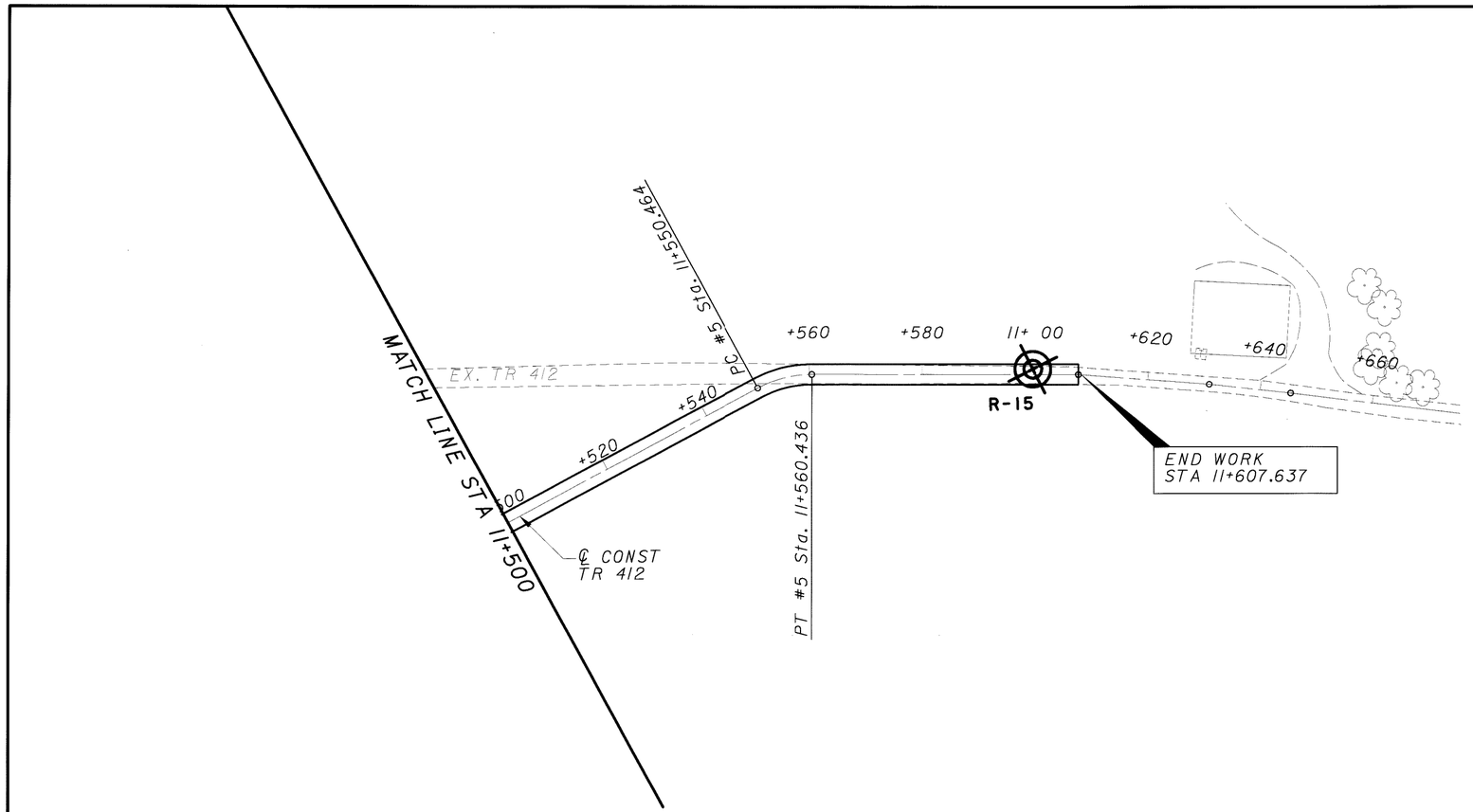

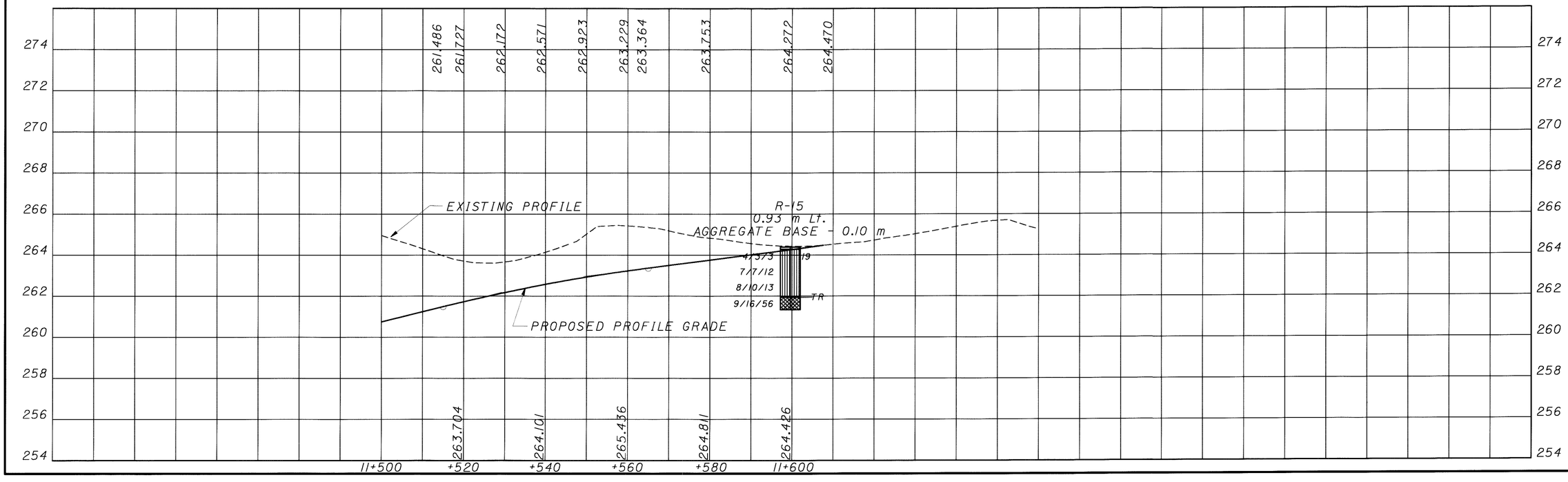

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0 20
1:500
HORIZONTAL
SCALE IN METERS

DRAWN BY RLS
CHECKED DAA

SOIL PROFILE
TR 412 STA 11+500 TO STA 11+607.637

ATH-33-40.981

101 / 132

799
949

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SOIL PROFILE
TR 243 STA 0+077.500 TO STA 0+162.000

ATH-33-40.981

HORIZONTAL SCALE IN METERS
1:500
0 20

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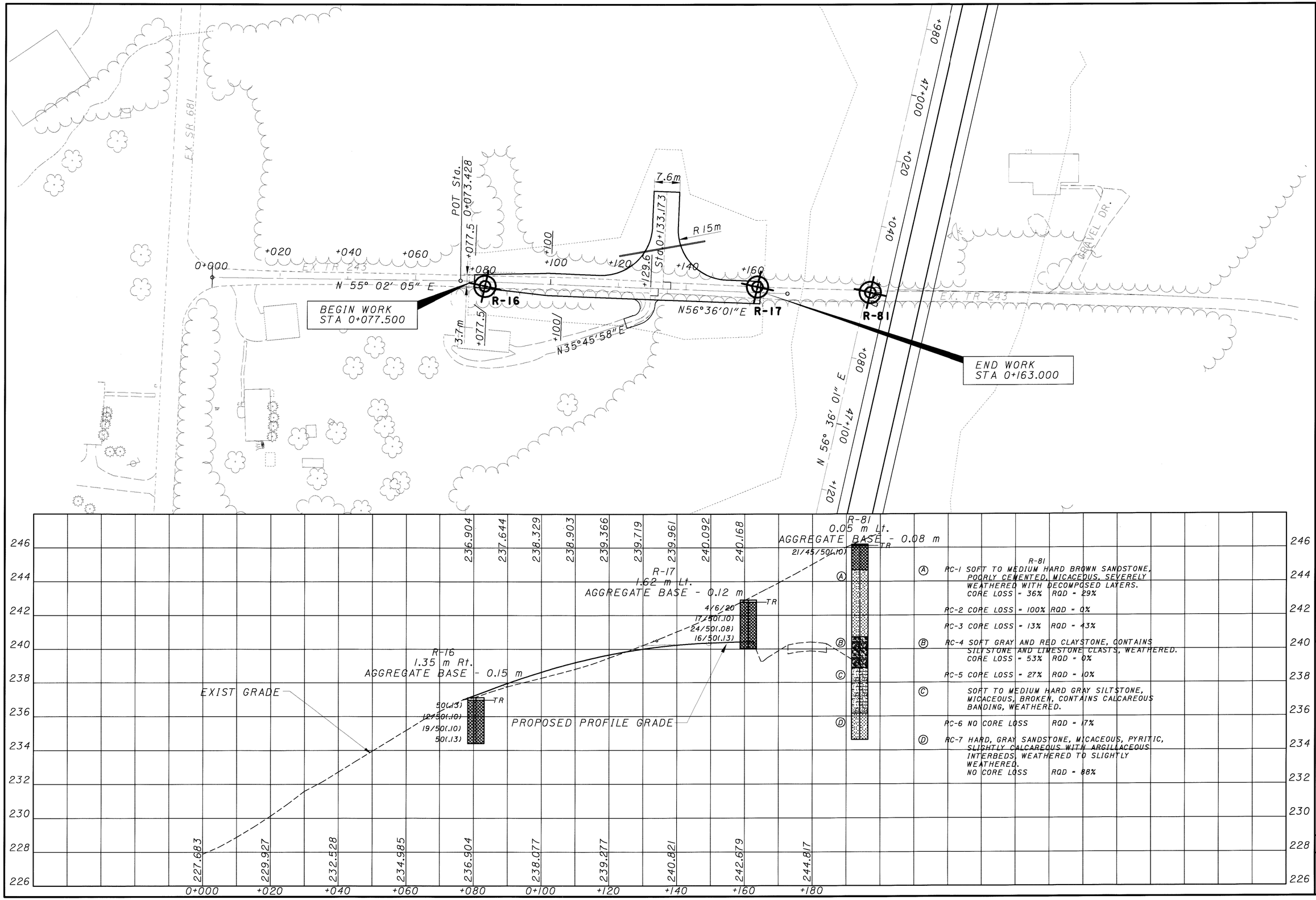
CHECKED DAA



R-81

Ⓐ RC-1 SOFT TO MEDIUM HARD BROWN SANDSTONE, POORLY CEMENTED, MICACEOUS, SEVERELY WEATHERED WITH DECOMPOSED LAYERS.
CORE LOSS - 36% RQD - 29%

RC-2 CORE LOSS - 100% RQD - 0%

RC-3 CORE LOSS - 13% RQD - 43%

Ⓑ RC-4 SOFT GRAY AND RED CLAYSTONE, CONTAINS SILTSTONE AND LIMESTONE CLASTS, WEATHERED.
CORE LOSS - 53% RQD - 0%

RC-5 CORE LOSS - 27% RQD - 10%

Ⓒ SOFT TO MEDIUM HARD GRAY SILTSTONE, MICACEOUS, BROKEN, CONTAINS CALCAREOUS BANDING, WEATHERED.

RC-6 NO CORE LOSS RQD - 17%

Ⓓ RC-7 HARD, GRAY SANDSTONE, MICACEOUS, PYRITIC, SLIGHTLY CALCAREOUS WITH ARGILLACEOUS INTERBEDS, WEATHERED TO SLIGHTLY WEATHERED.
NO CORE LOSS RQD - 88%

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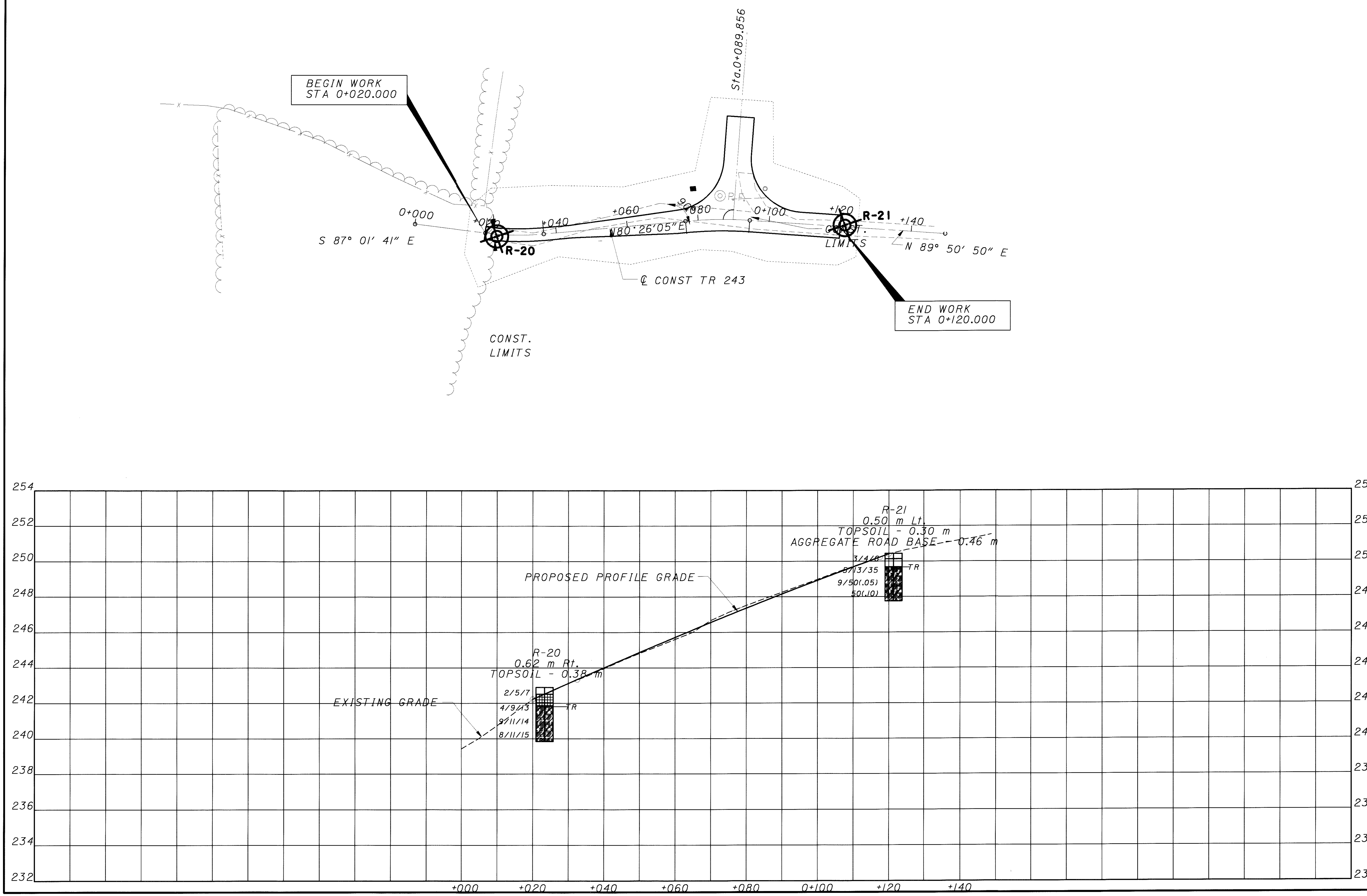

HORIZONTAL SCALE IN METERS 1:500

CALCULATED BBD

CHECKED TDW

TR 243 PLAN & PROFILE STA 0+020 TO STA 0+120

ATH-33-40.981

103/132

801/949

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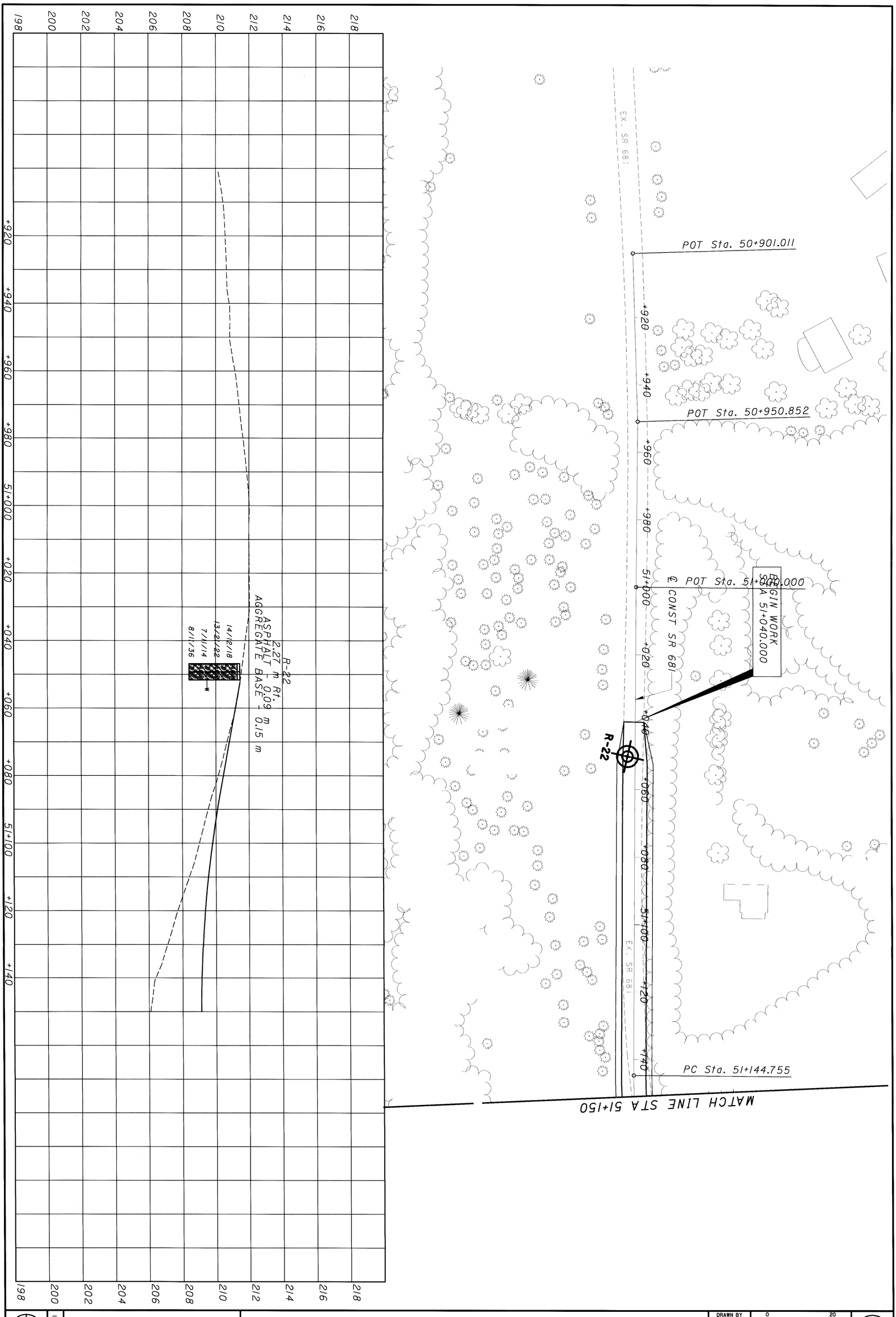


802 949	104/132	ATH-33-40.981	SOIL PROFILE - SR 681 (AT GRADE) STA 50+901.011 TO STA 51+150	DRAWN BY RLS / CHECKED DAA	0 20 1:500 HORIZONTAL SCALE IN METERS

