

Boring No. Y-4 Station & Offset 18+18.31, 5.94' Rt. Surface Elev. 738.8ft Project 04120056G

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class	
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
703.8																	
700.3	36	8/8/10			38.0'												
	38					Gray, very stiff, SILT, some clay, moist	12								17	VIS.	
	40																
	42																
695.8	44	3/6/6			43.0'	Gray, stiff, SILT AND CLAY, moist	13									26	VIS.
	46																
	48					48.0'	Gray, stiff, SANDY SILT, little clay, some gravel, damp	14	26	9	17	30	18	18	5	8	A-4a
	50																
690.3	52	3/4/8															
	54																
	56																
	58																
685.3	60	45/50-6"			53.5'	Gray, hard, SANDY SILT, some clay, little gravel, with cobbles and boulders, moist	15									9	VIS.
	62																
	64																
	66																
680.3	68	26/50-5"					16									5	VIS.
	70																
	72																
	74																
675.3	76	21/26/24			63.0'	Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, moist	17									9	VIS.
	78																
	80																
	82																
670.3	84	11/14/15			68.0'	Gray, very stiff, SANDY SILT, some clay, trace gravel, moist	18	2	6	17	44	31	24	8	18	A-4a	
	86																
	88																
	90																

Boring No. Y-4 Station & Offset 18+18.31, 5.94' Rt. Surface Elev. 738.8ft Project 04120056G

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class									
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.										
667.7																								
665.8	72	20/50-6"			73.0'	Brown, hard, SILT AND CLAY, moist	19									18	VIS.							
	74																							
	76																							
660.8	78	50-6"			78.0'	Gray, hard, SANDY SILT, little clay, damp	20									9	VIS.							
	80																							
	82																							
655.3	84	21/27/36				21										14	VIS.							
653.8				85.0'	BOTTOM OF BORING																			

Boring No. Y-4 Station & Offset 18+18.31, 5.94' Rt. Surface Elev. 738.8ft Project 04120056G

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
703.8																
	36															
700.3	38	8/8/10			38.0'											
	40					Gray, very stiff, SILT, some clay, moist	12								17	VIS.
	42															
695.8	44	3/6/6			43.0'	Gray, stiff, SILT AND CLAY, moist	13								26	VIS.
	46															
	48				48.0'											
690.3	50	3/4/8				Gray, stiff, SANDY SILT, little clay, some gravel, damp	14	26	9	17	30	18	18	5	8	A-4a
	52															
685.3	54	45/50-6"			53.5'	Gray, hard, SANDY SILT, some clay, little gravel, with cobbles and boulders, moist	15								9	VIS.
	56															
	58															
680.3	60	26/50-5"					16								5	VIS.
	62															
675.3	64	21/26/24			63.0'	Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, moist	17								9	VIS.
	66															
	68				68.0'											
670.3		11/14/15				Gray, very stiff, SANDY SILT, some clay, trace gravel, moist	18	2	6	17	44	31	24	8	18	A-4a
	70															

Boring No. Y-4 Station & Offset 18+18.31, 5.94' Rt. Surface Elev. 738.8ft Project 04120056G

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
667.7	72															
665.8	74	20/50-6"			73.0'	Brown, hard, SILT AND CLAY, moist	19								18	VIS.
	76															
660.8	78	50-6"			78.0'	Gray, hard, SANDY SILT, little clay, damp	20								9	VIS.
	80															
	82															
655.3	84	21/27/36					21								14	VIS.
653.8					85.0'	BOTTOM OF BORING										

GEOLOGY OF THE SITE

THE SITE IS LOCATED WHERE STILLWATER RIVER FLOWS FROM WEST TO EAST BENEATH SR 121. THE SITE’S TOPOGRAPHY IN THE IMMEDIATE AREA IS RELATIVELY FLAT TO MODERATELY SLOPING ALONG THE RIVERBANK. THE SITE IS LOCATED ON A RELATIVELY FLAT ALLUVIAL TERRACE, WHICH CONSISTS OF RECENT ALLUVIUM OVER GLACIAL OUTWASH DEPOSITS AND GLACIAL TILL FORMED DURING THE WISCONSIN GLACIATION. THE DEPTH TO ROCK IN THE IMMEDIATE PROJECT AREA IS ON THE ORDER OF 50 TO 75 FEET BELOW THE GROUND SURFACE. THE ALLUVIAL AND GLACIAL DEPOSITS ARE UNDERLAIN BY SEDIMENTARY ROCK CONSISTING OF DOLOMITE IDENTIFIED AS THE LOCKPORT DOLOMITE FORMATION. NO MAPPED KARST FEATURES ARE PRESENT IN THE CARBONATE DOMINANT GEOLOGY.

EXPLORATION

FOUR (4) STRUCTURE SOIL TEST BORINGS, IDENTIFIED AS B-1 THROUGH B-4, WERE DRILLED FOR THIS INVESTIGATION. TEST BORINGS B-1 THROUGH B-4 WERE DRILLED TO DEPTHS RANGING FROM 50 TO 60 FEET. THE TEST BORINGS WERE DRILLED WITH A TRUCK-MOUNTED DRILL RIG UTILIZING HOLLOW-STEM AUGERS (HSA) BETWEEN THE DATES OF OCTOBER 12 TO OCTOBER 15, 2004.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

AT THE ABUTMENTS, TEST BORINGS B-1 AND B-4 WERE DRILLED IN THE EXISTING S.R. 121 ROADWAY PAVEMENT. AT THE GROUND SURFACE, THESE TWO TEST BORINGS ENCOUNTERED APPROXIMATELY 2 INCHES OF ASPHALT PAVEMENT FOLLOWED BY APPROXIMATELY 12 INCHES OF CONCRETE PAVEMENT. TEST BORINGS B-2 AND B-3 ENCOUNTERED APPROXIMATELY 10 INCHES OF REINFORCED CONCRETE AT THE BRIDGE DECK.




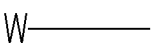
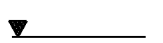





BENEATH THE PAVEMENT MATERIALS IN ABUTMENT TEST BORINGS B-1 AND B-4, FILL MATERIAL CONSISTING OF SILT AND CLAY (A-6A) WAS ENCOUNTERED TO DEPTHS RANGING FROM 5 TO 13.5 FEET. BENEATH THE FILL THE ABUTMENT TEST BORNIGS ENCOUNTERED SILT AND CLAY (A-6A), SANDY SILT (A-4A), COARSE AND FINE SAND (A-3A).

ALL FOUR TEST BORINGS ENCOUNTERED GRAVEL AND/OR STONE FRAGMENTS WITH VARYING AMOUNTS OF SAND, SILT AND CLAY (A-2-7 AND A-1-A) BEGINNING AT THE APPROXIMATE STREAMBED ELEVATION. THESE GRANULAR MATERIALS WERE INTERBEDDED WITH GLACIAL TILL CONSISTING OF SANDY SILT (A-4A) AND SILT (A-4B) LAYERS AND COBBLES AND BOULDERS DOWN TO THE BORING TERMINATION DEPTHS.

GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND RANGED IN DEPTH FROM 18 FEET TO 21.5 FEET. UPON COMPLETION OF THE TEST BORINGS THE GROUNDWATER DEPTHS RANGED FROM 14 FEET TO 19 FEET.

D50 VALUES WHICH HAVE BEEN CALCUALTED FOR THE SCOUR ANALYSIS CAN BE FOUND ON PAGE NO. 4 AND 5.

LEGEND

-  AUGER BORING LOCATION
-  PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION
-  TOP OF ROCK
-  INDICATES FREE WATER ELEVATION
-  INDICATES STATIC WATER ELEVATION
-  HORIZONTAL BAR ON BORING INDICATES THE DEPTH THE SAMPLE WAS TAKEN - PROFILE VIEW FIGURES BESIDE THE BORING 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
-  Z = NUMBER OF BLOWS FOR THIRD 6 INCHES

SYMBOLS OF ROCK TYPES

-  Fire Clay or Underclay
-  Weathered Mudstone
-  Mudstone
-  Weathered Shale
-  Shale
-  Weathered Clay-Shale
-  Clay-Shale
-  Boulders or Cobbles
-  Weathered Siltstone
-  Siltstone
-  Weathered Sandstone
-  Sandstone
-  Leached Dolomite
-  Dolomite
-  Leached Limestone
-  Limestone

PARTICLE SIZE DEFINITIONS

	300 mm	75 mm	2.0 mm	0.42 mm	0.074 mm	0.005 mm
Boulders	Cobbles	Gravel	Coarse Sand	FINE SAND	Silt	Clay
		No. 10 SIEVE	No. 40 SIEVE	No. 200 SIEVE		

NOTES

ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATIONS SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR’S OFFICE, THE OFFICE OF MATERIALS MANAGEMENT AT 1600 WEST BROAD STREET, THE OFFICE OF ROADWAY ENGINEERING OR THE OFFICE OF STRUCTURAL ENGINEERING AT 25 SOUTH FRONT STREET, COLUMBUS, OHIO 43215.

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECH-ANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 2 INCH O.D., 1-3/8” I.D. SPLIT SPOON SAMPLING DE-VICE, AT 2-1/2 AND/OR 5 FOOT DEPTH INTERVALS, DRIVEN BY MEANS OF A 140 lb. HAMMER WITH A FREE FALL OF 30 INCHES. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLING DEVICE THREE 18 INCH INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED ROTARY-TYPE DRILLING MACHINE, EMPLOYING A 2 INCH O.D. THIN WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILLING MACHINE.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILLING MACHINE, EMPLOYING AN NO CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS DISPLAY A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVA-TION OF THE SAMPLE, TYPE OF SAMPLE, THE STANDARD PENETRATION TEST READINGS IN THREE 6 INCH INCRE-MENTS, DEPTH AND ELEVATION OF PRESS SAMPLES, FIELD NUMBER ASSIGNED TO SAMPLE, SAMPLE DESCRIPTION-BASED ON LABORATORY TESTS UTILIZING GRADATION, PLASTICITY AND MOISTURE CONTENT DETERMINATIONS. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, WILL APPEAR GRAPHICALLY ON SEPARATE ENCLOSURES. ROCK SAMPLES ARE DISPLAYED ON THE LOG SHEETS INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, AMOUNT OF RECOVERY AND A VISUAL CLASSIFICATION BASED ON TYPE, COLOR, DEGREE OF HARDNESS, GRAIN SIZE, DETERIORATION, BED-DING ACID REACTION AND OTHER QUALIFYING FACTORS.

AT DEPTHS WHERE MATERIALS ARE BOULDERY OR GRAVEL-LY TO THE EXTENT THAT A SAMPLER CANNOT BE UTILIZED, A WASH SAMPLE IS PROCURED AND VISUALLY CLASSIFIED, IN ORDER TO DETERMINE THE GENERAL CHARACTERISTICS OF THE MATERIAL. THESE SAMPLES ARE NOT CONSIDERED SUFFICIENTLY REPRESENTATIVE TO WARRANT LABORATORY TESTING.

CTI ENGINEERING, INC.
1451 S.R. 28 BLOC. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE
02-27-06

REVIEWED
NT

DRAWN
C.N.

DESIGNED

FILE NUMBER

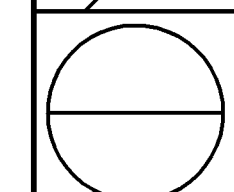
STRUCTURE

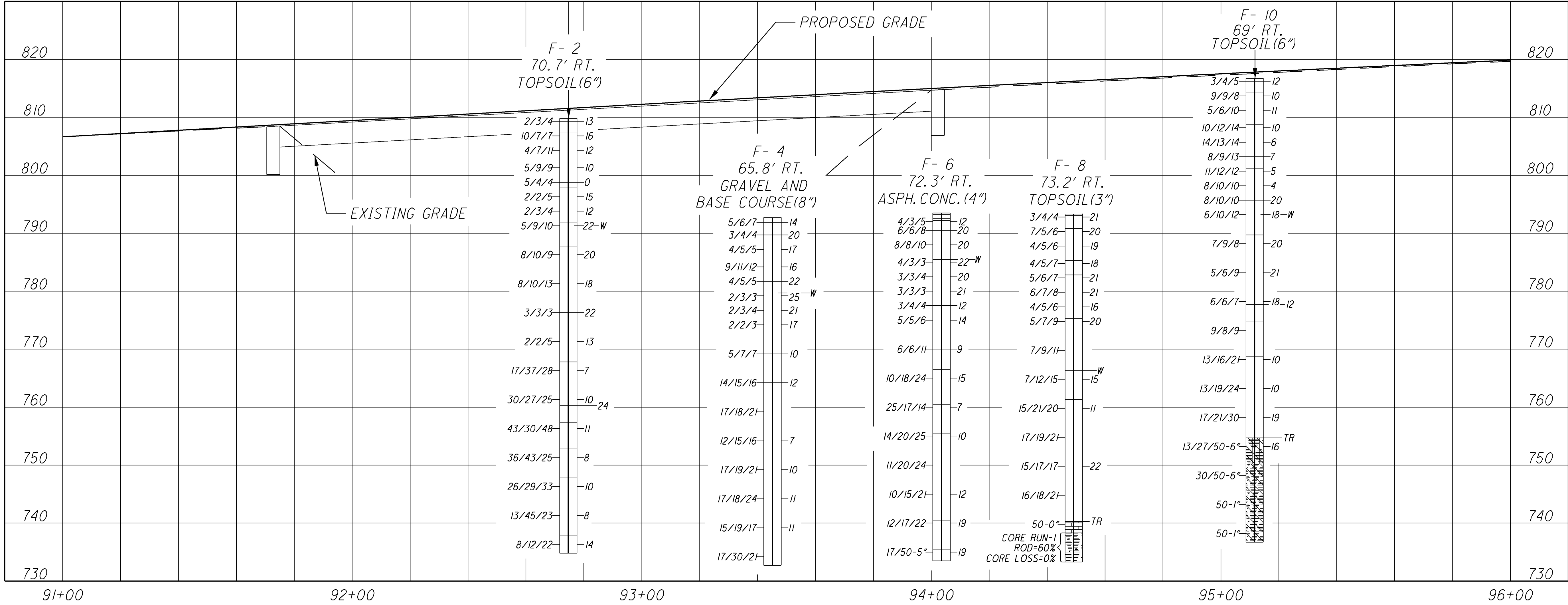
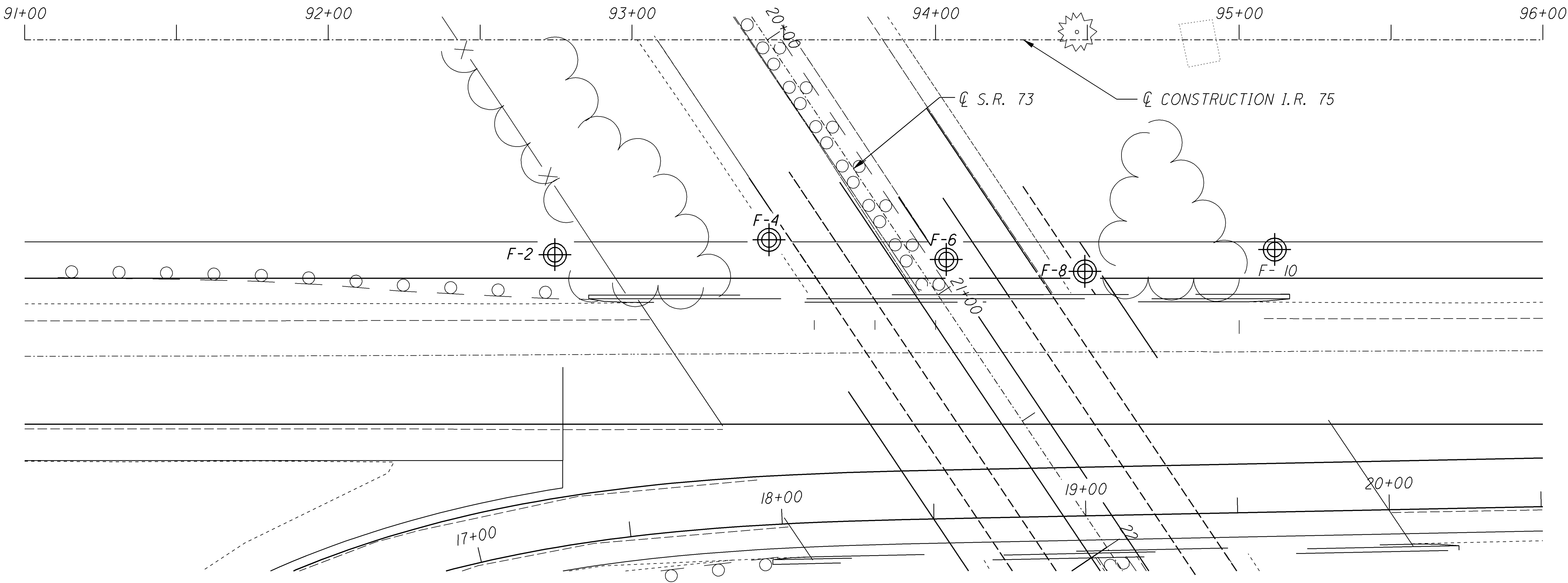
FOUNDATION INVESTIGATION

WAR-75-3.40

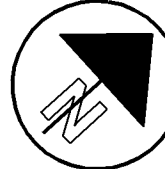
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91+00 92+00 93+00 94+00 95+00 96+00



0 20 40
HORIZONTAL
SCALE IN FEET

DATE
02-27-06

REVIEWED
NT

DRAWN
C.N.

DESIGNED
CHECKED

STRUCTURE FILE NUMBER

STRUCTURE FOUNDATION INVESTIGATION

BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

3 15

Date Started1/25/05

Sampler: TypeSS

Dia.1.375"

Date Completed1/26/05

Casing: Length80ft

Dia.3.25"

Boring No.F- I

Station & Offset9I+79.8I, 67.2 Lt.

Water Elev.786.8ft

Surface Elev.807.8ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
807.8 807.1	0 —	3/2/3		0.7'	Topsoil (8")										
807.8 807.1	—				Brown, medium stiff, SANDY SILT, damp	1								II	VIS.
805.3 804.8	2 —	9/16/10		2.5'											
805.3 804.8	—				Brown, very stiff, SANDY SILT, damp	2								I3	VIS.
802.8 802.3	4 —	11/11/10		5.0'											
802.8 802.3	—				Brown, very stiff, SANDY SILT, little gravel, little clay, damp	3	18	14	26	27	15	22	6	II	A-4a
799.3	6 —	7/10/11		10.0'											
799.3	—					4								I4	VIS.
796.8	8 —	2/3/5		13.0'											
796.8	—				Brown, medium stiff, SANDY SILT, little gravel, little clay, moist to wet	5								22	VIS.
794.8 794.3	12 —	5/7/8		18.0'											
794.8 794.3	—				Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, little silt, little clay, damp	6	36	20	24	14	6	NP	NP	9	A-1-b
791.8	14 —	5/4/6		20.5'											
791.8	—				Brown, loose, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, little silt, little clay, damp	7									VIS.
789.8 789.3	16 —	3/6/6		23.5'											
789.8 789.3	—				Gray, stiff, SILTY CLAY	8								II	VIS.
787.3 786.8	18 —	3/2/5		33.0'											
787.3 786.8	—				Gray to brown, medium stiff, SILT, and sand, trace clay, moist	9	0	0	38	57	5	NP	NP	18	A-4b
784.3	20 —	2/4/8													
784.3	—				Gray to brown, stiff, SILT, and sand, trace clay, moist	10								22	VIS.
779.3	22 —	9/8/11													
779.3	—				Gray to brown, very stiff, SILT, and sand, trace clay, moist	11								22	VIS.
774.8 774.3	24 —	4/4/7													
774.8 774.3	—				Gray, stiff, SANDY SILT, some clay, little gravel, damp, till	12	11	12	16	32	29	20	4	12	A-4a

Boring No. F- I

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
772.8	36 —	5/7/9													
769.3	—				Gray, very stiff, SANDY SILT, some clay, little gravel, damp, till	13								10	VIS.
764.3	38 —	3/7/15													
764.3	—					14								10	VIS.
759.8 759.3	40 —	9/13/22		48.0'											
759.8 759.3	—				Gray, hard,SILT, some sand, little gravel, trace clay, damp, fill	15	17	11	13	26	33			12	A-4b
756.3	42 —	13/40/23		51.5'											
756.3	—					16								12	VIS.
754.3	44 —	25/25/25		57.0'											
754.3	—				Gray, very dense,GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, damp	17									
750.8	46 —	3/5/9		62.0'											
750.8	—					18								13	VIS.
749.3	48 —	11/15/21		68.5'											
749.3	—				Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY, damp	19									
745.8	50 —														
744.3	52 —														
739.3	54 —														
739.3	—				Gray, hard, SANDY SILT, little gravel, little clay, damp	19								13	VIS.
	56 —														
	58 —														
	60 —														
	62 —														
	64 —														
	66 —														
	68 —														
	70 —														

Date Started1/25/05
Date Completed1/26/05

Sampler: TypeSS
Casing: Length80ft

Dia.1.375"
Dia.3.25"

Water Elev.786.8ft
Surface Elev.807.8ft

Boring No.F- I
Station & Offset9I+79.8I, 67.2 Lt.

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
807.8 807.1	0 —	3/2/3		0.7'	Topsoil (8")										
807.8 807.1	— 2				Brown, medium stiff, SANDY SILT, damp	1								II	VIS.
805.3 804.8	2 —	9/16/10		2.5'											
805.3 804.8	— 4				Brown, very stiff, SANDY SILT, damp	2								I3	VIS.
802.8 802.3	4 —	11/11/10		5.0'											
802.8 802.3	— 6				Brown, very stiff, SANDY SILT, little gravel, little clay, damp	3	18	14	26	27	15	22	6	II	A-4a
799.3	6 —	7/10/11		10.0'											
799.3	— 10					4								I4	VIS.
796.8	10 —	2/3/5		13.0'											
796.8	— 12				Brown, medium stiff, SANDY SILT, little gravel, little clay, moist to wet	5								22	VIS.
794.8 794.3	12 —	5/7/8		18.0'											
794.8 794.3	— 14				Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, little silt, little clay, damp	6	36	20	24	14	6	NP	NP	9	A-1-b
791.8	14 —	5/4/6		20.5'											
791.8	— 16				Brown, loose, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, little silt, little clay, damp	7									VIS.
789.8 789.3	16 —	3/6/6		23.5'											
789.8 789.3	— 18				Gray, stiff, SILTY CLAY	8								II	VIS.
787.3 786.8	18 —	3/2/5		33.0'											
787.3 786.8	— 20				Gray to brown, medium stiff, SILT, and sand, trace clay, moist	9	0	0	38	57	5	NP	NP	18	A-4b
784.3	20 —	2/4/8													
784.3	— 22				Gray to brown, stiff, SILT, and sand, trace clay, moist	10								22	VIS.
779.3	22 —	9/8/11													
779.3	— 24				Gray to brown, very stiff, SILT, and sand, trace clay, moist	11								22	VIS.
774.8 774.3	24 —	4/4/7													
774.8 774.3	— 26				Gray, stiff, SANDY SILT, some clay, little gravel, damp, till	12	11	12	16	32	29	20	4	12	A-4a

Boring No. F- I

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
772.8	36 —	5/7/9			Gray, very stiff, SANDY SILT, some clay, little gravel, damp, till	13									
769.3	38 —														
769.3	40 —														
769.3	42 —														
764.3	44 —	3/7/15				14									
764.3	— 46														
759.8 759.3	48 —	9/13/22		48.0'	Gray, hard,SILT, some sand, little gravel, trace clay, damp, fill	15	17	11	13	26	33			12	A-4b
759.8 759.3	— 50														
756.3	52 —	13/40/23		51.5'	Gray, very dense,GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, damp	16									
756.3	— 54														
754.3	56 —														
754.3	— 58														
750.8	60 —	25/25/25		57.0'	Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY, damp	17									
750.8	— 62														
749.3	62 —	3/5/9		62.0'	Gray, stiff, SANDY SILT, little gravel, little clay, damp	18									
749.3	— 64														
745.8	66 —														
745.8	— 68														
744.3	70 —	11/15/21		68.5'	Gray, hard, SANDY SILT, little gravel, little clay, damp	19									
744.3	— 72														

CTL ENGINEERING, INC
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE02-27-06
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STRUCTURE FILE NUMBER

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

4/15

LOG OF BORING (Continued)

Boring No. F-1

Elev. (ft)	Depth (ft)	Std. Pen. RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics							ODOT Class													
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.												
736.7																											
734.3	72	10/16/27		76.5'		20								12	VIS.												
	74																										
731.3	76	19/26/50-4"		76.5'																							
729.3	78															Gray, very dense, FINE SAND, little gravel, trace silt, trace clay, moist		21	19	15	57			NP	NP	15	A-3
727.8	80			80.0'																							
BOTTOM OF BORING																											

LOG OF BORING (Continued)

Boring No. F- 1

Elev. (ft)	Depth (ft)	Std. Pen. RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class			
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
736.7	72	10/16/27				20											VIS.	
734.3	74																	12
731.3	76																	
729.3	78						19/26/50-4"	76.5'	Gray, very dense, FINE SAND, little gravel, trace silt, trace clay, moist	21	19	15	57		NP	NP		15
727.8	80	80.0'																
BOTTOM OF BORING																		

LOG OF BORING

Date Started 1/26/05
Date Completed 1/26/05

Sampler: Type SS
Casing: Length 75ft

Dia. 1.375"
Dia. 3.25"

Water Elev. 791.3ft
Surface Elev. 809.8ft

Boring No. F- 2

Station & Offset 92+74.63, 70.7 Rt.

Elev. (ft)	Depth (ft)	Std. Pen. RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class												
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.													
809.8	0	2/3/4		0.5'	Topsoil (6")																						
809.8					1	Brown, loose, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY, damp, fill									13	VIS.											
809.3																											
807.3	2																										
806.8		10/7/7		2.5'	Brown, medium dense, COARSE AND FINE SAND, little gravel, little silt, little clay, damp, fill	2							NP	NP	12	A-3a											
804.3	4																3	15	18	37	20	10					
801.3	6																						4				
798.8	8																5										
797.8	10	5/4/4	11.0'	Brown, loose,COARSE AND FINE SAND, little gravel, little silt, little clay, damp, fill	5																						
796.3	12																										
793.8	14															6									15	VIS.	
791.8	16																										7
791.3	18	5/9/10	18.0'	Brown, very stiff, SILT, little sand, moist, till	8								22	VIS.													
787.8	20																										
786.3	22														8/10/9	22.0'	Gray, very stiff, SILT, some sand, trace clay, moist	9	0	0	33	59	8	NP	NP	20	A-4b
781.3	24																										
776.3	26	10										18	VIS.														
776.3	28													3/3/3													
	30																										
	32																										
	34																										

CTI ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE 02-27-06
FILE NUMBER

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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

5/15

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Boring No. F- 2

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
774.8															
	36	2/2/5		37.0'											
772.8															
	38				Gray, medium stiff, SANDY SILT, some clay, little gravel, damp, till	12	14	19	16	28	23	21	7	13	A-4a
771.3															
	40														
767.8	42	17/37/28		42.0'											
766.3					13									7	VIS.
	44														
	46														
762.8		30/27/25		49.5'	Brown and gray, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, damp	14A	53	11	9	20	7	NP	NP	10	A-2-4
761.3						14B								24	VIS.
760.3	50				Brown, very dense, COARSE AND FINE SAND, little gravel, moist										
	52														
757.3					43/30/48		52.5'								
756.3															
	54	Brown, very dense, COARSE AND FINE SAND, some gravel, damp	15											11	VIS.
	56														
752.8		36/43/25		57.0'											
	58														
751.3					Brown, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, damp	16								8	VIS.
	60														
747.8	62				26/29/33		62.0'								
746.3		Gray, hard, SANDY SILT, little gravel, little clay, damp, till	17	19				24	14	26	17	21	7	10	A-4a
	64														
	66	13/45/23													
741.3					18										
	68														
	70														

Boring No. F- 2

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
738.7															
737.8	72	8/12/22		72.0'											
736.3				Gray, hard, SILTY CLAY, little gravel, little sand, moist, till	19									14	VIS.
	74														
734.8															
BOTTOM OF BORING															

LOG OF BORING

Date Started 1/26/05
Date Completed 1/26/05

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>75ft</u>	Dia.	<u>3.25"</u>

Water Elev.	<u>791.3ft</u>
Surface Elev.	<u>809.8ft</u>

Boring No. F- 2 Station & Offset 92+74.63, 70.7 Rt.

[illegible]

Boring No. F- 2

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
774.8															
	36	2/2/5		37.0'											
772.8															
	38														
771.3															
	40	17/37/28		42.0'	Gray, medium stiff, SANDY SILT, some clay, little gravel, damp, till	12	14	19	16	28	23	21	7	13	A-4a
767.8	42														
	44					13								7	VIS.
766.3															
	46	30/27/25		49.5'											
762.8															
	48														
761.3															
760.3	50	43/30/48		52.5'	Brown and gray, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, damp	14A	53	11	9	20	7	NP	NP	10	A-2-4
	52				Brown, very dense, COARSE AND FINE SAND, little gravel, moist	14B								24	VIS.
757.3															
756.3	54				Brown, very dense, COARSE AND FINE SAND, some gravel, damp	15								11	VIS.
	56	36/43/25		57.0'											
752.8															
	58														
751.3					Brown, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, damp	16								8	VIS.
	60	26/29/33		62.0'											
747.8	62														
	64				Gray, hard, SANDY SILT, little gravel, little clay, damp, till	17	19	24	14	26	17	21	7	10	A-4a
746.3															
	66	13/45/23													
	68														
741.3						18								8	VIS.
	70														

Boring No. F- 2

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
738.7															
737.8	72	8/12/22		72.0'											
736.3	74				Gray, hard, SILTY CLAY, little gravel, little sand, moist, till	19								14	VIS.
734.8				75.0'	BOTTOM OF BORING										

Date Started 1/12/05
Date Completed 2/1/05

Sampler: Type SS Dia. 1.375"
Casing: Length 60ft Dia. 3.25"

Boring No. F- 3 Station & Offset 92+48.54, 71.9 Lt.

Water Elev. 755.2ft
Surface Elev. 790.2ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
790.2	0														
789.7	—	2/3/4		0.5'	Topsoil (6")										
	2				Brown, medium stiff, SANDY SILT, little clay, trace gravel, moist,	1	2	3	38	39	18	NP	NP	19	A-4a
787.7	—			2.5'											
787.2	—	9/11/12			Brown, very stiff, SILT, some clay, little sand, moist	2								18	VIS.
786.2	4			4.0'											
784.7	6	7/9/13			Gray, very stiff, SILT, some clay, little sand, moist	3	0	0	19	60	21	NP	NP	20	A-4b
	8														
781.7	—	6/7/7			Gray, stiff, SILT, some clay, little sand, moist	4								22	VIS.
	10														
779.2	—	6/8/8			Gray, very stiff, SILT, some clay, little sand, moist	5								17	VIS.
	12			13.0'											
777.2	—	5/7/8			Gray, stiff, SANDY SILT, some clay, trace gravel, damp, till	6								11	VIS.
776.7	14														
774.2	16	6/7/9			Gray, very stiff, SANDY SILT, some clay, trace gravel, damp, till	7	3	12	23	30	32	17	3	10	A-4a
	18														
771.7	—	7/8/8				8								10	VIS.
	20														
	22														
766.7	—	5/6/6			Gray, stiff, SANDY SILT, some gravel, little clay, damp, till	9	32	10	16	22	20	20	6	10	A-4a
	24														
	26			26.5'											
763.7	—														
	28	28/27/30			Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, damp, till	10	52	6	11	14	17	24	10	8	A-2-4
761.7	—														
	30														
758.2	32			32.0'											
756.7	—	15/17/18			Gray, hard, SANDY SILT, little gravel, little clay, damp, till	11								8	VIS.
	34														

Boring No. F- 3

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
755.2	—														
	36														
	—														
751.7	38	16/17/21				12									NO REC.
	40														
	42														
746.7	—	9/12/20			Gray, hard, SANDY SILT, little gravel, little clay, moist, till	13								20	VIS.
	44														
	46														
	48														
741.7	—	17/19/18			Gray, hard, SANDY SILT, little gravel, little clay, moist, till	14	16	28	16	22	18	21	6	20	A-4a
	50														
	52														
736.7	—	22/30/18				15									VIS.
	54														
	56														
	58														
731.7	—	50-6"				16									NO REC.
730.2	60			60.0'	BOTTOM OF BORING										

Date Started 2/8/05 Sampler: Type SS Dia. 1.375"
Date Completed 2/8/05 Casing: Length 60ft Dia. 3.25"

Boring No. F- 4 Station & Offset 93+45.15, 65.8 Rt. Water Elev. 779.7ft
Surface Elev. 792.7ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
792.7	0														
792.7		5/6/7		0.8'	GRAVEL AND/OR STONE FRAGMENTS WITH SAND, base course (8")	1	12	4	43	31	10	NP	NP	14	A-4a
791.9						Brown and gray, stiff, SANDY SILT, little gravel, trace clay, damp									
	2														
789.7		3/4/4		3.0'	Brown and gray, medium stiff, SANDY SILT, little clay, trace gravel, moist	2								20	VIS.
	4														
787.2		4/5/5			Brown and gray, stiff, SANDY SILT, little clay, trace gravel, moist	3	7	3	46	31	13	NP	NP	17	A-4a
	6														
784.7	8			8.0'											
784.2		9/11/12	Gray, very stiff, SILT, little sand, little clay, moist		4								16	VIS.	
	10														
781.7		4/5/5		11.0'	Gray, stiff, SILT, little sand, little clay, moist	5								22	VIS.
	12														
779.2		2/3/3			Gray, medium stiff, SILT, little sand, little clay, moist	6	0	0	18	64	18	NP	NP	25	A-4b
	14														
776.7	16														
		2/3/4				7							21	VIS.	
	18														
774.2		2/2/3											17	VIS.	
	20				8										
	22														
769.2		5/7/7													
	24		23.5'	Gray, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, damp		9	31	19	16	16	18	18	5	10	A-2-4
	26														
	28			28.5'											
764.2		14/15/16	Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, trace silt, trace clay, damp		10	39	49	8	1	3	NP	NP	12	A-1-b	
	30														
	32														
759.2		17/18/21													
	34					11									

Boring No. F- 4

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
757.7															
	36	12/15/16				12								7	VIS.
754.2	38														
	40														
	42	17/19/21				13								10	VIS.
749.2	44														
	46														
745.7		17/18/24		47.0'	Gray, hard, SANDY SILT, some gravel, some clay, damp, fill	14	21	12	17	29	21	21	6	11	A-4a
744.2	48														
	50														
	52														
	54	15/19/17				15								11	VIS.
	56														
	58														
739.2															
734.2		17/30/21				16									NO REC.
732.7	60			60.0'	BOTTOM OF BORING										

CTL ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
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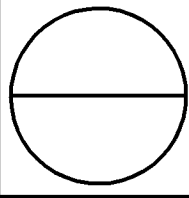
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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

8/15



Date Started2/24/05Date Completed2/24/05

Sampler: TypeSSDia.1.375"Caseing: Length60ftDia.3.25"

Boring No.F- 5Station & Offset93+03.92, 76.1 Lt.

Water Elev.Surface Elev.791.4ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aga	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
791.4	0				Asphalt (2")										VIS.
791.2	1.0'				Concrete (10")										VIS.
790.4					Gray, GRAVEL AND/OR STONE FRAGMENTS, fill										
789.4	2	7/7/8		1.8'	Gray and brown, stiff, SILT, damp	1								15	VIS.
787.9														17	VIS.
	4	9/12/15			Gray and brown, very stiff, SILT, damp	2									
785.9															
	6	12/14/16		5.5'	Gray, hard, SILT, some sand, trace clay, moist	3	0	0	33	58	9	NP	NP	19	A-4b
782.9														19	VIS.
	8	14/17/12			Gray, very stiff, SILT, some sand, trace clay, moist	4									
780.4															
	10	12/8/7		11.0'	Gray, stiff, SILT, little sand, trace clay, moist	5	0	0	19	73	8	NP	NP	20	A-4b
777.9															
	12														
775.4		7/8/9		13.5'	Gray, very stiff, SANDY SILT, some gravel, little clay, with cobbles, damp, till	6	27	11	15	30	17	19	6	9	A-4a
	14														
772.9		7/7/9				7								11	VIS.
	16														
772.9		7/10/12				8									NO REC.
	18														
767.9															
	20	12/15/22		23.5'		9									NO REC.
762.9															
	22														
	24														
759.4		17/23/34			Gray, hard, SANDY SILT, some clay, little gravel, with cobbles, damp, till	10	19	12	15	26	28	25	10	9	A-4a
	26														
757.9															
	28														
	30														
	32			32.0'											
	34	12/14/17			Brown, hard, CLAY, and sand, little gravel, little silt, damp, till	11	12	12	24	14	38	49	25	19	A-7-6

Boring No. F- 5

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aga	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
756.4															
	36														
	38														
752.9		14/18/20				12									NO REC.
	40														
749.4	42			42.0'											
747.9		17/19/21				13									VIS.
	44														
	46														
742.9		50-4"				14									NO REC.
	48														
	50														
	52														
737.9		14/16/17			Gray, hard, SANDY SILT, some clay, little gravel, with cobbles, with boulders, damp, fill	15	10	9	13	46	22	24	7	11	A-4a
	54														
	56														
	58														
732.9		15/18/19				16								10	VIS.
731.4	60			60.0'											
BOTTOM OF BORING															

CTI ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

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CHECKED

STRUCTURE FILE NUMBER

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

9/15

Date Started2/24/05Date Completed2/24/05

Sampler: TypeSSDia.1.375" Casing: Length60ftDia.3.25"

Boring No.F- 6Station & Offset94+03.52, 72.3 Rt.

Water Elev.785.5ftSurface Elev.793.5ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aga	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
793.5	0				Asphalt concrete (4")										
793.5				0.3'	Concrete (9")										
793.2				1.0'											
792.5					Gravel, gray, fill										
792.2				1.3'											
792.0	2	4/3/5			Brown, loose, FINE SAND, little silt, little clay, with wood fragments, fill	1								12	VIS.
790.5		6/6/8		3.0'	Gray, stiff, SANDY SILT, trace clay, moist	2								20	VIS.
	4														
788.0		8/8/10			Gray, very stiff, SANDY SILT, trace clay, moist	3	0	0	48	45	7	NP	NP	20	A-4a
	6														
	8			8.0'											
785.0		4/3/3			Gray, medium stiff, SILT, some sand, trace clay, moist	4	0	0	27	64	9	NP	NP	22	A-4b
	10														
782.5		3/3/4				5								20	VIS.
	12														
780.0		3/3/3				6								21	VIS.
	14														
777.5	16	3/4/4		16.0'	Gray, medium stiff, SANDY SILT, some clay, little gravel, damp, till	7	14	19	17	27	23	20	7	12	A-4a
	18														
775.0		5/5/6			Gray, stiff, SANDY SILT, some clay, little gravel, moist, till	8								14	VIS.
	20														
	22														
770.0		6/6/11		23.5'	Gray, very stiff, SANDY SILT, some clay, little gravel, damp, till	9								9	VIS.
	24														
	26														
766.5				27.0'											
	28														
765.0		10/18/24			Gray, hard, SILT, some clay, trace sand, damp, till	10	0	0	2	69	29	22	3	15	A-4b
	30														
	32														
760.5				33.0'											
760.0	34	25/17/14			Brown, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, with cobbles, damp	11								7	VIS.

Boring No. F- 6

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aga	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
758.5															
	36														
755.5	38			38.0'											
755.0		14/20/25				12								10	VIS.
	40														
	42														
750.0		11/20/24				13									NO REC.
	44														
	46														
	48														
745.0		10/15/21			Gray, hard, SILT AND CLAY, some gravel, trace sand, damp, till	14	23	4	2	30	41	27	11	12	A-6a
	50														
	52														
740.5				53.0'											
740.0		12/17/22			Brown, hard, CLAY, some sand, little gravel, trace silt, damp, till	15	19	9	14	1	57	47	21	19	A-7-6
	54														
	56														
735.5	58			58.0'											
735.0		17/50-5"			Greenish gray and gray, hard, SANDY SILT, little gravel, damp, till	16								19	VIS.
733.5	60			60.0'											
BOTTOM OF BORING															

Date Started1/11/05
Date Completed1/12/05

Sampler: TypeSS
Casing: Length60ft

Dia.1.375"
Dia.3.25"

Water Elev.781.1ft
Surface Elev.791.1ft

Boring No.F- 7

Station & Offset93+60.43, 62.9 Lt.

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
791.1	0														
791.1 790.7 790.6		1/2/2		0.4'	Topsoil (5") Brown, very loose, COARSE AND FINE SAND, little silt, little clay, damp	1								14	VIS.
	2														
788.1		3/4/4		3.0'		2								26	VIS.
	4														
785.6		3/4/4			Brown, loose, COARSE AND FINE SAND, little silt, little clay, moist	3	0	0	72	14	14	NP	NP	25	A-3a
	6														
782.6		5/6/8			Brown, medium dense, COARSE AND FINE SAND, little silt, little clay, moist	4								23	VIS.
	8														
	10			10.0'											
780.1		5/7/9			Gray, very stiff, SANDY SILT, little clay, moist	5	0	0	47	35	18	NP	NP	25	A-4a
	12														
777.6		5/7/10				6								18	VIS.
	14														
775.6 775.1		6/8/12			Gray, very stiff, SANDY SILT, little clay, moist	7	0	0	63	22	15	NP	NP	19	A-4a
	16														
773.1 772.6		9/12/16		18.0'	Gray, very stiff, SANDY SILT, some gravel, some clay, damp, till	8	24	13	18	19	26	20	5	13	A-4a
	20														
769.1				22.0'											
	22														
767.6		17/19/22			Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, damp	9									NO REC.
	24														
764.1				27.0'											
	26														
762.6		21/24/30			Gray, hard, SANDY SILT, some clay, with cobbles, with boulders, damp, till	10								8	VIS.
	28														
	30														
759.1				32.0'											
	32														
757.6		16/17/19			Brown, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, trace clay, damp	11	41	14	18	21	6	NP	NP	9	A-2-4
	34														

Boring No.F- 7

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
756.1															
	36														
754.1				37.0'											
	38														
752.6		17/21/23			Gray, hard, SILT AND CLAY, some sand, trace gravel, with cobbles, with boulders, damp, till	12								11	VIS.
	40														
	42														
747.6		19/24/32				13								13	VIS.
	44														
	46														
742.6		30/21/22				14								8	VIS.
	48														
	50														
	52														
737.6		12/14/16			Gray, very stiff, SILT AND CLAY, some sand, trace gravel, with cobbles, with boulders, moist, till	15	4	18	13	38	27	27	11	16	A-6a
	54														
	56														
	58														
732.6		13/15/17			Gray, hard, SILT AND CLAY, some sand, trace gravel, with cobbles, with boulders, moist, till	16								16	VIS.
731.1	60			60.0'	BOTTOM OF BORING										

CTL ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE02-27-06
FILE NUMBER

REVIEWEDNT
STRUCTURE

DRAWNC.N.
REVISED

DESIGNED
CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

11/15

Date Started 1/10/05
Date Completed 1/11/05

Sampler: Type SS Dia. 1.375"
Casing: Length 55ft Dia. 3.25"

Water Elev. 766.3ft
Surface Elev. 793.3ft

Boring No. F- 8 Station & Offset 94+49.19, 73.2 Rt.

