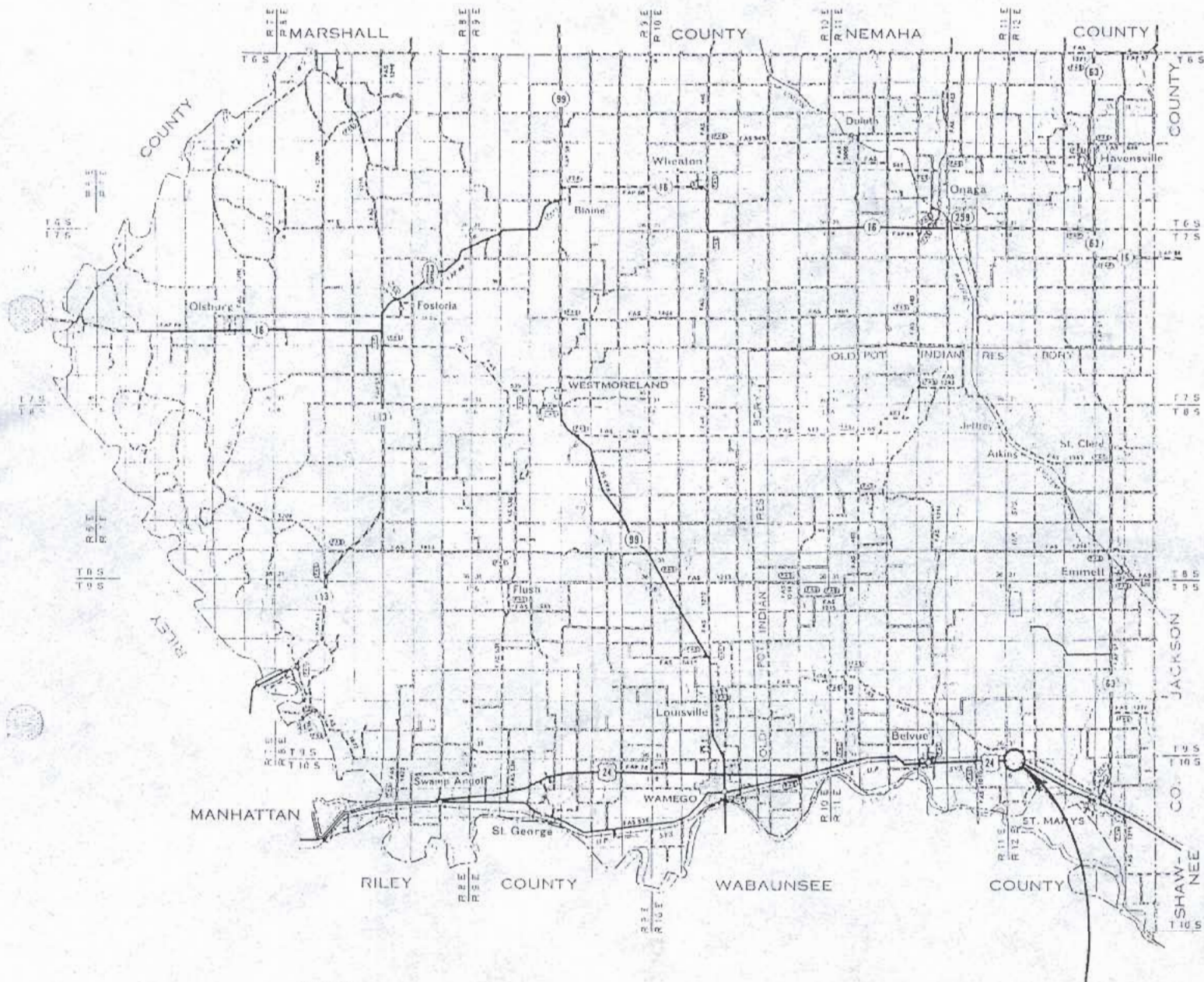
LAWRENCE A. ROCKERS
CHIEF GEOLOGIST

BY

ALEX A. KOTOYANTZ, GEOLOGIST

WALLACE K. TAYLOR, REGIONAL GEOLOGIST

DECEMBER 1987



LEGEND

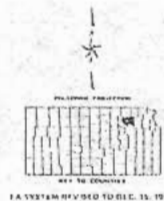
ROADS AND ROADWAY FEATURES

PRIMITIVE ROAD
UNIMPROVED ROAD
GRAVEL AND GRAVEL ROAD
SOIL SURFACE ROAD
GRAVEL OR STONE ROAD
NOT GRAVEL OR GRAVEL
GRAVEL ON STONE ROAD
GRAVEL AND GRAVEL
GRAVEL ON STONE ROAD WITH
STABILIZED SURFACE
DRAINAGE ROADWAY TYPE
PAVED ROAD
DIVIDED HIGHWAY
HIGHWAY WITH FULL CONTROL OF
ACCESS AND INTERCHANGE

ROAD SYSTEM DESIGNATION

FEDERAL AID INTERSTATE HIGHWAY SYSTEM
FEDERAL AID PRIMARY HIGHWAY SYSTEM
FEDERAL AID SECONDARY HIGHWAY SYSTEM
INTERSTATE NUMBERED HIGHWAYS
U.S. NUMBERED HIGHWAYS
STATE HIGHWAY SYSTEM AND
STATE THROUGH HIGHWAY
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BRIDGE FOUNDATION GEOLOGY REPORT

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

<u>LOCATION</u>	<u>BEDROCK CONTACT</u>	<u>DESIGN PILE TIP ELEVATION</u> <u>H-PILE</u>
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 penetrometer drive were made to determine geologic setting at this bridge site.

KANSAS DEPARTMENT OF TRANSPORTATION

COUNTY *Bottawatomie* 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	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' 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' 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
Koteyantz
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	31 133	30 168
45-50	27	32 59	34 93	32 125	40 165
50-55	44	36 150	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					
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Ref.
 62⁸
 (905.55)

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

REMARKS: 24° some firmness, 34^{933²} firm, 50^{919⁵} very firm, 60^{907⁸} hard,
 906⁸ → 61⁶ - 61⁷ (1 min.), 61⁸ - 61⁹ (1 min. 22 sec.), 62² - 62³ (2 min. 5 sec.),
 62²⁰ - 62⁷⁵ (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 ProjectSample from ProjectSubmitted by Wallace K. Taylor, Manhattan Regional Geologist

Identification marks -----

Project or POV 24-75-K-2603-01 Pottawatomie Co. Dist. #1Type of Construction Br. No. 24-75-23.68 Replacement

Contractor -----

TEST RESULTS

Sample No.	Station	Dist. ft. <u>E</u>	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 6⁵-8⁰ and SS-2 from 11⁵-13⁰).