SOIL PROFILE - SR 681 (AT GRADE)
STA 51+150 TO STA 51+400

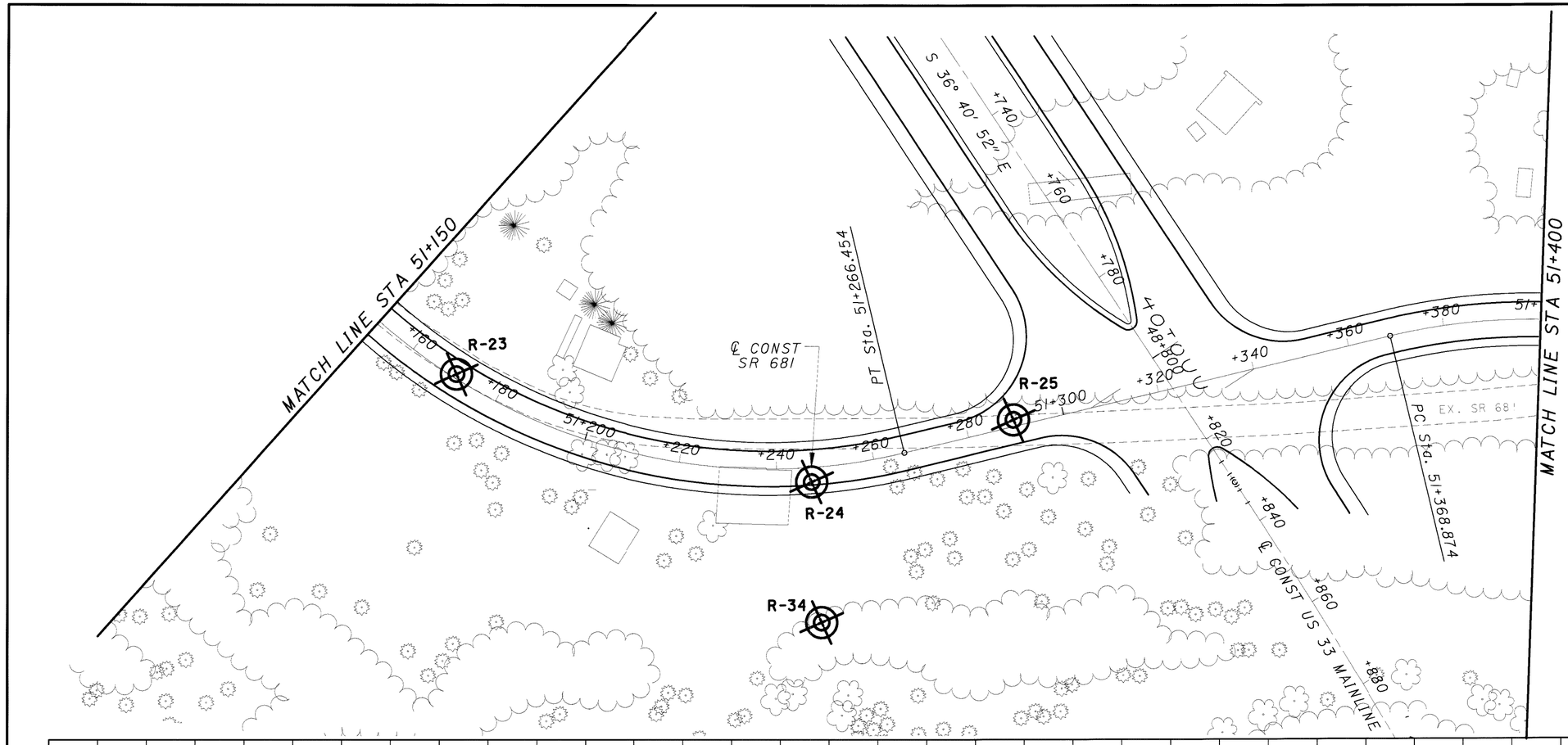
DRAWN BY RLS
CHECKED DAA

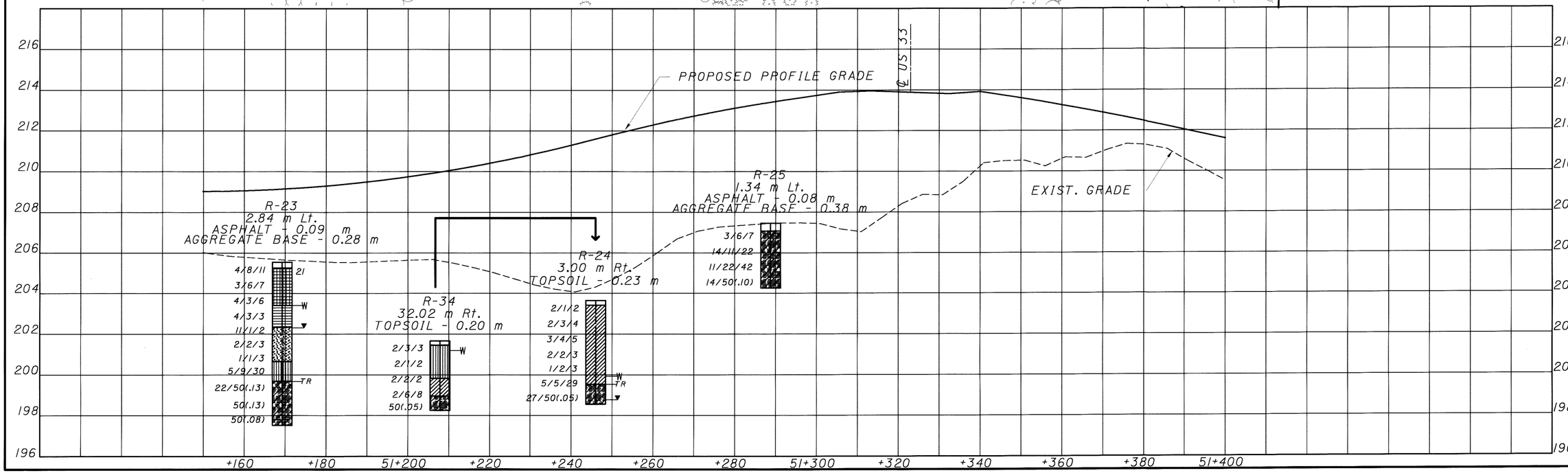
HORIZONTAL SCALE IN METERS
0 20
1:500

ATH-33-40.981

105/132

803/949





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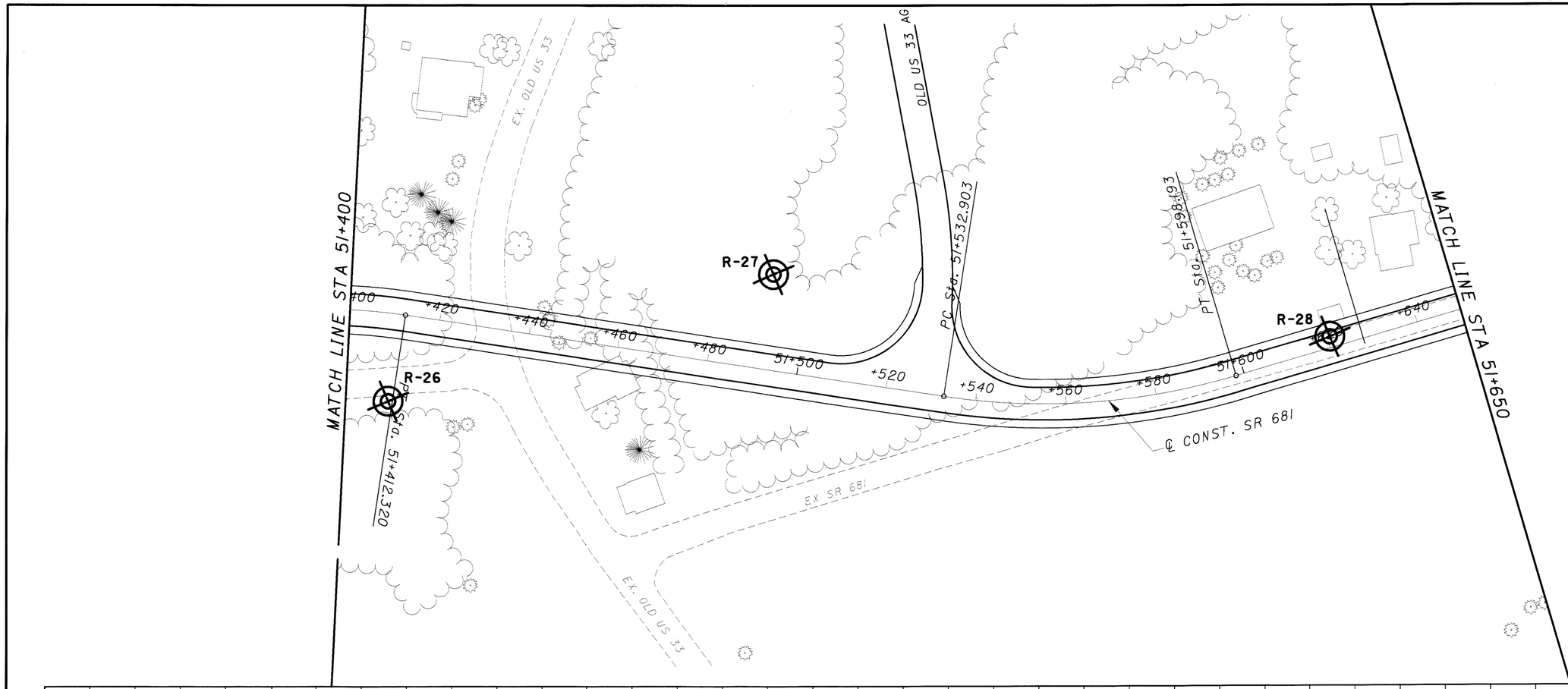

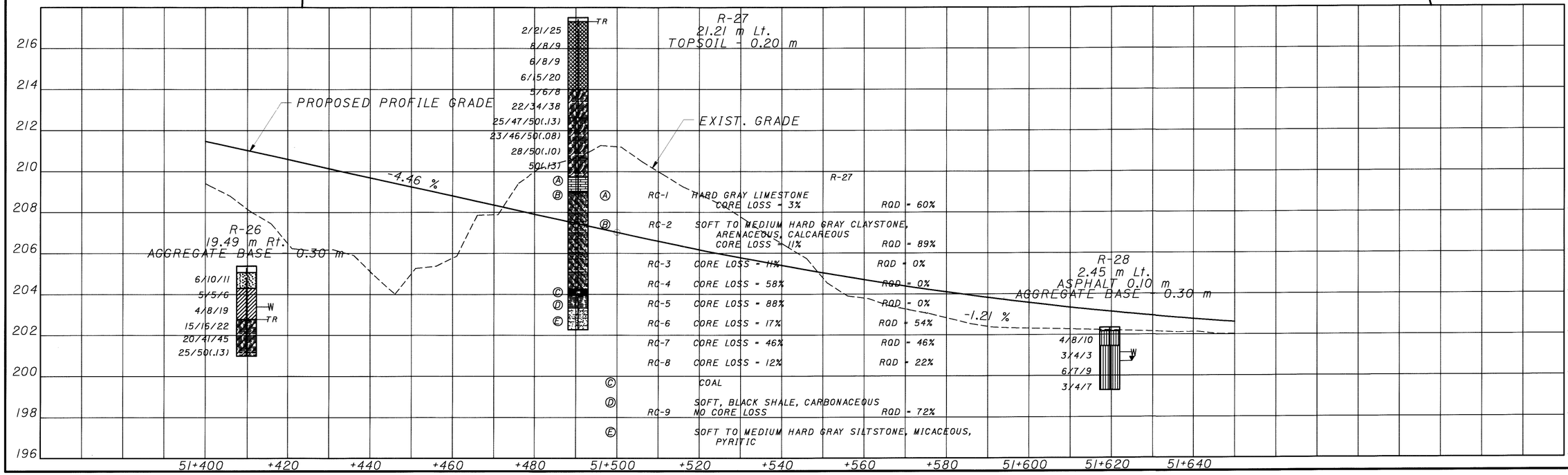

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N

0 20
1:500
HORIZONTAL
SCALE IN METERS

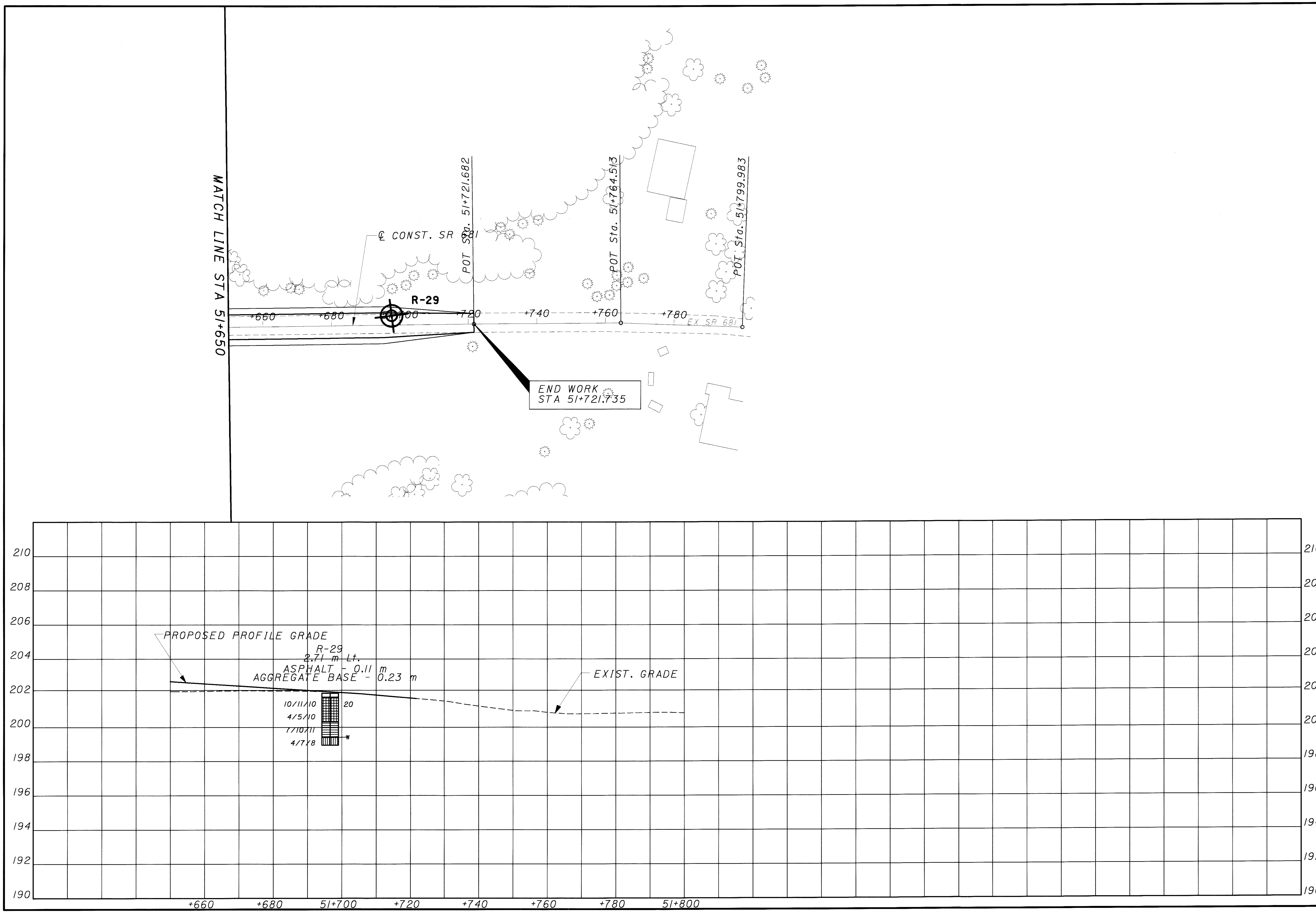
DRAWN BY RLS
CHECKED DAA

SOIL PROFILE - SR 681 (AT GRADE) STA 51+400 TO STA 51+650

ATH-33-40.981

106/132

804/949



SOIL PROFILE - SR 681 (AT GRADE)
STA 51+650 TO STA 51+799.983

1:500 HORIZONTAL SCALE IN METERS (0 – 20)

DRAWN BY RLS
CHECKED DAA

ATH-33-40.981

107/132

805/949

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EX. SR. 681

S 85° 59' 15" E

51+500

+460

+480

PC Sta. 47+018.212

R-27

PT Sta. 46+048.118

EX. US. 33

PC Sta. 46+143.840

PT Sta. 46+194.844

MATCH LINE STA 46+250

N26°25'

18m

+520

46+000

N 0°59'14"W

+020

+040

+060

+080

46+100

+120

+140

+160

+180

46+200

+220

+240

N 39° 37' 10" W

2.0m

1.8m

5.6m

STA 46+000.000 OLD US 33=
STA 51+530.076 SR 681 AG

BEGIN WORK
STA 46+000.000

+540

R18m

PC Sta. 51+532.903

R-30

WEST OLD US 33 N 15° 15' 59" W

1.8m

FIELD

CB-5

R-31A

+560

+580

2.2m

2.4m

PT Sta. 51+598.193

51+600

R-30
0.01 m Lt.
TOPSOIL - 0.15 m

R-27
36.29 m Lt.
TOPSOIL - .20 m

R-31a
13.05 m Rt.
TOPSOIL - 0.36

EXIST GRADE

PROPOSED PROFILE GRADE

8.30 %

R-27			
Ⓐ	RC-1	HARD GRAY LIMESTONE CORE LOSS - 3%	RQD - 50%
Ⓑ	RC-2	SOFT TO MEDIUM HARD GRAY CLAYSTONE, ARENACEOUS, CALCAREOUS CORE LOSS - 11%	RQD - 89%
	RC-3	CORE LOSS - 11%	RQD - 0%
	RC-4	CORE LOSS - 58%	RQD - 0%
	RC-5	CORE LOSS - 88%	RQD - 0%
	RC-6	CORE LOSS - 17%	RQD - 54%
	RC-7	CORE LOSS - 46%	RQD - 46%
	RC-8	CORE LOSS - 12%	RQD - 22%
Ⓒ		COAL	
Ⓓ		SOFT, BLACK SHALE, CARBONACEOUS	
	RC-9	NO CORE LOSS	RQD - 72%
Ⓔ		SOFT TO MEDIUM HARD GRAY SILTSTONE, MICACEOUS, PYRITIC	

R-30			
Ⓐ	RC-1	MEDIUM HARD GRAY SILTSTONE CORE LOSS - 13%	RQD - 88%
	RC-2	CORE LOSS - 2%	RQD - 36%
Ⓑ		COAL, INTERBEDDED WITH CARBONACEOUS SHALE	
Ⓒ		SOFT TO MEDIUM HARD GRAY SILTSTONE	
	RC-3	CORE LOSS - 27%	RQD - 0%
Ⓓ		MEDIUM HARD GRAY LIMESTONE, ARGILLACEOUS	
	RC-4	NO CORE LOSS	RQD - 100%
Ⓔ		SOFT TO MEDIUM HARD RED AND GRAY SILTSTONE, ARGILLACEOUS, PYRITIC	
	RC-5	CORE LOSS - 13%	RQD - 0%
	RC-6	CORE LOSS - 10%	RQD - 58%
	RC-7	NO CORE LOSS	RQD - 13%
Ⓕ		COAL	
Ⓖ		SOFT DARK GRAY CLAYSTONE, ARENACEOUS, CALCAREOUS	
	RC-8	NO CORE LOSS	RQD - 25%

224 222 220 218 216 214 212 210 208 206 204 202 200

46+000 +020 +040 +060 +080 46+100 +120 +140 +160 +180 46+200 +220 +240

N

0 10 20
1:500
HORIZONTAL
SCALE IN METERS

DRAWN BY RLS
CHECKED DAA

SOIL PROFILE
OLD US 33 (AT GRADE) STA 46+000 TO 46+250

ATH-33-40.981

108/132

806/949

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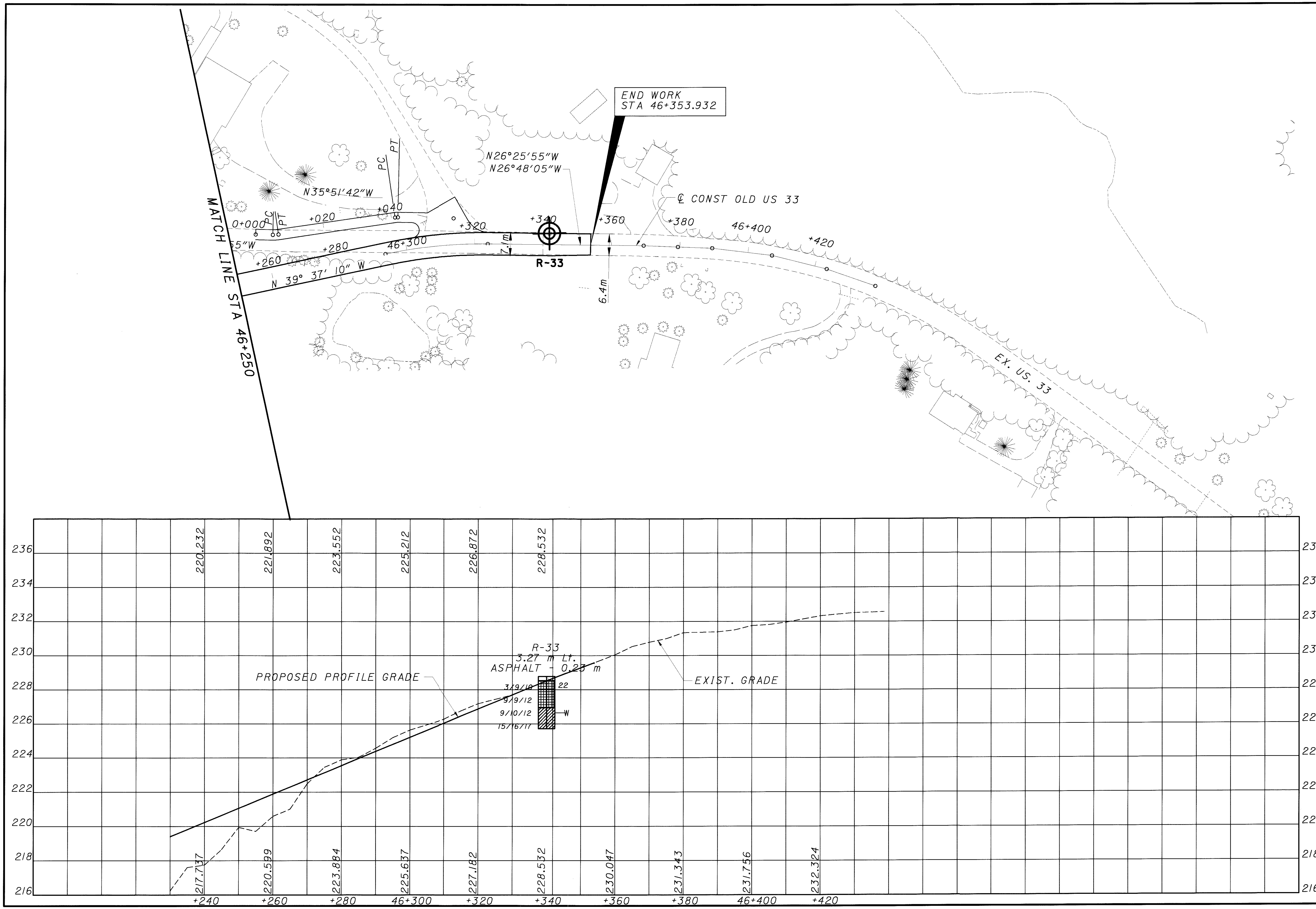
END WORK
STA 46+353.932
N26°25'55"W
N26°48'05"W
N35°51'42"W
℄ CONST OLD US 33
MATCH LINE STA 46+250
0+000
+020
+040
PC
PT
+260
+280
46+300
+320
+340
+360
+380
46+400
+420
N 39° 37' 10" W
7.m
6.4m
R-33
EX. US. 33
R-33
3.27 m Lt.
ASPHALT - 0.23 m
3/9/10
9/9/12
9/10/12
15/16/17
22
W
PROPOSED PROFILE GRADE
EXIST. GRADE
220.232
221.892
223.552
225.212
226.872
228.532
217.737
220.599
223.884
225.637
227.182
228.532
230.047
231.343
231.756
232.324
236
234
232
230
228
226
224
222
220
218
216
+240
+260
+280
46+300
+320
+340
+360
+380
46+400
+420

0 20
1:500
HORIZONTAL
SCALE IN METERS

DRAWN BY RLS
CHECKED DAA

SOIL PROFILE
OLD US 33 (AT GRADE) STA 46+250 TO 46+438

ATH-33-40.981

109/132

807/949

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SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL

CALCULATED DC

CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 39+636.470

ATH-33-40.981

110/132

808/949

268
264
260
256
252
248
244
240
236
232
228

2:1
10:1
2:1
6:1
252.916
255.402
39+636.470
305.402
2:1

SB-7
STA. 39+650.23
TOPSOIL-0.33 m
5/6/6/8
8/8/8
TR

SB-7

Ⓐ RC-1 HARD GRAY SANDSTONE, FINE GRAINED, MICACEOUS; SLIGHTLY WEATHERED.
CORE LOSS - 38% RQD - 42%

Ⓑ MEDIUM HARD BROWN SANDSTONE, FINE TO MEDIUM GRAINED, MICACEOUS; WEATHERED; FRIABLE.
RC-2 CORE LOSS - 5% RQD - 52%

Ⓒ HARD GRAY SANDSTONE, FINE GRAINED, MICACEOUS; SLIGHTLY WEATHERED.
RC-3 CORE LOSS - 12% RQD - 68%

Ⓓ HARD GRAY LIMESTONE, MODERATELY WEATHERED.
RC-4 CORE LOSS - 13% RQD - 35%

Ⓔ SOFT TO MEDIUM HARD BROWN SANDSTONE; FINE TO MEDIUM GRAINED, SEVERELY WEATHERED.
RC-5 CORE LOSS - 8% RQD - 20%
RC-6 CORE LOSS - 37% RQD - 28%
RC-7 CORE LOSS - 32% RQD - 25%

Ⓕ RC-8 SOFT TO MODERATELY HARD GRAY SANDSTONE, ARGILLACEOUS; WEATHERED; FRIABLE, SLIGHTLY CARBONACEOUS.
CORE LOSS - 38% RQD - 0%

Ⓖ RC-9 SOFT DARK GRAY SHALE, CARBONACEOUS.
CORE LOSS - 7% RQD - 55%

Ⓗ HARD GRAY SANDSTONE, FINE TO MEDIUM GRAINED, SLIGHTLY WEATHERED.

Ⓘ MEDIUM HARD DARK GRAY SANDSTONE, SILTY AND ARGILLACEOUS; SEVERELY WEATHERED.