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
793.3	0														
793.3		3/4/4		0.3'	Topsoil (3")	1	18	13	47	15	7	NP	NP	21	A-3a
793.1															
792.8						Gray, loose, COARSE AND FINE SAND, little gravel, little silt, trace clay, moist									
	2														
790.8		7/5/6		2.5'		2								20	VIS.
790.3															
	4														
787.8		4/5/6			Gray, medium dense, COARSE AND FINE SAND, some silt, trace clay, moist	3	0	2	69	22	7	NP	NP	19	A-3a
	6														
	8			8.0'											
785.3		4/5/7			Gray, stiff, SILT, little sand, trace clay, damp	4	0	0	10	80	10	NP	NP	18	A-4b
784.8															
	10														
782.8		5/6/7		10.5'	Gray, stiff, SANDY SILT, some gravel, little clay, wet, till	5								21	VIS.
782.3															
	12														
779.8		6/7/8				6								21	VIS.
	14														
777.3		4/5/6			Gray, stiff, SANDY SILT, some gravel, little clay, moist, till	7	31	16	15	19	19	20	6	16	A-4a
	16														
	18			18.0'											
775.3		5/7/9			Gray, very stiff, SANDY SILT, some clay, little gravel, with cobbles, with boulders, moist, till	8	16	18	17	22	27	21	6	20	A-4a
774.8															
	20														
	22														
769.8		7/9/11				9									NO REC.
	24														
	26														
766.3				27.0'											
	28														
764.8		7/12/15			Gray, medium dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, with cobbles, with boulders, damp	10	52	20	14	6	8	NP	NP	15	A-I-a
	30														
761.3				32.0'											
	32														
759.8		15/21/20			Gray, hard, SANDY SILT, little gravel, little clay, with cobbles, with boulders, damp, till	11								11	VIS.
	34														

Boring No. F- 8

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics							ODOT Class																							
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.																						
758.3																																					
	36	17/19/21	5.0	53.0'	Gray, hard, SANDY SILT, little gravel, little clay, with cobbles, with boulders, moist, till	12									NO REC.																						
754.8																																					
	38																																				
	40																																				
	42	15/17/17				55.0'									RC-1									22	VIS.												
749.8																																					
	44																																				
	46																																				
	48	16/18/21																						60.0'	BOTTOM OF BORING										VIS.		
744.8																																					
	50																																				
	52																																				
740.3		50-0"			LIMESTONE, gray, with shale seams, augered		15																													VIS.	
739.8																																					
	54																																				
	56																																				
738.3		60%													SHALE (55%), light gray, silty, fractured, thin bedded, moderately soft, with interbedded LIMESTONE (45%), light gray, fine grained, fractured, thin bedded, moderately hard	RC-1																					VIS.
	58																																				
733.3	60																																				

Date Started 1/19/05 Sampler: Type SS Dia. 1.375"
Date Completed 1/21/05 Casing: Length 75ft Dia. 3.25"

Boring No. F- 9 Station & Offset 94+18.19, 70.3 Lt. Water Elev. 791.1ft
Surface Elev. 814.6ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
814.6	0				Topsoil (6")										
814.6	1	3/22/3		0.5'	Brown, very stiff, SANDY SILT, little gravel, damp	1								14	VIS.
811.6	2													9	VIS.
809.1	4	7/6/7			Brown, stiff, SANDY SILT, little gravel, damp	2									
808.6	6	3/6/7		6.0'		3								15	VIS.
806.1	8	6/6/7			Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, trace silt, trace clay, damp	4	28	36	27	6	3	NP	NP	5	A-1-b
803.6	10					5								4	VIS.
801.6	12	6/7/7													
801.1	14	5/8/8			Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, trace silt, trace clay, damp	6	42	25	26	4	3	NP	NP	4	A-1-b
798.6	16	9/10/10				7								4	VIS.
796.6	18			18.0'											
796.1	20	10/8/7			Brown, medium dense, FINE SAND, some gravel, trace silt, trace clay, damp	8	21	17	56	1	5	NP	NP	3	A-3
793.6	22	13/13/12		21.0'	Rusty brown, medium dense, COARSE AND FINE SAND, damp	9								7	VIS.
791.1	24	11/9/9		23.5'	Gray, medium dense, FINE SAND, little silt, damp	10								16	VIS.
788.6	26	7/11/13		26.0'	Gray, very stiff, SANDY SILT, trace gravel, trace clay, damp	11	3	5	46	39	7	NP	NP	18	A-4a
786.1	28	8/8/10		28.5'	Gray, very stiff, SILT, trace sand, trace gravel, trace clay, damp	12	1	1	5	86	7	NP	NP	22	A-4b
782.6	32			32.0'											
781.1	34	7/7/8			Gray, stiff, SILT, some clay, little gravel, damp, till	13								11	VIS.

Boring No. F- 9

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
779.6	36														
776.1	38	6/7/13			Gray, very stiff, SILT, some clay, little gravel, damp, till	14								11	VIS.
771.1	40														
766.1	42														
765.6	44	6/13/22				15								10	VIS.
766.1	46														
765.6	48	14/27/50-3"		48.5'	Gray, very dense, FINE SAND, damp	16A								5	VIS
761.1	50			49.0'	Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, damp	16B	66	16	10	6	2	NP	NP		A-1-a
756.1	52														
756.1	54	23/31/50-6"				17								10	VIS.
751.1	56														
746.1	58	25/26/25				18								13	VIS.
746.1	60														
746.1	62														
746.1	64	50-6"				19								1	VIS.
746.1	66														
746.1	68	21/21/41			Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, with cobbles, damp	20								12	VIS.
746.1	70														

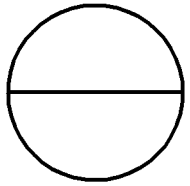
Date Started 1/19/05 Sampler: Type SS Dia. 1.375"
Date Completed 1/21/05 Casing: Length 75ft Dia. 3.25"

Boring No. F- 9 Station & Offset 94+18.19, 70.3 Lt. Water Elev. 791.1ft
Surface Elev. 814.6ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
814.6	0														
814.6	0	3/22/3		0.5'	Topsoil (6")										
814.1	—				Brown, very stiff, SANDY SILT, little gravel, damp	1								14	VIS.
811.6	2														
811.6	—	7/6/7			Brown, stiff, SANDY SILT, little gravel, damp	2								9	VIS.
811.6	4														
809.1	—														
808.6	6	3/6/7		6.0'		3								15	VIS.
808.6	—														
806.1	8														
806.1	—	6/6/7			Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, trace silt, trace clay, damp	4	28	36	27	6	3	NP	NP	5	A-1-b
806.1	10														
803.6	—														
803.6	12	6/7/7				5								4	VIS.
803.6	—														
801.6	—														
801.1	14	5/8/8			Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, trace silt, trace clay, damp	6	42	25	26	4	3	NP	NP	4	A-1-b
801.1	—														
798.6	16														
798.6	—	9/10/10				7								4	VIS.
798.6	—														
796.6	18														
796.1	—	10/8/7		18.0'	Brown, medium dense, FINE SAND, some gravel, trace silt, trace clay, damp	8	21	17	56	1	5	NP	NP	3	A-3
796.1	20														
793.6	—														
793.6	22	13/13/12		21.0'	Rusty brown, medium dense, COARSE AND FINE SAND, damp	9								7	VIS.
793.6	—														
791.1	—														
791.1	24	11/9/9		23.5'	Gray, medium dense, FINE SAND, little silt, damp	10								16	VIS.
791.1	—														
788.6	26														
788.6	—	7/11/13		26.0'	Gray, very stiff, SANDY SILT, trace gravel, trace clay, damp	11	3	5	46	39	7	NP	NP	18	A-4a
788.6	28														
786.1	—														
786.1	—	8/8/10		28.5'	Gray, very stiff, SILT, trace sand, trace gravel, trace clay, damp	12	1	1	5	86	7	NP	NP	22	A-4b
786.1	30														
786.1	—														
782.6	32														
782.6	—														
781.1	—														
781.1	34	7/7/8		32.0'	Gray, stiff, SILT, some clay, little gravel, damp, till	13								11	VIS.
781.1	—														

Boring No. F- 9

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
779.6	—														
779.6	36														
779.6	—														
776.1	38														
776.1	—	6/7/13			Gray, very stiff, SILT, some clay, little gravel, damp, till	14								11	VIS.
776.1	40														
776.1	—														
771.1	42														
771.1	—														
771.1	44	6/13/22				15								10	VIS.
771.1	—														
771.1	46														
771.1	—														
771.1	48														
766.1	—														
765.6	—	14/27/50-3"		48.5' 49.0'	Gray, very dense, FINE SAND, damp	16A								5	VIS
765.6	—				Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, damp	16B	66	16	10	6	2	NP	NP		A-1-a
765.6	50														
765.6	—														
765.6	52														
765.6	—														
761.1	—														
761.1	54	23/31/50-6"				17								10	VIS.
761.1	—														
761.1	56														
761.1	—														
756.1	58														
756.1	—														
756.1	60	25/26/25				18								13	VIS.
756.1	—														
756.1	62														
756.1	—														
751.1	—														
751.1	64	50-6"				19								1	VIS.
751.1	—														
751.1	66														
751.1	—														
746.1	68														
746.1	—														
746.1	70	21/21/41			Gray, very dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, with cobbles, damp	20								12	VIS.
746.1	—														



LOG OF BORING (Continued)

Boring No. F- 9

Elev. (ft)	Depth (ft)	Std. Pen. RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics							ODOT Class	
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
743.5															
741.1	72	13/23/27			Gray, dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, with cobbles, damp	21								9	VIS.
	74														
739.6				75.0'											
BOTTOM OF BORING															

LOG OF BORING (Continued)

Boring No. F- 9

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class			
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
743.5																		
	72																	
741.1																		
	74	13/23/27			Gray, dense, GRAVEL AND/OR STONE FRAGMENTS, some sand, trace silt, trace clay, with cobbles, damp	21										9		VIS.
739.6				75.0'														
BOTTOM OF BORING																		

LOG OF BORING

Date Started1/21/05

Date Completed1/25/05

Sampler: TypeSS

Casing: Length80ft

Dia.1.375"

Dia.3.25"

Water Elev.793.2ft

Surface Elev.816.7ft

Boring No. F-10

Station & Offset95+11.68, 69.0 Rt.

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class			
							% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
816.7	0																	
816.7		3/4/5		0.5'	Topsoil (6")													
816.2					Brown, stiff, SANDY SILT, some gravel, some clay, damp	1										12		VIS.
814.2	2																	
813.7		9/9/8		2.5'														
	4				Light brown, very stiff, SANDY SILT, and clay, little gravel, damp	2	14	8	18	21	39	22	8	10			A-4a	
811.2																		
	6	5/6/10				3										11		VIS.
808.7																		
808.2																		
	8																	
		10/12/14		8.0'	Brown, medium dense, COARSE AND FINE SAND, little gravel, damp	4	15	32	40			NP	NP	10			A-3a	
	10																	
805.7		14/13/14				5										6		VIS.
	12																	
803.2																		
	14	8/9/13		13.5'	Brown, very stiff, SANDY SILT, damp	6										7		VIS.
801.2																		
800.7																		
	16	11/12/12		15.5'	Brown, medium dense, COARSE AND FINE SAND, some gravel, little clay, trace silt, damp	7	22	22	39	2	15	NP	NP	5			A-3a	
	18																	
798.2		8/10/10				8										4		VIS.
	20																	
795.7																		
	22	8/10/10		21.0'		9										20		VIS.
793.2																		
	24	6/10/12			Brown, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, damp	10	33	30	30			NP	NP	18			A-1-b	
	26																	
789.7																		
	28																	
788.2																		
		7/9/8			Brown, very stiff, SANDY SILT, little clay, damp	11	0	0	53	34	13	NP	NP	20			A-4a	
	30																	
784.7																		
	32																	
783.2																		
	34	5/6/9			Gray, stiff, SANDY SILT, moist	12										21		VIS.

CTI ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE
02-27-06

REVIEWED
NT

DRAWN
C.N.

DESIGNED
CHECKED

FILE NUMBER

STRUCTURE

REVIS

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1002 OVER S.R. 73

WAR-75-3.40

1415

...\\WAR-75-1002_P&P_SHEETS_WITH_TE 3/28/2008 12:15:34 PM

Boring No. F-10

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class	
							% Aq	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
745.6																
743.2	72	50-1"			CLAYSHALE, gray, augered	20										VIS.
	74															
	76															
	78															
738.2		50-1"				21										VIS.
736.7	80			80.0'	BOTTOM OF BORING											

Boring No. F-10

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Aq	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
745.6	72	50-1"			CLAYSHALE, gray, augered	20									VIS.
743.2	74														
	76														
	78														
738.2															
	50-1"					21								VIS.	
736.7	80														
BOTTOM OF BORING															

LOG OF BORING

Date Started 1/21/05
Date Completed 1/25/05

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>80ft</u>	Dia.	<u>3.25"</u>

Water Elev.	<u>793.2ft</u>
Surface Elev.	<u>816.7ft</u>

Boring No. F-10 Station & Offset 95+11.68, 69.0 Rt.

[illegible]

GEOLOGY OF THE SITE

THE SITE IS LOCATED WHERE STILLWATER RIVER FLOWS FROM WEST TO EAST BENEATH SR 121. THE SITE’S TOPOGRAPHY IN THE IMMEDIATE AREA IS RELATIVELY FLAT TO MODERATELY SLOPING ALONG THE RIVERBANK. THE SITE IS LOCATED ON A RELATIVELY FLAT ALLUVIAL TERRACE, WHICH CONSISTS OF RECENT ALLUVIUM OVER GLACIAL OUTWASH DEPOSITS AND GLACIAL TILL FORMED DURING THE WISCONSIN GLACIATION. THE DEPTH TO ROCK IN THE IMMEDIATE PROJECT AREA IS ON THE ORDER OF 50 TO 75 FEET BELOW THE GROUND SURFACE. THE ALLUVIAL AND GLACIAL DEPOSITS ARE UNDERLAIN BY SEDIMENTARY ROCK CONSISTING OF DOLOMITE IDENTIFIED AS THE LOCKPORT DOLOMITE FORMATION. NO MAPPED KARST FEATURES ARE PRESENT IN THE CARBONATE DOMINANT GEOLOGY.

EXPLORATION

FOUR (4) STRUCTURE SOIL TEST BORINGS, IDENTIFIED AS B-1 THROUGH B-4, WERE DRILLED FOR THIS INVESTIGATION. TEST BORINGS B-1 THROUGH B-4 WERE DRILLED TO DEPTHS RANGING FROM 50 TO 60 FEET. THE TEST BORINGS WERE DRILLED WITH A TRUCK-MOUNTED DRILL RIG UTILIZING HOLLOW-STEM AUGERS (HSA) BETWEEN THE DATES OF OCTOBER 12 TO OCTOBER 15, 2004.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

AT THE ABUTMENTS, TEST BORINGS B-1 AND B-4 WERE DRILLED IN THE EXISTING S.R. 121 ROADWAY PAVEMENT. AT THE GROUND SURFACE, THESE TWO TEST BORINGS ENCOUNTERED APPROXIMATELY 2 INCHES OF ASPHALT PAVEMENT FOLLOWED BY APPROXIMATELY 12 INCHES OF CONCRETE PAVEMENT. TEST BORINGS B-2 AND B-3 ENCOUNTERED APPROXIMATELY 10 INCHES OF REINFORCED CONCRETE AT THE BRIDGE DECK.




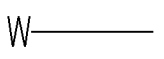
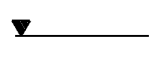
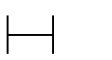




BENEATH THE PAVEMENT MATERIALS IN ABUTMENT TEST BORINGS B-1 AND B-4, FILL MATERIAL CONSISTING OF SILT AND CLAY (A-6A) WAS ENCOUNTERED TO DEPTHS RANGING FROM 5 TO 13.5 FEET. BENEATH THE FILL THE ABUTMENT TEST BORNIGS ENCOUNTERED SILT AND CLAY (A-6A), SANDY SILT (A-4A), COARSE AND FINE SAND (A-3A).

ALL FOUR TEST BORINGS ENCOUNTERED GRAVEL AND/OR STONE FRAGMENTS WITH VARYING AMOUNTS OF SAND, SILT AND CLAY (A-2-7 AND A-1-A) BEGINNING AT THE APPROXIMATE STREAMBED ELEVATION. THESE GRANULAR MATERIALS WERE INTERBEDDED WITH GLACIAL TILL CONSISTING OF SANDY SILT (A-4A) AND SILT (A-4B) LAYERS AND COBBLES AND BOULDERS DOWN TO THE BORING TERMINATION DEPTHS.


GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND RANGED IN DEPTH FROM 18 FEET TO 21.5 FEET. UPON COMPLETION OF THE TEST BORINGS THE GROUNDWATER DEPTHS RANGED FROM 14 FEET TO 19 FEET.

D50 VALUES WHICH HAVE BEEN CALCUALTED FOR THE SCOUR ANALYSIS CAN BE FOUND ON PAGE NO. 4 AND 5.

LEGEND

-  AUGER BORING LOCATION
-  PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION
-  TR TOP OF ROCK
-  W INDICATES FREE WATER ELEVATION
-  INDICATES STATIC WATER ELEVATION
-  HORIZONTAL BAR ON BORING INDICATES THE DEPTH THE SAMPLE WAS TAKEN - PROFILE VIEW
-  FIGURES BESIDE THE BORING 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
-  Z = NUMBER OF BLOWS FOR THIRD 6 INCHES

SYMBOLS OF ROCK TYPES

	Fire Clay or Underclay		Weathered Siltstone
	Weathered Mudstone		Siltstone
	Mudstone		Weathered Sandstone
	Weathered Shale		Sandstone
	Shale		Leached Dolomite
	Weathered Clay-Shale		Dolomite
	Clay-Shale		Leached Limestone
	Boulders or Cobbles		Limestone

PARTICLE SIZE DEFINITIONS

	300 mm	75 mm	2.0 mm	0.42 mm	0.074 mm	0.005 mm
Boulders	Cobbles	Gravel	Coarse Sand	FINE SAND	Silt	Clay
		No. 10 SIEVE	No. 40 SIEVE	No. 200 SIEVE		

NOTES

ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATIONS SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE, THE OFFICE OF MATERIALS MANAGEMENT AT 1600 WEST BROAD STREET, THE OFFICE OF ROADWAY ENGINEERING OR THE OFFICE OF STRUCTURAL ENGINEERING AT 25 SOUTH FRONT STREET, COLUMBUS, OHIO 43215.

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 2 INCH O.D., 1-3/8" I.D. SPLIT SPOON SAMPLING DEVICE, AT 2-1/2 AND/OR 5 FOOT DEPTH INTERVALS, DRIVEN BY MEANS OF A 140 lb. HAMMER WITH A FREE FALL OF 30 INCHES. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLING DEVICE THREE 18 INCH INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED ROTARY-TYPE DRILLING MACHINE, EMPLOYING A 2 INCH O.D. THIN WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILLING MACHINE.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILLING MACHINE, EMPLOYING AN NO CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS DISPLAY A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, THE STANDARD PENETRATION TEST READINGS IN THREE 6 INCH INCREMENTS, DEPTH AND ELEVATION OF PRESS SAMPLES, FIELD NUMBER ASSIGNED TO SAMPLE, SAMPLE DESCRIPTION-BASED ON LABORATORY TESTS UTILIZING GRADATION, PLASTICITY AND MOISTURE CONTENT DETERMINATIONS. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, WILL APPEAR GRAPHICALLY ON SEPARATE ENCLOSURES. ROCK SAMPLES ARE DISPLAYED ON THE LOG SHEETS INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, AMOUNT OF RECOVERY AND A VISUAL CLASSIFICATION BASED ON TYPE, COLOR, DEGREE OF HARDNESS, GRAIN SIZE, DETERIORATION, BEDDING ACID REACTION AND OTHER QUALIFYING FACTORS.

AT DEPTHS WHERE MATERIALS ARE BOULDERY OR GRAVELLY TO THE EXTENT THAT A SAMPLER CANNOT BE UTILIZED, A WASH SAMPLE IS PROCURED AND VISUALLY CLASSIFIED, IN ORDER TO DETERMINE THE GENERAL CHARACTERISTICS OF THE MATERIAL. THESE SAMPLES ARE NOT CONSIDERED SUFFICIENTLY REPRESENTATIVE TO WARRANT LABORATORY TESTING.

CTL ENGINEERING, INC.
1451 S.R. 28 BLOC. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE
02-24-06

REVIEWED
NT

DRAWN
C.N.

DESIGNED

FILE NUMBER

STRUCTURE

REVISIED

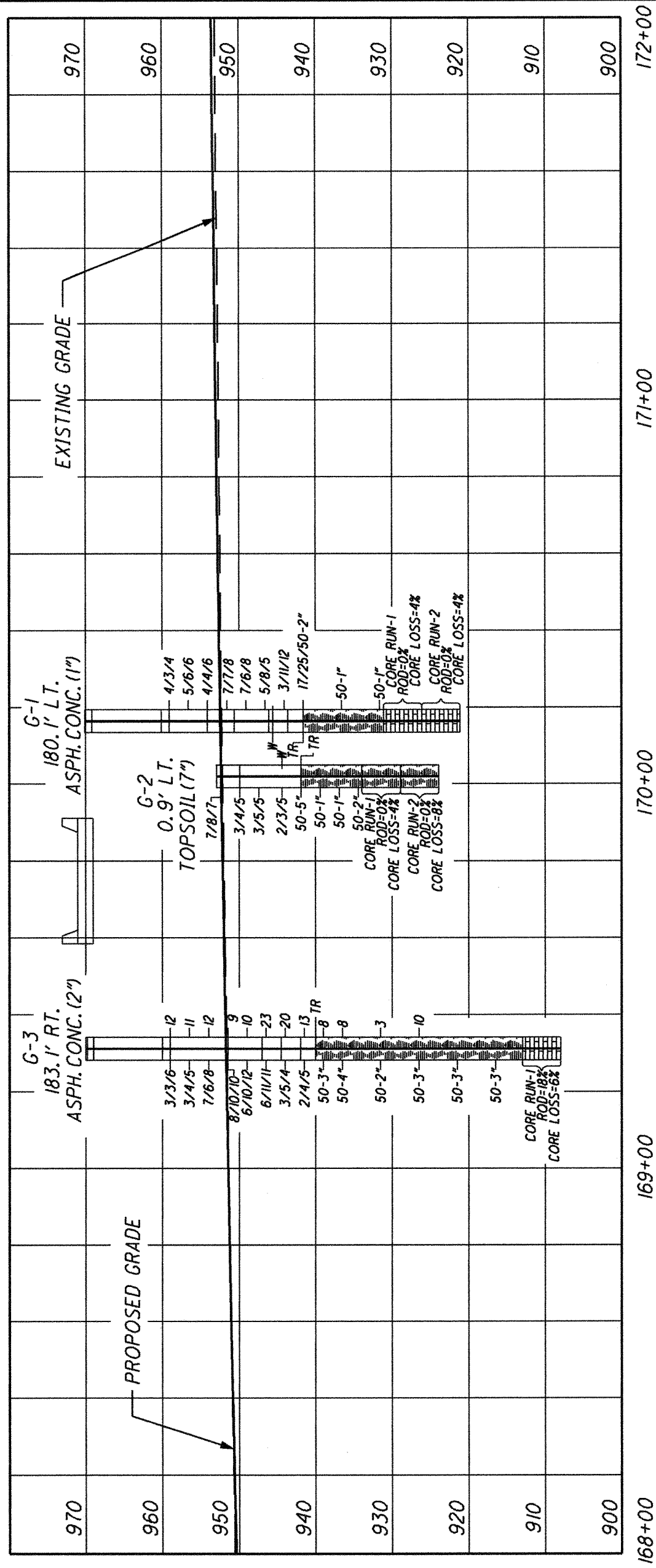
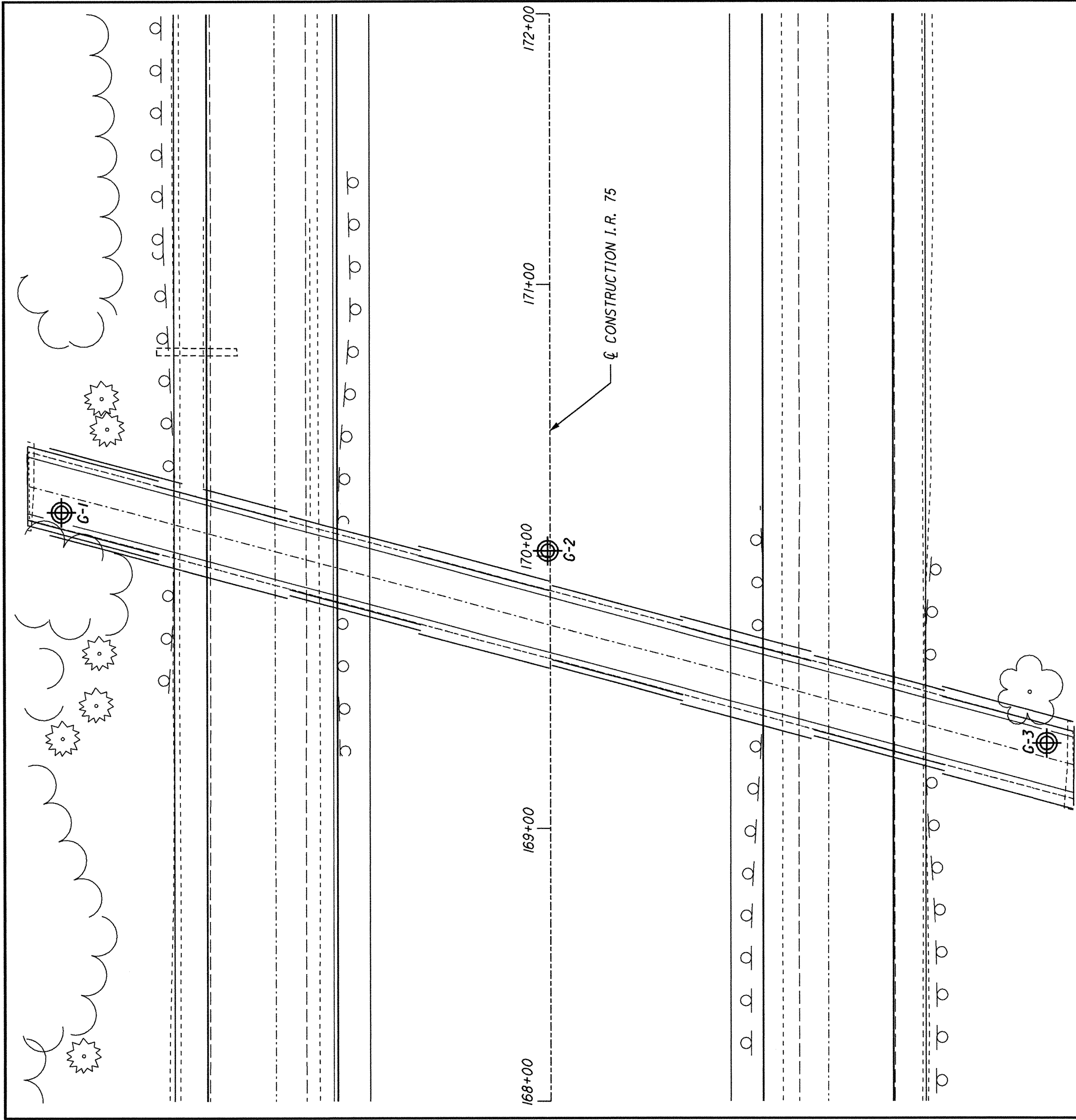
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STRUCTURE FOUNDATION INVESTIGATION

WAR-75-3.40

1 / 5





LOG OF BORING

Date Started 2/2/05
Date Completed 2/3/05

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>19.0ft</u>	Dia.	<u>3.25"</u>

Boring No. G-2 Station & Offset 170+01.92, 0.9' Lt.

Water Elev.	944.4ft
Surface Elev.	952.9ft

[illegible]

BOTTOM OF BORING

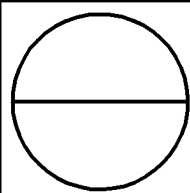
LOG OF BORING

Date Started 2/7/05
Date Completed 2/8/05

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>57.0ft</u>	Dia.	<u>3.25"</u>

Boring No. G-3 Station & Offset 169+31.19, 183.1' Rt.

Water Elev. _____
Surface Elev. 970.0ft

[illegible] $\frac{4}{5}$ 

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-1146 OVER I-75

WAR-75-3.40

DATE

REVIEWED

DRAWN

DESIGNED

CTL ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

LOG OF BORING

Date Started 2/2/05
Date Completed 2/3/05

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>19.0ft</u>	Dia.	<u>3.25"</u>

Water Elev.	944.4ft
Surface Elev.	<u>952.9ft</u>

Boring No. G-2 Station & Offset 170+01.92, 0.9' Lt.

[illegible]

BOTTOM OF BORING

Boring No. G-3

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class																		
								% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.																	
935.0	36	50-2"					11								3	VIS.																	
931.5	38																																
	40																																
	42																																
926.5	44	50-3"	SHALE, gray, with limestone seams, augered	12									10	VIS.																			
	46																																
	48																																
921.5	50	50-3"		13																			VIS.										
	52																																
	54																																
916.5	56	50-3"		14																												VIS.	
	58																																
	60																																
913.0	62	18%	4.7	0.3	57.0'	RC-1																											VIS.
	60																																
	62																																
BOTTOM OF BORING																																	

LOG OF BORING

Date Started 2/7/05
Date Completed 2/8/05

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>57.0ft</u>	Dia.	<u>3.25"</u>

Water Elev. _____
Surface Elev. 970.0ft

Boring No. G-3

Station & Offset 169+31.19, 183.1' Rt.[illegible]

Boring No. G-3

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class			
								% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.		
935.0	36	50-2"				SHALE, gray, with limestone seams, augered	11									3	VIS.	
931.5	38																	
	40																	
	42																	
926.5	44	50-3"					12										10	VIS.
	46																	
	48																	
921.5	50	50-3"						13										VIS.
	52																	
	54																	
916.5	56	50-3"						14										VIS.
	58																	
	60																	
913.0	62	18%	4.7	0.3	57.0'	LIMESTONE (70%), light gray, fine grained, crystalline, nodular and wavy bedding, hard, with interbedded SHALE (30%), medium gray, silty, wavy bedding, soft	RC-1										VIS.	
	64																	
	66																	
908.0	62	BOTTOM OF BORING																

GEOLOGY OF THE SITE

THE SITE IS LOCATED WHERE STILLWATER RIVER FLOWS FROM WEST TO EAST BENEATH SR 121. THE SITE'S TOPOGRAPHY IN THE IMMEDIATE AREA IS RELATIVELY FLAT TO MODERATELY SLOPING ALONG THE RIVERBANK. THE SITE IS LOCATED ON A RELATIVELY FLAT ALLUVIAL TERRACE, WHICH CONSISTS OF RECENT ALLUVIUM OVER GLACIAL OUTWASH DEPOSITS AND GLACIAL TILL FORMED DURING THE WISCONSIN GLACIATION. THE DEPTH TO ROCK IN THE IMMEDIATE PROJECT AREA IS ON THE ORDER OF 50 TO 75 FEET BELOW THE GROUND SURFACE. THE ALLUVIAL AND GLACIAL DEPOSITS ARE UNDERLAIN BY SEDIMENTARY ROCK CONSISTING OF DOLOMITE IDENTIFIED AS THE LOCKPORT DOLOMITE FORMATION. NO MAPPED KARST FEATURES ARE PRESENT IN THE CARBONATE DOMINANT GEOLOGY.

EXPLORATION

FOUR (4) STRUCTURE SOIL TEST BORINGS, IDENTIFIED AS B-1 THROUGH B-4, WERE DRILLED FOR THIS INVESTIGATION. TEST BORINGS B-1 THROUGH B-4 WERE DRILLED TO DEPTHS RANGING FROM 50 TO 60 FEET. THE TEST BORINGS WERE DRILLED WITH A TRUCK-MOUNTED DRILL RIG UTILIZING HOLLOW-STEM AUGERS (HSA) BETWEEN THE DATES OF OCTOBER 12 TO OCTOBER 15, 2004.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

AT THE ABUTMENTS, TEST BORINGS B-1 AND B-4 WERE DRILLED IN THE EXISTING S.R. 121 ROADWAY PAVEMENT. AT THE GROUND SURFACE, THESE TWO TEST BORINGS ENCOUNTERED APPROXIMATELY 2 INCHES OF ASPHALT PAVEMENT FOLLOWED BY APPROXIMATELY 12 INCHES OF CONCRETE PAVEMENT. TEST BORINGS B-2 AND B-3 ENCOUNTERED APPROXIMATELY 10 INCHES OF REINFORCED CONCRETE AT THE BRIDGE DECK.

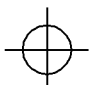
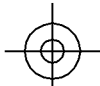

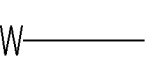
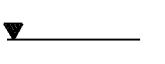
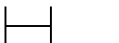
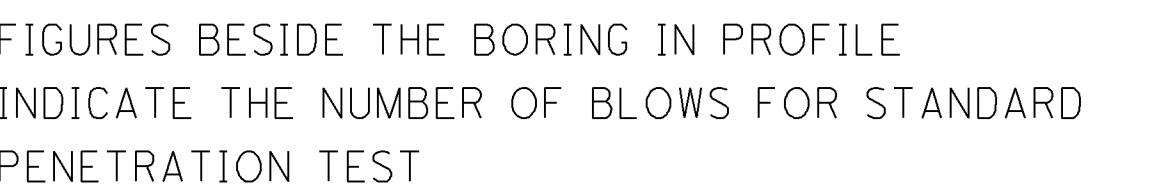



BENEATH THE PAVEMENT MATERIALS IN ABUTMENT TEST BORINGS B-1 AND B-4, FILL MATERIAL CONSISTING OF SILT AND CLAY (A-6A) WAS ENCOUNTERED TO DEPTHS RANGING FROM 5 TO 13.5 FEET. BENEATH THE FILL THE ABUTMENT TEST BORNIGS ENCOUNTERED SILT AND CLAY (A-6A), SANDY SILT (A-4A), COARSE AND FINE SAND (A-3A).

ALL FOUR TEST BORINGS ENCOUNTERED GRAVEL AND/OR STONE FRAGMENTS WITH VARYING AMOUNTS OF SAND, SILT AND CLAY (A-2-7 AND A-1-A) BEGINNING AT THE APPROXIMATE STREAMBED ELEVATION. THESE GRANULAR MATERIALS WERE INTERBEDDED WITH GLACIAL TILL CONSISTING OF SANDY SILT (A-4A) AND SILT (A-4B) LAYERS AND COBBLES AND BOULDERS DOWN TO THE BORING TERMINATION DEPTHS.

















GROUNDWATER WAS ENCOUNTERED DURING DRILLING AND RANGED IN DEPTH FROM 18 FEET TO 21.5 FEET. UPON COMPLETION OF THE TEST BORINGS THE GROUNDWATER DEPTHS RANGED FROM 14 FEET TO 19 FEET.

D50 VALUES WHICH HAVE BEEN CALCUALTED FOR THE SCOUR ANALYSIS CAN BE FOUND ON PAGE NO. 4 AND 5.

LEGEND

-  AUGER BORING LOCATION
-  PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION
-  TR TOP OF ROCK
-  INDICATES FREE WATER ELEVATION
-  INDICATES STATIC WATER ELEVATION
-  HORIZONTAL BAR ON BORING INDICATES THE DEPTH THE SAMPLE WAS TAKEN - PROFILE VIEW
-  FIGURES BESIDE THE BORING 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
-  Z = NUMBER OF BLOWS FOR THIRD 6 INCHES

SYMBOLS OF ROCK TYPES

-  Fire Clay or Underclay
-  Weathered Mudstone
-  Mudstone
-  Weathered Shale
-  Shale
-  Weathered Clay-Shale
-  Clay-Shale
-  Boulders or Cobbles
-  Weathered Siltstone
-  Siltstone
-  Weathered Sandstone
-  Sandstone
-  Leached Dolomite
-  Dolomite
-  Leached Limestone
-  Limestone

PARTICLE SIZE DEFINITIONS

300 mm	75 mm	2.0 mm	0.42 mm	0.074 mm	0.005 mm
Boulders	Cobbles	Gravel	Coarse Sand	FINE SAND	Silt Clay
		No. 10 SIEVE	No. 40 SIEVE	No. 200 SIEVE	

NOTES

ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATIONS SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE, THE OFFICE OF MATERIALS MANAGEMENT AT 1600 WEST BROAD STREET, THE OFFICE OF ROADWAY ENGINEERING OR THE OFFICE OF STRUCTURAL ENGINEERING AT 25 SOUTH FRONT STREET, COLUMBUS, OHIO 43215.

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 2 INCH O.D., 1-3/8" I.D. SPLIT SPOON SAMPLING DEVICE, AT 2-1/2 AND/OR 5 FOOT DEPTH INTERVALS, DRIVEN BY MEANS OF A 140 lb. HAMMER WITH A FREE FALL OF 30 INCHES. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLING DEVICE THREE 18 INCH INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED ROTARY-TYPE DRILLING MACHINE, EMPLOYING A 2 INCH O.D. THIN WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILLING MACHINE.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILLING MACHINE, EMPLOYING AN NQ CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS DISPLAY A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, THE STANDARD PENETRATION TEST READINGS IN THREE 6 INCH INCREMENTS, DEPTH AND ELEVATION OF PRESS SAMPLES, FIELD NUMBER ASSIGNED TO SAMPLE, SAMPLE DESCRIPTION-BASED ON LABORATORY TESTS UTILIZING GRADATION, PLASTICITY AND MOISTURE CONTENT DETERMINATIONS. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, WILL APPEAR GRAPHICALLY ON SEPARATE ENCLOSURES. ROCK SAMPLES ARE DISPLAYED ON THE LOG SHEETS INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, AMOUNT OF RECOVERY AND A VISUAL CLASSIFICATION BASED ON TYPE, COLOR, DEGREE OF HARDNESS, GRAIN SIZE, DETERIORATION, BEDDING ACID REACTION AND OTHER QUALIFYING FACTORS.

AT DEPTHS WHERE MATERIALS ARE BOULDERY OR GRAVELLY TO THE EXTENT THAT A SAMPLER CANNOT BE UTILIZED, A WASH SAMPLE IS PROCURED AND VISUALLY CLASSIFIED, IN ORDER TO DETERMINE THE GENERAL CHARACTERISTICS OF THE MATERIAL. THESE SAMPLES ARE NOT CONSIDERED SUFFICIENTLY REPRESENTATIVE TO WARRANT LABORATORY TESTING.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-0394 OVER DICKS CREEK

WAR-75-3.40

1 / 5



CTL ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

DATE
02-27-06

REVIEWED
NT

DRAWN
C.N.

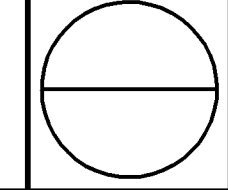
DESIGNED

FILE NUMBER

STRUCTURE

REVISID

CHECKED



LOG OF BORING																	
Date Started		6/9/05		Sampler: Type		SS		Dia.		1.375"							
Date Completed		6/9/05		Casing: Length		18ft		Dia.		3.25"							
Boring No.		A-1		Station & Offset		208+30.15, 15.9' Lt		Water Elev.		Dry							
								Surface Elev.		693.7ft							
Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class	
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
693.7	0					Topsoil (2")											
693.7		50-6"				Cobbles (10")											
692.7	2					Gray, hard, SANDY SILT, some gravel, some clay, with cobbles, damp, fill	1									4	VIS.
690.2	4	10/11/11			3.5'	Medium gray, very stiff, SANDY SILT, some gravel, some clay, with cobbles, damp, fill	2	37	11	11	19	22	21	6	9	A-4a	
687.7	6	10/6/8			6.0'	Brownish gray, stiff, SILT AND CLAY, damp, fill	3								15	VIS.	
686.2	8	50-5"			7.5'	SHALE, gray, augered	4								5	VIS.	
684.7		15/15/20					5								9	VIS.	
683.2	10					16/17/17	6									14	VIS.
681.7	12	25/50-5"			12.0'	LIMESTONE, gray, augered	7									VIS.	
680.2	14	50-6"			13.5'	SHALE, gray, augered	8									VIS.	
678.7	16	50-4"			9											NO REC.	
677.2		50-2"			16.5'	LIMESTONE, gray, augered	10									VIS.	
675.7	18	35%			18.0'	SHALE (80%), medium to dark gray, moderately hard, with interbedded LIMESTONE (20%), dark to light gray, moderately hard	RC-1									VIS.	
	20																
	22	45%	4.6	0.4	23.0'												
670.7	24					SHALE (87%), medium to dark gray, with interbedded LIMESTONE (13%), medium to light gray	RC-2										VIS.
	26																
665.7	28				28.0'												
BOTTOM OF BORING																	

LOG OF BORING																	
Date Started		6/9/05		Sampler: Type		SS		Dia.		1.375"							
Date Completed		6/9/05		Casing: Length		10ft		Dia.		3.25"							
Boring No.		A-2		Station & Offset		208+93.17, 5.3' Lt.		Water Elev.				Surface Elev.					
Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class	
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
690.9	0					Topsoil (6")											
690.4		6/8/8			0.5'	Black, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, with cobbles, wood fragments, organics, moist, fill	1	41	12	20	13	14	27	7	28	A-2-4	
	2																
687.4	4					13/21/16	5.0'	Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, with cobbles, damp, fill	2								5
685.9		9/50-4"	SHALE, gray, augered	3										18	VIS.		
684.9	6	13/13/23		4										14	VIS.		
683.4	8	11/26/50-4"			10.0'		5								9	VIS.	
681.9		50-3"					6									10	VIS.
680.9	10	28%				SHALE (72%), dark gray, moderately hard, with interbedded, LIMESTONE (28%), light to dark gray, moderately hard	RC-1										VIS.
	12				15.0'												
	14																
675.9		48%				SHALE (60%), dark gray, moderately hard, with interbedded, LIMESTONE (40%), light to dark gray, moderately hard	RC-2										VIS.
	16				20.0'												
	18																
670.9	20																
BOTTOM OF BORING																	

LOG OF BORING

Date Started	<u>6/9/05</u>
Date Completed	<u>6/9/05</u>

Sampler: Type	<u>SS</u>	Dia.	<u>1.375"</u>
Casing: Length	<u>18ft</u>	Dia.	<u>3.25"</u>

Boring No. A-1

Station & Offset 208+30.15, 15.9' Lt

Water Elev.	<u>Dry</u>
Surface Elev.	<u>693.7ft</u>

[illegible]

BOTTOM OF BORING

LOG OF BORING

Date Started6/9/05
Date Completed6/9/05

Sampler: TypeSSDia.1.375"
Casing: Length10ftDia.3.25"

Boring No.A-2Station & Offset208+93.17, 5.3' Lt.

Water Elev.
Surface Elev.

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class	
								% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
690.9	0															
690.9		6/8/8			0.5'	Topsoil (6")										
690.4						Black, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, with cobbles, wood fragments, organics, moist, fill	1	41	12	20	13	14	27	7	28	A-2-4
	2															
687.4		13/21/16			3.5'											
	4					Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, with cobbles, damp, fill	2								5	VIS.
685.9		9/50-4"			5.0'											
684.9						SHALE, gray, augered	3									18
684.9	6	13/13/23					4								14	VIS.
683.4		11/26/50-4"					5								9	VIS.
	8															
681.9		50-3"					6								10	VIS.
680.9	10					28%	5.0	0.0	10.0'	SHALE (72%), dark gray, moderately hard, with interbedded, LIMESTONE (28%), light to dark gray, moderately hard	RC-1					
	12															
	14															
675.9		48%	4.8	0.2	15.0'											
	16					SHALE (60%), dark gray, moderately hard, with interbedded, LIMESTONE (40%), light to dark gray, moderately hard	RC-2									
	18															
670.9	20				20.0'											

BOTTOM OF BORING

Date Started12/19/05
Date Completed12/19/05

Sampler: TypeSSDia. 2.250.D.
Casing: Length3.5ftDia. 3.25"

Boring No.A- 3

Station & Offset208+73.94, 67.6' Rt*

Water Elev. 693.0ft
Surface Elev. 696.0ft

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class	
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
696.0	0	2/2/3			0.5'	Topsoil											VIS.
696.0	2					Dark brown, medium stiff, SILT AND CLAY, some sand, moist	1	0	1	24	28	47	37	14	30	A-6a	
695.0																	
692.5	4	17/33/45			3.5'	SHALE, dark gray, augered	2									10	VIS.
691.0	6	93%	4.7	0.3	5.0'	SHALE (73%), dark to medium gray, moderately soft, with interbedded LIMESTONE (27%), medium gray, moderately soft, crystalline	RC-1										VIS.
	8																
686.0	10	88%	4.4	0.6	10.0'	SHALE (73%), dark to medium gray, moderately soft, with interbedded LIMESTONE (27%), medium gray, moderately hard	RC-2										VIS.
	12																
	14																
681.0					15.0'												

*Estimated value. Final station, offset, and surface elevation to be determined.