CC: D. L. Jarboe
 L. Rockers
 W. Taylor
 Jeff Frantzen
 Soils Section
 File

Reported by James J. Brennan for
 Title Jeff Frantzen, Soils Engineer

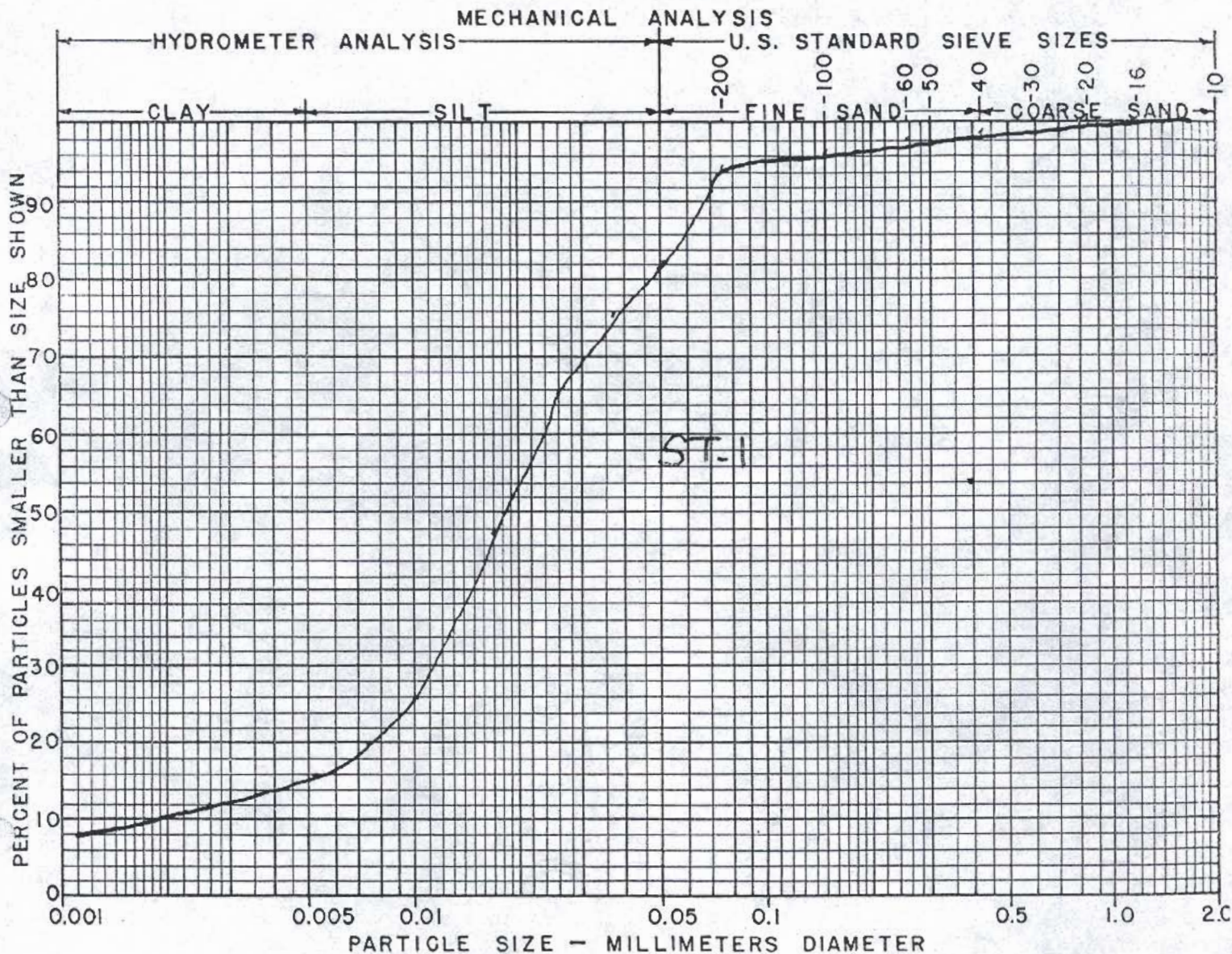
D. O. T. FORM No. 623

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)	CLASSIFICATION
ST-1	213+92	Rt 20	5 ⁰ -6 ⁵	37	23	14		2.63	Si L

