

GENERAL INFORMATION

INTRODUCTION

The project consists of the relocation of USR 6-24, (Napoleon By-Pass), beginning at existing USR 6, approximately 0.25 mile west of the city of Napoleon, extending northeastward, terminating at USR 24. The alignment for which plans were available at the time of this report terminates approximately 450 feet east of County Road No. 11, 0.5 mile north of existing USR 24.

Included in this report are profiles of Ramp D (USR 6 Interchange), Twp. Rd. 14B, SR 108 Interchange, and Twp. Rd. R.

For maximum cuts and fill embankment, see project index on this sheet.

GEOLOGY AND OBSERVATIONS OF THE PROJECT

The alignment traverses a portion of the glaciated, dissected Lake Plain, presently being incised by Oerhouse Creek. The area is within the boundaries of the Illinoian and Wisconsin ice sheets, where moderately deep glacial drift overlies shales of the Ohio formation, Devonian age. Several areas of poor surface drainage were observed along the project.

EXPLORATION

Exploratory borings were made by means of truck-mounted mechanical soil auger and hand auger (in areas of difficult access), between April 29 and May 12, 1964.

INVESTIGATIONAL FINDINGS

Materials occurring immediately below proposed grade and embankment foundation areas are predominantly silt clays (A-6a and A-6b) and clay (A-7-6), having moisture contents in the lower portions of the plastic range.

Wet material was encountered at station 667+00.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS - 238 SAMPLES TESTED

DESCRIPTION	U. S. R. CLASS	OHIO CLASS	% AGG	% SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
Coarse and fine sand	---	A-3a	6	23	47	11	13	NP	NP	11	2
Sandy silt	A-4(4)	A-4a	15	10	18	33	24	21	5	15	4
Silt	A-4(8)	A-4b	1	3	9	60	27	23	4	18	6
Silt and clay	A-6(9)	A-6a	5	5	10	36	44	30	13	17	110
Silty clay	A-6(11)	A-6b	4	3	8	37	48	36	17	20	49
Clay	A-7-6(15)	A-7-6	1	1	6	30	62	46	24	25	67
Sod and/or Topsoil	X' = Approximate depth.										
Berm material.	X X X										
Auger boring - plan view.	⊕										
Auger boring plotted to vertical scale only.											
Water content nearly equal to or greater than liquid limit.	●										
Free water.	W										

NOTE: Figures beside borings indicate water content in percent. e.g. /5

SOIL PROFILE

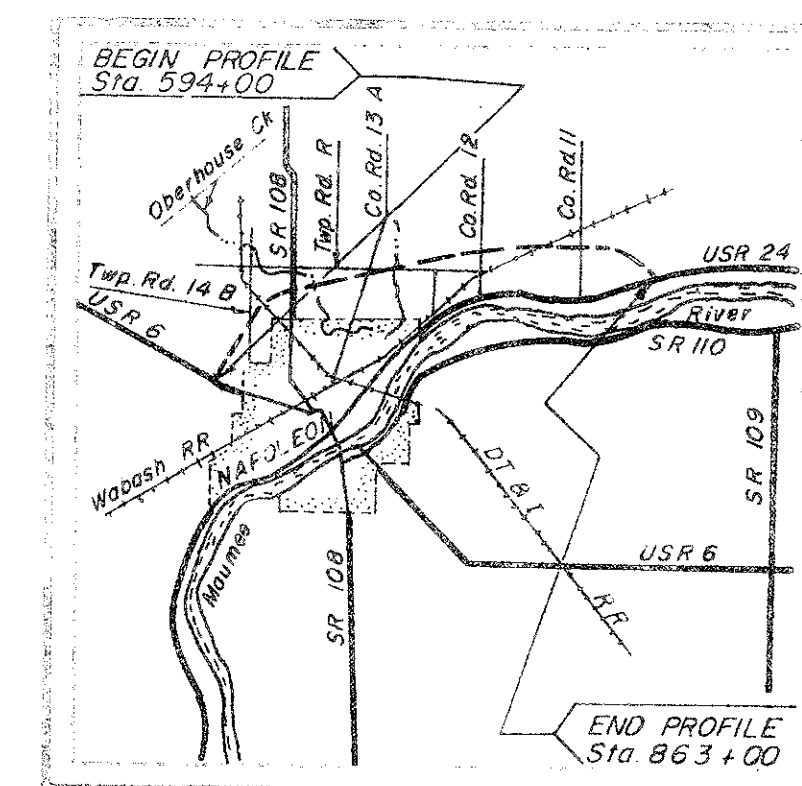
HENRY COUNTY

HEN-6-11.73

HEN-24-9.61

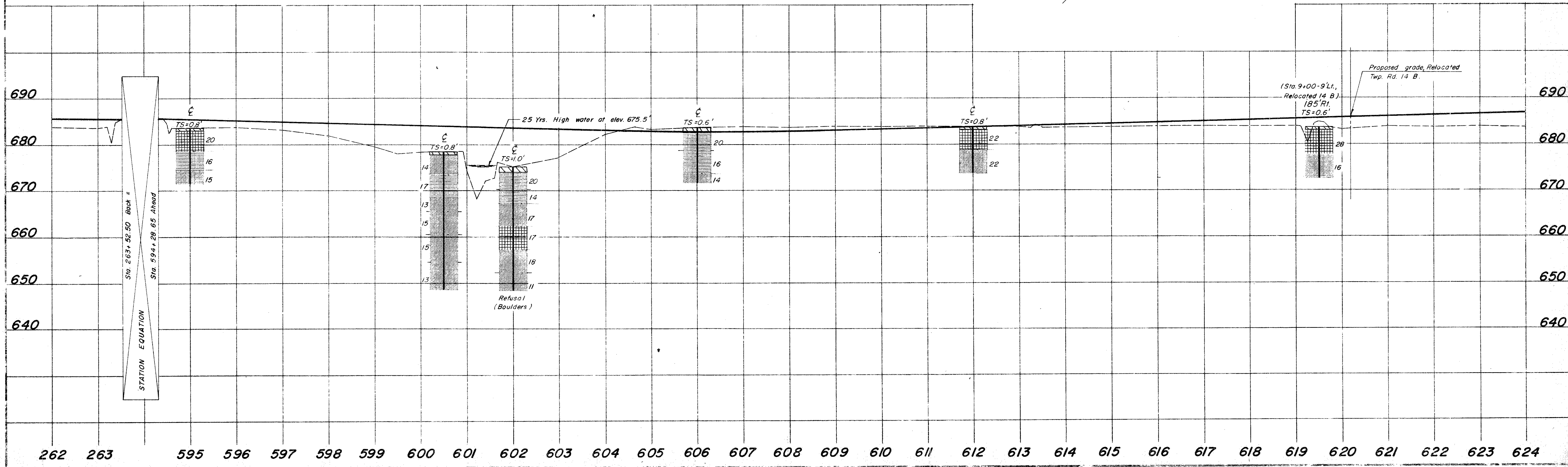
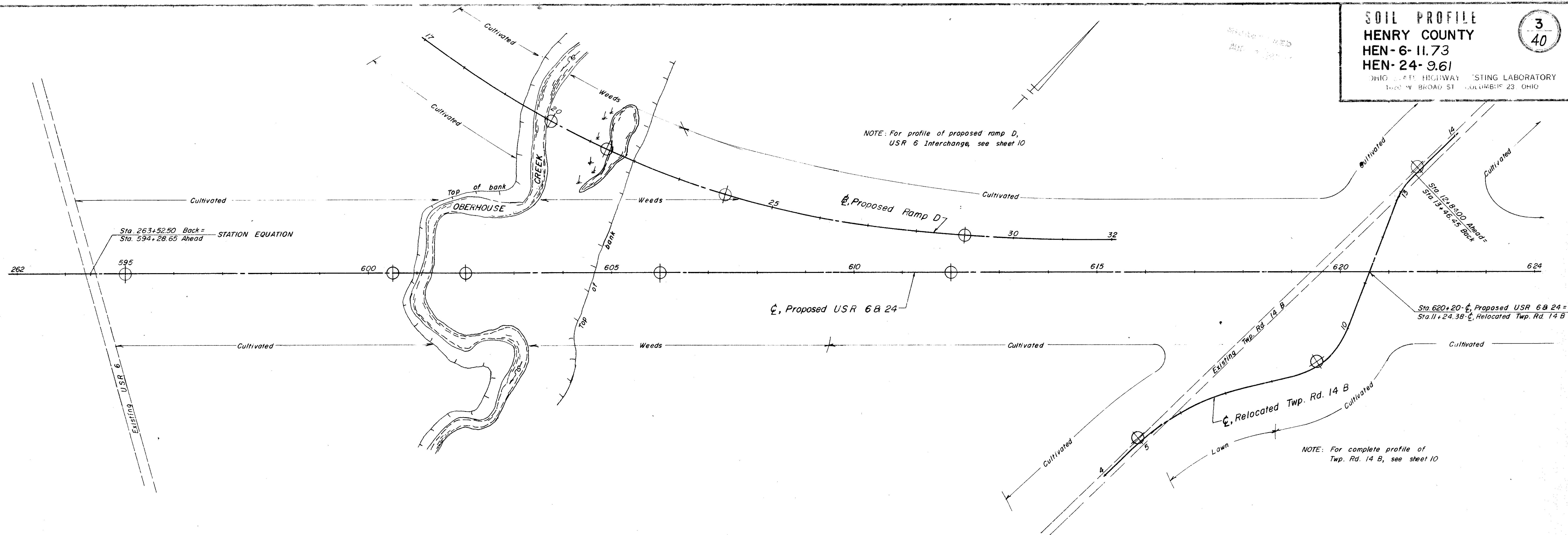
OHIO STATE HIGHWAY TESTING LABORATORY
1500 W. BROAD ST. COLUMBUS 10, OHIO

NOTE: INFORMATION REPORT BY THIS AGENCY PROJECT WAS OBTAINED BASED ON DATA IN EXISTING OR RECENT RECORDS FOR THE PROJECT. THE STATE OF OHIO DOES NOT GUARANTEE THE ACCURACY OF THIS DATA. THE PROJECT CONTAINS INFORMATION FROM THE STATE OF OHIO.



SUMMARY OF SOIL TEST DATA
NOTE: NP shown in Liquid Limit and Plasticity Index columns indicates that the material is non-plastic.
*Denotes sample taken at or near grade.

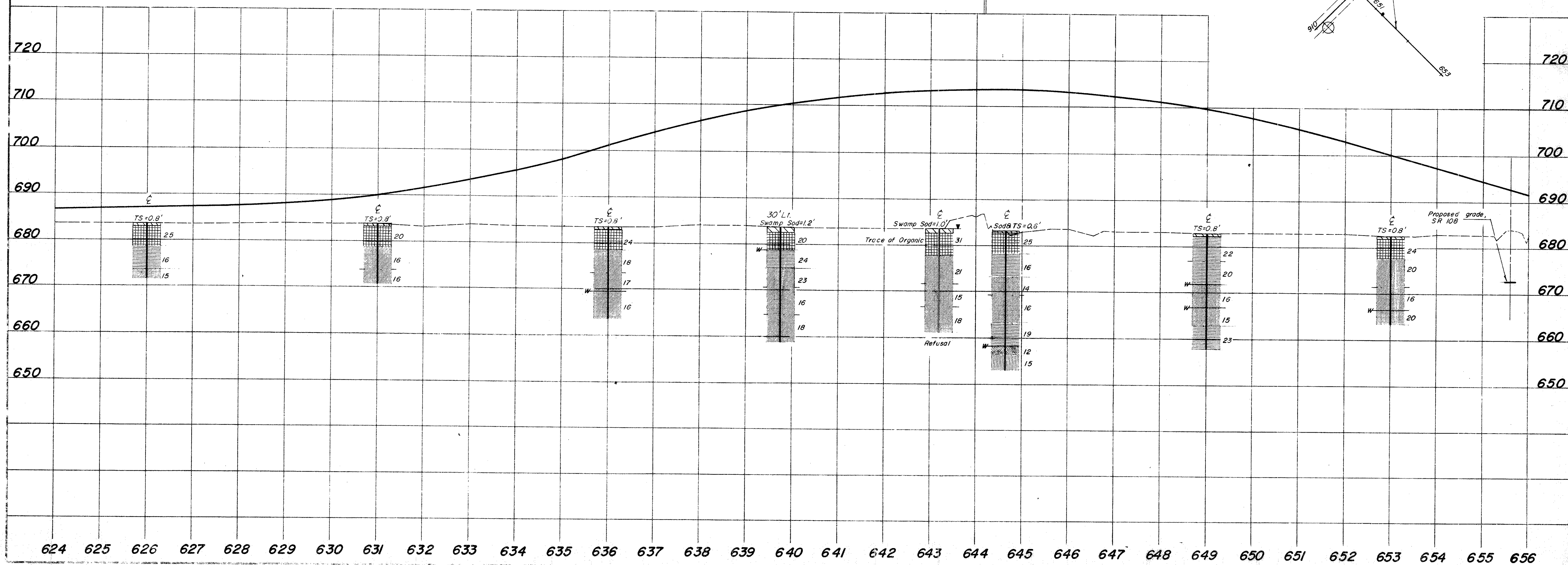
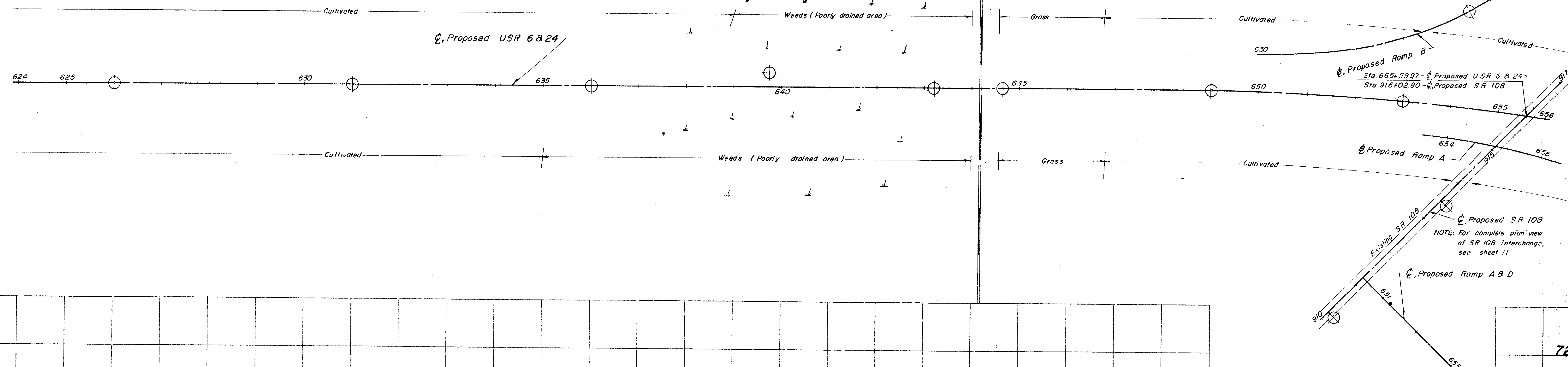
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595+00	CL	0.8-5.0	0	3	13	26	58	41	20	20	A-7-6 *	657+00	CL	2.0-5.0	0	1	28	36	35	28	11	20	A-6a	783+00	CL	0.7-5.0	0	4	2	39	55	41	21	30	A-7-6	922+50	15' Rt	0.8-6.0	0	1	6	42	51	39	19	20	A-6b *
		5.0-9.0	0	6	4	37	53	35	17	16	A-6b			5.0-9.0	0	4	16	51	29	24	8	21	A-6b			5.0-9.0	8	4	10	29	49	34	16	20	A-6b			6.0-11.0	0	4	9	24	49	30	12	17	A-6b
		9.0-12.0	0	3	13	34	50	29	12	15	A-6a			9.0-14.0	0	4	10	37	49	28	11	14	A-6a			9.0-12.0	5	4	9	35	47	33	15	14	A-6a												
														14.0-18.0	14	5	13	34	34	25	11	12	A-6a																								
600+50	CL	0.8-5.0	15	5	11	29	40	31	14	14	A-6a	668+50	75' Lt	3.0-6.5	0	2	8	23	67	48	24	25	A-7-6	787+00	CL	0.7-5.0	0	1	1	37	61	40	18	27	A-6b	951+00	BL	0.3-5.0	0	1	4	41	54	45	24	20	A-7-6
		5.0-10.0	0	3	8	35	54	38	18	17	A-6b			6.5-9.0	9	0	3	38	50	36	14	23	A-6a			5.0-10.0	10	4	10	31	45	35	17	23	A-6b			5.0-10.0	0	6	4	34	44	33	15	17	A-6a
		10.0-13.0	0	6	13	33	48	32	14	13	A-6a															10.0-12.0	8	3	9	27	53	33	15	18	A-6a			10.0-12.0	0	6	9	37	49	30	12	17	A-6a
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		18.0-24.0	0	5	3	41	51	29	13	15	A-6a																																				
		24.0-30.0	32	6	11	25	26	22	11	13	A-6a																																				
602+00	CL	1.0-5.0	0	4	21	28	47	38	19	20	A-6b			0.3-5.0	0	6	14	21	59	48	24	23	A-7-6			0.5-5.0	0	0	1	41	58	45	28	20	A-7-6			0.8-5.0	0	1	10	30	59	49	28	23	A-7-6 *
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		18.0-23.0	0	3	10	33	54	32	15	18	A-6a			23.0-27.0	0	4	10	49	39	28	12	12	A-6a *			19.0-23.0	9	16	35	23	17	NP	NP	16	A-4a			11.0-16.0	0	4	10	30	59	49	28	23	A-7-6 *
		23.0-27.0	14	6	12	31	37	27	11	11	A-6a			10.0-14.0	12	5	4	40	39	28	12	12	A-6a *			23.0-27.0	11	37	35	9	13	NP	NP	10	A-3a			9.0-12.0	0	5	12	31	52	29	13	15	A-6a
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639+75	30' Lt	1.2-5.0	0	2	12	32	54	47	26	20	A-7-6			0.0-3.0	0	0	4	54	42	40	20	25	A-6b			0.8-5.0	12	5	12	30	41	33	14	18	A-6a			0.8-5.0	0	0	6	63	31	38	19	23	A-6b *
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		9.0-13.0	0	3	12	34	51	40	19	24	A-6a			7.0-12.0	0	1	3	23	73	47	22	27	A-7-6			12.0-17.0	0	5	9	33	53	32	15	19	A-6a			9.0-12.0	0	5	13	39	43	30	12	16	A-6a
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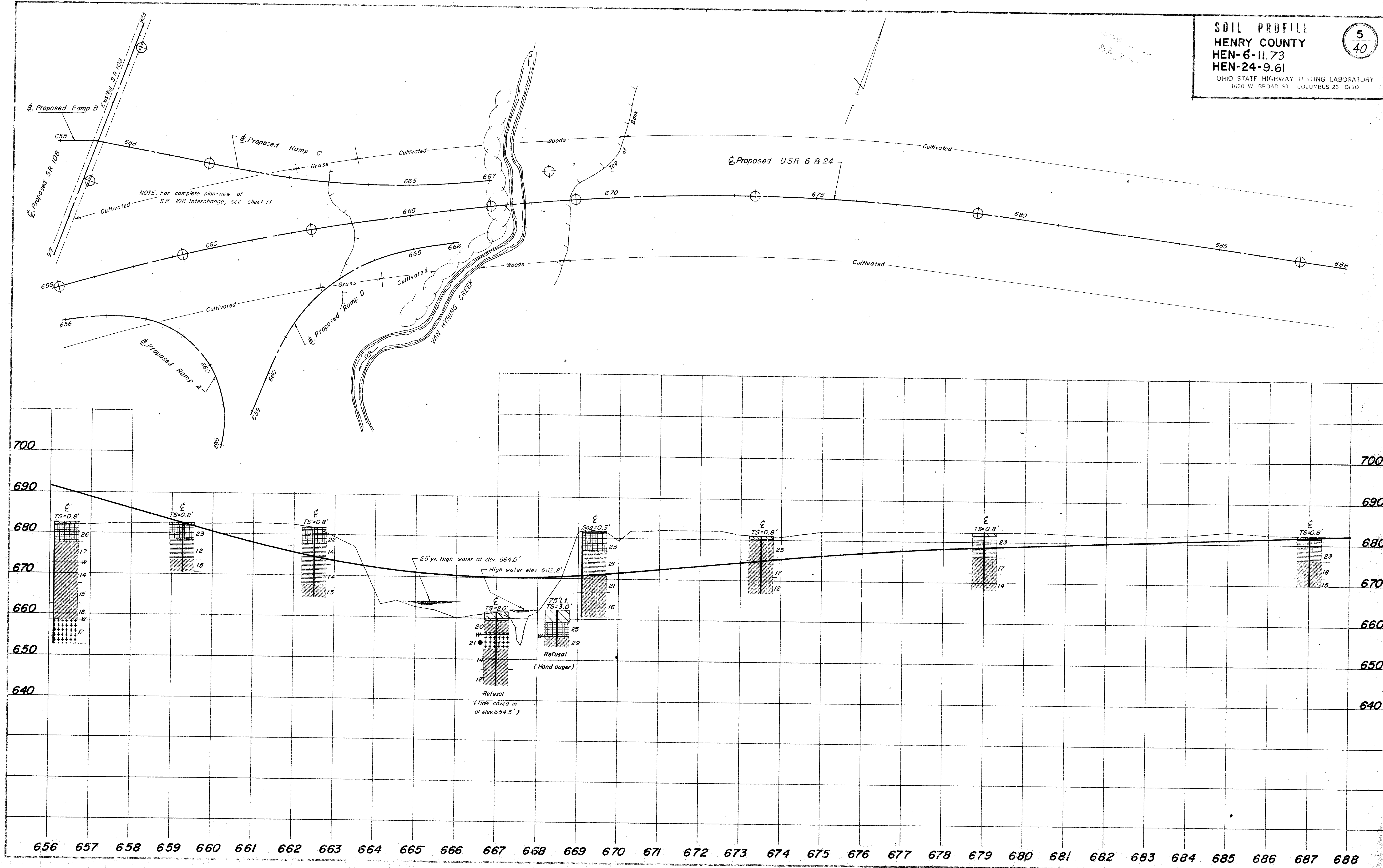


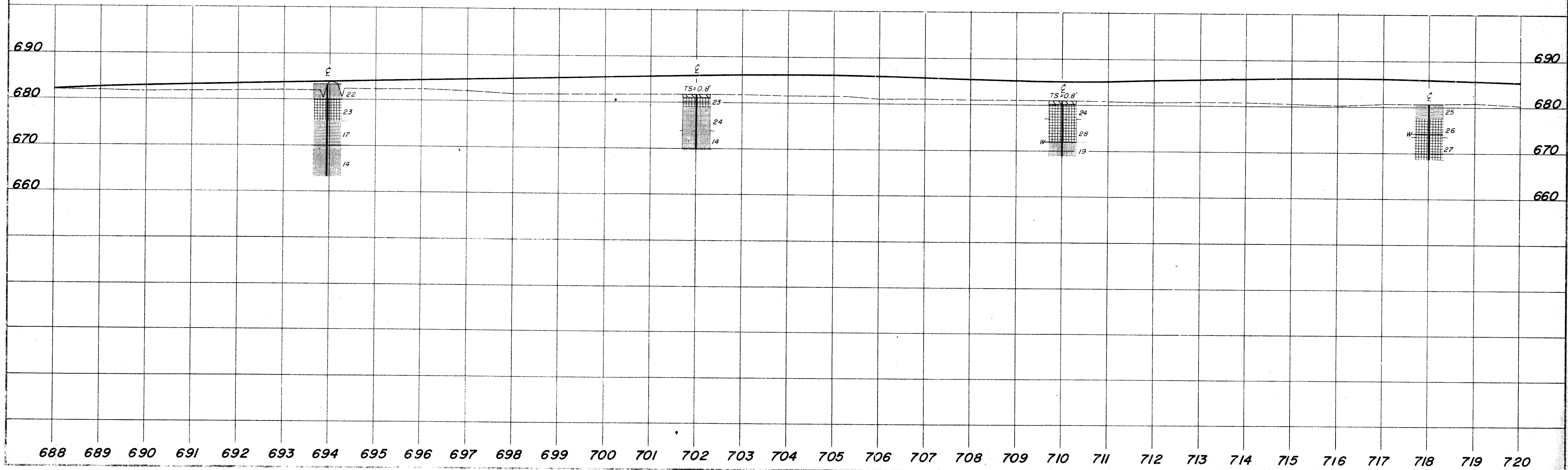
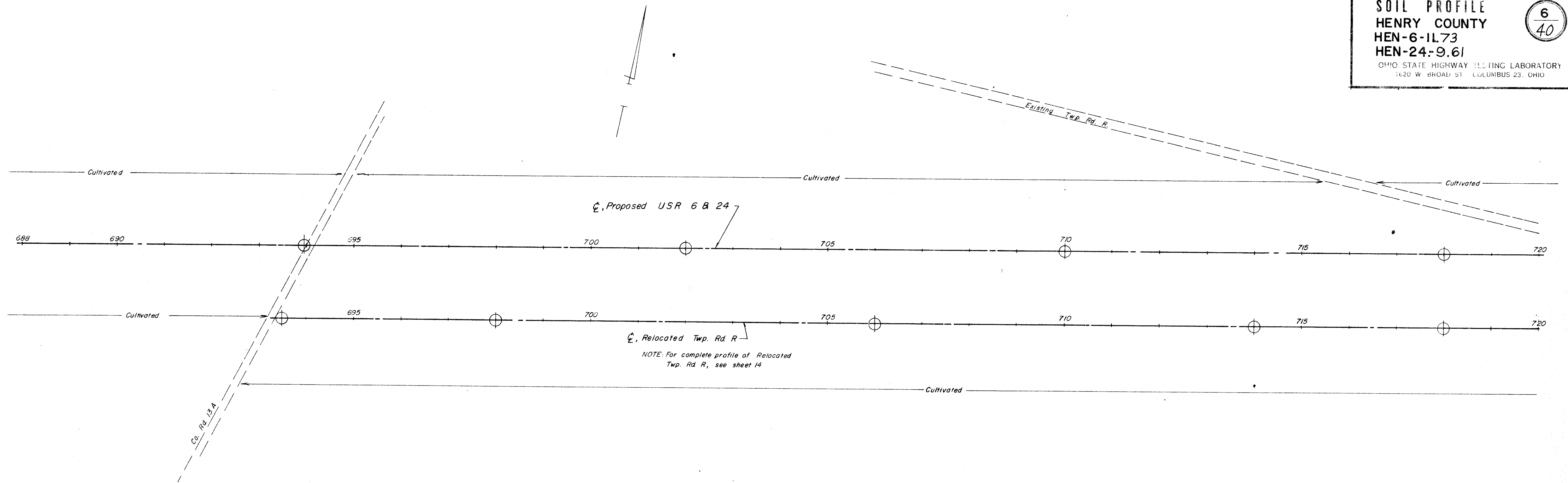
SOIL PROFILE HENRY COUNTY HEN-6-11.73 HEN-24-9.61