R-40
STA. 39+634.71
TOPSOIL-0.36 m
1/2/3
9/6/6
6/4/6
7/8/8
4/9/12
7/28/50(.05)
18/15/26

R-41
STA. 39+635.00
TOPSOIL-0.38 m
1/2/3 18
2/2/3
4/2/2 26
2/3/4
2/8/13
13/16/50(.13)
28/35/34
19/33/51

64 60 56 52 48 44 40 36 32 28 24 20 16 12 8 4 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64

SHEET TOTAL ℄ SHEET TOTAL

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SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
		16951	0
		886	0
		16601	0

CALCULATED DC

CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 40+020.000

ATH-33-40.981

111 / 132

809 / 949

B-82
STA 40+027.36
TOPSOIL-0.1 m

3/3/3 22
3/3/6 18
4/14/21 14
14/21/30 14
14/25/28 12 TR
18/42/40 12
9/24/36
39/50(.10)
RC-1
RC-2
RC-3
RC-4
RC-5
RC-6
RC-7
RC-8
RC-9

B-42
STA 40+029.13
TOPSOIL-0.20 m

2/3/4
6/13/13
16/35/25
16/16/13
12/18/28
12/32/50(.05) TR

R/W

2:1 10:1 2:1 6:1 250.300

300 mm TYPE C

6:1 2:1 10:1 1/2:1 250.642

6:1 2:1 10:1 1/2:1 250.620

251.567
40+020.000
265.865

B-82

RC-1 SANDSTONE; BROWN, MEDIUM HARD, SLIGHTLY BROKEN, SLIGHTLY JOINTED, MEDIUM GRAINED, CALCAREOUS, MODERATELY WEATHERED.
CORE LOSS - 4% ROD - 34%

SANDSTONE, GRAY, MEDIUM TO MODERATELY HARD, MASSIVE, FINE GRAINED, MICACEOUS.

RC-2 SHALE; GRAY, VERY SOFT TO SOFT, HIGHLY BROKEN, HIGHLY JOINTED, ARENACEOUS, FISSILE.
CORE LOSS - 3% ROD - 8%

SANDSTONE, GRAY, MEDIUM TO MODERATELY HARD, SLIGHTLY BROKEN, SLIGHTLY JOINTED, MICACEOUS.

SHALE, GRAY, VERY SOFT TO SOFT, HIGHLY BROKEN, HIGHLY JOINTED, ARENACEOUS, FISSILE.

MUDSTONE, GRAY, SOFT TO VERY SOFT, HIGHLY BROKEN, HIGHLY JOINTED, SILTY.

RC-3 SILTSTONE; GRAY, SOFT, MASSIVE.
CORE LOSS - 17% ROD - 66%

RC-4 SANDSTONE, BROWN, MEDIUM TO MODERATELY HARD, MASSIVE, COARSE GRAINED.
NO CORE LOSS ROD - 92%

RC-5 NO CORE LOSS ROD - 97%

RC-6 NO CORE LOSS ROD - 82%

RC-7 SANDSTONE, GRAY, MODERATELY HARD, SLIGHTLY BROKEN TO MASSIVE, SLIGHTLY JOINTED, COARSE GRAINED, CROSS-BEDDED, CARBONACEOUS, MICACEOUS.
NO CORE LOSS ROD - 44%

RC-8 CORE LOSS - 14% ROD - 50%

SHALE, BLACK, SOFT, HIGHLY BROKEN, FISSILE, SLICKENSIDED, CARBONACEOUS, FOSSILIFEROUS.

SANDSTONE, GRAY, MODERATELY HARD, SLIGHTLY BROKEN, SLIGHTLY JOINTED, CARBONACEOUS, LAMINATED, MICACEOUS.

RC-9 MUDSTONE, GRAY, SOFT TO VERY SOFT, HIGHLY BROKEN, HIGHLY JOINTED, FISSILE, CARBONACEOUS, LAMINATED SPARSELY FOSSILIFEROUS.
CORE LOSS - 11% ROD - 15%

R-42

Ⓐ RC-1 HARD GRAY LIMESTONE; WEATHERED TO MODERATELY WEATHERED, CONTAINS MICACEOUS ARENACEOUS LAMINAE.
CORE LOSS - 13% ROD - 87%
RC-2 CORE LOSS - 10% ROD - 68%

Ⓑ HARD GRAY SANDSTONE; WEATHERED; CONTAINS LIMESTONE CLASTS.
RC-3 NO CORE LOSS ROD - 20%

Ⓒ HARD GRAY SILTSTONE, MICACEOUS; WEATHERED.

Ⓓ SOFT GRAY CLAYSTONE; SEVERELY WEATHERED.

Ⓔ HARD GRAY LIMESTONE, ARGILLACEOUS; WEATHERED; PYRITIC.
RC-4 NO CORE LOSS ROD - 88%

Ⓕ HARD BROWN SANDSTONE, ARGILLACEOUS; WEATHERED; CONTAINS CLAY LAMINAE.

Ⓖ HARD GRAY LIMESTONE; WEATHERED.

Ⓗ VERY SOFT BROWN CLAYSTONE, MICACEOUS; SEVERELY WEATHERED.

Ⓘ RC-5 MEDIUM HARD BROWN SANDSTONE; MODERATELY WEATHERED.
NO CORE LOSS ROD - 85%

Ⓙ HARD GRAY LIMESTONE; BROWN LAMINATIONS; SLIGHTLY WEATHERED.

Ⓚ RC-6 MEDIUM HARD TO SOFT BROWN SANDSTONE, MICACEOUS; LAMINATED; SEVERELY WEATHERED; VERY BROKEN.
CORE LOSS - 3% ROD - 0%
RC-7 CORE LOSS - 15% ROD - 22%
RC-8 NO CORE LOSS ROD - 15%
RC-9 CORE LOSS - 15% ROD - 7%

268 264 260 256 252 248 244 240 236

64 60 56 52 48 44 40 36 32 28 24 20 16 12 8 4 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64

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SHEET TOTAL

SHEET TOTAL

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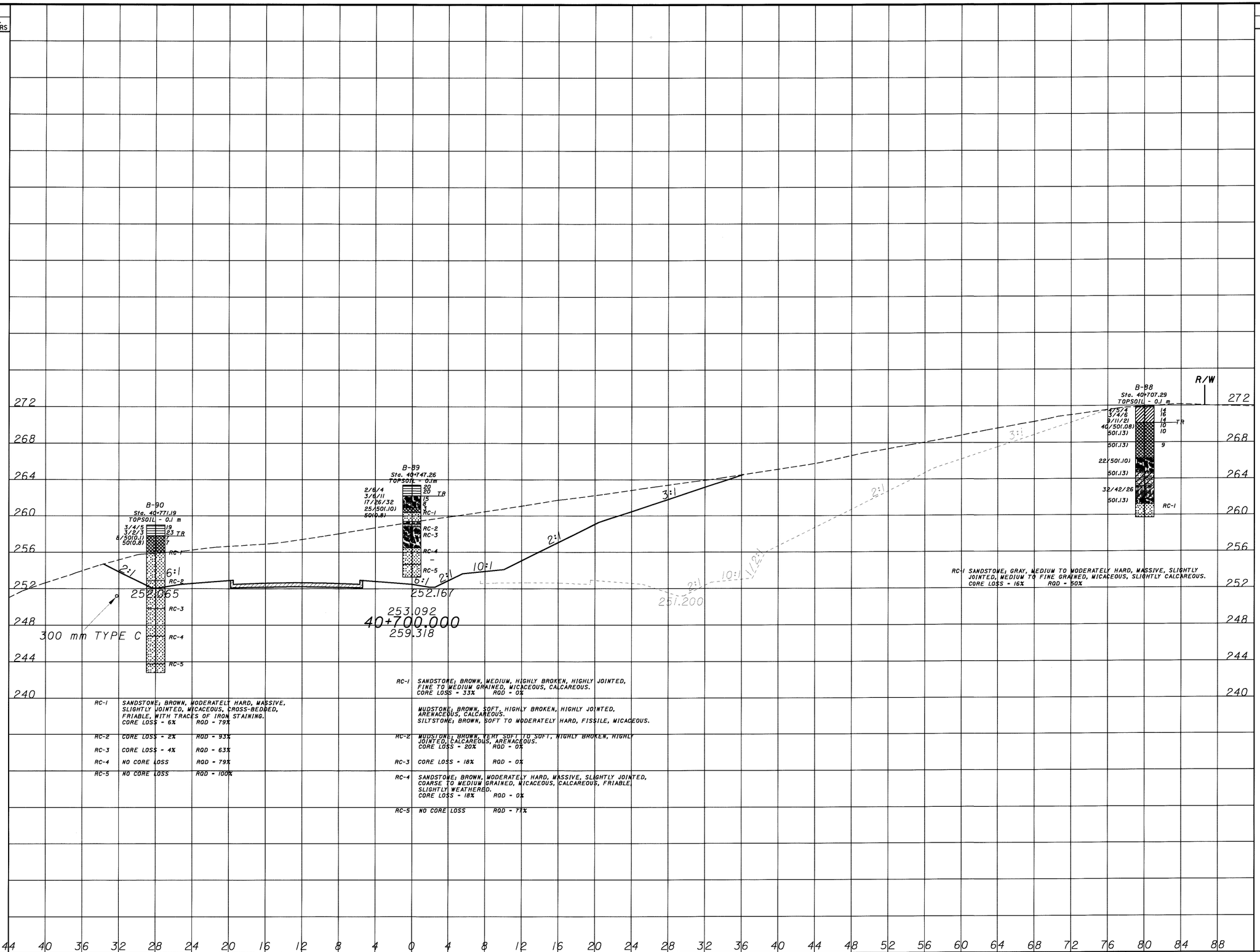
SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
		7506	0
		279	0
		3716	100

CALCULATED DC

CHECKED DAA



RC-1 SANDSTONE; GRAY, MEDIUM TO MODERATELY HARD, MASSIVE, SLIGHTLY JOINTED, MEDIUM TO FINE GRAINED, MICACEOUS, SLIGHTLY CALCAREOUS.
CORE LOSS - 16% ROD - 50%

RC-1 SANDSTONE; BROWN, MEDIUM, HIGHLY BROKEN, HIGHLY JOINTED, FINE TO MEDIUM GRAINED, MICACEOUS, CALCAREOUS.
CORE LOSS - 33% ROD - 0%

MUDSTONE; BROWN, SOFT, HIGHLY BROKEN, HIGHLY JOINTED, ARENACEOUS, CALCAREOUS.
SILTSTONE; BROWN, SOFT TO MODERATELY HARD, FISSILE, MICACEOUS.

RC-2 MUDSTONE; BROWN, VERY SOFT TO SOFT, HIGHLY BROKEN, HIGHLY JOINTED, CALCAREOUS, ARENACEOUS.
CORE LOSS - 20% ROD - 0%

RC-3 CORE LOSS - 18% ROD - 0%

RC-4 SANDSTONE; BROWN, MODERATELY HARD, MASSIVE, SLIGHTLY JOINTED, COARSE TO MEDIUM GRAINED, MICACEOUS, CALCAREOUS, FRIABLE, SLIGHTLY WEATHERED.
CORE LOSS - 18% ROD - 0%

RC-5 NO CORE LOSS ROD - 77%

RC-1 SANDSTONE; BROWN, MODERATELY HARD, MASSIVE, SLIGHTLY JOINTED, MICACEOUS, CROSS-BEDDED, FRIABLE, WITH TRACES OF IRON STAINING.
CORE LOSS - 6% ROD - 79%

RC-2 CORE LOSS - 2% ROD - 93%

RC-3 CORE LOSS - 4% ROD - 63%

RC-4 NO CORE LOSS ROD - 79%

RC-5 NO CORE LOSS ROD - 100%

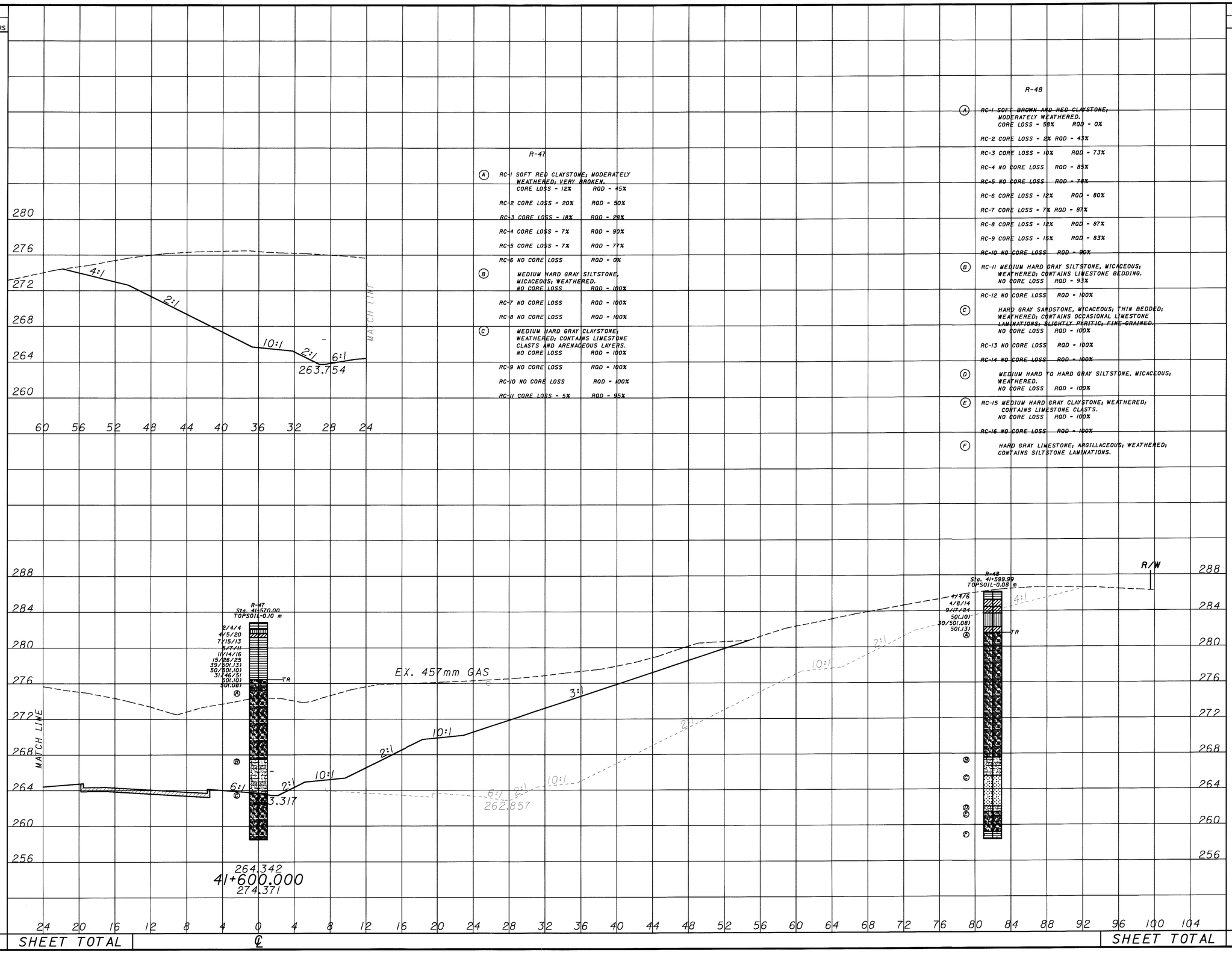
SHEET TOTAL

SHEET TOTAL

SOIL PROFILE
CROSS SECTION - US 33 STA. 40+700.000

ATH-33-40.981

SEEDING	
END WIDTH	SQ. METERS



R-47

(A) RC-1 SOFT RED CLAYSTONE; MODERATELY WEATHERED; VERY BROKEN.
CORE LOSS - 12% RQD - 45%
RC-2 CORE LOSS - 20% RQD - 50%
RC-3 CORE LOSS - 18% RQD - 28%
RC-4 CORE LOSS - 7% RQD - 90%
RC-5 CORE LOSS - 7% RQD - 77%
RC-6 NO CORE LOSS RQD - 0%

(B) MEDIUM HARD GRAY SILTSTONE, MICACEOUS; WEATHERED.
NO CORE LOSS RQD - 100%
RC-7 NO CORE LOSS RQD - 100%
RC-8 NO CORE LOSS RQD - 100%

(C) MEDIUM HARD GRAY CLAYSTONE; WEATHERED; CONTAINS LIMESTONE CLASTS AND ARENACEOUS LAYERS.
NO CORE LOSS RQD - 100%
RC-9 NO CORE LOSS RQD - 100%
RC-10 NO CORE LOSS RQD - 100%
RC-11 CORE LOSS - 5% RQD - 95%

R-48

(A) RC-1 SOFT BROWN AND RED CLAYSTONE; MODERATELY WEATHERED.
CORE LOSS - 59% RQD - 0%
RC-2 CORE LOSS - 2% RQD - 43%
RC-3 CORE LOSS - 10% RQD - 73%
RC-4 NO CORE LOSS RQD - 85%
RC-5 NO CORE LOSS RQD - 74%
RC-6 CORE LOSS - 12% RQD - 80%
RC-7 CORE LOSS - 7% RQD - 87%
RC-8 CORE LOSS - 12% RQD - 87%
RC-9 CORE LOSS - 15% RQD - 83%
RC-10 NO CORE LOSS RQD - 90%

(B) RC-11 MEDIUM HARD GRAY SILTSTONE, MICACEOUS; WEATHERED; CONTAINS LIMESTONE BEDDING.
NO CORE LOSS RQD - 93%
RC-12 NO CORE LOSS RQD - 100%

(C) HARD GRAY SANDSTONE, MICACEOUS; THIN BEDDED; WEATHERED; CONTAINS OCCASIONAL LIMESTONE LAMINATIONS; SLIGHTLY PYRITIC; FINE-GRAINED.
NO CORE LOSS RQD - 100%
RC-13 NO CORE LOSS RQD - 100%
RC-14 NO CORE LOSS RQD - 100%

(D) MEDIUM HARD TO HARD GRAY SILTSTONE, MICACEOUS; WEATHERED.
NO CORE LOSS RQD - 100%

(E) RC-15 MEDIUM HARD GRAY CLAYSTONE; WEATHERED; CONTAINS LIMESTONE CLASTS.
NO CORE LOSS RQD - 100%
RC-16 NO CORE LOSS RQD - 100%

(F) HARD GRAY LIMESTONE; ARGILLACEOUS; WEATHERED; CONTAINS SILTSTONE LAMINATIONS.

END AREA		VOLUME	
CUT	FILL	CUT	FILL
		699	0
		19346	0

CALCULATED DC
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 41+600.000

ATH-33-40.981

113/132

811/949

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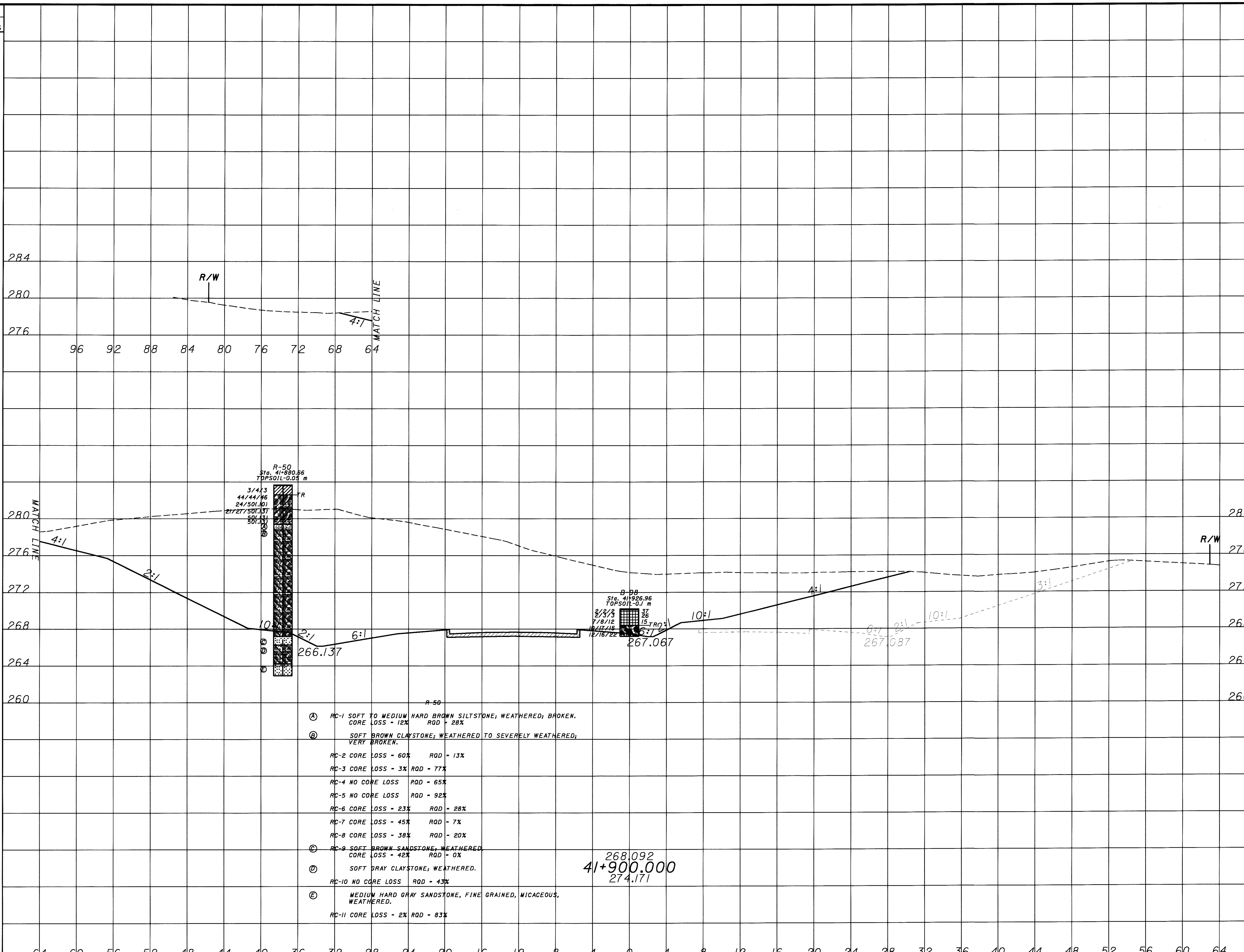
SEEDING	
END WIDTH	SQ. METERS



SHEET TOTAL | SHEET TOTAL

END AREA		VOLUME	
CUT	FILL	CUT	FILL
687	0		
		17784	0
		24643	0

CALCULATED DC | CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 41+900.000