Date Started12/8/05
Date Completed12/13/05

Sampler: TypeSSDia. 2.25 O.D.
Casing: Length6ftDia. 3.25"

Boring No.A-4

Station & Offset209+33.09, 45.1' Lt*

Water Elev. Dry
Surface Elev. 691.6*

Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class			
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
0.0	0	4/6/8			0.8'	Topsoil (9")										VIS.			
-691.6	2				8/10/12			3.5'	Dark brown, stiff, SILT AND CLAY, with broken chert fragments, damp, possible fill	1							18	VIS.	
-2420.6	4								50/3"			6.0'	Light brown, very stiff, SILT AND CLAY, with rock fragments, damp	2					
-4149.6	6	80%	4.5	0.5									7.0'	SHALE, gray, augered	3				
-4841.2	8				SHALE (74%), gray, moderately hard, with interbedded LIMESTONE (26%), gray, moderately hard, crystalline	RC-1													
	10																		
-8299.2	12	83%	4.8	0.2					12.0'	SHALE (61%), dark gray, moderately soft, with interbedded LIMESTONE (39%), gray, moderately hard	RC-2								
	14																		
	16																		
-11757.2					17.0'														

*Estimated value. Final station, offset, and surface elevation to be determined.

WAR-75-3.40

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. WAR-75-0394 OVER DICKS CREEK

DESIGNED
CHECKED

DRAWN
REVISED

REVIEWED
NT

DATE
02-27-06

FILE NUMBER

CTL ENGINEERING, INC.
1451 S.R. 28 BLDG. B-NORTH
LOVELAND, OHIO 45140
PHONE: 513-722-8665 FAX: 513-722-8669

LOG OF BORING

Date Started12/19/05

Date Completed12/19/05

Sampler: TypeSS

Casing: Length3.5ft

Dia.2.250.D.

Dia.3.25"

Water Elev.693.0ft

Surface Elev.696.0ft

Boring No.A- 3

Station & Offset208+73.94, 67.6' R+*

Elev. (ft)	Depth (ft)	Std. Pen. RQD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class		
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
696.0	0																
696.0		2/2/3			0.5'	Topsoil											VIS.
695.0	2					Dark brown, medium stiff, SILT AND CLAY, some sand, moist	1	0	1	24	28	47	37	14	30	A-6a	
		17/33/45			3.5'												
692.5	4					SHALE, dark gray, augered	2									10	VIS.
691.0		93%	4.7	0.3	5.0'												VIS.
	6					SHALE (73%), dark to medium gray, moderately soft, with interbedded LIMESTONE (27%), medium gray, moderately soft, crystalline	RC-1										
	8																
		88%	4.4	0.6	10.0'		RC-2										VIS.
686.0	10																
	12																
	14																
681.0					15.0'												

BOTTOM OF BORING

*Estimated value. Final station, offset, and surface elevation to be determined.

LOG OF BORING

Date Started12/8/05

Date Completed12/13/05

Sampler: TypeSS

Casing: Length6ft

Dia.2.25 O.D.

Dia.3.25"

Boring No.A-4

Station & Offset209+33.09, 45.1' Lt*

Water Elev.Dry

Surface Elev.691.6*

Elev. (ft)	Depth (ft)	Std. Pen. RQD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class	
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
0.0	0	4/6/8			0.8'	Topsoil (9")										VIS.
-691.6	2					Dark brown, stiff, SILT AND CLAY, with broken chert fragments, damp, possible fill	1								18	VIS.
-2420.6	4	8/10/12			3.5'	Light brown, very stiff, SILT AND CLAY, with rock fragments, damp	2								16	VIS.
	6															
-4149.6	6	50/3"	4.5	0.5	6.0'	SHALE, gray, augered	3								16	VIS.
-4841.2	8	80%			7.0'	SHALE (74%), gray, moderately hard, with interbedded LIMESTONE (26%), gray, moderately hard, crystalline	RC-1									
-8299.2	10	83%	4.8	0.2	12.0'	SHALE (61%), dark gray, moderately soft, with interbedded LIMESTONE (39%), gray, moderately hard	RC-2									VIS.
	14															
-11757.2	16				17.0'											

BOTTOM OF BORING

*Estimated value. Final station, offset, and surface elevation to be determined.

D ₅₀ VALUES			
BOREHOLE	DEPTH	SAMPLE	D50
A-1	3.5	2	0.325
A-2	0.5	1	0.651
A-3	1	1	0.651
A-5	1	1	0.225
A-5	3.5	2	0.008

LOG OF BORING																
Date Started		12/9/05		Sampler: Type		SS		Dia.		2.25 O.D.						
Date Completed		12/13/05		Casing: Length		6ft		Dia.		3.25"						
Boring No.		A-5		Station & Offset		208+41.55, 67.6' Lt*		Water Elev.		Dry						
								Surface Elev.		690.5*						
Elev. (ft)	Depth (ft)	Std. Pen. ROD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class	
								% Aqg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
0.0	0					Topsoil (8")									VIS.	
-690.5	2	5/6/8			0.7'	Dark brown, medium dense, COARSE AND FINE SAND, little silt, little clay, trace gravel, damp	1	13	21	42	14	10	NP	NP	11	A-3a
-2416.8	4	3/6/10			3.5'	Brown, very stiff, SILTY CLAY, trace sand, trace gravel, with chert fragments, damp	2	15	2	4	37	42	39	17	21	A-6b
-4143.0	6	5/10/15			6.0'	CLAY SHALE, gray, augered	3								14	VIS.
-5869.3	8															
-6214.5	10	50/4" 10%	1.8	3.2	8.5'	SHALE, light gray, augered	4									VIS.
	12				9.0'	SHALE (80%), gray, moderately soft, with interbedded LIMESTONE (20%), gray, moderately hard	RC-1									VIS.
-9667.0	14	93%	4.7	0.3	14.0'	SHALE (61%), dark gray, moderately soft, with interbedded LIMESTONE (39%), gray, moderately hard	RC-2									VIS.
	16															
	18															
-13119.5	20	90%	4.6	0.4	19.0'	SHALE (69%), dark gray, moderately hard, with interbedded LIMESTONE (31%), moderately hard	RC-3									VIS.
	22															
-16572.0	24				24.0'											
BOTTOM OF BORING																
*Estimated value. Final station, offset, and surface elevation to be determined.																

INTRODUCTION

THIS REPORT IS A PRESENTATION OF THE SUBSURFACE INVESTIGATION PERFORMED FOR THE PROPOSED PAVEMENT REHABILITATION AND INSIDE SHOULDER WIDENING OF INTERSTATE 75 (I-75), NORTH OF CINCINNATI, OHIO. THE WIDENING IS PART OF A WAR-75-3.40 PROJECT, WHICH ENTAILS REHABILITATING THE EXISTING LANES OF I-75, BOTH NORTHBOUND AND SOUTHBOUND, AND WIDENING THE INSIDE SHOULDERS TO APPROX. TWELVE (12) FEET IN BOTH DIRECTIONS. THE LIMITS OF THE PROJECT EXTEND FROM MILEPOST 3.40 (STATION 180+00) TO MILEPOST 12.20 (STATION 208+30.81). THE TOTAL PROJECT LENGTH IS 8.76 MILES, WITH TWO (2) STATION EQUATIONS ALONG THE ALIGNMENT AS NOTED BELOW:

STA. 266+41.17 BACK = STA. 267+43.07 AHEAD
STA. 448+20.98 BACK = STA. 11+00 AHEAD

THE PROPOSED PAVEMENT AND SHOULDER GRADES FOR THE PROJECT WILL ROUGHLY MATCH THE EXISTING PAVEMENT GRADE. THE WIDENED SOUTHBOUND AND NORTHBOUND INSIDE SHOULDERS WILL BE CONSTRUCTED WITHIN THE EXISTING GRASS MEDIAN. DRAINAGE IS TOWARDS THE CENTERLINE OF THE GRASS MEDIAN.

GEOLOGY AND OBSERVATIONS OF THE PROJECT

PHYSIOGRAPHICALLY, THE SITE LIES WITHIN THE SOUTHERN OHIO LOAMY TILL PLAIN. THE PROJECT TRAVERSES SOIL CLASSIFIED PREDOMINANTLY AS WISCONSINAN-AGED GLACIAL TILLS AND GROUND AND END MORAINES. THESE GLACIAL FEATURES OFTEN ARE FORMED DURING THE RETREAT OF A GLACIER, RESULTING IN UNDIFFERENTIATED MIXTURES OF CLAY, SILT, SAND AND GRAVEL. OUTWASH DEPOSITS COMPRISE AREAS WITHIN RIVER VALLEYS, CREEK BEDS OR LOW PLAINS, SUCH AS THE NORTH BRANCH DICKS CREEK AND CLEAR CREEK AREAS. OUTWASH DEPOSITS CONSIST OF UNDIFFERENTIATED SAND AND GRAVEL DEPOSITED BY THE MELTWATER IN FRONT OF GLACIAL ICE.

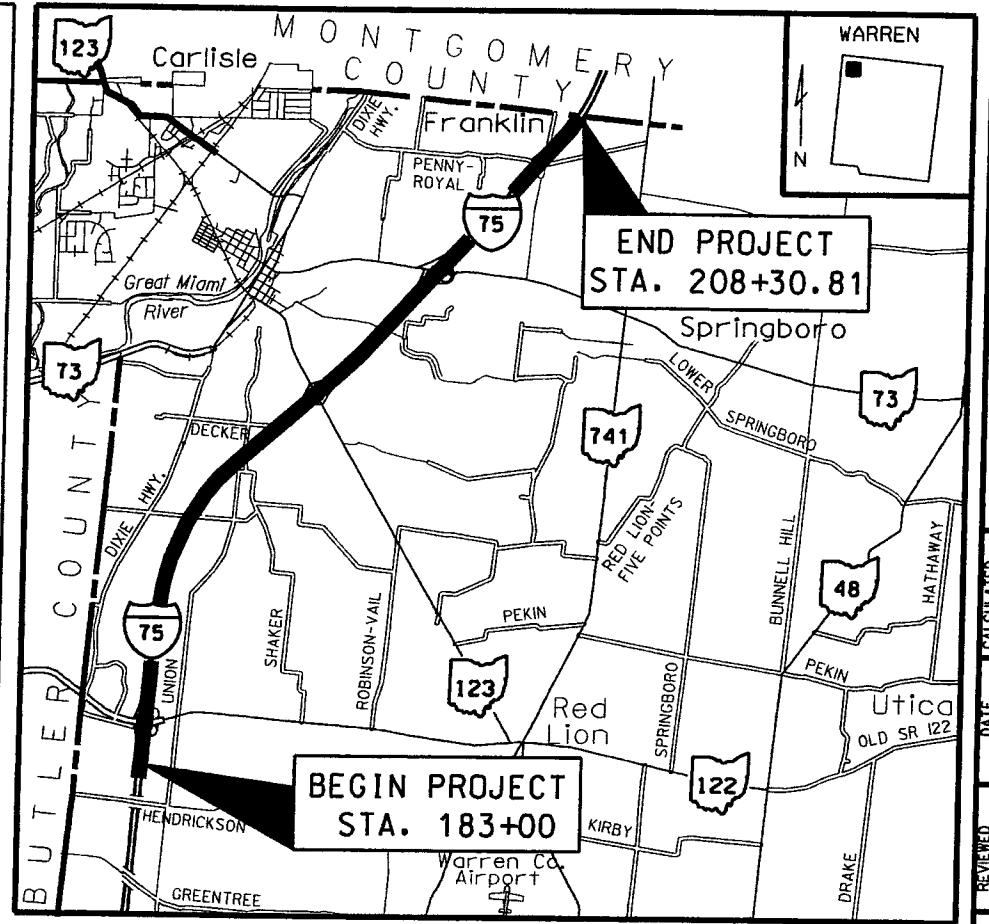
BASED ON THE BEDROCK GEOLOGY AND TOPOGRAPHY MAPS OF THE SPRINGBORO, FRANKLIN AND MONROE, OHIO QUADRANGLES, OBTAINED FROM THE OHIO DEPARTMENT OF NATURAL RESOURCES (ODNR), THE BEDROCK ALONG THIS SECTION OF THE ROADWAY CHANGES IN COMPOSITION AND ELEVATION NOTABLY. THE UNDERLYING BEDROCK, ALONG THE PROJECT ALIGNMENT, VARIES BETWEEN FIVE (5) ORDOVICIAN-AGED BEDROCK FORMATIONS COMPRISED OF DIFFERENT PERCENTAGES OF SHALE AND/OR LIMESTONE. THE MAJOR FORMATIONS INCLUDE THE DRAKES FORMATION, WHITEWATER FORMATION, AND LIBERTY FORMATION UNDIVIDED (PERCENT SHALE/LIMESTONE/DOLOMITE VARIES ON PREDOMINANT FORMATION PRESENT). THE WAYNESVILLE FORMATION (70% SHALE/30% LIMESTONE), THE ARNHEIM FORMATION (60% SHALE/40% LIMESTONE), THE GRANT LAKE FORMATION (50% LIMESTONE/50% SHALE), AND THE MIAMITOWN SHALE-FAIRVIEW FORMATION UNDIVIDED (PERCENT SHALE/LIMESTONE VARIES ON PREDOMINANT FORMATION PRESENT).

THE BEDROCK SURFACE CHANGES IN ELEVATION, ALONG THE PROJECT LIMITS, FROM APPROXIMATELY 750 FEET MEAN SEA LEVEL (MSL) AT THE PROJECT BEGINNING, TO APPROXIMATELY 925 FEET MSL AT THE PROJECT ENDING. THE DEPTH TO BEDROCK, ALONG THE CENTERLINE OF THE PROJECT VARIES FROM THE GROUND SURFACE (OUTCROP) TO APPROX. 150 FEET BELOW THE EXISTING SURFACE GRADE. AT THE PROJECT START, JUST NORTH OF HENDRICKSON ROAD TO APPROX. DECKER ROAD, THE BEDROCK RANGES BETWEEN 800 AND 750 FEET MSL, WITH A FEW OUTCROPS EVIDENT AROUND THE PROJECT BEGINNING AND WITHIN THE VICINITY OF THE NORTH BRANCH DICKS CREEK AREA. FROM DECKER ROAD TO STATE ROUTE 73, THE BEDROCK SLOPES DOWNWARD TOWARDS CLEAR CREEK FORMING A BURIED VALLEY WITH THE LOWEST ELEVATION OF 550 FEET MSL. THE OVERBURDEN WITHIN THE FLOODPLAIN OF CLEAR CREEK IS THE THICKEST SECTION RANGING FROM 100 TO 150 FEET THICK. FROM STATE ROUTE 73 TO THE PROJECT END, AT THE MONTGOMERY COUNTY LINE, THE BEDROCK SLOPES UPWARD TO AN ELEVATION OF 925 FEET MSL.

ACCORDING TO THE GROUND WATER POLLUTION POTENTIAL REPORT OF WARREN COUNTY, OHIO, PUBLISHED BY ODNR, THE PRINCIPAL AQUIFER, SUPPLYING MUCH OF THE WATER TO DOMESTIC WELLS LOCATED IN THE AREA ALONG MOST OF THE PROJECT, IS THE HIGHLY FRACTURED SHALE AND LIMESTONE BEDROCK WITH MINOR AMOUNTS OBTAINED FROM THE GLACIAL TILL OVERBURDEN. THE DEPTH TO WATER, WHICH VARIES DEPENDING ON THE THICKNESS OF THE GLACIAL TILL, IS USUALLY BETWEEN 15 TO 30 FEET. WITHIN THE VICINITY OF CLEAR CREEK NORTH TO STATE ROUTE 73, THE GROUNDWATER IS PREDOMINANTLY SUPPLIED BY SAND, GRAVEL AND TILL DEPOSITED WITHIN THE BURIED VALLEY. THE DEPTH TO WATER IN THIS AREA RANGES BETWEEN APPROXIMATELY 5 TO 15 FEET.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS - 332 SAMPLES TESTED

DESCRIPTION	ODOT CLASS	% AGG.	% C. SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
GRAVEL	A-1-a(0)	74	11	6	-9-				5	6
GRAVEL WITH SAND	A-1-b(0)	37	25	16	-22-		18	3	9	10
GRAVEL WITH SAND AND SILT	A-2-4(0)	36	18	16	-30-		19	5	8	13
GRAVEL WITH SAND, SILT, AND CLAY	A-2-6(0)	44	13	10	16	17	28	14	9	1
COARSE AND FINE SAND	A-3a(0)	17	30	31	-22-				8	6
SANDY SILT	A-4a(0)	20	11	16	28	25	18	7	10	159
SILT	A-4b(0)	8	1	7	-74-		21	5	12	5
SILT AND CLAY	A-6a(0)	16	8	9	29	38	29	13	14	86
SILTY CLAY	A-6b(10)	15	8	9	29	39	33	17	14	43
CLAY	A-7-6(0)	7	6	15	31	41	49	30	3	3
WEATHERED SHALE										
RANDOM FILL										
TOPSOIL										
ASPHALT										
CONCRETE										
BASE MATERIAL										
DRIVE SAMPLE AND/OR CORE BORING - PLAN VIEW										
DRIVE SAMPLE AND/OR CORE BORING PLOTTED TO VERTICAL SCALE ONLY										
NOTE: FIGURES BESIDE BORINGS INDICATE WATER CONTENT IN PERCENT. e.g. 15										
EXPLORATION										
A TOTAL OF 117 TEST BORINGS, INCLUDING 59 PAVEMENT BORINGS AND 58 MEDIAN BORINGS, WERE DRILLED AT THE APPROXIMATE STATIONS AND OFFSETS SHOWN ON THE BORING LOGS FOR THE REFERENCED PROJECT. THE 59 PAVEMENT BORINGS WERE SPACED AT 800-FOOT INTERVALS IN ALTERNATING LANES OF THE PAVEMENT, APPROXIMATELY TWO FEET INSIDE FROM THE OUTER EDGE OF THE PASSING LANE PAVEMENT. THE 58 MEDIAN BORINGS WERE SPACED AT 800-FOOT INTERVALS, IN ALTERNATING LANES IN THE MEDIAN, APPROXIMATELY 6 FEET FROM THE INSIDE SHOULDER OF THE PASSING LANE PAVEMENT.										
THE BORING LOCATIONS WERE LOCATED AND STAKED BY REPRESENTATIVES OF RESOURCE INTERNATIONAL, BASED ON ESTABLISHED MILEPOSTS AND LANDMARKS, AND SURVEYED BY REPRESENTATIVES OF PREFERRED SURVEY, INC. THE STATIONING AND OFFSETS OF THE TEST BORINGS ARE SHOWN ON THE BORING LOGS, SHEETS 3 THRU 7. THE TEST BORINGS WERE DRILLED BETWEEN OCTOBER 20 AND OCTOBER 30, 2003, USING AN ALL-TERRAIN VEHICLE (ATV)-MOUNTED ROTARY DRILLING MACHINE UTILIZING 4.0-INCH, CONTINUOUS, SOLID FLIGHT AUGERS TO ADVANCE THE HOLES..										
INVESTIGATIONAL FINDINGS										
THE EXISTING SURFACE AREA AT FIFTY-EIGHT (58) OF THE TEST BORING LOCATIONS WAS COVERED WITH TOPSOIL WITH AN AVERAGE THICKNESS OF APPROXIMATELY 4.0 INCHES. THE MINIMUM AND MAXIMUM TOPSOIL THICKNESS RANGED FROM APPROXIMATELY 2 TO 10 INCHES. NOTE THAT THE TOPSOIL THICKNESS WILL VARY SIGNIFICANTLY ACROSS THE PROJECT SITE.										
AT THE REMAINING FIFTY-NINE (59) TEST BORINGS LOCATIONS, THE EXISTING PAVEMENT SECTION WAS CORED.										



LOCATION MAP

NOTE

THE SOIL AN/OR STRUCTURE FOUNDATION INVESTIGATION SHEETS CONTAIN ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN. ADDITIONAL SUBSURFACE INVESTIGATIONS MAY HAVE BEEN MADE TO STUDY SOME ASPECT OF THE PROJECT. MORE INFORMATION, IF ANY, MAY BE OBTAINED IN DISTRICT 8, THE OFFICE OF MATERIALS MANAGEMENT, AT 1600 WEST BROAD STREET, OR THE OFFICE OF STRUCTURAL ENGINEERING, AT 1980 WEST BROAD STREET

PROJECT INDEX			
STATIONS FROM	TO	PLAN SHEET	PROFILE SHEET
174+00	202+00	8	8
202+00	230+00	9	9
230+00	258+00	10	10
258+00	287+00	11	11
287+00	315+00	12	12
315+00	343+00	13	13
343+00	371+00	14	14
371+00	399+00	15	15
399+00	427+00	16	16
427+00	17+00	17	17
17+00	45+00	18	18
45+00	73+00	19	19
73+00	101+00	20	20
101+00	129+00	21	21
129+00	157+00	22	22
157+00	185+00	23	23
185+00	208+30	24	24

RESOURCE INTERNATIONAL, INC.
28 ENTERPRISE DRIVE
WESTERVILLE, OHIO 43081 (614) 885-1959



DATE	REVIEWED	DRAWN
1/19/04		KAL
DATE	CHECKED	GPH
1/19/04		

SOIL PROFILE

WARREN COUNTY
WAR-75-3.40

(CONT'D) INVESTIGATIONAL FINDINGS

THE SUBSURFACE SOIL AT THE TEST BORING LOCATIONS CONSISTED PRIMARILY OF A-4A SANDY SILTS AND A-6A SILT AND CLAY SOILS. THE TABLE BELOW TABULATES THE PERCENTAGE OF EACH SOIL TYPE ENCOUNTERED WITHIN THE UPPER APPROXIMATELY 4.0 FEET (SS-1 AND SS-2) OF THE EXISTING SUBGRADE, AS SHOWN IN THE TABLE BELOW:

SOIL CLASSIFICATION	PERCENTAGE
A-1-A	2.6
A-1-B	3.4
A-2-4	5.6
A-2-6	0.4
A-3A	0.9
A-4A	44.9
A-4B	2.6
A-6A	24.4
A-6B	12.4
A-7-6	1.3
SHALE	1.7

BASED UPON A TABULATION OF THE STANDARD TEST BORING AND LABORATORY TESTING DATA THE FOLLOWING OBSERVATIONS WERE NOTED DURING THE APPLICATION OF THE PLAN SUBGRADE GUIDELINES:

BEDROCK WAS ENCOUNTERED WITHIN 5.0 FEET OF THE EXISTING SUBGRADE SURFACE IN 15 OF THE 117 TEST BORINGS AS NOTED IN THE TABLE BELOW:

BORING	DEPTH TO BEDROCK
B-3	2.7
B-10	4.0
B-11	2.8
B-12	4.0
B-13	4.3
B-15	4.5
B-19	5.0
B-20	3.0
B-27	2.7
B-28	4.0
B-62	2.8
B-70	4.0
B-71	2.5
B-78	2.5
B-86	3.5

A-4B SOIL WAS ENCOUNTERED WITHIN 2.0 FEET OF THE EXISTING SUBGRADE SURFACE AT TWO (2) OF THE SIX (6) TEST BORINGS WHERE A-4B WAS ENCOUNTERED:

SOILS WITH MOISTURE CONTENT PLUS 3 OF OPTIMUM, AS ESTIMATED BY THE PLAN SUBGRADE GUIDELINES, WERE ENCOUNTERED WITHIN THE UPPER 4 FEET OF THE EXISTING SUBGRADE (SS-1 AND SS-2) AT 31 OF THE 117 TEST BORINGS.

A SUMMATION OF THE RANGE OF MINIMUM "N" VALUES WITHIN THE UPPER APPROXIMATELY 4 FEET (SS-1 OR SS-2) OF THE EXISTING SUBGRADE AT ALL THE TEST BORING LOCATIONS IS PROVIDED IN THE TABLE BELOW:

MINIMUM BLOW COUNT "N" FROM SS-1 OR SS-2 EACH TEST BORING LOCATION	# OF BORINGS
0-5	2
6-10	36
11-15	35
16-20	13
21+	31

A MORE COMPREHENSIVE DESCRIPTION OF THE SOILS ENCOUNTERED DURING THE DRILLING PROGRAM CAN BE FOUND ON THE BORING LOGS ON SHEETS 3 THRU 7

THE NATURAL MOISTURE CONTENTS OF THE SOIL SAMPLES TESTED RANGED FROM 3% TO 25%, WITH AN AVERAGE OF 11.5%. APPROXIMATELY 50 PERCENT OF THE SAMPLES TESTED HAD MOISTURE CONTENTS BETWEEN 10% AND 14%. THE NATURAL MOISTURE CONTENTS OF THE SOIL SAMPLES TESTED FOR PLASTICITY INDEX RANGED FROM 12% BELOW TO 7% ABOVE THEIR CORRESPONDING PLASTIC LIMITS, BUT WERE PRIMARILY BELOW THEIR CORRESPONDING PLASTIC LIMITS.

GROUNDWATER WAS NOT ENCOUNTERED AND/OR MEASURED UPON COMPLETION AT ANY OF THE TEST BORING LOCATIONS. HOWEVER, CAVE-IN OCCURRED IN ALMOST ALL OF THE BORINGS AT COMPLETION, AFTER REMOVING THE AUGERS. THE CAVING LIKELY INFLUENCED THE GROUNDWATER READING (I.E., THE CAVED-IN MATERIAL MAY HAVE DISPLACED THE WATER IN THE BOREHOLE, PREVENTED WATER FROM ENTERING THE BOREHOLE OR SMALL VOLUMES OF WATER SEEPAGE MAY HAVE COLLECTED ON TOP OF THE CAVED-IN SOIL [OR SOIL BRIDGE]).

(CONT'D) INVESTIGATIONAL FINDINGS

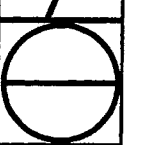
ALSO, PLEASE NOTE THAT SHORT-TERM WATER LEVEL READINGS ARE NOT NECESSARILY AN ACCURATE INDICATION OF THE ACTUAL GROUNDWATER LEVEL. IN ADDITION, GROUNDWATER LEVELS AND THE PRESENCE OF GROUNDWATER ARE CONSIDERED TO BE DEPENDENT ON SEASONAL FLUCTUATIONS IN PRECIPITATION. THE DETERMINATION OF THE GROUNDWATER LEVELS DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR.

GROUNDWATER WAS NOT ENCOUNTERED DURING DRILLING AT ANY OF THE BORINGS. HOWEVER, SOME AREAS OF EITHER PERCHED WATER IN THE NATURAL SOILS AND/OR TRAPPED WATER IN THE FILL MATERIALS SHOULD BE ANTICIPATED DURING CONSTRUCTION OF THE PAVEMENT SECTIONS. PROPER GROUNDWATER CONTROL MEASURES SHOULD BE EMPLOYED AND MAINTAINED TO PREVENT DISTURBANCE TO EXCAVATION BOTTOMS CONSISTING OF COHESIVE SOIL, AND TO PREVENT THE POSSIBLE DEVELOPMENT OF A QUICK OR "BOILING" CONDITION IF SOFT SILT AND/OR FINE SAND IS ENCOUNTERED. IT IS PREFERABLE THAT THE GROUNDWATER LEVEL, IF ENCOUNTERED, BE MAINTAINED AT LEAST 24 INCHES BELOW THE DEEPEST EXCAVATION. NOTE THAT DETERMINING AND MAINTAINING ACTUAL GROUNDWATER LEVELS DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR


WARREN COUNTY
WAR-75-3.40

SOIL PROFILE

2 / 24



RESOURCE INTERNATIONAL, INC.
281 ENTERPRISE DRIVE
WESTERVILLE, OHIO 43081 (614) 885-1959



DRAWN KAL	REVIEWED	CALCULATED	CHECKED
	DATE 1/19/04	DATE 1/19/04	GPH

SUMMARY OF SOIL TEST DATA

LOCATION & OFFSET	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
NORTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75										
B-1 180+00, 32' RT	0.0-0.6 0.6-1.4 1.4-1.5 1.5-3.0 3.0-4.5 4.5-5.3	7.6" - ASPHALT 9.5" - CONCRETE 1.2" - SAND AND GRAVEL BASE 17 8 11 26 38 31 13 14 9 13 11 23 44 33 15 16 13 11 17 -59-								A-6a A-6a VISUAL
B-2 188+00, 19' RT	0-0.2 0.2-1.0 1.0-1.5 1.5-3.0 3.0-3.5 3.5-5.0	2.5" - TOPSOIL 26 14 14 26 20 18 5 10 SAME AS 1.5-3.0 89 8 2 -1- SAME AS 1.5-3.0 16 10 13 31 30 22 9 11								A-4a VISUAL VISUAL VISUAL A-4a
B-3 196+00, 32' RT	0.0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-3.4 4.5-4.8	6.0" - ASPHALT 10.0" - CONCRETE 3.0" - SAND AND GRAVEL BASE 22 18 19 22 19 GRAY WEATHERED SHALE WITH LIMESTONE SAME AS 3.0-3.4							11 4 3	VISUAL VISUAL VISUAL
B-4 204+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-3.5 3.5-5.0	3.0" - TOPSOIL 83 9 3 -5- 75 9 6 -10- SAME AS 1.5-3.0 MOTTLED BROWN AND GRAY SILT AND CLAY, LITTLE SAND, TRACE GRAVEL							5 5 22	VISUAL VISUAL VISUAL VISUAL
B-5 212+00, 32' RT	0.0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.5" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 3 5 32 31 29 24 11 14 18 20 16 -46- 16 17 12 -55-							11 11 9	A-6a A-4a VISUAL
B-6 220+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 13 13 13 28 33 27 12 12 14 10 12 31 33 25 9 11 7 7 24 -62-							12 11 22	A-6a A-4a VISUAL
B-7 228+00, 32' RT	0.0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 73 11 8 -8- 10 12 25 -53- 9 16 34 -41-							5 13 14	VISUAL A-4a VISUAL
B-8 236+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 14 6 9 22 39 34 16 13 9 12 15 18 46 32 15 14 15 16 22 -47-							13 14 8	A-6b A-6a VISUAL
B-9 244+00, 32' RT	0.0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.5" - CONCRETE 3.0" - SAND AND GRAVEL BASE 12 15 21 -52- 17 13 13 25 32 24 11 10 22 18 15 -45-							10 12 14	A-6a A-6a VISUAL
B-10 252+00, 19' RT	0-0.3 0.3-1.5 1.5-1.7 3.0-5.0	4.0" - TOPSOIL 21 12 10 28 29 31 12 13 20 7 7 30 36 36 14 15 4 14 15 -67-							13 15 13	A-6a A-6a VISUAL
B-11 260+00, 32' RT	0-0.5 0.5-1.2 1.2-1.4 1.4-3.0 3.0-3.3 4.5-4.7	6.0" - ASPHALT 8.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE MOTTLED GRAY AND BROWN SILT AND CLAY, SOME SAND, LITTLE GRAVEL GRAY WEATHERED SHALE SAME AS 3.0-3.3							9 7	VISUAL VISUAL

LOCATION & OFFSET	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) NORTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75										
B-12 269+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-4.2	3.0" - TOPSOIL 25 16 16 21 22 23 9 12 12 6 7 19 36 32 27 12 14 4 8 8 -80-								A-4a A-6a VISUAL
B-13 277+00, 32' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-4.6	6.5" - ASPHALT 9.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 12 10 14 29 35 24 9 12 14 9 11 30 36 22 7 11 GRAY WEATHERED SHALE								A-4a A-4a VISUAL
B-14 285+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 29 18 17 20 16 22 8 10 10 13 17 17 -53- 12 9 20 -59-								A-4a A-4a VISUAL
B-15 293+00, 32' RT	0-0.5 0.5-1.3 1.3-2.0 2.0-3.0 3.0-4.5 4.5-4.8	6.0" - ASPHALT 9.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 13 11 6 26 44 35 15 17 7 6 2 29 56 36 15 14 GRAY WEATHERED SHALE								A-6a A-6a VISUAL
B-16 301+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 17 18 10 22 33 30 13 15 6 5 8 32 49 34 17 17 45 6 5 -44-								A-6a A-6b VISUAL
B-17 309+00, 32' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.0" - CONCRETE 2.5" - SAND AND GRAVEL BASE 8 6 5 31 50 34 13 16 13 7 4 29 47 36 16 16 36 10 7 -47-								A-6a A-6b VISUAL
B-18 317+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 26 18 15 19 22 24 9 10 16 13 13 26 32 30 14 12 12 9 13 -66-								A-4a A-6a VISUAL
B-19 325+00, 32' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-5.0 5.0-5.7	6.5" - ASPHALT 8.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 56 6 8 -29- 8 3 2 33 54 33 14 13 32 8 6 -54- GRAY WEATHERED SHALE								A-2-4 A-6a VISUAL VISUAL
B-20 333+00, 19' RT	0-0.3 0.3-1.5 1.5-2.5 2.5-3.0 3.0-4.3	3.5" - TOPSOIL 34 17 12 20 17 23 9 9 BROWN SAND, LITTLE SILT, TRACE CLAY 23 11 9 26 31 32 16 11 GRAY WEATHERED SHALE								A-4a VISUAL A-6b VISUAL
B-21 341+00, 32' RT	0-0.5 0.5-1.4 1.4-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.6" - ASPHALT 10.0" - CONCRETE 1.0" - SAND AND GRAVEL BASE 11 11 21 -57- 17 11 19 39 14 NP NP 16 11 17 -56-								A-4a A-4a VISUAL
B-22 349+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.75" - TOPSOIL 26 26 19 18 11 17 5 8 14 14 18 32 22 21 8 9 15 11 18 -56-								A-2-4 A-4a VISUAL
B-23 357+00, 32' RT	0-0.5 0.5-1.2 1.2-1.5 1.5-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 9.0" - CONCRETE 2.75" - SAND AND GRAVEL BASE 7 9 17 -67- 15 9 13 40 23 20 3 9 9 8 26 -57-								A-4a A-4a VISUAL

SUMMARY OF SOIL TEST DATA

LOCATION & OFFSET	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) NORTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75										
B-24 365+00, 19' RT	0-0.3 0.3-1.5 1.5-2.0 2.0-3.0 3.0-5.0	3.5" - TOPSOIL 21 18 19 22 FILL: BROWN GRAVEL, LITTLE SAND, TRACE SILT, TRACE CLAY 28 8 14 27 13 9 20 -58-							10 9 10	A-4a VISUAL A-4a VISUAL
B-25 373+00, 32' RT	0-0.6 0.6-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	7.0" - ASPHALT 8.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 11 10 21 36 14 9 20 35 11 9 24 -56-							10 10 9	A-4a A-4a VISUAL
B-26 381+00, 19' RT	0-0.3 0.3-1.0 1.0-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 28 0 18 29 FILL: BROWN GRAVEL, LITTLE SAND, TRACE SILT, TRACE CLAY 17 0 8 24 1 14 24 -61-							10 14 14	A-4a VIS A-6a VISUAL
B-27 389+00, 32' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-5.7	5.5" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 28 5 4 20 22 3 2 24 24 17 15 -44-							12 11 11	A-6b A-6a VISUAL
B-28 397+00, 19' RT	0-0.2 0.2-1.5 1.5-3.0 3.0-4.0 4.0-4.3	2.5" - TOPSOIL 12 11 18 26 19 10 12 22 27 10 14 -49- GRAY WEATHERED SHALE							14 12 12	A-6a A-6a VISUAL
B-29 405+00, 32' RT	0-0.5 0.5-1.5 1.5-1.7 1.7-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 10.0" - CONCRETE 2.5" - SAND AND GRAVEL BASE 13 14 18 30 14 12 18 32 24 11 17 -48-							8 9 8	A-4a A-4a VISUAL
B-30 413+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.5" - TOPSOIL 22 20 20 18 5 5 5 30 13 5 6 -76-							9 13 13	A-4a A-6a VISUAL
B-31 421+00, 32' RT	0-0.4 0.4-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	5.8" - ASPHALT 10.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 31 5 5 20 11 9 7 28 11 8 15 -66-							11 11 14	A-6a A-6a VISUAL
B-32 429+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 30 16 17 14 17 7 7 27 15 11 20 -54-							8 12 8	A-4a A-6a VISUAL
B-33 437+00, 32' RT	0-0.4 0.4-1.3 1.3-1.5 1.6-3.0 3.0-4.5 4.5-6.5	5.8" - ASPHALT 10.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 12 15 26 39 10 9 31 32 19 11 24 -46-							13 9 10	A-4a A-4a VISUAL
B-34 445+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 17 12 18 27 13 11 20 -56- 18 17 17 -48-							9 8 10	A-4a A-4a VISUAL
B-35 16+00, 32' RT	0-0.5 0.5-1.0 1.0-1.4 1.5-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 7.5" - CONCRETE 5.0" - SAND AND GRAVEL BASE 26 9 17 28 16 0 0 61 13 11 19 -57-							10 13 9	A-4a A-4b VISUAL

LOCATION & OFFSET	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) NORTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75										
B-36 24+00, 19' RT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	4.5" - TOPSOIL 20 14 20 13 7 13 13 11 27 -46- -49- 27					16 20	4 6	9 9 9	A-4a A-4a VISUAL
B-37 32+00, 32' RT	0-0.5 0.5-1.4 1.4-1.9 1.9-3.0 3.0-4.5 4.5-6.5	6.5" - ASPHALT 9.5" - CONCRETE 6.0" - SAND AND GRAVEL BASE 13 13 20 31 12 11 21 6 8 23 -56- -63-				24	20 18	7 5	8 7 10	A-4a A-4a VISUAL
B-38 40+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 33 18 18 11 15 22 12 9 21 -31- -52- -58-					17 19	3 6	9 8 10	A-2-4 A-4a VISUAL
B-39 48+00, 32' RT	0-0.5 0.5-1.3 1.5-3.0 3.0-4.5 4.5-6.2	5.5" - ASPHALT 10.0" - CONCRETE 41 23 24 0 0 14 0 1 24 -12- -46- -75-					NP 18	NP 4	6 10 12	A-1-b A-4b VISUAL
B-40 56+00, 19' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	2.75" - TOPSOIL 18 16 21 33 18 20 20 16 23 -45- -29- -41-					22 16	7 4	11 8 7	A-4a A-2-4 VISUAL
B-41 64+00, 32' RT	0-0.5 0.5-1.4 1.4-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.5" - ASPHALT 10.5" - CONCRETE 1.0" - SAND AND GRAVEL BASE 13 10 19 30 17 11 17 29 23 16 23 -38-					28 26	7 6	10 10 8	A-4a A-4a VISUAL
B-42 72+00, 30.3' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 40 19 16 34 22 16 15 14 34 -25- -28- -37-					18 16	4 3	8 8 14	A-1-b A-2-4 VISUAL
B-43 80+00, 70.9' RT	0-0.5 0.5-1.2 1.2-1.5 1.5-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 9.0" - CONCRETE 2.5" - SAND AND GRAVEL BASE 16 11 10 25 0 0 4 SAME AS 3.0-4.5 -96-					33	15	16 18 18	A-6a VISUAL
B-44 88+00, 78.6' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 16 13 24 15 9 14 19 9 23 -47- -49-				38	17 24	4 10	10 13 11	A-4a A-4a VISUAL
B-45 96+00, 92.5' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 10 1 20 36 14 10 18 33 15 13 24 -48-					33 25	8 6	14 11 11	A-4a A-4a VISUAL
B-46 104+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 29 12 18 24 13 19 37 10 17 -36-					20 22	6 8	12 12 10	A-4a A-4a VISUAL
B-47 112+00, 93.5' RT	0-0.7 0.7-1.5 1.5-1.7 1.7-3.0 3.0-4.5 4.5-6.5	7.6" - ASPHALT 10.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 28 8 14 27 24 10 13 30 13 10 46 -31-					26 25	10 11	14 15 18	A-4a A-6a VISUAL
B-48 120+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 31 19 21 48 5 7 14 17 24 -29- -45-					NP 24	NP 9	8 13 15	A-2-4 A-4a VISUAL



SUMMARY OF SOIL TEST DATA

LOCATION & OFFSET		Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) NORTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75											
B-49	128+00, 92.5' RT	0-0.6 0.6-1.3 1.3-1.6 1.6-3.0 3.0-4.5 4.5-6.5	7.0" - ASPHALT 9.0" - CONCRETE 3.0" - SAND AND GRAVEL BASE 47 9 13 32 15 15 51 14 7			-31- -38- -28-		17 25	5 10	11 11 6	A-2-4 A-4a VISUAL
B-50	136+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 42 9 24 12 35 7	19 16 11		-30- -47-	22	19 21	7 8	11 12 16	A-2-4 A-4a VISUAL
B-51	144+00, 92.5' RT	0-0.5 0.5-1.3 1.3-1.6 1.7-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.5" - CONCRETE 4.0" - SAND AND GRAVEL BASE 26 13 7 5 11 9 14 31 11			-62-	39 47	30 30	13 12	14 16 10	A-6a A-6a VISUAL
B-52	152+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 32 20 12 9 38 10	19 12 5	11 36	18 31 -47-		18 27	4 12	9 18 13	A-2-4 A-6a VISUAL
B-53	160+00, 92.5' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.0" - CONCRETE 2.75" - SAND AND GRAVEL BASE 12 12 8 9 24 8	19 20 19	33 33	24 30 -49-		22 25	9 9	13 13 18	A-4a A-4a VISUAL
B-54	168+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 21 18 17 10 24 8	23 17 14	17 41	21 15 -54-		22 22	7 7	10 10 17	A-4a A-4a VISUAL
B-55	176+00, 92.5' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 15 13 11 8 10 15	20 20 14	31 37	21 30 -61-		19 22	5 7	10 11 13	A-4a A-4a VISUAL
B-56	184+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 33 15 1 4 14 8	15 13 18	16 38	21 44 -60-		26 38	10 16	11 21 19	A-4a A-6b VISUAL
B-57	192+00, 92.5' RT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 33 9 18 8 39 9	18 22 6	22 31	18 29 -46-		19 24	5 10	12 13 8	A-4a A-4a VISUAL
B-58	200+00, 79.5' RT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 38 17 34 9 8 8	7 16 15	16 22	22 19 -69-		19	6	8 6 13	VISUAL A-4a VISUAL
B-59	208+00, 92.5' RT	0-0.4 0.4-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 10.4" - CONCRETE 2.0" - SAND AND GRAVEL BASE 22 12 29 9 23 15	9 24 25	33 25	-52-		22 23	7 8	12 10 8	A-4a A-4a VISUAL

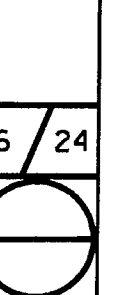
LOCATION & OFFSET		Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
SOUTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75											
B-60	184+00, 32' LT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.3-4.5 4.5-6.5	5.5" - ASPHALT 9.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 22 5 19 14 23 13		11 17 20	21 21 24	41 26 -44-	39 21	21 8	11 8 9	A-6b A-4a VISUAL
B-61	192+00, 19' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	4.5" - TOPSOIL 42 17 21 9 19 11	11 13 14	17 31 -56-	13 26	22 23	8 10	7 11 9	A-2-4 A-4a VISUAL	
B-62	200+00, 32' LT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-3.5 4.5-4.7	6.5" - ASPHALT 9.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 36 12 5 12 GRAY WEATHERED SHALE SAME AS 3.0-3.5		12 12 16	16 24	30	13	13 6	A-6a VIS VIS	
B-63	208+00, 19' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	4.75" - TOPSOIL 44 13 34 9 11 8	10 12 18	16 18 -63-	17 27	28 29	14 13	9 12 12	A-2-6 A-6a VISUAL	
B-64	216+00, 32' LT	0-0.6 0.6-1.4 1.4-1.6 1.5-3.0 3.0-4.5 4.5-6.5	7.0" - ASPHALT 9.75" - CONCRETE 2.0" - SAND AND GRAVEL BASE 24 11 28 16 43 20	17 17 12	19 19 12	29 -38- -25-	31 23	16 9	11 9 6	A-6b A-4a VISUAL	
B-65	224+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	2.5" - TOPSOIL 17 11 29 12 23 10	13 25 10	25 -49- -54-	34 27	29 27	13 12	8 8 10	A-6a A-6a VISUAL	
B-66	232+00, 32' LT	0-0.6 0.6-1.4 1.4-2.0 2.0-3.0 3.0-4.5 4.5-6.5	7.0" - ASPHALT 9.75" - CONCRETE 2.0" - SAND AND GRAVEL BASE 30 15 23 16 10 13		10 16 31	-45- -45- -46-	23 38	9 19	14 13 10	A-4a A-6b VISUAL	
B-67	240+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 12 21 22 11 21 13	17 14 21	24 -50- -45-	29 24	27 24	10 10	12 13 17	A-4a A-4a VISUAL	
B-68	248+00, 32' LT	0-0.5 0.5-1.4 1.4-1.5 1.6-3.0 3.0-4.5 4.5-6.5	6.5" - ASPHALT 10.5" - CONCRETE 1.0" - SAND AND GRAVEL BASE 19 10 17 11 34 16	8 6 31	18 18 13	45 -62- -37-	36 36	17 17	15 15 11	A-6b A-6b VISUAL	
B-69	256+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 16 8 SAME AS 0.3-1.5 4 0	6 31 0	39 -96-	38	38	19	13 6 15	A-6b VISUAL VISUAL	
B-70	264+00, 32' LT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-4.8	6.5" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 26 7 14 4 GRAY WEATHERED SHALE	9 25 39	33 39	29 36	13 15	13 15	A-6a A-6a VISUAL		
B-71	273+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-3.3	4.0" - TOPSOIL 14 15 6 7 GRAY WEATHERED SHALE	32 37	30 45	36 5	17 17	13 14	A-6b A-6b VISUAL		



