

GENERAL INFORMATION

INTRODUCTION

The project consists of the construction of U.S. Highways IR 77, beginning immediately south of Belle Valley, extending northward, and terminating 700 feet south of Co. Rd. 37.

Proposed grade indicates cuts, maximum 34 feet in depth, and fill embankments, maximum 25 feet in height.

GEOLOGY AND OBSERVATIONS OF THE PROJECT

The project is located on the dissected Allegheny Plateau, where the alignment crosses the and traverses the floodplain of West Fork Duck Creek, follows the east valley wall, and traverses a portion of the upland to the northeast of the creek. Moderately deep valley fill and shallow to thin residual soils overlie sand, sandstone and limestone bedrock of the Conemaugh Series, Pennsylvanian age. Several rock outcrops were noted and measured, as well as several areas of slumping and areas of poor surface drainage.

EXPLORATION

Exploratory borings were made by means of truck-mounted mechanical soil auger, hand auger (in areas of difficult access), and rotary-type drill rig, between October 15 and November 4, 1964.

INVESTIGATIONAL FINDINGS

Materials occurring immediately below proposed grade consist of bedrock and some of the clays (A-6a) and clays (A-7-5).

Bedrock is represented in the excavations in the following areas:

Stations 681+00 to 681+05 - shale and sandstone at both grades and in the ditches and back slopes.

Stations 682+00 to 682+75 - shale and sandstone at left grade and in the left ditch and back slope.

Stations 683+75 to 683+00 - sandstone, shale, and coal (stations 681+00 to 681+00) at both grades and in the ditches and back slopes.

Stations 684+00 to 684+00 - shale and sandstone at left grade and in the left ditch and left back slope.

Stations 685+00 to 685+00 - sandstone at left grade and in the left ditch; sandstone and shale in the left back slope.

Stations 686+00 to 686+00 - shale at right grade and in the right ditch and lower portion of the right back slope.

Stations 687+00 to 687+00 - shale at both grades and in the ditches and back slopes.

Stations 688+00 to 688+00 - shale at left grade and in the ditches and back slopes.

Stations 689+00 to 689+00 - shale at left grade and in the ditches and back slopes.

Stations 690+00 to 690+00 - shale at both grades and in the ditches and back slopes, some indurated clay in the back slopes.

Stations 691+00 to 691+00 - shale at right grade and in the right ditch and lower portion of the right back slope.

Stations 692+00 to 692+00 - shale in the right ditch and back slope.

Stations 693+00 to 693+00 - shale at right grade and in the right ditch and back slope.

Stations 694+00 to 694+00 - shale at both grades and in the ditches and back slopes.

Stations 695+00 to 695+00 - shale at left grade and in the left ditch and lower portion of the left back slope.

Stations 696+00 to 696+00 - indurated clay at left grade and in the left ditch and left back slope.

Stations 697+00 to 697+00 - indurated clay at both grades and in the ditches and back slopes, some shale in the upper portions of the back slopes.

Stations 698+00 to 698+00 - indurated clay at right grade and in the right ditch and lower portion of the right back slope.

Stations 699+00 to 699+00 - shale and indurated clay in the right ditch and lower portion of the right back slope.

Stations 700+00 to 700+00 - shale and indurated clay at right grade and in the right ditch and back slope.

Stations 701+00 to 701+00 - shale at both grades and in the ditches and back slopes.

Stations 702+00 to 702+00 - shale at both grades and in the right ditch and back slopes.

Stations 703+00 to 703+00 - shale at left grade and in the left ditch and lower portion of the left back slope.

Stations 704+00 to 704+00 - shale in the left ditch and back slope.

Stations 705+00 to 705+00 - shale at right grade and in the right ditch and lower portion of the right back slope.

Stations 706+00 to 706+00 - shale at both grades and in the ditches and back slopes.

Stations 707+00 to 707+00 - shale at right grade and in the right ditch and lower portion of the right back slope.

Stations 708+00 to 708+00 - shale in the right ditch.

Frost susceptible silt was encountered within three feet below proposed grade at stations 683+00.

Embankment foundation materials comprise moderately deep sandy silts and silts (A-4a and A-4b), silt clays (A-6a), and clays (A-7-5 and A-7-5), in the valley, and generally shallow to thin silt clays (A-6a) and clays (A-7-5) in the uplands. Wet and/or organic materials were encountered in the valley between approximately stations 688+00 and 690+00.