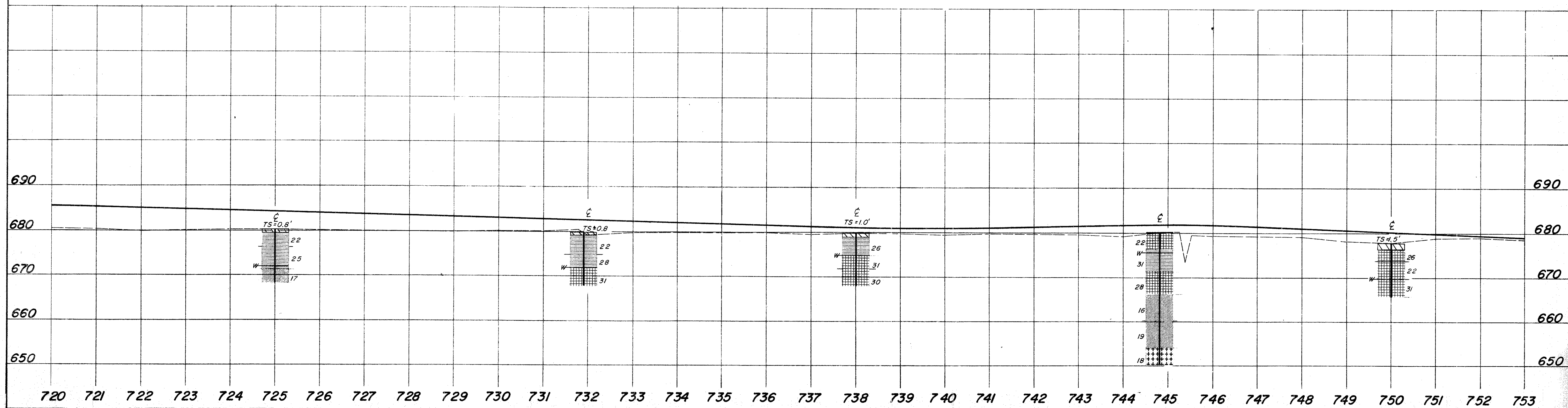
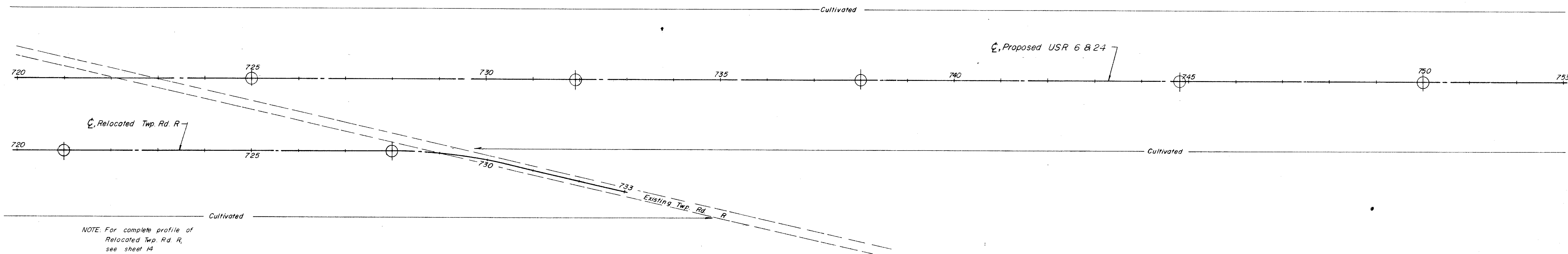
OHIO STATE HIGHWAY TESTING LABORATORY
1620 W BROAD ST COLUMBUS 23 OHIO

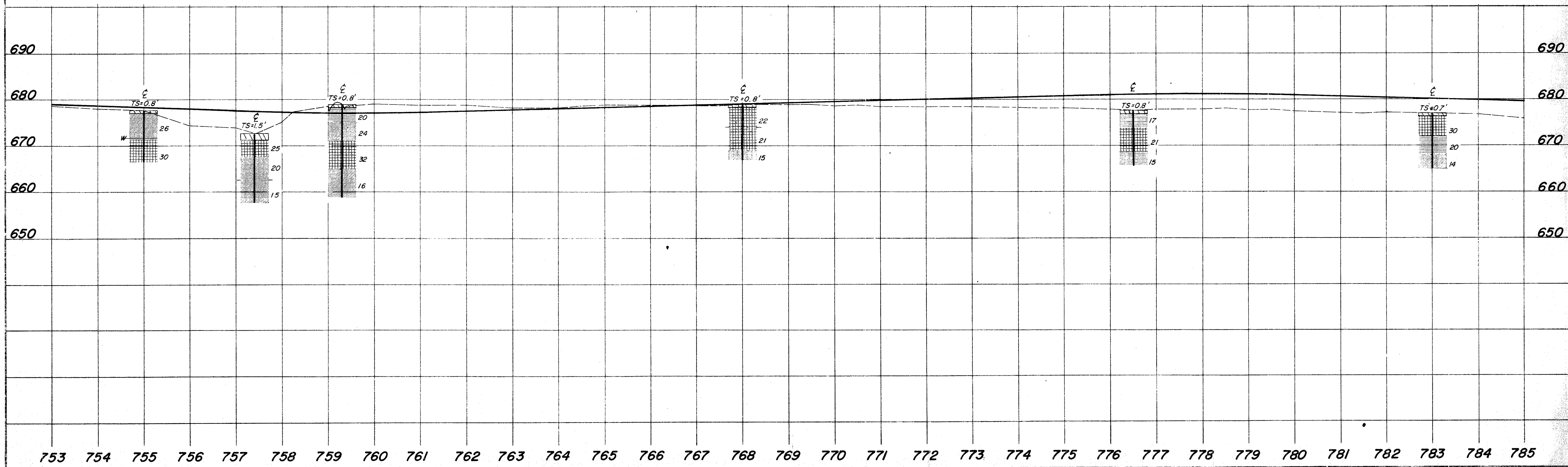
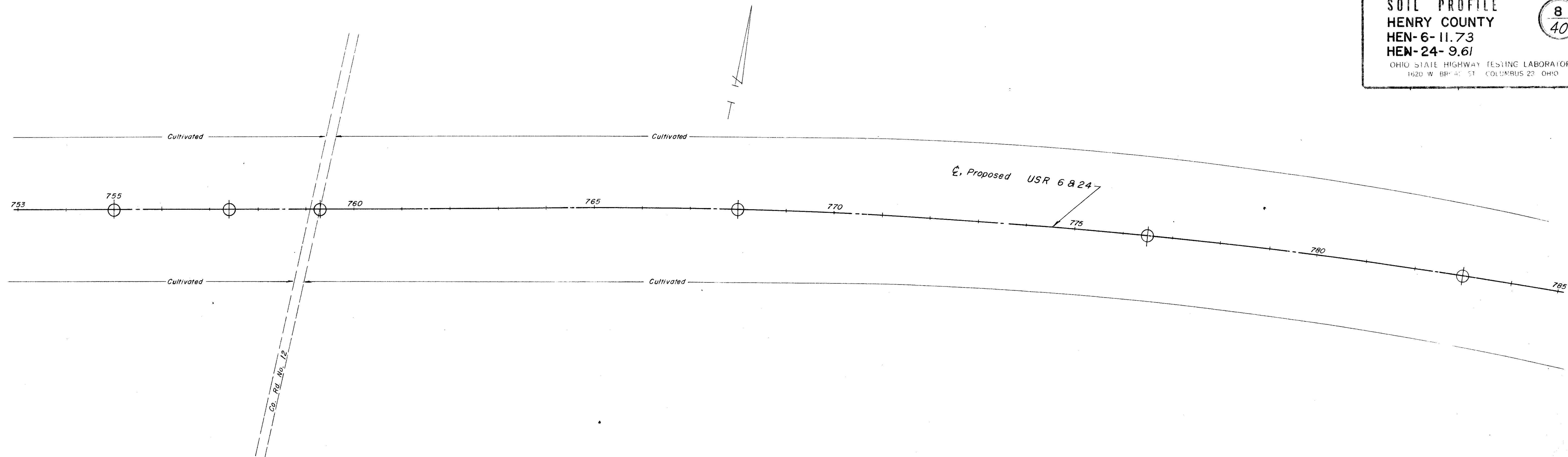
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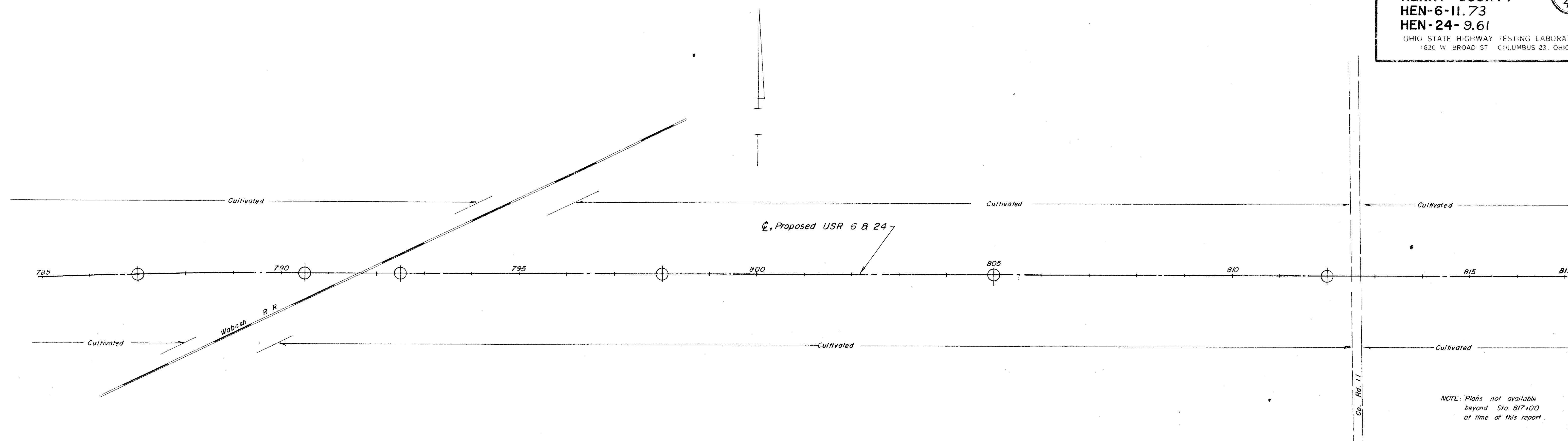




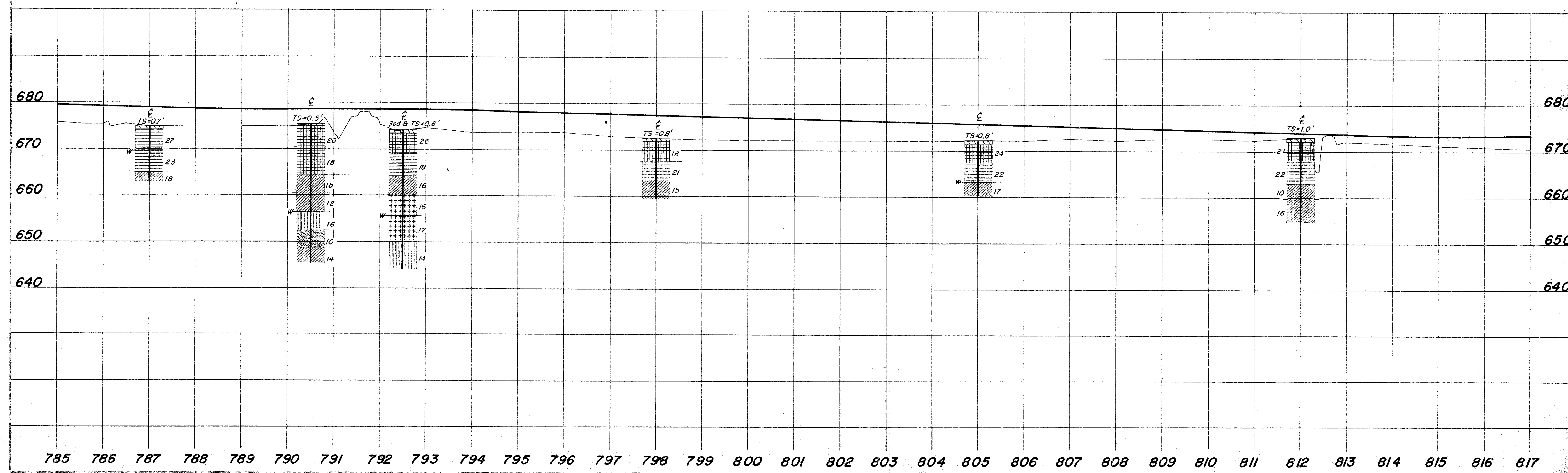
SOIL PROFILE
HENRY COUNTY
HEN-6-11.73
HEN-24-9.61

OHIO STATE HIGHWAY TESTING LABORATORY
1620 W. BROAD ST. COLUMBUS 23, OHIO

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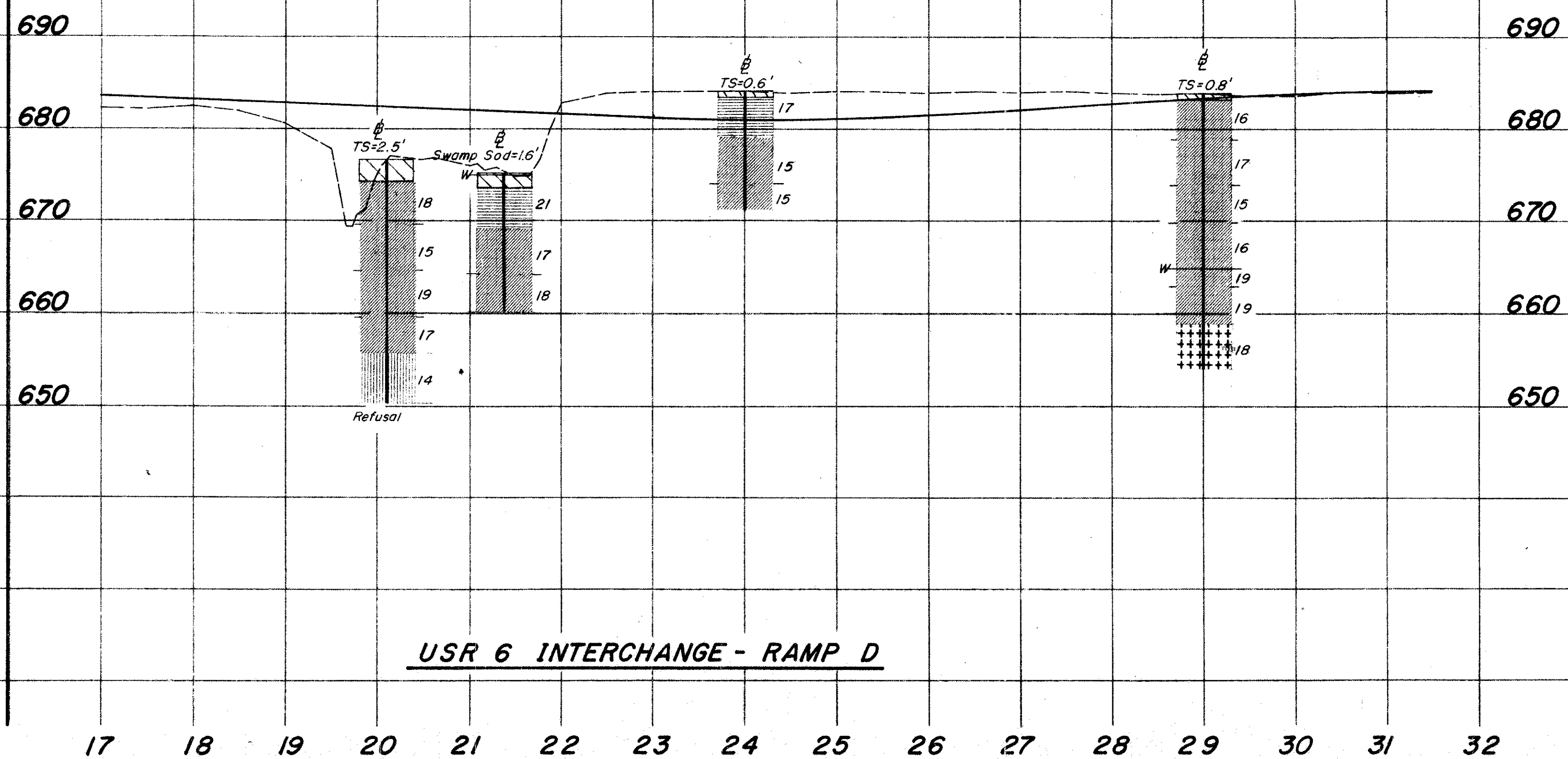
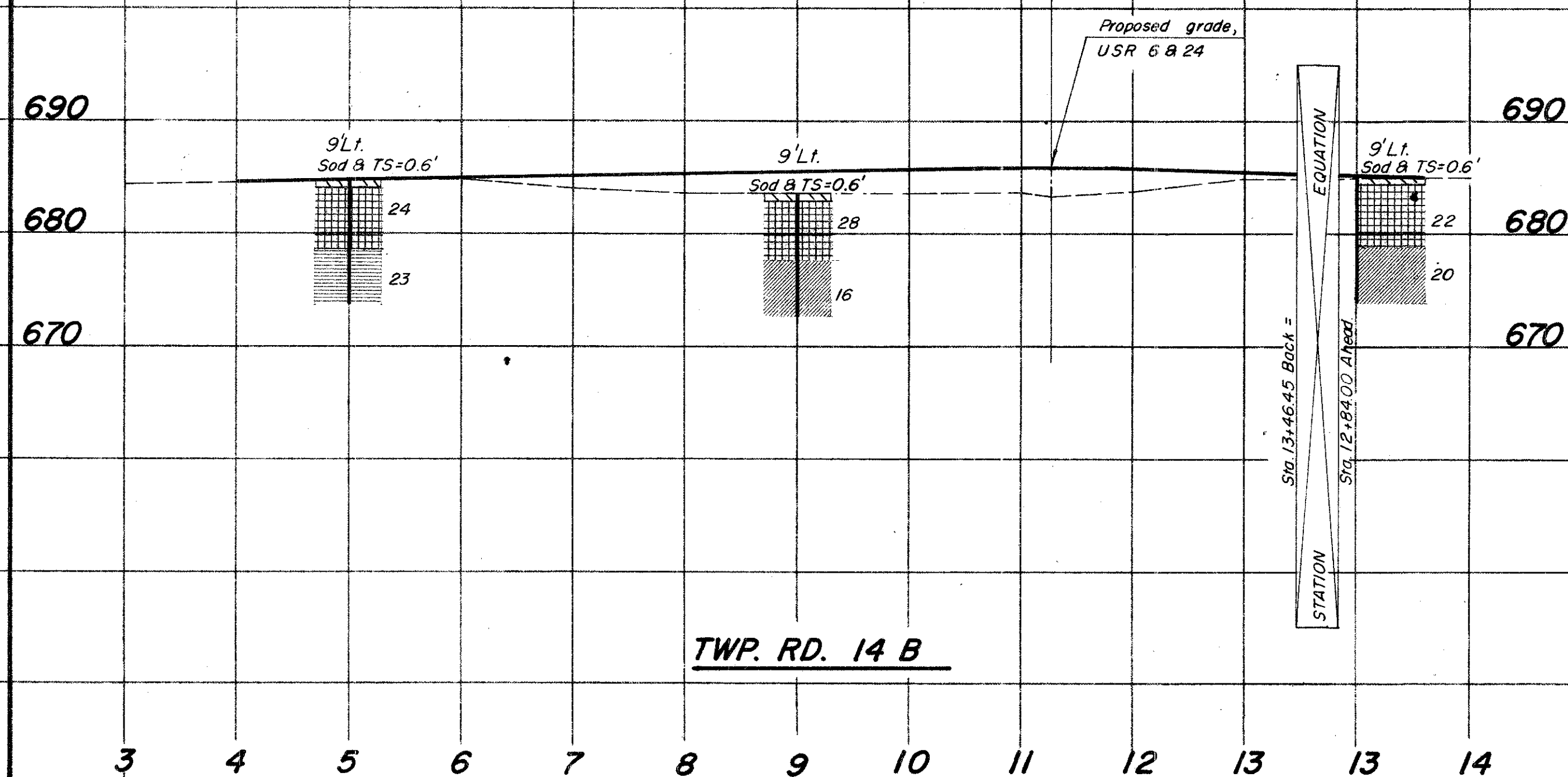
NOTE: Plans not available
beyond Sta. 817+00
at time of this report.



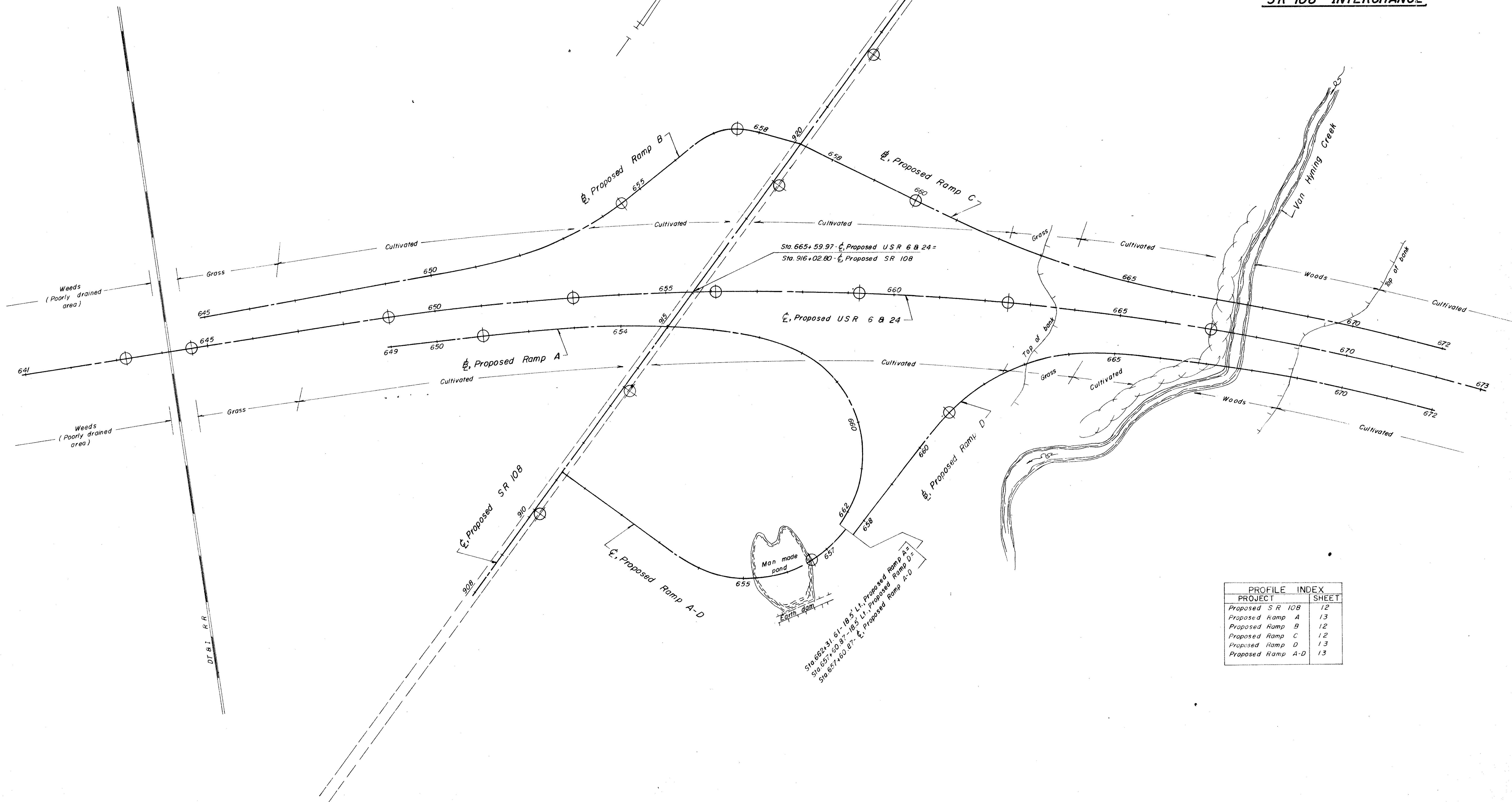
SOIL PROFILE
HENRY COUNTY
HEN-6-11.73
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OHIO STATE HIGHWAY TESTING LABORATORY
1620 W. BROAD ST. COLUMBUS 23, OHIO

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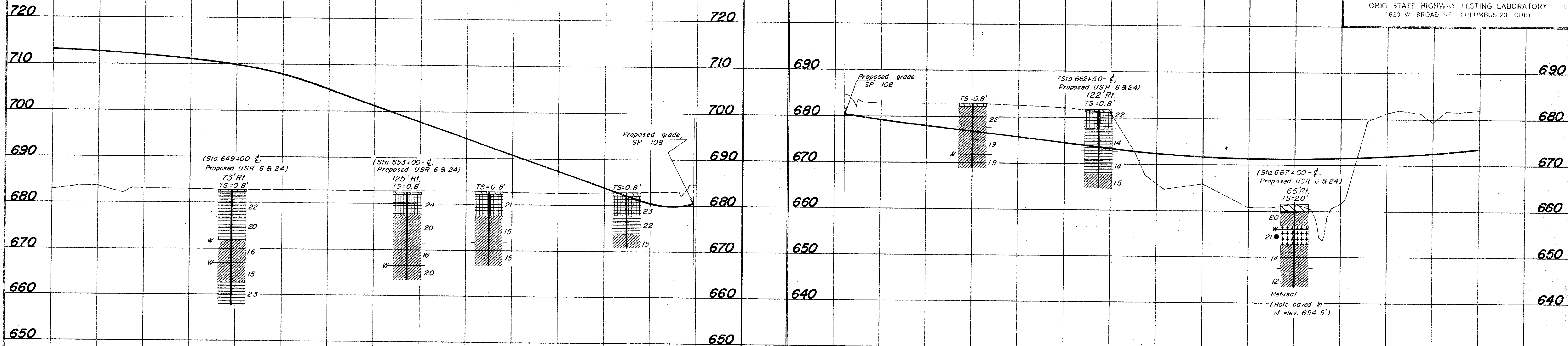