SUMMARY OF SOIL TEST DATA

LOCATION & OFFSET		Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) SOUTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75											
B-72	281+00, 32' LT	0-0.5 0.5-1.4 1.4-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 10.6" - CONCRETE 1.0" - SAND AND GRAVEL BASE 11 6 8 35 2 4 6 6 16 11 19 27	-88-	40	35 34 28	17 16 12	20 20 20	A-6b A-6b A-6a		
B-73	289+00, 19' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-3.3	4.25" - TOPSOIL 18 17 10 10 10 6 25 7 3	-55-	44 43	27 29	11 12	11 14 18	A-6a A-6a VISUAL		
B-74	297+00, 32' LT	0-0.5 0.5-1.4 1.4-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.25" - ASPHALT 9.8" - CONCRETE 1.0" - SAND AND GRAVEL BASE 10 9 12 31 23 6 8 31 24 7 8	-61-	38 32	27 23	11 8	12 11 12	A-6a A-4a VISUAL		
B-75	305+00, 19' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	5.0" - TOPSOIL 29 15 9 15 10 4 17 6 4	-73-	30 39	35 38	16 18	10 14 15	A-6b A-6b VISUAL		
B-76	313+00, 32' LT	0.0-1.3 1.3-2.0 2.0-3.0 3.0-4.5 4.5-6.5	16.8" - ASPHALT 2.0" - SAND AND GRAVEL BASE 6 8 6 27 4 3 27 9 8	-80- -56-	42	32 39	16 17	19 10 11	A-6b A-6b VISUAL		
B-77	321+00, 19' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	4.5" - TOPSOIL 30 22 17 71 10 5 22 10 9	-31- -14-	23 30	19 19	8 5	9 7 14	A-2-4 VISUAL A-4a		
B-78	329+00, 32' LT	0-0.8 0.8-0.9 0.9-1.1 1.5-3.0 3.0-3.5 4.5-5.0	9.0" - ASPHALT 2.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 6 9 11 GRAY WEATHERED SHALE SAME AS 3.0-3.5	-74-	24	8	10 6 6	A-4a VISUAL VISUAL			
B-79	337+00, 19' LT	0-0.2 0.2-1.5 1.5-3.0 3.0-5.0	2.0" - TOPSOIL 14 19 16 13 8 11 12 10 15	-51- -68- -63-	23 25	9 10	7 13 12	A-4a A-4a VISUAL			
B-80	345+00, 32' LT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.0" - CONCRETE 2.5" - SAND AND GRAVEL BASE 10 10 9 13 12 9 17 6 3	-71- -66- -74-	25 29	9 12	11 12 12	A-4a A-6a VISUAL			
B-81	353+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.25" - TOPSOIL 16 13 17 18 17 19 5 7 11	-54- -46- -77-	18 17	5 5	8 8 9	A-4a A-4a VISUAL			
B-82	361+00, 132' LT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.9" - ASPHALT 9.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 13 12 19 28 9 12 18 35 16 10 17	-57-	28 26	20 20	6 7	9 9 7	A-4a A-4a VISUAL		
B-83	369+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.0" - TOPSOIL 41 17 14 37 5 3 28 7 22	-43-	NP 23	NP 29	NP 13	8 12 12	A-2-4 A-6a VISUAL		

LOCATION & OFFSET		Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) SOUTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75											
B-84	377+00, 32' LT	0-0.5 0.5-1.1 1.1-1.4 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 8.0" - CONCRETE 3.0" - SAND AND GRAVEL BASE 6 5 11 36 1 1 1 42 6 5 9 -80-					24 32	9 15	14 16 16	A-4a A-6a VISUAL
B-85	385+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 9 3 6 23 10 19 52 18 10			-82- -48- -20-		25 35	5 16	14 14 4	A-4a A-6b VISUAL
B-86	393+00, 32' LT	0-0.5 0.5-1.2 1.2-1.4 1.5-3.0 3.0-3.5 3.5-4.0 4.5-4.8	6.9" - ASPHALT 7.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 31 4 4 23 35 2 1 38 GRAY WEATHERED SHALE SAME AS 3.5-4.0				38 24	33 32	14 12	7 9 9	A-6a A-6a VISUAL VISUAL
B-87	401+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	3.5" - TOPSOIL 14 9 10 58 17 10 4 5 27		34	-15- -64-	33	26 15	11 2	12 6 23	A-6a A-1-a VISUAL
B-88	409+00, 32' LT	0-0.5 0.5-1.2 1.5-3.0 3.0-4.5 4.5-6.5	6.9" - ASPHALT 7.0" - CONCRETE 10 7 10 4 5 16 8 5 30		26 39	-57-	47 36	32 29	16 12	15 12 25	A-6b A-6a VISUAL
B-89	417+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 44 22 15 10 10 11 24 7 13		31	-19- -56-	38	16 31	2 16	7 11 12	A-1-b A-6b VISUAL
B-90	425+00, 32' LT	0-0.5 0.5-1.3 1.3-1.5 1.5-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 9.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 5 5 7 35 34 11 12 22 12 9 16			-63-	48 21	28 25	12 11	14 11 11	A-6a A-6a VISUAL
B-91	432+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 12 18 19 11 9 19 15 10 18		21 31	-57-	30 30	23 25	9 11	8 11 13	A-4a A-6a A-6a
B-92	441+00, 32' LT	0-0.5 0.5-1.5 1.5-3.0 3.0-3.5 3.5-4.5 4.5-6.5	6.0" - ASPHALT 9.0" - CONCRETE 30 21 26 46 39 8 SAME AS 4.5-6.5 8 8 22			-23- -7- -62-		NP NP	NP NP	5 4 14	A-1-b A-1-b VISUAL
B-93	12+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 26 11 20 16 16 13 3 4 31		25 35	-62-	18 30	20 24	6 8	13 17 21	A-4a A-4a VISUAL
B-94	20+00, 32' LT	0-0.5 0.5-1.3 1.3-2.0 2.0-3.0 3.0-4.5 4.5-6.5	6.5" - ASPHALT 9.5" - CONCRETE 8.0" - SAND AND GRAVEL BASE 16 11 19 30 16 8 23 33 14 12 24			-50-	24 20	22 18	9 4	9 7 9	A-4a A-4a VISUAL
B-95	28+00, 19' LT	0-0.5 0.5-1.5 1.5-3.0 3.0-5.0	6.0" - TOPSOIL 18 14 19 15 11 19 21 9 18		27 31	-52-	21 24	21 20	8 7	12 7 9	A-4a A-4a VISUAL



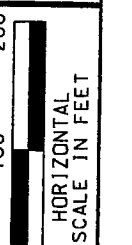
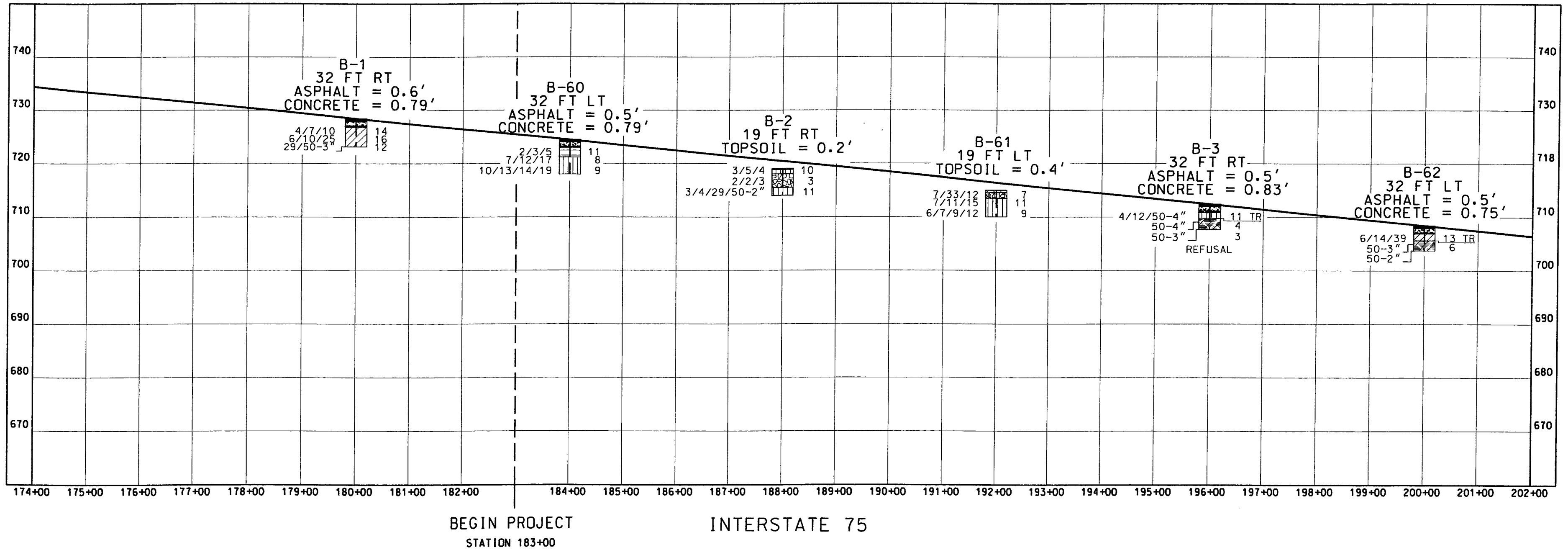
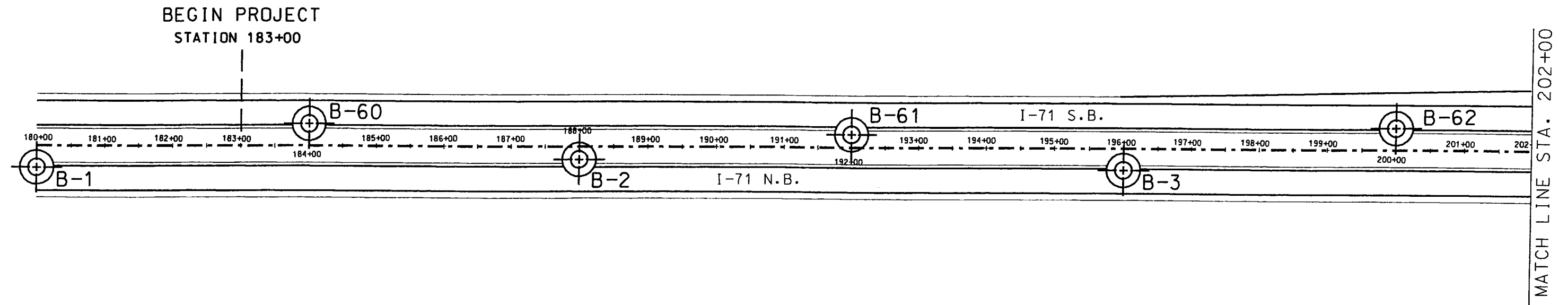
SUMMARY OF SOIL TEST DATA

LOCATION & OFFSET	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) SOUTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75										
B-96 36+00, 32' LT	0-0.5 0.5-1.1 1.1-1.4 1.4-3.0 3.0-4.5 4.5-6.5	5.75" - ASPHALT 7.75" - CONCRETE 3.0" - SAND AND GRAVEL BASE 15 11 17 30 26 21 9 8 18 10 19 31 22 21 8 12 6 10 13 -71-								A-4a A-4a VISUAL
B-97 44+00, 19' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 13 6 12 30 39 31 17 8 0 0 1 59 40 26 11 18 0 0 0 -100-								A-6b A-6a VISUAL
B-98 52+00, 32' LT	0-0.5 0.5-1.3 1.3-1.5 1.6-3.0 3.0-4.5 4.5-6.5	5.0" - ASPHALT 9.5" - CONCRETE 2.0" - SAND AND GRAVEL BASE 19 12 20 30 20 17 5 9 3 2 4 30 62 35 13 21 0 1 2 -97-								A-4a A-6a VISUAL
B-99 60+00, 19' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	5.5" - TOPSOIL 19 14 20 28 20 18 5 6 13 6 12 32 38 28 13 17 8 11 17 -65-								A-4a A-6a VISUAL
B-100 68+00, 34' LT	0-0.5 0.5-1.3 1.3-1.5 1.6-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 30 26 25 -18- 17 32 40 -11- 26 30 27 -17-					NP NP	NP NP	7 7 7	A-1-b A-3a VISUAL
B-101 76+00, 44' LT	0-0.4 0.4-1.5 1.5-1.8 3.0-5.0	5.5" - TOPSOIL 27 9 18 23 23 22 8 11 2 6 14 52 25 26 10 16 23 11 18 -49-								A-4a A-6b VISUAL
B-102 84+00, 84.3' LT	0-0.5 0.5-1.3 1.3-2.0 2.0-3.0 3.0-4.5 4.5-6.5	5.5" - ASPHALT 10.0" - CONCRETE 2.0" - SAND AND GRAVEL BASE 19 12 25 8 36 48 31 19 22 17 25 -37- 23 23 34 -20-								A-7-6 A-4a VISUAL
B-103 91+00, 79.5' LT	0-0.3 0.3-1.5 1.5-3.0 3.0-5.0	4.0" - TOPSOIL 32 12 20 22 14 20 6 7 16 11 29 -44- 14 16 44 -26-								A-4a A-4a VISUAL
B-104 100+00, 92.5' LT	0-0.5 0.5-1.1 1.1-2.0 2.0-3.0 3.0-4.5 4.5-6.5	6.0" - ASPHALT 6.5" - CONCRETE 10.25" - SAND AND GRAVEL BASE 18 17 20 -45- 24 14 19 24 -48- 14 14 24 -48-								A-4a A-4a VISUAL
B-105 108+00, 79.5' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	3.75" - TOPSOIL 39 24 17 -21- 24 8 14 24 -57- 13 12 18 -57-								A-1-b A-6b VISUAL
B-106 116+00, 92.5' LT	0-0.5 0.5-1.3 1.3-1.6 1.5-3.0 3.0-4.5 4.5-6.5	5.6" - ASPHALT 9.4" - CONCRETE 4.0" - SAND AND GRAVEL BASE 18 11 19 32 20 16 5 8 19 14 18 -49- 17 14 16 -53-								A-4a A-4a VISUAL
B-107 124+00, 79.5' LT	0-0.4 0.4-1.5 1.5-3.0 3.0-5.0	5.0" - TOPSOIL 14 22 30 -34- 25 35 16 -24- 1 52 21 -26-								A-3a A-1-b VISUAL

LOCATION & OFFSET	Depth From To	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	% W.C.	ODOT Class
(CONT'D) SOUTH BOUND BORINGS REFERENCED TO CENTERLINE OF INTERSTATE 75										
B-108 132+00, 92.5' LT	0-0.5 0.5-1.1 1.1-1.4 1.5-3.5 3.5-5.5 5.5-6.5	6.6" - ASPHALT 6.5" - CONCRETE 3.75" - SAND AND GRAVEL BASE 21 12 17 -50- 37 15 12 -36- SAME AS 3.5-5.5								A-4a A-4a VISUAL
B-109 140+00, 79.5' LT	0-0.6 0.6-2.0 2.0-4.0 4.0-5.0	7.5" - TOPSOIL 10 9 14 -67- 9 13 20 -58- 4 6 18 -72-								A-6a A-6b VISUAL
B-110 148+00, 92.5' LT	0-0.5 0.5-1.2 1.2-2.0 2.0-3.5 3.5-4.5 5.5-5.9	6.0" - ASPHALT 8.25" - CONCRETE 9.0" - SAND AND GRAVEL BASE 32 10 6 26 26 29 13 12 41 17 11 -31- 56 13 12 -19-								A-6a A-2-4 VISUAL
B-111 156+00, 79.5' LT	0-0.4 0.4-2.0 2.0-4.0 4.0-5.0	4.5" - TOPSOIL 17 14 14 -55- 12 12 14 35 -59- 8 11 22 -59-								A-6a A-6b VISUAL
B-112 164+00, 92.5' LT	0-0.5 0.5-1.2 1.2-1.5 1.5-3.5 3.5-5.5 5.5-6.5	6.5" - ASPHALT 7.5" - CONCRETE 3.5" - SAND AND GRAVEL BASE 8 11 16 -65- 2 5 16 45 -64- 6 8 22 -64-								A-4a A-7-6 VISUAL
B-113 172+00, 79.5' LT	0-0.4 0.4-1.0 1.0-2.0 2.0-4.0 4.0-5.0	4.5" - TOPSOIL 7.5" - SAND AND GRAVEL BASE 14 12 17 -57- 10 10 17 -63- 9 8 14 -69-								A-4a A-4a VISUAL
B-114 180+00, 92.5' LT	0-0.6 0.6-1.0 1.0-3.5 3.5-4.0 4.0-5.5 5.5-6.5	7.4" - ASPHALT 5.5" - CONCRETE 30.0" - SAND AND GRAVEL BASE 37 12 10 -41- 5 3 4 -88- 3 4 13 -80-								A-4a A-4b VISUAL
B-115 188+00, 79.5' LT	0-0.5 0.5-2.0 2.0-4.0 4.0-5.0	6.0" - TOPSOIL 8 10 16 -66- 6 9 16 -69- 9 8 17 -66-								A-4a A-4a VISUAL
B-116 196+00, 925' LT	0-0.5 0.5-1.0 1.0-2.0 2.0-3.5 3.5-5.5 5.5-6.5	7.4" - ASPHALT 5.5" - CONCRETE 30.0" - SAND AND GRAVEL BASE 3 6 13 45 33 40 23 19 9 8 12 -71- 11 12 16 -61-								A-6b A-6a VISUAL
B-117 204+00, 79.5' LT	0-0.8 0.8-2.0 2.0-4.0 4.0-5.0	10.0" - TOPSOIL 0 1 3 42 54 53 33 19 4 11 8 50 27 17 3 10 29 14 12 -45-								A-7-6 A-4a VISUAL



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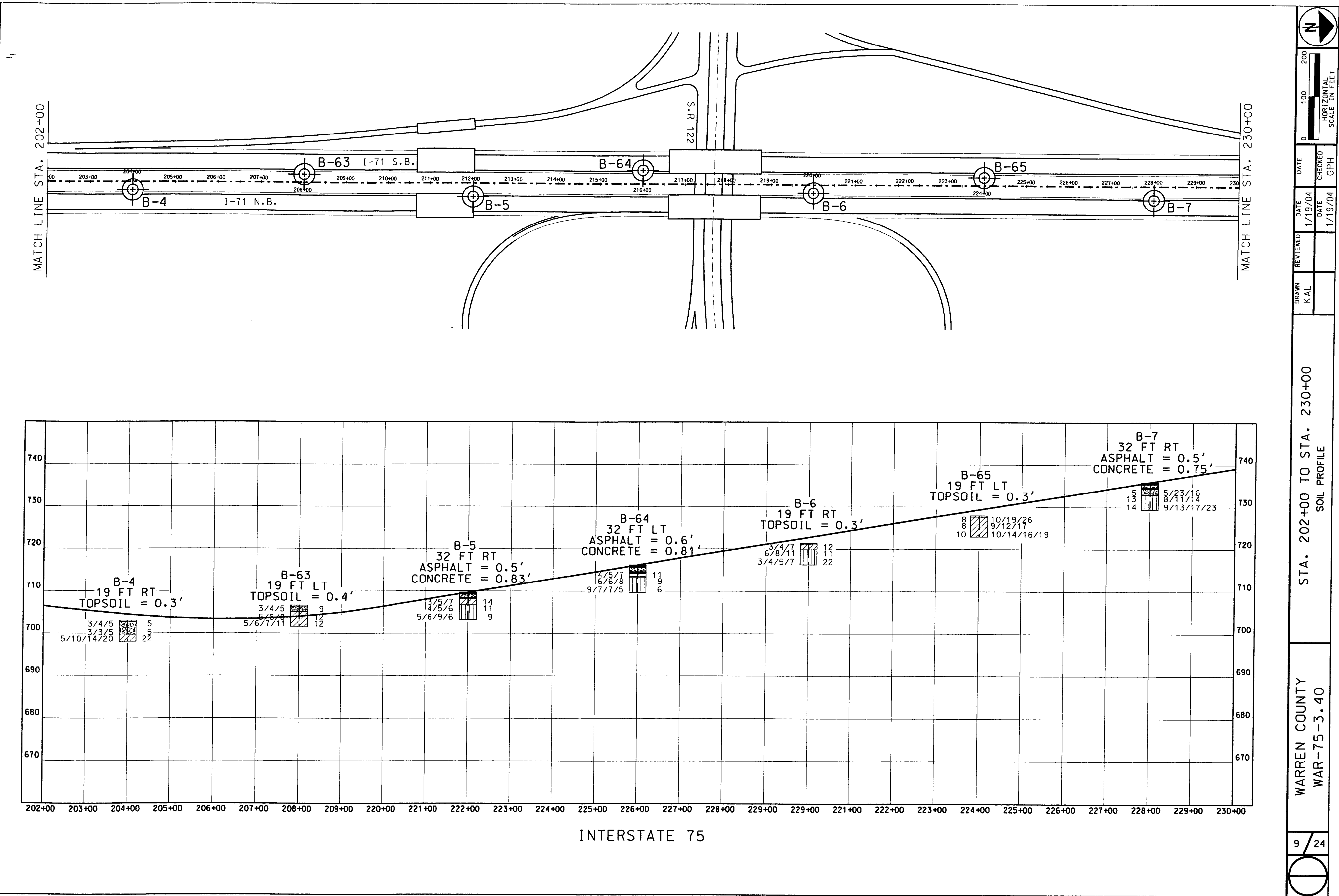
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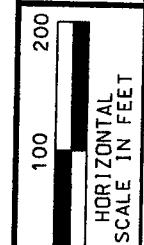
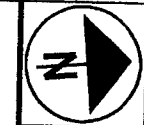
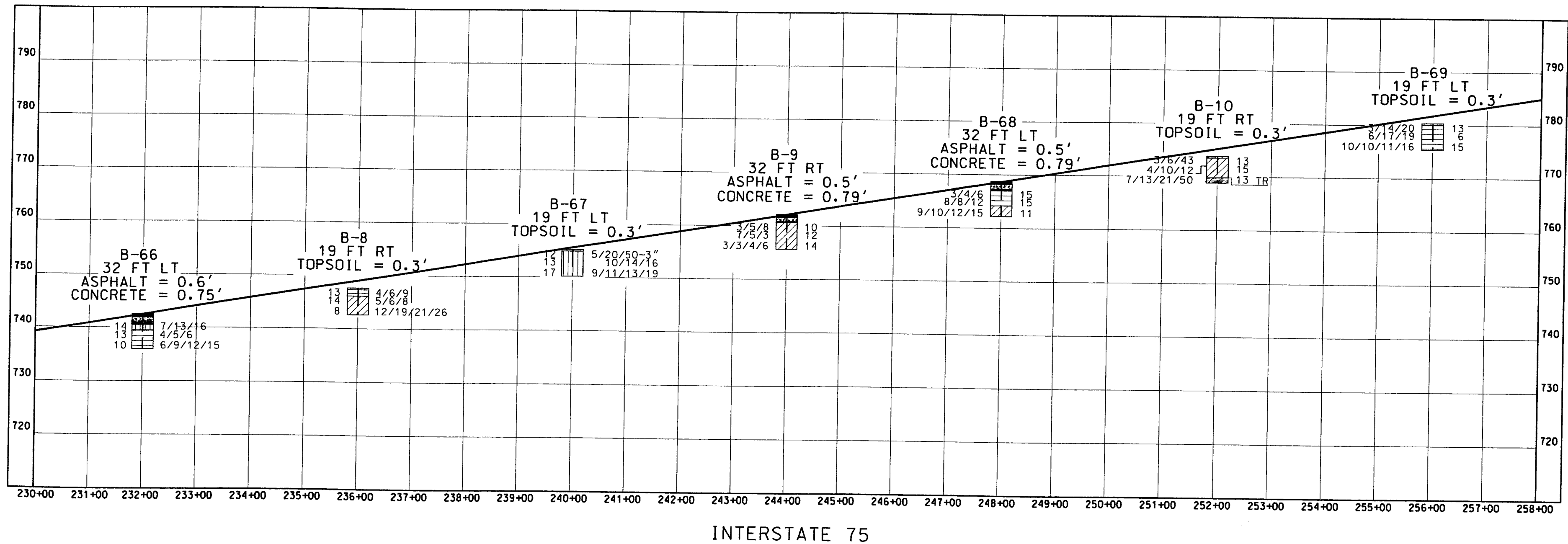
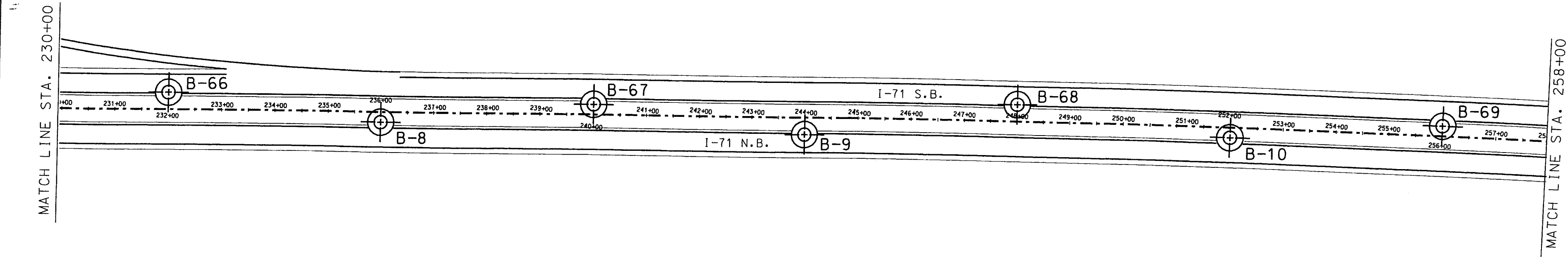
STA. 174+00 TO STA. 202+00
SOIL PROFILE

WARREN COUNTY
WAR-75-3.40

8/24







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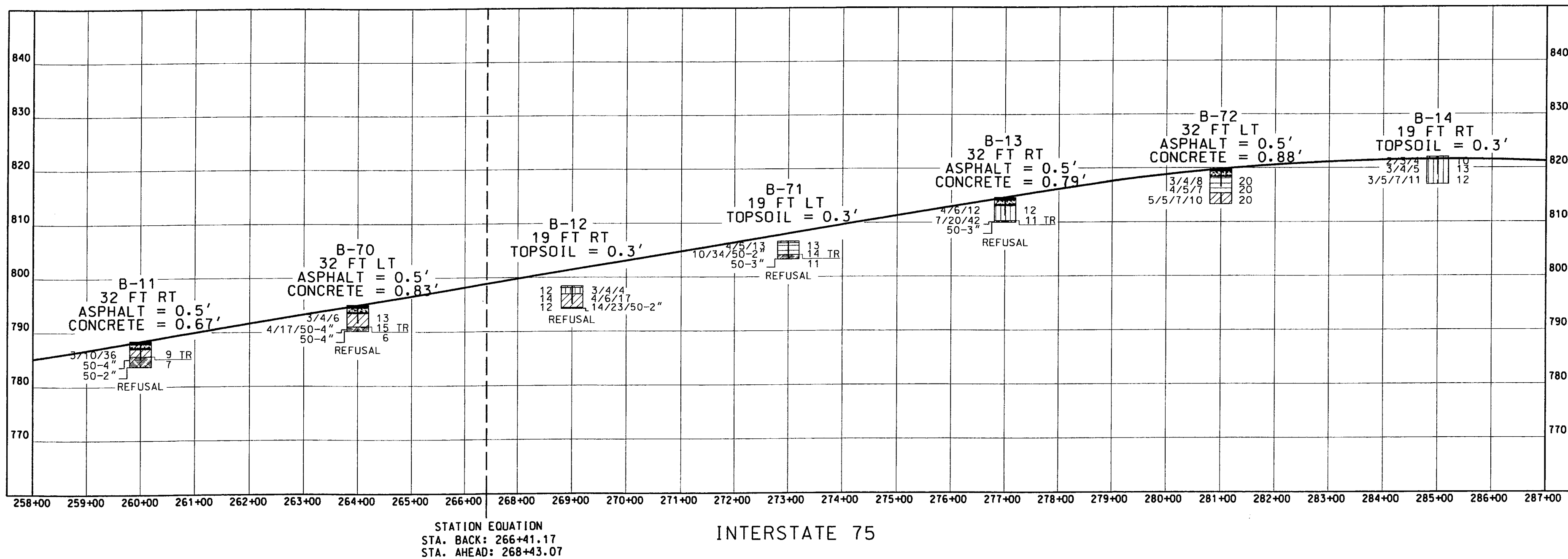
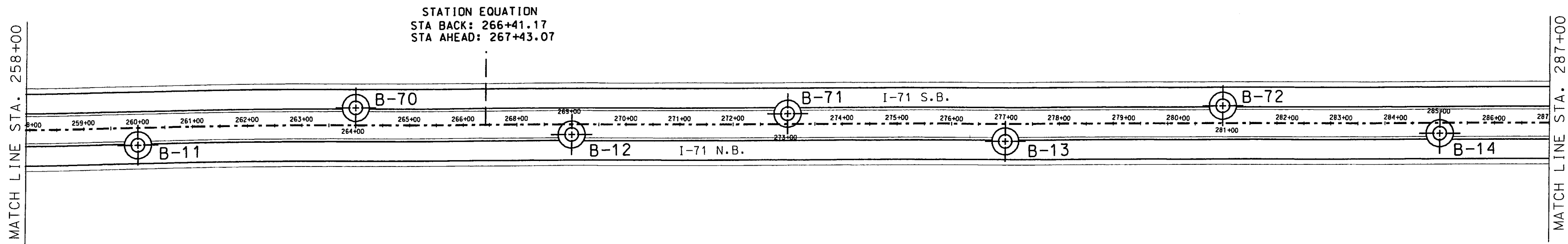
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SOIL PROFILE

WARREN COUNTY

WAR-75-3.40

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WARREN COUNTY
WAR-75-3.40

STA. 258+00 TO STA. 287+00
SOIL PROFILE

DATE	REVIEWED	DRAWN	CHECKED
12/15/03		K.A.L.	
12/15/03			G.P.H.

DATE

12/15/03

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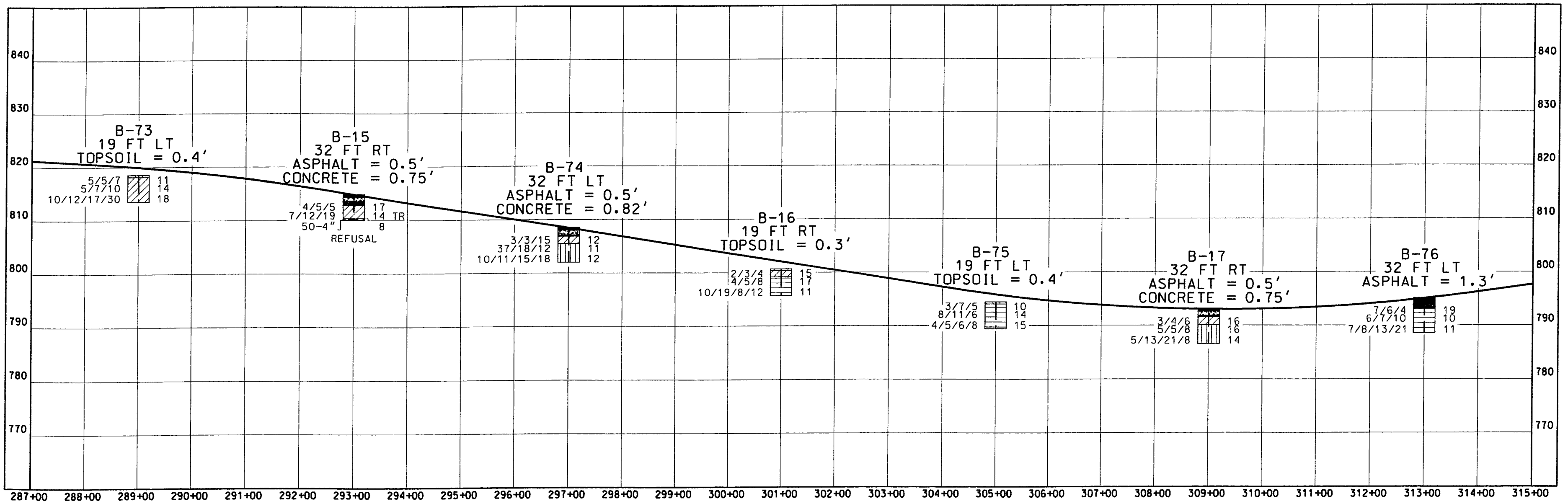
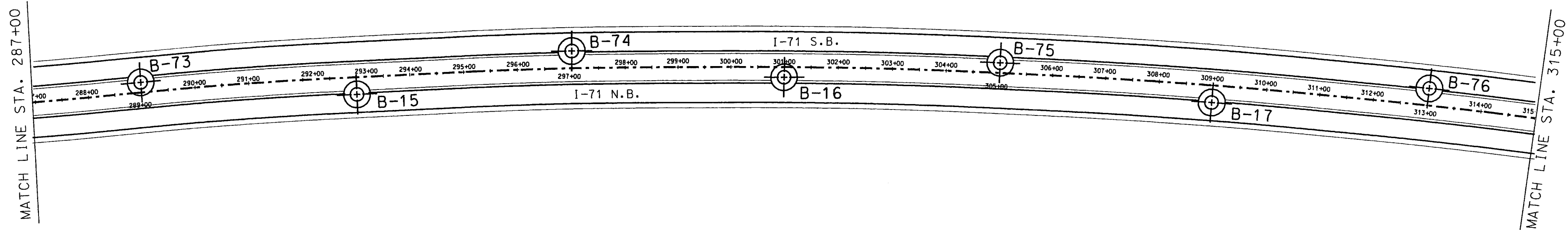
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HORIZONTAL
SCALE IN FEET

11



INTERSTATE 75

DATE	1/19/04
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CHECKED	GPH

WARREN COUNTY
WAR-75-3.40

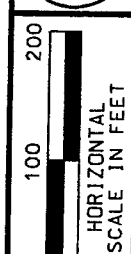
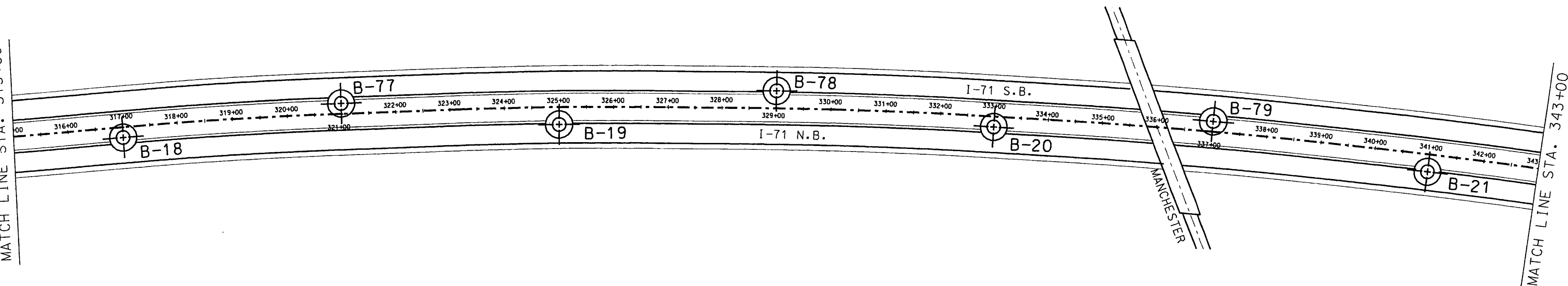
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SOIL PROFILE

12

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MATCH LINE STA. 315+00



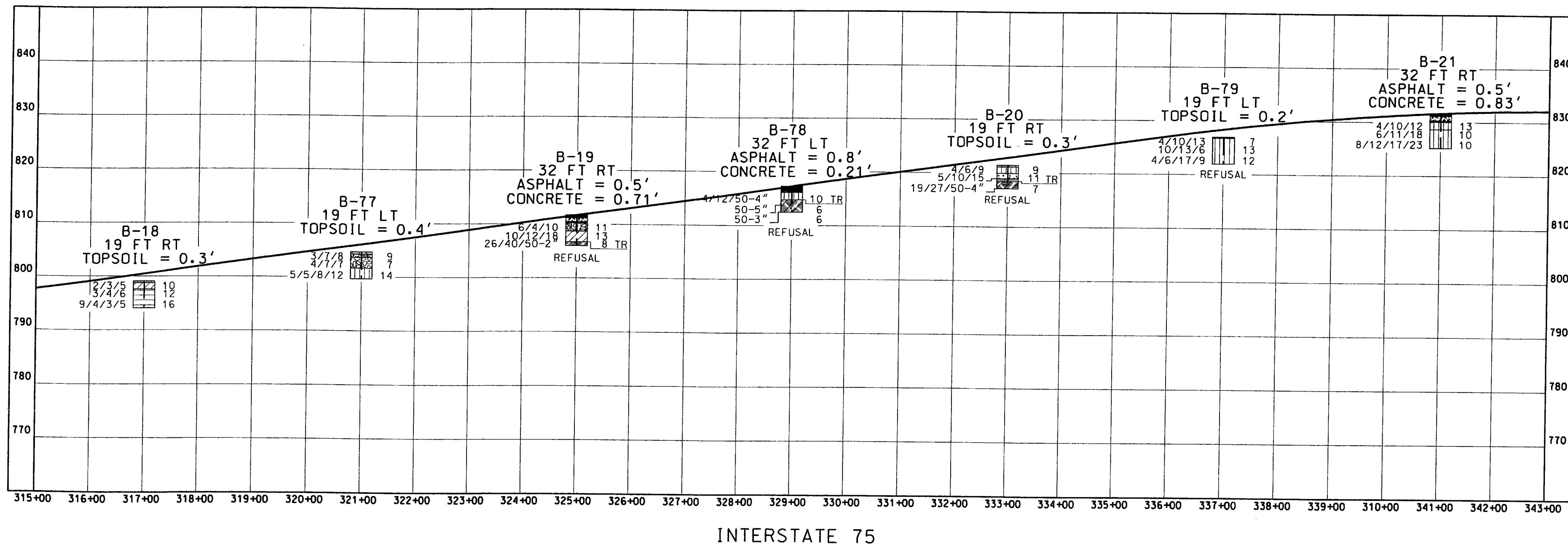
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1/19/04	1/19/04

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DATE 1/19/04

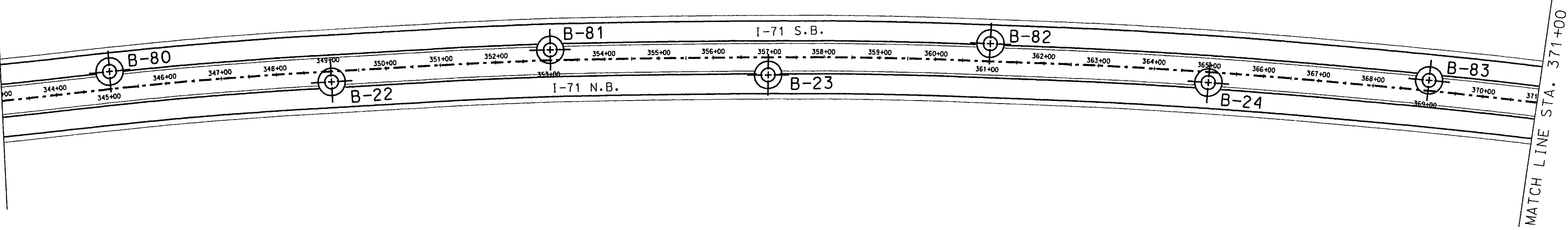
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WARREN COUNTY
WAR-75-3.40



INTERSTATE 75

MATCH LINE STA. 343+00





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HORIZONTAL
SCALE IN FEET

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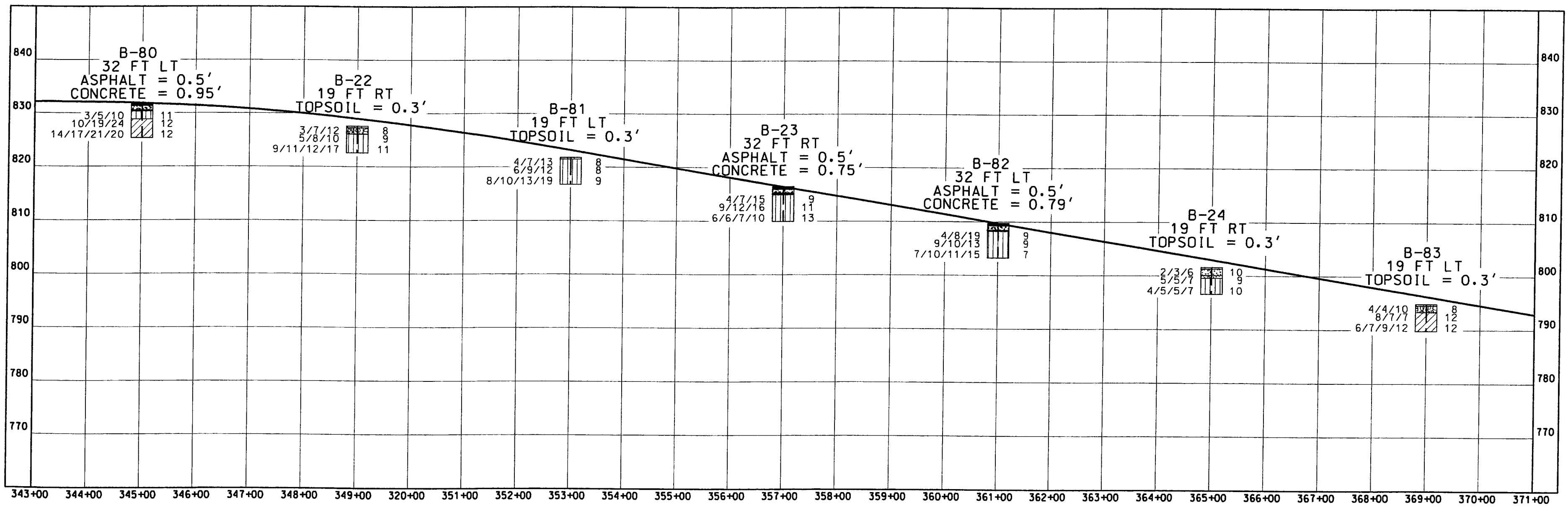
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STA. 343+00 TO STA. 371+00
SOIL PROFILE