It is noted that portions of the embankment foundation comprise shallow soils overlying sloping bedrock surface.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS 139 SAMPLES TESTED

DESCRIPTION	H.R.B. CLASS	OHIO CLASS	% AGG	% SAND	% SILT	% CLAY	LIQ. LIM. (%)	PLAS. LIM. (%)	UNIFORMITY INDEX	FL. INDEX	WATER CONTENT (%)	SHRINKAGE (%)
Gravel with sand	A-1-L	A-1-a	61	13	9	9	5	25	5	16	1	1
Gravel with sand and silt	A-2-H(1)	A-2-4	47	15	5	12	15	16	16	17	1	1
Sandy silt	A-4(3)	A-4a	27	6	17	25	25	33	8	37	7	7
Silt	A-4(2)	A-4b	6	1	3	54	25	22	6	23	7	7
Silt and clay	A-6(B)	A-6a	23	0	2	75	37	31	12	21	22	22
Silty clay	A-6(11)	A-6a	11	0	0	34	14	39	17	23	3	3
Plastic clay	A-7-5(16)	A-7-5	27	1	4	31	37	57	25	25	8	8
Clay	A-7-5(11)	A-7-5	31	0	2	25	33	55	20	21	19	19
Coal												
Clay bedrock												
Weathered indurated clay												
Weathered shale												
Weathered sandstone												
Shale												
Sandstone												
Limestone												
Various other materials												
Sed. and/or Topsoil $\times 1/2$ Approximate depth.												
Auger boring - plan view.												
Drive sample and/or core boring - plan view.												
Auger boring plotted to vertical scale only.												
Drive sample and/or core boring plotted to vertical scale only.												

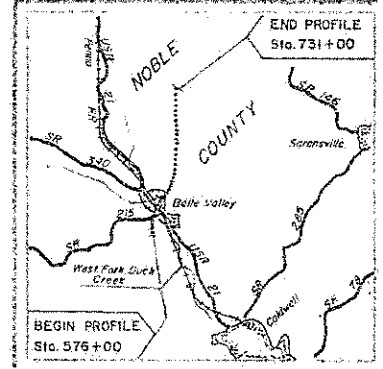
NOTE: Figures beside borings indicate water content in percent, $\times 1/5$

SOIL PROFILE NOBLE COUNTY NOB-IR 77-10.87

1/30

THIS SOIL PROFILE IS A SUMMARY OF THE DATA FROM THE SOIL BORINGS AND TESTS MADE FOR THE PROJECT. IT IS NOT A FIELD PROFILE AND SHOULD NOT BE USED FOR DESIGN PURPOSES WITHOUT CONSULTATION WITH THE ENGINEER.

FED. NO. 1-77-1(5)27



LOCATION MAP

Recon JSM 9/17/64
 Drilling-Auger C.M.C., L.C.M., R.D.L.
 10/15/64 to 10/21/64
 Core C.J., C.P.
 10/21/64 to 11/4/64
 Drafting-R.F., E.V.S., R.L.M. 11/20/64

SOIL PROFILE
NOBLE COUNTY
NOB-IR 77-10.87

2
30

OHIO STATE UNIVERSITY SOILS LABORATORY
1680 N. HOVEY AVE. COLUMBUS, OHIO 43210

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.