REMARKS _____

D. L. Jarboe

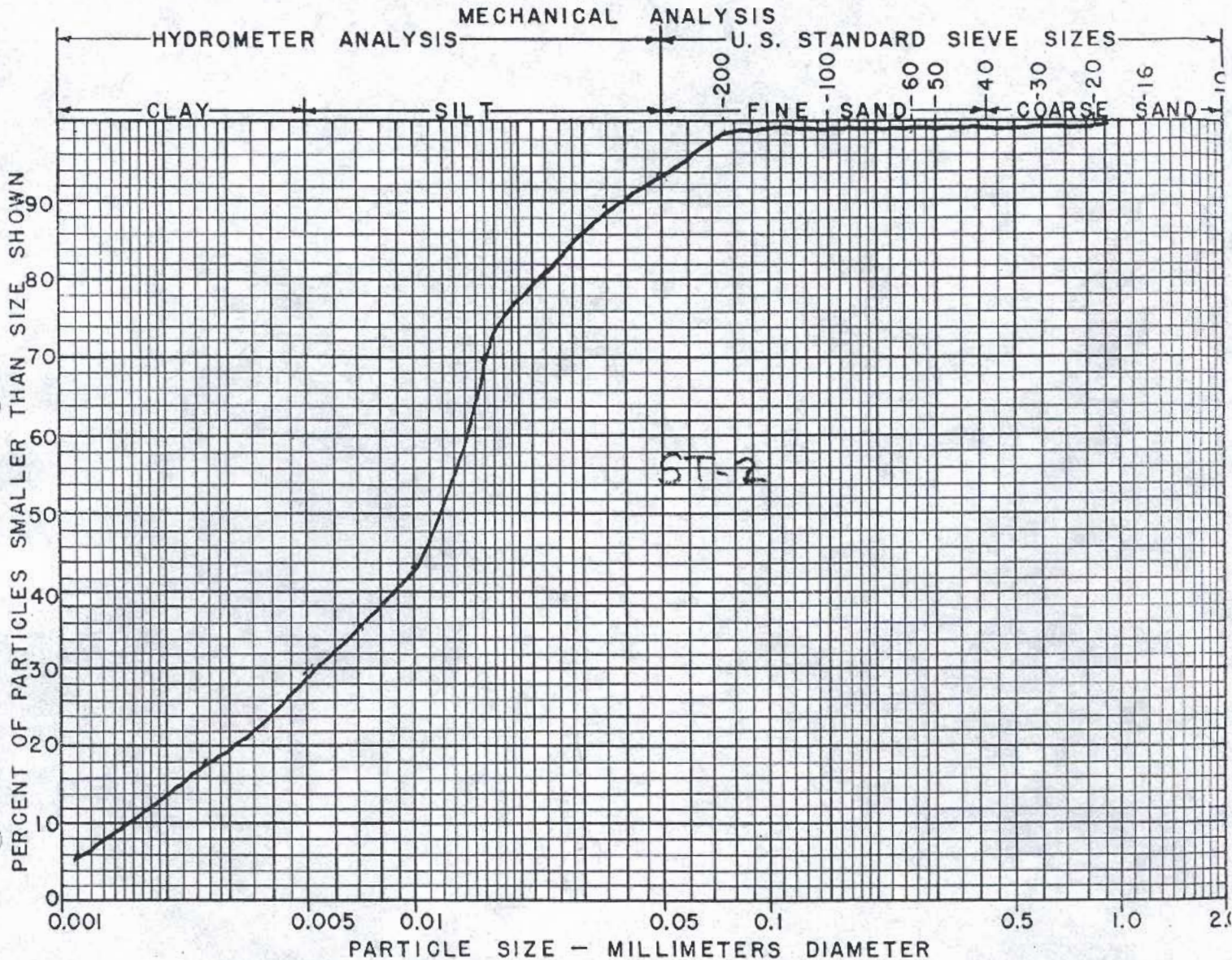
ENG'R. OF MATERIALS

BY James D. Brennan

Jeff Frantzen, Soils Engineer

REPORT OF SOIL TESTS

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)	CLASSIFICATION
ST-2	213+92	Rt 20	10 ⁰ -11 ⁵	41	22	19		2.65	Si C