ATH-33-40.981

114/132

812/949

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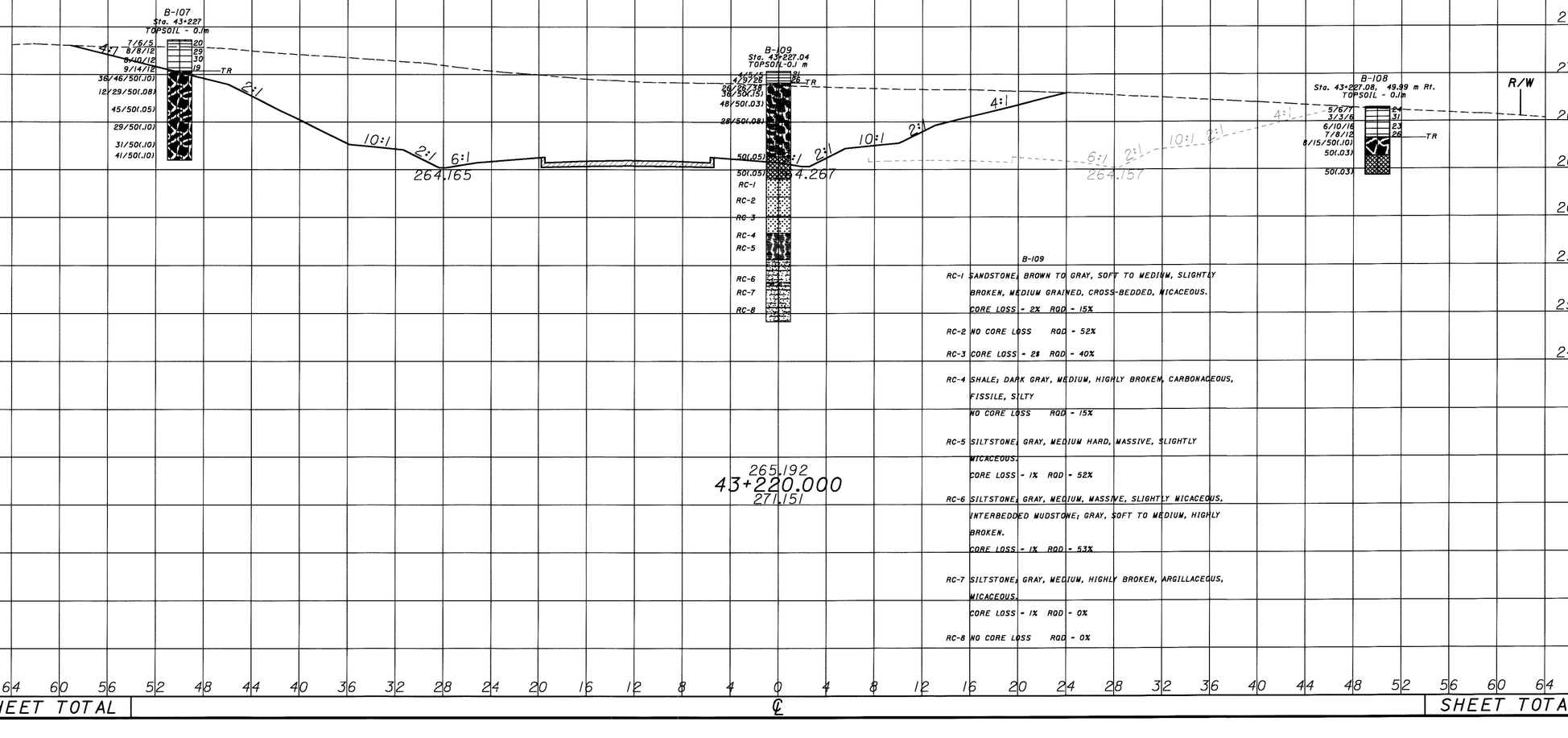
SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
394	0		
5586	0		

CALCULATED DC

CHECKED DAA



B-109

RC-1 SANDSTONE, BROWN TO GRAY, SOFT TO MEDIUM, SLIGHTLY BROKEN, MEDIUM GRAINED, CROSS-BEDDED, MICACEOUS.
CORE LOSS - 2% RQD - 15%

RC-2 NO CORE LOSS RQD - 52%

RC-3 CORE LOSS - 2% RQD - 40%

RC-4 SHALE; DARK GRAY, MEDIUM, HIGHLY BROKEN, CARBONACEOUS, FISSILE, SILTY
NO CORE LOSS RQD - 15%

RC-5 SILTSTONE, GRAY, MEDIUM HARD, MASSIVE, SLIGHTLY MICACEOUS.
CORE LOSS - 1% RQD - 52%

RC-6 SILTSTONE, GRAY, MEDIUM, MASSIVE, SLIGHTLY MICACEOUS, INTERBEDDED MUDSTONE; GRAY, SOFT TO MEDIUM, HIGHLY BROKEN.
CORE LOSS - 1% RQD - 53%

RC-7 SILTSTONE, GRAY, MEDIUM, HIGHLY BROKEN, ARGILLACEOUS, MICACEOUS.
CORE LOSS - 1% RQD - 0%

RC-8 NO CORE LOSS RQD - 0%

SOIL PROFILE
CROSS SECTION - US 33 STA. 43+220.000

ATH-33-40.981

SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL

CALCULATED RLS

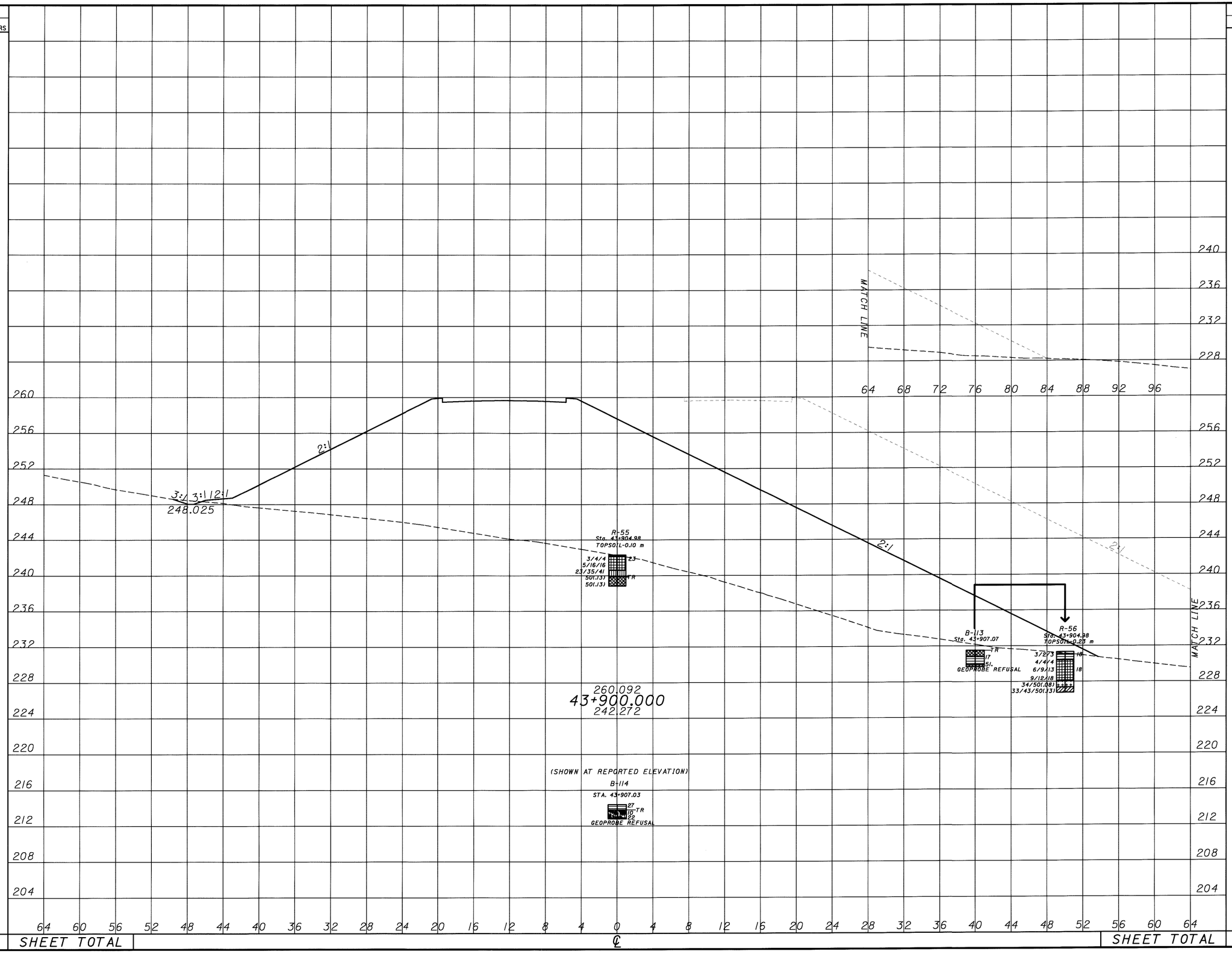
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 43+900.000

ATH-33-40.981

116/132

814/949



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		10	22603

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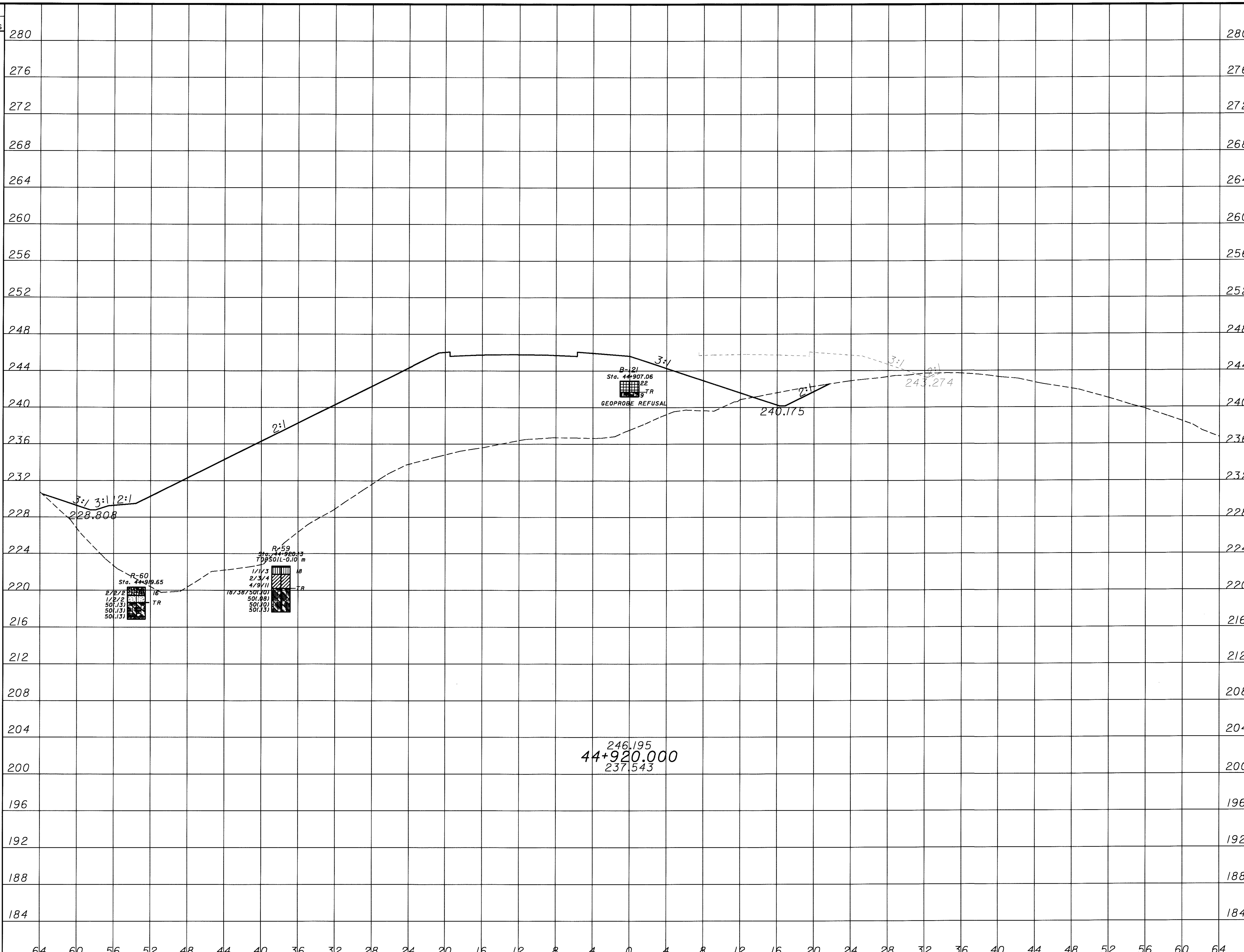
SEEDING	
END WIDTH	SQ. METERS



SHEET TOTAL ℄ SHEET TOTAL

END AREA		VOLUME	
CUT	FILL	CUT	FILL
7	666		
		86	9274
2	261		
		1302	2615

CALCULATED RLS
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 44+920.000

ATH-33-40.981

117/132

815/949

SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
223	0		
205	21		
		4275	210
		3181	1481

CALCULATED JLS

CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 45+040.000

ATH-33-40.981

118/132

816/949

R-62
Sta. 45+040.16
TOPSOIL-0.08 m
35/50(.08)
50(.10)
50(.08)
TR

R-61
Sta. 45+039.80
TOPSOIL-0.05 m
2/4/4
8/13/17
15/30/35
20/38/50(.08)
50(.13)
50(.13)
TR

R-63
Sta. 45+019.99, 35.99 m Rt.
TOPSOIL-0.05 m
6/6/8
11/17/22
50(.08)
50(.10)
TR

2:1
10:1
2:1
6:1
3:1
15:1
2:1

R-62

(A) RC-1 SOFT BROWN SANDSTONE, MICACEOUS; MODERATELY WEATHERED; SLIGHTLY BROKEN TO MASSIVE.
CORE LOSS = 17% RQD = 67%
RC-2 CORE LOSS = 18 RQD = 80%
RC-3 CORE LOSS = 10% RQD = 38%

(B) VERY SOFT GRAY CLAYSTONE; WEATHERED, SLIGHTLY BROKEN; OCCASIONALLY CALCAREOUS IN SMALL BANDS.
RC-4 NO CORE LOSS RQD = 40%
RC-5 CORE LOSS = 25% RQD = 27%

(C) SOFT GRAY SILTSTONE, MICACEOUS; WEATHERED; BROKEN-SLIGHTLY BROKEN.
RC-6 CORE LOSS =57% RQD = 0%

(D) SOFT REDDISH BROWN CLAYSTONE; SEVERELY WEATHERED; VERY BROKEN.
RC-7 NO CORE LOSS RQD = 77%

(E) MEDIUM HARD GRAY LIMESTONE; WEATHERED; SLIGHTLY BROKEN.

(F) MEDIUM HARD GRAY SILTSTONE, MICACEOUS, LAMINATED, WEATHERED, SLIGHTLY BROKEN.
RC-8 CORE LOSS = 27% RQD = 10%

(G) SOFT REDDISH BROWN CLAYSTONE, CALCAREOUS; SEVERELY WEATHERED; VERY BROKEN; CONTAINS COARSE SAND AND GRAVEL CLASTS.
RC-9 CORE LOSS = 38% RQD = 0%
RC-10 CORE LOSS = 80% RQD = 7%
RC-11 CORE LOSS = 36% RQD = 17%

R-61

(A) RC-1 SOFT RED, GRAY, AND BROWN CLAYSTONE, MICACEOUS, SEVERELY WEATHERED, ARENACEOUS, CONTAINS LIMESTONE, SILTSTONE, AND SANDSTONE CLASTS.
CORE LOSS = 21% RQD = 25%
RC-2 CORE LOSS = 62% RQD = 12%
RC-3 CORE LOSS = 50% RQD = 0%
RC-4 CORE LOSS = 68% RQD = 0%

242.235
45+040.000
239.935

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SHEET TOTAL

SHEET TOTAL

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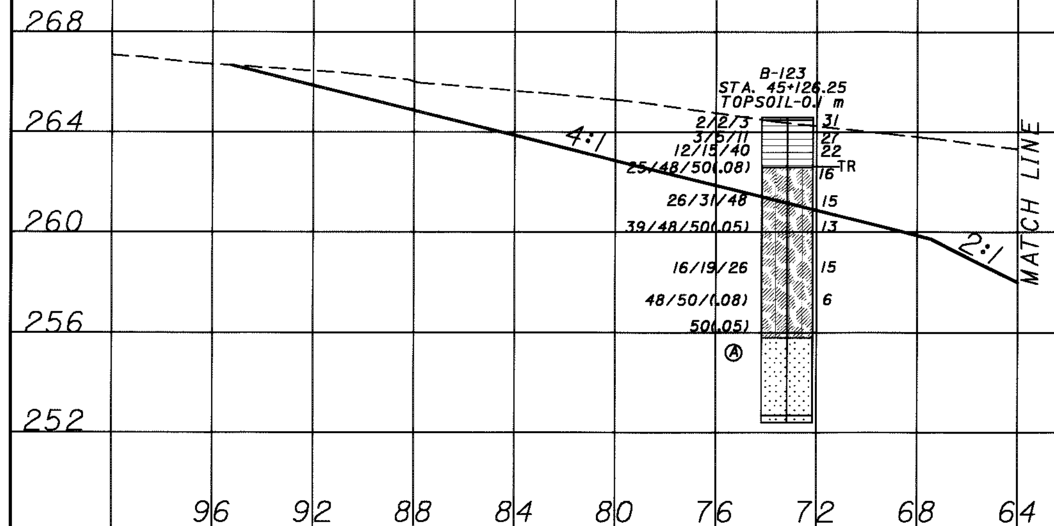
SEEDING	
END WIDTH	SQ. METERS



B-123

Ⓐ RC-1 SANDSTONE; GRAY, MEDIUM, MASSIVE, FINE GRAINED, MICACEOUS, SLIGHTLY WEATHERED.
CORE LOSS = 5% RQD = 63%

RC-2 NO CORE LOSS RQD = 100%

B-125

Ⓐ RC-1 SANDSTONE; BROWN, SOFT TO MEDIUM HARD, HIGHLY BROKEN, FINE TO MEDIUM GRAINED, SILTY, FRIABLE, MICACEOUS.
CORE LOSS = 5% RQD = 0%

Ⓑ RC-2 CLAYSHALE; BROWN, SOFT, HIGHLY BROKEN, SILTY.
CORE LOSS = 39% RQD = 0%

Ⓒ MUDSTONE; GREENISH GRAY, VERY SOFT TO SOFT, HIGHLY BROKEN, NON-BEDDED, SLIGHTY JOINTED.

Ⓓ RC-3 SILTSTONE; GRAY, MEDIUM HARD, HIGHLY BROKEN, ARGILLACEOUS, CROSS-BEDDED, PYRITIC.
NO CORE LOSS RQD = 0%

B-124

Ⓐ RC-1 SHALE; BROWN, SOFT, HIGHLY BROKEN, MICACEOUS, SILTY.

SANDSTONE; BROWN AND GRAY, MEDIUM HARD, HIGHLY BROKEN, FINE GRAINED, MICACEOUS, SLIGHTLY WEATHERED.
NO CORE LOSS RQD = 18%

RC-2 CORE LOSS = 3% RQD = 20%

Ⓑ RC-3 MUDSTONE; GRAY, VERY SOFT TO SOFT, HIGHLY BROKEN, NON-BEDDED, SILTY, WITH GRAY CLAY SEAMS UP TO 10 CM THICK.
CORE LOSS = 4% RQD = 16%

Ⓒ SILTSTONE; GRAY, MEDIUM, MICACEOUS, SLIGHTLY BROKEN.

Ⓓ RC-4 SANDSTONE; GRAY, MEDIUM, MASSIVE, FINE GRAINED, CROSS-BEDDED, MICACEOUS.
NO CORE LOSS RQD = 41%

Ⓔ RC-5 MUDSTONE; VARIEGATED GRAY, RED, AND PURPLE, VERY SOFT TO SOFT, HIGHLY BROKEN, NON-BEDDED, SLIGHTLY CALCAREOUS, WITH LIMESTONE NODULES.
CORE LOSS = 67% RQD = 0%

RC-6 CORE LOSS = 10% RQD = 0%

RC-7 CORE LOSS = 44% RQD = 0%

RC-8 CORE LOSS = 10% RQD = 38%

Ⓕ RC-9 SILTSTONE; GRAY, MEDIUM HARD, MASSIVE, MICACEOUS, ARGILLACEOUS, WITH LIMESTONE NODULES.
NO CORE LOSS RQD = 67%

Ⓖ SANDSTONE; GRAY, MEDIUM TO MODERATELY HARD, FINE GRAINED, MICACEOUS, SILTY.

RC-10 SANDSTONE; BROWN TO GRAY, MODERATELY HARD, MASSIVE, FINE TO COARSE GRAINED, MICACEOUS, SLIGHTLY WEATHERED, WITH LIMESTONE NODULES.
NO CORE LOSS RQD = 70%

RC-11 NO CORE LOSS RQD = 60%

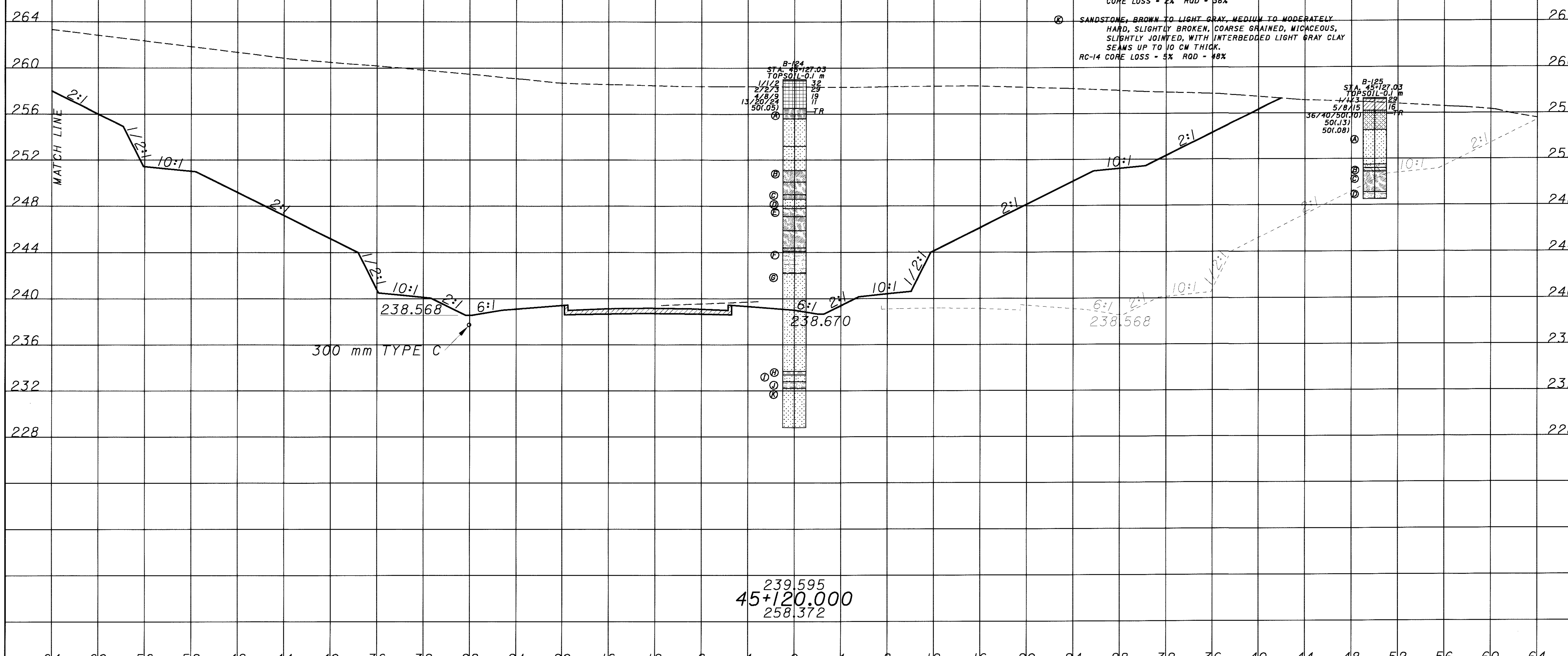
RC-12 CORE LOSS = 5% RQD = 68%

Ⓗ SHALE; BROWN, SOFT TO MEDIUM, HIGHLY BROKEN, SILTY, SLIGHTLY JOINTED.

Ⓘ SANDSTONE; GRAY, MEDIUM, MASSIVE, FINE GRAINED, MICACEOUS, CROSS-BEDDED.