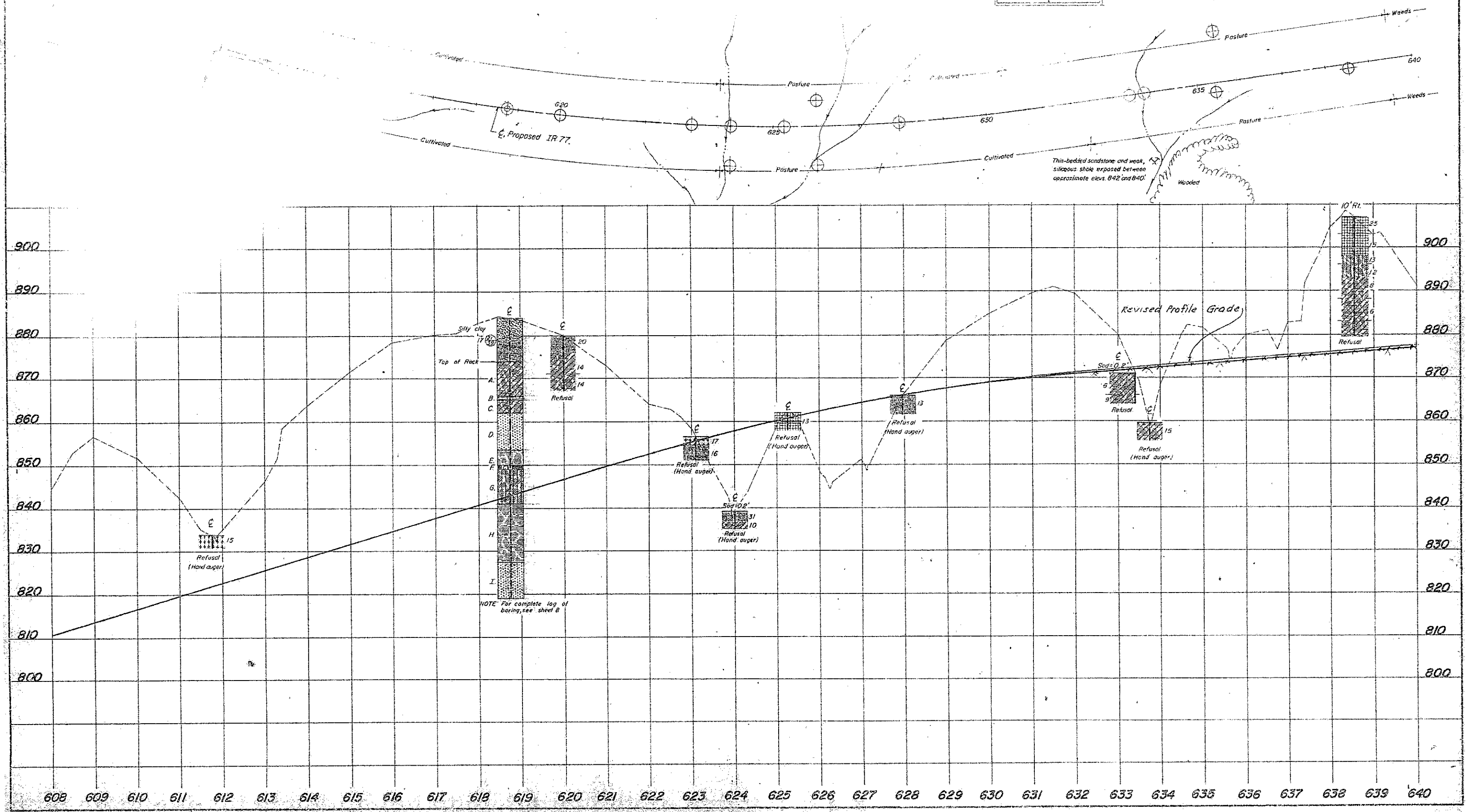
STATION & OFFSET	DEPTH FROM-TO	Wt %	Wt %	Wt %	Wt %	L.L.	P.I.	W.C.	CLASS.	SHTL
575+00	CL 0.4-5.0 5.0-10.0	48 41	5 3	4 5	27 26	28 28	11 11	15 16	A-6a A-6a	
576+00	110' Rt 0.4-4.0 4.0-7.0 7.0-10.0	0 50 0	2 6 0	4 4 0	20 20 40	52 21 35	13 11 8	22 15 8	A-7-6 A-6a Visual	Gray Weathered Indurated Clay
578+00	CL 0.4-5.0 5.0-11.0 11.0-13.0 13.0-18.0 18.0-21.0	0 24 50 0 0	0 6 0 0 0	1 14 5 5 0	53 24 12 40 50	46 34 23 13 13	9 10 10 18 10	35 31 24 28 24	A-4b A-4a A-7-5 A-7-6 Visual	Gray Weathered Indurated Clay
581+50	CL 0.4-6.0 6.0-12.0 12.0-17.5 17.5-20.0	0 0 0 0	1 0 1 0	4 2 3 0	49 35 57 37	46 37 32 37	11 9 14 13	24 20 20 13	A-6a A-4b A-6a Visual	Gray Weathered Indurated Clay
586+50	CL 0.4-5.0 5.0-7.0 7.0-14.0 14.0-19.0 19.0-20.0	20 0 0 32 30	2 0 2 9 16	5 1 33 15 14	34 63 31 10 19	36 36 38 31 25	11 7 6 9 6	29 27 32 26 13	A-7-5 A-4b A-4a A-4a A-6a	
590+50	CL 0.4-6.0 6.0-11.0 11.0-15.0 15.0-19.5 19.5-25.0	0 0 0 47 0	0 1 2 15 0	5 2 6 5 0	49 47 43 19 15	56 46 45 45 15	14 11 19 - 10	29 29 23 17 10	A-6a A-6a A-7-5 A-2-4 Visual	Red Weathered Indurated Clay
594+75	CL 0.0-3.0 3.0-6.0 6.0-11.0 11.0-14.0 14.0-19.0	0 48 0 45 61	4 0 0 5 13	4 2 0 12 9	35 22 46 18 8	57 30 34 20 21	14 25 16 10 5	18 24 35 26 16	A-7-6 A-7-6 A-7-6 A-4a A-1-b	
599+00	CL 0.0-2.0 2.0-7.0 7.0-12.0 12.0-18.0 18.0-19.0 19.0-23.0 23.0-25.0	0 46 21 50 0 0 4	3 0 0 0 0 3 4	5 1 10 1 1 24 4	46 22 23 17 43 36 24	55 28 29 24 33 37 31	14 25 17 24 12 8 11	22 27 27 24 20 20 11	A-7-6 A-7-6 A-6b A-7-6 A-6a A-4a A-6a	
601+00	CL 0.0-1.5 1.5-2.0	22	7	4	35	32	12	8	A-6a *	Light-Brown Weathered Sandstone
611+75	CL 0.0-3.0	21	2	3	52	22	NP	NP	A-4b	
620+00	CL 0.0-4.0 4.0-9.0 9.0-13.0	0 31 50	2 0 0	3 10 1	63 23 17	30 31 35	11 14 14	30 29 24	A-6a Visual A-6a *	Brown Weathered Siliceous Shale Brown Weathered Siliceous Shale
622+00	CL 0.0-2.0 2.0-5.5	22	5	3	50	20	NP	NP	A-4b *	
624+00	CL 0.2-2.5 2.5-4.0	25	3	4	39	26	11	31	A-6a Visual	Brown Weathered Shale
624+00	95' Rt 0.0-3.0 3.0-4.0	0	2	3	50	27	4	13	A-4b Visual	Brown Broken Clay Shale
625+25	CL 0.0-4.0	26	3	2	30	37	38	13	A-7-6 *	
626+00	60' Lt 0.2-4.0	21	2	2	27	47	17	20	A-7-6	