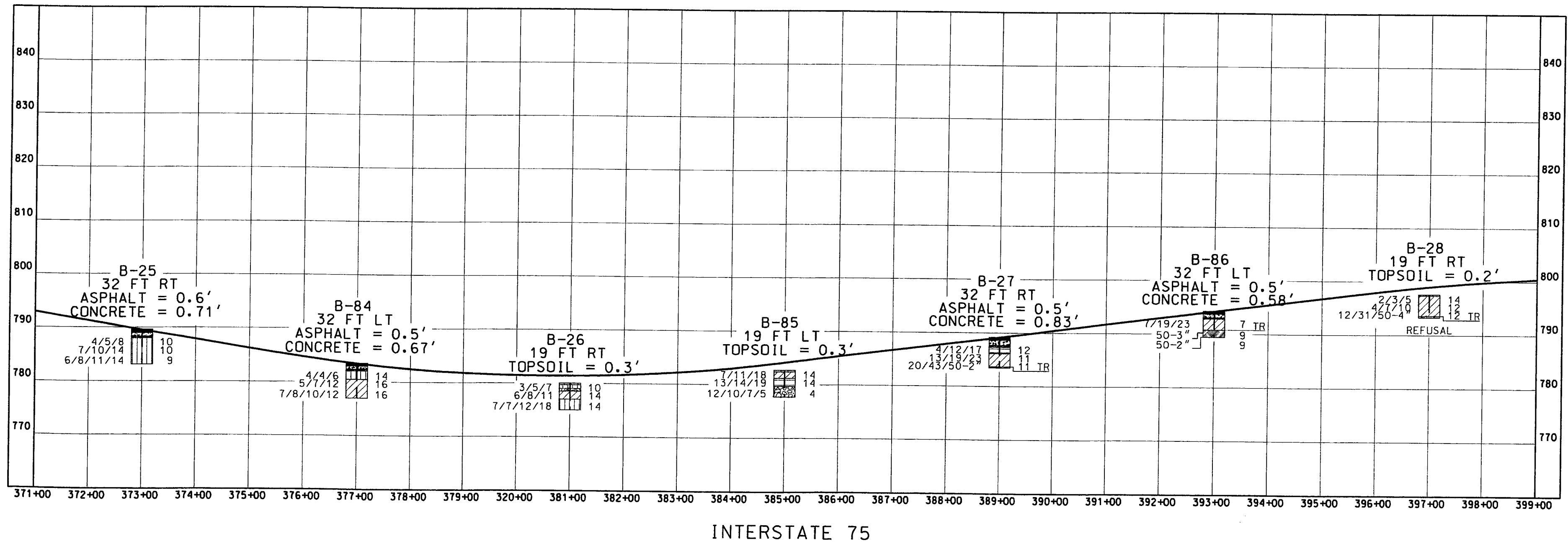
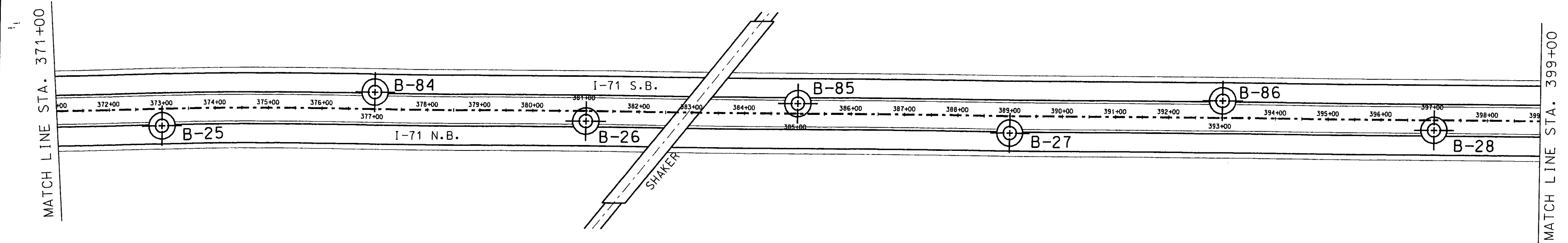
WARREN COUNTY
WAR-75-3.40

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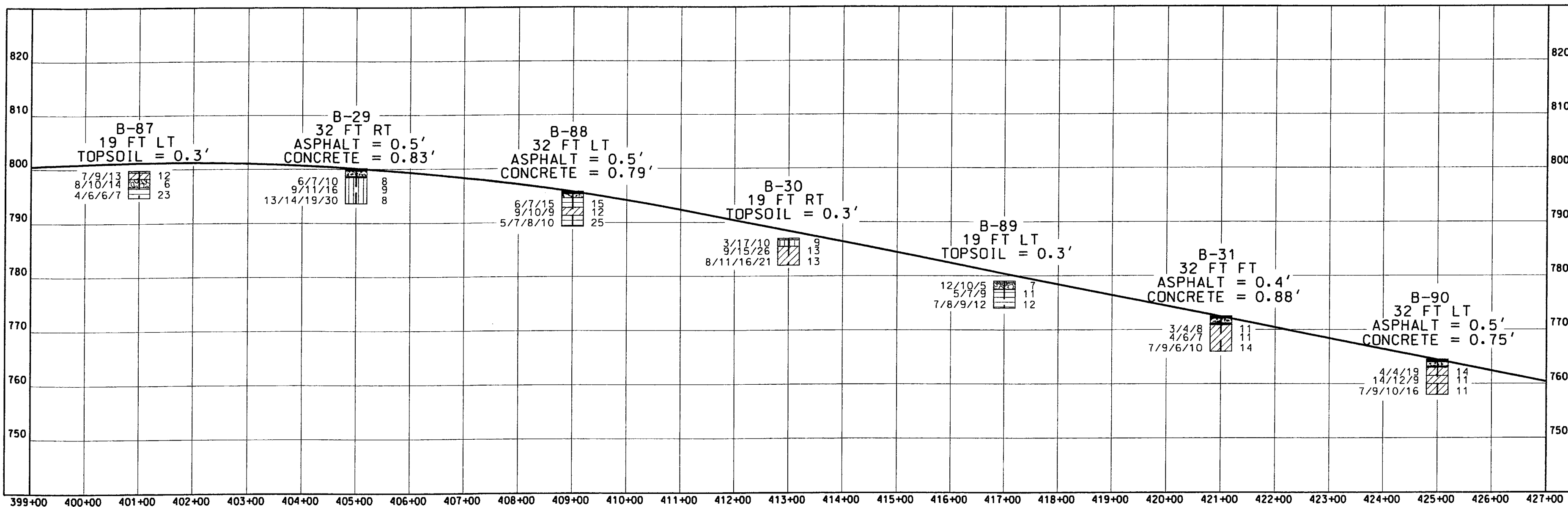
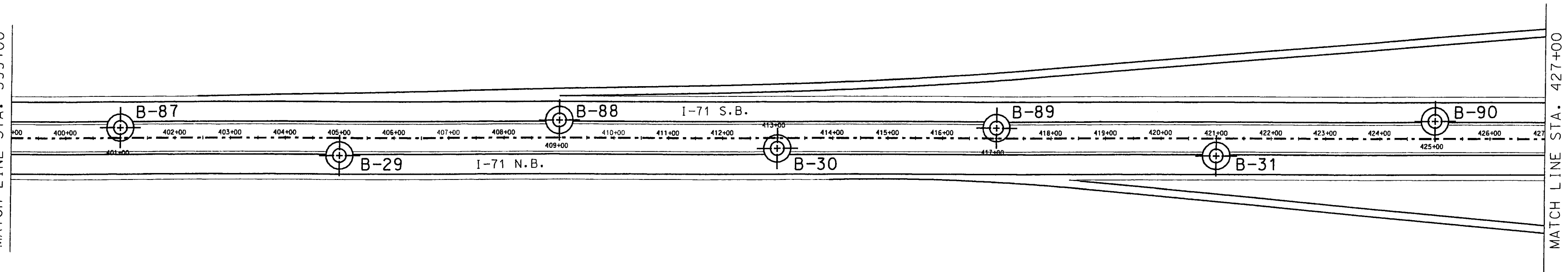


INTERSTATE 75



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MATCH LINE STA. 399+00



INTERSTATE 75

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HORIZONTAL
SCALE IN FEET

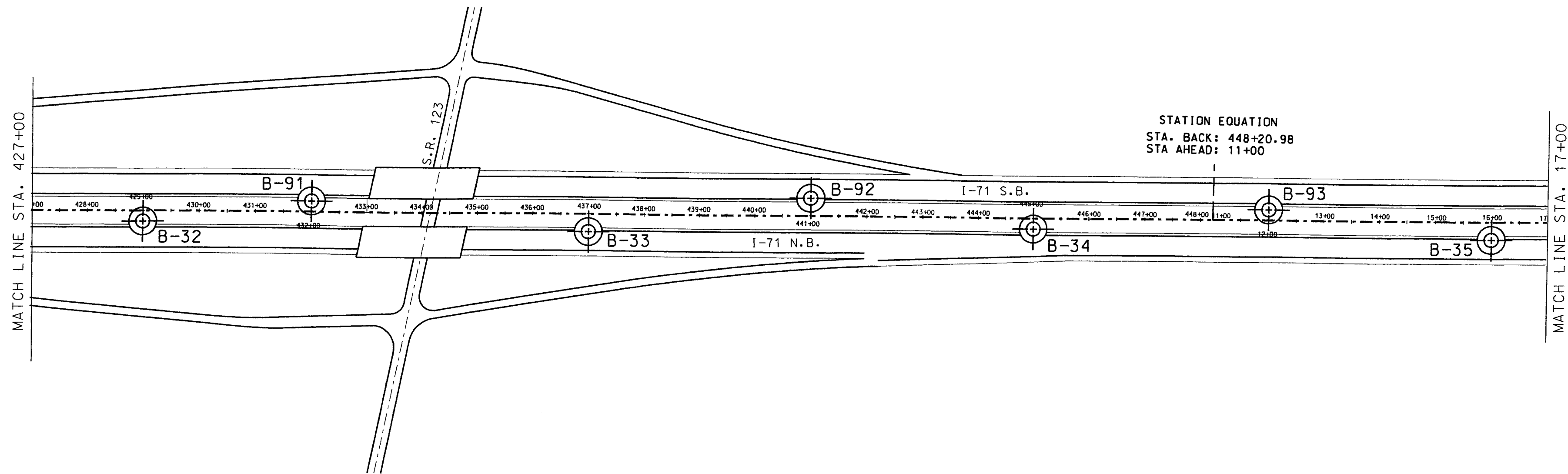
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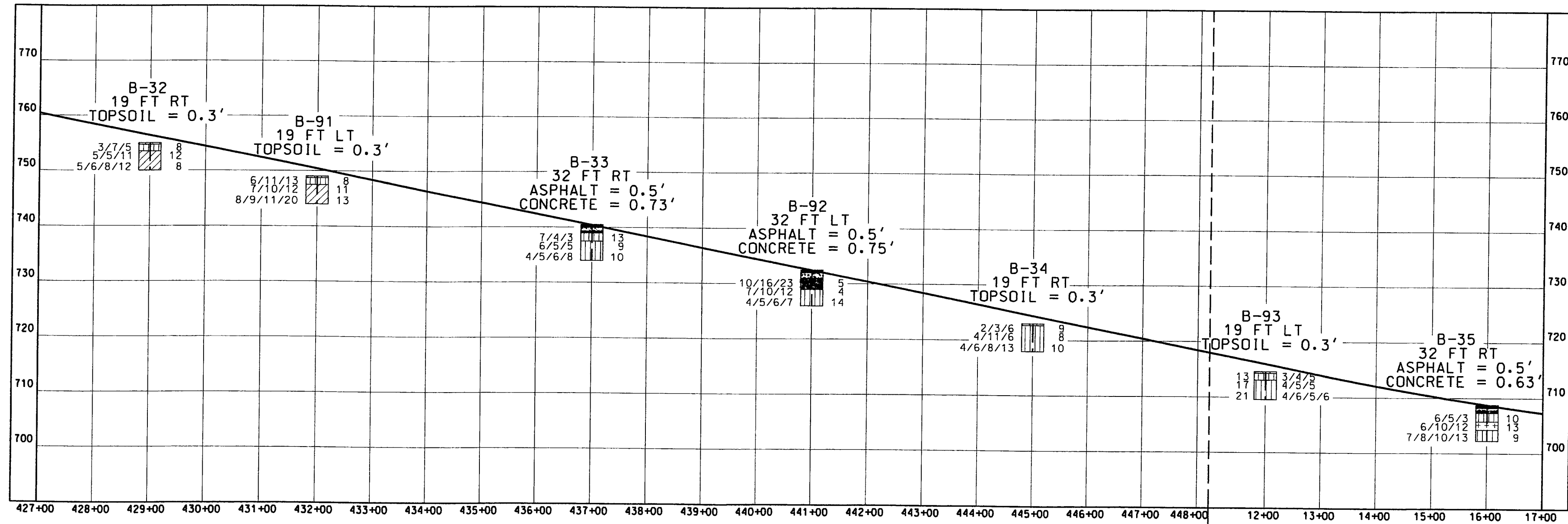
STA. 399+00 TO STA. 427+00
SOIL PROFILE

WARREN COUNTY
WAR-75-3.40

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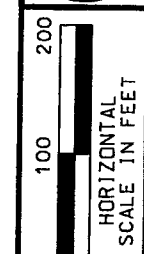


STATION EQUATION
STA. BACK: 448+20.98
STA. AHEAD: 11+00



INTERSTATE 75

STATION EQUATION
STA. BACK: 448+20.98
STA. AHEAD: 11+00



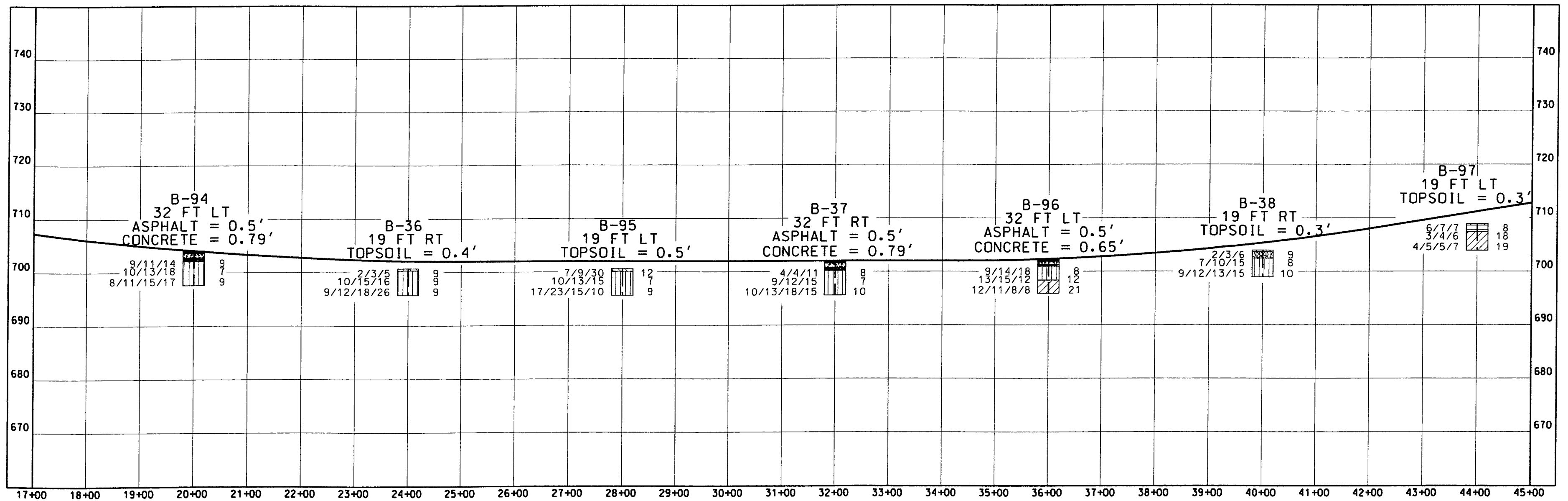
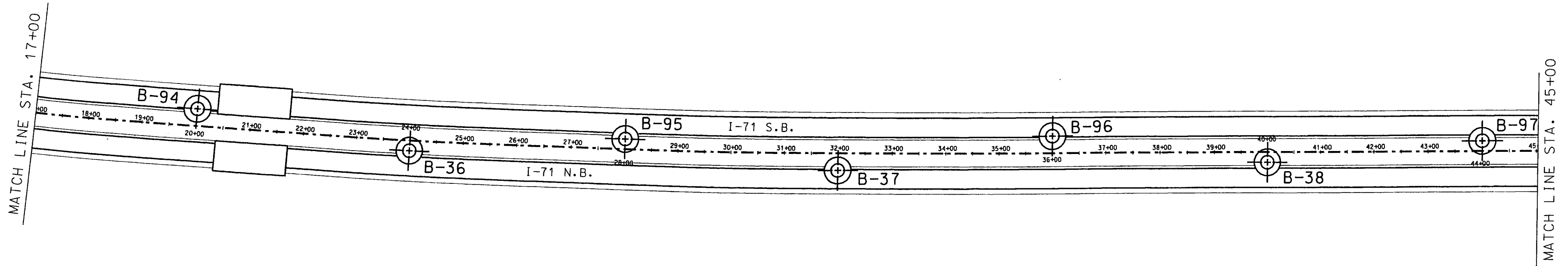
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1/19/04	GPH
DATE	REVIEWED
1/19/04	KAL
DATE	DRAWN
1/19/04	KAL

STA. 427+00 TO STA. 17+00
SOIL PROFILE

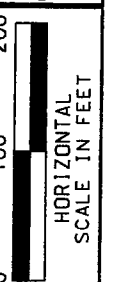
WARREN COUNTY
WAR-75-3.40

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INTERSTATE 75



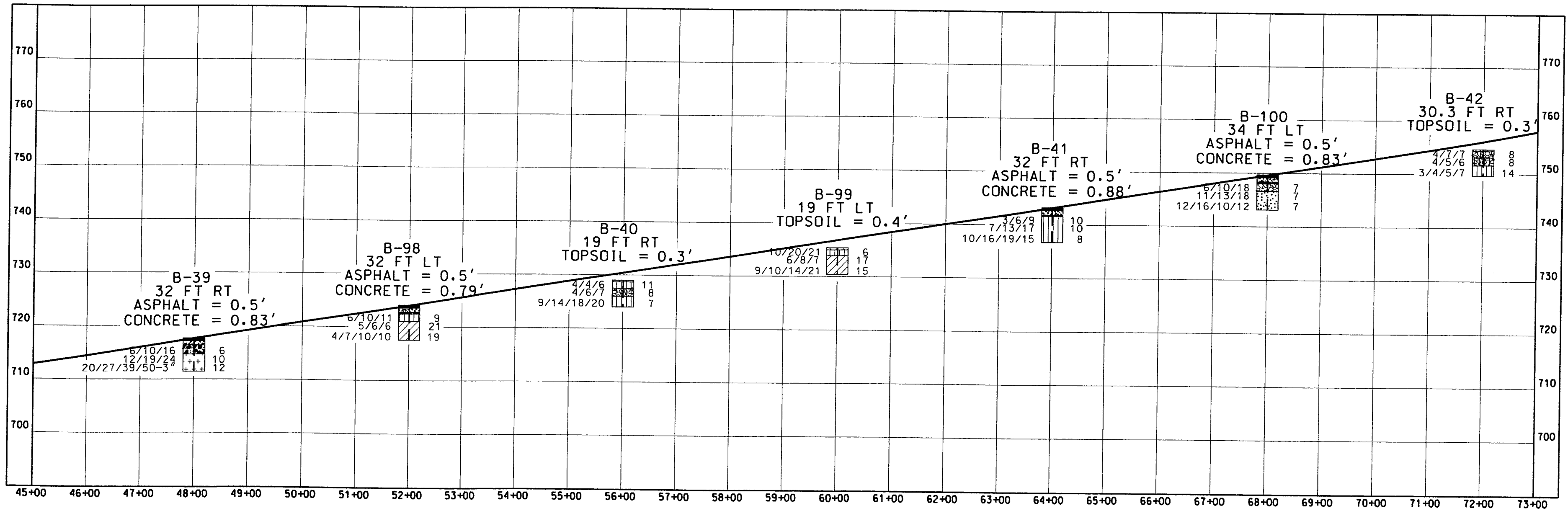
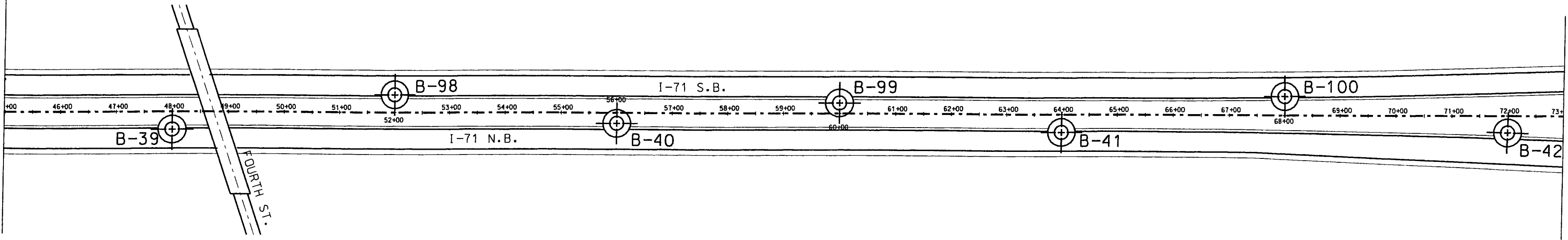
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STA. 17+00 TO STA. 45+00
SOIL PROFILE

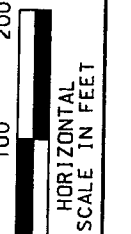
WARREN COUNTY
WAR-75-3.40

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MATCH LINE STA. 45+00



INTERSTATE 75



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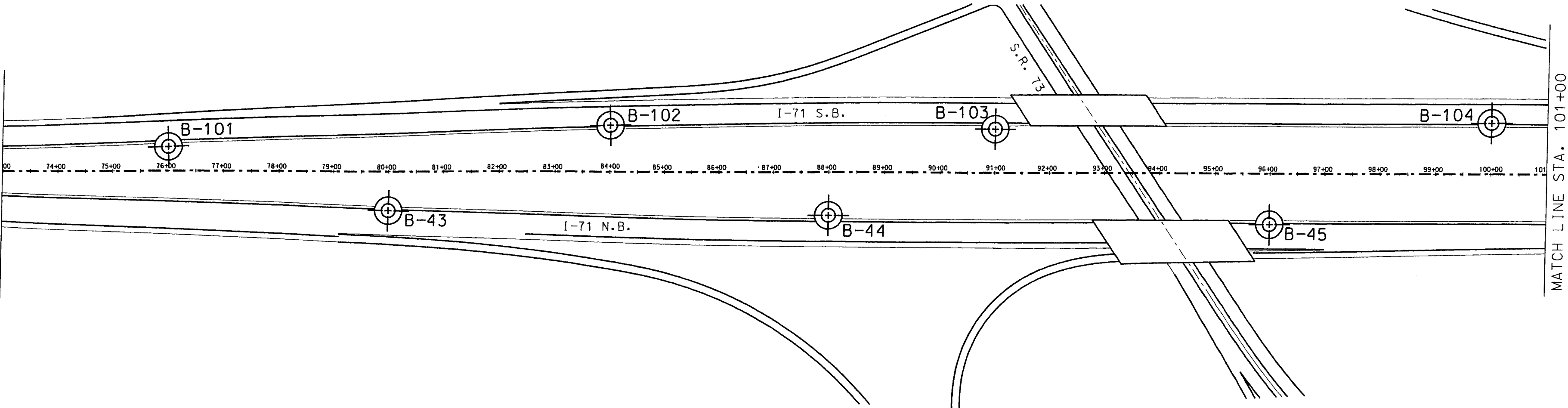
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SOIL PROFILE

WARREN COUNTY
WAR-75-3.40

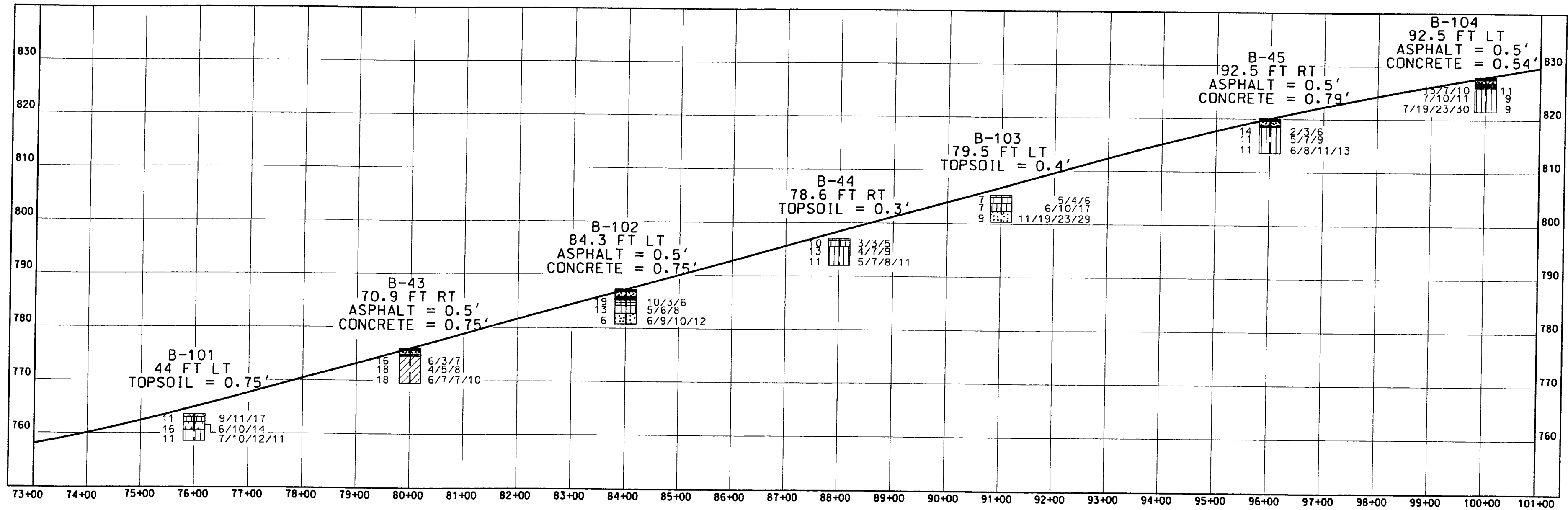
19 / 24



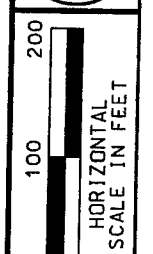
MATCH LINE STA. 73+00



MATCH LINE STA. 101+00



INTERSTATE 75

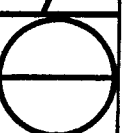


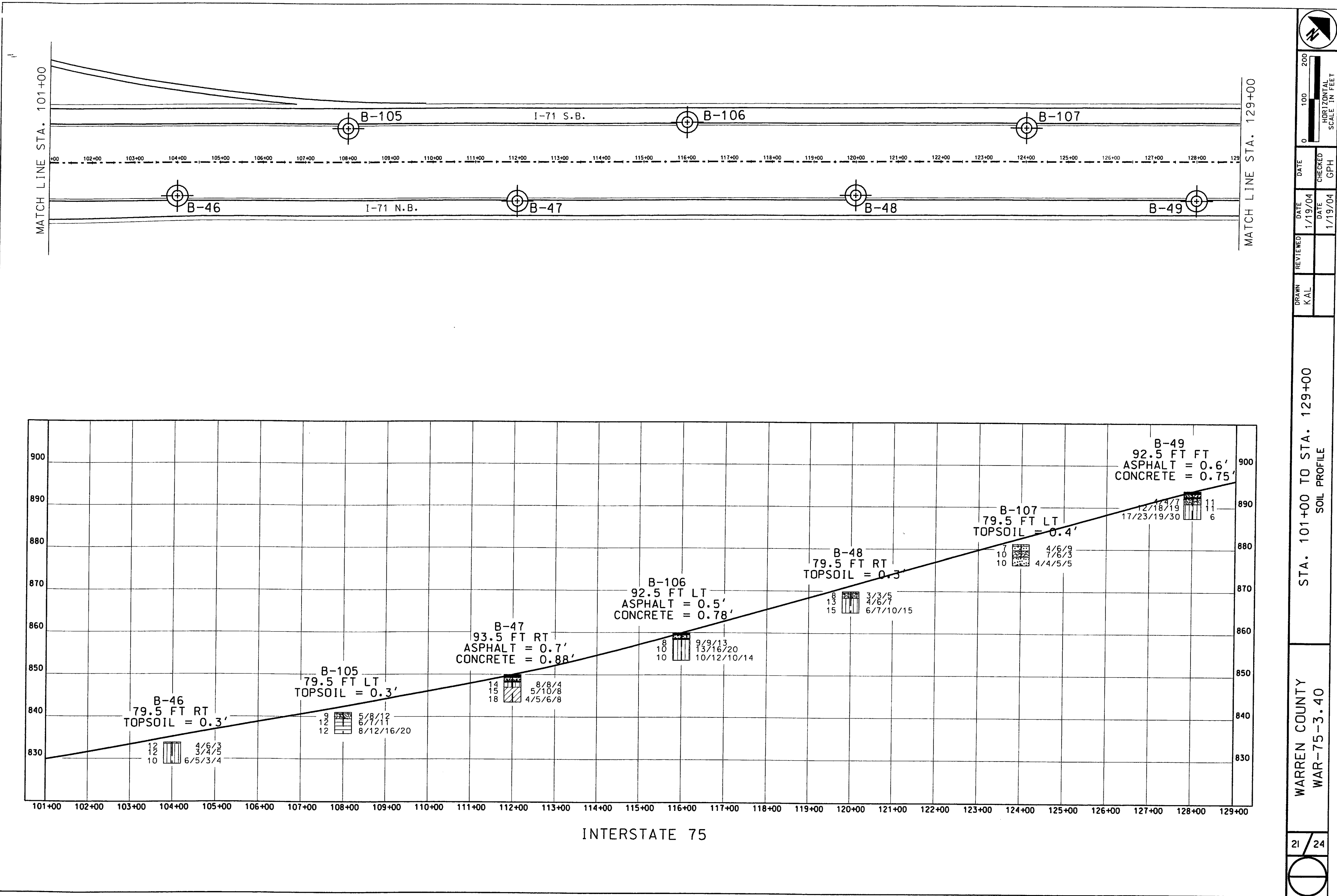
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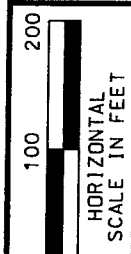
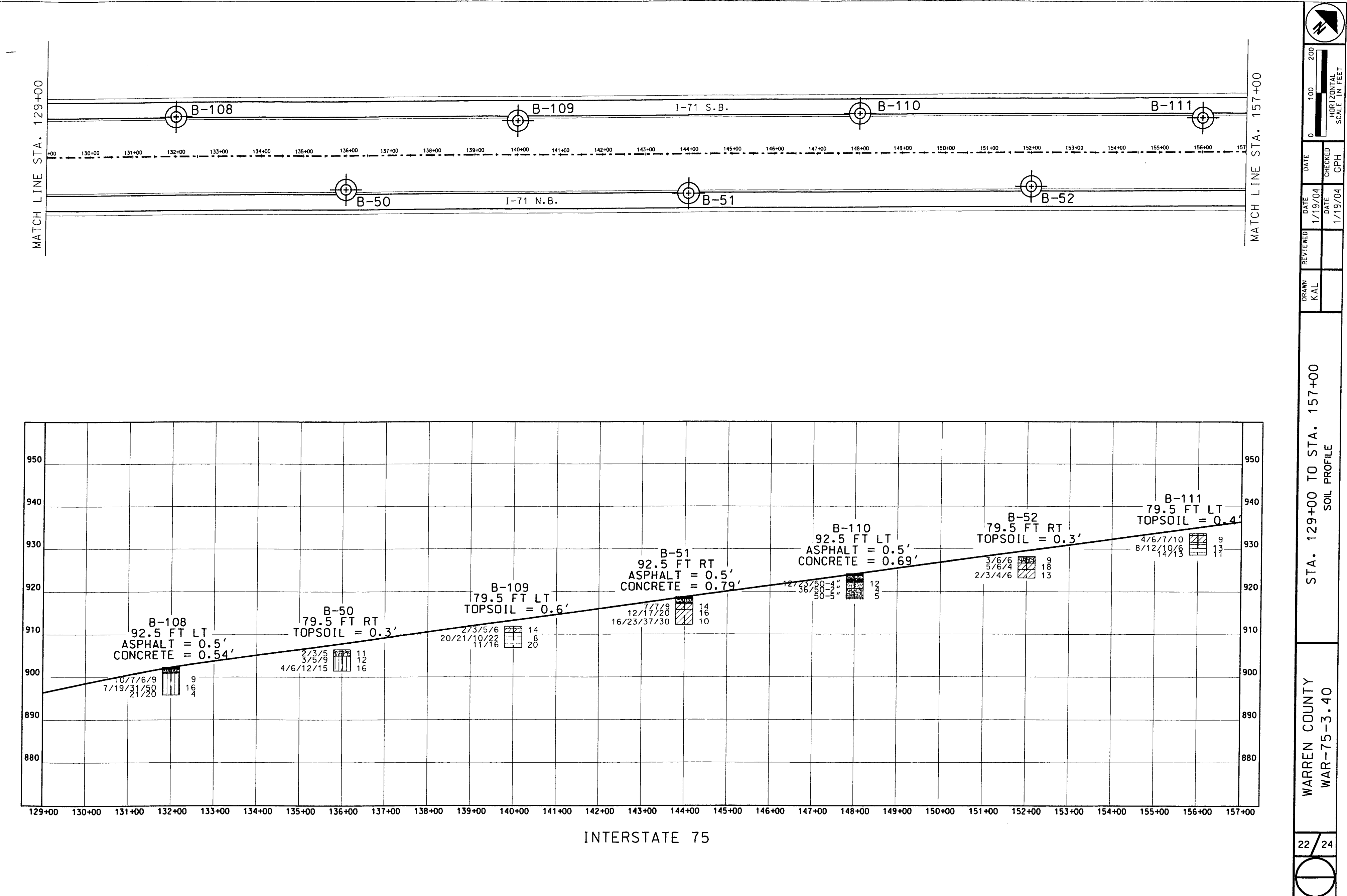
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SOIL PROFILE

WARREN COUNTY
WAR-75-3.40

20 / 24

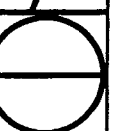


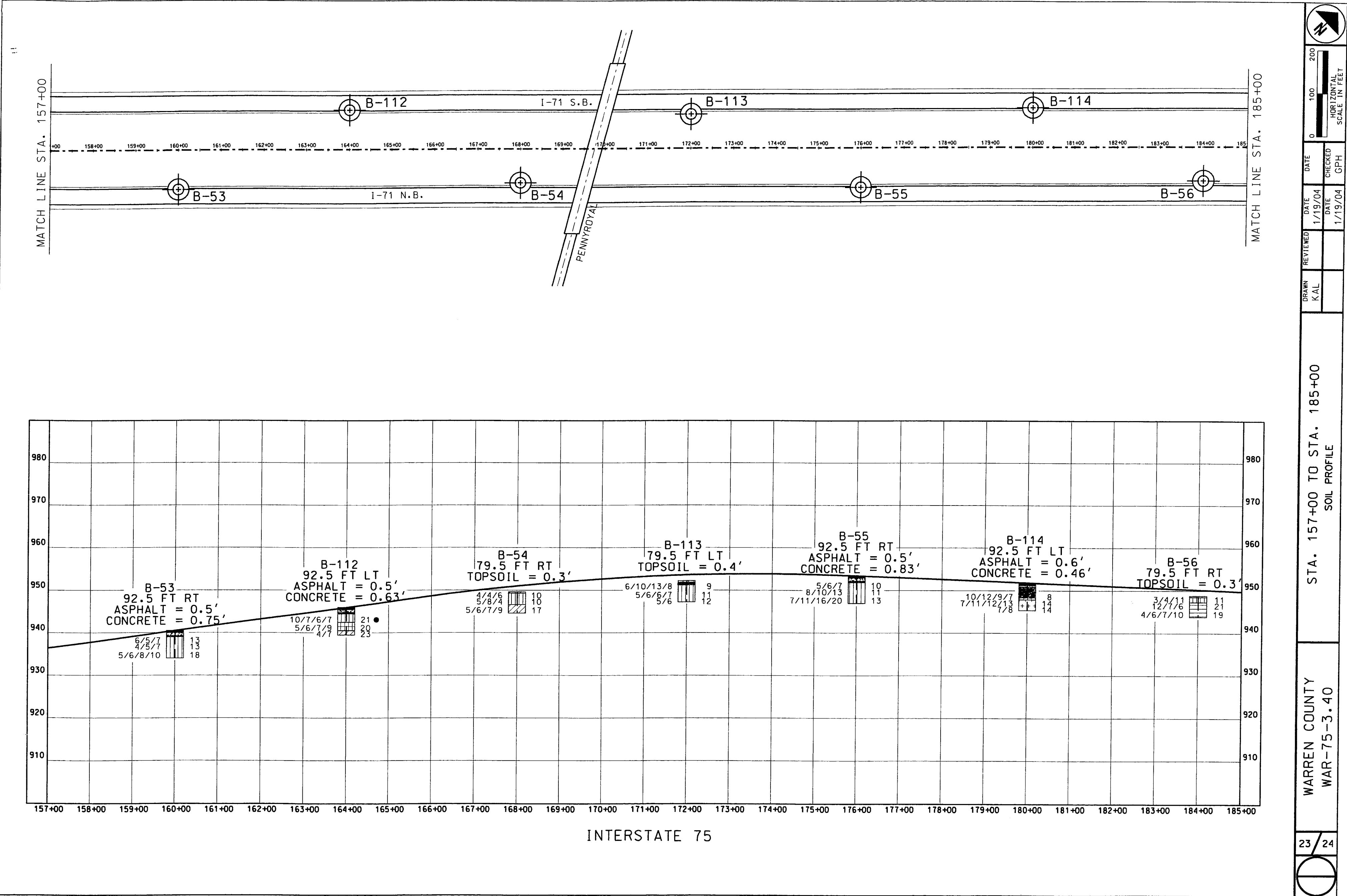


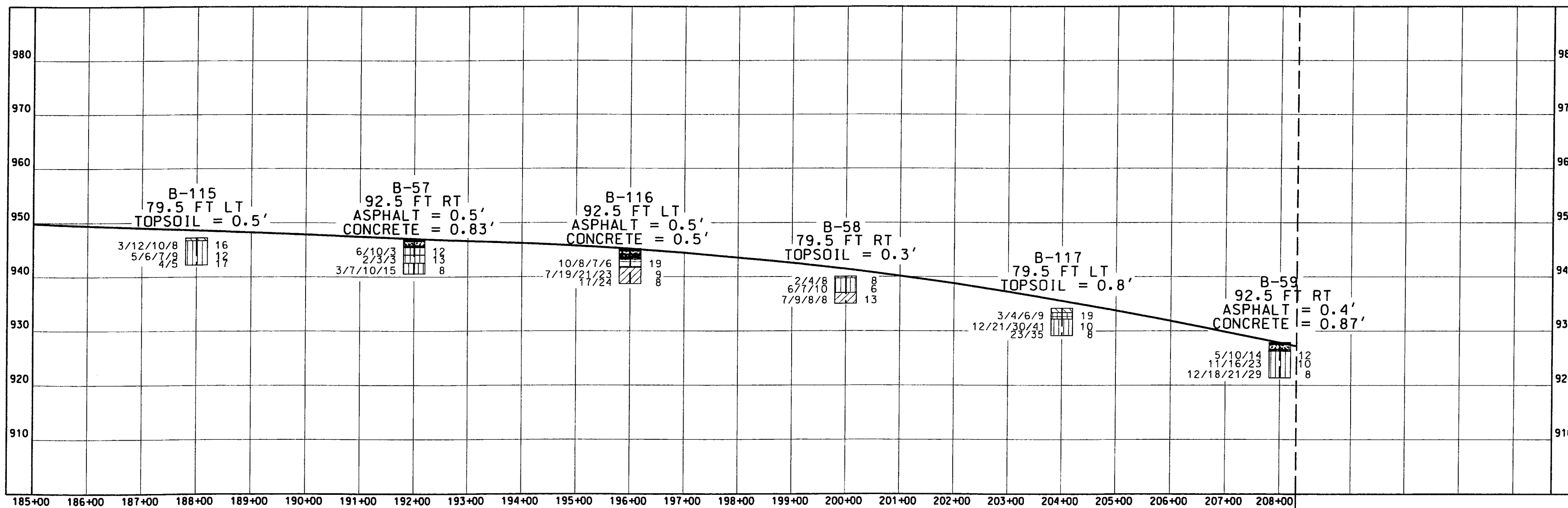
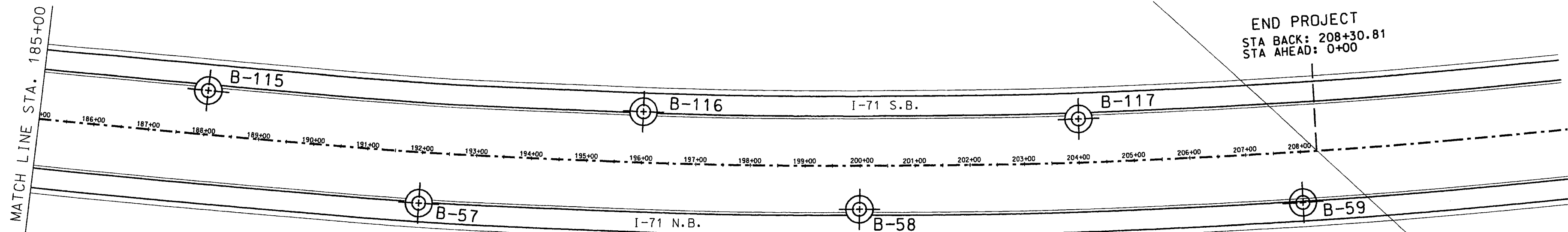


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1/19/04	1/19/04
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STA. 129+00 TO STA. 157+00
SOIL PROFILE







HORIZONTAL
SCALE IN FEET

DATE	DATE	DATE	DATE
1/19/04	1/19/04	1/19/04	1/19/04
REVIEWED	CHECKED	CHECKED	CHECKED
DRAWN	K.A.L.		

WARREN COUNTY
WAR-75-3.40

STA. 185+00 TO STA. 208+30.81
SOIL PROFILE

24/24

INTRODUCTION

THIS REPORT CONSISTS OF THE SOILS INVESTIGATION OF A 0.74 MILE SECTION OF SR 122 WIDENING WEST OF INTERSTATE 75 AND A 0.38 MILE SECTION OF SR 122 WIDENING EAST OF INTERSTATE 75. WORK BEGINS WEST OF INTERSTATE 75 FROM GRAND AVENUE TO JUST PAST TOWNE BOULEVARD ON SR 122, FROM STATION 7+00 TO STATION 46+00, AND EAST OF INTERSTATE 75 FROM UNION ROAD TO JUST PAST THE MIDDLETOWN CITY LIMITS, FROM STATION 85+50 TO STATION 105+50.

GEOLOGY AND OBSERVATIONS OF THE PROJECT

THE PROJECT AREA IS LOCATED IN THE SOUTHERN OHIO LOAMY TILL PLAN. THIS REGION IS CHARACTERIZED BY A SURFACE OF SILTY LOAM, END AND RECESSIONAL MORAINES, AND STREAM VALLEYS FILLED WITH OUTWASH THAT ALTERNATE BETWEEN BROAD AND NARROW FLOODPLAINS. THE PROJECT SITES ARE LOCATED IN AN AREA WHERE GLACIAL DERIVED SOILS OVERLIE ORDOVICIAN-AGED INTERBEDDED SHALE AND LIMESTONE BEDROCK.

SURFACE ELEVATIONS ALONG THE EXISTING ALIGNMENT RANGE FROM 694 TO 764 FEET.

EXPLORATION

EXPLORATORY BORINGS WERE ADVANCED BY AUGERS POWERED BY A TRUCK MOUNTED DRILL RIG ON JANUARY 30 AND 31, 2006. EIGHTEEN BORINGS WERE ADVANCED FOR THIS PROJECT.

INVESTIGATIONAL FINDINGS

WEST OF INTERSTATE 75, ASPHALT PAVEMENT DEPTH RANGED FROM 0.3 TO 1.0 FEET. THE SUBSURFACE SOILS CONSISTED PRIMARILY OF SILTY CLAY (A-6b) AND SILT AND CLAY (A-6a) WITH LESSER AMOUNTS OF SANDY SILT (A-4a), GRAVEL WITH SAND, SILT AND CLAY (A-2-6), GRAVEL WITH SAND AND SILT (A-2-4), COARSE AND FINE SAND (A-3a), AND GRAVEL (A-1-a). SPT N-VALUES RANGED FROM TWO TO 36 BLOWS PER FOOT. NATURAL MOISTURE CONTENT RANGED FROM FIVE TO 25 PERCENT. OVERALL, THE MOISTURE CONTENT AVERAGED FOUR PERCENT HIGHER THAN OPTIMUM MOISTURE ACCORDING TO GB1.

EAST OF INTERSTATE 75, THE ASPHALT PAVEMENT DEPTH WAS 1.5 AND 1.3 FEET FOR BORINGS 14 AND 18, RESPECTIVELY. THE SUBSURFACE SOILS CONSISTED PRIMARILY OF SANDY SILT (A-4a) WITH LESSER AMOUNTS OF GRAVEL (A-1-a), SILTY CLAY (A-6b), CLAY (A-7-6), GRAVEL WITH SAND, SILT, AND CLAY (A-2-6) AND GRAVEL WITH SAND AND SILT (A-2-4). SPT N-VALUES RANGED FROM SIX TO 55 BLOWS PER FOOT. NATURAL MOISTURE CONTENT RANGED FROM THREE TO 27 PERCENT. OVERALL, THE MOISTURE CONTENT AVERAGED TWO AND A HALF PERCENT HIGHER THAN OPTIMUM MOISTURE ACCORDING TO GB1.