Ⓙ RC-13 SILTSTONE; GRAY, MEDIUM, MICACEOUS, ARGILLACEOUS, SLIGHTLY BROKEN.
CORE LOSS = 2% RQD = 38%

Ⓚ SANDSTONE; BROWN TO LIGHT GRAY, MEDIUM TO MODERATELY HARD, SLIGHTLY BROKEN, COARSE GRAINED, MICACEOUS, SLIGHTLY JOINTED, WITH INTERBEDDED LIGHT GRAY CLAY SEAMS UP TO 10 CM THICK.
RC-14 CORE LOSS = 5% RQD = 48%



SHEET TOTAL | ℄ | SHEET TOTAL

END AREA		VOLUME	
CUT	FILL	CUT	FILL
	0		
		28516	0
1577			

CALCULATED DC
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 45+120.000

ATH-33-40.981

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SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
0	235		
21	121		
		214	3563
47	5		
		773	2268
		682	1267

CALCULATED RLS

CHECKED DAA

R-65

Ⓐ RC-1 SOFT TO WEDIUM HARD BROWN SANDSTONE, SEVERELY WEATHERED; SLIGHTLY BROKEN TO BROKEN; FINE TO COARSE GRAINED; WEAKLY CEMENTED; IRON STAINING THROUGHOUT.
CORE LOSS - 43% RQD - 30%
RC-2 CORE LOSS - 57% RQD - 0%
RC-3 CORE LOSS - 37% RQD - 63%
RC-4 CORE LOSS - 13% RQD - 87%
RC-5 CORE LOSS - 38% RQD - 40%
RC-6 CORE LOSS - 2% RQD - 98%
RC-7 NO CORE LOSS RQD - 88%
RC-8 CORE LOSS - 2% RQD - 82%

Ⓑ VERY SOFT GRAY CLAYSTONE; SEVERELY WEATHERED; VERY BROKEN.

Ⓒ RC-9 SOFT TO WEDIUM HARD SANDSTONE, ARGILACEOUS; LAMINATED; WEATHERED; WITH CLAYSTONE LENSES TO 1".
NO CORE LOSS RQD - 75%

Ⓓ RC-10 SOFT GRAY CLAYSTONE; VERY BROKEN; WITH SEAMS OF COAL TO 2".

R-67
STA. 45+399.95
TOPSOIL-0.10 m
3/3/4
3/4/4
5/9/11
5/10/30
8/16/23
50(.13)
15
TR

R-66
STA. 45+400.03
TOPSOIL-0.10 m
4/5/6
2/2/4
6/17/23
10/17/21
6/10/15
14/17/18
21
TR

R-65
STA. 45+399.98
TOPSOIL-0.10 m
5/6/23
50(.10)
50(.10)
TR
Ⓐ
Ⓑ
Ⓒ
Ⓓ

3:1
3:1
2:1
2:1
10:1
2:1
228.470
230.370
45+400.000
226.383

64 60 56 52 48 44 40 36 32 28 24 20 16 12 8 4 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64

SHEET TOTAL ℄ SHEET TOTAL

SOIL PROFILE
CROSS SECTION - US 33 STA. 45+400.000

ATH-33-40.981

120/132

818/949

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SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL

CALCULATED DC

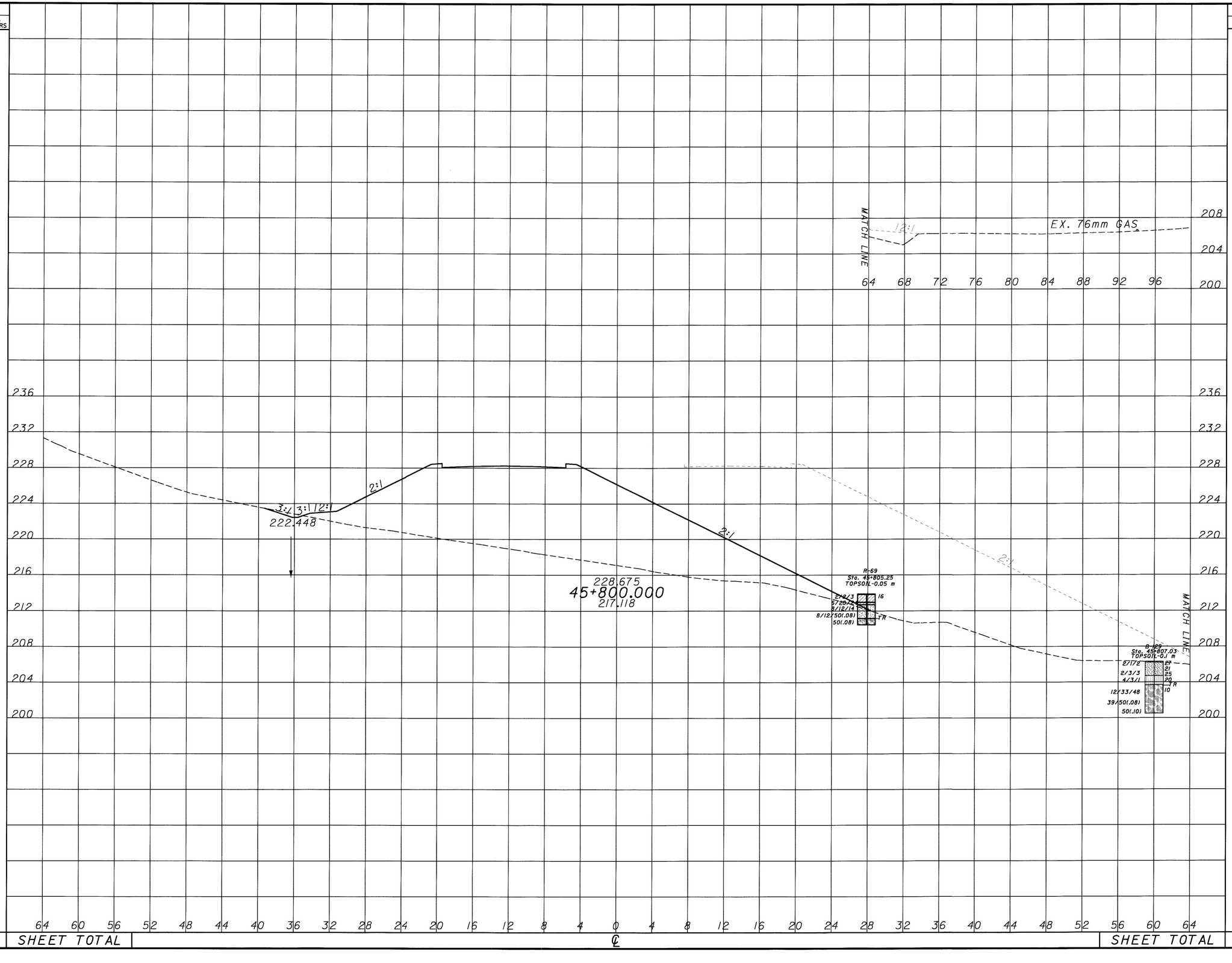
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 45+800.000

ATH-33-40.981

121 / 132

819 / 949



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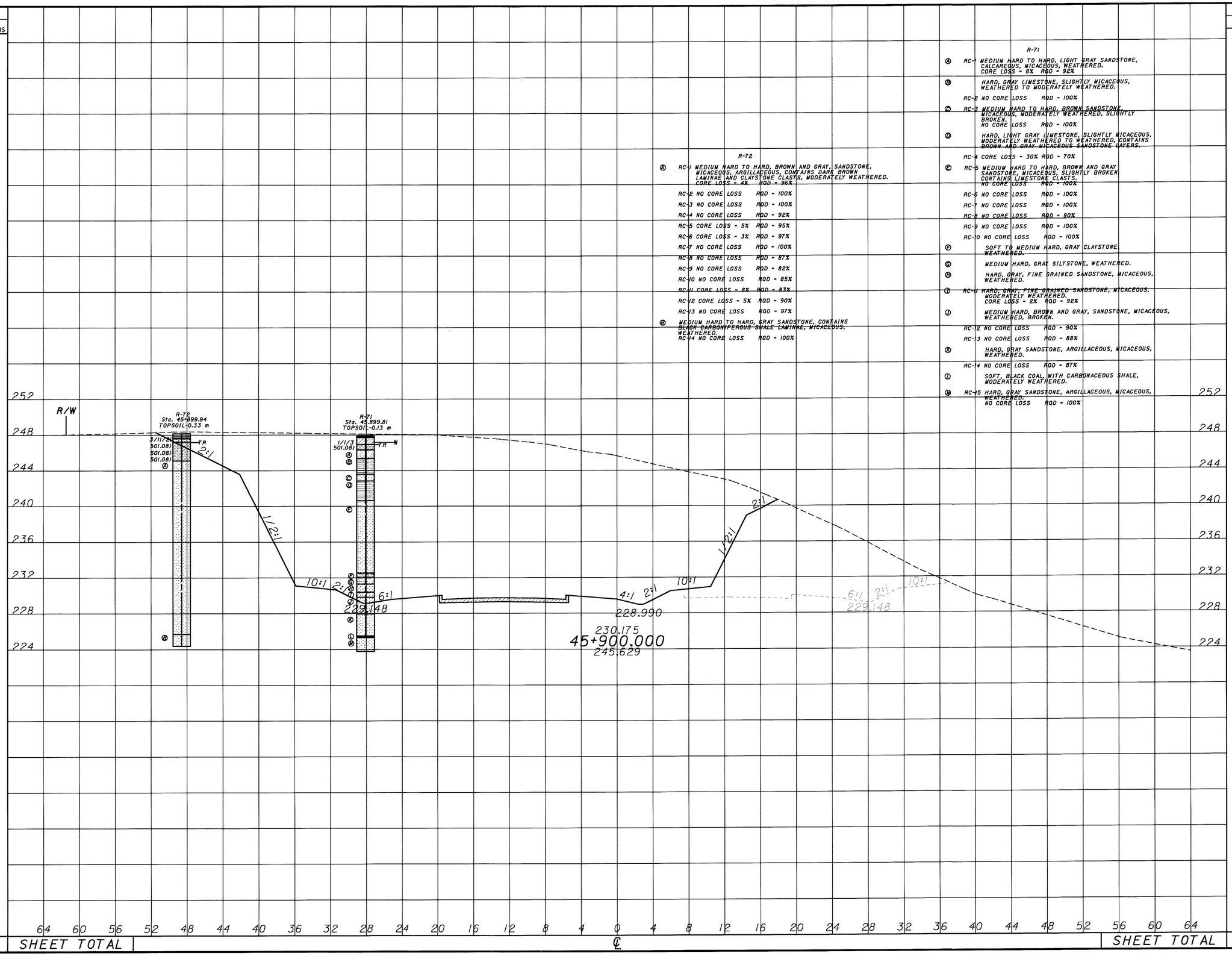
SEEDING	
END WIDTH	SQ. METERS



R-72

Ⓐ RC-1 MEDIUM HARD TO HARD, BROWN AND GRAY, SANDSTONE, MICACEOUS, ARGILLACEOUS, CONTAINS DARK BROWN LAMINAE AND CLAYSTONE CLASTS, MODERATELY WEATHERED. CORE LOSS - 4% ROD - 96%
RC-2 NO CORE LOSS ROD - 100%
RC-3 NO CORE LOSS ROD - 100%
RC-4 NO CORE LOSS ROD - 92%
RC-5 CORE LOSS - 5% ROD - 95%
RC-6 CORE LOSS - 3% ROD - 97%
RC-7 NO CORE LOSS ROD - 100%
RC-8 NO CORE LOSS ROD - 87%
RC-9 NO CORE LOSS ROD - 82%
RC-10 NO CORE LOSS ROD - 85%
RC-11 CORE LOSS - 8% ROD - 83%
RC-12 CORE LOSS - 5% ROD - 90%
RC-13 NO CORE LOSS ROD - 97%
Ⓑ MEDIUM HARD TO HARD, GRAY SANDSTONE, CONTAINS BLACK CARBONIFEROUS SHALE LAMINAE, MICACEOUS, WEATHERED.
RC-14 NO CORE LOSS ROD - 100%

R-71

Ⓐ RC-1 MEDIUM HARD TO HARD, LIGHT GRAY SANDSTONE, CALCAREOUS, MICACEOUS, WEATHERED. CORE LOSS - 8% ROD - 92%
Ⓑ HARD, GRAY LIMESTONE, SLIGHTLY MICACEOUS, WEATHERED TO MODERATELY WEATHERED.
RC-2 NO CORE LOSS ROD - 100%
Ⓒ RC-3 MEDIUM HARD TO HARD, BROWN SANDSTONE, MICACEOUS, MODERATELY WEATHERED, SLIGHTLY BROKEN. NO CORE LOSS ROD - 100%
Ⓓ HARD, LIGHT GRAY LIMESTONE, SLIGHTLY MICACEOUS, MODERATELY WEATHERED TO WEATHERED, CONTAINS BROWN AND GRAY MICACEOUS SANDSTONE LAYERS.
RC-4 CORE LOSS - 30% ROD - 70%
Ⓔ RC-5 MEDIUM HARD TO HARD, BROWN AND GRAY SANDSTONE, MICACEOUS, SLIGHTLY BROKEN, CONTAINS LIMESTONE CLASTS. NO CORE LOSS ROD - 100%
RC-6 NO CORE LOSS ROD - 100%
RC-7 NO CORE LOSS ROD - 100%
RC-8 NO CORE LOSS ROD - 90%
RC-9 NO CORE LOSS ROD - 100%
RC-10 NO CORE LOSS ROD - 100%
Ⓕ SOFT TO MEDIUM HARD, GRAY CLAYSTONE, WEATHERED.
Ⓖ MEDIUM HARD, GRAY SILTSTONE, WEATHERED.
Ⓗ HARD, GRAY, FINE GRAINED SANDSTONE, MICACEOUS, WEATHERED.
Ⓘ RC-11 HARD, GRAY, FINE GRAINED SANDSTONE, MICACEOUS, MODERATELY WEATHERED. CORE LOSS - 2% ROD - 92%
Ⓙ MEDIUM HARD, BROWN AND GRAY, SANDSTONE, MICACEOUS, WEATHERED, BROKEN.
RC-12 NO CORE LOSS ROD - 90%
RC-13 NO CORE LOSS ROD - 88%
Ⓚ HARD, GRAY SANDSTONE, ARGILLACEOUS, MICACEOUS, WEATHERED.
RC-14 NO CORE LOSS ROD - 87%
Ⓛ SOFT, BLACK COAL, WITH CARBONACEOUS SHALE, MODERATELY WEATHERED.
Ⓜ RC-15 HARD, GRAY SANDSTONE, ARGILLACEOUS, MICACEOUS, WEATHERED. NO CORE LOSS ROD - 100%

END AREA		VOLUME	
CUT	FILL	CUT	FILL
902	0	16287	0

CALCULATED BBD
CHECKED TDW

SOIL PROFILE
CROSS SECTION - US 33 STA. 45+900.000

ATH-33-40.981

122/132

820/949

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SEEDING	
END WIDTH	SQ. METERS

R-75

Ⓐ RC-1 MEDIUM HARD BROWN SANDSTONE, MICACEOUS, MODERATELY WEATHERED TO WEATHERED, CONTAINS DARK BROWN LAMINAE.
CORE LOSS - 6% RQD - 94%

Ⓑ MEDIUM HARD TO HARD GRAY SANDSTONE, CALCAREOUS, MODERATELY WEATHERED, SLIGHTLY MICACEOUS.
RC-2 NO CORE LOSS RQD - 100%

Ⓒ HARD BROWN AND GRAY SANDSTONE, MICAACEOUS, MODERATELY WEATHERED.
RC-3 NO CORE LOSS RQD - 100%

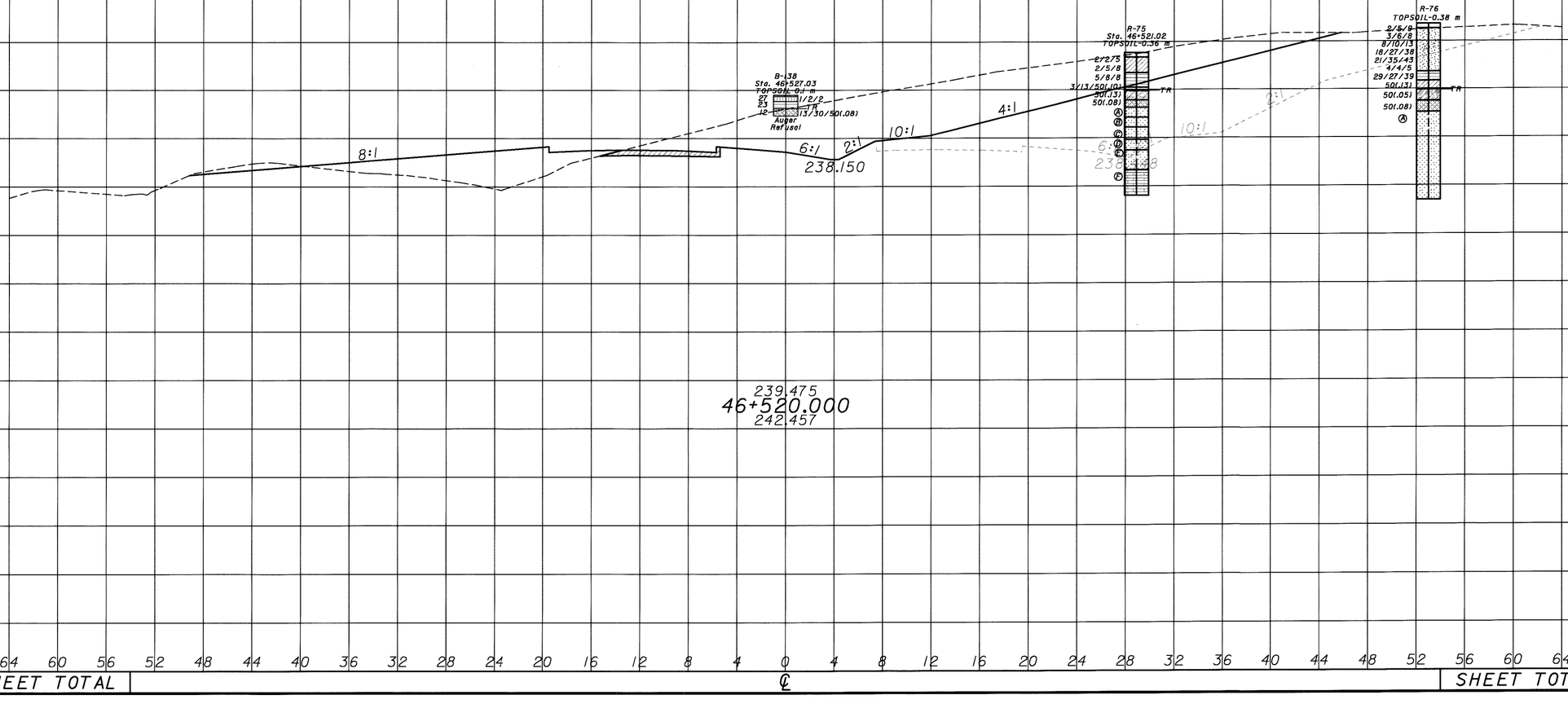
Ⓓ HARD LIGHT GRAY SANDSTONE, CALCAREOUS, MODERATELY WEATHERED, MICACEOUS.

Ⓔ MEDIUM HARD LIGHT GRAY SANDSTONE, MICACEOUS, WEATHERED.

Ⓕ HARD LIGHT GRAY LIMESTONE, MICACEOUS, MODERATELY WEATHERED.
RC-4 NO CORE LOSS RQD - 97%

R-76

Ⓐ RC-1 MEDIUM HARD BROWN AND GRAY SANDSTONE, MODERATELY WEATHERED, CONTAINS DARK BROWN LAMINAE AND CLAYSTONE CLASTS.
CORE LOSS - 4% RQD - 94%
RC-2 NO CORE LOSS RQD - 100%
RC-3 NO CORE LOSS RQD - 100%
RC-4 NO CORE LOSS RQD - 100%
RC-5 NO CORE LOSS RQD - 100%



END AREA		VOLUME	
CUT	FILL	CUT	FILL
		1854	535
105	40		
		2992	403
		6015	0

CALCULATED DC
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 46+520.000

ATH-33-40.981

123/132

821/949

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SEEDING	
END WIDTH	SQ. METERS

R-80

Ⓐ RC-1 MEDIUM HARD, BROWN SANDSTONE, MICACEOUS, WEATHERED.
CORE LOSS - 12% RQD - 88%

RC-2 CORE LOSS - 22% RQD - 62%

Ⓑ SOFT, BROWN AND GRAY CLAYSTONE, WEATHERED TO SEVERELY WEATHERED.

RC-3 CORE LOSS - 58% RQD - 0%

RC-4 CORE LOSS - 60% RQD - 0%

Ⓒ RC-5 MEDIUM HARD, GRAY SILTSTONE, SLIGHTLY MICACEOUS, WEATHERED.
NO CORE LOSS RQD - 100%

R-79

Ⓐ RC-1 MEDIUM HARD BROWN SANDSTONE, MICACEOUS, WEATHERED.
CORE LOSS - 23% RQD - 67%

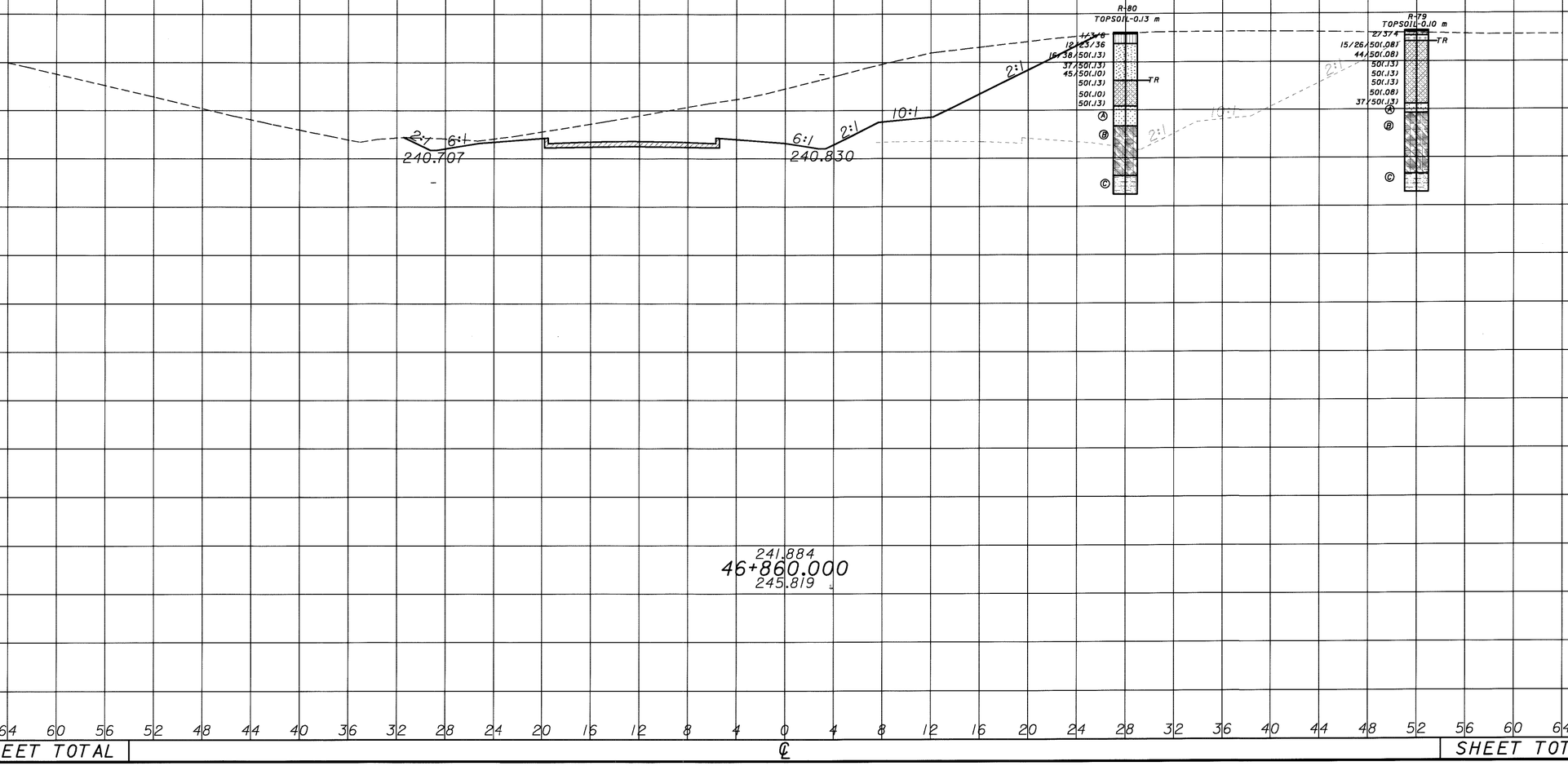
Ⓑ SOFT BROWN CLAYSTONE, SEVERLY WEATHERED.