SR 108 INTERCHANGE



PROFILE INDEX	
PROJECT	SHEET
Proposed SR 108	12
Proposed Ramp A	13
Proposed Ramp B	12
Proposed Ramp C	12
Proposed Ramp D	13
Proposed Ramp A-D	13

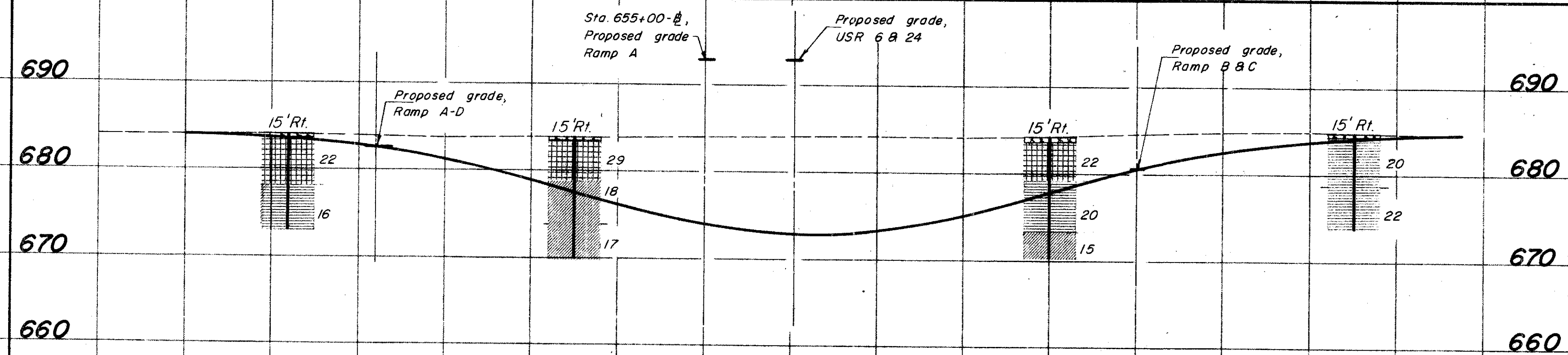
SR 108 INTERCHANGE



RAMP B

RAMP C

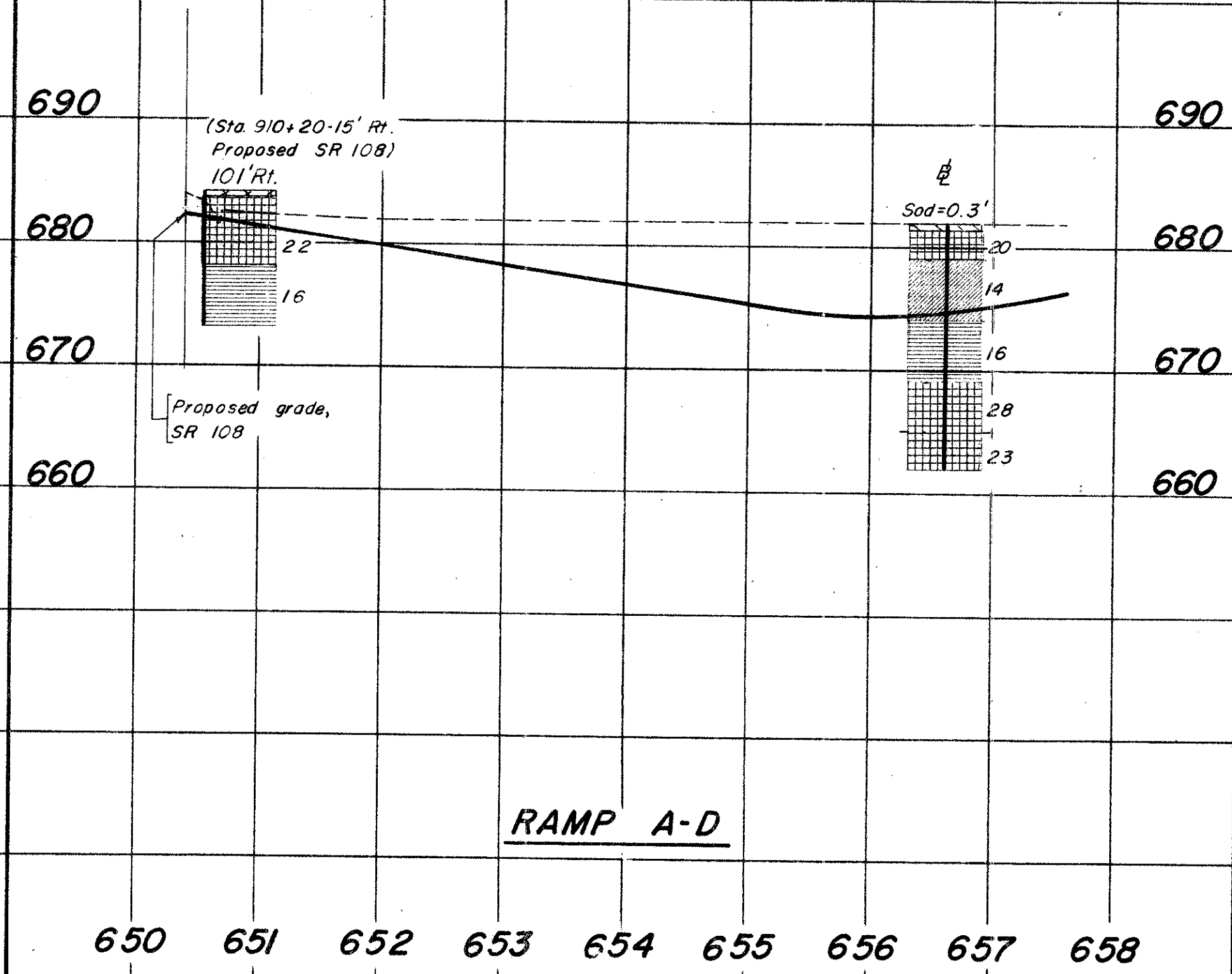
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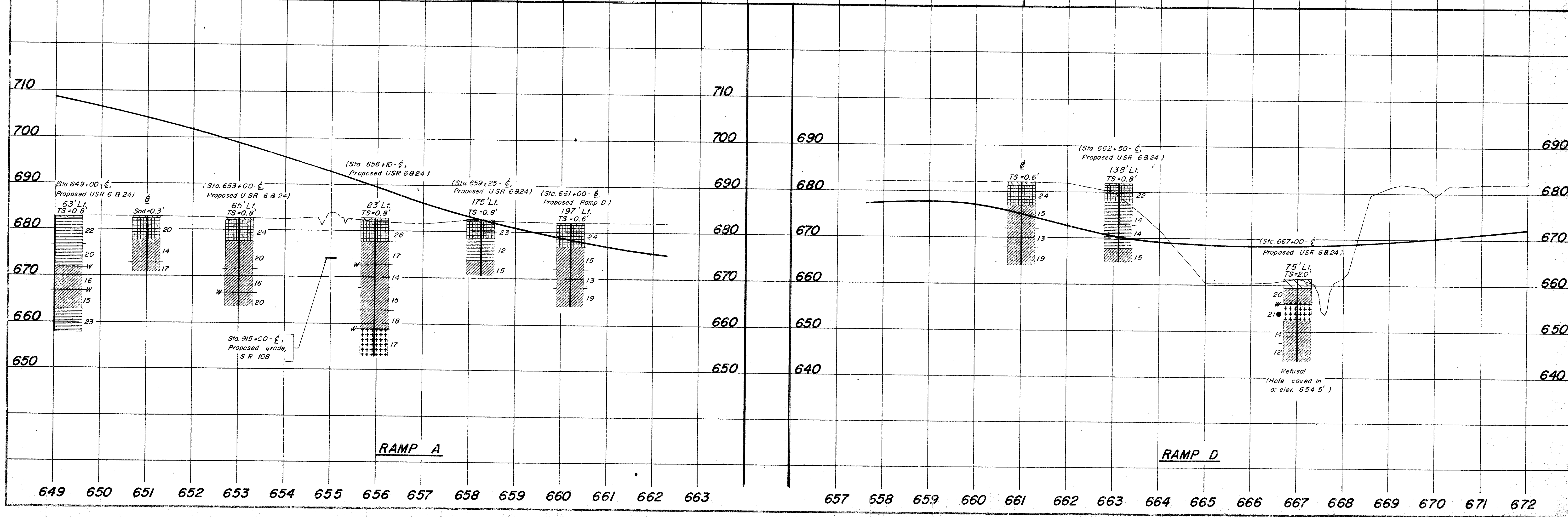
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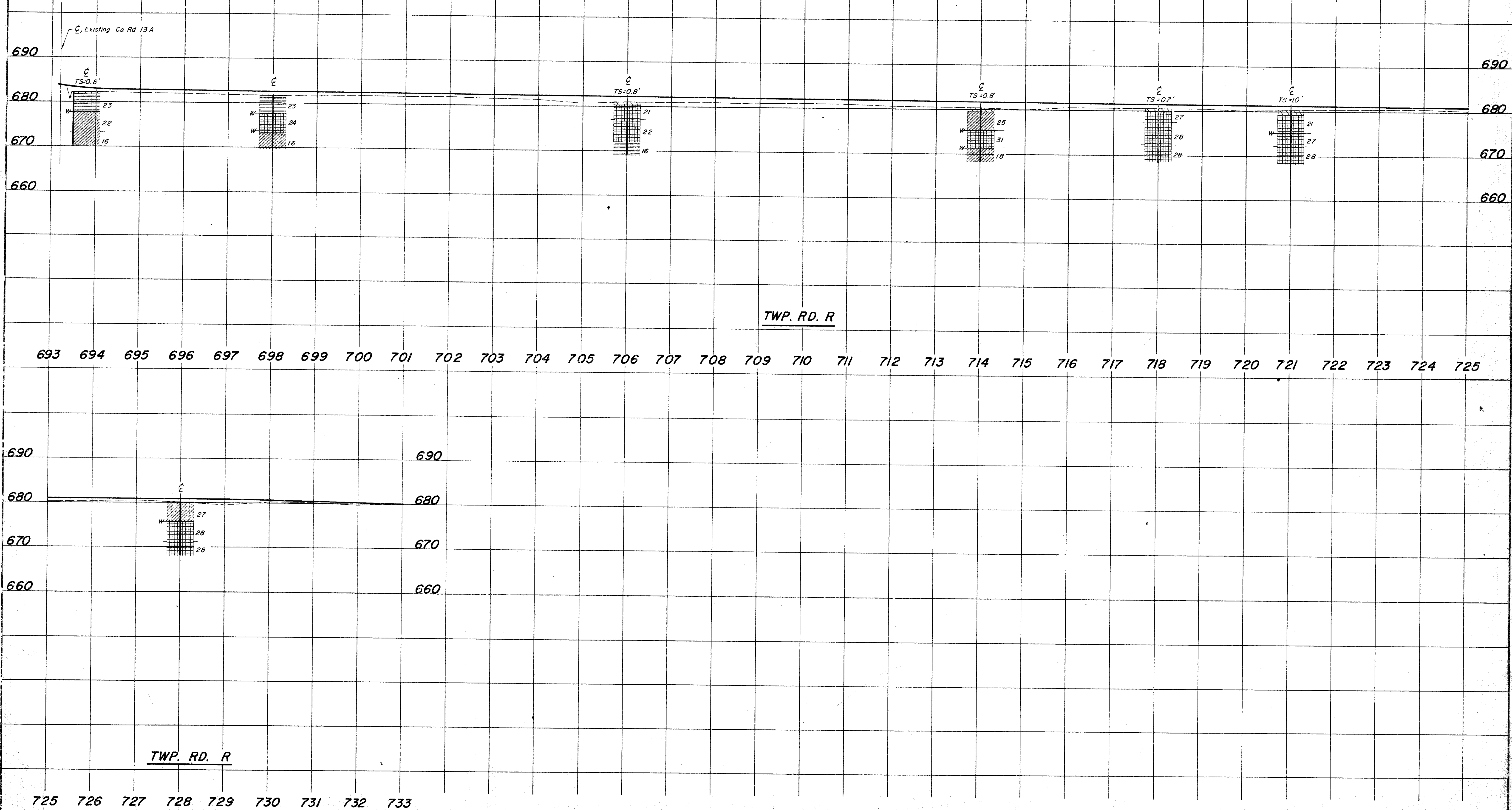
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SR 108 INTERCHANGE



RAMP A-D





GENERAL INFORMATION

INTRODUCTION

The project consists of a portion of Relocated USR 6 and 24 and the USR 6 and 24 interchange, located northeast of Napoleon.

Proposed grades indicate the following:

Relocated USR 6 and 24 fill embankment, 4 to 6 feet high.

Relocated USR 6 (WB) - cut, 0 to 3 feet deep; fill embankment, 0 to 3 feet high.

Relocated USR 6 (EB) - fill embankment, 5 to 9 feet high.

Relocated USR 24 (WB) - fill embankment, 2 to 5 feet high.

Relocated USR 24 (EB) - cut, 0 to 1.5 foot deep; fill embankment 2 to 19 feet high.

Relocated USR 24 - fill embankment, 0 to 2.5 feet high.

GEOLOGY OF THE PROJECT

The alignments traverse a portion of the glaciated dissected Lake Plain, adjacent to the Maumee River. Moderately deep glacial-derived soils overlie shales of the Ohio formation, Devonian age.

EXPLORATION

Exploratory borings were made by means of truck-mounted mechanical soil auger and hand auger (in areas of difficult access), on May 12, 13, and 14, and July 8, 1965.

INVESTIGATIONAL FINDINGS

Borings disclose that materials occurring immediately below proposed grade and in the embankment foundation areas are largely comprised of sandy silts, silt clays, and clays, in the A-4a, A-6, and A-7-6 classifications, generally having moisture contents in the lower portions of the plastic range.

Wet silts were encountered at Relocated USR 24 station 574+00.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS— 70 SAMPLES TESTED

DESCRIPTION	H.R.B. CLASS	OHIO CLASS	% AGG	% SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
Gravel	A-1-a	A-1-a	70	10	10	10	2	NP	NP	1
Coarse and Fine Sand	—	A-3a	3	10	50	10	20	2	22	11
Sandy Silt	A-4(6)	A-4a	0	6	22	34	25	0	12	10
Silt	A-4(6)	A-4a	0	1	5	71	20	4	21	11
Silt and Clay	A-6(10)	A-6a	10	11	30	20	20	12	17	26
Silty Clay	A-6(12)	A-6a	2	0	10	41	27	10	22	17
Clay	A-7-6(10)	A-7-6	4	2	6	42	46	20	24	16
Various other materials.										

Soil and/or Test: Approximate depth.

Auger boring view.

Drive sample and/or core boring view.

Auger boring plotted to vertical scale only.

NOTE: Figures beside borings indicate water content in percent e.g. 15

Berm Material.

VISUAL CLASSIFICATION

Drive sample and/or core boring plotted to vertical scale only.

Water content nearly equal to or greater than liquid limit.

Indicates a non-plastic material with a high water content.

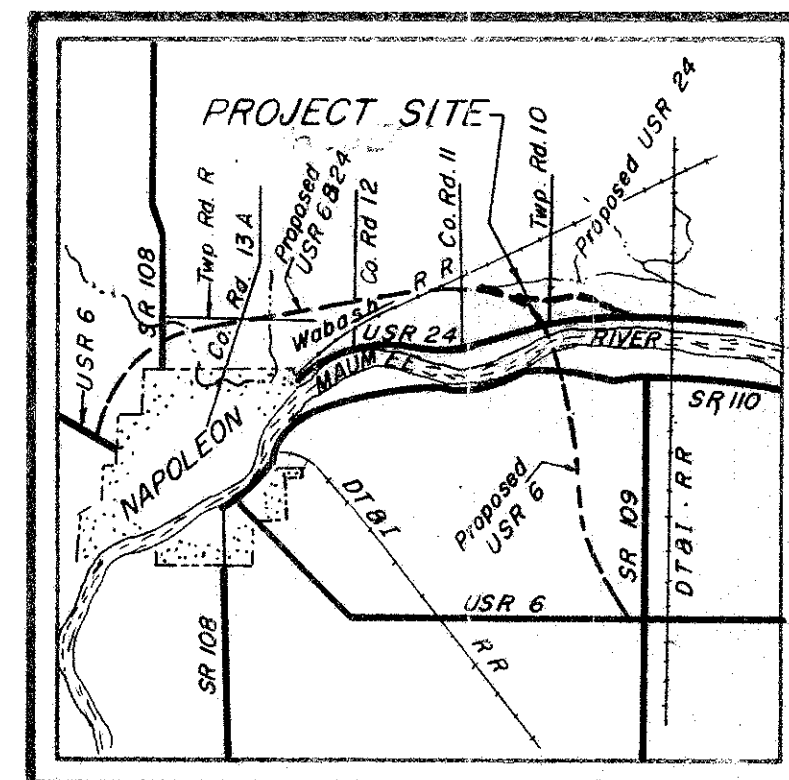
Free Water.

Static Water Level.

Number of blows for "Standard Penetration" test.
X-number of blows for first 6 inches.
Y-number of blows for second 6 inches.

SOIL PROFILE
HENRY COUNTY
HEN-6 & 24(11.73)(9.61)
SUPPLEMENT
OHIO STATE HIGHWAY TESTING LABORATORY
1620 W. BROAD ST. COLUMBUS 23, OHIO

NOTE: INFORMATION SHOWN BY THIS SUBGRADE PROFILE WAS OBTAINED SOLELY FOR USE IN ESTABLISHING DESIGN CONTROLS FOR THE PROJECT. THE STATE OF OHIO DOES NOT GUARANTEE THE ACCURACY OF THIS DATA AND IT IS NOT TO BE CONSTRUED AS A PART OF THE PLANS GOVERNING CONSTRUCTION OF THE PROJECT.



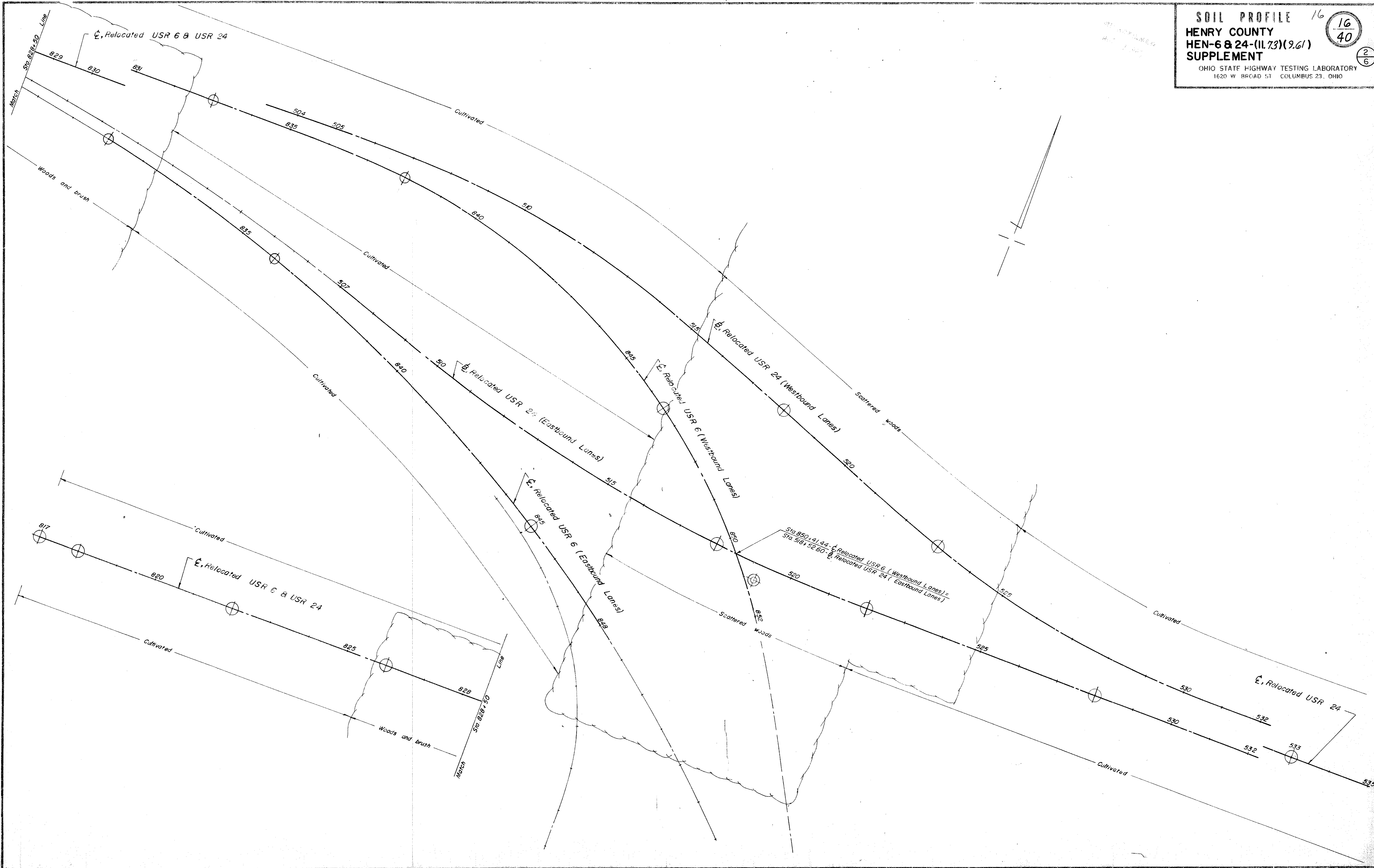
LOCATION MAP

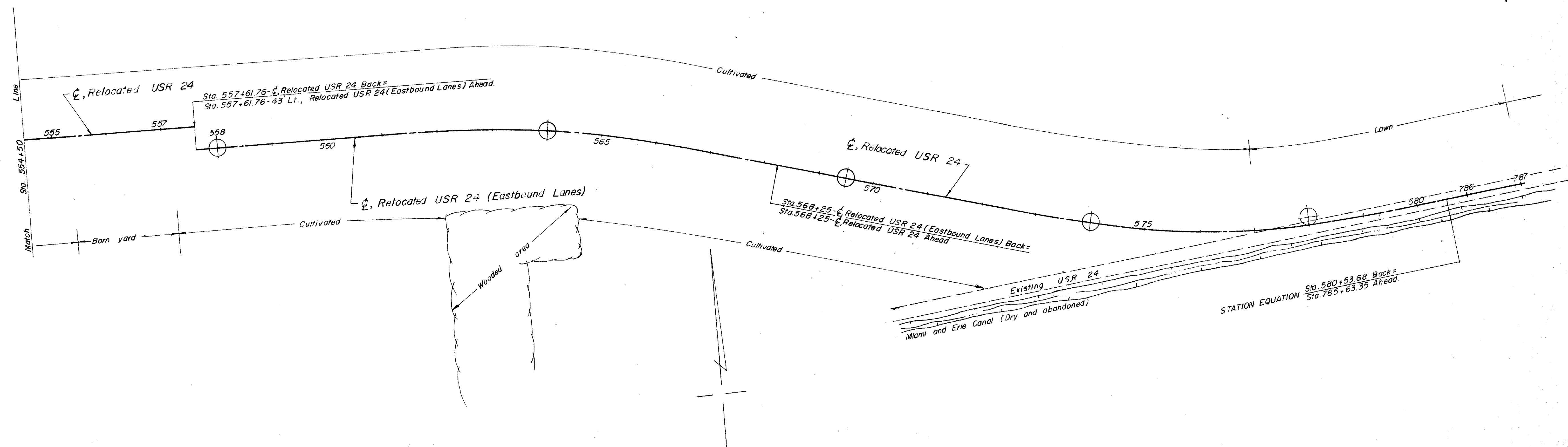
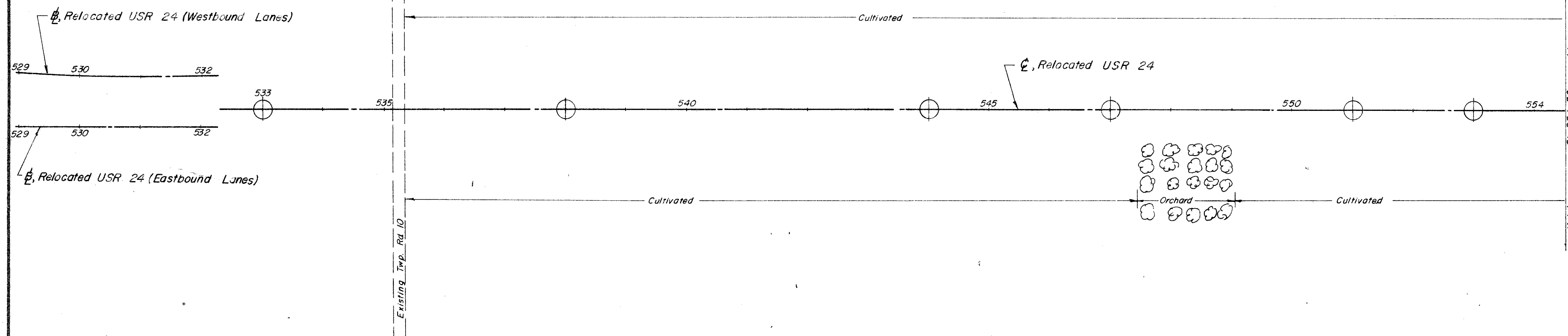
Recon - P.D.B. 2/26/65
Drilling - Auger.
L.M.D. 5/12/65 to 5/14/65
A.J.P. 7/8/65
Drafting - A.F.A.D.B., C.L.I. 8/28/65