626+00	90' Rt 1.0-6.0	23	0	2	31	24	35	11	A-6a	
627+95	CL 0.0-4.5	24	0	2	38	30	26	12	A-6a *	
633+40	CL 0.2-5.0 5.0-7.0	0 15	0 1	0 1	28 21	30 21	12 12	12	A-6a Visual	Brown Weathered Siliceous Shale Brown Weathered Siliceous Shale
633+75	CL 0.0-4.0	0	0	0	40	21	15	15	Visual	Brown Weathered Shale
633+42	22' Rt 0.0-5.0 5.0-8.0	0 1	0 1	0 1	24 26	30 27	12 12	12	A-6a Visual *	Brown Weathered Siliceous Shale Brown Weathered Siliceous Shale
635+50	120' Lt 0.2-4.0 4.0-6.0 6.0-9.0	0 25 25	1 1 1	2 1 2	51 47 41	45 41 41	10 14 14	20 17 6	A-4b A-7-6 Visual	Brown Broken Clay Shale
638+35	10' Rt 0.0-4.0 4.0-9.0 9.0-11.0 11.0-14.0 14.0-17.0 17.0-24.0 24.0-27.5	0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0	21 20 24 24 24 24 24	42 42 42 42 42 42 42	17 15 13 12 12 12 12	17 25 13 12 12 12 12	A-7-C A-7-6 Visual Visual Visual Visual Visual	Reddish-Brown Weathered Indurated Clay Red Weathered Indurated Clay Brown and Gray Clay Bedrock
643+00	CL 0.2-2.0 2.0-4.0	15	3	0	30	41	37	11	A-6a *	Light-Brown Weathered Siliceous Shale
650+50	CL 0.4-5.0 5.0-9.0	0 0	0 0	2 2	28 42	45 57	13 14	21	A-7-6 A-6a	
655+00	60' Lt 0.4-5.0 5.0-7.0	47	2	1	17	53	25	19	A-7-6 Visual	Brown Weathered Indurated Clay
663+20	CL 0.4-7.0 7.0-13.0	0 30	0 3	4 2	40 27	40 30	17 15	24	A-6b A-7-6	
663+00	CL 0.4-4.0 4.0-7.0	0	2	2	44	52	37	12	A-6a Visual	Brown Weathered Siliceous Shale
669+25	CL 0.4-6.0 6.0-9.0	0 40	3 3	3 2	39 27	54 27	14 12	12	A-7-6 A-7-6 *	
672+25	CL 0.4-3.0 3.0-8.0 8.0-12.0 12.0-15.0	0 15 13 12	2 0 0 0	2 0 0 0	30 38 38 30	58 54 44 44	22 19 13 12	19	A-7-6 Visual Visual Visual	Brown Weathered Siliceous Shale Brown Weathered Shale Brown Weathered Siliceous Shale
673+05	CL 0.4-4.0 4.0-10.0	45 32	4 2	2 4	20 32	27 23	17 16	21	A-7-6 *	
676+00	CL 0.4-4.0 4.0-5.0	0	1	3	39	57	40	17	A-6a *	
678+50	CL 0.3-3.0	0	0	0	40	27	15	15	Visual	Red Broken Clay Shale
681+00	CL 0.4-3.0 3.0-7.0	26 52	5 7	3 3	30 17	33 20	25 14	11	A-4a A-7-6	
681+00	130' Lt 0.4-4.0 4.0-9.0	0	7	6	40	47	30	11	A-6a Visual	Brown Weathered Siliceous Shale
687+50	CL 0.3-3.5	0	0	0	40	47	30	11	Visual	Light-Brown Weathered Indurated Clay