RC-2 CORE LOSS - 20% RQD - 60%

RC-3 CORE LOSS - 52% RQD - 20%

RC-4 CORE LOSS - 67% RQD - 0%

Ⓒ RC-5 WEDIUM HARD GRAY SILTSTONE WITH INTERBEDDED, SANDSTONE, WEATHERED.
NO CORE LOSS RQD - 100%



END AREA		VOLUME	
CUT	FILL	CUT	FILL
156	0		
		5292	0
373	0		
		8431	0
470	0		
		8539	0
384	0		
		5737	0

CALCULATED RLS

CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 46+860.000

ATH-33-40.981

124 / 132

822 / 949

SHEET TOTAL ℄ SHEET TOTAL

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SEEDING	
END WIDTH	SQ. METERS

R-82

Ⓐ RC-1 SOFT BROWN SANDSTONE, MICACEOUS, WEATHERED TO SEVERELY WEATHERED.
CORE LOSS - 90% RQD - 0%

RC-2 CORE LOSS - 20% RQD - 0%

Ⓑ SOFT GRAY CLAYSTONE, SLIGHTLY CALCAREOUS, SEVERELY WEATHERED, VERY BROKEN.

RC-3 NO CORE LOSS RQD - 0%

Ⓒ SOFT BROWN SANDSTONE, MICACEOUS, SEVERELY WEATHERED.

Ⓓ SOFT GRAY AND BROWN CLAYSTONE, SLIGHTLY CALCAREOUS, SEVERELY WEATHERED, VERY BROKEN.

RC-4 CORE LOSS - 58% RQD - 0%

RC-5 CORE LOSS - 28% RQD - 25%

RC-6 CORE LOSS - 2% RQD - 67%

Ⓔ MEDIUM HARD GRAY SILTSTONE, SLIGHTLY MICACEOUS, WEATHERED, CONTAINS ARGILLACEOUS AND ARENACEOUS LAYERS.

RC-7 NO CORE LOSS RQD - 100%

R-81

Ⓐ RC-1 SOFT TO MEDIUM HARD BROWN SANDSTONE, POORLY CEMENTED, MICACEOUS, SEVERELY WEATHERED WITH DECOMPOSED LAYERS.
CORE LOSS - 36% RQD - 29%

RC-2 CORE LOSS - 100% RQD - 0%

RC-3 CORE LOSS - 13% RQD - 43%

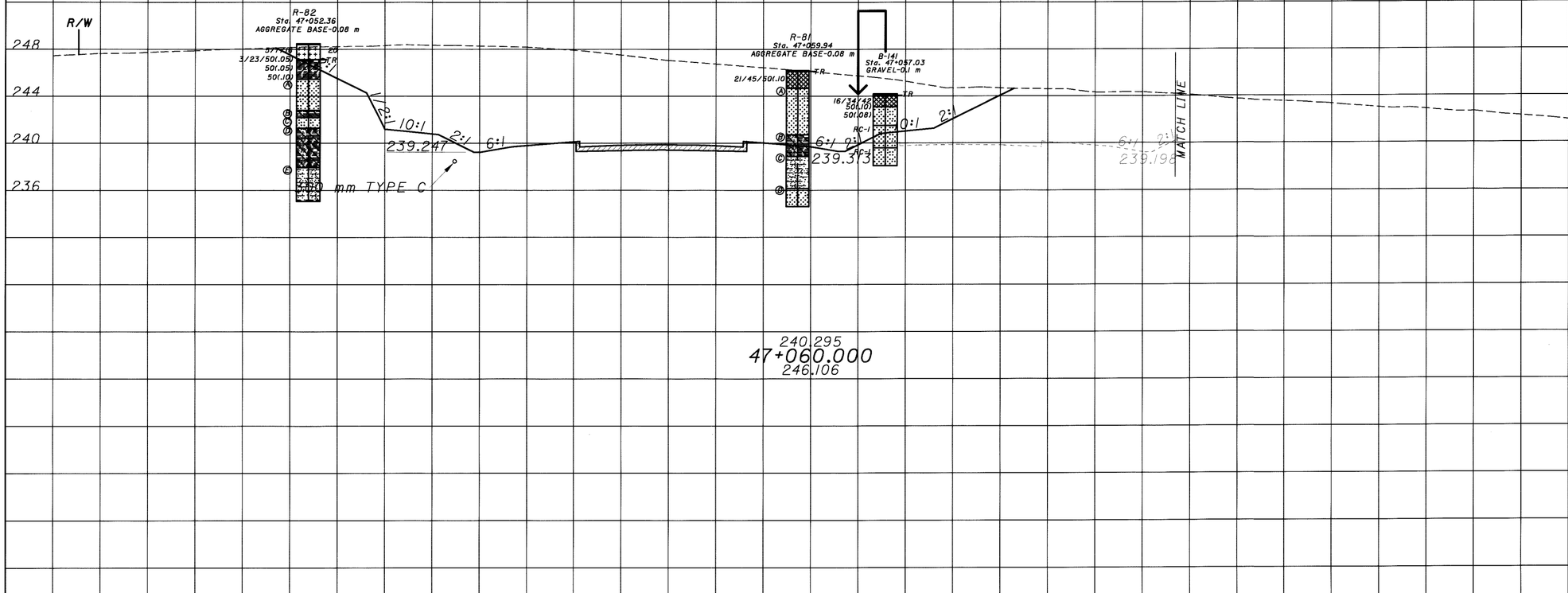
Ⓑ RC-4 SOFT GRAY AND RED CLAYSTONE, CONTAINS SILTSTONE AND LIMESTONE CLASTS, WEATHERED.
CORE LOSS - 53% RQD - 0%

RC-5 CORE LOSS - 27% RQD - 10%

Ⓒ SOFT TO MEDIUM HARD GRAY SILTSTONE, MICACEOUS, BROKEN, CONTAINS CALCAREOUS BANDING, WEATHERED.

RC-6 NO CORE LOSS RQD - 17%

Ⓓ RC-7 HARD, GRAY SANDSTONE, MICACEOUS, PYRITIC, SLIGHTLY CALCAREOUS WITH ARGILLACEOUS INTERBEDS, WEATHERED TO SLIGHTLY WEATHERED.
NO CORE LOSS RQD - 88%



END AREA		VOLUME	
CUT	FILL	CUT	FILL
		6226	0
343	0		
		7391	0

CALCULATED DC
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 47+060.000

ATH-33-40.981

125/132

823/949

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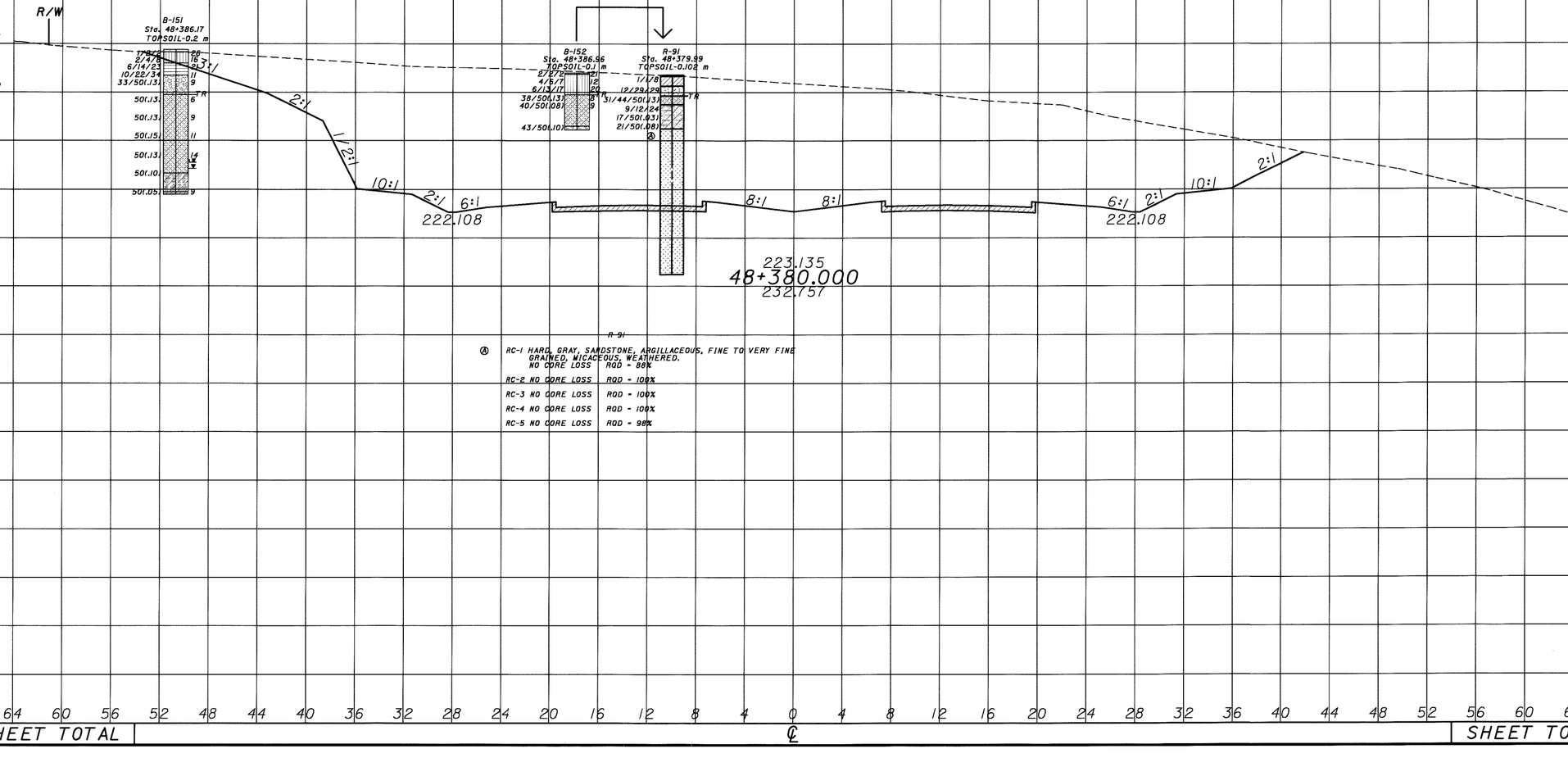
SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
724	0		
		14073	0

CALCULATED DC

CHECKED DAA

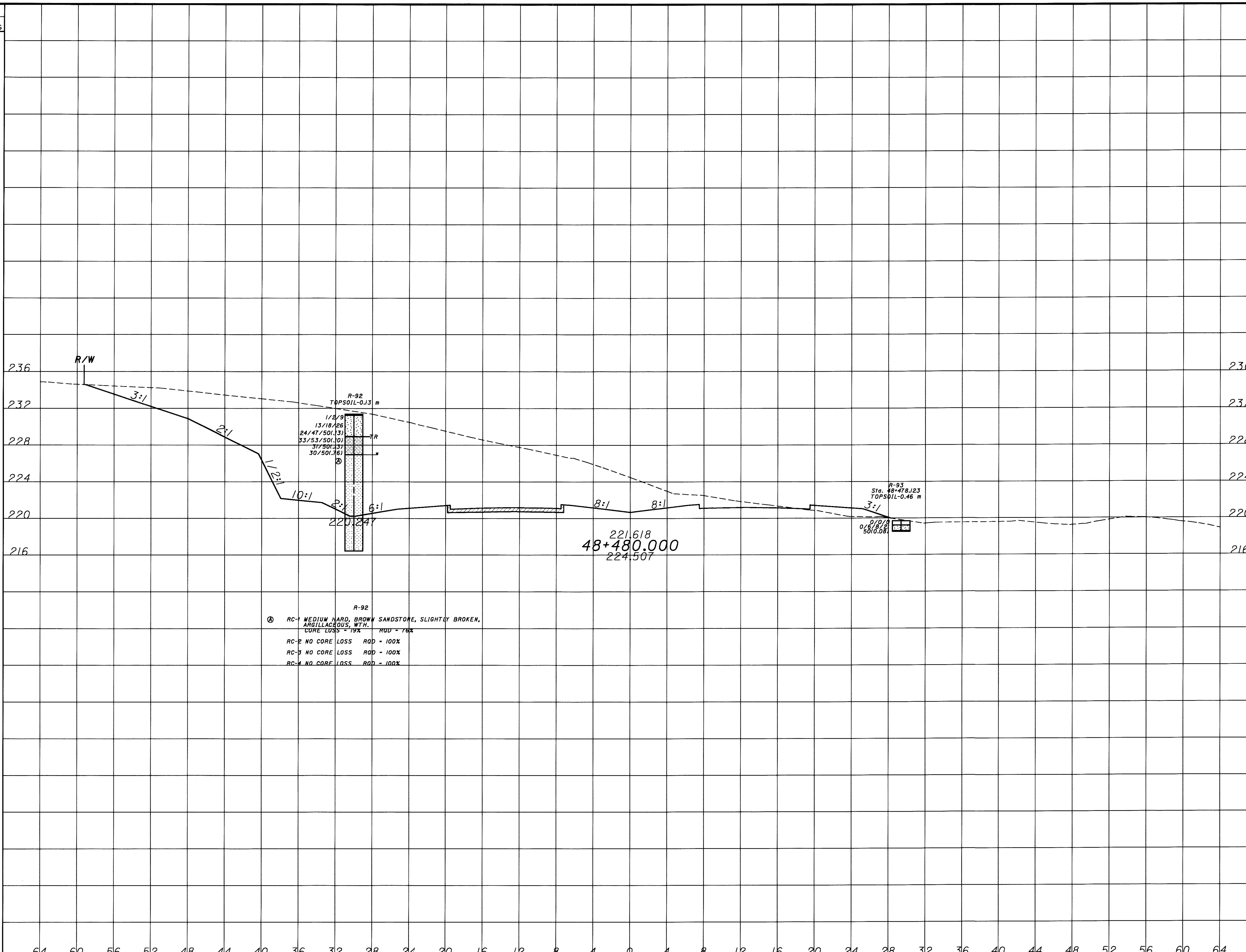


SOIL PROFILE
CROSS SECTION - US 33 STA. 48+380.000

ATH-33-40.981

SOIL PROFILE
CROSS SECTION - US 33 STA. 48+480.000

ATH-33-40.981



SEEDING	
END WIDTH	SQ. METERS

SHEET TOTAL

END AREA		VOLUME	
CUT	FILL	CUT	FILL
		9281	57
357	6		
		7823	57
		10134	0

SHEET TOTAL

CALCULATED DC
CHECKED DAA

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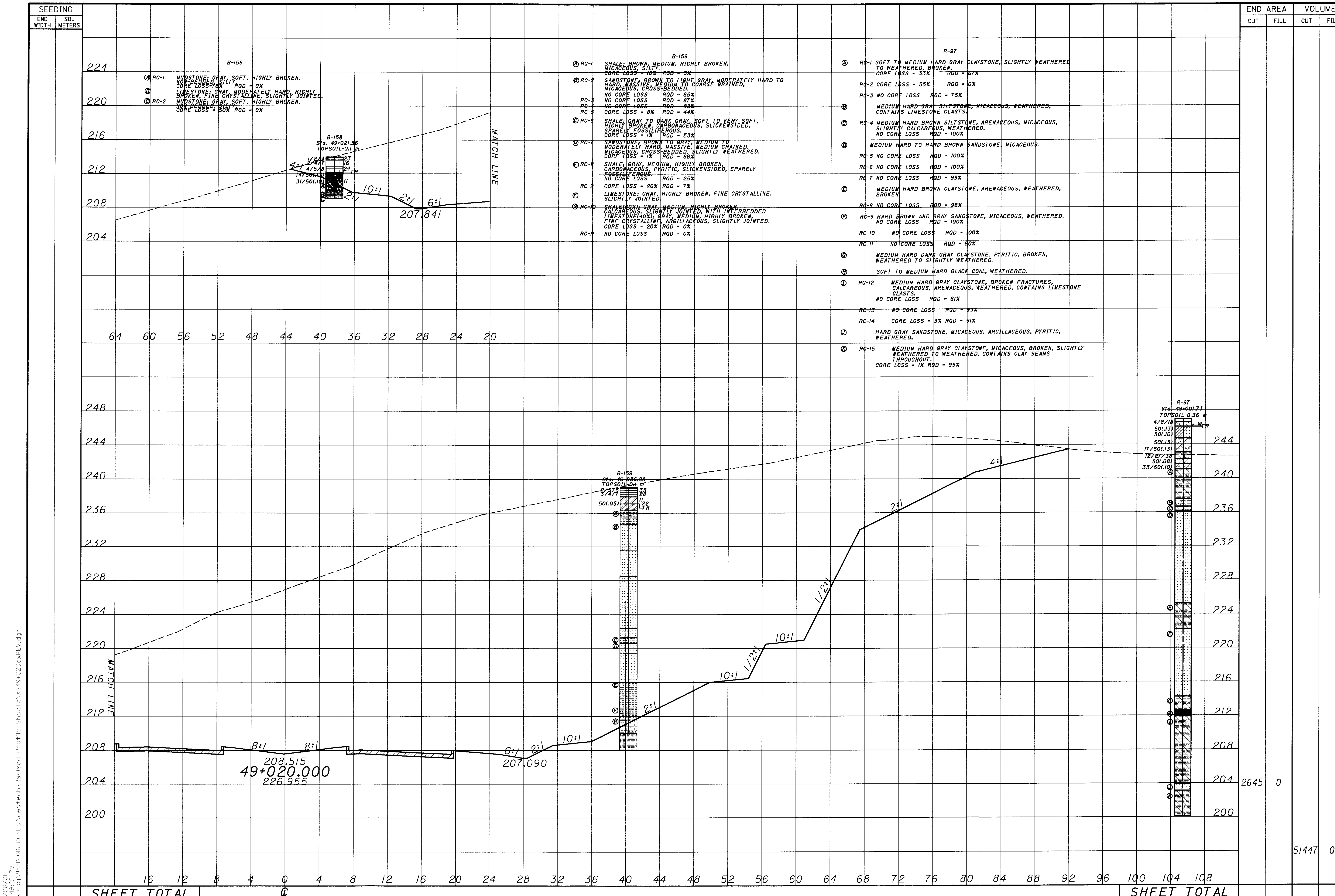


CALCULATED DC
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 49+020.00

ATH-33-40.981

128/132

826/949

SEEDING	
END WIDTH	SQ. METERS

END AREA	
CUT	FILL
916	0

VOLUME	
CUT	FILL
11602	5

CALCULATED DC

CHECKED DAA

SOIL PROFILE
CROSS SECTION -US 33 STA. 49+180.000

ATH-33-40.981

MATCH LINE

MATCH LINE

240 236 232 228 224 220 216 212 208 204 200 196

64 68 72 76 80 84 88 92 96

224 220 216 212 208

B-16D
Sta. 49+159.58
TOPSOIL-0.1 m
1/2/3 20
3/2/4 19
3/6/8 20
8/18/44 18
TR
18/41/50(.13) 5
7

SB-34
TOPSOIL-0.08 m
8/4/4 TR
17/44/50(0.10) W
24/50(.05)
42/50(.05)
27/50(.08) W
30/50(.08)
50(.08)
24/47/50(.08)

R-98
Sta. 49+176.75
TOPSOIL-0.30 m
8/4/22 TR
50(.10)
50(.08)
50(.13)

EX. 51mm OIL

8:1 8:1 3:1 2:1 10:1 2:1 1 1/2:1 2:1

201.690

SB-34

Ⓐ RC-1 SOFT TO MEDIUM HARD RED AND GRAY CLAYSTONE, ARENACEOUS; SEVERELY WEATHERED.
CORE LOSS = 8% RQD = 80%
RC-2 CORE LOSS = 7% RQD = 88%
RC-3 NO CORE LOSS RQD = 100%

Ⓑ RC-4 MEDIUM HARD GRAY SANDSTONE, ARGILLACEOUS; SEVERELY WEATHERED.
NO CORE LOSS RQD = 100%

R-98

Ⓐ RC-1 SOFT TO MEDIUM HARD BROWN SANDSTONE, POORLY CEMENTED, MICACEOUS, WEATHERED TO SEVERELY WEATHERED.
NO CORE LOSS RQD = 100%
RC-2 NO CORE LOSS RQD = 100%

Ⓑ RC-3 MEDIUM HARD GRAY SILTSTONE, ARGILLACEOUS, WEATHERED.
CORE LOSS = 7% RQD = 100%

Ⓒ SOFT BLACK COAL.

Ⓓ RC-4 MEDIUM HARD GRAY SILTSTONE, WEATHERED, SLIGHTLY BROKEN, CONTAINS ROCK CLASTS.

Ⓔ RC-5 SOFT TO MEDIUM HARD RED, BROWN, GRAY CLAYSTONE, SLIGHTLY WEATHERED.