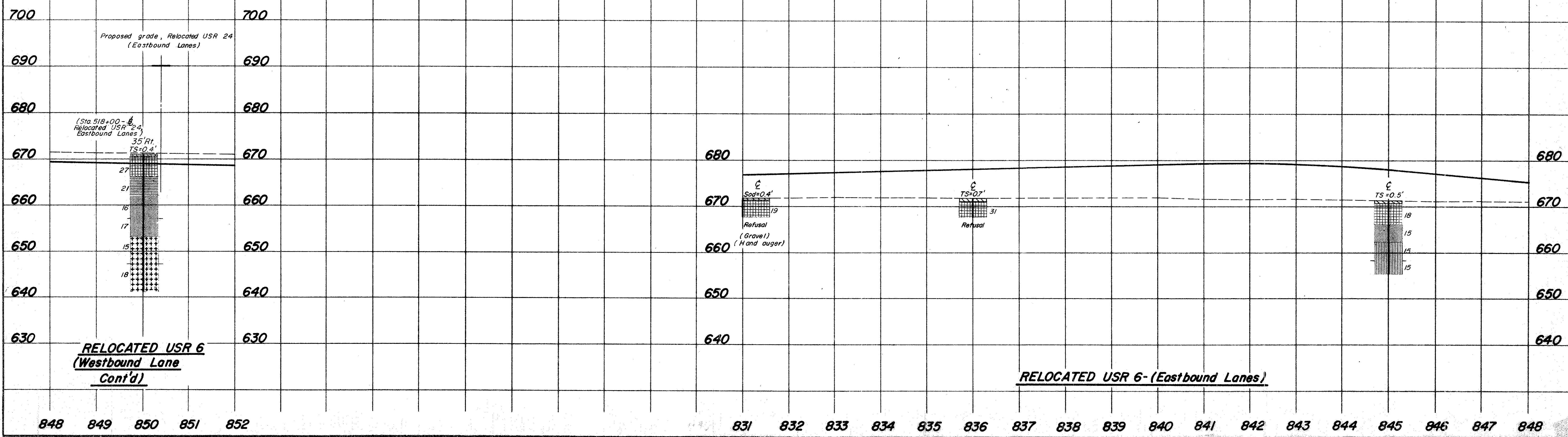
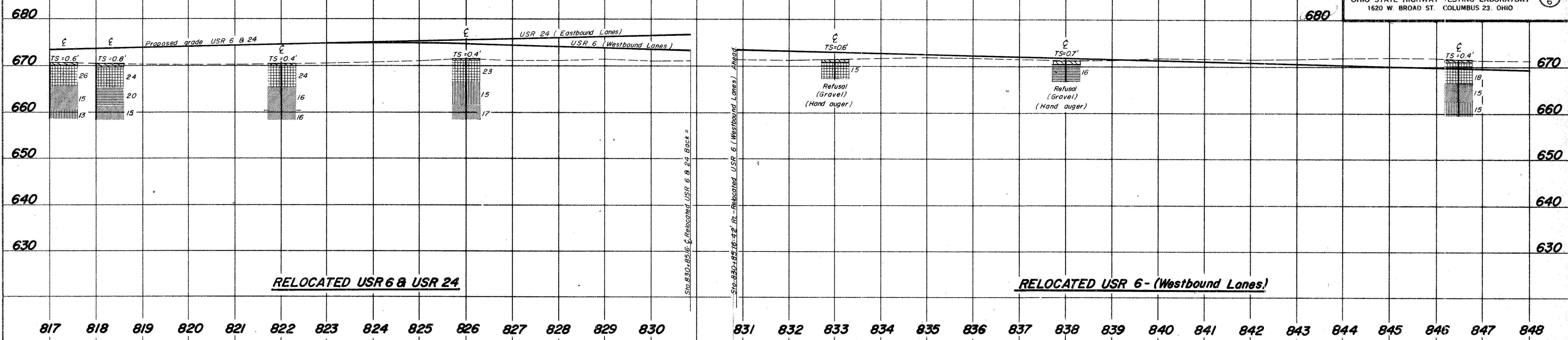
SUMMARY OF SOIL TEST DATA

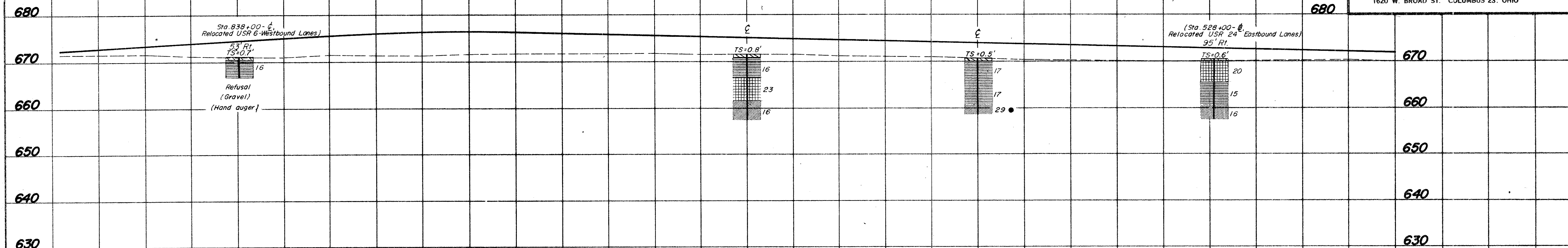
NOTE: NP shown in Liquid Limit and Plasticity Index columns indicates that the material is non-plastic.
* Denotes sample taken at or near grade

STATION & OFFSET	DEPTH FROM - TO	AGG.	C.S.	F.S.	SILT	CLAY	L.L.	P.I.	W.C.	SHTL CLASS
RELOCATED USR 6 & USR 24										
517+00	CL	0.4-5.0	19	1	5	29	47	32	27	A-7-F
		5.0-10.0	11	5	13	35	27	30	11	A-6a
		10.0-12.0	14	5	12	35	23	20	2	A-4a
518+00	CL	0.4-5.0	0	1	6	20	65	53	26	A-7-F
		5.0-9.0	0	4	4	43	47	26	12	A-6a
		9.0-12.0	0	6	14	23	47	27	12	A-6a
522+00	CL	0.4-5.0	12	1	4	15	42	53	22	A-7-F
		5.0-10.0	18	5	11	35	31	22	14	A-6a
		10.0-12.0	11	8	13	36	35	28	11	A-6a
525+00	CL	0.4-5.0	0	1	3	41	55	50	25	A-7-F
		5.0-10.0	5	5	15	30	27	7	15	A-4a
		10.0-12.0	0	3	12	27	40	30	13	A-6a
RELOCATED USR 6 (WESTBOUND LANE)										
523+00	CL	0.4-4.0	0	3	2	29	60	57	31	A-7-F *
528+00	CL	0.4-4.5	11	3	12	35	39	40	20	A-6a *
545+00	CL	0.4-5.0	0	5	11	50	34	43	22	A-7-F *
		5.0-9.0	7	5	14	27	31	14	15	A-6a
		9.0-12.0	20	4	12	35	29	27	9	A-4a
RELOCATED USR 6 (EASTBOUND LANE)										
531+00	CL	0.4-4.0	0	3	13	30	55	42	10	A-7-F
535+00	CL	0.4-5.0	0	3	11	35	51	42	20	A-7-F
545+00	CL	0.4-5.0	0	4	10	40	37	44	25	A-7-F
		5.0-9.0	0	5	13	40	30	24	15	A-6a
		9.0-13.0	10	3	13	42	26	27	9	A-6a
		13.0-15.0	12	5	13	37	23	25	8	A-4a
RELOCATED USR 24 (WESTBOUND LANE)										
518+00	CL	0.4-5.0	0	6	11	43	40	35	18	A-6a
		5.0-10.0	0	2	8	53	37	60	31	A-7-F
		10.0-14.0	2	6	13	39	34	28	13	A-6a
523+00	CL	0.4-5.0	0	5	14	34	38	37	20	A-6a
		5.0-10.0	27	4	10	23	26	34	17	A-6a
		10.0-12.0	12	6	12	35	35	28	12	A-6a
RELOCATED USR 24 (EASTBOUND LANE)										
513+00	3L	0.4-5.0	0	2	8	39	51	58	34	A-7-F
		5.0-9.0	9	5	7	39	40	39	19	A-6a
		9.0-14.0	5	5	13	39	38	29	12	A-6a
		14.0-18.0	14	5	11	37	33	27	11	A-6a
		18.0-24.0	0	2	6	77	15	NP	NP	A-4a
		24.0-30.0	0	1	3	82	14	NP	NP	A-4a
522+00	3L	0.4-5.0	22	4	9	36	29	38	19	A-6a
		5.0-10.0	16	4	10	37	33	35	14	A-6a
		10.0-15.0	19	5	11	36	29	28	11	A-6a
		15.0-20.0	9	6	11	41	33	30	12	A-6a
528+00	3L	0.4-5.0	21	1	5	37	36	50	29	A-7-F
		5.0-10.0	21	5	9	35	30	34	17	A-6a
		10.0-12.0	28	5	7	29	31	30	14	A-6a
RELOCATED USR 24										
533+00	CL	0.4-5.0	4	1	2	66	27	55	30	A-7-F *
		5.0-10.0	11	6	11	35	37	35	17	A-6a
		10.0-12.0	11	6	11	35	37	25	11	A-6a
538+00	CL	0.4-5.0	0	1	13	53	33	39	20	A-6a *
		5.0-9.0	3	3	13	46	35	35	18	A-6a
		9.0-11.0	13	6	11	27	43	27	11	A-6a
544+00	CL	0.4-6.0	0	1	2	59	38	37	18	A-6a *
		6.0-9.0	0	3	10	44	38	20	24	A-6a
		9.0-11.0	11	4	12	39	34	30	11	A-6a
547+00	CL	0.4-4.0	0	1	6	52	41	43	23	A-7-F *
		4.0-7.0	0	0	3	66	31	39	18	A-6a
		7.0-8.0	14	34	30	15	7	17	3	A-3a
		8.0-12.0	9	6	13	43	29	27	11	A-6a
551+00	CL	0.4-4.0	0	7	47	30	16	30	16	A-6a *
		4.0-7.0	0	1	3	55	41	42	19	A-7-F
		7.0-10.0	0	3	22	45	30	36	17	A-6a
		10.0-12.0	8	7	13	38	34	26	9	A-4a
553+00	CL	0.4-4.0	0	3	70	12	15	22	3	A-3a *
		4.0-7.5	0	1	1	49	49	34	14	A-6a
		7.5-10.0	0	1	77	10	12	NP	NP	A-3a
		10.0-13.0	10	6	11	34	39	27	11	A-6a
RELOCATED USR 24 (EASTBOUND LANE)										
558+00	CL	0.4-4.0	0	0	2	39	59	44	22	A-7-F
		4.0-8.0	0	0	0	38	54	37	18	A-6a
		8.0-10.0	56	19	10	13	2	NP	NP	A-1-a
		10.0-12.0	7	7	10	42	31	26	11	A-6a
564+00	CL	0.4-3.0	0	2	45	28	25	25	3	A-4a
		3.0-7.0	0	1	6	48	45	32	13	A-6a
		7.0-10.0	16	13	26	20	19	22	6	A-6a
		10.0-12.0	7	5	12	42	34	28	13	A-6a
RELOCATED USR 24										
569+00	CL	0.4-3.0	0	5	55	25	15	23	4	A-4a
		3.0-7.0	0	1	12	54	33	31	12	A-6a
		7.0-12.0	10	6	14	35	35	30	13	A-6a
574+00	CL	0.4-3.0	0	12	58	26	4	NP	NP	A-3a *
		3.0-8.0	0	1	4	65	30	27	6	A-4a
		8.0-10.0	0	2	6	60	32	28	9	A-4a
		10.0-12.0	7	6	12	36	39	26	8	A-4a
578+00	CL	0.4-6.0	0	1	1	34	64	51	28	A-7-F
		6.0-11.0	6	1	4	24	71	39	17	A-6a
		11.0-15.0	6	6	10	35	40	28	11	A-6a
DRIVE SAMPLE SOIL TEST DATA										
RELOCATED USR 24 (EASTBOUND LANE)										
519+30	CL	5.0-6.0	0	5	13	17	65	35	14	A-6a
		6.0-7.5	22	4	7	25	42	34	12	A-6a
		7.5-9.0	0	0	13	30	51	32	8	A-4a
		9.0-10.5	11	0	12	28	43	28	8	A-4a
		10.5-12.0	0	0	14	32	46	28	10	A-4a
		12.0-13.5	0	6	5	41	40	28	9	A-4a
		13.5-15.0	0	6	12	31	51	28	10	A-4a
		15.0-16.5	0	4	9	36	51	28	8	A-4a
		16.5-18.0	0	4	9	23	64	33	15	A-6a
		18.0-19.5	0	0	1	81	18	NP	NP	A-4a
		19.5-21.0	0	0	16	31	45	27	6	A-4a
		21.0-22.5	0	9	27	21	23	18	5	A-4a
		22.5-24.0	13	7	22	30	28	18	3	A-4a
		25.0-26.0	Gray Gravelly Sandy Silt							Visual



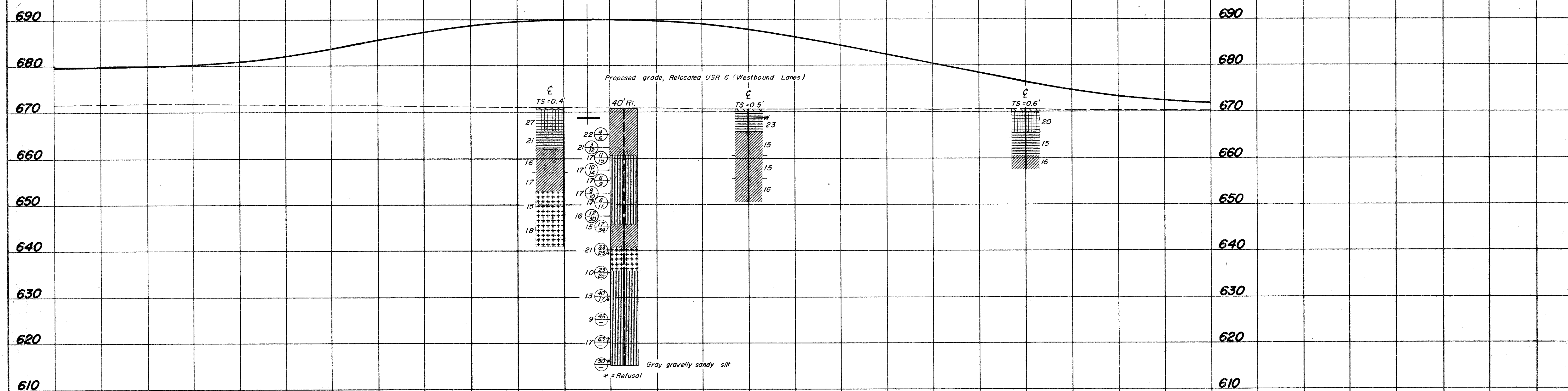






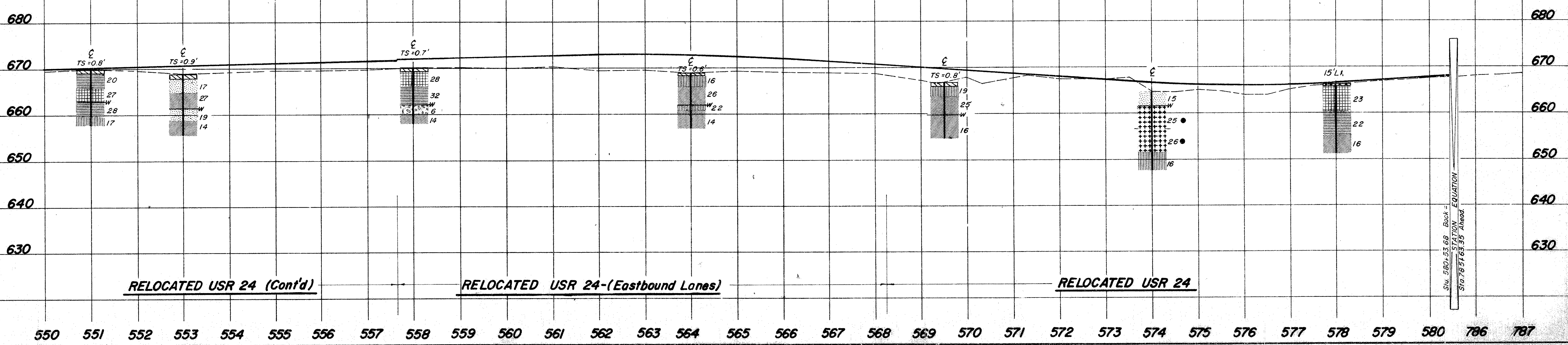
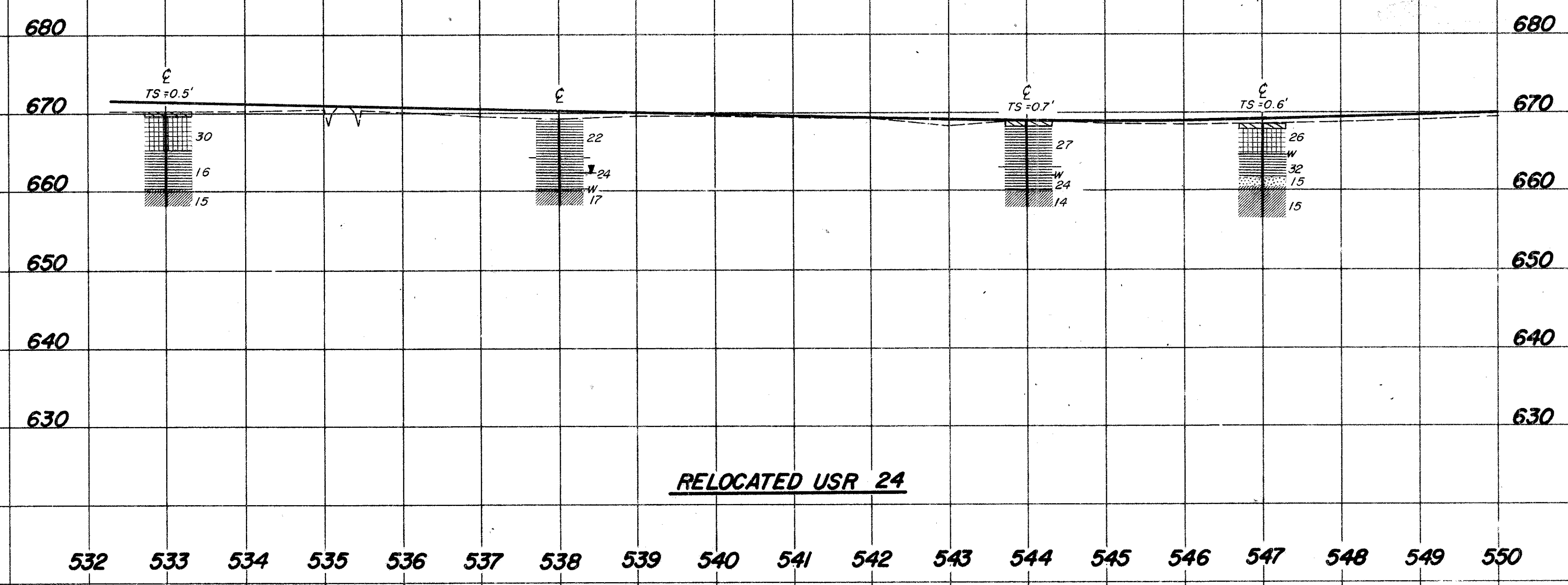
RELOCATED USR-24 (Westbound Lanes)

503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532



RELOCATED USR-24 (Eastbound Lanes)

507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532



GENERAL INFORMATION

Drive Rod Penetration Sounding Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface condition may be evaluated.

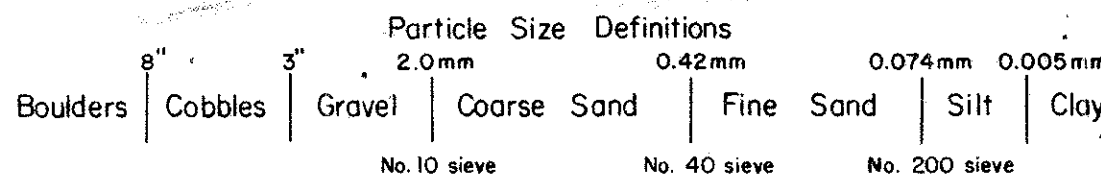
Drive Sample Borings - Drive - Press Sample Borings

Drive sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and/or 5-foot depth intervals, driven by means of a 140-pound drop-hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The boring log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depth of press samples, field sample number, sample description - based on laboratory tests and the Casagrande AC classification system - and gradation, plasticity, and moisture content determinations. Results of strength and consolidation testing appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.



LEGEND

- Auger Boring Location - Plan View.
- Press and/or Drive Sample and/or Core Boring Location - Plan View.
- Drive Rod Penetration Resistance Sounding Location - Plan View.
- Capped Pile
- Footing
- Footing on Pile
- TR Top of Rock

- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- Figures Beside the Boring Log in Profile Indicate the Number of Blows For Standard Penetration Test.
X = Number of Blows for First 6 Inches.
Y = Number of Blows for Second 6 Inches.
- Drive Rod Penetration Resistance Sounding Log - Profile.
- Casing
- Resistance "R" < 10,000 lbs.
- Resistance "R" > 10,000 lbs.
- Indicates Final Measurement of Penetration, in Inches.
- Indicates Free Water Elevation.
- Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

- Coal
- Weathered Indurated Clay
- Indurated Clay
- Weathered Shale
- Shale

- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

GEOLOGY OF THE SITE

The structure site is located on the relatively flat Lake Plain Region, where moderately deep glacial-derived soils overlie shale bedrock, of Devonian age.

EXPLORATION

The exploration consisted of two drive sample-core borings, made between August 6 and 13, 1964, and twelve drive rod penetration tests, made between July 7 and 20, 1964.

INVESTIGATIONAL FINDINGS

The borings disclosed that relatively flat-lying bedrock surface, encountered at 36 and 43-foot depths, elevation 640 feet, is overlain by dense and extremely dense, stiff, moist, silts and clays. Borings were terminated 12 and 13 feet below bedrock surface, elevation 626 feet.

Rod soundings met gradual increase in penetration resistance with increase in depth and were terminated upon encounter with refusal to penetration at 11 and 30-foot depths, elevations 671 and 650 feet, considered to be in very dense sandy silt or stiff clay, as revealed by the borings.

No free water was observed in any of the rod sounding holes.

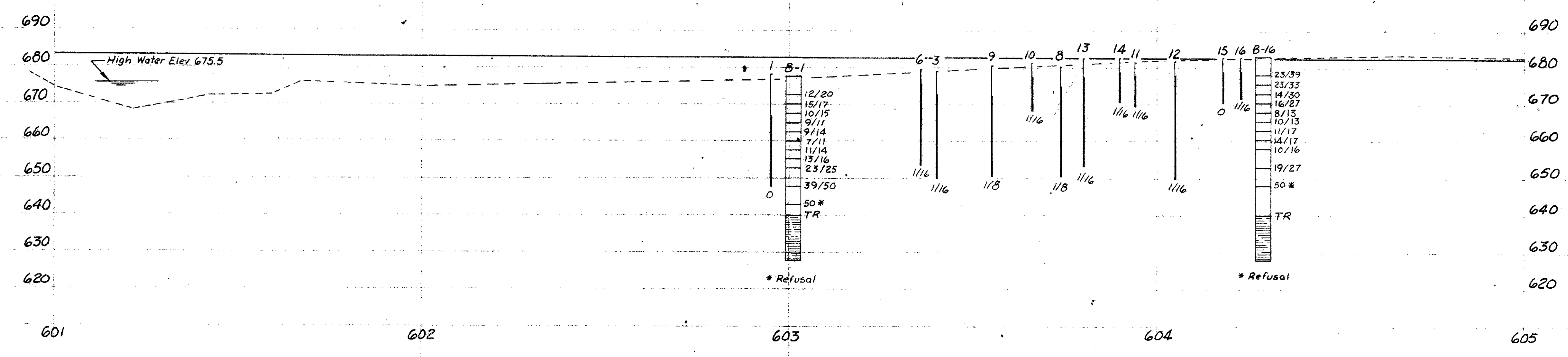
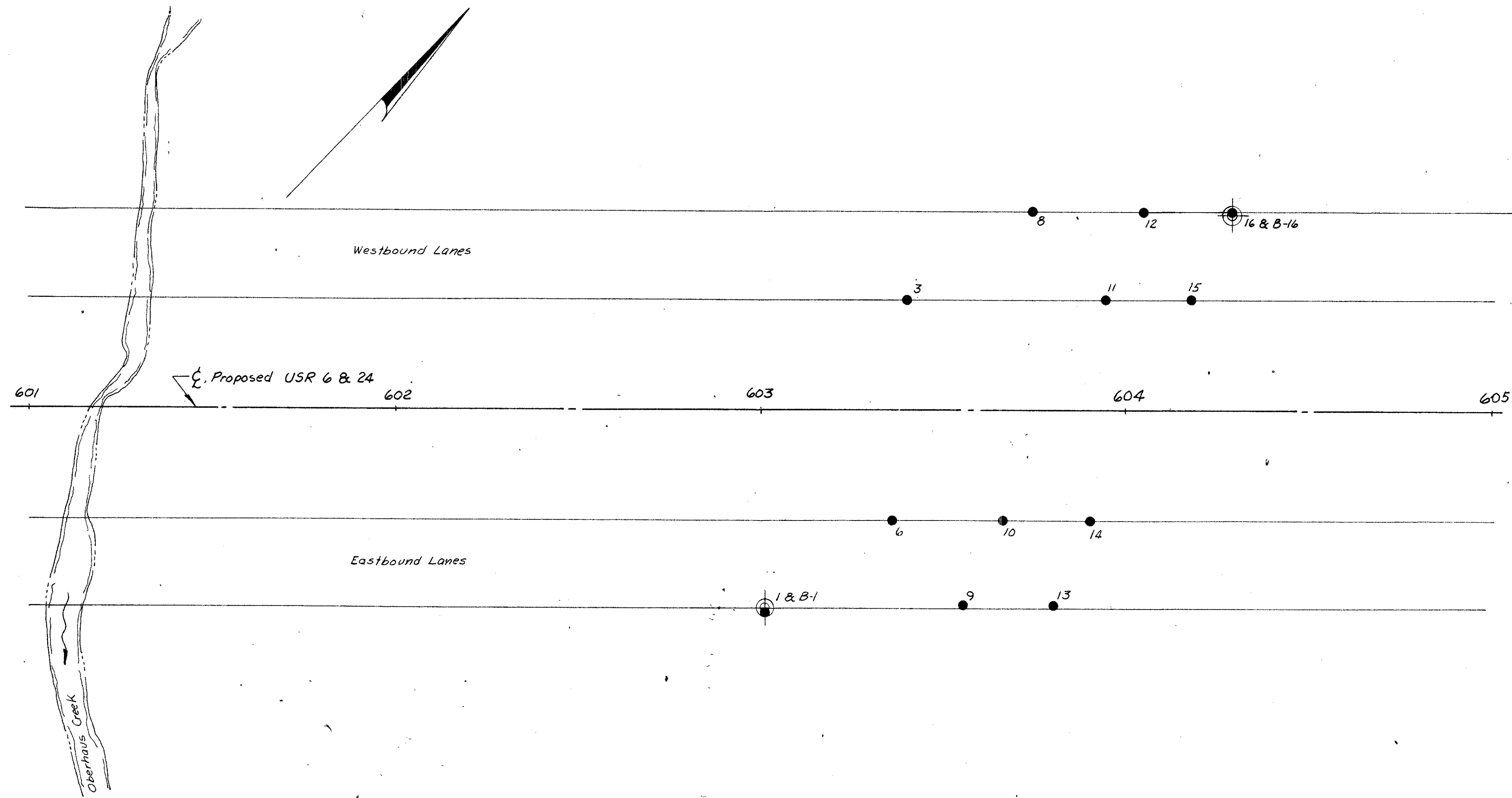
NOTE: Information shown by this subsurface investigation was obtained solely for the use in establishing design controls for the project. The State of Ohio does not guarantee the accuracy of this data and it is not to be construed as a part of the plans governing construction of the project.