691+90	CL 0.3-3.0 3.0-9.0	66 2	2 2	9 9	20 20	41 41	14 5	14	A-7-6 *	Visual
695+85	80' Lt 0.3-5.0 5.0-10.0 10.0-16.0 16.0-21.0	0 0 0 0	0 0 0 0	0 0 0 0	20 20 20 20	41 41 41 41	14 14 14 14	15 15 15 13	Visual Visual Visual Visual	Red Broken Clay Shale Red Broken Clay Shale Reddish-Gray Weathered Indurated Clay Red Weathered Indurated Clay
696+00	CL 0.3-5.0 5.0-10.0	44	0	3	22	31	10	17	A-7-6	Brown Broken Clay Shale
696+00	150' Rt 0.3-6.0 6.0-12.0 12.0-16.0	0 31 44	1 1 2	1 2 1	26 26 33	62 40 42	38 20 42	12 11 17	A-6a A-6a A-7-6	Red Weathered Indurated Clay Red Weathered Indurated Clay Red Weathered Indurated Clay
697+00	60' Lt 0.3-5.0 5.0-10.0 10.0-14.0	50	0	2	44	25	-	17	A-7-6 Visual *	Red Weathered Indurated Clay
697+00	100' Rt 0.3-5.0 5.0-10.0 10.0-15.0 15.0-18.0	0 26 26 0	1 2 2 0	3 36 31 36	32 31 33 33	25 25 25 25	12 12 12 12	10	A-6a A-6a Visual Visual	Reddish-Gray Weathered Indurated Clay Reddish-Gray Weathered Indurated Clay Brown and Gray Clay Bedrock
700+05	CL 0.2-5.0 5.0-10.0	27 20	2 0	6 1	31 18	35 18	26 12	13	A-6a A-6a	
701+85	CL 0.3-3.0 3.0-10.0 10.0-14.0	44 27	1 1	2 1	21 20	32 42	51 41	24 11	A-7-6 A-7-5 *	Red Weathered Indurated Clay
702+85	CL 0.3-6.0 6.0-10.0	37	3	5	22	33	41	15	A-7-6 *	Brown Weathered Shale
707+30	CL 0.3-7.0 7.0-11.0	50	1	1	22	25	32	11	A-6a Visual	Brown Weathered Indurated Clay
712+00	CL 0.3-7.0 7.0-10.0	34 36	1 1	1 2	27 15	27 26	30 47	13 18	A-6a A-7-5	
717+00	80' Lt 0.3-5.0	52	2	3	14	24	44	16	A-7-6	
717+00	CL 0.3-2.0 2.0-9.0	26 59	1 0	3 1	28 18	30 29	33 30	13 14	A-6a A-6a	
719+00	CL 0.3-3.0 3.0-7.0	39	1	0	22	35	61	22	A-7-6	Brown Weathered Shale
722+00	50' Pt 0.3-7.0 7.0-9.0	46	0	0	24	22	20	0	A-4a Visual	Brown Weathered Siliceous Shale
722+75	CL 0.3-6.0 6.0-10.0	40 44	0 1	1 2	19 23	40 34	49 34	21 11	A-7-6 A-6a	
730+65	CL 0.3-6.0 6.0-9.0	0	0	0	40	27	22	26	Visual	Red Weathered Indurated Clay Reddish-Gray Weathered Indurated Clay
610+75	CL 5.0-6.0	44	2	5	27	22	36	12	A-6a	
645+25	CL 5.0-6.0 10.0-10.5 15.0-15.5	0 0 0	0 0 0	0 0 0	20 20 20	41 41 41	14 14 14	17 15 17	Visual Visual Visual	Brown Extremely Weathered Shale Brown Extremely Weathered Shale Brownish-Red Extremely Weathered Shale