LEGEND FOR PROJECT AVERAGE RESULTS OF TESTS – 56 SAMPLES TESTED

DESCRIPTION	ODOT CLASS	% AGG.	% C. SAND	% F. SAND	% SILT	% CLAY	LIQUID LIMIT	PLASTICITY INDEX	WATER CONTENT	SAMPLES TESTED
GRAVEL	A-1-a(0)	66	18	7	6	3	NP	NP	7	5
GRAVEL WITH SAND	A-1-b(0)	41	32	9	9	9	19	5	8	1
GRAVEL WITH SAND AND SILT	A-2-4(0)	46	16	16	12	10	24	8	15	4
GRAVEL WITH SAND, SILT AND CLAY	A-2-6(1)	29	24	17	11	18	29	15	17	6
COARSE AND FINE SAND	A-3a(0)	7	9	69	8	8	NP	NP	14	2
SANDY SILT	A-4a(4)	20	10	15	31	24	22	8	13	14
SILT AND CLAY	A-6a(5)	15	12	17	26	30	27	12	14	9
SILTY CLAY	A-6b(11)	8	7	13	34	38	37	19	21	14
CLAY	A-7-6(14)	6	6	4	46	38	42	23	27	1
VARIOUS OTHER MATERIAL										

- SOD AND/OR TOP SOIL = X = APPROXIMATE DEPTH
- BERM MATERIAL
- AUGER BORING – PLAN VIEW
- DRIVE SAMPLE AND/OR CORE BORING – PLAN VIEW
- ROADWAY OR AUGER BORING PLOTTED TO VERTICAL SCALE ONLY
- 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
- Z

 = NUMBER OF BLOWS FOR THIRD 6 INCHES

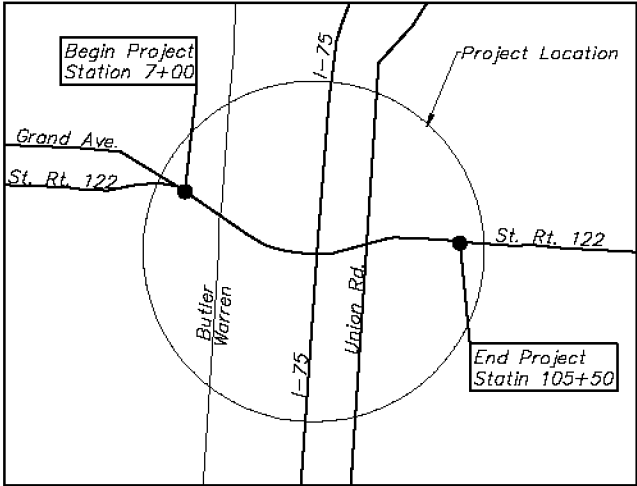
NOTE: FIGURES BESIDE BORINGS INDICATE WATER CONTENT IN PERCENT. e.g. 15

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.

NOTES

ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATIONS SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE INVESTIGATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE OR THE OFFICE OF GEOTECHNICAL ENGINEERING AT 1600 WEST BROAD STREET.



LOCATION MAP

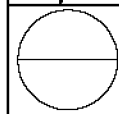
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Drilling-M.M.F., G.T.J., S.T.W.-1/06
Drafting-C.W.-3/06

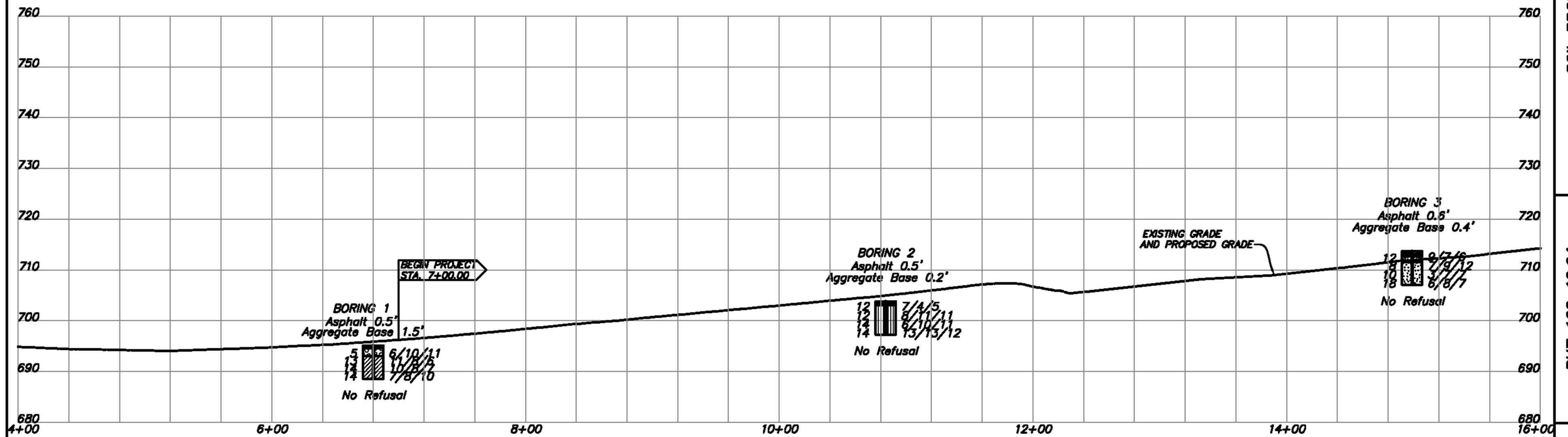
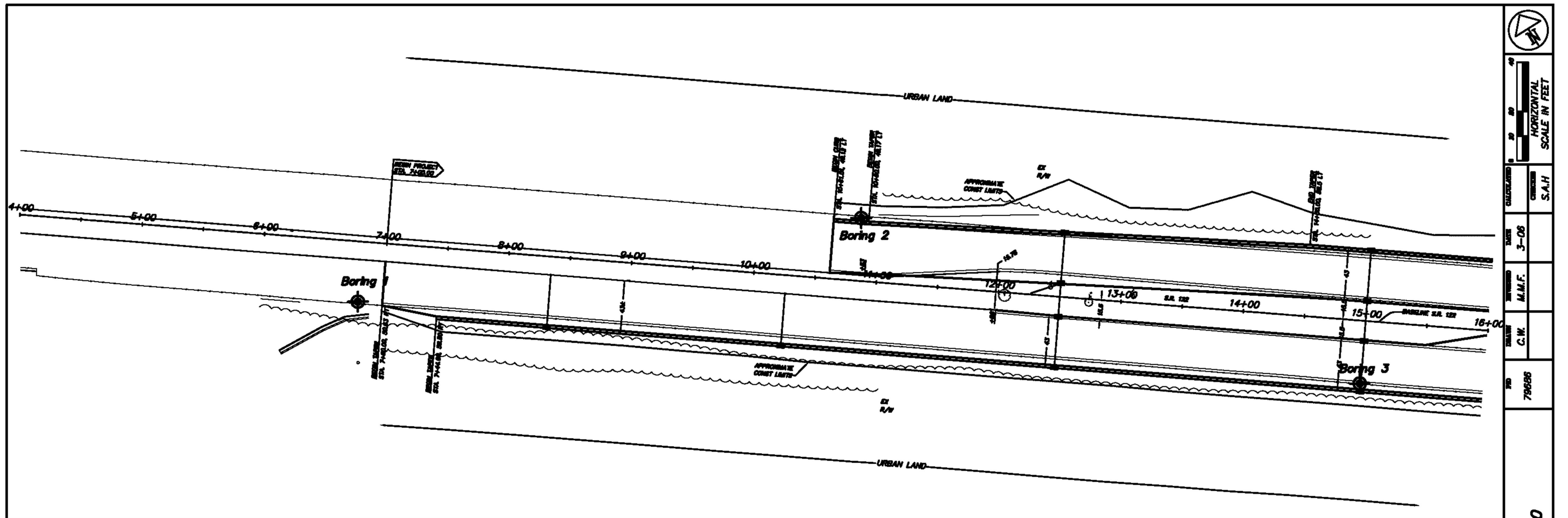
BORING	STATION & OFFSET	DEPTH FROM TO	% AGG.	% C. S.	% F. S.	% SILT	% CLAY	L. L.	P. I.	% W. C.	ODOT CLASS	BORING	STATION & OFFSET	DEPTH FROM TO	% AGG.	% C. S.	% F. S.	% SILT	% CLAY	L. L.	P. I.	% W. C.	ODOT CLASS
B1	6+80,49' RT.	0.5-2.0	65	19	8	5	3	NP	NP	5	A-1-a(0)	B7	26+80,50' RT.	0.4-1.9	37	18	13	16	16	26	13	15	A-2-6(1)
"	"	2.0-3.5	12	13	14	27	34	27	13	13	A-6a(6)	"	"	1.9-3.4	3	5	9	44	39	38	16	25	A-6b(10)
"	"	3.5-5.0	27	9	11	24	29	29	11	14	A-6a(4)	"	"	3.4-4.9	-	-	-	-	-	-	-	24	Visual
"	"	5.0-6.5	-	-	-	-	-	-	-	14	Visual	"	"	4.9-6.4	11	7	18	38	26	26	11	17	A-6a(6)
B2	10+84,51' LT.	0.5-2.0	38	17	9	19	17	20	7	12	A-4a(0)	B8	30+95,49' LT.	0.4-1.9	43	23	9	14	11	22	8	15	A-2-4(0)
"	"	2.0-3.5	8	4	8	47	33	24	10	12	A-4a(8)	"	"	1.9-3.4	1	2	3	57	37	36	17	22	A-6b(11)
"	"	3.5-5.0	8	4	10	45	33	23	9	14	A-4a(8)	"	"	3.4-4.9	2	7	17	36	38	37	19	23	A-6b(11)
"	"	5.0-6.5	-	-	-	-	-	-	-	14	Visual	"	"	4.9-6.4	0	20	43	10	27	28	15	14	A-6a(2)
B3	14+99,51' RT.	0.6-2.1	34	15	29	12	10	NP	NP	12	A-2-4(0)	B9	35+05,50' RT.	0.4-1.9	29	16	11	27	17	26	11	22	A-6a(2)
"	"	2.1-3.6	3	10	71	7	9	NP	NP	8	A-3a(0)	"	"	1.9-3.4	3	44	25	9	19	29	17	16	A-2-6(1)
"	"	3.6-5.1	-	-	-	-	-	-	-	10	Visual	"	"	3.4-4.9	25	36	14	7	18	37	21	16	A-2-6(1)
"	"	5.1-6.6	11	7	67	8	7	NP	NP	18	A-3a(0)	"	"	4.9-6.4	-	-	-	-	-	-	-	17	Visual
B4	18+92,51' LT.	0.7-2.2	62	17	7	9	5	NP	NP	8	A-1-a(0)	"	"	6.4-7.9	41	32	9	9	9	19	5	8	A-1-b(0)
"	"	2.2-3.7	10	11	15	28	36	36	21	21	A-6b(10)	B10	39+00,51' LT.	0.4-1.9	15	10	13	24	38	27	13	13	A-6a(7)
"	"	3.7-5.2	20	11	19	20	30	37	22	17	A-6b(7)	"	"	1.9-3.4	15	11	14	25	35	27	13	11	A-6a(6)
"	"	5.2-6.7	-	-	-	-	-	-	-	20	Visual	"	"	3.4-4.9	16	12	13	26	33	27	13	12	A-6a(6)
B5	18+98,59' RT.	1.0-2.5	50	12	13	13	12	23	8	19	A-2-4(0)	"	"	4.9-6.4	-	-	-	-	-	-	-	13	Visual
"	"	2.5-4.0	-	-	-	-	-	-	-	23	Visual	B11	43+64,50' RT.	0.3-1.8	29	13	8	32	18	30	10	18	A-4a(3)
"	"	4.0-5.5	6	22	38	7	27	28	13	13	A-2-6(1)	"	"	1.8-3.3	3	9	25	18	45	35	19	20	A-6b(9)
"	"	5.5-7.0	-	-	-	-	-	-	-	13	Visual	"	"	3.3-4.8	4	6	14	30	46	40	23	25	A-6b(13)
B6	22+96,51' LT.	0.4-1.9	43	17	9	18	13	26	12	23	A-2-6(0)	"	"	4.8-6.3	1	2	6	51	40	36	18	21	A-6b(11)
"	"	1.9-3.4	3	6	19	30	42	38	21	23	A-6b(12)	B12	46+01,62' LT.	1.0-2.5	32	15	11	20	22	32	17	19	A-6b(3)
"	"	3.4-4.9	14	10	17	30	29	29	12	13	A-6a(5)	"	"	2.5-4.0	4	7	10	43	36	36	18	19	A-6b(11)
"	"	4.9-6.4	10	9	17	37	27	20	6	15	A-4a(6)	"	"	4.0-5.5	3	3	5	51	38	40	17	24	A-6b(11)
												"	"	5.5-7.0	-	-	-	-	-	-	-	25	Visual

SOIL PROFILE

BUT-122-10.94
WAR-122-0.00

BORING	STATION & OFFSET	DEPTH FROM TO	% AGG.	% C. S.	% F. S.	% SILT	% CLAY	L. L.	P. I.	% W. C.	ODOT CLASS
B13	84+81," 19' LT.	0.0-1.5	56	15	12	10	7	27	8	12	A-2-4(0)
"	"	1.5-3.0	20	8	10	20	42	39	20	18	A-6b(9)
"	"	3.0-4.5	-	-	-	-	-	-	-	18	Visual
"	"	4.5-6.0	62	9	5	9	15	30	13	16	A-2-6(0)
B14	88+77,8' RT.	1.5-3.0	10	9	13	34	34	33	17	14	A-6b(9)
"	"	3.0-4.5	25	11	17	23	24	21	8	17	A-4a(3)
"	"	4.5-6.0	-	-	-	-	-	-	-	10	Visual
"	"	6.0-7.5	22	11	13	26	28	24	8	10	A-4a(4)
B15	92+76,16' LT.	0.0-1.5	-	-	-	-	-	-	-	NR	-
"	"	2.0-3.5	20	11	20	27	22	20	7	12	A-4a(3)
"	"	3.5-5.0	16	11	21	30	22	20	7	12	A-4a(3)
"	"	5.0-6.5	-	-	-	-	-	-	-	12	Visual
B16	96+98," 19' RT.	0.0-1.5	72	22	2	3	1	NP	NP	3	A-1-a(0)
"	"	1.5-3.0	6	6	4	46	38	42	23	27	A-7-6(14)
"	"	3.0-4.5	19	13	15	32	21	21	7	16	A-4a(4)
"	"	4.5-6.0	-	-	-	-	-	-	-	17	Visual
B17	101+12," 24' LT.	0.6-2.1	72	13	6	6	3	NP	NP	9	A-1-a(0)
"	"	2.1-3.6	-	-	-	-	-	-	-	7	Visual
"	"	5.1-6.6	29	10	16	24	21	20	7	11	A-4a(2)
B18	105+03," 14' LT.	1.3-2.8	58	17	12	8	5	NP	NP	12	A-1-a(0)
"	"	2.8-4.3	28	10	20	26	16	19	5	11	A-4a(1)
"	"	4.3-5.8	14	11	18	32	25	22	8	11	A-4a(5)
"	"	5.8-7.3	11	8	17	33	31	23	9	11	A-4a(6)





0 20 40

HORIZONTAL SCALE IN FEET

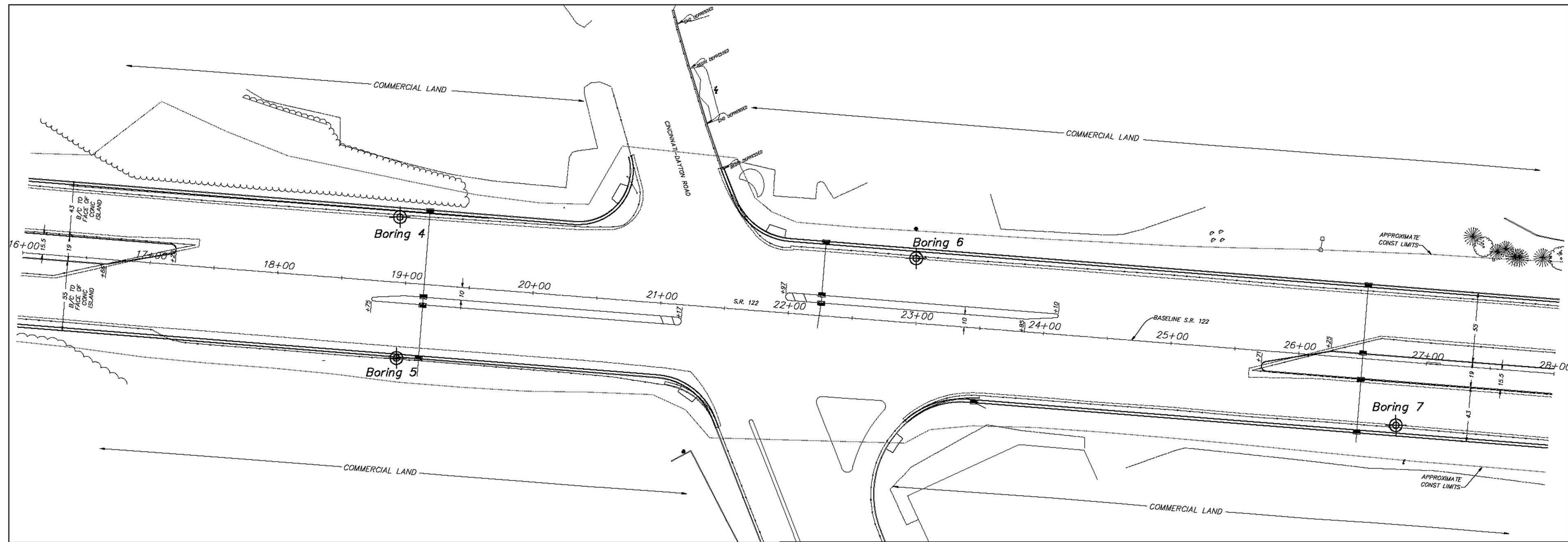
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	3-08	M.M.F.	C.W.	79886	3/8

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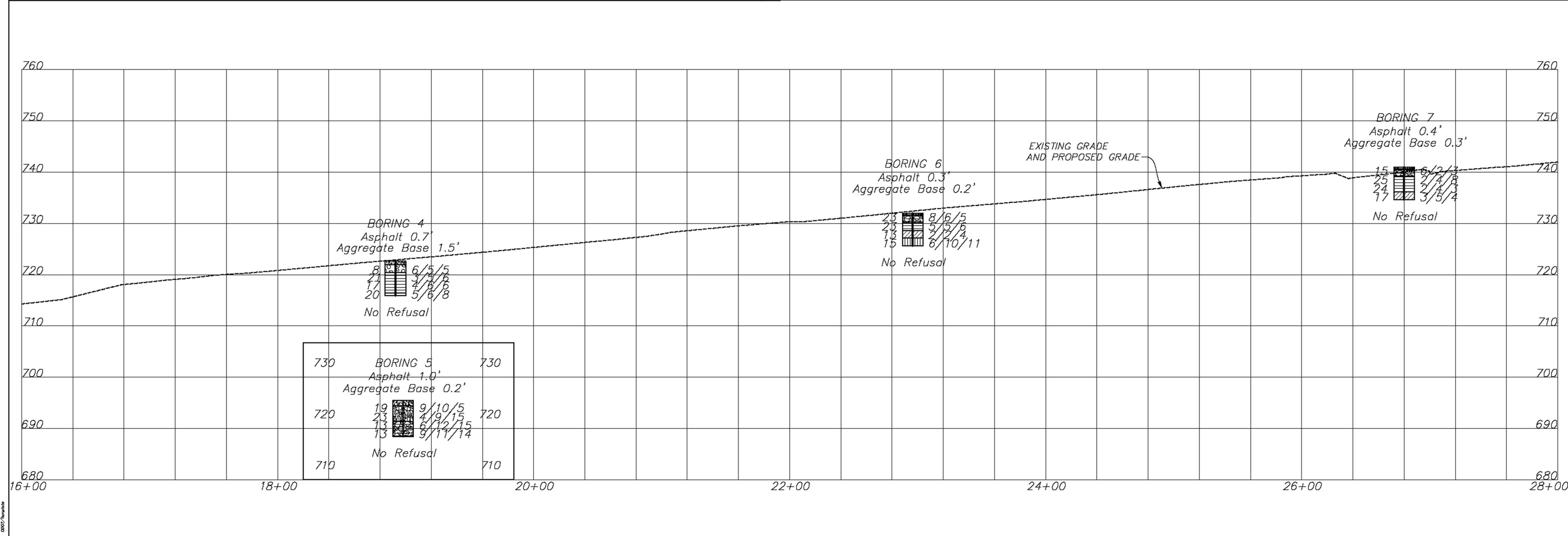
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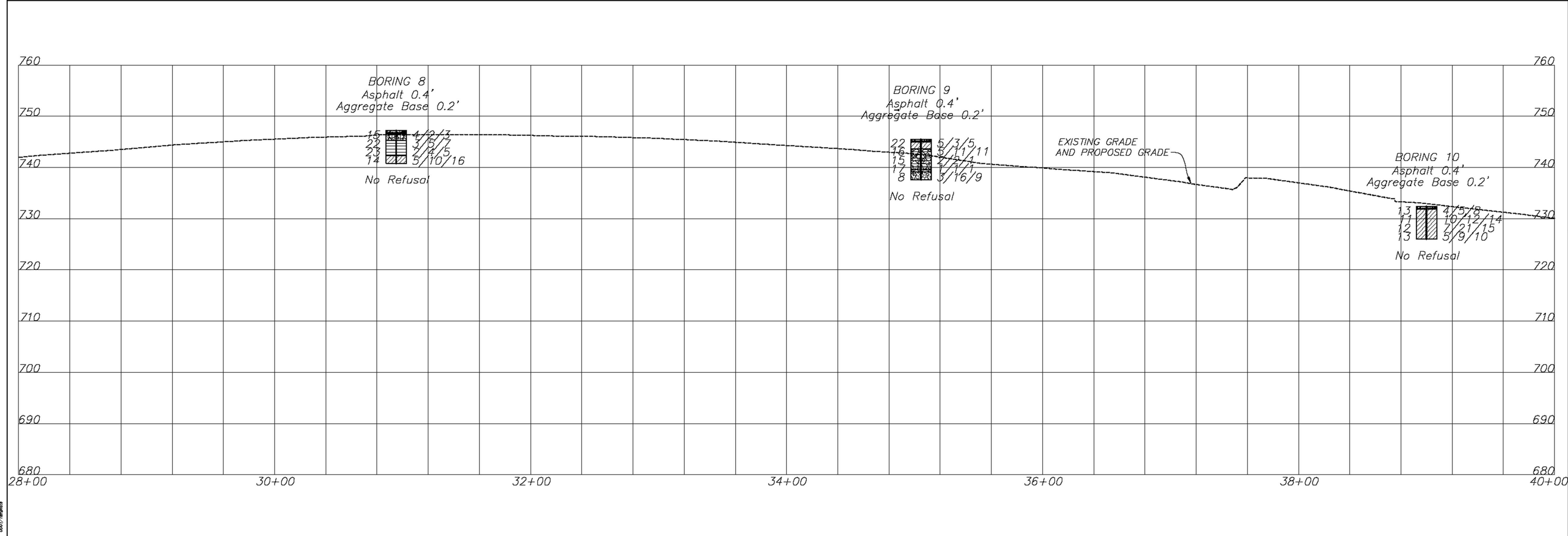
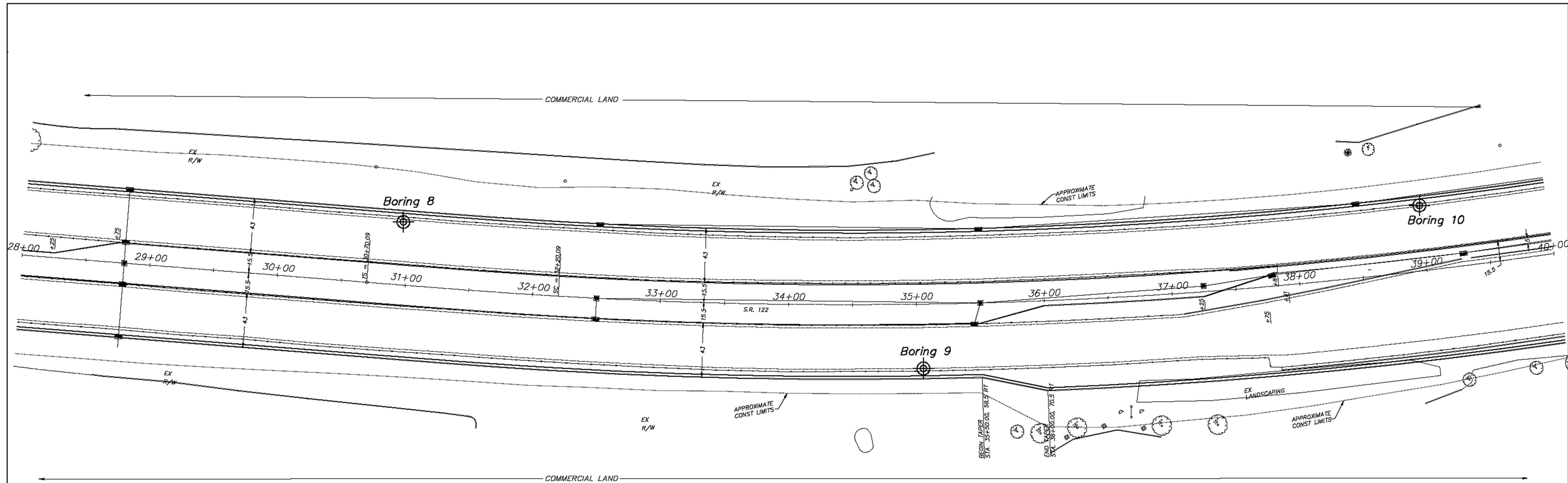


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 DATE 5-06
 REVIEWED M.M.F.
 DRAWN C.W.
 PID 79686
 CHECKED S.A.H.



SOIL PROFILE
 STA. 16+00-28+00

BUT-122-10.94
 WAR-122-0.00



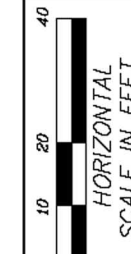
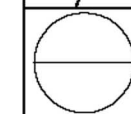
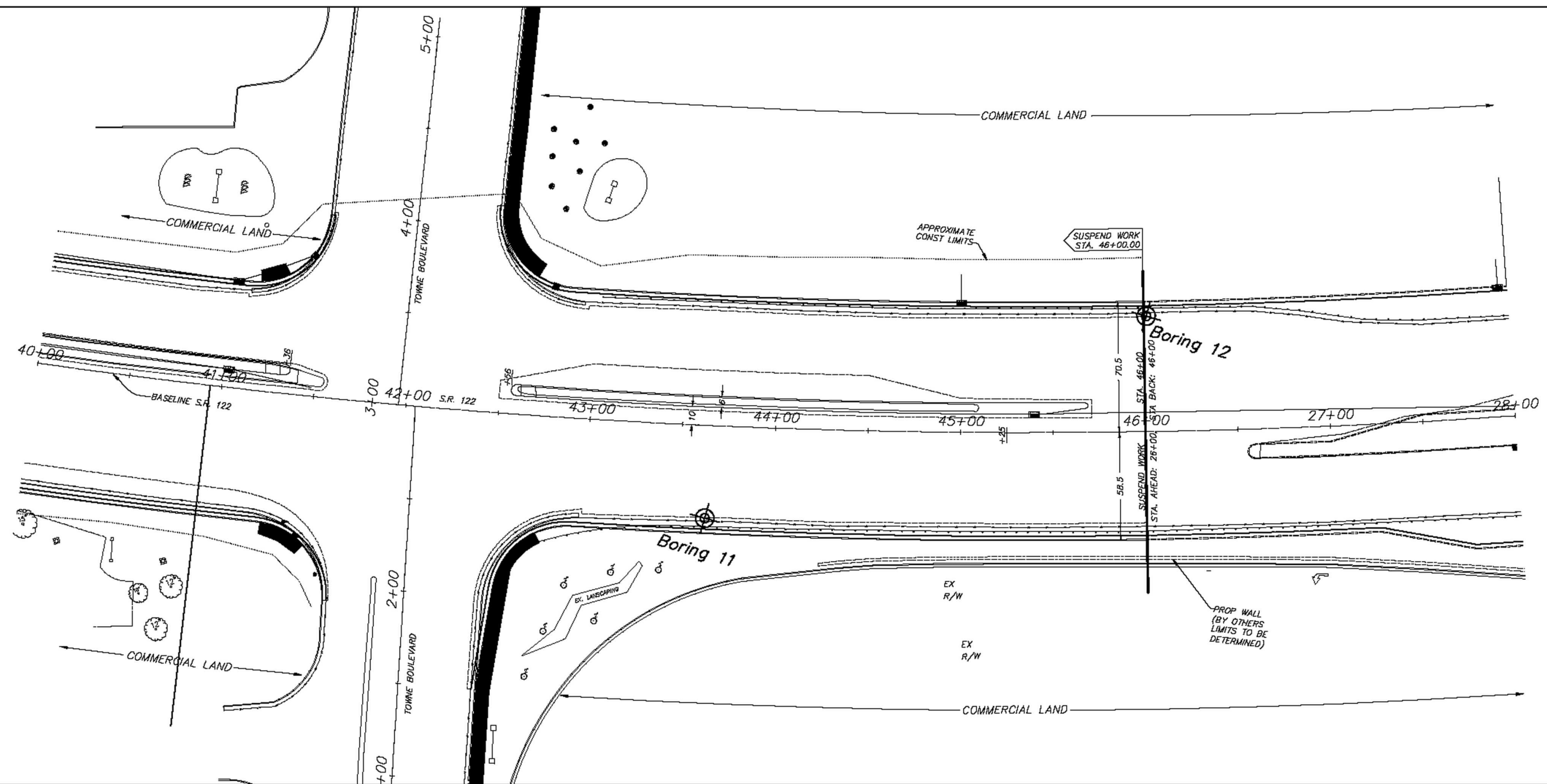
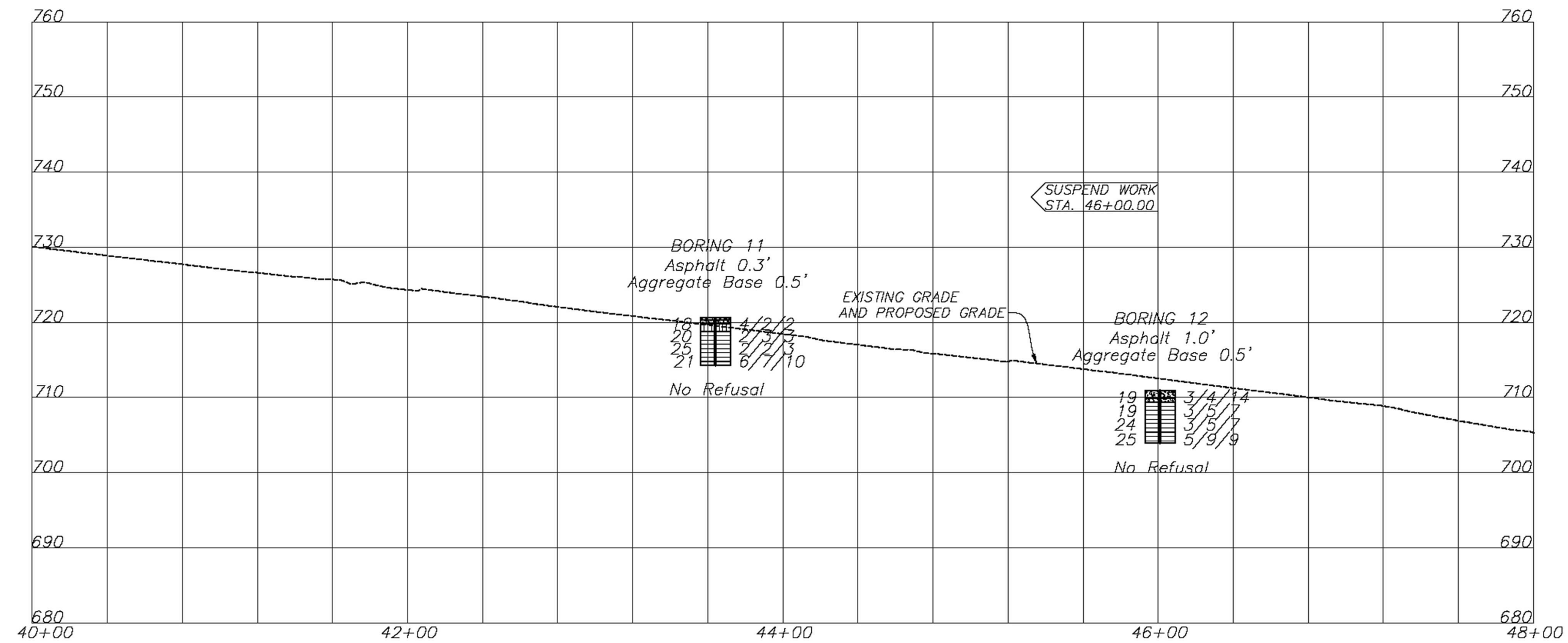


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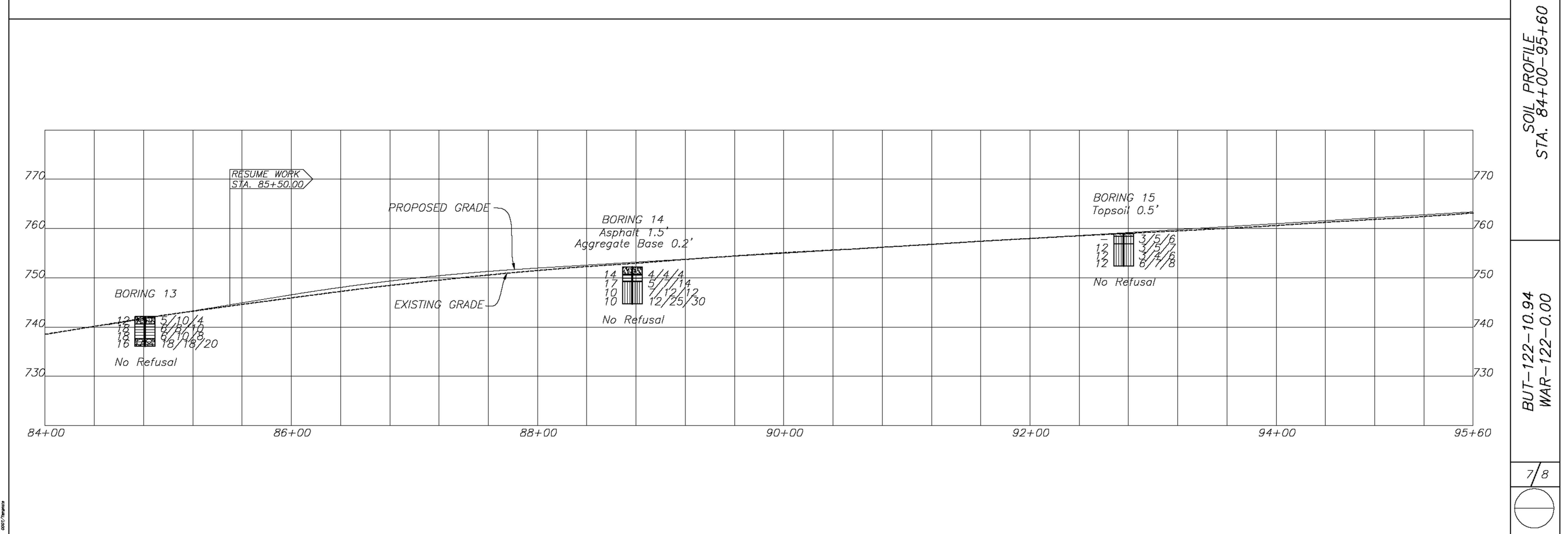
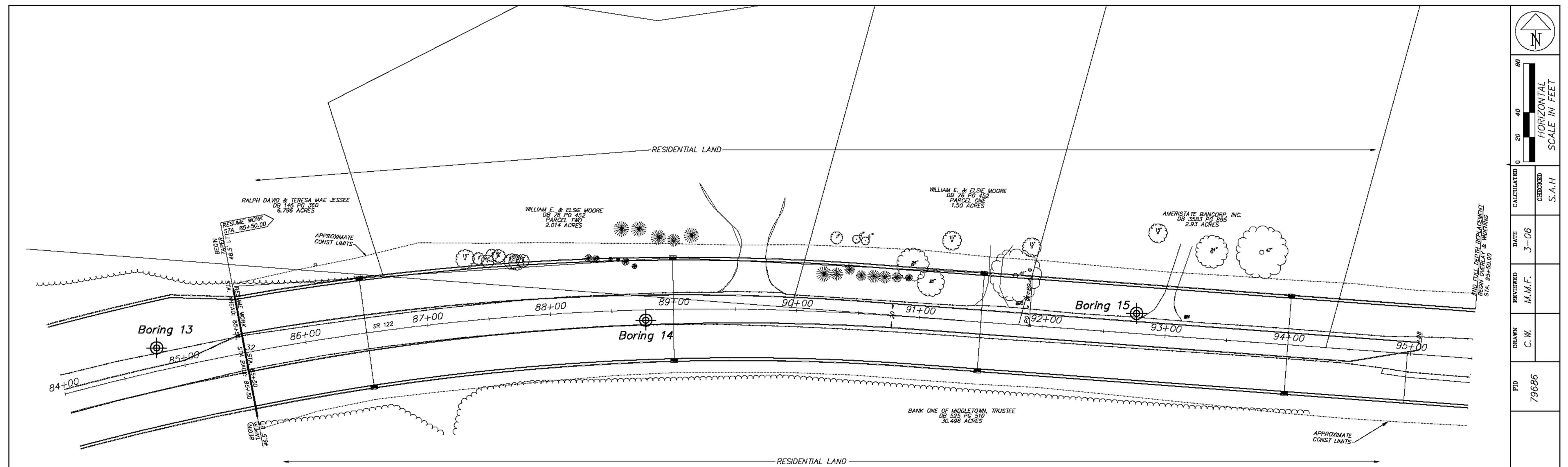
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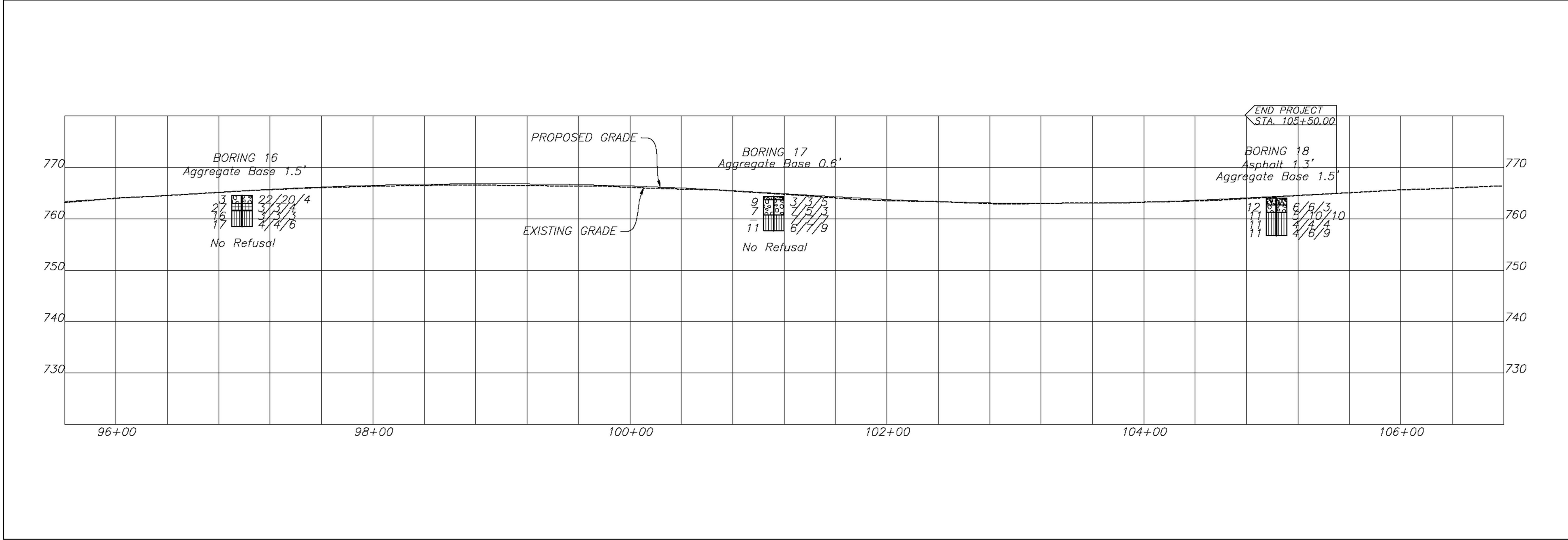
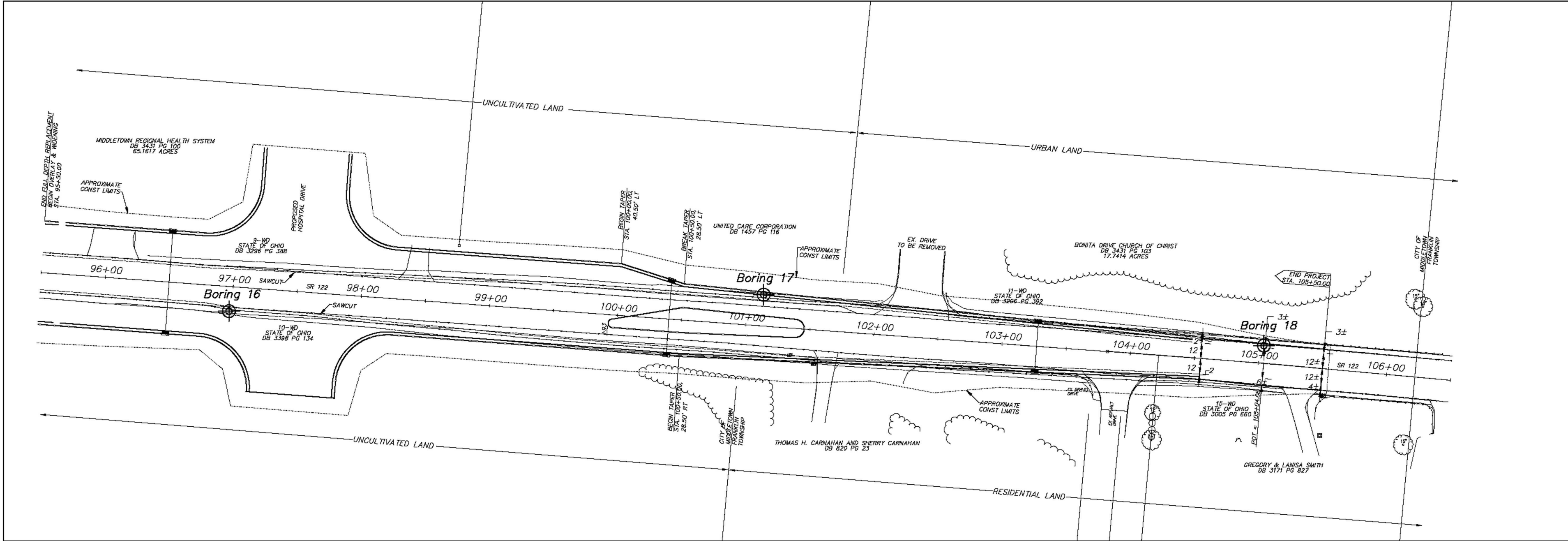
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SOIL PROFILE
STA. 40+00-48+00

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WAR-122-0.00

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HORIZONTAL
SCALE IN FEET

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SCALE IN FEET

DATE

3-06

REVIEWED

M.M.F.

DRAWN

C.W.

PID

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SOIL PROFILE
STA. 95+60-106+80

BUT-122-10.94
WAR-122-0.00

8/8

2003
Year

Job. No. PID 10754
Changes _____

#18457

County

Warren

Project
Identification

WAR-75-3.10

File No. D23

CONSULTANT PROJECT

Begin Sta. _____ End Sta. _____

Name of Consultant WEL Engineers

Name of Drilling Contractor CTL / Resource International

Contents of File Reports

Soil Profile

Review Comments

Date of Report _____ No. of Tracings _____

Date Received _____ Filed with Year _____

Remarks _____



Engineers of Ohio, Inc.