OHIO STATE HIGHWAY
TESTING LABORATORY

1620 WEST BROAD STREET, COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6 & 24-11.73 L/R
OVER OBERHAUS CREEK
SEC. HEN-6 & 24-(11.73)(961)

CHECKED BY: R.H.P. REVIEWED BY: R.D.R. DATE: 10/20/64



OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD ST., COLUMBUS 23, OHIO			
STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO. HEN-6 & 24-1179 L/R OVER OBERHAUS CREEK SEC. HEN-6 & 24-(11.73)(9.61)			
PLAN AND PROFILE			
DRAWN BY R.L.C.	CHECKED BY R.H.P.	REVIEWED BY R.D.R.	DATE 10/20/64

SCALE: 1"=20'

LOG OF BORING															
Date Started <u>8-13-64</u>		Sampler Type <u>SS</u>		Dia. <u>1 3/8"</u>		Water Elev. _____									
Date Completed <u>8-13-64</u>		Casing Length <u>50'</u>		Dia. <u>3 1/2"</u>											
Boring No. <u>2-2</u>		Station & Offset <u>603+03, 34' 10" (MEAN ADJUSTMENT)</u>		Surface Elev. <u>677.6'</u>											
Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	Physical Characteristics							SHTL Class.	
							% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PI	W.C.	
677.6	0														
	2														
	4														
678.6	6	12/20			Mottled Brown and Gray Sandy Gravelly Clay	1	21	4	11	35	29	35	17	15	
679.1	8	15/17			Brown and Gray Sandy Gravel	2	27	6	11	18	38	32	9	29	
681.6	10	18/15			Gray Gravelly Silt	3	38	4	5	23	28	26	9	17	
683.1	12				Gray Sandy Clay	4	0	8	16	33	43	29	11	39	
685.6	14	9/11			Gray Silt and Clay	5	0	5	10	36	49	34	14	19	
688.1	16	9/14			Gray Silt and Clay	6	0	4	9	38	57	33	14	22	
689.6	18	7/11			Gray Silt and Clay	7	0	4	10	34	52	36	15	17	
691.1	20	11/14			Gray Silt and Clay	8	23	5	9	26	37	29	11	17	
692.6	22														
693.1	24	13/16			Gray Gravelly Clay	9	0	5	29	37	29	18	4	19	
694.6	26	23/25			Gray Sandy Silt										
697.6	28														
699.1	30	39/50			Gray Sandy Silt	10	0	9	14	42	35	25	9	10	
700.6	32														
702.1	34														
703.6	36	50/+			Gray Silty Sand and Shale Fragments	11	45	8	13	22	11	MP	MP	9	
704.1	38				TOP OF ROCK										
	40		2.0	0.0											
	42														
	44		5.0	0.0	Shale, dark-gray, slightly carbonaceous throughout, non-fissile, firm, jointed. Core loss 1 1/2'.										
	46														
	48		4.9	0.1											
697.6	50				BOTTOM OF BORING										
CONTINUED															

LOG OF BORING															
Date Started		8-5-64		Sampler Type		SS		Dia.		1 3/8"		Water Elev.			
Date Completed		8-13-64		Casing Length		40'		Dia.		3 1/2"					
Boring No.		2-16		Station & Offset		604+29, 33' 16" (FURNACE AVERAGE)		Surface Elev.		683.1'					
Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PI	W.C.	SHTL Class
683.1	0														
	2														
	4														
678.1	6	23/39			Brown Sandy Silt	1	0	7	13	37	43	29	10	14	
675.6	8	23/33			Brown and Gray Sandy Silt	2	0	7	14	30	49	30	10	14	
673.1	10	14/30			Gray and Brown Gravelly Silt	3	0	6	14	37	43	29	9	15	
670.6	12														
	14	16/27			Gray and Brown Sandy Clay	4	0	18	12	38	32	28	12	19	
668.1	16	8/13			Gray Sandy Clay	5	0	7	13	36	44	27	11	15	
669.6	18	10/13			Gray Sandy Gravelly Silt	6	29	11	9	22	29	25	9	12	
663.1	20	11/17			Gray Silt and Clay	7	0	6	7	46	41	27	11	17	
660.6	22														
	24	14/17			Gray Sandy Clay	8	0	11	15	28	46	30	13	19	
658.1	26	10/16			Gray Silt and Clay	9	0	5	10	32	53	31	12	20	
	28														
653.1	30	19/27			Gray Clayey Silt	10	0	7	12	46	35	25	8	17	
	32														
	34														
648.1	36	50/+			Gray Sandy Silt	11	0	8	17	39	36	24	9	11	
	38														
643.1	40				No Sample Recovered - Harder than till (clay silt with stone fragments). Core loss 5 1/2'.										
640.1	42														
	44		3.4	1.6	TOP OF ROCK										
	46														
	48		5.0	0.0	Shale, dark gray, slightly carbonaceous throughout; non-fissile, firm, slightly jointed, broken in top 2.0'. No core loss.										
	50														
	52														
	54		5.0	0.0	BOTTOM OF BORING										
638.1															

Test Location No. _____ Station & Offset _____ Surface Elev. _____ Water Elev. _____	Test Location No. _____ Station & Offset _____ Surface Elev. _____ Water Elev. _____	Test Location No. <u>1</u> Station & Offset <u>603+01.55 RT</u> Surface Elev. <u>678.1</u> Water Elev. _____	Test Location No. <u>3</u> Station & Offset <u>603+40.30 LT</u> Surface Elev. <u>679.0</u> Water Elev. _____	Test Location No. <u>6</u> Station & Offset <u>603+36.30 RT</u> Surface Elev. <u>679.4</u> Water Elev. _____	Test Location No. <u>8</u> Station & Offset <u>603+74.54 LT</u> Surface Elev. <u>680.3</u> Water Elev. _____	Test Location No. <u>9</u> Station & Offset <u>603+55.53 RT</u> Surface Elev. <u>680.7</u> Water Elev. _____	Test Location No. <u>10</u> Station & Offset <u>603+66.30 RT</u> Surface Elev. <u>681.3</u> Water Elev. _____
Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition _____	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition _____	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition _____
685 681 677 673 669 665 661 657 653 649 645		681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD
Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds

Test Location No. _____ Station & Offset _____ Surface Elev. _____ Water Elev. _____	Test Location No. _____ Station & Offset _____ Surface Elev. _____ Water Elev. _____	Test Location No. <u>11</u> Station & Offset <u>603+94.30 LT</u> Surface Elev. <u>681.7</u> Water Elev. _____	Test Location No. <u>12</u> Station & Offset <u>604+05.54 LT</u> Surface Elev. <u>681.9</u> Water Elev. _____	Test Location No. <u>13</u> Station & Offset <u>603+80.53 RT</u> Surface Elev. <u>682.6</u> Water Elev. _____	Test Location No. <u>14</u> Station & Offset <u>603+90.30 RT</u> Surface Elev. <u>682.7</u> Water Elev. _____	Test Location No. <u>15</u> Station & Offset <u>604+18.30 LT</u> Surface Elev. <u>682.7</u> Water Elev. _____	Test Location No. <u>16</u> Station & Offset <u>604+29.54 LT</u> Surface Elev. <u>682.8</u> Water Elev. _____
Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition _____	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition _____	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>	Piling _____ Hammer _____ Formula _____ Reference _____ Rod Condition <u>GOOD</u>
685 681 677 673 669 665 661 657 653 649 645		681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD	681 677 673 669 665 661 657 653 649 645 TEST ROD
Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds	Capacity "R" in Thousands of Pounds

24
40
4

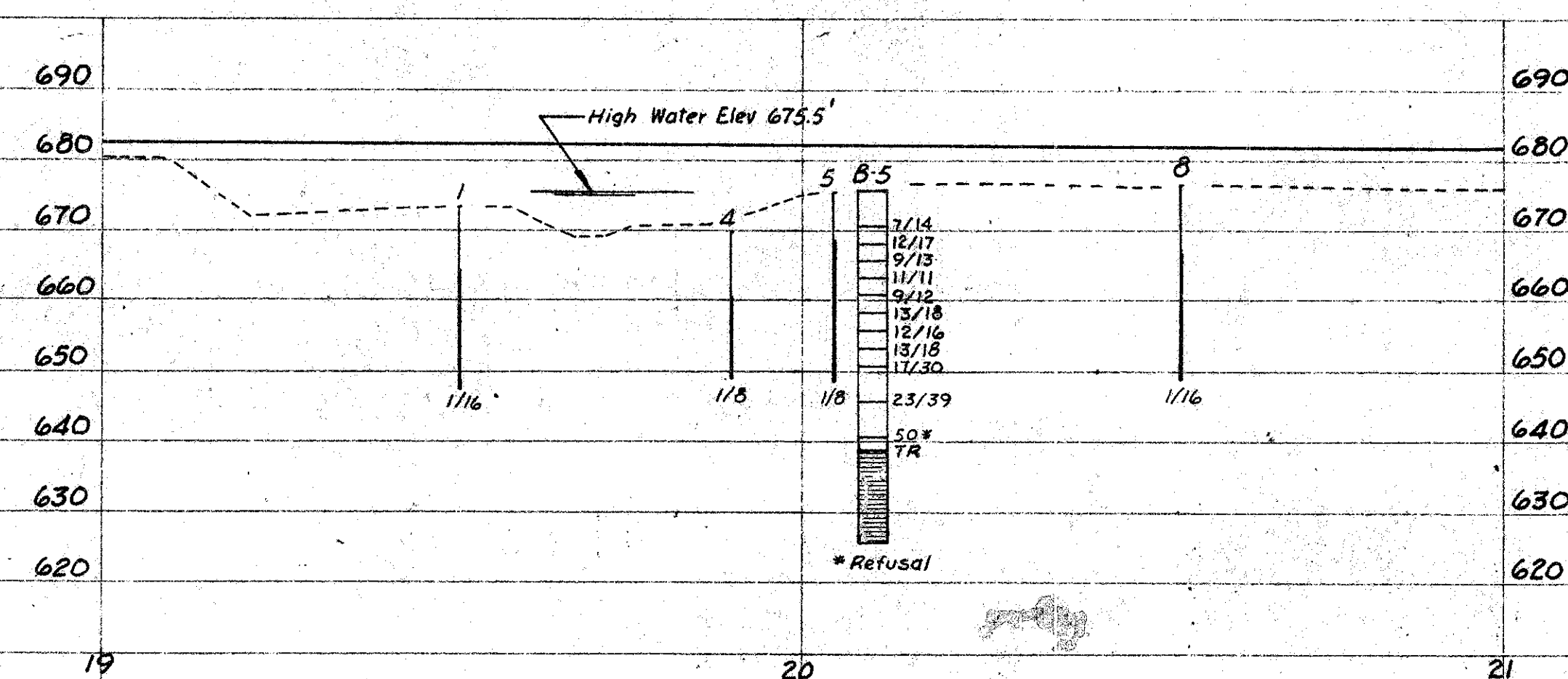
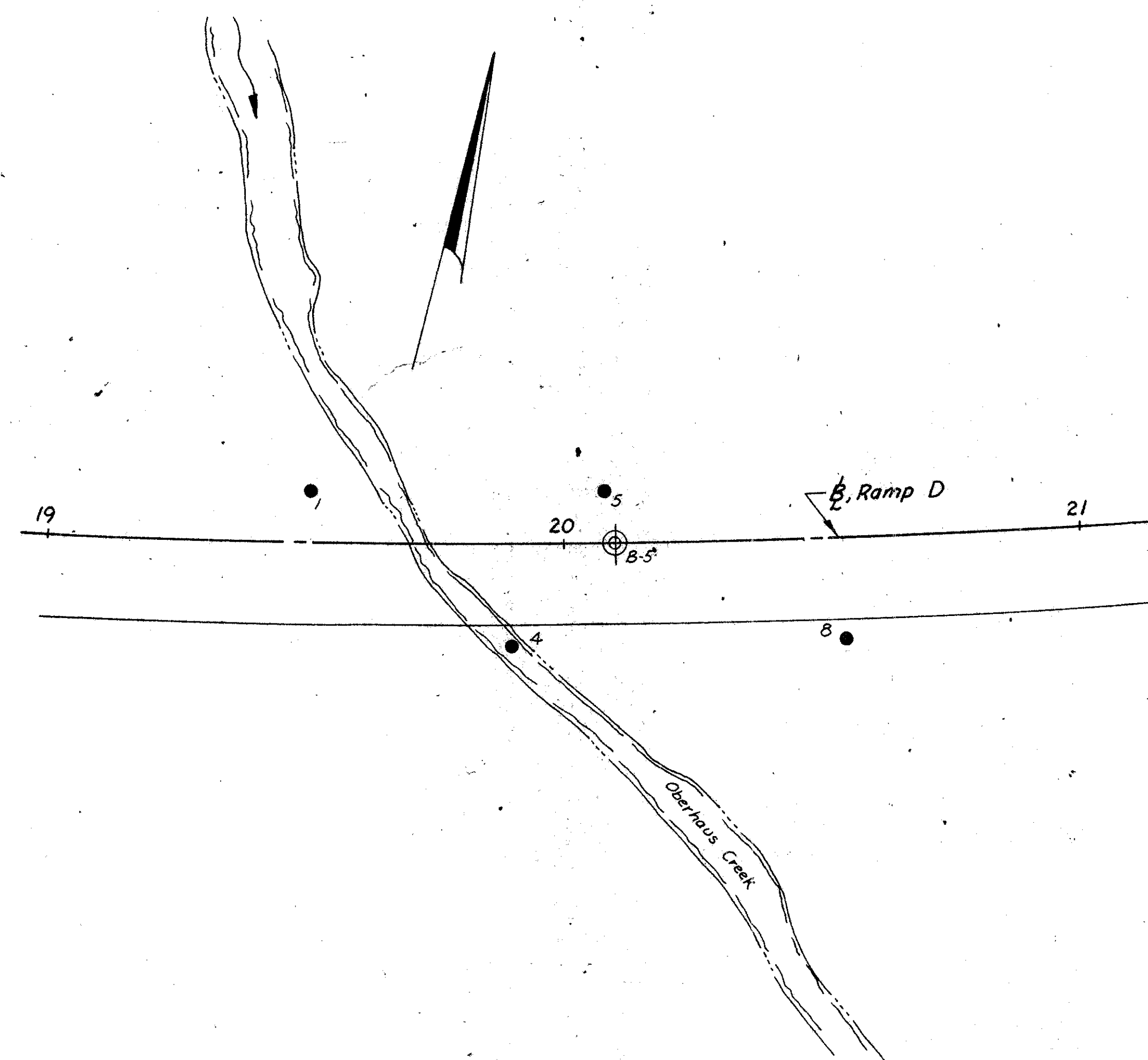
OHIO STATE HIGHWAY TESTING LABORATORY
1620 WEST BROAD ST. COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6 & 24-11.79 L/R
OVER OBERHAUS CREEK
SEC. HEN-6 & 24-11.73(961)

DRIVE ROD PENETRATION RESISTANCE DATA

PLOTTED BY R.C.	CHECKED BY R.H.P.	REVIEWED BY R.D.R.	DATE 10/20/64
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CHECKED BY RHP	REVIEWED BY RDR	DATE 10/20/64
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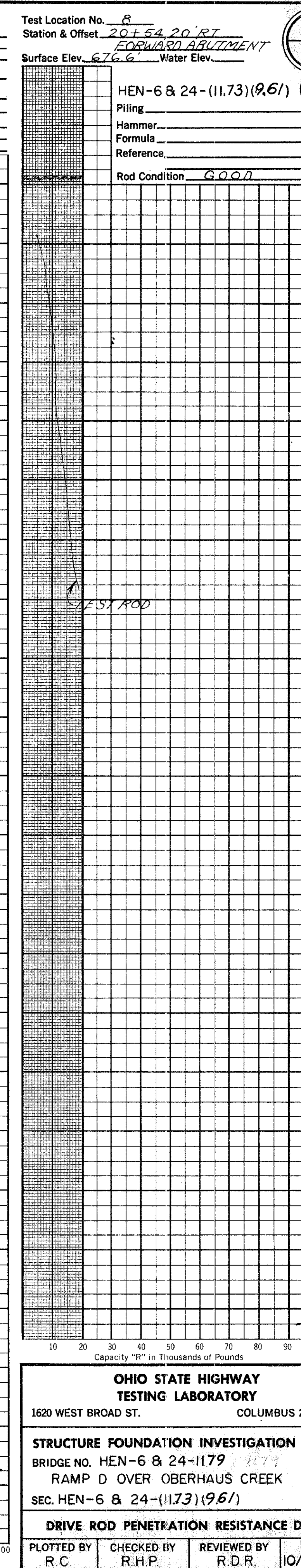
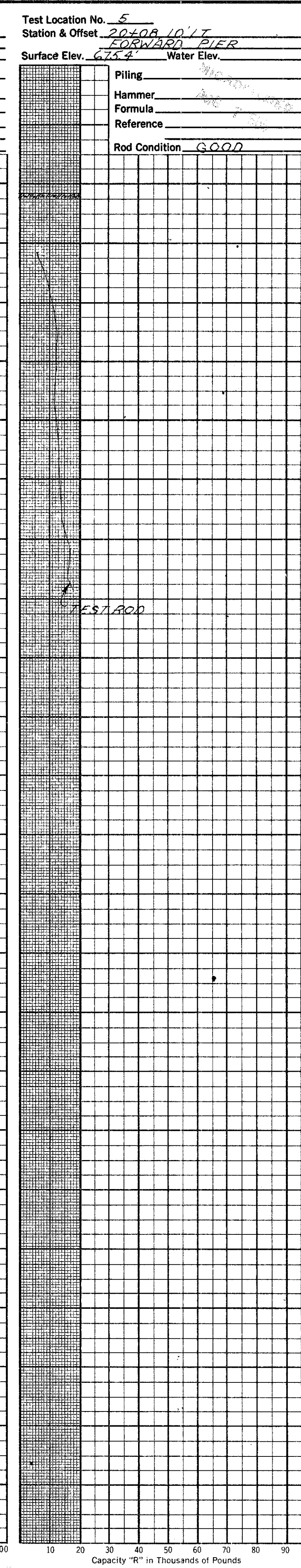
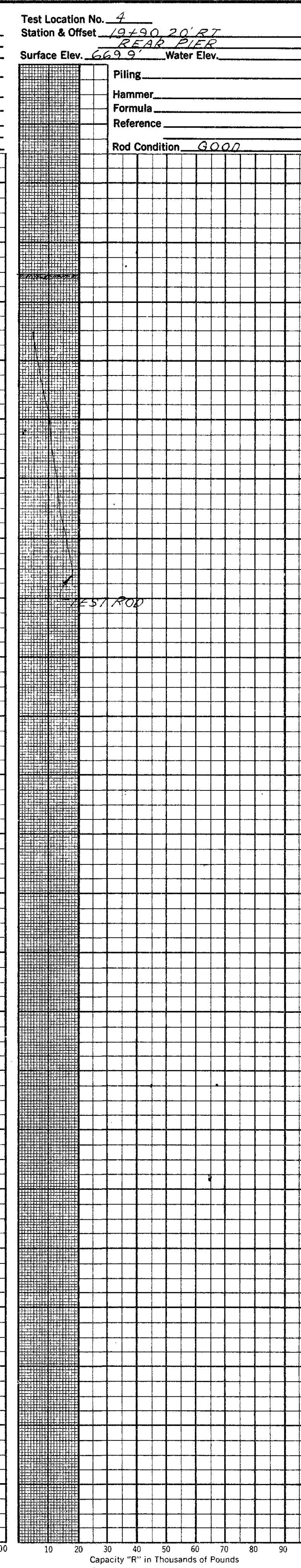
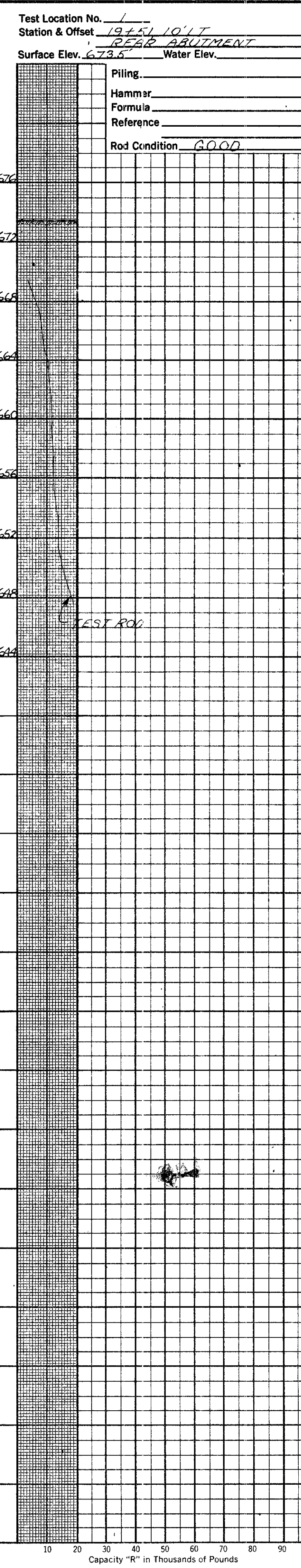
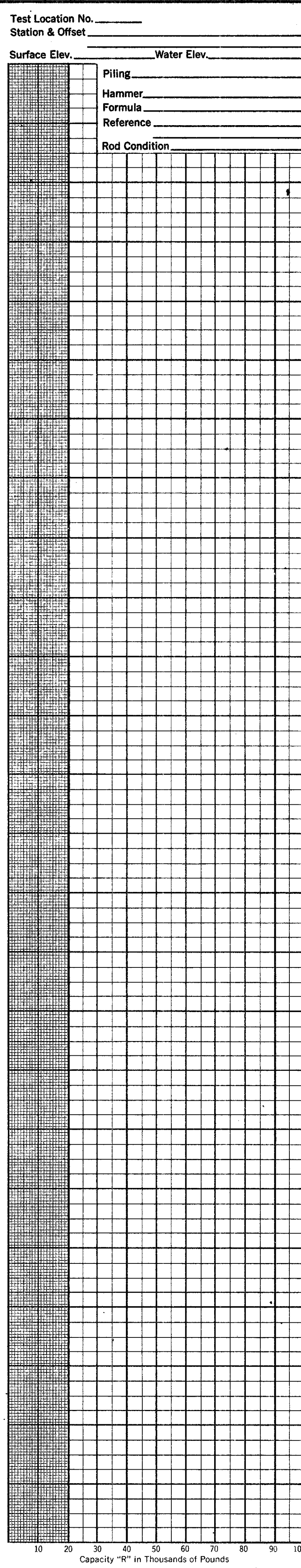
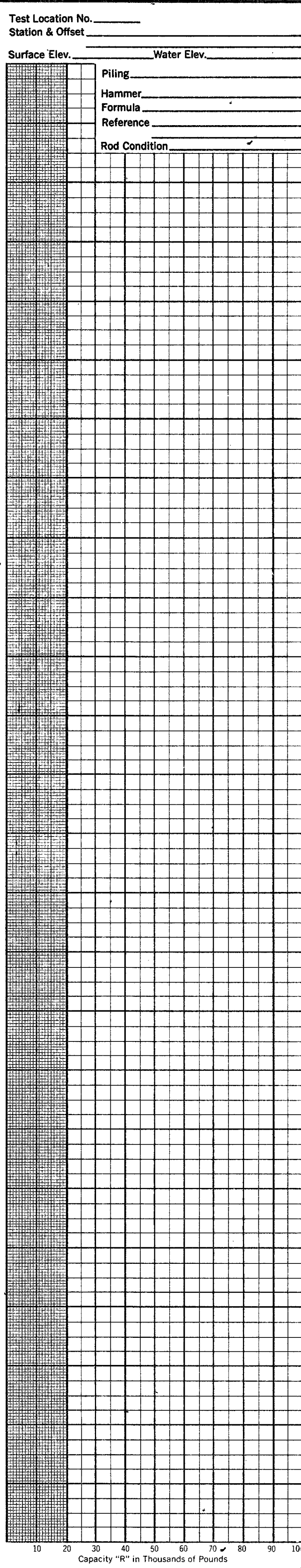
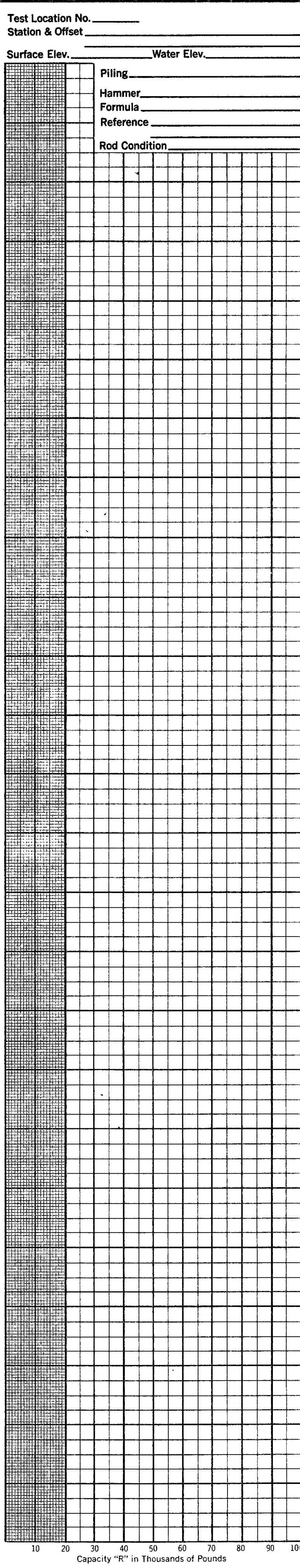
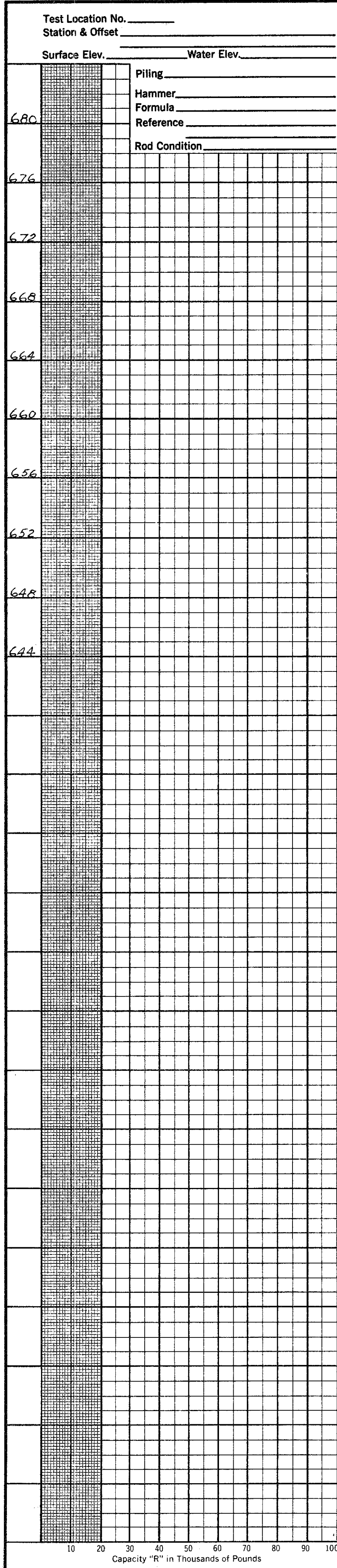
OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST., COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6 & 24-1179 — 1179
RAMP D OVER OBERHAUS CREEK
SEC. HEN-6 & 24-(1173)(961)

PLAN AND PROFILE

DRAWN BY R.L.C.	CHECKED BY R.H.P.	REVIEWED BY R.D.R.	DATE 10/20/64
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SCALE: 1" = 20'



27
40
3
3

OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST. COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6 & 24-1179
RAMP D OVER OBERHAUS CREEK
SEC. HEN-6 & 24-(1173)(961)

DRIVE ROD PENETRATION RESISTANCE DATA

PLOTTED BY R.C.	CHECKED BY R.H.P.	REVIEWED BY R.D.R.	DATE 10/20/64
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GENERAL INFORMATION

Drive Rod Penetration Sounding Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity R , in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value R against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface condition may be evaluated.