SOIL PROFILE
NOBLE COUNTY
NOB-IR 77-10.87

4
30

CROSS SECTION INDEX	
STATION	SHEET
618+50	8
624+00	9
626+00	9
633+50	9

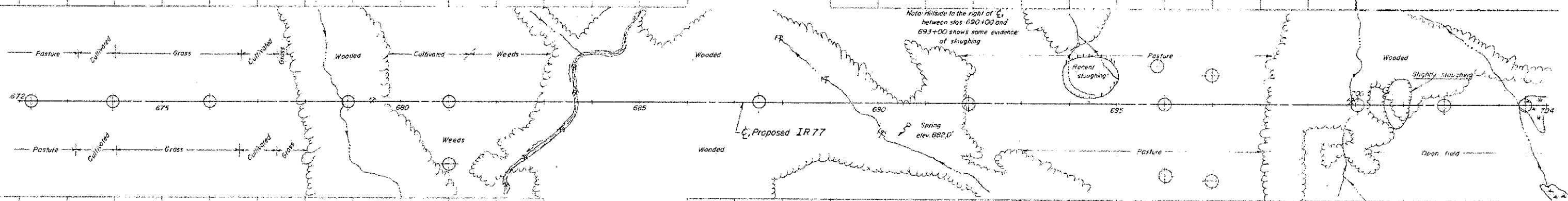
OHIO STATE HIGHWAY TESTING LABORATORY
1620 W. BROAD ST. COLUMBUS 23, OHIO



REVISED 7/20/65

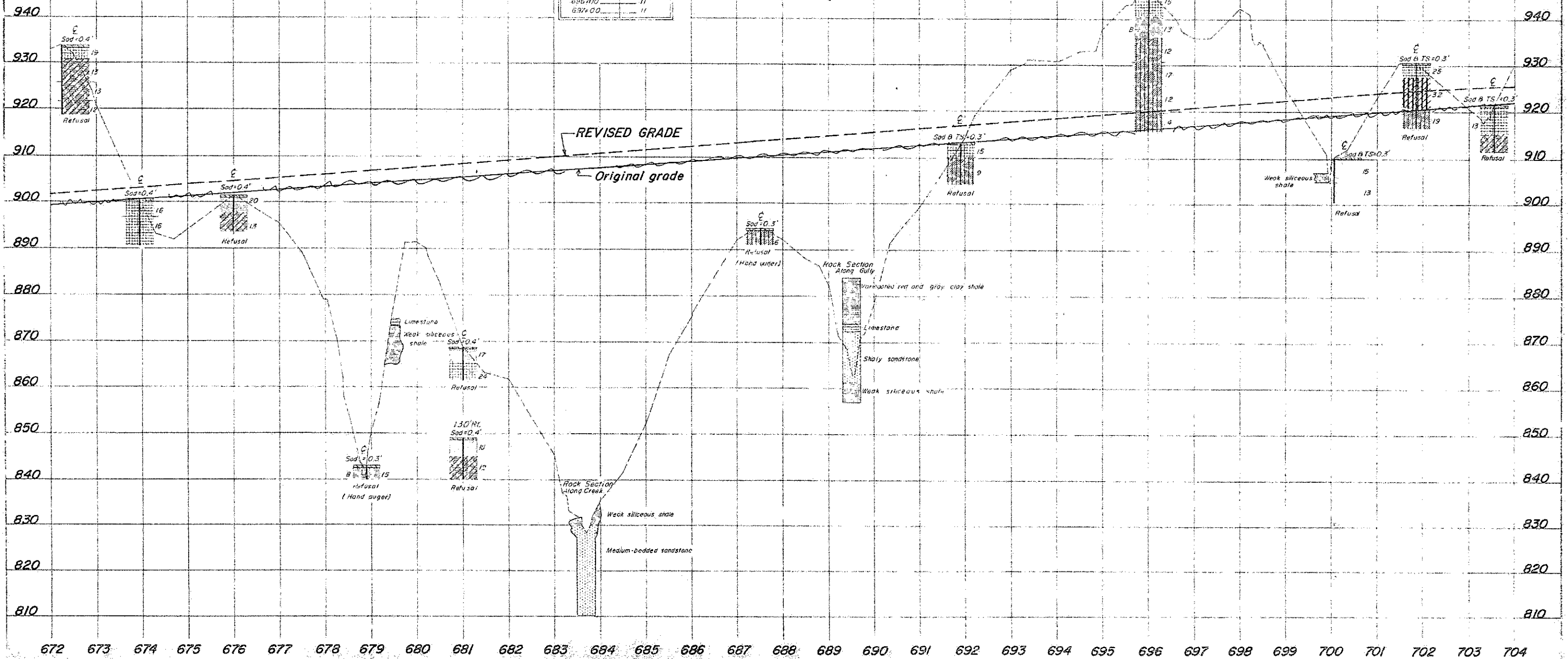
SOIL PROFILE
NOBLE COUNTY
NOB-IR 77-10.87