Anthony Vitale, Sr., P.E. - E-46621

Christopher M. Shea, P.E. - E-57985

James E. Vitale, Ph.D.

Anthony G. Vitale

May 12 2006

Mr. Michael C. Flynn, P.E., P.S. - District Deputy Director
The Ohio Department of Transportation - District 8
505 South St. Rt. 741
Lebanon, OH 45036

Attention: Mr. Jeffery P. Pietch, P.E. - Project Manager

RE: WAR-75-3.40 - PID No. 10754
Stage 1 Submittal,
WEC PN OH2004-35

Dear Mr. Pietch:

Enclosed for your review and approval please find the following items which consist of our Stage 1 submittal:

- ✓ 1. 18 quarter size sets of the Roadway Plans.
- ✓ 2. 18 quarter size sets of the Bridge Plans.
- 3. 2 copies of the Drainage Reports.
- 4. 2 copies of the Scupper Calculations.
- 5. 2 copies of the Hydraulic Reports, and 1 electronic copy of the HEC-RAS input files for WAR-122-0094 and WAR-75-0378N&S bridges.
- 6. 2 copies of the Final Bridge Foundation Recommendation Reports, and 2 copies of the Soil Profile Sheets.
- 7. 2 copies of the Roadway Geotechnical Reports, and one electronic copy of the pdf files.
- 8. 2 copies of the Noise Wall Geotechnical Reports, and one electronic copy of the pdf files.
- 9. 2 copies of the Superelevation Exaggerated Profile Sheets.
- 10. 2 copies of the Pavement Design for Pennyroyal Road, SR 122, Access Road, and Commerce Drive.
- 11. 2 copies of the revised Traffic Control Calculations.
- 12. 2 copies of the Manchester Road and Lower Springboro Road Bridge Reports.
- 13. 1 copy of the Title Search Reports for SR 122 Interchange area.
- 14. 1 quarter size copy of the Soil Profile sheets for IR 75 from Resource International.
- 15. 2 copies of the Stage 1 Submission Checklist, Final PAVR comment compliance, and Design Submittal Notes.
- 16. 1 copy of the Scope of Service for Part 2.

For additional information please see the Submission Checklist.

Please call if you have any questions or if you need additional information, plans, documents or reports.

Bill Ujvari

1 SET For Constructability Review

1 SET To Gene Geiger
For Geotechnical Review

Comments To Jon Milesky
By June 20, 2006

(513)933-6616

RECEIVED

MAY 23 2006

OFFICE OF GEO TECH
ENGINEERING



Engineers of Ohio, Inc.

Anthony Vitale, Sr., P.E. - E-46621

Christopher M. Shea, P.E. - E-57985

James E. Vitale, Ph.D.

Anthony G. Vitale

Sincerely,

W.E.C. Engineers of Ohio, Inc.

A handwritten signature in black ink that reads "Chris M. Shea". The signature is written in a cursive, flowing style.

Christopher M. Shea, P.E.
Vice President

Enclosures

cc: File, Central File, Greg Boyer (WD), Omar Kanoun (ELR), Jon Brunot (B&N), Doug Batt (CTL)

SUBSURFACE INVESTIGATION

**SOIL PROFILE INVESTIGATION
WAR-75-3.40, PID NO. 10754
WARREN COUNTY, OHIO
CTL PROJECT NO. 04120056G**

PREPARED FOR:

**W.E.C. ENGINEERS OF OHIO
3455 MILL RUN DR.
SUITE 310
HILLIARD, OHIO 43026**

PREPARED BY:

**CTL ENGINEERING, INC.
2860 FISHER ROAD
COLUMBUS, OHIO 43204**

RECEIVED

JUN 02 2006

**OFFICE OF GEO TECH
ENGINEERING**

May 5, 2006



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APPENDIX B	TEST BORING RECORDS
APPENDIX C	GB1 SPREADSHEET
APPENDIX D	SETTLEMENT ANALYSIS
APPENDIX E	SLOPE STABILITY ANALYSIS
APPENDIX F	DESIGN CHECKLIST
APPENDIX G	DISPOSITION OF COMMENTS



I. PROJECT LOCATION AND DESCRIPTION

This project is located in Warren County, Ohio and involves the widening of Interstate 75 (IR 75) into the existing median and the reconfiguration of the State Route 122 (SR 122) interchange with IR 75. The project begins approximately 0.70 mile south of SR 122 interchange and continues northward to the Warren County-Montgomery County line for an overall length of approximately 8.80 miles. The widening of IR 75 and reconfiguration of the SR 122 interchange will require the replacement and/or rehabilitation of 17 bridges/structures. Of the 17 structures identified for the project, 15 of the structures will either be replaced with new structures or widened. The remaining 2 bridges will require deck replacement along with other miscellaneous superstructure work.

In addition to the new and widened structures, the project includes the reconfiguration of the SR 122 interchange. The improvements will involve construction of new northbound exit and entrance ramps and providing additional lanes on the existing southbound ramps.

This report addresses the proposed widening of SR 122. The work begins approximately 1,300 feet west of IR 75 (Station 25+00) and ends approximately 725 feet east of the intersection of Union Road with SR 122 (Station 65+50) for a total length of about 4,050 feet. The report also includes the widening of Clearcreek-Franklin Road / Pennyroyal Road as part of the replacement of the overhead structure WAR-75-1149.

II. SUBSURFACE INVESTIGATION

The roadway test borings for this portion of the project were drilled between June 2005 and April 2006. The borings were drilled at the approximate stations and offsets indicated on the attached Soil Profile sheets.

The test borings were drilled utilizing hollow stem augers (HSA). Standard penetration tests were conducted using a 140-pound hammer falling 30 inches to drive a 2-inch O.D. split barrel sampler for 18 inches.

Soil samples obtained from the drilling operation were preserved in glass jars, visually classified in the field and laboratory, and tested for natural moisture content. Representative soil samples were subjected to laboratory testing including grain size distribution and Atterberg limits.

CTL Engineering, Inc. (CTL) selected the test boring locations. The stations, offsets and ground surface elevations at the test boring locations were provided by Woolpert, Inc.



III. SITE GEOLOGY

The project site lies within the Southern Ohio Loamy Till Plain (Physiographic Regions of Ohio, Ohio Department of Natural Resources, 1998). The mapping of these glacial soils (see Appendix A, Surficial Glacial Geology of the Ohio Portion of Cincinnati and Falmouth 30 x 60 Quadrangles, Ohio Department of Natural Resources, 1998 and Surficial Glacial Geology of the Ohio Portion of the Dayton 1:100,000 Quadrangle) indicates the overburden soils in this region are formed primarily in Wisconsin-age glacial tills and ground moraines. These glacial soils are consist of unstratified layers of intermixed clay, silt, sand, and gravel whose composition of these materials varies both laterally and vertically. In addition, a buried valley of glacial outwash consisting of sand and gravel interbedded with glacial till is located where IR 75 crosses Clear Creek. The glacial soils are typically overlain by a layer of silty soil, referred to as loess, on the order of 3 to 5 feet thick.

The soil overburden is underlain by Ordovician-age sedimentary rock consisting of interbedded shale and limestone (Bedrock Geology of the Monroe Quadrangles Ohio Department of Natural Resources, June 1994). The mapping identifies the formation as Grant Lake Formation. In general, the sedimentary rock encountered is typically distinguished by the ratio of shale (50 percent) and limestone (50 percent). The general description of these formation are described as shale gray to bluish gray, weathers to light gray and/or yellowish gray, nodular, wavy, irregular, planar with bedding that is thin, medium to thick.

Mapping of the bedrock topography (Bedrock Topography of the Monroe Quadrangle, Ohio Department of Natural Resources, June 1994) indicates the elevation of the rock surface ranges from about 675 feet to 700 feet at the interchange. It should be noted the referenced mapping utilizes 50-foot contours, which are interpolated from topographic surface features, and widely spaced data points where water wells have encountered rock.

Based on the mapping, the depth to rock is very shallow at the southern end of the project where it is less than 50 feet as indicated by outcrops near the North Branch of Dicks Creek. The thickness of the soil overburden increases to approximately 50 feet as the project continues northward from the North Branch Dicks Creek.

According to the Ground Water Resources of Warren County, Ohio Department of Natural Resources, 1996, the interchange corridor yields ground water from wells in the underlying interbedded shale and limestone. The description indicates the source of water is poor and is typically on the order of less than 3 gallons per minute (gpm).



IV. SUBSURFACE CONDITIONS

A. General Stratigraphy

A total of 51 test borings were drilled specifically for the roadways as previously described. In addition, the results of test borings, which were drilled for structures near or within the existing or proposed roadways, were also included in the discussion of the subsurface conditions below. The general subsurface conditions at each of the roadways and ramps are being discussed separately in the following paragraphs. Refer to the appended Soil Profile sheets for specific details of the surface cover and subsurface conditions at the test boring locations.

SR 122

The test borings (P-1 through P-15) generally encountered soils described as sandy silt, clayey silt, silt and clay or clay. These soils were classified as A-4a, A-6a, A-6b or A-7-6 according to ODOT soil classification system. Boring P-7 encountered gravel fill of the A-1-b soil category to a depth of 2.5 feet. Boring P-10 exhibited A-4b (Silt) soil to a depth of 3.0 feet below existing grade. A-4b soils were also encountered in boring P-15 between depths of 15.5 and 21.0 feet.

No bedrock was encountered in the shallow test borings drilled for this roadway. However, bedrock was encountered in the structure test borings drilled for the structures at IR 75 and at Dick's Creek. The depth to the top of bedrock below existing grade in the structure borings located near the proposed improvements (C-2 through C-6 and H-1 through H-6) ranged from 9.5 feet to 31.5 feet.

No groundwater was encountered in the shallow borings drilled for this roadway. However, groundwater was encountered in the structure test borings drilled for the structures at IR 75 and at Dick's Creek. Refer to the appended Soil Profile sheets for groundwater levels at these locations.

Ramp A

The test borings (V-1 and V-2) encountered layers of silt and clay or silty clay of the A-6a and A-6b soils categories. Gravel fill of the A-2-6 soils category was encountered in boring B-10 between depths of 5.5 and 10.5 feet.



No bedrock was encountered in the shallow test borings drilled for this ramp. However, bedrock was encountered at depths ranging from 20.5 to 31.5 feet in the structure test borings drilled for the structure over Dick's Creek (B-7 through B-10).

No groundwater was encountered in the shallow borings drilled for this ramp. However, groundwater was encountered in the structure test borings drilled for the structure at Dick's Creek. Refer to the appended Soil Profile sheets for groundwater levels at these locations.

Ramp B

The test borings (T-1 through T-3) encountered layers of sandy silt, silt and clay or clay of the A-4a, A-6a, or A-7-6 soils categories.

No bedrock was encountered in the test borings, which were drilled to a maximum depth of 5.5 feet below existing grade.

No groundwater was noted in the test borings drilled for this ramp.

Ramp C

The test borings (S-1 through S-8) encountered layers of gravel, sandy silt, silt and clay, silty clay and clay. These soils were classified as A-1-b, A-2-4, A-4a, A-6a, A-6b and A-7-6 according to the ODOT classification system.

No bedrock was encountered in the test borings for this ramp, which were extended to a maximum depth of 18 feet below existing grade. However, rock fragments were encountered at a depth of about 6.1 feet in boring S-2. This boring was performed in a proposed fill area.

Groundwater was measured in boring S-5 at a depth of 8.5 feet below existing grade. No groundwater was noted in the remaining test borings at any time during the fieldwork.

Ramp D

The test borings (L-1, L-2 and L-3) encountered layers of gravel, sandy silt, silt and clay and silt. These soils were classified as A-1-a, A-4a and A-6a according to the ODOT classification system.

No bedrock was encountered in the test borings for this ramp, which were extended to a maximum depth of 7 feet below existing grade.

No groundwater was noted in these test borings at any time during the fieldwork.

Ramp E

The test borings (R-1 through R-6) encountered layers of gravel, sandy silt, silt and clay, silty clay and clay of the A-3a, A-4a, A-6a, A-6b and A-7-6 soils categories.

Bedrock was encountered in the test borings as shown in Table 1.

Table 1. Ramp E - Depth to Rock and Auger Refusal

Boring No.	Depth to Top of Bedrock (feet)	Auger Refusal Depth (feet)
R-1	1.5	7.0
R-2	3.0	3.0
R-3	9.0	---
R-4	6.0	6.0
R-5a	12.0	---

Bedrock was also encountered in the structure test borings (A-1 through A-5) drilled for the structure over Dick's Creek. The depth to the top of bedrock in these structure test borings ranged from 3.5 to 7.5 feet below existing grade.

Groundwater levels were noted in borings R-3 and R-5 at depths ranging from 8.5 to 9.0 feet and in boring A-3 at a depth of 3.0 feet. No groundwater was noted in the remaining test borings drilled for this ramp.

Mainline IR 75 Backslopes

The test borings (K-1 through K-4) encountered layers of sandy silt, silt and clay and silty clay. These soils were classified as A-4a and A-6b according to the ODOT classification system. Boring K-1 exhibited A-4b (silt) soil between depths of 5.5 and 8.0 feet.

Bedrock was encountered in borings K-1, K-2 and K-4 at depths of 8.0, 22.5 and 8.0 feet, respectively. No bedrock was noted in boring K-3, which was drilled to a depth of 40 feet.

No groundwater was noted in the borings at any time during the field investigation.

Commerce Drive

The test borings (W-1 through W-4) encountered layers of gravel, sandy silt, silt, and silt and clay. These soils were classified as A-1-b, A-2-4, A-4a and A-6a according to the ODOT classification system. A fuel odor was noted in boring W-2 between depths of about 4.0 and 5.5 feet.

Bedrock was encountered in borings W-2 and W-3, at depths of 8.0 and 14.5 feet, respectively. No bedrock was noted in borings W-1 or W-4, which were drilled to depths of 5.5 and 10.0 feet, respectively.

Groundwater was noted in borings W-2 and W-3 at a depth of 9.0 feet below grade. No groundwater was noted in borings W-1 or W-4.

Pennyroyal Road and Clearcreek-Franklin Road

The test borings (J-1 through J-6) encountered layers of gravel, sandy silt, silt, silt and clay, silty clay, and clay of the A-4a, A-6a, A-6b, and A-7-6 soils categories.

No bedrock was encountered in borings J-1 through J-6, which were drilled to a maximum depth of 7.0 feet. However, bedrock was encountered in structure borings G-1, G-2 and G-3 at approximate elevations ranging from 940 to 942 feet.

No groundwater was noted in borings J-1 through J-6. However, groundwater was noted in borings G-1 and G-2 at approximate elevations ranging from 944 to 946 feet.

B. Field Test Results

In areas where the proposed embankment will be less than 3 feet in height (all borings except R-4, R-6, S-4 and S-5) the lowest standard penetration N-value in the upper 5 feet of each boring ranged from 4 to 30 blows per foot (bpf), averaging 13.9 bpf.

C. Laboratory Test Results

Group Index values were calculated for each of the samples tested. Group Index values for all test borings with embankment less than 3 feet in height (except R-4, R-6, S-4 and S-5) ranged from 0 to 18, averaging 6.0. This average Group Index value corresponds to an estimated California Bearing Ratio (CBR) value of 7. These soils exhibited an average Plasticity Index (PI) value of 12.0 percent.

In addition, optimum moisture content values for each sample tested in the upper 5 feet of the borings were estimated using procedures outlined in the Ohio Department of Transportation's, Geotechnical Bulletin 1 (GB1). The natural moisture content values of these soils ranged from 1 to 45 percent, averaging 13.5 percent. The estimated optimum moisture content values ranged from 6 to 24 percent, averaging 13.0 percent. On average, the natural moisture content of the samples tested were 0.5 percent greater than the average estimated optimum moisture content value, with 10 of the 47 test borings containing samples exhibiting natural moisture content values of more than 3 percent above the estimated optimum.

V. ANALYSIS & RECOMMENDATIONS

A. Subgrade Considerations

The subgrade considerations in this section pertain to cut areas or areas where fill embankments will be less than 3 feet in height. These segments are presented in Table 2 below.



Table 2. Subgrade in Cut or Less than 3 Feet Fill

Roadway Location	Station
SR 122	All
Ramp A	All
Ramp B	All
Ramp C	Beginning to 223+30
Ramp D	All
Ramp E	Beginning to 207+30 211+35 to 214+35 218+30 to End
Commerce Drive	All (except ditch area)
Pennyroyal Road / Clearcreek-Franklin Road	Beginning to 17+20 24+00 to End

As stated previously, areas where the proposed embankment will be less than 3 feet in height, the lowest standard penetration N value in the upper 5 feet of each boring ranged from 4 to 30 bpf, averaging 14.3 bpf.

Additionally, the average of the natural moisture content values of the samples tested were 0.5 percent above the average estimated optimum moisture content value, with 10 of the 47 test borings containing samples exhibiting natural moisture content values of more than 3 percent above the estimated optimum.

Based upon the above information as well as the requirements outlined in GB1, it is recommended that the pavement subgrade undercuts be estimated in the following areas presented in Table 3 below. The undercut depth is measured from the top of the proposed subgrade. The actual limits of undercut should be determined during proofrolling by the Engineer. Undercut areas should be restored to the proposed grade using Item 703.16.C Granular Material, Type B, C or D and Item 712.09 Geotextile Fabric, Type D.

Table 3. Estimated Subgrade Undercut Areas

Roadway Location	Station	Undercut Depth (feet)
SR 122	37+00 to 38+50	3.0
	56+00 to End	3.0
Ramp A	210+70 to 212+00	3.0
Ramp D	205+00 to End	1.5 2'
Commerce Drive	Beginning to 11+50	3.0*

* Additional undercut may be required in existing ditch area

Additionally, relatively shallow bedrock was encountered in borings R-1 through R-4 drilled for Ramp E. All bedrock should be removed within the upper 2 feet of the proposed subgrade. Based upon the proposed roadway grade, it is assumed that bedrock removal will be required from the beginning of Ramp E to Station 199+50 and from Station 201+00 to 207+30. The actual limits of bedrock removal should be determined during construction by the Engineer.

Results of GB1 indicated that cement stabilization might be an option for this project. The depth of cement stabilization would generally need to be about 16 inches. The A-4b soils encountered in the vicinity of boring P-10 (Sta. 61+99, SR 122) would still need to be removed to a depth of 3.0 feet even if cement stabilization is being performed in other areas.

The calculated Group Index values for the samples tested ranged from 0 to 18, averaging 6.0. This average Group Index value corresponds to an estimated California Bearing Ratio (CBR) value of 7. It is recommended that the pavement design be based upon a CBR value of 7.

B. Embankments

Ramp C - Station 223+30 to End

Embankment heights in this area will range from about 3 feet to about 20 feet. Standard penetration values determined in the test borings ranged from 10 to 32 bpf.

No undercut is expected below the embankment in this area. In the event that unstable soils are encountered at the surface, a bridge lift should be placed as outlined in Item 203.05 of the ODOT Construction and Material Specifications.

Settlement was computed in the area of maximum fill (approximately 14 feet in height) at Station 226+00. It is estimated that the underlying foundation soils will exhibit on the order of 5 to 8 inches of total settlement as a result of fill placement. It is expected that 90 percent of the settlement will occur within about 3 weeks of the completion of fill placement. Results of the analysis are appended to this report.

Global stability of the embankment was evaluated at Station 226+00. Results of the analysis are appended to this report. The analysis yielded a minimum factor of safety value of 1.54. This factor of safety value is in excess of the required factor of safety of 1.3.



Ramp E - Station 207+30 to 211+35

Embankment heights in this area will range from about 3 feet to about 13 feet. A new structure is also planned in this area to carry the proposed ramp over Dicks Creek. The depth to rock in the area ranges from 5 to 6 feet below existing grade. Standard penetration values range from 12 bpf to in excess of 50 bpf.

No undercut is expected below the embankment. In the event that soft soils are encountered at the surface, a bridge lift should be placed as outlined in Item 203.05 of the ODOT Construction and Material Specifications.

Settlement was computed in the area of maximum fill at Station 208+50. It is estimated that the underlying foundation soils will exhibit between 2.5 and 5.0 inches of settlement as a result of fill placement. Results of the analysis are appended to this report. It is expected that 90 percent of the settlement will occur within about 3 weeks of the completion of fill placement.

Because of the relatively shallow depth to bedrock, and the stiff to hard soils, global stability evaluations are not warranted in this area.

Ramp E - Station 214+35 to 218+30

Embankment heights in this area will range from about 3 feet to about 6 feet. Standard penetration values in the soils range from 17 bpf to in excess of 50 bpf.

No undercut is expected below the embankment. In the event that soft soils are encountered at the surface, a bridge lift should be placed as outlined in Item 203.05 of the ODOT Construction and Material Specifications.

Based on profile and cross sections, settlement estimates and global stability evaluations are not warranted, as proposed fills in this area will not be greater than 6 feet.

Pennyroyal Road/Clearcreek-Franklin - Station 17+20 to 24+00

New embankment heights along the roadway centerline in this area will range from about 3 feet to about 6 feet. Standard penetration values in the soils range from 10 to 36 bpf.



In the event that soft soils are encountered at the surface, a bridge lift should be placed as outlined in Item 203.05 of the ODOT Construction and Material Specifications.

Based on profile and cross sections, and due to the presence of relatively shallow bedrock at the toe of the embankments, settlement estimates and global stability evaluations are not warranted, as proposed fill depths in this area will not be greater than about 6 feet.

C. Cut Slopes

IR 75 - Station 180+01.62 to 183+00

A 2H:1V cut backslope is proposed on the order of 10 to 15 feet at its maximum depth. Standard penetration test N-values in test borings K-1 and K-2 ranged from 6 to 76 blows per foot (bpf) and typically increased with depth. Bedrock consisting of gray shale with interbedded limestone layers was encountered in test boring K-1 at an elevation of about 729.5 feet. Ground water was not encountered at the time of drilling.

Global stability of the cut slope was evaluated at Station 180+01.62. Results of the analysis are appended to this report. The analysis yielded a minimum factor of safety value of 1.22 for shallow sloughing type failure and 1.41 for a deeper-seated failure. This factor of safety value for shallow sloughing is less than the required factor of safety of 1.3. The slope was re-analyzed using a 3H:1V slope in the portion of the slope where soils are expected (upper 7 feet). The factor of safety using the flatter slope was computed to be 1.63. Therefore, it is recommended that the soils be laid back at a slope rate of 3H:1V or flatter. Alternatively, a 2H:1V slope could be used if the weak soils are undercut and replaced with dumped rock fill using Item 703.16.C Granular Material, Type B, C or D and Item 712.09 Geotextile Fabric, Type D.

IR 75 - Station 190+50 to 195+00

A 2H:1V cut slope is proposed on the order of 20 to 30 feet in depth at its maximum depth. Standard penetration test N-values in test borings K-3 and K-4 drilled in the this area ranged from 4 to 48 bpf. The upper 6 to 8 feet in the test borings indicate soil consistencies that are soft to medium stiff while the materials encountered below these depths are stiff to very stiff. Rock consisting of gray shale with interbedded limestone layers was encountered in test boring K-4 at an elevation of about 728 feet.



Global stability of the cut slope was evaluated at Station 190+50. Results of the analysis are appended to this report. The analysis yielded a minimum factor of safety value of 1.49. This factor of safety value is in excess of the required factor of safety of 1.3. The above analysis assumes that the upper 6 to 8 feet of the proposed 2H:1V cut slope will require some modification by either flattening the slope at a grade of 3H:1V or undercutting and replacing the material with dumped rock fill using Item 703.16.C Granular Material, Type B, C or D and Item 712.09 Geotextile Fabric, Type D.

D. General Construction and Earthwork

In addition to the recommendations provided above, general construction and earthwork recommendations are provided below. Site preparation and earthwork should be performed in accordance with the ODOT Construction and Material Specifications.

1. All surface objects, structures, brush, roots, trees and stumps should be cleared and or grubbed from the construction area. Areas where the proposed embankment fill is 9 feet or less, or where the existing grade is steeper than 8:1 H:V should be scalped. Clearing, grubbing and/or scalping should be performed in accordance with ODOT Item 201 and related sections.
2. During construction, adequate drainage should be provided on the surface of the exposed soils. Absorption of heavy rainfall, accumulations of water and heavy construction traffic may result in softening these soils, hence, severely weakening the strength of the subgrade soils.
3. Bridge approach embankments should be constructed and allowed to settle prior to bridge foundation installation. Embankment construction should follow ODOT Item 203 and related sections.
4. Except where otherwise noted in this report, embankment side slopes constructed at a rate of 2:1 H:V or flatter are generally considered safe against sliding and slope failure. The side slopes should be seeded and vegetation growth permitted to limit erosion and sloughing.
5. Compaction of the natural ground surface should be performed in accordance with ODOT Item 204. Any soft soils encountered during the compaction operations, which will not readily compact, should be removed and replaced with engineered fill.

6. Where new embankment fill will be placed on or adjacent to excavations or other slopes, slopes that are steeper than 8:1 H:V should be continuously benched over those areas. Benching should be of sufficient width to permit operations of placing and compacting equipment.
7. Temporary excavations in excess of 4.0 feet in depth should be sloped or shored according to OSHA requirements.

VI. CHANGED CONDITIONS

Should details for the proposed roadways and embankments be changed from those used in preparing this report, the Geotechnical Engineer should be notified in order to make the necessary modifications in our recommendations to account for the changed conditions.

VII. TESTING AND OBSERVATION

Experience shows that the subsurface conditions in an area sometimes vary from the ones indicated by the test borings at their specific locations. It is therefore recommended that a Soils Technician, under the supervision of a qualified Geotechnical Engineer, be retained on the site to monitor all earthwork.

VIII. CLOSURE

CTL Engineering, Inc. has prepared this preliminary report for your use in accordance with generally accepted soil and foundation engineering practices. Preliminary analysis, conclusions and other work product of CTL Engineering, Inc. are instruments of service for this project only.

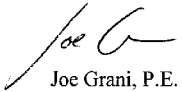
Soil samples will be retained in our laboratory for a period of 120 days, after which they will be discarded unless instructions are received from you as to their disposal.



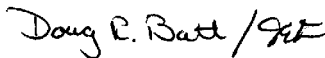
This geotechnical report does not address the environmental aspects of this particular site.

Respectfully Submitted,

CTL ENGINEERING, INC.



Joe Grani, P.E.
Project Engineer



Doug R. Batt, P.E.
Project Engineer



LOG OF BORING

Page 1 of 1

Date Started 6/9/05 Sampler: Type SS Dia. 1.375"
 Date Completed 6/9/05 Casing: Length 18ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, OH

Boring No. A-1 Station & Offset 208+28.09, 16.78' Lt
 Water Elev. Dry
 Surface Elev. 693.6ft

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
693.6	0				Topsoil (2")										
693.6					Cobbles (10")										
693.4		50-6"			Gray, hard, SANDY SILT , some gravel, some clay, with cobbles, damp, fill	1								4	VIS.
692.6	2														
690.1	4	10/11/11			Medium gray, very stiff, SANDY SILT , some gravel, some clay, with cobbles, damp, fill	2	37	11	11	19	22	21	6	9	A-4a
687.6	6	10/6/8			Brownish gray, stiff, SILT AND CLAY , damp, fill	3								15	VIS.
686.1	8	50-5"			SHALE , gray, augered	4								5	VIS.
684.6	10	15/15/20				5								9	VIS.
683.1	12	16/17/17				6								14	VIS.
681.6	14	25/50-5"			LIMESTONE , gray, augered	7									VIS.
680.1	16	50-6"			SHALE , gray, augered	8									VIS.
678.6	18	50-4"				9									NO REC
677.1	20	50-2"			LIMESTONE , gray, augered	10									VIS.
675.6	22	35%	3.6	1.4	SHALE (80%), medium to dark gray, moderately hard, with interbedded LIMESTONE (20%), dark to light gray, moderately hard	RC-1									VIS.
670.6	24	45%	4.6	0.4	SHALE (87%), medium to dark gray, with interbedded LIMESTONE (13%), medium to light gray	RC-2									VIS.
665.6	28														

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

Date Started 6/9/05 Sampler: Type SS Dia. 1.375"
 Date Completed 6/9/05 Casing: Length 10ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, OH

Boring No. A-2 Station & Offset 208+92.56, 4.99' Lt.

Water Elev. Dry
 Surface Elev. 691.2ft

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std Pen/ RQD	Rec. (ft)	Loss (ft)		Description	Sample	Physical Characteristics							ODOT	
							No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	Class
691.2	0					Topsoil (6")										
691.2		6/8/8			0.5'	Black, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, little clay, with cobbles, wood fragments, organics, moist, fill	1	41	12	20	13	14	27	7	28	A-2-4
690.7	2															
687.7		13/21/16			3.5'	Gray, dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND AND SILT, with cobbles, damp, fill	2								5	VIS.
686.2	4	9/50-4"			5.0'	SHALE, gray, augered	3								18	VIS.
685.2	6	13/13/23					4								14	VIS.
683.7	8	11/26/50-4"					5								9	VIS.
682.2		50-3"					6								10	VIS.
681.2	10	28%	5.0	0.0	10.0'	SHALE (72%), dark gray, moderately hard, with interbedded, LIMESTONE (28%), light to dark gray, moderately hard	RC-1									VIS.
	12															
	14															
676.2		48%	4.8	0.2	15.0'	SHALE (60%), dark gray, moderately hard, with interbedded, LIMESTONE (40%), light to dark gray, moderately hard	RC-2									VIS.
	16															
	18															
671.2	20				20.0'											

BOTTOM OF BORING

LOG OF BORING

Page 1 of 1

Date Started 12/19/05 Sampler: Type SS Dia. 2.250 D.
 Date Completed 12/19/05 Casing: Length 3.5ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, Ohio

Boring No. A-3 Station & Offset 208+57.55, 33.96' Rt Water Elev. 688.7ft
 Surface Elev. 691.7ft

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
691.7	0														
691.7	0.5				Topsoil										VIS.
690.7	1.0	2/2/3			Dark brown, medium stiff, SILT AND CLAY, some sand, moist	1	0	1	24	28	47	37	14	30	A-6a
688.2	3.5				SHALE, dark gray, augered	2								10	VIS.
686.7	5.0	93%	4.7	0.3	SHALE (73%), dark to medium gray, moderately soft, with interbedded LIMESTONE (27%), medium gray, moderately soft, crystalline	RC-1									VIS.
681.7	10.0	88%	4.4	0.6	SHALE (73%), dark to medium gray, moderately soft, with interbedded LIMESTONE (27%), medium gray, moderately hard	RC-2									VIS.
676.7	15.0														

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING

Page 1 of 1

Date Started 12/8/05 Sampler: Type SS Dia. 2.25 O.D.
 Date Completed 12/13/05 Casing: Length 6ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, Ohio

Boring No. A-4 Station & Offset 209+34.86, 50.46' Lt
 Water Elev. Dry
 Surface Elev. 692.7ft

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen / RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
692.7	0				Topsoil (9")										VIS.
692.7	0.8'				Dark brown, stiff, SILT AND CLAY , with broken chert fragments, damp, possible fill	1								18	VIS.
691.7	2	4/8													
689.2	3.5'	8/10/12			Light brown, very stiff, SILT AND CLAY , with rock fragments, damp	2								16	VIS.
686.7	6														
685.7	7.0'	50/3"			SHALE , gray, augered	3								16	VIS.
685.7	8	80%	4.5	0.5	SHALE (74%) , gray, moderately hard, with interbedded LIMESTONE (26%) , gray, moderately hard, crystalline	RC-1									VIS.
680.7	12														
675.7	17.0'	83%	4.8	0.2	SHALE (61%) , dark gray, moderately soft, with interbedded LIMESTONE (39%) , gray, moderately hard	RC-2									VIS.

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING

Page 1 of 1

Date Started 12/9/05 Sampler: Type SS Dia. 2.25 O.D.
 Date Completed 12/13/05 Casing: Length 6ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, Ohio

Boring No. A-5 Station & Offset 208+39.41, 82.14' Lt
 Water Elev. Dry
 Surface Elev. 690.5ft

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class	
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.
690.5	0					Topsoil (8")										VIS.
690.5																
689.5		5/8				Dark brown, medium dense, COARSE AND FINE SAND , little silt, little clay, trace gravel, damp	1	8	21	42	17	12			11	A-3a
	2															
687.0		3/6/10				Brown, very stiff, SILTY CLAY , trace sand, trace gravel, with chert fragments, damp	2	2	2	4	50	42	39	17	21	A-6b
	4															
684.5		5/10/15				CLAY SHALE , gray, augered	3								14	VIS.
	6															
682.0																
681.5		504" 10%	1.8	3.2		SHALE , light gray, augered	4									VIS.
	8					SHALE (80%), gray, moderately soft, with interbedded LIMESTONE (20%), gray, moderately hard	RC-1									VIS.
	10															
	12															
676.5		93%	4.7	0.3		SHALE (61%), dark gray, moderately soft, with interbedded LIMESTONE (39%), gray, moderately hard	RC-2									VIS.
	14															
	16															
	18															
671.5		90%	4.6	0.4		SHALE (69%), dark gray, moderately hard, with interbedded LIMESTONE (31%), moderately hard	RC-3									VIS.
	20															
	22															
666.5	24															

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING

Date Started 1/17/05 Sampler: Type SS Dia. 1.375"
Date Completed 1/18/05 Casing: Length 29ft Dia. 3.25"

Project Identification: WAR-75-3.40

04120056G

Water Elev. 683.7ft

Warren County, Ohio

Boring No. B-1 Station & Offset 209+13.44, 4.4' Rt.

Surface Elev. 703.7ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics										ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
703.7	0				TOPSOIL (10")												
703.7 702.9		5/4/3			BROWN AND GRAY SILTY CLAY (FILL)	1	20	11	12	19	38	30	11	16	A-6a		
	2																
700.7		2/3/4			BROWN AND GRAY SILTY CLAY (FILL)	2								12	VIS.		
	4																
699.2		2/4/7			BROWN AND GRAY SILTY CLAY (FILL)	3	22	14	13	9	42	35	16	15	A-6b		
	6																
695.2		6/6/7			BROWN AND GRAY SILTY CLAY (FILL)	4									VIS.		
	8																
692.7		6/6/8			GRAY AND BROWNISH GRAY SILTY SAND AND GRAVEL (POSSIBLE FILL)	5	44	18	3	22	13	37	15	22	A-2-6		
	10																
690.2		3/7/9			GRAY AND BROWNISH GRAY SILTY SAND AND GRAVEL (POSSIBLE FILL)	6								19	VIS.		
	12																
687.7		3/4/7			DARK GRAY SILTY CLAY AND SAND (POSSIBLE FILL)	7	0	0	46	16	38	NP	NP	18	A-4a		
	14																
685.2 684.7		2/10/16			DARK GRAY SILTY CLAY WITH SAND (POSSIBLE FILL)	8A								18	VIS.		
	16				GRAY SAND AND GRAVEL	8B	66	12	11	7	4	NP	NP	5	A-1-a		
682.7		25/50-3"			GRAY SHALE HIGHLY WEATHERED TO WEATHERED WITH INTERBEDDED LIMESTONE (AUGERED)	9									VIS.		
	18																
680.2		50-6"			GRAY SHALE HIGHLY WEATHERED TO WEATHERED WITH INTERBEDDED LIMESTONE (AUGERED)	10									VIS.		
	20																
678.7		50-5"			GRAY SHALE HIGHLY WEATHERED TO WEATHERED WITH INTERBEDDED LIMESTONE (AUGERED)	11									VIS.		
677.2		50-5"			GRAY SHALE HIGHLY WEATHERED TO WEATHERED WITH INTERBEDDED LIMESTONE (AUGERED)	12									VIS.		
	22																
675.2		50-3"			GRAY SHALE HIGHLY WEATHERED TO WEATHERED WITH INTERBEDDED LIMESTONE (AUGERED)	13									VIS.		
673.7		15%	3.9	1.1	GRAY SHALE HIGHLY WEATHERED TO WEATHERED WITH INTERBEDDED LIMESTONE (AUGERED)	30.0'									VIS.		
	24				SHALE (62%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (38%) LIGHT TO MEDIUM GRAY	RC-1											
	26																
668.7																	

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. B-1

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
668.7		31%	4.6	0.4	SHALE (75%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (25%) LIGHT GRAY	RC-2									VIS
	36														
	38														
664.7						39.0'									

BOTTOM OF BORING

LOG OF BORING

Date Started 2/17/05 Sampler: Type SS Dia. 1.375"
 Date Completed 2/17/05 Casing: Length 30ft Dia. 3.25"

Project Identification: WAR-75-3.4004120056GBoring No. B-2 Station & Offset 209+70.98, 30.0' Lt.Water Elev. 680.5ftWarren County, OhioSurface Elev. 705.5ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
705.5	0				PORTLAND CEMENT CONCRETE										
705.5					BORING DRILLED THROUGH BRIDGE DECK										
704.6															
	2														
	4														
	6														
	8														
	10														
	12														
	14														
	16														
	18														
	20														
	22														
682.0															
	24	1/1/2			DARK GRAYISH BROWN SANDY SILT TO SILTY SAND	1	3	9	37	32	19	30	6	29	A-4a
680.5															
	26	1/2/1			DARK GRAYISH BROWN SANDY SILT TO SILTY SAND	2	8	12	32	30	18	31	6	29	A-4a
679.0															
	28	1/2/3			DARK GRAYISH BROWN SANDY SILT TO SILTY SAND	3									VIS.
677.5															
	30	22/17/35			GRAY SILTY SAND AND GRAVEL	4	39	16	1	18	26	39	18	25	A-6b
676.0															
675.5		50-2" 0%	4.5	0.5	GRAY SILTY SAND AND GRAVEL SHALES (100%) LIGHT GRAY	5 RC-1									VIS. VIS.
	32														
	34														
670.5															

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. B-2

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
670.5		33%	5.0	0.0	SHALE (83%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (17%)	RC-2									VIS.
	36														
	38														
665.5	40														
					40.0'										

BOTTOM OF BORING

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 2/16/05 Sampler: Type SS Dia. 1.375"

Date Completed 2/16/05 Casing: Length 33ft Dia. 3.25"

Water Elev. 674.9ft

Warren County, Ohio

Boring No. B-3 Station & Offset 209+70.75, 29.9' Rt.

Surface Elev. 705.4ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample	Physical Characteristics									ODOT Class
						No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
705.4	0				PORTLAND CEMENT CONCRETE											
705.4					BORING DRILLED THROUGH BRIDGE DECK											
704.5																
	2															
	4															
	6															
	8															
	10															
	12															
	14															
	16															
	18															
	20															
	22															
	24															
680.4																
	26	1 1/2														
678.9		5/5/5			GRAY BROWN SILTY SAND AND GRAVEL	1	36	12	18	15	19	30	9	25	A-2-4	
677.4	28	22/35/22			GRAY BROWN SILTY SAND AND GRAVEL	2										VIS.
675.9	30	10/25/32			GRAY SILTY SAND AND GRAVEL	3	44	18	2	19	17	NP	NP	9	A-4a	
674.4	32	50-5"			GRAY CLAYEY SILT	4	35	11	2	26	26	36	15	9	A-6a	
672.9	34	50-2"			GRAY CLAYEY SILT	5										VIS.
672.4		13%	3.9	1.1	LIMESTONE	6										VIS.
					SHALE (60%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (40%) LIGHT AND DARK GRAY	RC-1										VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. B-3

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
670.4															
	36														
667.4	38	60%	4.9	0.1	SHALE (77%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (23%)	RC-2									VIS
	40														
	42														
662.4						43.0'									

BOTTOM OF BORING

LOG OF BORING

Date Started 2/17/05 Sampler Type SS Dia. 1.375"
 Date Completed 2/17/05 Casing Length 34ft Dia. 3.25"

Project Identification: WAR-75-3.40
04120056G

Boring No. B-4 Station & Offset 210+28.32, 29.9' Lt.

Water Elev. _____
 Surface Elev. 706.3ft Warren County, Ohio

Elev. (ft)	Depth (ft)	Std. Pen./ RCD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
706.3	0				PORTLAND CEMENT CONCRETE										
706.3						0.9'									
705.4					BORING DRILLED THROUGH BRIDGE DECK										
	2														
	4														
	6														
	8														
	10														
	12														
	14														
	16														
	18														
	20														
	22														
682.8	24	1/1/2			BROWN SANDY SILT TO SILTY SAND	1	34	6	14	35	11	35	12	26	A-6a
681.3	26	1/1/1			BROWN SANDY SILT TO SILTY SAND	2									VIS.
679.8		1/2/2			BROWN SANDY SILT TO SILTY SAND	3	12	11	22	37	18	37	13	20	A-6a
678.3	28	1/1/3			BROWN SILTY SAND AND GRAVEL	4	41	9	15	22	13	32	10	30	A-2-4
676.8	30	5/9/50-4"			GRAY SHALE WITH INTERBEDDED LIMESTONE LAYERS	5									VIS.
675.3		50-3"			GRAY SHALE WITH INTERBEDDED LIMESTONE LAYERS	6									VIS.
673.8	32	50-3"			GRAY SHALE WITH INTERBEDDED LIMESTONE LAYERS	7									VIS.
672.3	34	47%	3.9	1.1	SHALE (62%) MEDIUM GRAY	RC-1									VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

L OH [REDACTED] 1205 [REDACTED] R-75-B [REDACTED] CI.GP, [REDACTED] M DOT [REDACTED] 7/05

L OH [REDACTED] 1205-8-R-75-B [REDACTED] CI.GP [REDACTED]

L OH [REDACTED] 1205-8-R-75-B [REDACTED] CI.GP [REDACTED]

L OH [REDACTED] 1205-8-R-75-B [REDACTED] CI.GP [REDACTED]

L OH [REDACTED] 1205-8-R-75-B [REDACTED] CI.GP [REDACTED]

IL OH 1205-8-75-8-CL.GP

LOG OF BORING

Date Started 2/15/05 Sampler Type SS Dia. 1.375"
 Date Completed 2/16/05 Casing Length 35ft Dia. 3.25"

Project Identification: WAR-75-3.40
04120056G

Boring No. B-5 Station & Offset 210+28.13, 30.0' Rt.
 Water Elev. 682.8ft
 Surface Elev. 706.3ft

Warren County, Ohio

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	LL	P.I.	W.C.	
706.3	0				PORTLAND CEMENT CONCRETE										
705.4					BORING DRILLED THROUGH BRIDGE DECK										
	2														
	4														
	6														
	8														
	10														
	12														
	14														
	16														
	18														
	20														
	22														
682.8	24	1/1/1			GRAY BROWN SANDY SILT	1									VIS.
681.3	26	1/1/1			GRAY BROWN SANDY SILT	2	3	26	19	30	22	26	8	22	A-4a
679.8		1/1/2			GRAY BROWN SANDY SILT	3									VIS.
678.3	28	1/2/1			GRAY BROWN SILT	4	5	9	19	45	22	27	8	24	A-4b
676.8	30	1/2/2			GRAY BROWN SILTY SAND	5	20	18	18	25	19	27	9	25	A-4a
675.3		7/9/50-6"			GRAY SAND AND GRAVEL	6	76	10	2	5	7	NP	NP	25	A-1-a
674.3	32					7									VIS.
673.8		50-4"			GRAY CLAY SHALE WITH LIMESTONE LAYERS										
671.3	34														
	35.0'														

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. B-5

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample	Physical Characteristics								ODOT Class
						No.	% Agg.	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
671.3		33%	4.0	1.0	SHALE (68%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (38%) DARK AND LIGHT GRAY	RC-1									VIS
	36														
	38														
666.3	40	80%	5.0	0.0	SHALE (70%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (30%) LIGHT AND MEDIUM GRAY	RC-2									VIS
	42														
	44														
661.3															

BOTTOM OF BORING

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 2/9/05 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 2/9/05 Casing: Length 39ft Dia. 3.25"

Water Elev. 678.4ft

Warren County, Ohio

Boring No. B-6 Station & Offset 210+83.41, 7.9' Lt.