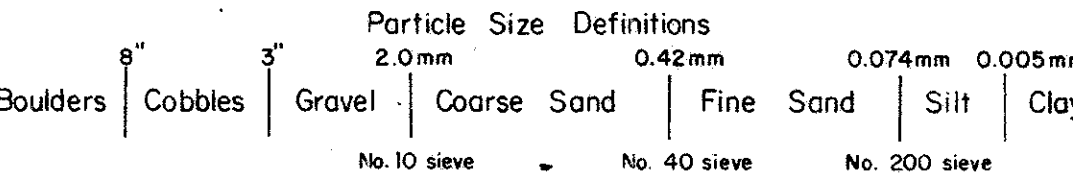
Drive Sample Borings - Drive - Press Sample Borings

Drive sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and/or 5-foot depth intervals, driven by means of a 140-pound drop-hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The boring log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depth of press samples, field sample number, sample description - based on laboratory tests and the Casagrande AC classification system - and gradation, plasticity, and moisture content determinations. Results of strength and consolidation testing appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.



LEGEND

- Auger Boring Location - Plan View.
- Press and/or Drive Sample and/or Core Boring Location - Plan View.
- Drive Rod Penetration Resistance Sounding Location - Plan View.
- Capped Pile
- Footing
- Footing on Pile
- Top of Rock

- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- Figures Beside the Boring Log in Profile Indicate the Number of Blows For Standard Penetration Test.
 X = Number of Blows for First 6 Inches.
 Y = Number of Blows for Second 6 Inches.
- Drive Rod Penetration Resistance Sounding Log - Profile.
- Casing
- Resistance " R " < 10,000 lbs.
- Resistance " R " > 10,000 lbs.
- Indicates Final Measurement of Penetration, in Inches.
- Indicates Free Water Elevation.
- Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

- Coal
- Weathered Indurated Clay
- Indurated Clay
- Weathered Shale
- Shale
- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

GEOLOGY OF THE SITE

The structure site is located on the relatively flat Lake Plain Region, where moderately deep glacial-derived soils overlie shale bedrock, of Devonian age.

EXPLORATION

The exploration consisted of two drive sample-core borings, made between August 20 and 28, 1964, and eight drive rod penetration tests, made on July 26 and 28, 1964.

INVESTIGATIONAL FINDINGS

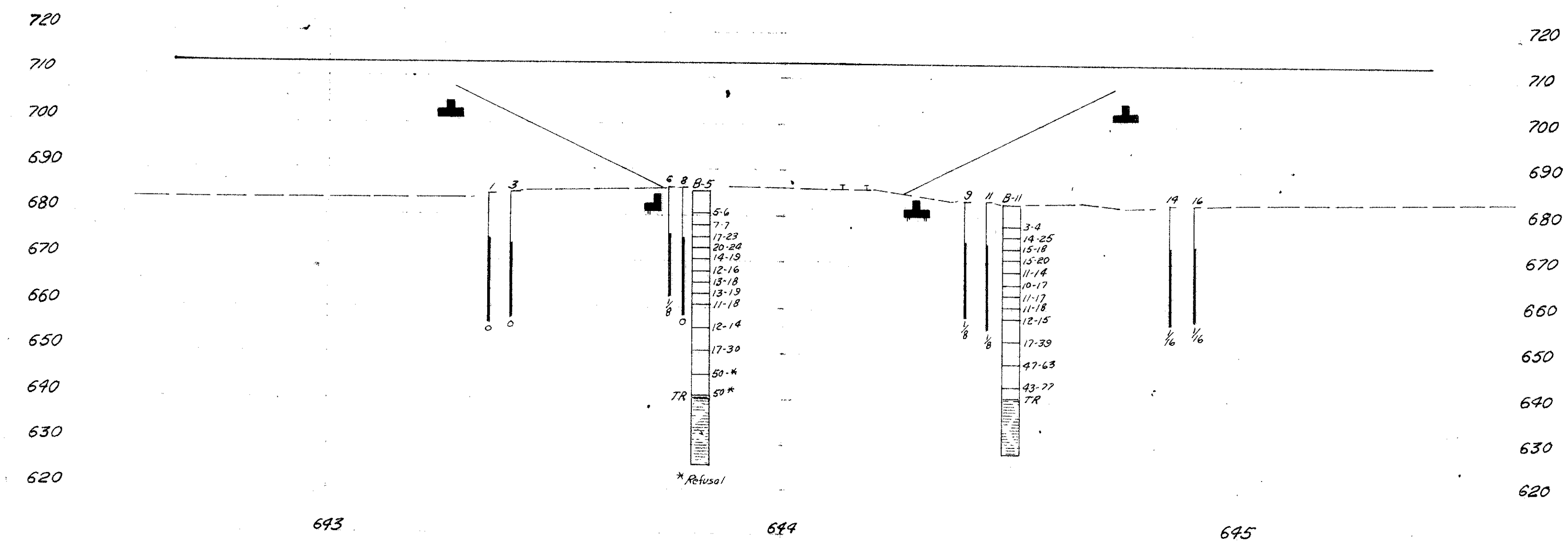
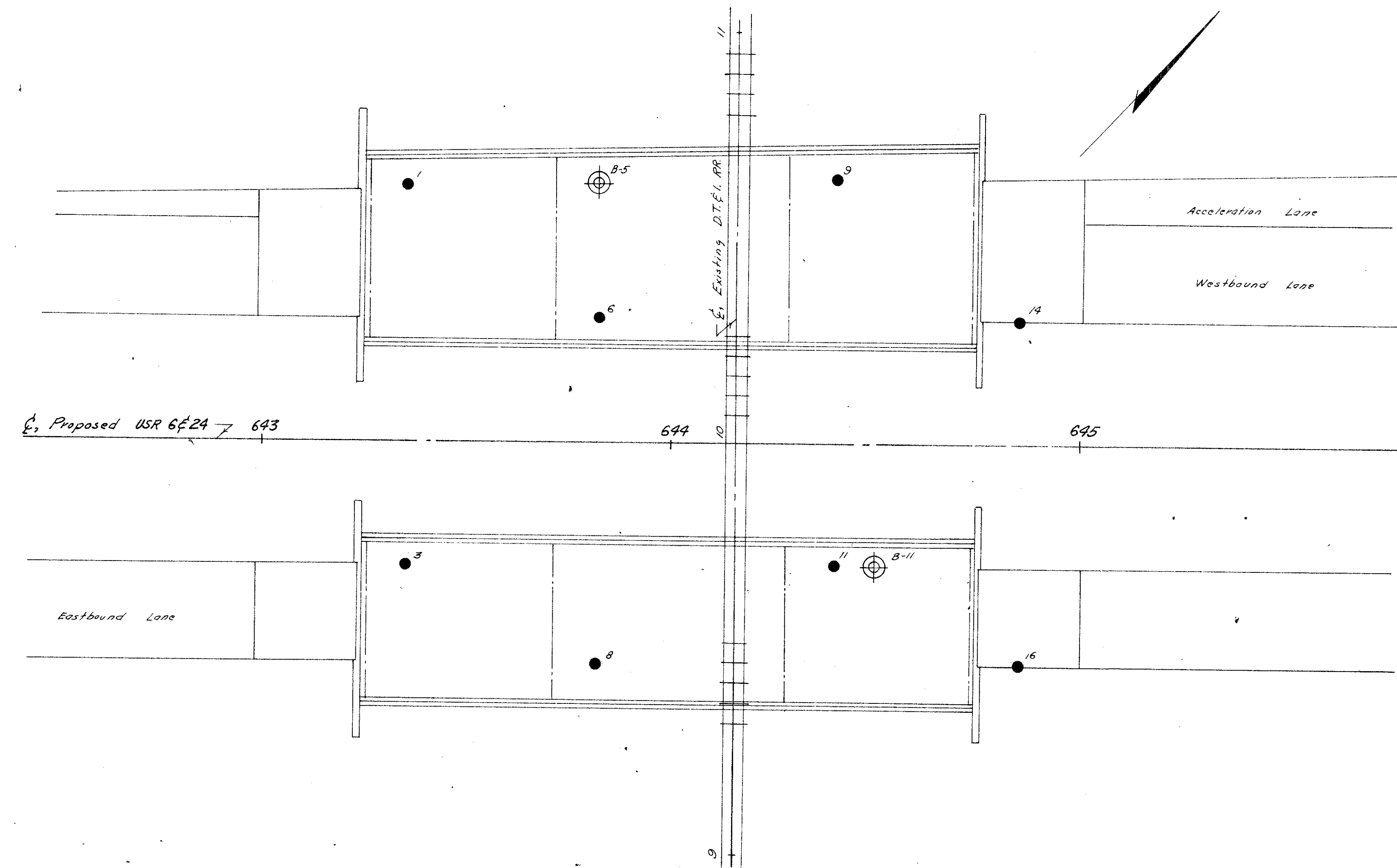
The borings disclosed that relatively flat-lying bedrock surface, encountered at 42 and 45-foot depths, elevation 640 feet, is overlain by dense and extremely dense, stiff, moist, silts and clays. Borings were terminated 12 and 13 feet below bedrock surface, elevations 628 and 625 feet.

Rod soundings met gradual increase in penetration resistance with increase in depth and were terminated upon encounter with medium-high resistance and refusal to penetration at 14 and 17-foot depths, elevations 662 and 657 feet, considered to be in very dense sandy silt, as revealed by the borings.

No free water was observed in any of the rod sounding holes.

NOTE: Information shown by this subsurface investigation was obtained solely for the use in establishing design controls for the project. The State of Ohio does not guarantee the accuracy of this data and it is not to be construed as a part of the plans governing construction of the project.

OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD STREET, COLUMBUS 23, OHIO		
STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO. HEN - 6 & 24 - 1257 L&R USR 6 & 24 OVER D.T. 8.1. RR. SEC. HEN - 6 & 24 - (11.73)(9.67)		
CHECKED BY R.H.P.	REVIEWED BY R.D.R.	DATE 10/20/64

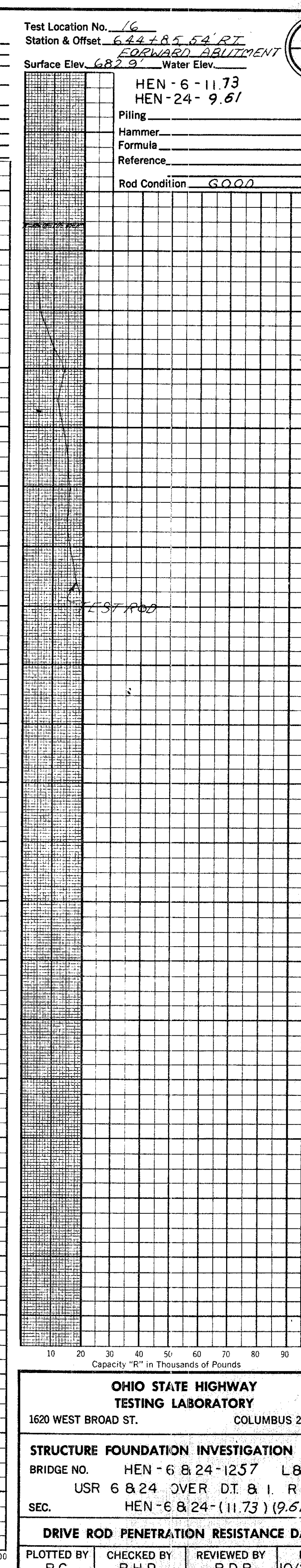
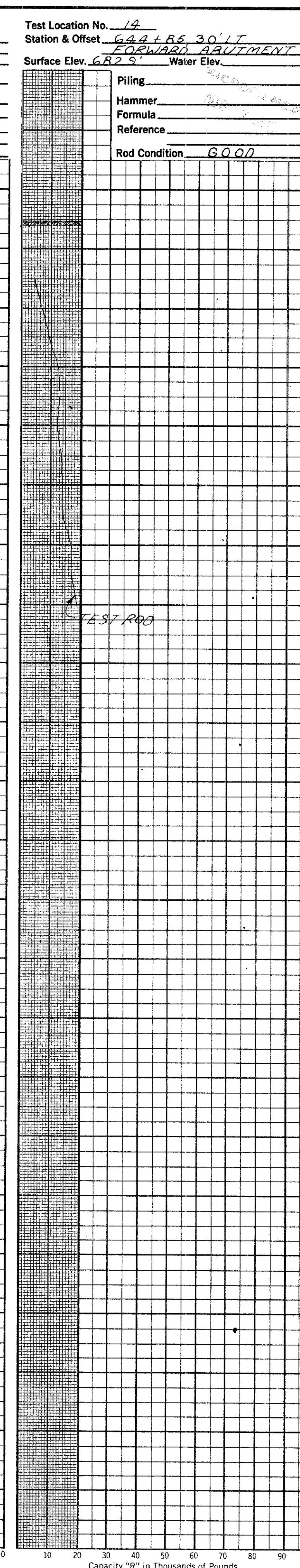
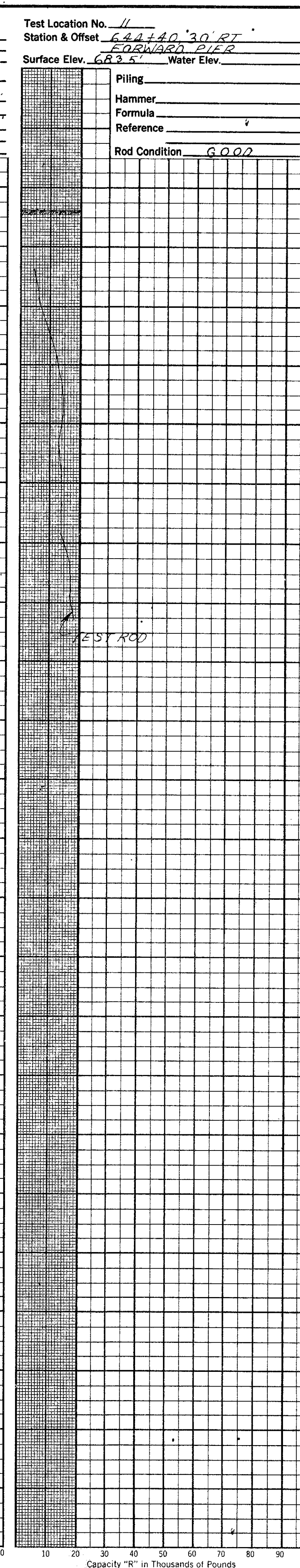
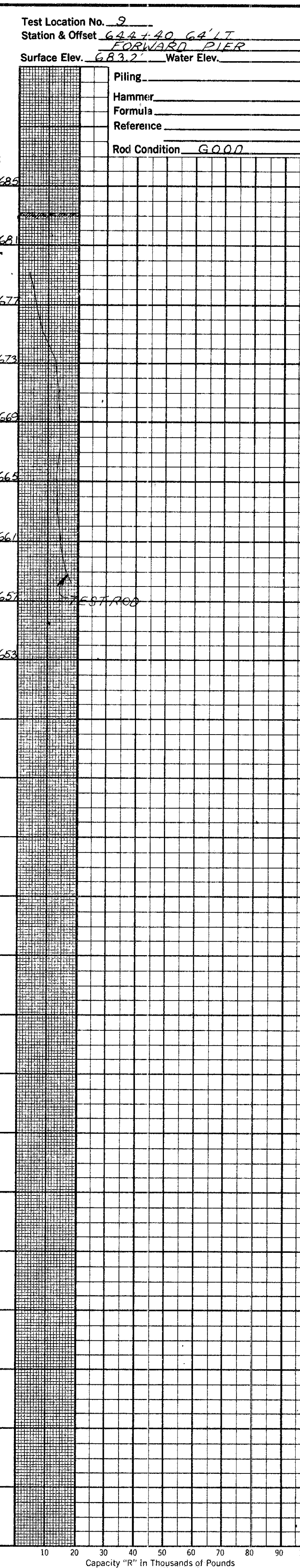
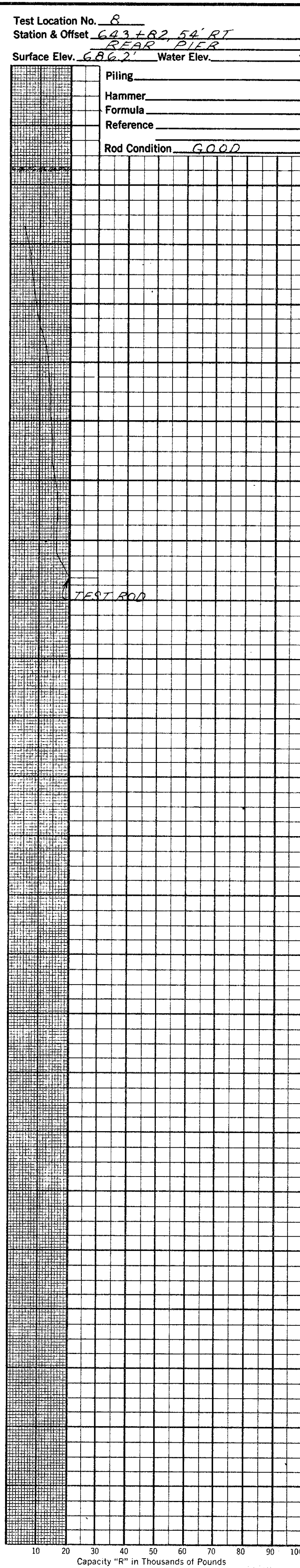
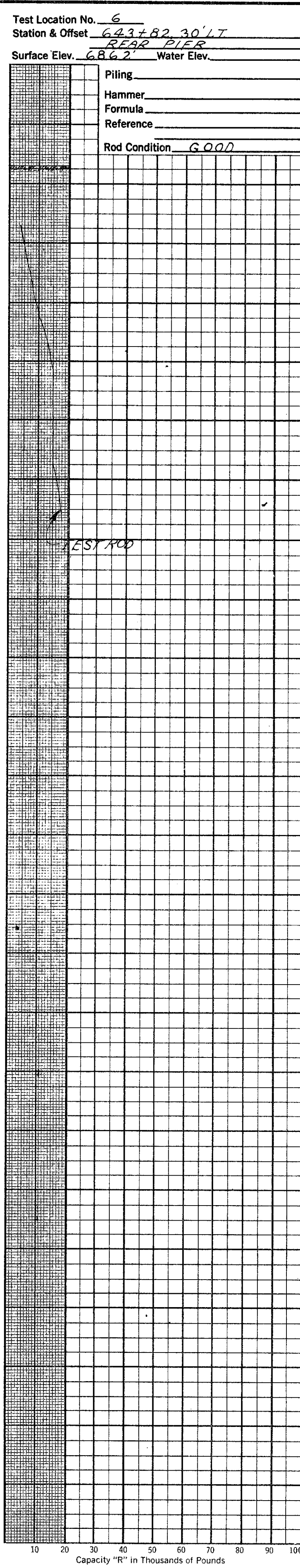
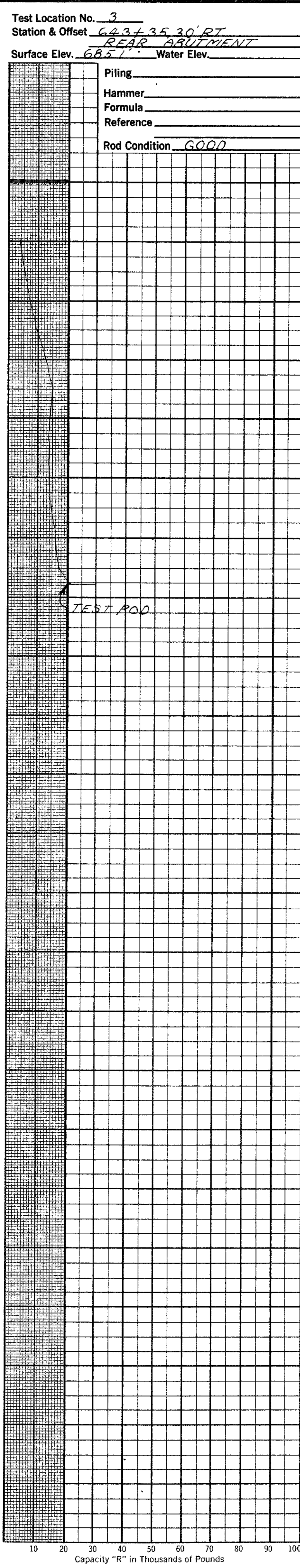
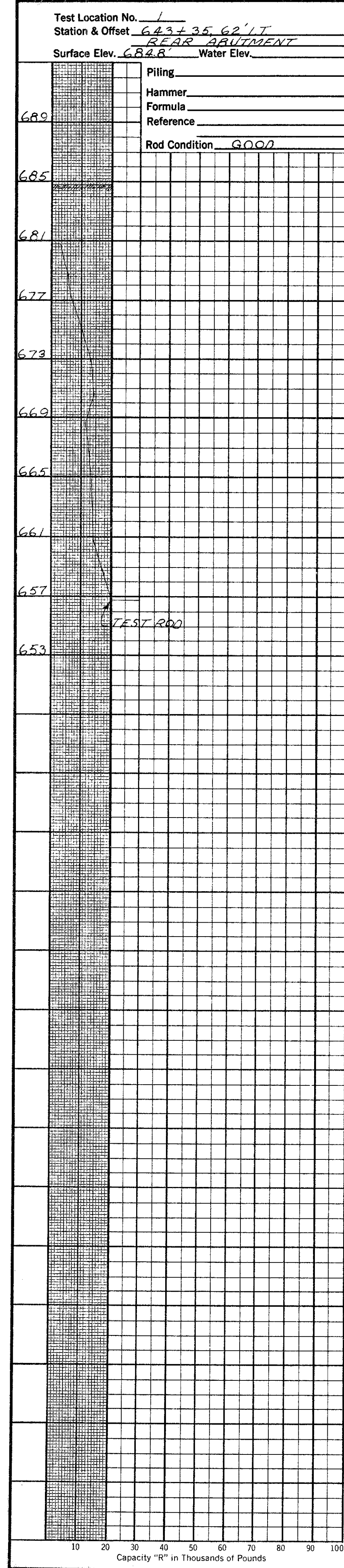


OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD ST., COLUMBUS 23, OHIO			
STRUCTURE FOUNDATION INVESTIGATION			
BRIDGE NO. HEN-6 8 24-1257 L&R			
USR 6 8 24 OVER D.T. & I. RR.			
SEC. HEN-6 8 24 - (11.73)(9.61)			
PLAN AND PROFILE			
DRAWN BY	CHECKED BY	REVIEWED BY	DATE
R.L.F.	R.H.P.	R.D.R.	10/20/64

LOG OF BORING															
Date Started <u>8-26-64</u>			Sampler Type <u>SS</u>			Dia. <u>1 3/8"</u>			Water Elev. _____			Surface Elev. <u>687.5'</u>			
Date Completed <u>8-26-64</u>			Casing Length <u>142'</u>			Dia. <u>1 1/2"</u>									
Boring No. <u>1-3</u>			Station & Offset <u>61+00, 63' 14" (BEAR PIER)</u>												
Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PL	W.C.	SHTL Class.
685.5	0														
	2														
	4														
685.5	6	5/6			Brown and Gray Silt and Clay	1	0	4	10	27	59	38	14	25	
685.0	8	7/7			Brown and Gray Sandy Clay	2	0	8	12	31	49	38	17	19	
685.5	10	17/23			Brown Sandy Clay	3	0	14	15	25	46	31	18	20	
685.0	12	28/34			Brown and Gray Silt and Clay	4	0	7	12	37	44	32	13	16	
685.5	14	14/19			Brown and Gray Silt and Clay	5	0	6	14	34	46	30	11	18	
685.0	16	12/16			Gray Clayey Silt	6	0	5	14	39	42	26	10	16	
685.5	20	13/18			Gray Silt and Clay	7	0	6	14	35	45	27	11	16	
685.0	22														
685.5	24	13/19			Gray Clayey Silt	8	0	6	8	34	52	27	10	16	
685.0	26	11/18			Gray Silt and Clay	9	0	5	11	30	54	29	11	18	
	28														
685.5	30	12/14			Gray Sandy Silt	10	0	7	27	30	36	18	3	21	
	32														
	34														
685.5	36	17/30			Gray Sandy Gravelly Silt	11	22	6	9	28	35	27	10	16	
	38														
685.5	40	30/36			Gray Sandy Gravelly Silt	12	28	7	11	25	29	24	9	18	
	42														
685.5	44	30/36			Gray Silty Sand and Stone Fragments	13	7	1	8	1	1	1		17	
685.5	46	(S.S.)			TOP OF ROCK										
	48		3.1	1.7											
	50				Shale, dark gray, carbonaceous, non-fissile, firm, broken intervals. Core loss 4/8.										
	52														
	54		5.0	0.0											
	56														
	58		5.0	0.0											
685.5	60				BOTTOM OF BORING										

LOG OF BORING															
Date Started <u>8-26-64</u>			Sampler Type <u>SS</u>			Dia. <u>1 3/8"</u>			Water Elev. _____			Surface Elev. <u>689.8'</u>			
Date Completed <u>8-27-64</u>			Casing Length <u>142.5'</u>			Dia. <u>1 1/2"</u>									
Boring No. <u>2-11</u>			Station & Offset <u>64+70, 30' 10" (FORWARD PIER)</u>												
Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	LL	PL	W.C.	SHTL Class.
689.8	0														
	2														
	4														
689.8	6	3/4			Brown and Gray Silt and Clay	1	0	6	14	35	49	31	12	21	
689.5	8	14/25			Brown Sandy Silt	2	10	7	12	34	37	28	10	17	
689.0	10														
689.5	12	15/18			Brown and Gray Sandy Gravelly Clay	3	21	6	11	29	33	30	12	17	
689.5	14	15/20			Brown and Gray Gravelly Sandy Clay	4	17	5	12	30	36	31	12	17	
689.0	16	11/24			Gray Clayey Gravel	5	50	5	6	17	22	30	14	15	
689.5	18	10/17			Gray Sandy Clay	6	10	7	12	29	42	33	16	17	
689.0	20	11/17			Gray Sandy Silt	7	10	6	12	31	41	24	7	16	
689.5	22														
689.0	24	11/18			Gray Sandy Silt	8	12	4	10	32	42	25	10	19	
689.0	26	12/13			Gray Silty Clay	9	0	1	2	30	67	40	15	28	
	28														
689.8	30	17/39			Gray Sandy Silt	10	0	6	14	36	44	23	8	14	
	32														
689.0	34														
689.0	36	47/63			Gray Gravelly Silt	11	24	8	1	40	27	21	6	11	
	38														
689.0	40	18/77			Gray Silt with Stone Fragments	12	25	5	8	31	35	24	9	16	
689.5	42														
	44		1.8	0.2	TOP OF ROCK										
	46														
	48		5.0	0.0	Shale, dark-gray, carbonaceous, firm, non-fissile, broken intervals. No core loss.										
	50														
	52														
689.0	54		5.0	0.0	BOTTOM OF BORING										

OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD ST. COLUMBUS 23, OHIO	
STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO. HEN-6 & 24-1257 L & R USR 6 & 24 OVER D.T. & I. RR SEC. HEN-6 & 24-(1173)(961)	
BORING DATA	
TYPED BY J.A.C.	CHECKED BY R.H.P.
REVIEWED BY R.D.R.	DATE 10/20/64



31
40
4
4

OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST. COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6 824-1257 L&R
USR 6 824 OVER DT & I. RR.
SEC. HEN-6 824-(11.73) (9.61)

DRIVE ROD PENETRATION RESISTANCE DATA
PLOTTED BY R.C. CHECKED BY R.H.P. REVIEWED BY R.D.R. DATE 10/20/64

GENERAL INFORMATION

Drive Rod Penetration Sounding Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface condition may be evaluated.