6
30



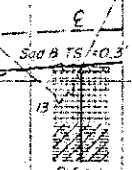
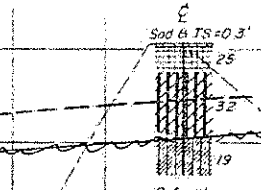
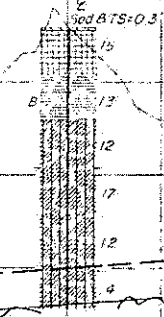
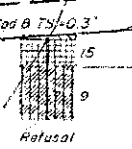
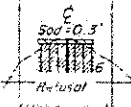
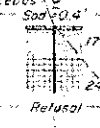
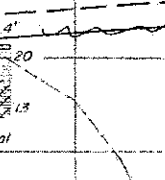
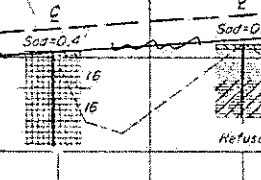
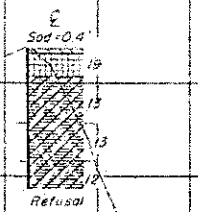
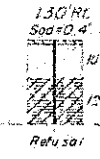
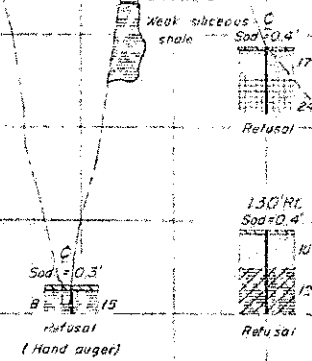
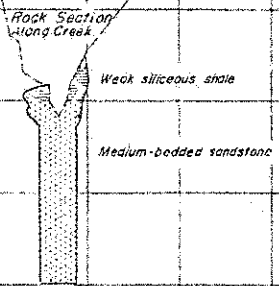
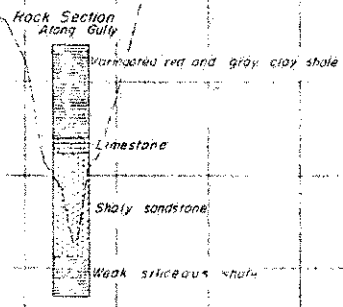
Note: Hillside to the right of C, between stas 690+00 and 693+00 shows some evidence of sloughing