204.912
49+180.000
212.416

64 60 56 52 48 44 40 36 32 28 24 20 16 12 8 4 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64

SHEET TOTAL ℄ SHEET TOTAL

SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL

CALCULATED JC

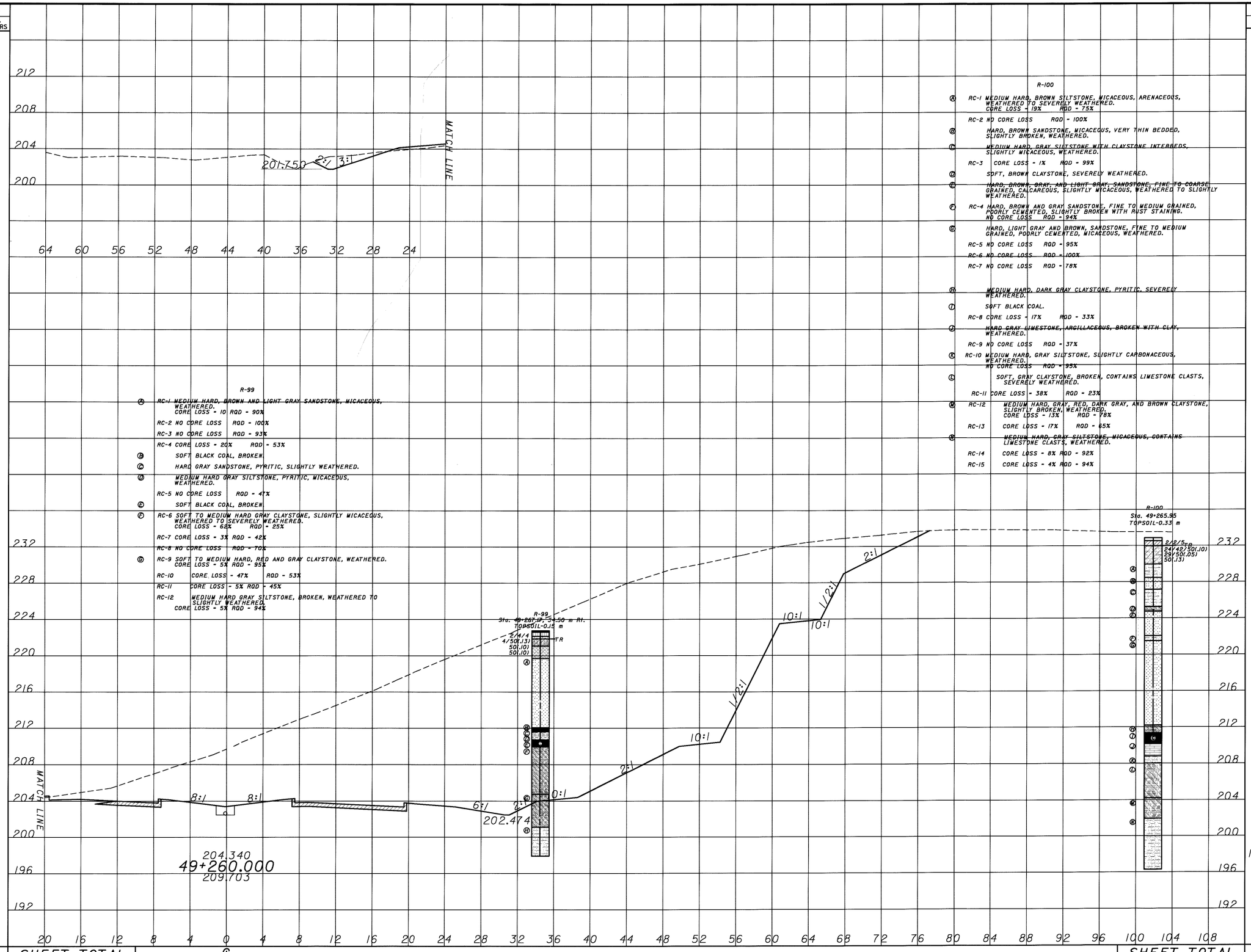
CHECKED DAA

SOIL PROFILE
CROSS SECTION - US 33 STA. 49+260.000

ATH-33-40.981

130/132

828/949



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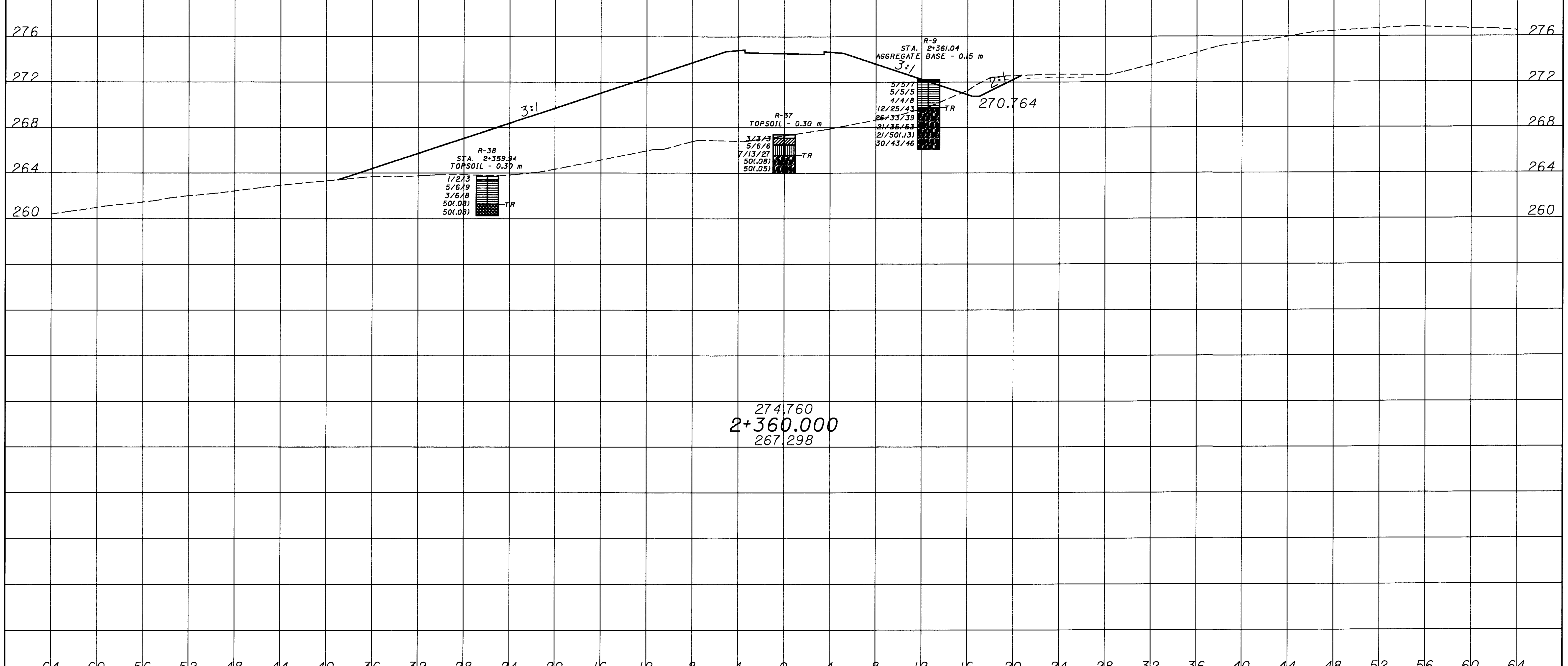
SOIL PROFILE
CROSS SECTION - CR 89 STA. 2+360

SEEDING	
END WIDTH	SQ. METERS



SHEET TOTAL ℄ SHEET TOTAL

END AREA CUT	END AREA FILL	VOLUME CUT	VOLUME FILL
1	171		
		45	4292
4	258		
		48	5156
1	258		
		78	4667

CALCULATED RLS
CHECKED DAA

ATH-33-40.981

131/132

829/949

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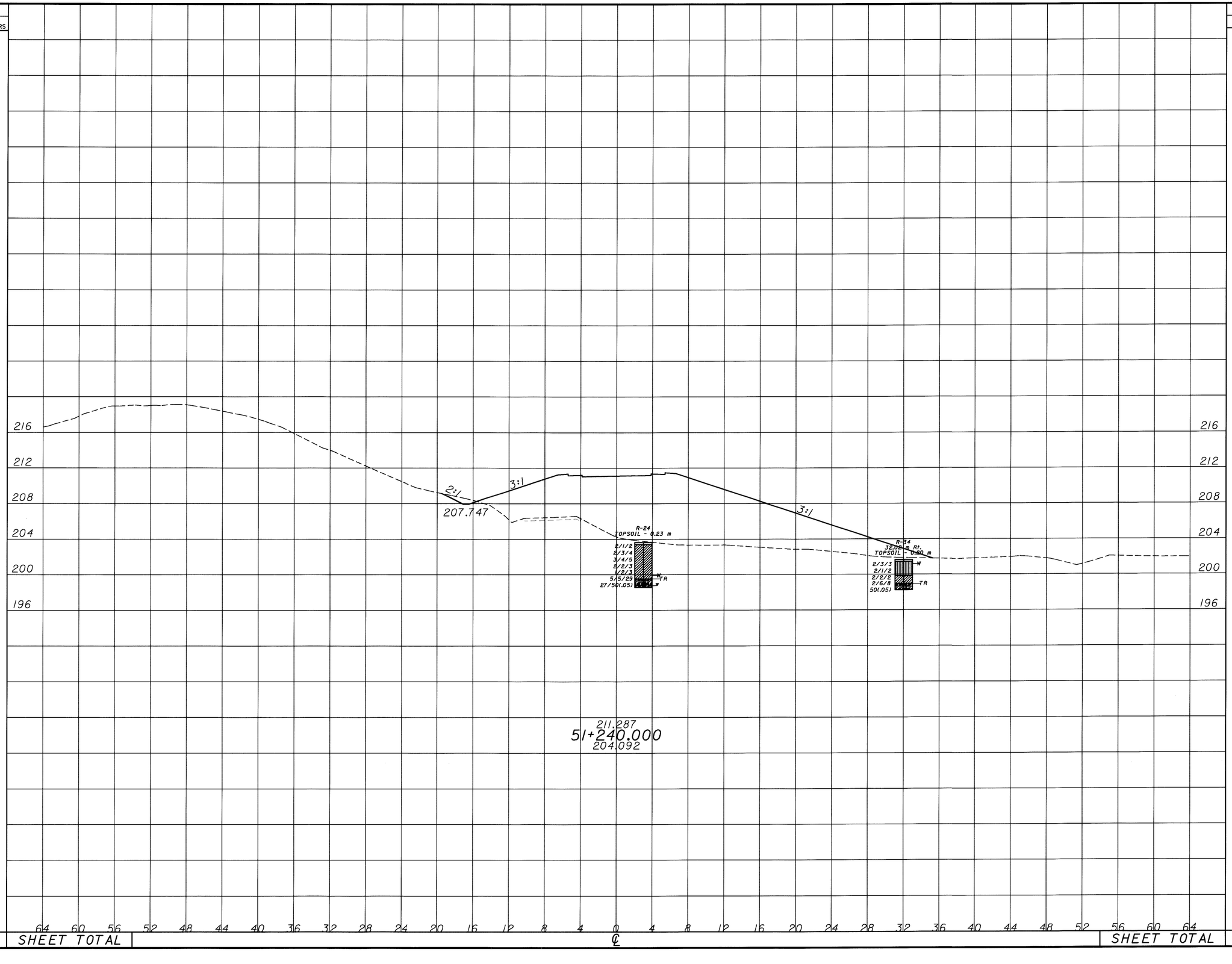
SEEDING	
END WIDTH	SQ. METERS

END AREA		VOLUME	
CUT	FILL	CUT	FILL
1	223	23	4036

CALCULATED RLS
CHECKED DAA



SOIL PROFILE
CROSS SECTION - SR 681 STA. 51+240

ATH-33-40.981

132 / 132

830
949

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GEOLOGY OF THE SITE

GENERALIZED GEOLOGIC REFERENCES REPORT THAT THE SITE IS LOCATED WITHIN THE UNGLACIATED SECTION OF THE ALLEGHENY PLATEAU. OVERBURDEN AT THE SITE CONSISTS OF THIN RESIDUAL SOILS ALONG RIDGETOPS AND HILLSIDES, COLLUVIAL SOILS AT THE BASE OF THE HILLSIDES, AND ALLUVIAL DEPOSITS ALONG STREAM CHANNELS. THE UNDERLYING BEDROCK AT THE SITE IS REPORTED TO BE SHALES, SANDSTONES, COAL, AND LIMESTONE OF MONOGAHELA SERIES ALONG THE HILLSIDES AND CONEMAUGH SERIES WITHIN THE VALLEY BOTTOM.

EXPLORATION

A TOTAL OF ELEVEN BORINGS, SB-7 THROUGH SB-15, SB-58 AND SB-59, WERE DRILLED AT THE PROJECT SITE BETWEEN NOVEMBER 1 AND NOVEMBER 11, 1999 AND BETWEEN APRIL 3 AND APRIL 5, 2000. THE BORINGS WERE DRILLED TO DEPTHS BETWEEN 6.10 AND 21.64 METERS (20.0 AND 71.0 FEET) BY MEANS OF A TRUCK-MOUNTED OR TRACK-MOUNTED (ATV) ROTARY-TYPE DILL RIG USING HOLLOWSTEM AUGERS. THE BORINGS WERE EXTENDED INTO BEDROCK AND BEDROCK WAS VERIFIED BY CORING IN ALL THE BORINGS.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

1. SOILS

AT THE GROUND SURFACE, 178 TO 457 MILLIMETERS (7 TO 18 INCHES) OF TOPSOIL WAS FIRST ENCOUNTERED BY THE BORINGS. BELOW THE TOPSOIL, THE BORINGS ENCOUNTERED BOTH COHESIVE AND GRANULAR SOILS EXTENDING TO THE TOP OF BEDROCK. THE BORINGS ALONG THE HILLSIDES AND AT THE BASE OF HILLSIDES (BORINGS SB-7 TO SB-9, SB-13 TO SB-15, AND SB-59) ENCOUNTERED PRIMARILY COHESIVE SOILS INCLUDING VERY STIFF TO HARD SILT AND CLAY (A-6a), SILTY CLAY (A-6b), AND SILT (A-4b). THE BORINGS LOCATED ALONG THE VALLEY BOTTOM (SB-10 TO SB-12) ENCOUNTERED COHESIVE SOILS AS WELL AS GRANULAR SOILS INCLUDING LOOSE TO VERY DENSE SAND (A-3a).

2. BEDROCK

BETWEEN 0.06 AND 1.07 METERS (0.2 AND 4.0 FEET) OF SEVERELY WEATHERED ROCK WAS TYPICALLY ENCOUNTERED BY THE BORINGS ABOVE MORE COMPETENT ROCK. HOWEVER, BORING SB-7 DID NOT ENCOUNTER A WEATHERED ROCK ZONE WHILE BORING SB-14 ENCOUNTERED 6.0 METERS (19.7 FEET) OF WEATHERED ROCK. COMPETENT ROCK ENCOUNTERED BY THE BORINGS INCLUDED VERY SOFT TO SOFT SHALE AND CLAYSTONE AND MEDIUM HARD TO HARD SANDSTONE, SILTSTONE, AND LIMESTONE. COAL WAS ALSO ENCOUNTERED IN BORING SB-15.

3. GROUNDWATER

GROUNDWATER SEEPAGE WAS FIRST ENCOUNTERED IN BORINGS SB-10, SB-11, AND SB-12 AT DEPTHS OF 3.51, 1.83, AND 1.22 METERS (11.5, 6.0, AND 4.0 FEET) BELOW GROUND SURFACE, RESPECTIVELY. SEEPAGE WAS NOT DETECTED IN ANY OTHER BORINGS. WATER LEVELS PRIOR TO CORING WERE RECORDED IN BORINGS SB-11 AND SB-12 AT 0.94 AND 0.76 METERS (3.1 AND 2.5 FEET), RESPECTIVELY, BELOW THE GROUND SURFACE. THE REMAINING BORINGS HAD NO DETECTABLE WATER LEVEL PRIOR TO CORING. AT COMPLETION OF DRILLING, WATER LEVELS RANGED FROM 0.82 TO 7.32 METERS (2.7 TO 24.0 FEET) BELOW THE EXISTING GROUND SURFACE. HOWEVER, THE FINAL WATER LEVELS INCLUDE DRILLING WATER AND MAY NOT BE REPRESENTATIVE OF THE ACTUAL GROUNDWATER CONDITIONS.

SYMBOLS OF ROCK TYPES

- COAL
- LIMESTONE
- SANDSTONE
- SHALE
- WEATHERED CLAYSTONE
- WEATHERED LIMESTONE
- WEATHERED SANDSTONE
- WEATHERED SHALE
- WEATHERED SILTSTONE

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 INVESTIGATION 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.

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

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 50.80 mm O.D., 34.93 mm I.D., SPLIT-SPOON SAMPLER, AT CONTINUOUS, 0.75 m AND/OR 1.50 m DEPTH INTERVALS, DRIVEN BY MEANS OF A 63.5 kg HAMMER WITH A FREE FALL OF 0.76 m. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER THREE 0.15 m INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING A 76 mm O.D. THIN-WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILL RIG.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING AN NQ2 OR NXM CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS SHOW A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, NUMBER OF BLOWS FOR THE STANDARD PENETRATION TEST IN THREE 0.15 m INCREMENTS, AND A SAMPLE DESCRIPTION BASED ON LABORATORY TEST RESULTS, UTILIZING THE ODOT CLASSIFICATION SYSTEM. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, 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.

SCOUR ANALYSIS INFORMATION

BORING NUMBER	SAMPLE NUMBER	DEPTH (m)	ODOT CLASSIFICATION	D50 SIZE (mm)
SB-11	S-1	0.30-0.76 (1.0'-2.5')	A-4a	0.0243
SB-11	S-2	1.10-1.50 (3.5'-5.0')	A-2-4	0.195
SB-11	S-3	1.80-2.30 (6.0'-7.5')	A-2-4	0.223
SB-12	S-1	0.30-0.76 (1.0'-2.5')	A-6a	0.0355
SB-12	S-2	1.10-1.50 (3.5'-5.0')	A-2-4	0.812

LEGEND

- PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION
- TR — TOP OF ROCK
- W — INDICATES FREE WATER ELEVATION
- ▼ — INDICATES STATIC WATER ELEVATION
- X/Y/Z — FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR STANDARD PENETRATION TEST
  - X = NUMBER OF BLOWS FOR FIRST 0.15 m
  - Y = NUMBER OF BLOWS FOR SECOND 0.15 m
  - Z = NUMBER OF BLOWS FOR THIRD 0.15 m
- 50 (n) — INDICATES NUMBER OF BLOWS (50) TO DRIVE A SPLIT-BARREL SAMPLER A DEPTH OF (n) METERS OTHER THAN THE NORMAL 0.15 METER INCREMENT.

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

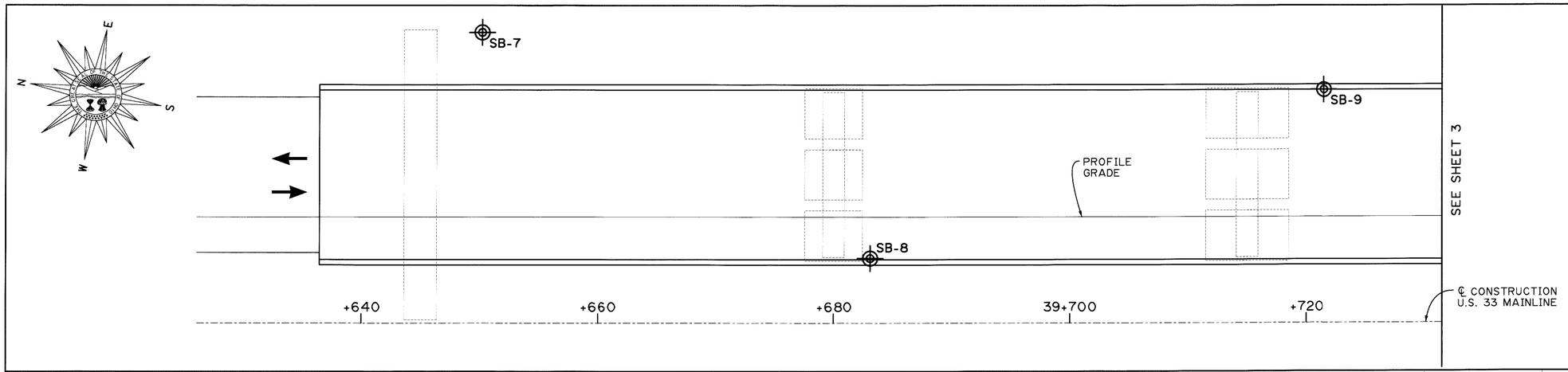
DRAWN BY J.L.P. | REVIEWED BY T.A.H. | DATE 02/02/01 | CALCULATED T.A.H. | CHECKED BY A.E.N.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

1 / 10

831
949



metric units

DLZ
1221 DUBLIN ROAD • COLUMBUS, OHIO 43215

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

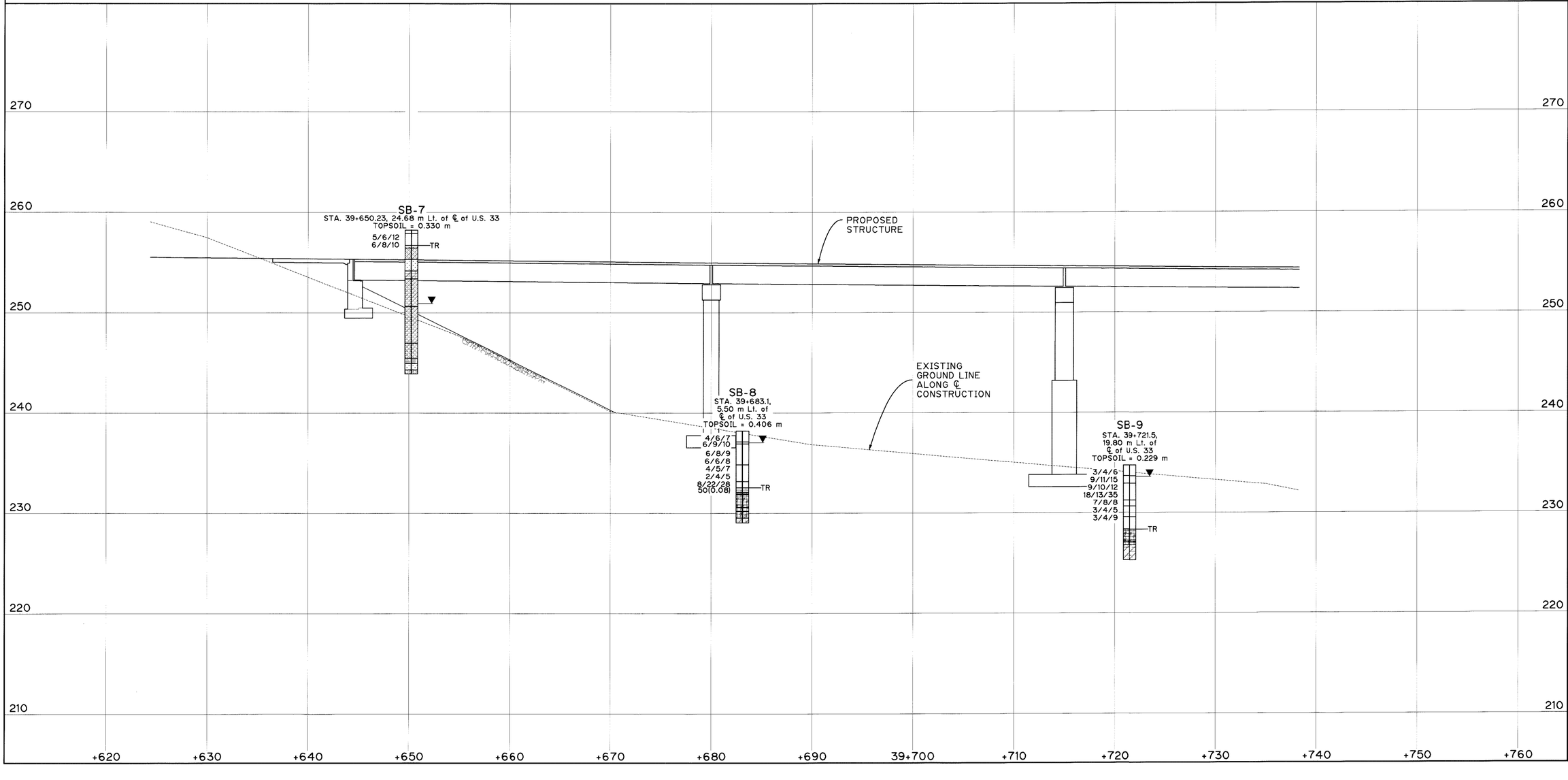
CALCULATED T.A.H.	CHECKED BY A.E.N.
DATE 02/02/01	
REVIEWED BY T.A.H.	
DRAWN BY J.L.P.	