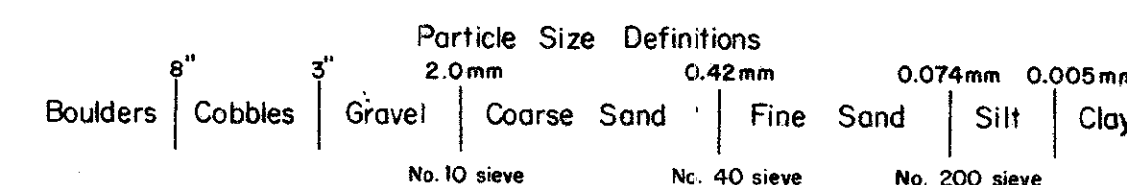
Drive Sample Borings - Drive - Press Sample Borings

Drive sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and/or 5-foot depth intervals, driven by means of a 140-pound drop-hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

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LEGEND

- Auger Boring Location - Plan View.
- Press and/or Drive Sample and/or Core Boring Location - Plan View.
- Drive Rod Penetration Resistance Sounding Location - Plan View.
- Capped Pile
- Footing
- Footing on Pile
- Top of Rock

- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- Figures Beside the Boring Log in Profile Indicate the Number of Blows For Standard Penetration Test.
X = Number of Blows for First 6 Inches.
Y = Number of Blows for Second 6 Inches.
- Drive Rod Penetration Resistance Sounding Log - Profile.
- Casing
- Resistance "R" < 10,000 lbs.
- Resistance "R" > 10,000 lbs.
- Indicates Final Measurement of Penetration, in Inches.
- Indicates Free Water Elevation.
- Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

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- Indurated Clay
- Weathered Shale
- Shale
- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

GEOLOGY OF THE SITE

The structure site is located on the relatively flat Lake Plain Region, where moderately deep glacial-derived soils overlie shale bedrock, of Devonian age.

EXPLORATION

The exploration consisted of two drive sample-core borings, made between August 28 and September 2, 1964, and six drive rod penetration tests, made on July 23 and 24, 1964.

INVESTIGATIONAL FINDINGS

The borings disclosed that relatively flat-lying bedrock surface encountered at elevations 640 and 639 feet, is overlain by dense and extremely dense, stiff, moist, silts and clays. Borings were terminated 6 and 12 feet below bedrock surface, elevations 633 and 627 feet.

Rod soundings met gradual increase in penetration resistance with increase in depth and were terminated upon encounter with refusal to penetration at 25 and 31-foot depths, elevations 658 and 652 feet, considered to be in very dense sandy silt, as revealed by the borings.

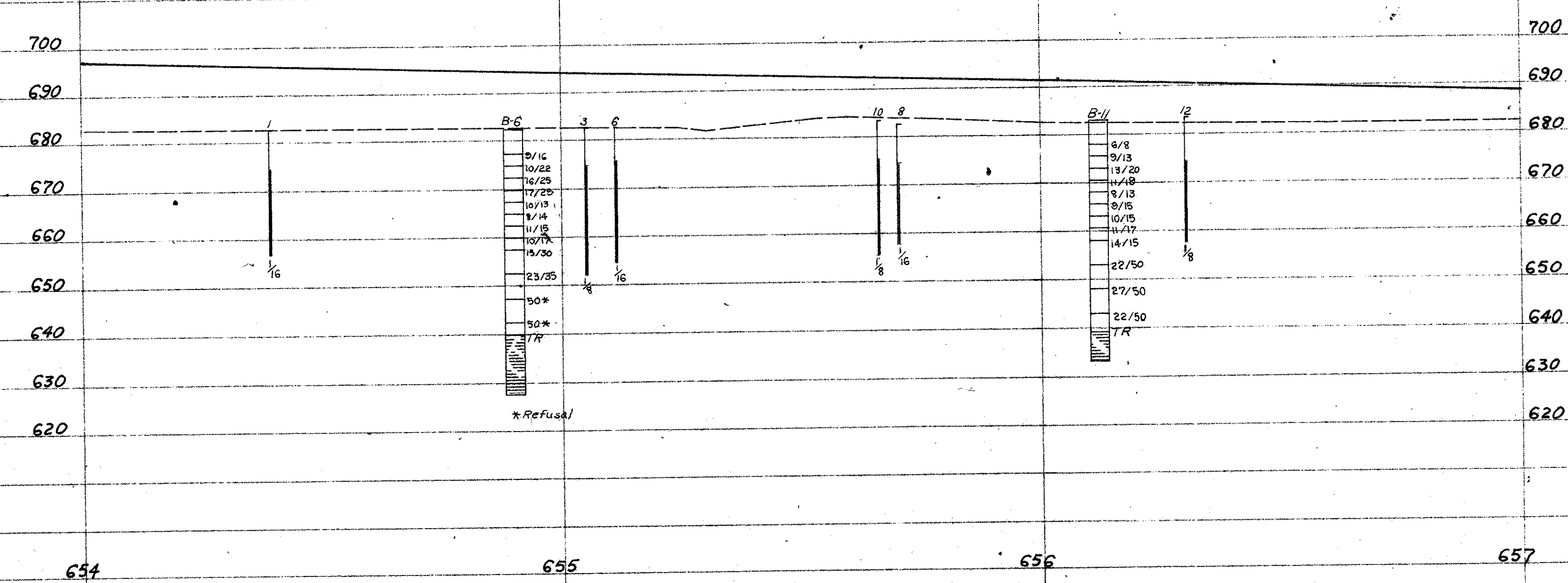
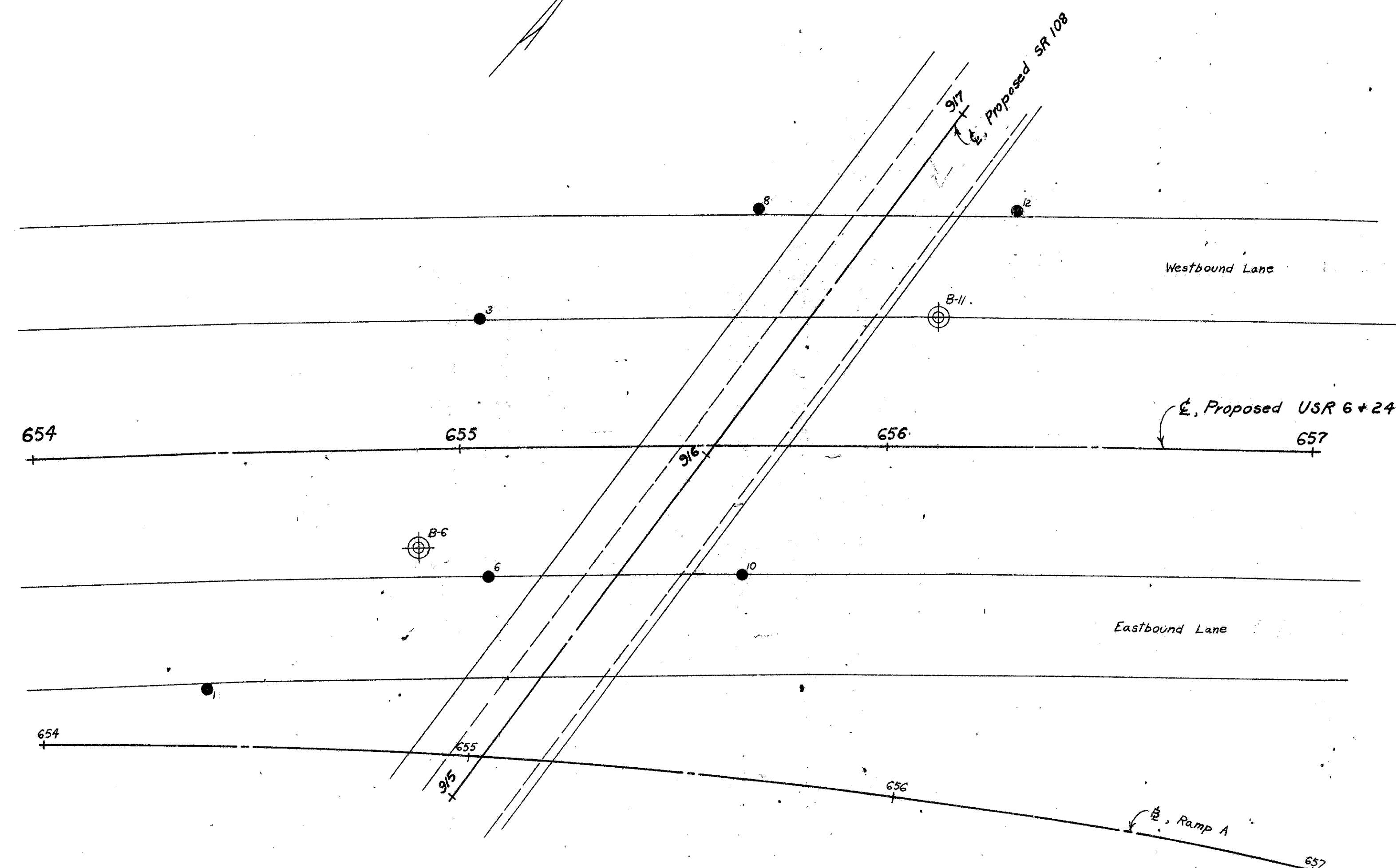
No free water was observed in any of the rod sounding holes.

NOTE: Information shown by this subsurface investigation was obtained solely for the use in establishing design controls for the project. The State of Ohio does not guarantee the accuracy of this data and it is not to be construed as a part of the plans governing construction of the project.

OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6-1279 L/R
OVER SR 108
SEC. HEN-6 & 24 - (11.73) (9.61)

CHECKED BY R.H.P. REVIEWED BY R.D.R. DATE 10/7/64



OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD ST., COLUMBUS 23, OHIO			
STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO. HEN-6-1279LFA OVER SR 108 SEC. HEN-6 B 24-(11.73) (96/1)			
PLAN AND PROFILE			
DRAWN BY L.N.L.	CHECKED BY R.H.P.	REVIEWED BY R.D.R.	DATE 10/7/64

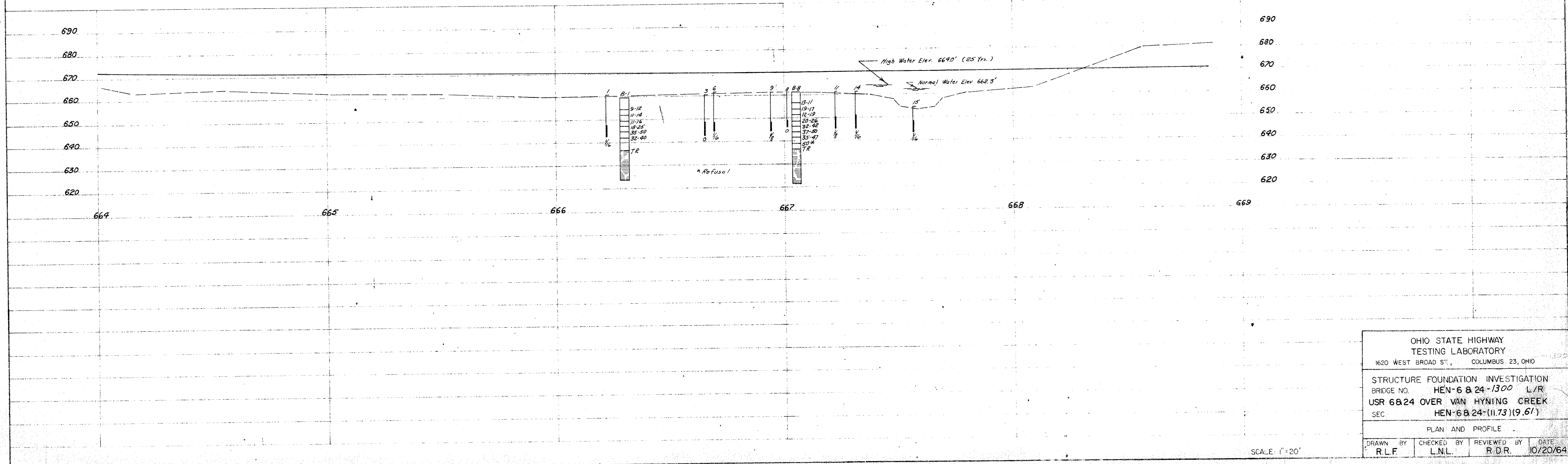
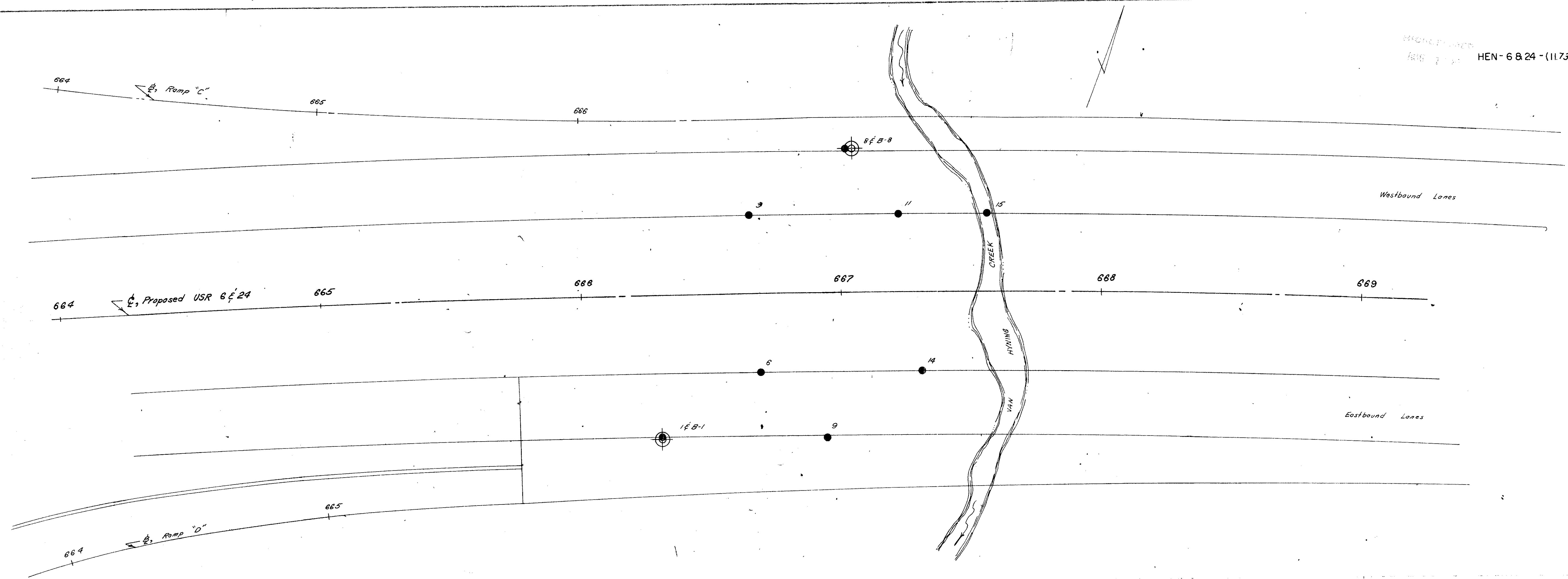
SCALE: 1"=20'

LOG OF BORING															
Date Started <u>8-28-64</u>			Sampler Type <u>SB</u> Dia. <u>1 1/8"</u>			Water Elev. _____									
Date Completed <u>9-1-64</u>			Casing Length <u>42'</u> Dia. <u>1 1/8"</u>												
Boring No. <u>659-3</u>			Station & Offset <u>659+50.23' R/L (ROAD SIDE)</u>			Surface Elev. <u>662.3'</u>									
Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTL. Class.
662.3	0														
	2														
	4														
677.3	6	9/16			Brown Silt and Clay	1	0	5	12	39	44	32	12	16	
674.3	8	10/22			Brown Sandy Clay	2	8	6	13	34	39	31	13	16	
672.3	10	16/25			Brown and Gray Sandy Silt	3	12	8	13	28	39	30	10	20	
669.3	12														
	14	17/29			Brown Sandy Clay	4	10	8	11	33	38	29	11	17	
667.3	16	18/13			Gray Sandy Clay	5	11	6	10	31	42	28	11	16	
664.3	18	8/24			Gray Sandy Clay	6	9	5	12	29	45	27	11	17	
662.3	20	11/15			Gray Silt and Clay	7	0	6	8	38	48	28	13	17	
659.3	22	18/17			Gray Sandy Clay	8	13	6	12	29	40	28	12	17	
657.3	24	13/30			Gray Sandy Silt	9	8	7	9	36	40	25	7	14	
	26														
652.3	30	23/35			Gray Sandy Silt	10	12	5	11	36	36	24	7	14	
	32														
647.3	36	30/4			Gray Sandy Silt	11	13	4	9	34	40	27	8	13	
	38														
639.3	40	30/4			Gray Silty Sand and Stone Fragments	12	V	I	S	U	A	L			
639.3	42	(8.3')			TOP OF ROCK										
	44		2.4	0.1											
	46														
	48		5.0	0.0	Shale, gray, carbonaceous, non-fissile, firm. Core loss 1%.										
	50														
	52														
	54		5.0	0.0											
627.3					BOTTOM OF BORING										

CONTINUED

LOG OF BORING															
Date Started <u>9-1-64</u>			Sampler Type <u>SB</u> Dia. <u>1 1/8"</u>			Water Elev. _____									
Date Completed <u>9-8-64</u>			Casing Length _____ Dia. _____												
Boring No. <u>B-11</u>			Station & Offset <u>659+12.30' L/R (ROADWAY SIDE)</u>			Surface Elev. <u>663.1'</u>									
Elev.	Depth	Std. Pen. (N)	Rec. ft.	Loss ft.	Description	Sample No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	SHTL. Class.
663.1	0														
	2														
	4														
678.1	6	6/8			Mottled Brown and Gray Gravelly Clay	1	11	3	7	32	47	36	12	24	
675.6	8	9/13			Brown Sandy Silt	2	8	6	12	37	40	29	8	17	
673.1	10	13/20			Brown and Gray Sandy Clay	3	9	6	13	34	38	32	11	17	
670.6	12														
	14	11/19			Brown Sandy Silt	4	6	6	13	32	43	31	10	16	
668.1	16	8/13			Gray Sandy Silt	5	8	6	12	36	38	25	6	13	
665.6	18	9/15			Gray Sandy Silt	6	12	6	12	32	38	26	8	16	
663.1	20	10/15			Gray Sandy Silt	7	10	5	10	35	40	24	7	16	
660.6	22	11/17			Gray Sandy Silt	8	11	6	8	37	38	25	8	18	
658.1	24	14/15			Gray Silt and Clay	9	5	5	10	28	52	30	12	20	
	26														
	28														
653.1	30	22/50			Gray Gravelly Silt	10	30	4	2	47	17	18	3	10	
	32														
	34														
648.1	36	27/50			Gray Gravelly Sandy Silt	11	15	8	14	32	31	23	6	10	
	38														
643.1	40	20/50			Gray Sandy Silt	12	18	9	19	35	27	22	8	18	
	42														
639.1	44				TOP OF ROCK										
	46		0.8	0.2											
	48		4.6	0.4	Shale, gray, carbonaceous, non-fissile, firm, broken 1.0' interval beginning at 45.0'. Core loss 10%.										
639.1	50				BOTTOM OF BORING										

HEN-6824-(11.73)(9.67)



OHIO STATE HIGHWAY TESTING LABORATORY 1620 WEST BROAD ST., COLUMBUS 23, OHIO			
STRUCTURE FOUNDATION INVESTIGATION			
BRIDGE NO.	HEN-6824-1300 L/R		
USR 6824 OVER VAN HYNING CREEK			
SEC.	HEN-6824-(11.73)(9.67)		
PLAN AND PROFILE			
DRAWN BY	CHECKED BY	REVIEWED BY	DATE
RLF	LNL	R.D.R.	10/20/64

SCALE: 1"=20'

GEOLOGY OF THE SITE

The structure site is located on the relatively flat Lake Plain Region, where moderately deep glacial-derived soils overlie shale bedrock, of Devonian age.

EXPLORATION

The exploration consisted of two drive sample-core borings, made between August 18 and 30, 1964, and eight drive rod penetration tests, made on July 29 and 30, 1964.

INVESTIGATIONAL FINDINGS

The borings disclosed that relatively flat-lying bedrock surface, encountered at 23 and 25-foot depths, elevation 636 feet, is overlain by dense and extremely dense, stiff, gravels, silts, clays and boulders. Borings were terminated 13 and 15 feet below bedrock surface, elevations 624 and 621 feet.

Rod soundings met gradual increase in penetration resistance with increase in depth and were terminated upon encounter with medium-high resistance and refusal to penetration at 11 and 17-foot depths, elevations 647 and 642 feet, considered to be in very dense sandy silt, as revealed by the borings.

No free water was observed in any of the rod sounding holes.

- Auger Boring Location - Plan View.
- Press and/or Drive Sample and/or Core Boring Location - Plan View.
- Drive Rod Penetration Resistance Sounding Location - Plan View.
- Capped Pile
- Footing
- Footing on Pile
- TR Top of Rock

LEGEND

- Horizontal Bar on Boring Log Indicates the Depth the Sample Was Taken.
- Figures Beside the Boring Log in Profile Indicate the Number of Blows For Standard Penetration Test.
X = Number of Blows for First 6 Inches.
Y = Number of Blows for Second 6 Inches.
- Drive Rod Penetration Resistance Sounding Log - Profile.
- Casing
- Resistance "R" < 10,000 lbs.
- Resistance "R" > 10,000 lbs.
- Indicates Final Measurement of Penetration, in Inches.
- Indicates Free Water Elevation.
- Indicates Static Water Elevation.

SYMBOLS OF ROCK TYPES

- Coal
- Weathered Indurated Clay
- Indurated Clay
- Weathered Shale
- Shale
- Weathered Sandstone
- Sandstone
- Leached Dolomite
- Dolomite
- Leached Limestone
- Limestone

GENERAL INFORMATION

Drive Rod Penetration Sounding Tests

Drive rod penetration resistance tests constitute driving a 1.315-inch diameter steel rod, with a 45° cone point, into the ground, using a 122-pound drop-hammer with a free fall of five feet. At one or two-foot depth intervals, a measurement is taken to determine the amount of penetration achieved in three hammer drops. This reading is converted to an empirical value for capacity "R", in thousands of pounds (which is a measure of both the point resistance and frictional resistance on the rod), by using charts prepared by the Ohio Department of Highways, Bureau of Bridges, on the basis of correlation study of rod penetration with past performance of pile driving. For interpretation, a graph is prepared by plotting the value "R" against the depth at which the reading was taken, and connecting the plotted points. The curve so obtained reflects the density of subsurface materials in a manner that can be readily compared with data from similar tests at other locations on the structure site. From this comparison, the overall uniformity of subsurface condition may be evaluated.