CROSS SECTION INDEX	
STATION	SHEET
686+00	11
687+00	11

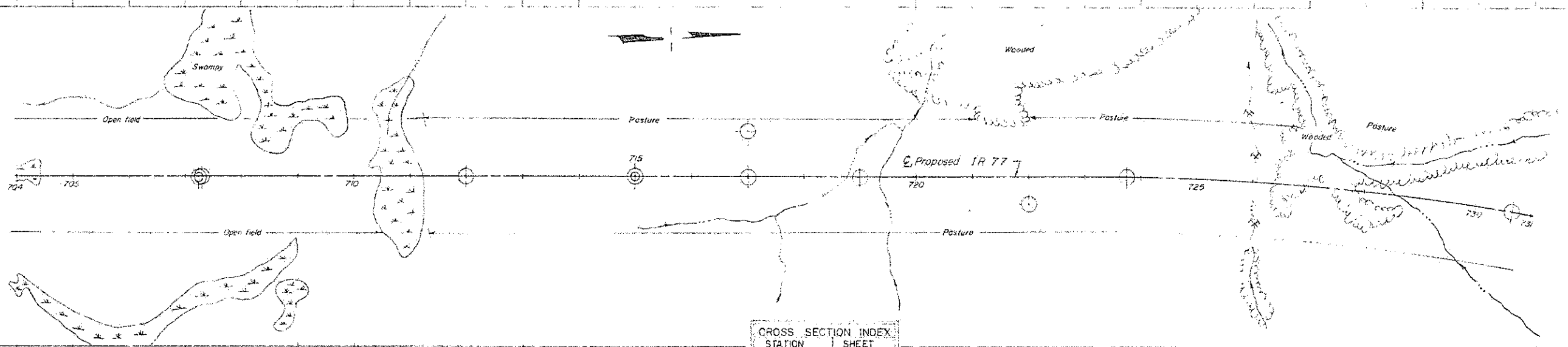


REVISED GRADE

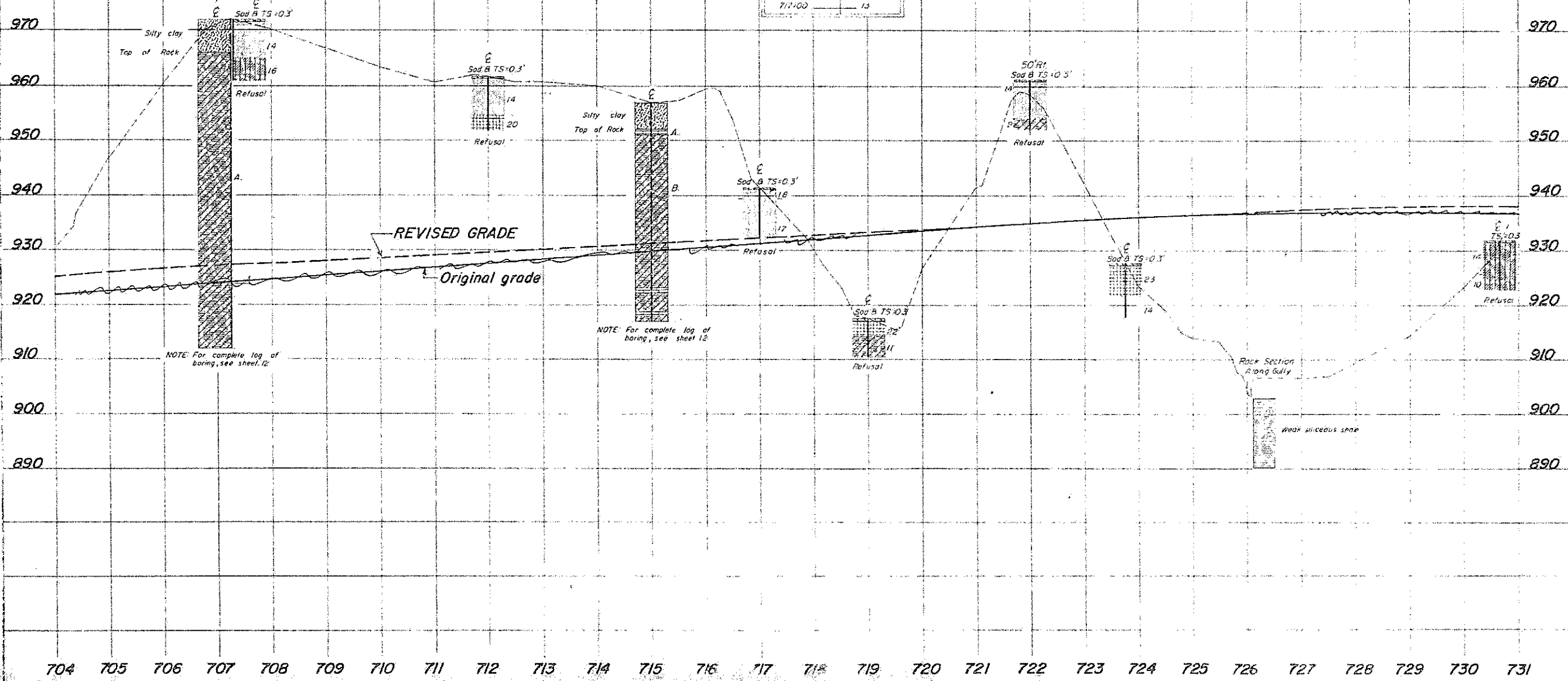
Original grade



REVISED 7/20/65



CROSS SECTION INDEX	
STATION	SHEET
707-50	12
715+00	12
717+00	13



NOTE: For complete log of boring, see sheet 12

NOTE: For complete log of boring, see sheet 12

Rock Section Along Gully
Wear siliceous shale

704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731