REMARKS _____

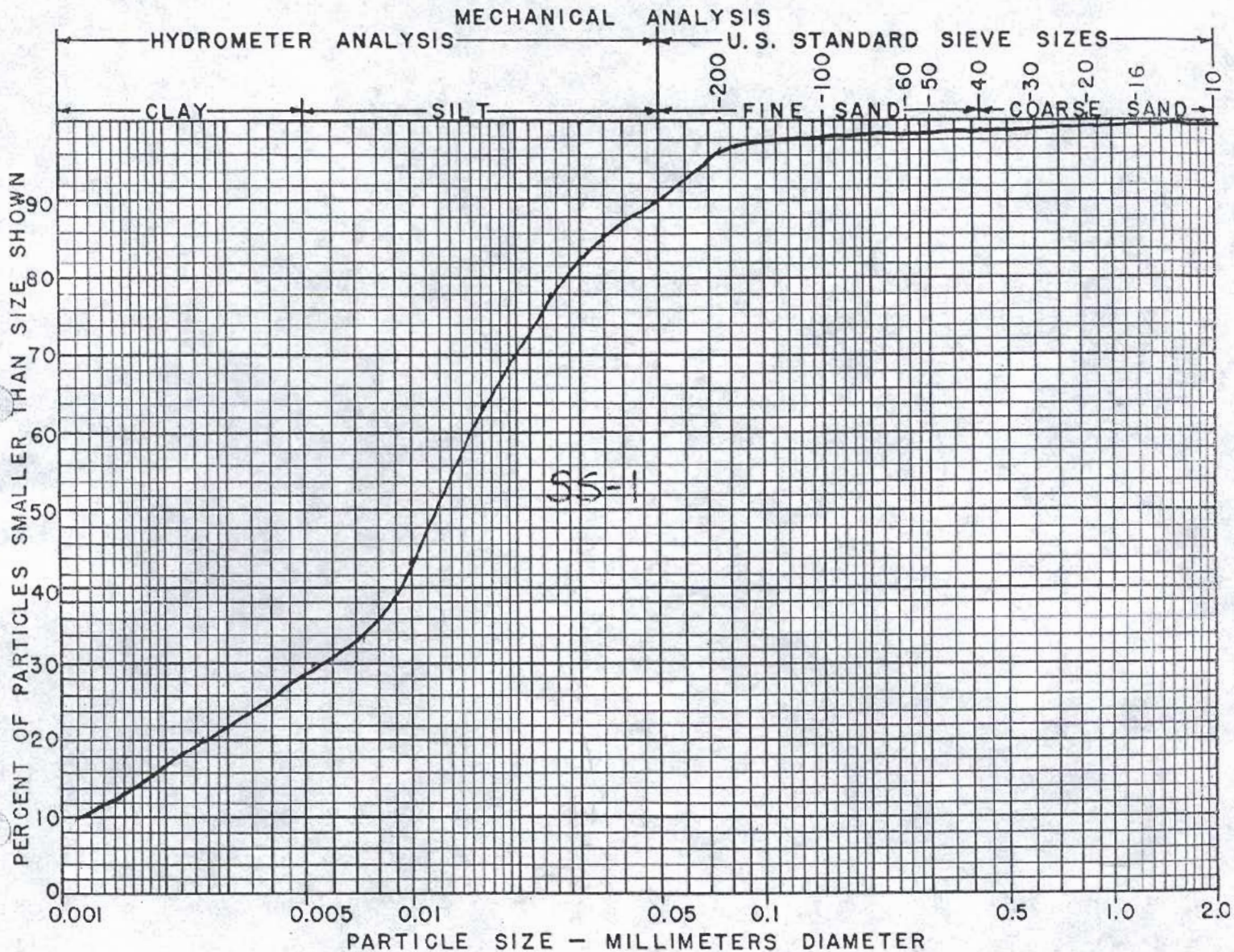
D. L. Jarboe

ENG'R. OF MATERIALS

BY James D. Bowman for
 Jeff Brantzen, Soils Engineer

REPORT OF SOIL TESTS

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)	CLASSIFICATION
SS-1	213+92	Rt. 20	6 ⁵ -8 ⁰	43	24	19		2.62	S CL