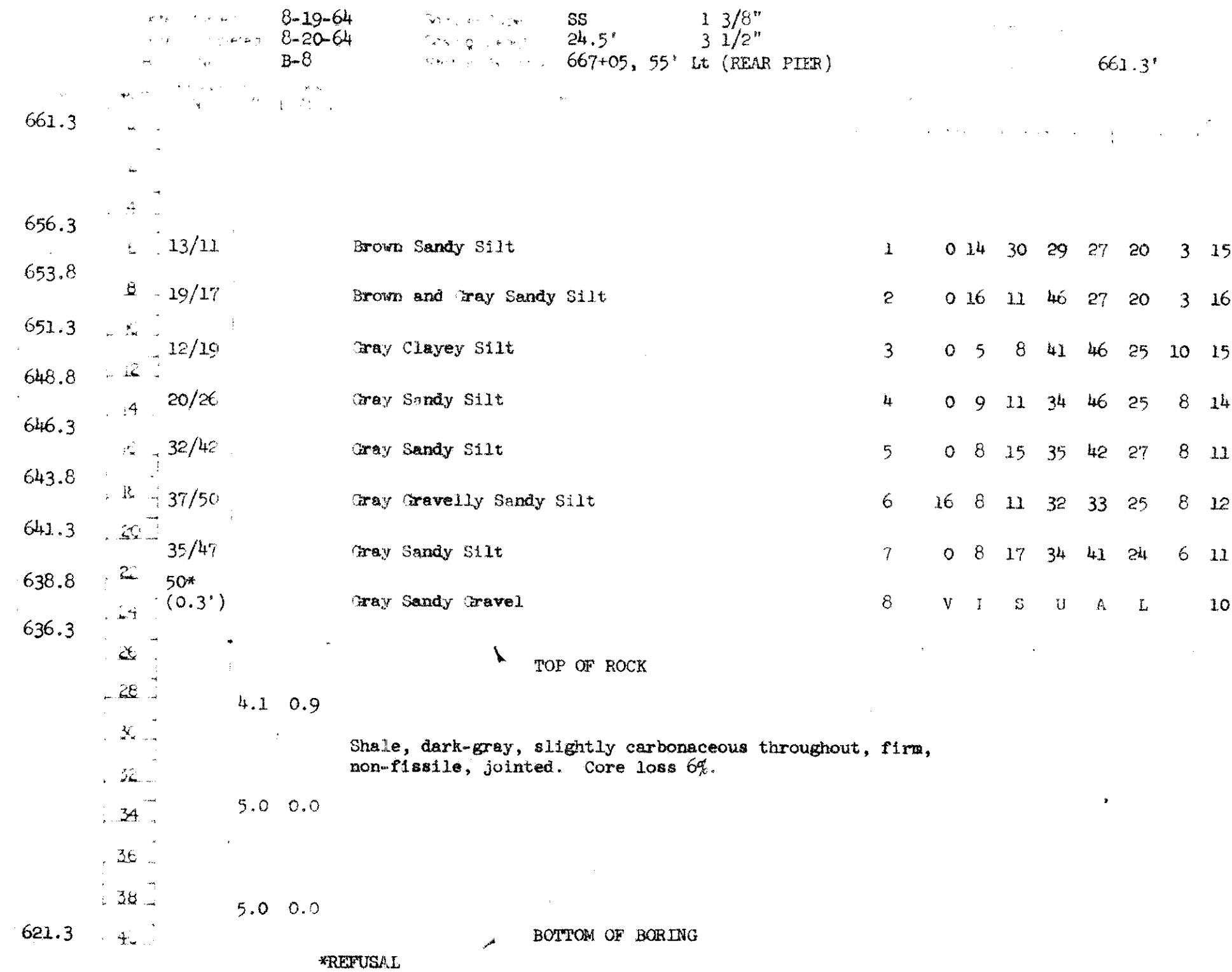
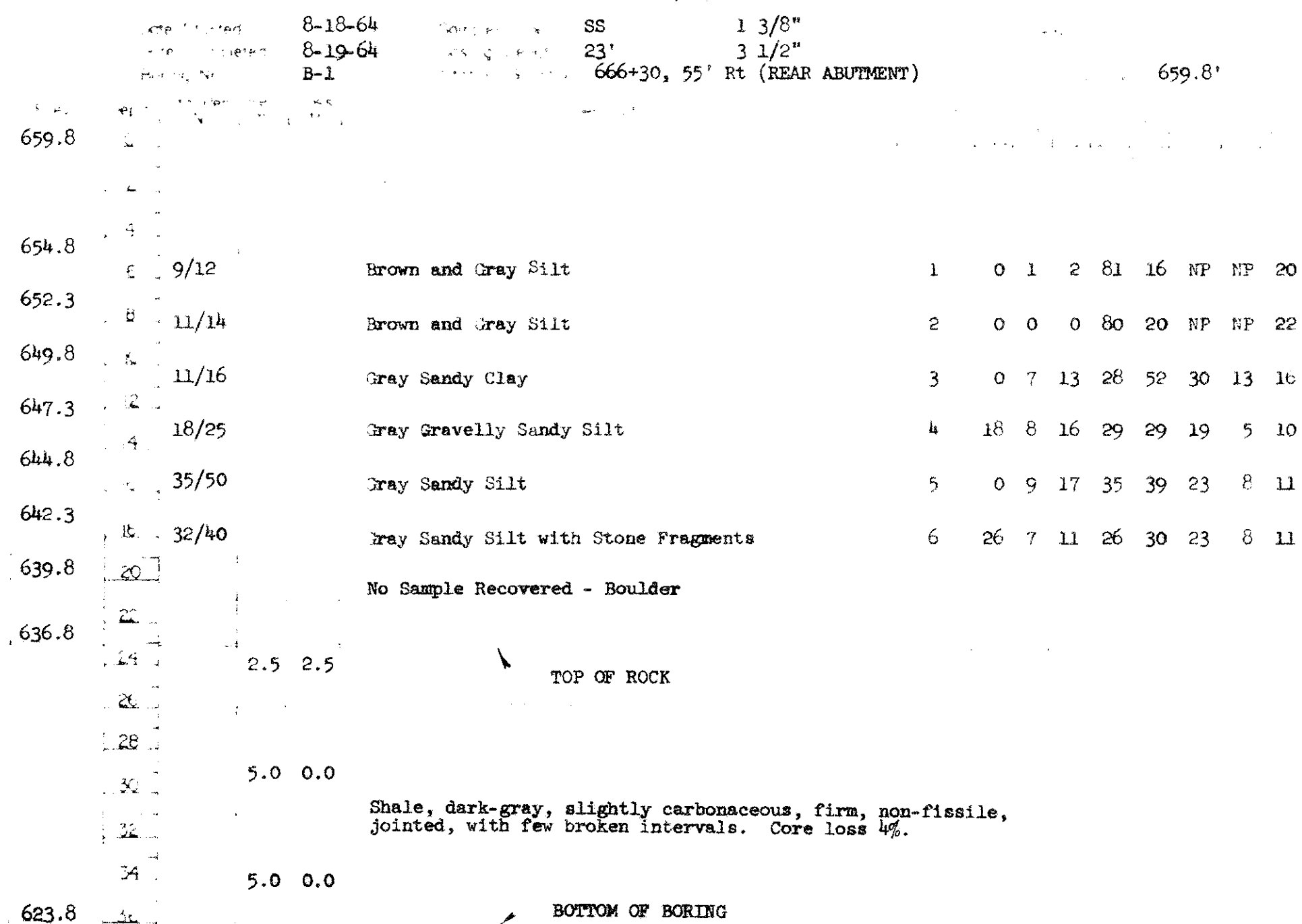
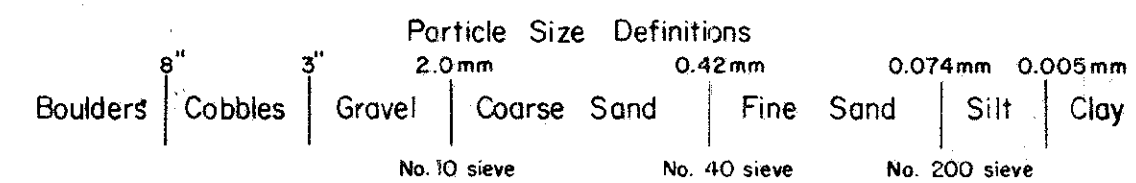
Drive Sample Borings - Drive - Press Sample Borings

Drive sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. sampler, at 2-1/2 and/or 5-foot depth intervals, driven by means of a 140-pound drop-hammer, with a free fall of 30 inches. The number of blows required to drive the sampler 12 inches is considered the standard penetration test.

Drive-press sample borings are made by means of a rotary-type drill rig, employing a 2" O.D., 1-3/8" I.D. drive sampler, and 3" O.D. thin-wall press sampler. The press sampler is advanced by continuous uniform pressure, applied by the drill rig.

The boring log sheets show a graphic plot of the information obtained, including depth and elevation of the sample, number of blows for the standard penetration tests in two 6-inch increments, depth of press samples, field sample number, sample description - based on laboratory tests and the Casagrande AC classification system - and gradation, plasticity, and moisture content determinations. Results of strength and consolidation testing appear on separate enclosures.

At depths where materials are bouldery or gravelly to the extent that the sampler can not be driven, a wash sample is procured for visual classification, in order to determine the general character of the material. These samples are not considered sufficiently representative to warrant laboratory testing.

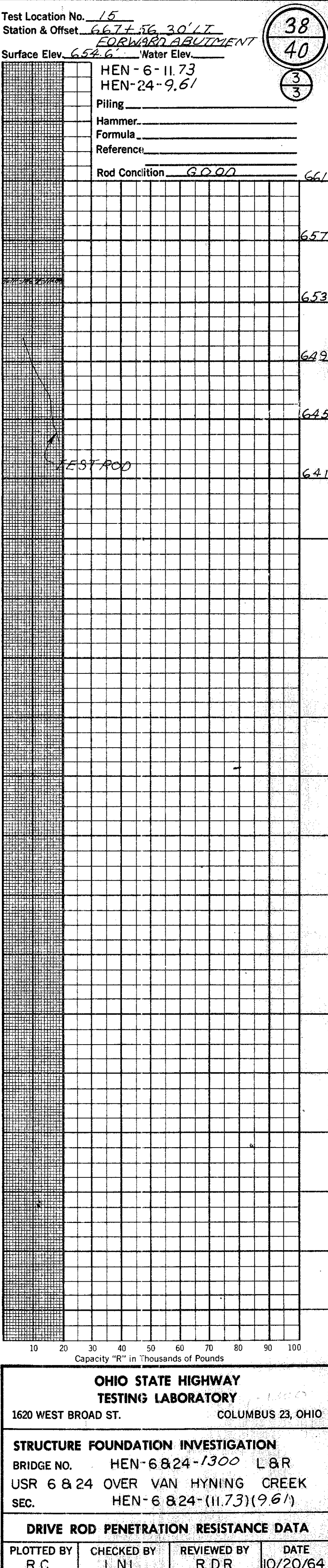
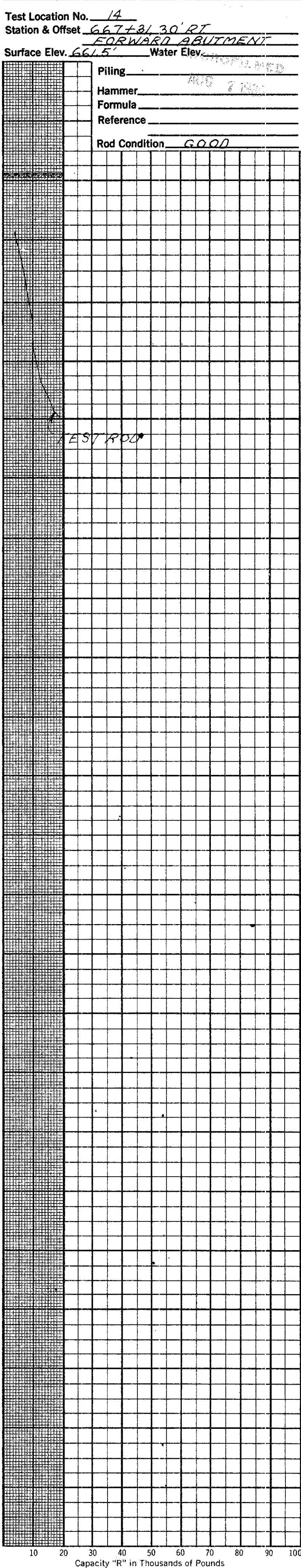
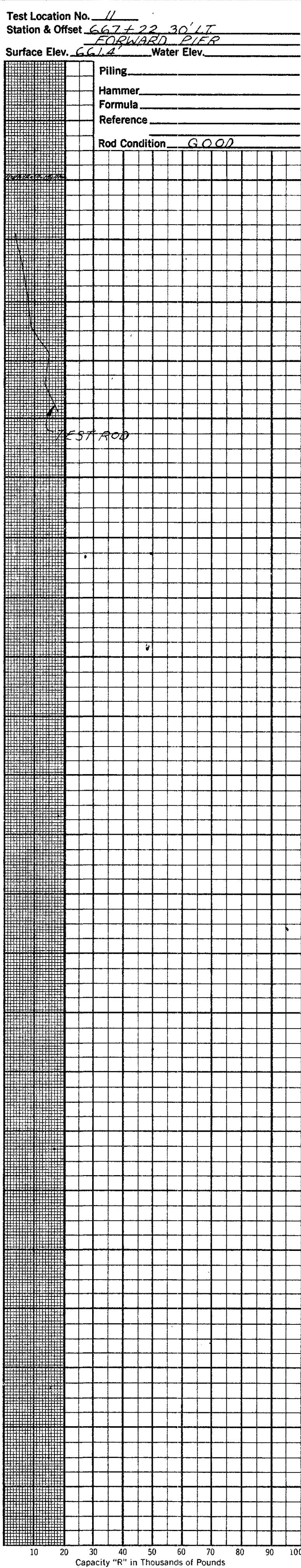
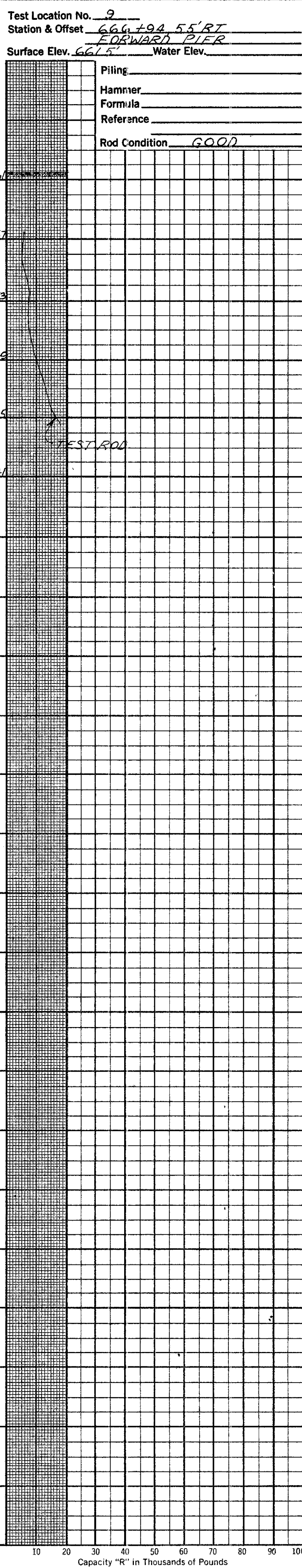
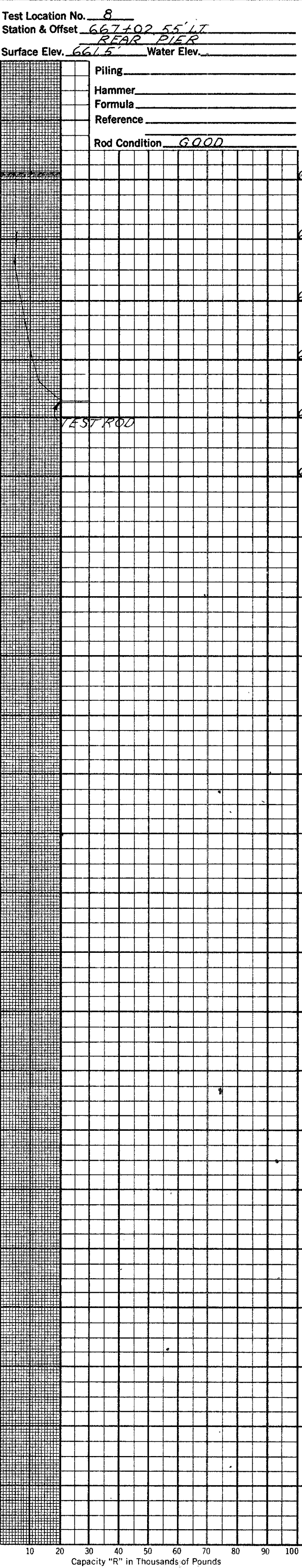
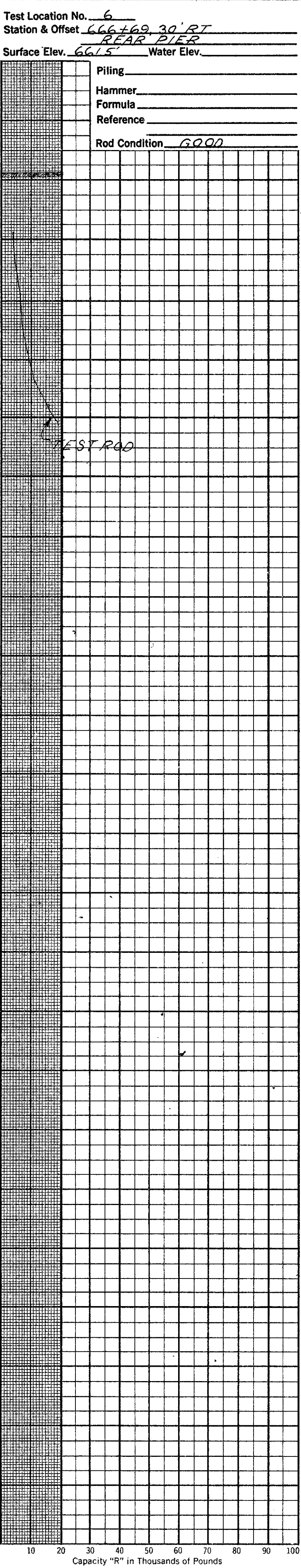
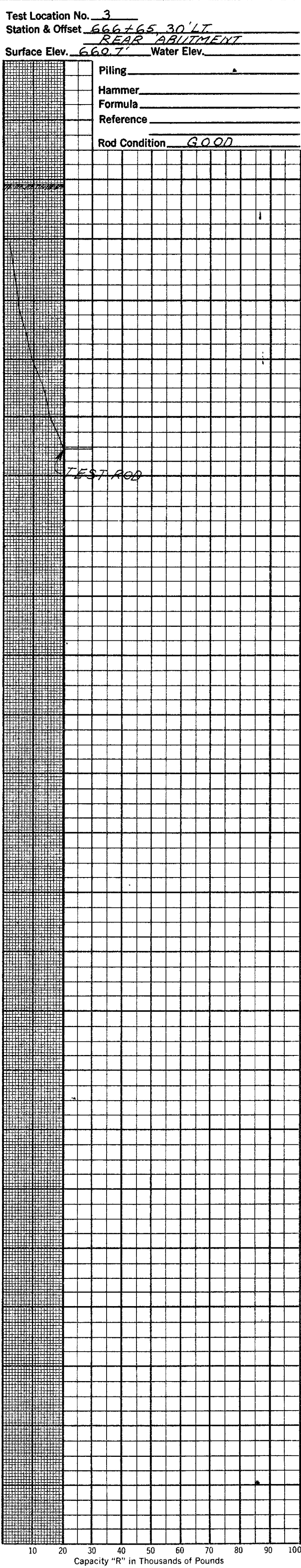
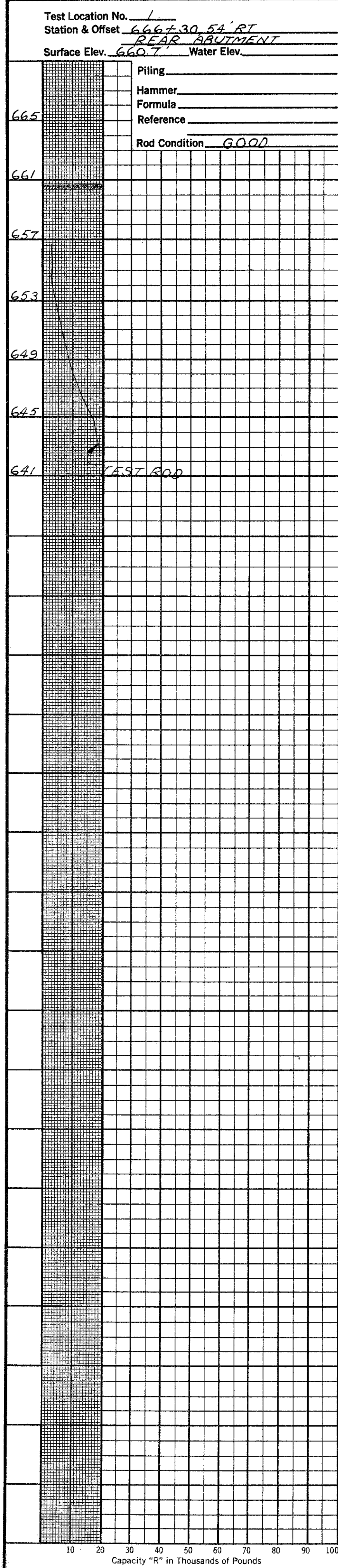


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OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD STREET, COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN - 6 & 24 - 1300 L/R
USR 6 & 24 OVER VAN HYNING CREEK
SEC. HEN - 6 & 24 - (11.73)(9.6')

CHECKED BY L.N.L. REVIEWED BY R.D.R. DATE 10/20/64



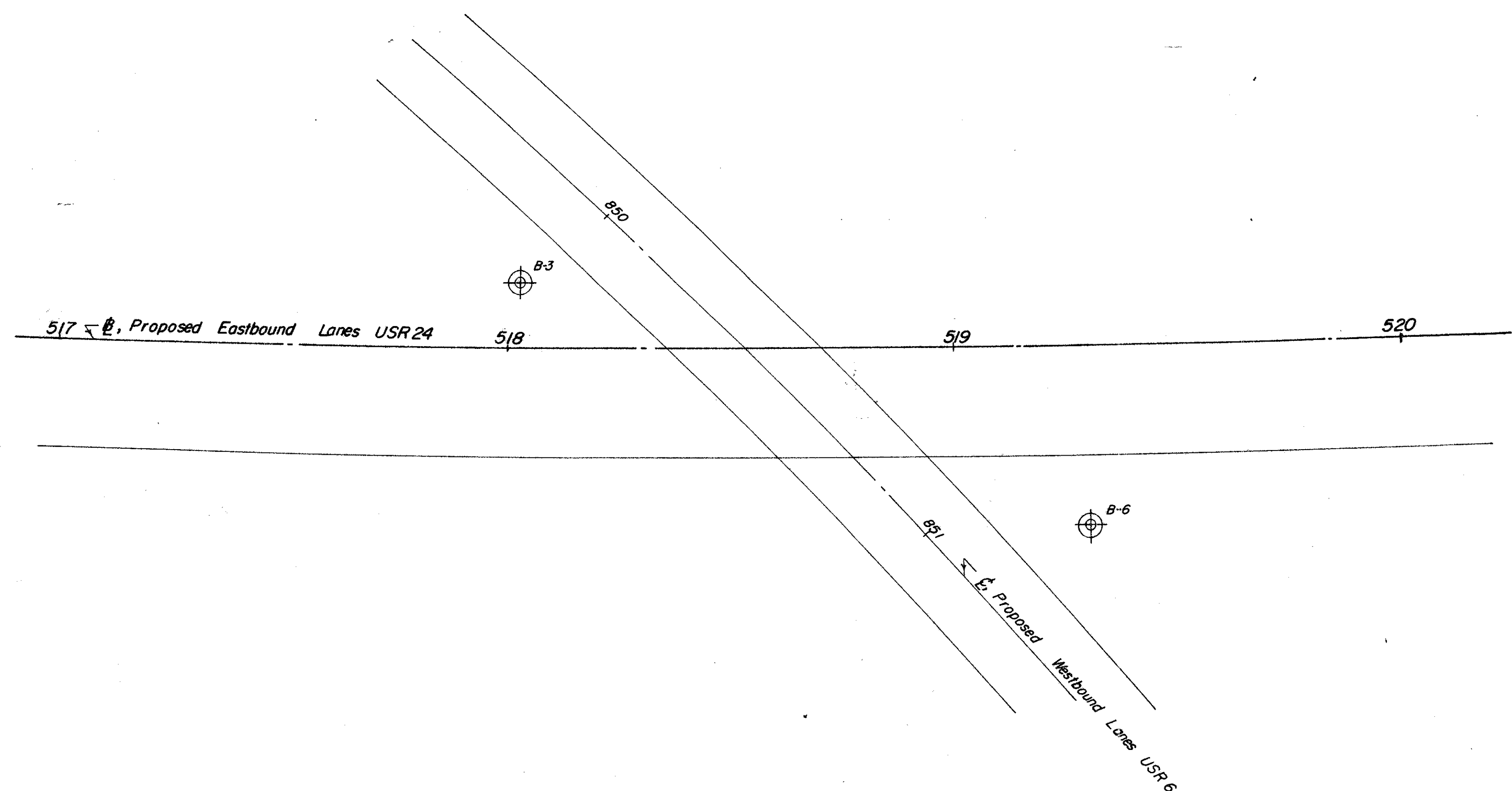
38
40
3
3

OHIO STATE HIGHWAY
TESTING LABORATORY
1620 WEST BROAD ST. COLUMBUS 23, OHIO

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. HEN-6 824-1300 L&R
USR 6 824 OVER VAN HYNING CREEK
SEC. HEN-6 824-(11.73)(96')

DRIVE ROD PENETRATION RESISTANCE DATA
PLOTTED BY R.C. CHECKED BY L.N.L. REVIEWED BY R.D.R. DATE 10/20/64

CHECKED BY R. H. P.	REVIEWED BY R. D. R.	DATE 4/16/65
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OHIO DEPARTMENT OF HIGHWAYS TESTING LABORATORY 1620 WEST BROAD STREET, COLUMBUS 23, C	
STRUCTURE FOUNDATION INVESTIG	
BRIDGE NO.	HEN-24-0981
OVER W. BOUND USR 6 (RELOC	
SEC.	HEN-6824- (11.73) (96
PLAN AND PROFILE	
DRAWN BY	CHECKED BY
RLP	RHP
REVIEWED BY	DA
RDR	4/16