Surface Elev. 706.9ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Physical Characteristics										ODOT Class
						Sample No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
706.9	0				TOPSOIL (7")	0.6'										
706.9 706.3		4/5/6			BROWN AND GRAY SANDY SILT	1									11	
	2															
703.9		6/9/9			BROWN AND GRAY SANDY SILT	2									13	VIS.
	4															
701.9 701.4		7/7/6			GRAY CLAYEY SILT WITH ROCK FRAGMENTS AND COBBLES	3									8	VIS.
	6															
698.4		5/3/6			GRAY CLAYEY SILT WITH ROCK FRAGMENTS AND COBBLES	4	30	10	9	26	25	30	10	11		A-4a
	8															
695.9		6/5/7			GRAY CLAYEY SILT WITH ROCK FRAGMENTS AND COBBLES	5									19	VIS.
	10															
693.9 693.4		4/6/8			BROWN CLAYEY SILT	6	18	5	11	35	31	36	17	13		A-6b
	12															
690.9		7/9/11			BROWN CLAYEY SILT	7									13	VIS.
	14															
688.4		4/7/10			BROWN CLAYEY SILT	8									17	VIS.
	16															
686.9		13/11/12			BROWN AND GRAY SAND AND GRAVEL	9	53	16	15	5	11	21	4	5		A-1-b
685.9																
683.4		11/13/13			BROWN AND GRAY SAND AND GRAVEL	10									7	VIS.
	18															
680.9		11/19/24			BROWN AND GRAY SAND AND GRAVEL	11	55	16	9	8	12	20	3	11		A-1-b
678.9 678.4		32/16/22			BROWN SILTY CLAY	12	10	3	4	29	54	47	27	16		A-7-6
	20															
674.9																
673.4		18/43/50-3'			GRAY CLAY SHALE	13									15	VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. B-6

Elev. (ft)	Depth (ft)	Std. Pen./ RCD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
671.9															
	36														
668.4	38														
667.9		50-3" 8%	4.5	0.5	GRAY CLAY SHALE SHALES (70%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (30%) DARK AND LIGHT GRAY	39.0' RC-1	14							9	VIS. VIS
	40														
	42														
662.9	44	32%	4.5	0.5	SHALES (77%) MEDIUM GRAY WITH INTERBEDDED LIMESTONE (23%) DARK AND LIGHT GRAY	44.0' RC-2									VIS
	46														
	48														
657.9						48.0'									

BOTTOM OF BORING

LOG OF BORING

Page 1 of 2

Date Started 1/19/05 Sampler: Type SS Dia. 1.375"
 Date Completed 1/19/05 Casing: Length 29ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, Ohio

Water Elev. 685.5ftSurface Elev. 704.0ftBoring No. B-7 Station & Offset 209+11.82, 87.7' Lt.CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen./ R.G.D.	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
704.0	0														
704.0	0.6'				Topsoil										
703.4		4/6/8			Brown, stiff, SILT AND CLAY, some sand, some gravel, damp, fill	1	26	15	11	21	27	30	11	15	A-6a
701.0		4/10/8			Brown, very stiff, SILT AND CLAY, some sand, some gravel, with cobbles, damp, fill	2								12	VIS.
698.5		4/3/4			Brown, medium stiff, SILT AND CLAY, some sand, some gravel, damp, fill	3	23	13	14	18	32	33	14	14	A-6a
695.5		5/10/10			Brown, very stiff, SILT AND CLAY, some sand, some gravel, with cobbles, damp, fill	4									VIS.
693.0		7/9/11			Brown, very stiff, SILT AND CLAY, some sand, some gravel, damp, fill	5								11	VIS.
690.5		7/10/14			Brown, very stiff, SILT AND CLAY, little sand, little gravel, damp	6	10	3	7	16	64	35	14	13	A-6a
688.0		9/12/20			Brown, hard, SILT AND CLAY, little sand, little gravel	7									NO REC
685.5		14/16/50-3"			Gray, hard, CLAY, with clay shale fragments, damp	8								16	VIS.
683.0		38/44/50-5"			CLAY SHALE, gray, severely to moderately weathered, moderately hard, with clay seams, augered	9									VIS.
680.5		32/50-4"				10									VIS.
675.5		50/2"				11									VIS.
675.0		50/2"	4.7	0.3	SHALE (72%), medium gray, moderately hard, with interbedded LIMESTONE (28%), light gray, slightly weathered, moderately hard	RC-1									VIS.
670.0		47%	4.8	0.2	SHALE (68%), medium gray, moderately hard, with interbedded LIMESTONE	RC-2									VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

Date Started 2/10/05 Sampler: Type SS Dia. 1.375"
Date Completed 2/14/05 Casing: Length 30ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754

Warren County, Ohio

Boring No. B-8 Station & Offset 209+69.95, 129.9' Lt.

Water Elev. 680.9ft

Surface Elev. 702.9ft

CTL Project No. 04120056G

[illegible]

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

Project Identification: WAR-75-3.40 PID 10754

Warren County, Ohio

Boring No. B-8

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
666.8	36	25%	3.8	1.2		SHALE (82%), medium gray, moderately hard, with interbedded LIMESTONE (18%), gray, severely weathered, moderately hard	RC-2									VIS.
	38															
662.9	40				40.0'											

BOTTOM OF BORING

Date Started 2/21/05 Sampler: Type SS Dia. 1.375"
 Date Completed 2/21/05 Casing: Length 33ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754
Warren County, Ohio

Boring No. B-9 Station & Offset 210+29.28, 114.5' Lt. Water Elev. 674.2ft
 Surface Elev. 703.2ft

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
703.2	0				Portland cement concrete										
703.2	0.9'				Boring through bridge deck										
702.3	2														
	4														
	6														
	8														
	10														
	12														
	14														
	16														
	18														
683.2	20	7 1/2			Gray, soft, SANDY SILT , some clay, little gravel, moist, fill	1	18	4	19	38	21	32	10	24	A-4a
681.7	22	2 2/3			Gray, medium stiff, SANDY SILT , some clay, little gravel, fill	2									NO REC
680.2	24	3 8/8			Gray, stiff, SILT AND CLAY , and gravel, little sand, moist, fill	3	42	8	11	25	14	30	11	19	A-6a
678.7	26	6 2/2			Gray, soft, SILT AND CLAY , and gravel, little sand, with cobbles, damp, fill	4									VIS.
677.2	28	3 3/1			Gray, very loose, GRAVEL AND/OR STONE FRAGMENTS WITH SAND , little silt, trace clay, with cobbles, damp, fill	5	74	4	6	10	6	NP	NP	15	A-1-b
675.7	30	1 2/1			Gray, soft, SANDY SILT , little clay, trace gravel, moist	6	7	6	35	33	19	26	7	24	A-4a
674.2	32	0 1/30			SHALE , gray, soft, with interbedded LIMESTONE , gray, severely weathered, medium hard, augered	7									VIS.
671.7	34	50-6"				8									VIS.
670.2		13%	2.6	2.4	SHALE (85%), medium gray, moderately hard, with interbedded LIMESTONE (15%), gray, severely weathered, hard	RC-1									VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

Project Identification: WAR-75-3.40 PID 10754

Warren County, Ohio

Boring No. B-9

Elev. (ft)	Depth (ft)	Std. Pen / RQD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics								ODOT Class
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
867.1	36															
665.2	38	47%	4.2	0.8	38.0'	SHALE (68%), medium gray, moderately hard, with interbedded LIMESTONE (32%), gray, slightly weathered, hard	RC-2									VIS.
	40															
	42															
660.2	43				43.0'											

BOTTOM OF BORING

Date Started 2/9/05 Sampler: Type SS Dia. 1.375"
Date Completed 2/9/05 Casing: Length 34ft Dia. 3.25"

Project Identification: WAR-75-3.40 PID 10754

Warren County, Ohio

Boring No. B-10 Station & Offset 210+86.24, 139.9' Lt.

Water Elev. 679.5ft

Surface Elev.

CTL Project No. 04120056G

Elev. (ft)	Depth (ft)	Std. Pen. / RCD	Rec. (ft)	Loss (ft)		Description	Sample No.	Physical Characteristics							ODOT Class		
								% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.		W.C.	
702.5	0					Asphalt											
702.5					0.8'												
701.7																	
701.0	2	4/5/7				Brownish gray, stiff, SILT AND CLAY, some sand, some gravel, with cobbles/boulders, damp, fill	1	22	12	12	25	29	30	13	11	A-6a	
699.5	4	3/3/3				Brownish gray, medium stiff, SILT AND CLAY, some sand, some gravel, with cobbles/boulders, damp, fill	2								12	VIS.	
697.5					5.5'												
697.0	6	4/11/7				Brownish gray, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, SILT, AND CLAY, with cobbles/boulders, damp, fill	3	54	4	9	12	21	29	11	13	A-2-6	
	8																
694.0	10	5/8/7					4										NO REC
692.0					10.5'												
691.5	12	4/2/2				Brownish gray, soft, SILT AND CLAY, some gravel, little sand, with cobbles/boulders, damp, fill	5	31	5	12	19	33	30	13	13	A-6a	
	14	11/12/15			13.5'												
689.0	16					Gray, very stiff, SILTY CLAY, and gravel, little sand, with cobbles/boulders, damp	6	37	1	12	20	30	35	17	11	A-6b	
686.5	18	11/7/12					7								11	VIS	
684.5					18.0'												
684.0	20	4/5/7				Gray, medium dense, GRAVEL AND/OR STONE FRAGMENTS WITH SAND, trace silt, trace clay, with cobbles/boulders, damp	8	66	3	16	7	8	NP	NP	15	A-1-b	
	22				23.0'												
679.5	24	32/21/17				Gray, hard, SANDY SILT, some gravel, with cobbles/boulders, damp	9	23	8	32	19	18	26	9	8	A-4a	
679.0	26																
	28	50-6"					10								5	VIS.	
674.0	30				31.5'												
671.0	32																
669.0	34	50-4" 8%	2.0	3.0	34.0'	SHALE, gray, moderately hard, with LIMESTONE seams, augered SHALE (87%), medium grav. moderately	11 RC-1									10	NO REC VIS

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

Project Identification: WAR-75-3.40 PID 10754

Warren County, Ohio

Boring No. B-10

[illegible]

BOTTOM OF BORING

LOG OF BORING

Date Started 2/10/05 Sampler: Type SS Dia. 1.375"
Date Completed 2/10/05 Casing: Length 44ft Dia. 3.25"

Project Identification: WAR-75-3.40
04120056G

Boring No. C-1 Station & Offset 216+46.57, 3.0' Lt.

Water Elev. 692.2ft Warren County, Ohio
Surface Elev. 715.7ft SR 122 Interchange

Elev. (ft)	Depth (ft)	Std. Pen/ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
715.7	0				TOPSOIL (7")										
715.7	1	5/10/5			BROWN AND GRAY SILTY SAND (FILL)	1	22	18	18	24	18	25	9	12	A-4a
712.7	2	9/8/6			BROWN AND GRAY SILTY SAND (FILL)	2									VIS.
710.2	4	6/8/3			BROWN AND GRAY SILTY SAND AND GRAVEL WITH COBBLES (FILL)	3								8	VIS.
707.2	6	9/6/5			BROWN AND GRAY SILTY SAND AND GRAVEL WITH COBBLES (FILL)	4	44	9	6	19	22	29	11	14	A-6a
704.7	8	7/7/10			BROWN AND GRAY SILTY SAND AND GRAVEL WITH COBBLES (FILL)	5								9	VIS.
702.7	10	2/6/8			BROWN AND GRAY SILT WITH COBBLES (FILL)	6	4	13	4	51	28	35	14	17	A-6a
702.2	12	5/10/10			BROWN AND GRAY SILT WITH COBBLES (FILL)	7								14	VIS.
699.7	14	9/7/6			DARK GRAY SILT	8	1	4	6	65	24	31	9	22	A-4b
697.2	16	4/4/3			BROWN AND LIGHT BROWN SILTY SAND	9								26	VIS.
694.7	18	3/7/12			BROWN AND LIGHT BROWN SILTY SAND	10	28	14	14	22	22	25	10	12	A-4a
692.2	20	14/20/30			BROWN AND LIGHT BROWN SILTY SAND	11								9	VIS.
689.7	22	12/21/28			BROWNISH GRAY TO GRAY SILTY SAND	12								8	VIS.
687.2	24	29/50-7"			BROWNISH GRAY TO GRAY SILTY SAND	13	25	14	16	25	20	22	9	7	A-4a

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. C-1

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample	Physical Characteristics									ODOT Class		
						No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.				
679.6																		
677.2	36	50-5"																
	38																	
	40																	
	42																	
672.2	44	50-2" 8%	4.0	1.0	GRAY CLAYSHALE WITH LIMESTONE LAYERS	14									5	VIS.		
671.7	44	50-2" 8%	4.0	1.0	GRAY CLAYSHALE WITH LIMESTONE LAYERS	15										8	VIS.	
	46				SHALE (83%) MEDIUM GRAY SILTY LAMINATED SOFT WITH INTERBEDDED LIMESTONE (17%) LIGHT GRAY FINE TO MEDIUM GRAINED VERY THINLY BEDDED HARD	RC-1												
	48																	
666.7	50				7%	4.2	0.8	SHALE (83%) MEDIUM GRAY SILTY LAMINATED SOFT WITH INTERBEDDED LIMESTONE (17%) LIGHT GRAY FINE TO MEDIUM GRAINED VERY THINLY BEDDED HARD	RC-2									
	52																	
661.7	54																	
BOTTOM OF BORING																		

BOTTOM OF BORING

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 12/20/04 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 12/20/04 Casing: Length 30.0ft Dia. 3.25"

Water Elev. 681.2ft

Warren County, Ohio

Boring No. C-2 Station & Offset 217+16.11, 1.2' Lt.

Surface Elev. 696.2ft

SR 122 Interchange

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics										ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
696.2	0				ASPHALT CONCRETE (6") OVER BASE COURSE (8")												
696.2 695.0	2	5/7/7			BROWN AND GRAY SANDY SILT WITH COBBLES (FILL)	1									6	VIS.	
693.2	4	3/3/4			BROWN AND GRAY SANDY SILT WITH COBBLES (FILL)	2										VIS.	
690.7	6	4/4/5			BROWN SANDY SILT TO SILTY SAND	3	15	18	29	20	18	32	12	19		A-6a	
687.7	8	12/14/15			BROWN SANDY SILT TO SILTY SAND	4	11	14	30	24	21	25	9	11		A-4a	
685.2	10	12/15/17			GRAY FINE TO COARSE SAND	5	34	20	31	9	6	16	3	8		A-1-b	
683.2 682.7	12	8/10/12			GRAY SILTY SAND AND GRAVEL	6	37	15	23	15	10	20	7	8		A-2-4	
680.2	16	9/11/11			GRAY SILTY SAND AND GRAVEL	7									12	VIS.	
677.7	18	12/14/15			GRAY SILTY SAND WITH ROCK FRAGMENTS AND GRAVEL	8										VIS.	
672.7	24	7/7/12			GRAY SILTY SAND AND GRAVEL	9	25	16	29	16	14	19	6	11		A-2-4	
669.2	28	50-4"			GRAY SHALE WITH LIMESTONE LAYERS	10									13	VIS.	
666.2	30	40%	3.8	1.2	SHALE (75%) MEDIUM GRAY SILTY LAMINATED THIN BEDDED SOFT WITH INTERBEDDED LIMESTONE (25%) LIGHT GRAY FINE TO MEDIUM GRAINED CRYSTALLINE FRACTURED AND JOINTED VERY THINLY BEDDED HARD	RC-1										VIS.	
661.2	35.0'																

Particle Sizes: Agg >= 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay <= 0.005mm.

LOG OF BORING

Date Started 12/10/04 Sampler: Type SS Dia. 1.375"
 Date Completed 12/15/04 Casing: Length 30.0ft Dia. 3.25"

Project Identification: WAR-75-3.40

04120056G

Water Elev. 672.9ft

Warren County, Ohio

Surface Elev. 694.9ft

SR 122 Interchange

Boring No. C-3 Station & Offset 217+56.46, 88.5' Lt.

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
694.9	0				TOPSOIL (7")										
694.3		5/7/7			BROWN SANDY SILT (FILL)	1								17	VIS.
	2														
691.9		3/3/3			BROWN SANDY SILT (FILL)	2	3	26	17	31	23	37	12	24	A-6a
	4														
689.9															
689.4	6	2/3/3			DARK BROWN AND BLACK SANDY SILT TO SILTY SAND (FILL)	3	16	26	10	24	24	46	19	25	A-7-6
	8														
686.4		7/9/12			LIGHT BROWN SANDY SILT TO SILTY SAND WITH COBBLES (TILL)	4	23	30	10	20	17	24	7	13	A-4a
	10														
683.9		9/16/21			LIGHT BROWN SANDY SILT TO SILTY SAND WITH COBBLES (TILL)	5								12	VIS.
	12														
681.4		50-2"			GRAY SAND AND GRAVEL WITH COBBLES AND BOULDERS	6									VIS.
	14														
678.9		27/50-6"			GRAY SAND AND GRAVEL WITH COBBLES AND BOULDERS	7									VIS.
	16														
676.4		12/14/17			GRAY SAND AND GRAVEL WITH COBBLES AND BOULDERS	8	40	11	30	4	15	26	10	11	A-2-4
	18														
	20														
672.9															
	22														
671.4		27/21/50-4"			GRAY SAND AND GRAVEL WITH COBBLES AND BOULDERS	9	55	12	31			NP	NP	12	A-1-b
	24														
	26														
666.9															
666.4		50-4"			GRAY SHALE	10								10	VIS.
	28														
664.9		48%	3.6	0.4	SHALE (65%) MEDIUM GRAY SILTY LAMINATED THIN BEDDED SOFT WITH INTERBEDDED LIMESTONE (35%) LIGHT GRAY FINE TO MEDIUM GRAINED CRYSTALLINE FRACTURED AND JOINTED VERY THINLY BEDDED HARD	RC-1									VIS.
	30														
	32														
	34														
659.9															

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING

Date Started 12/15/04 Sampler: Type SS Dia. 1.375"
Date Completed 12/16/04 Casing: Length 30.0ft Dia. 3.25"

Project Identification: WAR-75-3.40

04120056G

Warren County, Ohio

SR 122 Interchange

Boring No. C-4 Station & Offset 217+55.82, 3.6' Rt

Water Elev. 683.3ft

Surface Elev. 696.3ft

[illegible]

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

CTL OH DOT2 04120058G.WAR-75-C.3-24-05CI.GPJ CTL OH DOT.GDT 7/1/05

LOG OF BORING

Date Started 12/16/04 Sampler: Type SS Dia. 1.375"
 Date Completed 12/17/04 Casing: Length 35.0ft Dia. 3.25"

Project Identification: WAR-75-3.4004120056GWater Elev. 684.4ftWarren County, OhioSurface Elev. 697.4ftSR 122 InterchangeBoring No. C-5 Station & Offset 217+55.00, 131.2' Rt.

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Physical Characteristics										ODOT Class
						Sample No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
697.4	0				TOPSOIL (6")	0.5'										
697.4 696.9		4/5/7			BROWN SANDY SILT (FILL)	1									8	VIS.
	2															
694.4		7/9/12			BROWN SANDY SILT (FILL)	2									12	VIS.
	4															
692.4 691.9		9/12/14			BROWN SAND AND GRAVEL WITH COBBLES AND BOULDERS	3	48	15	35	1	1	NP	NP	5		A-1-b
	6															
688.9		21/27/29			BROWN SAND AND GRAVEL WITH COBBLES AND BOULDERS	4										VIS.
	8															
686.4		16/16/17			BROWNISH GRAY SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS	5	38	1	29	20	12	20	6	8		A-2-4
	10															
683.9		14/18/22			BROWNISH GRAY SILTY SAND AND GRAVEL WITH COBBLES AND BOULDERS	6										VIS.
	12															
681.4		12/12/16			GRAY SANDY SILT TO SILTY SAND WITH COBBLES AND BOULDERS (TILL)	7	32	17	13	22	16	22	8	9		A-4a
	14															
678.9		14/15/17			GRAY SANDY SILT TO SILTY SAND WITH COBBLES AND BOULDERS (TILL)	8								10		VIS.
	16															
674.4 673.9		29/35/47			BROWN AND GRAY SAND AND GRAVEL WITH COBBLES AND BOULDERS	9	55	14	26	3	2	NP	NP	7		A-1-b
	18															
	20															
	22															
668.9		40/50-5"			BROWN AND GRAY SAND AND GRAVEL WITH COBBLES, BOULDERS AND HEAVING SANDS	10								7		VIS.
	24															
665.9																
	26															
663.9		50-4"			GRAY SHALE WITH LIMESTONE LAYERS	11										VIS.
662.4																

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40
04120056GBoring No. C-5

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
661.3		37%	3.8	1.2	SHALE (65%) MEDIUM GRAY SILTY LAMINATED THIN BEDDED SOFT WITH INTERBEDDED LIMESTONE (35%) LIGHT GRAY FINE TO MEDIUM GRAINED CRYSTALLINE FRACTURED AND JOINTED VERY THINLY BEDDED HARD	RC-1									VIS.
	36														
	38														
657.4	40				40.0'										

BOTTOM OF BORING

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 12/21/04 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 12/21/04 Casing: Length 30.0ft Dia. 3.25"

Water Elev. 685.2ft

Warren County, Ohio

Surface Elev. 696.2ft

SR 122 Interchange

Boring No. C-6 Station & Offset 218+14.04, 3.5' Lt.

Elev. (ft)	Depth (ft)	Std. Pen./ ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
696.2	0				ASPHALT CONCRETE (6") OVER BASE COURSE (10")										
696.2	1.3'					1								19	VIS.
694.9	2	2/3/4			BROWN AND BLACK CLAYEY SILT (FILL)										
693.2	4	3/4/6			BROWN AND BLACK CLAYEY SILT (FILL)	2	14	4	5	44	33	45	22	26	A-7-6
691.2	5.0'														
690.7	6	3/3/4			BROWN AND BLACK SILTY SAND (FILL)	3	15	23	25	13	24	37	17	24	A-6b
687.7	8														
685.7	10	7/12/12			BROWN SAND AND GRAVEL LAYERS	4	42	20	28	3	7	21	6	9	A-1-b
685.2	10.5'														
	12	5/7/9			BROWN SANDY SILT TO SILTY SAND (TILL)	5	34	17	13	17	19	23	8	11	A-4a
683.2	13.0'														
682.7	14	17/19/21			GRAY SANDY SILT WITH COBBLES AND BOULDERS (TILL)	6								12	VIS.
680.2	16	30/22/17			GRAY SANDY SILT WITH COBBLES AND BOULDERS (TILL)	7								9	
677.7	18														
	20	12/12/14			GRAY SANDY SILT WITH COBBLES AND BOULDERS (TILL)	8								8	VIS.
673.2	22														
672.7	23.0'														
	24	50-5"			GRAY SAND AND GRAVEL WITH COBBLES AND BOULDERS	9	87	9	2			NP	NP	12	A-1-a
668.2	26														
667.7	28														
666.2	30	57%	4.9	0.1	GRAY SHALE WITH LIMESTONE LAYERS	10								7	VIS.
	30.0'														
	32				SHALE (69%) MEDIUM GRAY SILTY LAMINATED THIN BEDDED SOFT WITH INTERBEDDED LIMESTONE (31%) LIGHT GRAY FINE TO MEDIUM GRAINED CRYSTALLINE FRACTURED AND JOINTED VERY THINLY BEDDED HARD	RC-1									
661.2	34														
	35.0'														

BOTTOM OF BORING

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

CTL OH DOT2 04120056G.WAR-75-3.40-05C1.GPJ CTL OH DOT.GDT 7/1/05

LOG OF BORING

Date Started 12/27/04 Sampler: Type SS Dia. 1.375"
 Date Completed 12/29/04 Casing: Length 57.5ft Dia. 3.25"

Project Identification: WAR-75-3.40

04120056G

Water Elev. 666.4ft

Warren County, Ohio

Surface Elev. 719.9ft

SR 122 Interchange

Boring No. C-7 Station & Offset 218+92.16, 10.3' Lt.

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample	Physical Characteristics										ODOT	
						No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	Class			
719.9	0																	
719.9		5/10/11			BROWN AND GRAY SANDY SILT TO SILTY SAND (FILL)	1										17		VIS.
719.4	2																	
716.9	4	8/13/10			BROWN AND GRAY SANDY SILT TO SILTY SAND (FILL)	2	12	43	9	18	18	21	7	9		A-4a		
714.4	6	8/7/8			BROWN AND GRAY SANDY SILT TO SILTY SAND (FILL)	3									9		VIS.	
	8																	
711.4	10	5/7/9			BROWN AND GRAY SANDY SILT TO SILTY SAND (FILL)	4										10		VIS.
708.9	12	6/5/7			BROWN AND GRAY SANDY SILT TO SILTY SAND (FILL)	5	11	17	16	29	27	22	7	11		A-4a		
706.9					13.0'													
706.4	14	4/5/5			LIGHT BROWN SANDY SILT (FILL)	6	17	18	6	45	14	31	11	21		A-6a		
703.9	16	28/14/8			LIMESTONE FRAGMENTS (FILL)	7												VIS.
	18																	
701.4		6/11/7			BROWN AND GRAY SANDY SILT WITH LIMESTONE FRAGMENTS (FILL)	8										10		VIS.
	20																	
	22																	
					23.5'													
696.4	24	5/8/7			DARK BROWNISH GRAY SILT	9	0	18	6	61	15	33	8	21		A-4a		
	26																	
	28																	
691.4		3/7/3			DARK BROWNISH GRAY SILT	29.0'	10A									18		VIS.
690.9	30				BROWN AND GRAY SANDY SILT	10B										16		VIS.
	32																	
					33.5'													
686.4	34	15/18/22			GRAY SILTY SAND TO SANDY SILT (TILL)	11	18	23	10	29	20	23	7	9		A-4a		

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. C-7

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics									ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
683.8																
681.4	36	33/35/38			GRAY SILTY SAND TO SANDY SILT WITH COBBLES (TILL)	12									7	VIS.
	38															
	40															
676.4	42	17/19/23			GRAY SILTY SAND TO SANDY SILT WITH COBBLES (TILL)	13									8	VIS.
	44															
	46															
671.4	48	7/18/40			GRAY SILTY SAND TO SANDY SILT WITH COBBLES (TILL)	14									4	VIS.
	50															
	52															
666.4	54	15/15/14			BROWN AND GRAY SAND AND GRAVEL	15	54	37	6		NP	NP	18	A-1-a		
	56															
	58															
662.7 662.4 662.3	58	50-1"			BROWN AND GRAY SAND AND GRAVEL SHALE (50%) MEDIUM GRAY SILTY LAMINATED THIN BEDDED SOFT WITH INTERBEDDED LIMESTONE (50%) LIGHT GRAY FINE TO MEDIUM GRAINED CRYSTALLINE FRACTURED AND JOINTED VERY THINLY BEDDED HARD	16 RC-1										VIS. VIS.
60																
62																
64																
66																
657.3	62				SHALE (85%) MEDIUM GRAY SILTY LAMINATED THIN BEDDED SOFT WITH INTERBEDDED LIMESTONE (15%) LIGHT GRAY FINE TO MEDIUM GRAINED CRYSTALLINE FRACTURED AND JOINTED VERY THINLY BEDDED HARD	RC-2										VIS.
	64															
	66															
652.3																
BOTTOM OF BORING																

CTL OH DOT7 04120056G WAR-75-C-3-24-06C1 GPJ C1 LOH DOT DOT 71103

LOG OF BORING

Date Started 2/1/05 Sampler Type SS Dia. 1.375"
 Date Completed 2/2/05 Casing Length 80ft Dia. 3.25"

Project Identification: WAR-75-3.40
04120056G

Boring No. D-1 Station & Offset 432+82, 4.8' Rt. Water Elev. 709.5ft Warren County, Ohio
 Surface Elev. 748.0ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
748.0	0														
748.0					TOPSOIL (7")	0.6'									
747.4		4/7/6			BROWN SANDY SILT (FILL)	1								9	VIS.
	2														
745.5															
745.0		10/11/11			BROWN SANDY SILT (FILL)	2	12	14	21	29	24	19	5	9	A-4a
	4														
742.5															
	6	6/10/7			BROWN SANDY SILT (FILL)	3								8	VIS.
	8														
740.0															
739.5		6/5/5			BROWN CLAYEY SILT (FILL)	4								16	VIS.
	10														
737.0															
	12	5/6/8			BROWN CLAYEY SILT (FILL)	5	15	17	13	23	32	39	18	15	A-6b
	14														
734.5		4/6/7			BROWN CLAYEY SILT (FILL)	6								13	VIS.
	16														
732.0		7/9/10			BROWN CLAYEY SILT (FILL)	7								8	VIS.
	18														
729.5															
728.5		5/6/5			BROWN SANDY SILT (FILL)	8A	11	9	22	32	26	20	6	12	A-4a
	20														
727.0					GRAY TO BROWN TO GREEN SILTY CLAY (FILL)	8B								17	VIS.
	22	7/7/7			GRAY TO BROWN TO GREEN SILTY CLAY (FILL)	9									VIS.
724.5															
724.0		7/10/14			GRAY TO BROWN SILTY CLAY (FILL)	10A	6	6	5	28	55	32	14	15	A-6a
	24				GRAY TO DARK BROWN SILTY CLAY (FILL)	10B								9	VIS.
	26														
722.0															
721.5		6/4/9			GRAY TO DARK BROWN SILTY CLAY (FILL)	11A 11B	3	11	18	28	40	43	22	17 22	VIS. A-7-6
	28														
720.0															
719.5		4/4/4			BROWN SILTY SAND	12	34	16	11	30	9	NP	NP	13	A-4a
	30														
716.0															
	32														
714.5															
	34	16/19/18			BROWN SANDY SILT TO SILTY SAND (TILL)	13								8	VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-1

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics									ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
713.0																
709.5	36	6/7/17			BROWN SANDY SILT TO SILTY SAND (TILL)	14										VIS.
	38															
	40															
	42															
704.5	44	9/12/13			BROWN SANDY SILT TO SILTY SAND (TILL)	15									18	VIS.
	46															
	48															
699.5	50	10/27/37			BROWN SANDY SILT TO SILTY SAND (TILL)	16										VIS.
	52															
	54															
694.5	56	12/17/16			BROWN SANDY SILT TO SILTY SAND (TILL)	17	19	13	23	28	17	17	3	9		A-4a
	58															
	60															
	62															
689.5	64	50-1"			BROWN SANDY SILT TO SILTY SAND (TILL)	18									9	VIS.
	66															
	68															
686.5	70	50-4"			GRAY GRAVEL	19										VIS.
684.5																
682.0																
680.0																
681.0	68	24/48/38			GRAY SAND AND GRAVEL	20	67	6	6	9	12	24	10	11		A-2-4
	69.5															
	70															

CTL OH DOT 04120056G WAR-75-3.40-05C (GP) CTL OH DOT 04120056G WAR-75-3.40-05C (GP) CTL OH DOT 04120056G WAR-75-3.40-05C (GP)

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-1

Elev. (ft)	Depth (ft)	Std. Pen./ ROD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT	
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	Class	
676.9																
676.0	72					72.0'										
674.5	74	28/28/30			GRAY SANDY SILT (TILL)	21										VIS.
	76															
	78															
669.5		18/30/44			GRAY SANDY SILT (TILL)	22								11		VIS.
668.0	80					80.0'										
BOTTOM OF BORING																

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 3/1/05 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 3/1/05 Casing: Length 60ft Dia. 3.25"

Water Elev. 697.5ft

Warren County, Ohio

Boring No. D-2 Station & Offset 433+51, 4.5' Lt.

Surface Elev. 725.5ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Physical Characteristics										ODOT Class	
						Sample No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
725.5	0				ASPHALT (4") CONCRETE OVER PORTLAND CEMENT CONCRETE (8")												
725.5 725.2 724.5	2	7/7/8			BROWN SANDY SILT (FILL)	1									8		VIS.
722.5	4	7/8/8			DARK GRAY AND BROWN SILT	2	2	16	10	48	24	32	11	9		A-6a	
720.5 720.0	6	3/4/5			BROWN SILTY SAND	3	26	37	11	8	18	51	32	22		A-2-7	
717.5 717.0	8	7/9/11			BROWN SANDY SILT TO SILTY SAND	4	15	16	31	24	14	19	4	12		A-4a	
714.5	10	17/19/20			BROWN SANDY SILT TO SILTY SAND	5	16	19	19	28	18	19	6	8		A-4a	
712.0	14	14/21/23			BROWN SANDY SILT TO SILTY SAND	6										VIS.	
709.5	16	11/18/24			BROWN SANDY SILT TO SILTY SAND	7								9		VIS.	
707.5 707.0	18	13/15/17			GRAY CLAY	8	1	8	3	26	62	36	18	16		A-6b	
702.5 702.0	24	15/25/32			BROWN SANDY SILT (TILL)	9									7		VIS.
697.5 697.0	28	10/17/21			GRAY SANDY SILT TO SILTY SAND (TILL)	10	18	14	23	20	25	17	4	8		A-4a	
692.0	34	20/24/30			GRAY SANDY SILT TO SILTY SAND (TILL)	11										VIS.	

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay = < 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-2

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
690.5															
	36														
687.0	38	25/32/37			GRAY SANDY SILT TO SILTY SAND (TILL)	12								7	VIS.
	40														
	42														
682.0	44	27/50-6"			GRAY SANDY SILT TO SILTY SAND (TILL)	13									VIS.
	46														
	48														
677.0	50	20/30/36			GRAY SANDY SILT TO SILTY SAND (TILL)	14								10	VIS.
	52														
672.0	54	50-3"			GRAY SANDY SILT TO SILTY SAND (TILL)	15								8	VIS.
	56														
	58														
667.0		20/24/27			GRAY SANDY SILT TO SILTY SAND (TILL)	16								11	VIS.
665.5	60					60.0'									

BOTTOM OF BORING

CHL ON D012 04120056G WAR-75-3 7248561 GPT 1 CHL ON D01 1000 7/7/03

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 1/14/05 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 1/14/05 Casing: Length 59.5ft Dia. 3.25"

Water Elev. 717.2ft

Warren County, Ohio

Boring No. D-3 Station & Offset 433+94, 3.5' Rt.

Surface Elev. 726.2ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Physical Characteristics											ODOT Class
						Sample No.	% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
726.2	0				PORTLAND CEMENT CONCRETE (12")												
726.2	1	2/3/7			BROWN SANDY SILT	1									14		VIS.
722.7	2																
722.7	4	2/3/4			BROWNISH GRAY SANDY SILT	2									18		VIS.
720.2	6	2/3/3			BROWNISH GRAY SANDY SILT	3	3	15	18	41	23	31	10	23			A-4a
718.2	8																
717.7	9	1/2/1			BROWNISH GRAY SILTY SAND AND GRAVEL	4	46	28	9	11	6	26	8	20			A-2-4
717.2	10																
715.2	11	11/12/16			BROWN GRAVEL	5									13		VIS.
714.7	12																
712.7	14	6/10/14			GRAY SANDY SILT (TILL)	6									14		VIS.
710.2	16	7/10/12			GRAY SANDY SILT (TILL)	7	19	16	14	30	21	20	6	11			A-4a
707.7	18	5/8/14			GRAY SANDY SILT (TILL)	8									14		VIS.
	20																
	22																
702.7	24	11/13/15			GRAY SANDY SILT (TILL)	9	11	12	9	44	24	20	4	17			A-4a
	26																
699.2	28																
697.7	30	2/25/50-14"			GRAY SILTY SAND AND GRAVEL	10									7		VIS.
	32																
692.7	34	25/21/10			GRAY SILTY SAND AND GRAVEL	11									9		VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

CIT OH D017 04120056G WAR-75-3.40 3.5' Rt. 04120056G 17798

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-3

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
691.2	36														
688.2	38														
687.7	40	50-6"			GRAY SILTY SAND AND GRAVEL	12	50	14	11	11	14	20	6	9	A-1-b
	42														
682.7	44	50-6"			GRAY SILTY SAND AND GRAVEL	13								8	VIS.
	46														
677.7	48	31/35/50-18"			GRAY SILTY SAND AND GRAVEL	14								12	VIS.
	50														
	52														
672.7	54	45/50-12"			GRAY SILTY SAND AND GRAVEL	15								10	VIS.
	56														
668.2	58														
667.7		21/50-12"													
666.7					GRAY SILTY CLAY (TILL)	16	20	16	8	18	38	30	13	16	A-6a

BOTTOM OF BORING

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 3/2/05 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 3/2/05 Casing: Length 60ft Dia. 3.25"

Water Elev. 712.0ft

Warren County, Ohio

Boring No. D-4 Station & Offset 434+34, 1.0' Rt.

Surface Elev. 725.5ft

Boring No.	Station & Offset	Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics										ODOT Class
									% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.			
TL OH DOT 04120056 WARS-75-0-324521 GP 101 OH DOT 301 17705		725.5	0				ASPHALT CONCRETE OVER PORTLAND CEMENT CONCRETE	1.2'											
		724.3					GRAVEL	2.0'											
		723.5	2	7/7/9			BROWN SAND AND GRAVEL, WOOD FRAGMENTS, COBBLES AND BOULDERS (FILL)	1	50	19	13	11	7	NP	NP	5	A-1-b		
		722.0	4	50-3"			BROWN SAND AND GRAVEL, WOOD FRAGMENTS, COBBLES AND BOULDERS (FILL)	2									VIS.		
		720.0	6	7/6/5			BROWN SAND AND GRAVEL, WOOD FRAGMENTS, COBBLES AND BOULDERS (FILL)	3									VIS.		
		717.0	8	4/5/5			BROWN SAND AND GRAVEL, WOOD FRAGMENTS, COBBLES AND BOULDERS (FILL)	4								21	VIS.		
		714.5	10	4/3/3			GRAY CLAYEY SILT (TILL)	5									11	VIS.	
		712.0	12	7/9/11			GRAY CLAYEY SILT (TILL)	6										VIS.	
		709.5	14	4/5/7			GRAY CLAYEY SILT (TILL)	7	3	5	13	41	38	22	8		A-4a		
		707.0	16	6/7/11			GRAY SILT	8	2	1	1	51	45	27	11		A-6a		
		702.0	18	27/11/12			GRAY SILT	9									18	VIS.	
		698.5	20				GRAY SANDY SILT TO SILTY SAND (TILL)	10	25	14	22	16	23	18	5	8		A-4a	
		697.0	22	12/17/21			GRAY SANDY SILT TO SILTY SAND (TILL)	11									7	VIS.	
		692.0	24	38/50-6"			GRAY SANDY SILT TO SILTY SAND (TILL)												

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay = < 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-4

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
690.5															
	36														
687.5	38														
687.0		17/19/24													
	40														
	42														
682.0		50-6"													
	44													4	VIS.
	46														
	48														
677.0		17/26/28												8	VIS.
	50														
	52														
672.0		16/18/21													
	54													9	A-2-4
	56														
	58														
667.0		17/18/24												11	VIS.
665.5	60														
BOTTOM OF BORING															

C:\OH DOT\2 04120056G\WAR-75-3.40-66G1.GPJ C:\OH DOT\DOT-17766

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 2/1/05 Sampler Type SS Dia. 1.375"

04120056G

Date Completed 2/1/05 Casing Length 75ft Dia. 3.25"

Water Elev. 712.6ft

Warren County, Ohio

Boring No. D-5 Station & Offset 435+10, 6.1' Lt.

Surface Elev. 743.6ft

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
743.6	0				TOPSOIL (7")										
743.6		4/9/12			BROWN SANDY SILT	1								8	VIS.
743.1	2														
740.6	4	7/7/8			BROWN SANDY SILT	2								11	VIS.
738.6					5.0'										
738.1	6	4/5/5			BROWN SILTY SAND AND GRAVEL	3	36	14	22	19	9	21	3	9	A-2-4
	8														
735.1		5/10/12			BROWN SILTY SAND AND GRAVEL	4								16	VIS.
	10														
732.6		6/13/20			BROWN SILTY SAND AND GRAVEL	5								9	VIS.
	12														
730.1		4/6/6			BROWN SILTY SAND AND GRAVEL	6								0	VIS.
	14														
728.1					15.5'										
727.6	16	5/7/6			DARK BROWN SILTY SAND AND GRAVEL	7								9	VIS.
	18														
725.1		4/5/10			DARK BROWN SILTY SAND AND GRAVEL	8	35	26	15	12	12	30	13	12	A-2-6
	20														
722.6		5/4/3			DARK BROWN SILTY SAND AND GRAVEL	9								15	VIS.
	22														
720.6					23.0'										
720.1	24	3/3/4			GRAY SILTY CLAY	10								22	VIS.
	26														
718.1		2/4/6			BROWN TO GRAY SILTY CLAY	11								12	VIS.
717.6	28														
715.1		5/8/10			BROWN TO GRAY SILTY CLAY	12	12	27	0	22	39	36	15	18	A-6a
	30														
712.1					31.5'										
	32														
710.1	34	9/10/13			BROWN SANDY SILT (TILL)	13								9	VIS.

Particle Sizes: Agg => 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay =< 0.005mm.

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-5

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics									ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.		
708.6																
705.1	36	6/8/10			BROWN SANDY SILT (TILL)	14	7	26	10	27	30	24	8	10	A-4a	
	38															
	40															
701.6	42	20/14/16			BROWNISH GRAY COARSE AND FINE SAND	15								11	VIS.	
700.1	44															
696.6	46															
695.1	48	10/23/32			BROWN SANDY SILT (TILL)	16								7	VIS.	
	50															
	691.6															52
690.1	54	28/42/50-5'			GRAY SANDY SILT (TILL)	17								10	VIS.	
	56															
	58															
685.1	60	33/33/35			GRAY SANDY SILT (TILL)	18								7	VIS.	
	62															
	680.1															64
675.1	66	44/40/37			GRAY SANDY SILT (TILL)	19								11	VIS.	
	68															
	70															
		26/27/35			GRAY SANDY SILT (TILL)	20								11	VIS.	

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. D-5

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
672.5															
	72														
670.1															
	74	20/23/31			GRAY SANDY SILT (TILL)	21								11	VIS.
668.6						75.0'									

BOTTOM OF BORING

LOG OF BORING

Project Identification: WAR-75-3.40

Date Started 1/28/05 Sampler: Type SS Dia. 1.375"

04120056G

Date Completed 1/31/05 Casing: Length 90ft Dia. 3.25"

Water Elev. 678.7ft

Warren County, Ohio

Surface Elev. 703.2ft

Clearcreek Bridge

Boring No. E-1 Station & Offset 20+22.48, 17.26' LT.

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
703.2	0														
703.2		3/5/7			BROWN SANDY SILT	1									VIS.
702.7	2														
700.2	4	10/8/8			BROWN SANDY SILT	2									VIS.
697.7	6	4/6/6			BROWN CLAYEY SILT	3	15	9	19	29	28	26	10		A-4a
695.2	8														
694.7	10	6/10/12			BROWN SANDY SILT WITH COBBLES	4								8	VIS.
692.2	12	20/17/14			BROWN SANDY SILT WITH COBBLES	5								9	VIS.
689.7	14	10/8/6			BROWN SANDY SILT	6									VIS.
687.2	16	3/3/4			BROWN SANDY SILT TO SILTY SAND	7	0	10	41	25	24	23	5	17	A-4a
684.7	18	4/4/5			BROWN SANDY SILT TO SILTY SAND	8									VIS.
682.2	20	3/4/5			GRAY CLAY AND SILT	9	0	0	0	30	70	37	18	22	A-6b
679.7	22														
679.7	24	4/4/22			GRAY CLAY AND SILT	10A								19	VIS.
678.7	26				BROWN SILTY SAND AND GRAVEL	10B								12	VIS.
677.2	28	15/15/17			BROWN SAND AND GRAVEL	11								6	VIS.
674.7	30	10/12/20			BROWN SAND AND GRAVEL	12	54	31	10	3	2	NP	NP	9	A-1-a
669.7	32														
668.7	34	5/3/4			GRAY CLAYEY SILT	13								18	VIS.

Particle Sizes: Agg >= 2.00mm, Coarse Sand = 2.00-0.42mm, Fine Sand = 0.42-0.074mm, Silt = 0.074-0.005mm, Clay <= 0.005mm.

04120056G

[illegible]

LOG OF BORING (Continued)

Project Identification: WAR-75-3.40

04120056G

Boring No. E-1

Elev. (ft)	Depth (ft)	Std. Pen./ RQD	Rec. (ft)	Loss (ft)	Description	Sample No.	Physical Characteristics								ODOT Class
							% Agg	% C.S.	% F.S.	% Silt	% Clay	L.L.	P.I.	W.C.	
632.1															
	72														
629.7		50-6"			GRAY SANDY SILT TO SILTY SAND (TILL)	21								7	VIS.
	74														
	76														
624.7		43/50-4"			GRAY SANDY SILT TO SILTY SAND (TILL)	22	16	28	21	18	17	16	3	8	A-2-4
	78														
	80														
	82														
619.7		50-3"			GRAY SANDY SILT TO SILTY SAND (TILL)	23								5	VIS.
	84														
617.2						86.0'									
	86														
614.7		36/48/50-5"			GRAY SAND AND GRAVEL	24								14	VIS.
	88														
613.2	90					90.0'									
BOTTOM OF BORING															