REMARKS _____

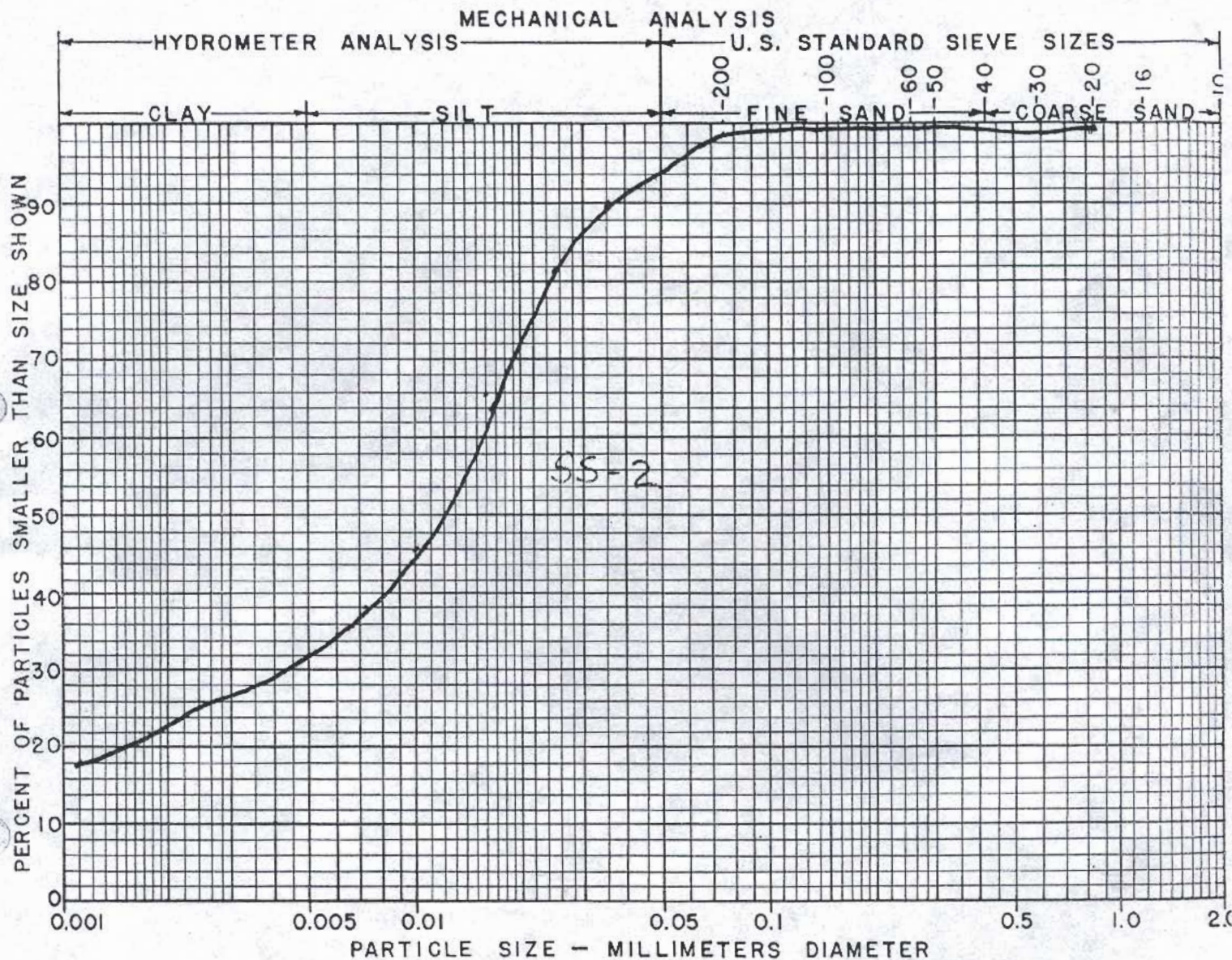
D. L. Jarboe

ENG'R. OF MATERIALS

 BY James J. Brantzen for
 Jeff Brantzen, Soils Engineer

REPORT OF SOIL TESTS

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



PHYSICAL PROPERTIES OF PORTION PASSING NO. ___ SIEVE

SAMPLE NUMBER	STATION	DIST. $\downarrow$	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