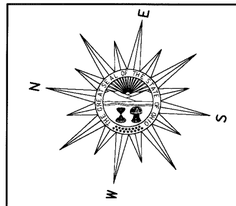
STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

2 / 10

832
949





SEE SHEET 2

PRATTS FORK CREEK

SB-11

SB-13

PROFILE GRADE

SB-10

SB-12

SEE SHEET 4

+740 +760 +780 39+800 +820 +840

℄ CONSTRUCTION U.S. 33 MAINLINE

PROPOSED STRUCTURE

EXISTING GROUND LINE ALONG ℄ CONSTRUCTION

NORMAL WATER EL. 229.23

HW50 = EL. 229.80

HW100 = EL. 229.90

SB-10
STA. 39+743.0
5.50 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.305 m
2/4/10
6/5/8
5/5/5
1/2/2
4/4/6
6/21/14
14/31/36
40/50(0.08)
W
TR

SB-11
STA. 39+781.4
19.80 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.254 m
2/2/2
2/2/2
1/2/24
50(0.08)
54/50(0.00)
W
TR

SB-12
STA. 39+803.2
5.40 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.356 m
1/2/2
2/2/10
24/50(0.10)
50(0.13)
38/50(0.05)
50(0.08)
W
TR

SB-13
STA. 39+840.49
16.80 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.381 m
2/13/4
3/6/8
8/9/10
2/3/5
12/24/37
21/50(0.15)
37/50(0.15)
33/50(0.15)
TR

250 240 230 220 210

+720 +730 +740 +750 +760 +770 +780 +790 39+800 +810 +820 +830 +840 +850 +860

metric units

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

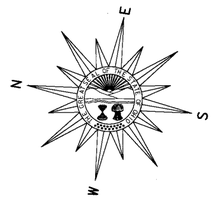
SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

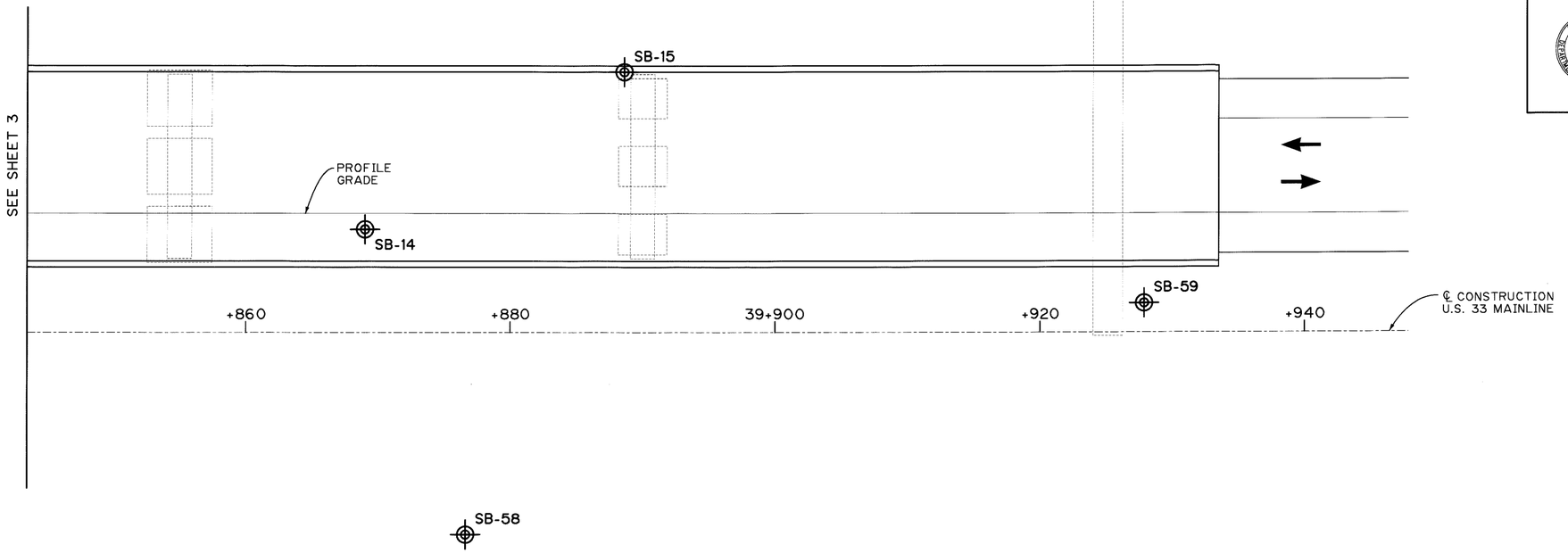
CALCULATED	CHECKED BY
T.A.H.	A.E.N.

DATE	REVIEWED BY	DRAWN BY
02/02/01	T.A.H.	J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981





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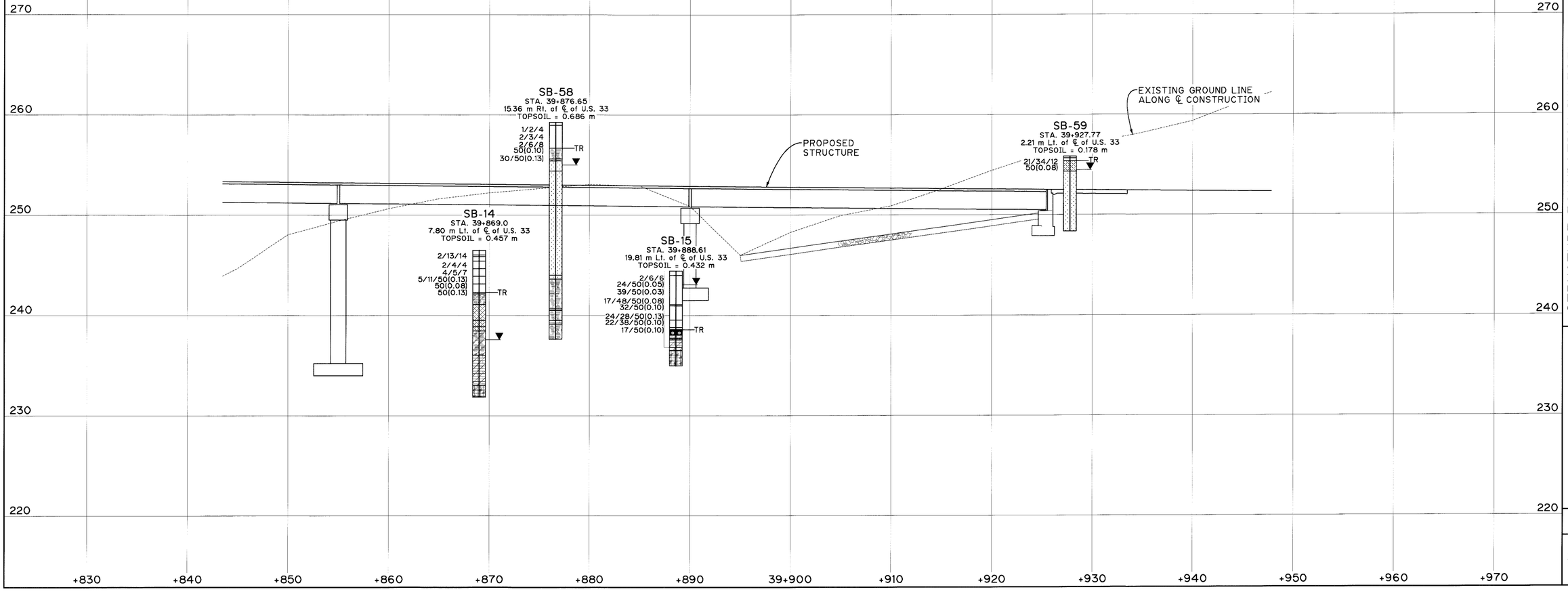

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6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

CALCULATED	CHECKED BY A.E.N.
DATE 02/02/01	
REVIEWED BY T.A.H.	
DRAWN BY J.L.P.	

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

4 / 10

834
949

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-7 | Location: 39+650.23, 24.68 m Lt. of US 33 centerline | Date Drilled: 11/8/99

WATER OBSERVATIONS: Water seepage at: none. Water level at completion: dry prior to coring; 7.32 m [24.0'] (w ith core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
0 [0]	258.23 [847.2]						Topsoil - 0.33 m [13"]								
0.34 [1.1]	257.89 [846.1]	5					Hard brown SILT AND CLAY (A-6a); decomposed c aystone; damp.								
		6 12	.330 [13]	1		431+ [4.5+]									
		6 8	.152 [6]	2		431+ [4.5+]									
1.52 [5]	256.71 [842.2]	10	Core 0.61 m [24"]	Rec .381 m [15"]		RQD 42%	Hard gray SANDSTONE, fine grained, micaceous; slightly weathered.								
1.80 [5.9]	256.43 [841.3]		Core 1.524 m [60"]	Rec 1.448 m [57"]		RQD 52%	Medium hard brown SANDSTONE, fine to medium grained, micaceous; weathered; friable. @ 2.19 m - 2.32 m [7.2' - 7.6'], decomposed layer. @ 2.56 m - 2.59 m [8.4' - 8.5'], vertical fracture. @ 2.71 m - 2.77 m [8.9' - 9.1'], clay seam.								
2.90 [9.5]	255.33 [837.7]						Hard gray SANDSTONE, fine grained, micaceous; slightly weathered.								
			Core 1.524 m [60"]	Rec 1.346 m [53"]		RQD 68%									
4.05 [13.3]	254.18 [833.9]						Hard gray LIMESTONE; moderately weathered. @ 4.42 m - 4.57 m [14.5' - 15.0'], contains fine to medium sand.								
4.57 [15]															
4.85 [15.9]	253.38 [831.3]						Soft to medium hard brown SANDSTONE; fine to medium grained, severely weathered. @ 5.55 m - 5.61 m [18.2' - 18.4'] & 6.22 m - 6.43 m [20.4'-21.1'] clayey decomposed layers. @ 5.76 m [18.9'], 6.52 m [21.4'], 6.71 m [22.0'], clayey seams.								
			Core 1.524 m [60"]	Rec 1.321 m [52"]		RQD 35%									
6.10 [20]							@ 6.71 m - 6.77 m [22.0' - 22.2'], severely weathered.								
			Core 1.524 m [60"]	Rec 1.397 m [55"]		RQD 28%									
7.62															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-8 | Location: 39+683.1, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS: Water seepage at: none. Water level at completion: dry prior to coring; 1.15 m [3.8'] (w ith core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
0 [0]	238.22 [781.6]						Topsoil removed by dozer ~ 0.406 m [16"]								
		4 6 7	.432 [17]	1		431+ [4.5+]	Hard dark brown SILT AND CLAY (A-6a); damp.								
1.07 [3.5]	237.15 [778.1]	6 9	.356	2A		24 [0.25]	Soft gray SILT (A-4b); organic; moist.								
1.28 [5.0]	236.94 [777.4]	10	[14]	2B		431+ [4.5+]	Very stiff to hard brown, light brown and gray SILTY CLAY (A-6b), some fine to coarse sand, some gravel; coluvial soil; damp.								
		6 8 9	.254 [10]	3		431+ [4.5+]									
3.05 [10]		6 6 8	.457 [18]	4		335 [3.5]									
3.35 [11.0]	234.87 [770.6]	4 5 7	.279 [11]	5		96 [1.0]	Stiff to very stiff dark brown SILT AND CLAY (A-6a), some to "and" gravel, some fine to coarse sand; coluvial soil; moist.								
4.57 [15]		2 4 5	.381 [15]	6		287 [3.0]									
5.03 [16.5]	233.19 [765.1]	8 22 28	.457 [18]	7		431+ [4.5+]	Hard gray SILT AND CLAY (A-6a); decomposed siltstone; damp.								
5.64 [18.5]	232.58 [763.1]	50/.08	.076 [3]	8			Limestone fragments								
6.10 [20]	232.12						Very soft brown CLAYSTONE; severely weathered.								
6.25 [20.7]	231.97 [760.9]	Core 1.524 m [60"]	Rec 1.067 m [42"]	RQD 63%			Hard gray LIMESTONE, weathered. Medium hard gray CLAYSTONE, slightly calcareous; weathered.								
6.31	231.91														
7.62															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-7 | Location: 39+650.23, 24.68 m Lt. of US 33 centerline | Date Drilled: 11/8/99

WATER OBSERVATIONS: Water seepage at: none. Water level at completion: dry prior to coring; 7.32 m [24.0'] (w ith core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
7.62 [25]	250.81 [822.2]						Soft to medium hard brown SANDSTONE; fine to medium grained, severely weathered. @ 7.77 m - 8.11 m [25.5' - 26.6'], highly friable with clay seams.								
			Core 1.524 m [60"]	Rec .965 m [38"]		RQD 28%	@ 8.14 m - 8.23 m [26.7' - 27.0'], clayey layer.								
9.14 [30]							@ 9.72 m [31.9'] & 9.85 m [32.3'], clay seams.								
			Core 1.524 m [60"]	Rec 1.041 m [41"]		RQD 25%	@ 10.33 m - 10.36 m [33.9' - 34.0'], vertical fracture. @ 10.52 m - 11.19 m [34.5' - 36.7'], severely weathered with possible core loss.								
10.67 [35]															
11.28 [37.0]	246.95 [810.2]	Core 1.524 m [60"]	Rec .940 m [37"]			RQD 0%	Soft to moderately hard gray SANDSTONE, argillaceous; weathered; friable, slightly carbonaceous.								
12.19 [40]															
12.80 [42.0]	245.43 [805.2]	Core 1.524 m [60"]	Rec 1.422 m [56"]			RQD 55%	Soft dark gray SHALE, carbonaceous.								
13.29 [43.6]	244.94 [803.6]						Hard gray SANDSTONE; fine to medium grained, slightly weathered.								
13.72 [45]															
13.93 [45.7]	244.30 [801.5]						Medium hard dark gray SANDSTONE, silty and argllaceous; severely weathered.								
14.33 [47.0]	243.90 [800.2]						Bottom of Boring - 14.33 m [47.0']								
15.24															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-8 | Location: 39+683.1, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS: Water seepage at: none. Water level at completion: dry prior to coring; 1.15 m [3.8'] (w ith core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
7.62 [25]	230.60 [756.6]	Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 80%			Medium hard red and gray CLAYSTONE; weathered.								
8.02 [26.3]	230.20 [755.2]						Medium hard gray SILTY CLAYSTONE, slightly calcareous; weathered. @ 8.44 m [27.7'], slickensided shear.								
8.69 [28.5]	229.53 [753.1]						Medium hard gray SILTSTONE, slightly calcareous; weathered; contains limestone clasts.								
9.14 [30]	229.08 [751.6]						Bottom of Boring - 9.14 m [30.0']								
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

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CALCULATED T.A.H. | CHECKED BY A.E.N.
DATE 02/02/01 | REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

5 / 10

835
949

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-9 | Location: 39+721.5, 19.8 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.15 m [3.8'] (w th core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	234.75						Topsoil removed by dozer ~ 0.229 m [9"]
		3 4 6	.432 [17]	1		311 [3.25]	Very stiff brown SILTY CLAY (A-6b), trace to little fine to coarse sand; damp.
1.07 [3.5]	233.68 [768.7]	8 11 15	.457 [18]	2		431+ [4.5+]	Hard brown and light brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.
1.52 [5]	232.92 [764.2]	9 10 12	.406 [16]	3			Medium dense dark brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); damp.
1.83 [6.0]		18 13 35	.381 [15]	4			@ 2.59 m - 3.05 m [8.5' - 10.0'], dense, light brown.
3.05 [10]	231.24 [758.7]	7 8 8	.432 [17]	5		120 [1.25]	Stiff brown SILTY CLAY (A-6b); contains fine sand seams; moist.
3.51 [11.5]	230.64 [756.7]	3 4 5	.330 [13]	6			Loose to medium dense light brown, dark brown and gray GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); damp to moist.
4.11 [13.5]	229.57 [753.2]	3 4 9	.432 [17]	7		---	Hard purple, brown and gray SILTY CLAY (A-6b); severely weathered claystone; damp.
4.57 [15]	228.35 [749.2]	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 75%			Soft to medium hard gray SILTY CLAYSTONE; weathered. @ 6.40 m - 7.01 m [21.0' - 23.0'], slightly calcareous. @ 7.41 m [24.3'], contains limestone clasts. @ 7.62 m [25.0'], contains limestone clasts.
6.10 [20]							
6.40 [21.0]							
7.62							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL X—●— Natural —X LL; 10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-10 | Location: 39+743.0, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS:
Water seepage at: 3.51 m [11.5']
Water level at completion: dry prior to coring
0.98 m [3.2'] (w th core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	231.30 [758.9]						Topsoil - 0.305 m [12"]
0.30 [1.0]	231.00 [757.9]	2					Very stiff dark brown SILT (A-4b), trace fine sand; slightly organic; damp.
0.61 [2.0]	230.69 [756.9]	4 10	.432 [17]	1		287 [3.0]	Medium dense brown COARSE AND FINE SAND (A-3a), trace silty clay, trace gravel; damp.
1.07 [3.5]	230.23 [755.3]	6 5 8	.457 [18]	2		383 [4.0]	Hard brown, gray and black SILTY CLAY (A-6b), trace fine to coarse sand; damp.
1.52 [5]	229.47 [752.9]	5 5 5	.381 [15]	3			Medium dense brown COARSE AND FINE SAND (A-3a), some clayey silt, trace gravel; damp to moist.
1.83 [6.0]	228.71 [750.4]	1 2 2	.457 [18]	4		48 [0.5]	Soft brown and gray SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; moist. @ 2.62 m - 2.68 m [8.6' - 8.8'], coal and carbonaceous shale fragments.
2.59 [8.5]	227.79 [747.3]	4 4 6	.406 [16]	5			Medium dense brown and red GRAVEL WITH SAND (A-1-b); moist to wet.
3.05 [10]	227.19 [745.4]	6 21 14	.432 [17]	6		431+ [4.5+]	Hard gray SILTY CLAY (A-6b); decomposed silty shale; damp.
3.51 [11.5]		14 31 36	.457 [18]	7		431+ [4.5+]	
4.11 [13.5]	225.66 [740.4]	40 50/.08	.229 [9]	8		431+ [4.5+]	Severely weathered gray SILTY SHALE.
4.57 [15]	225.20 [738.8]	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 92%			Soft gray SHALE; severely weathered.
5.64 [18.5]	224.78 [737.5]						Hard gray SANDSTONE, fine to medium grained, micaceous; slightly weathered.
6.10 [20]							
6.52 [21.4]							
7.62							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL X—●— Natural —X LL; 10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-9 | Location: 39+721.5, 19.8 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.15 m [3.8'] (w th core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62 [25]	227.13 [745.2]	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 75%			Soft to medium hard gray SILTY CLAYSTONE; weathered.
7.96 [26.1]	226.79 [744.1]						Medium hard gray SILTSTONE; weathered.
9.14 [30]	225.30 [739.2]						Bottom of Boring - 9.45 m [31.0']
9.45 [31.0]							
10.67 [35]							
12.19 [40]							
13.72 [45]							
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL X—●— Natural —X LL; 10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-10 | Location: 39+743.0, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS:
Water seepage at: 3.51 m [11.5]
Water level at completion: dry prior to coring
0.98 m [3.2'] (w th core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62 [25]	223.68 [733.9]	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 92%			Hard gray SANDSTONE, fine to medium grained, micaceous; slightly weathered.
9.14 [30]	222.16 [728.9]						@ 9.11 m [29.9'], very thin clay seam. Bottom of Boring - 9.14 m [30.0']
10.67 [35]							
12.19 [40]							
13.72 [45]							
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL X—●— Natural —X LL; 10 20 30 40

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CALCULATED T.A.H.
CHECKED BY A.E.N.
DATE 02/02/01
REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

6 / 10

836
949

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-11 | Location: 39+781.4, 19.8 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS:
Water seepage at: 1.83 - 2.29 m [6.0' - 7.5']
Water level at completion: 0.94 m [3.1'] prior to coring
2.88 m [9.4'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. (Drive)	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	229.52												
0.24 [0.8]	229.28 [752.2]					Topsoil - 0.254 m [10"]							
0.91 [3.0]	228.61 [750.0]	2 2 2	.356 [14]	1	144 [1.5]	Stiff dark brown SANDY SILT (A-4a), some clay; moist.	0	4	---	28	41	27	
1.52 [5]		2 2 2	.127 [5]	2		Loose brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; moist.	9	25	---	31	22	14	
2.29 [7.5]	227.23 [745.5]	1 2 24	.381 [15]	3		@ 1.83 m [6.0'], becomes medium dense, wet.	17	21	---	31	21	11	
3.05 [10]		50/.08	.076 [3]	4	---	Hard gray SILT AND CLAY (A-6a); decomposed siltstone; damp.							50+
3.51 [11.5]	226.01 [741.5]	54 50/.00	.076 [3]	5		@ 3.35 m - 3.51 m [11.0' - 11.5'], soft gray SILTSTONE, severely weathered to weathered..							50+
		Core 0.61 m	Rec .508 m	RQD 18%		Hard gray SILTSTONE; slightly weathered.							
4.48 / 4.57 [15]	225.04 [738.3]	Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 94%		Hard gray SANDSTONE, fine to medium grained, micaceous; slightly weathered. @ 5.00 m - 5.12 m [16.4' - 16.8'], calcareous layer. @ 5.24 m - 5.35 m [17.2' - 17.5'], calcareous layer. @ 5.39 m - 5.43 m [17.7' - 17.8'], calcareous layer. @ 5.84 m - 5.85 m [19.1' - 19.2'], calcareous layer. @ 6.25 m - 6.28 m [20.5' - 20.6'], calcareous layer.							
6.10 [20]													
6.43 [21.1]	223.09 [731.9]					Hard gray SILTSTONE; slightly weathered.							
7.16 [23.5]	222.36 [729.5]					Bottom of Boring - 7.16 m [23.5']							
7.62													

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-12 | Location: 39+803.2, 5.4 m Lt. of US 33 centerline | Date Drilled: 11/1/99

WATER OBSERVATIONS:
Water seepage at: 1.22 m [4.0']
Water level at completion: 0.76 m [2.5'] (before coring)
2.68 m [8.8'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. (Drive)	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	229.42 [752.7]												
0.37 [1.2]	229.05 [751.5]					Topsoil - 0.356 m [14"]							
0.91 [3.0]	228.51 [749.7]	1 2 2	.381 [15]	1	192 [2.0]	Stiff to very stiff brown SILT AND CLAY (A-6a), some fine to coarse sand; moist.	0	6	---	28	46	21	
1.52 [5]		2 2 10	.279 [11]	2		Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little clay; damp.	38	21	---	15	16	10	
1.83 [6.0]	227.59 [746.7]	24 50/.10	.254 [10]	3	---	Hard gray SANDY SILT (A-4a); decomposed to severely weathered siltstone; damp.							50+
		50/.13	.127 [5]	4	---								50+
3.05 [10]		38 50/.05	.203 [8]	5	---								50+
4.18 [13.7]	225.24 [739.0]	50/.08	.076	6		@ 4.11 m - 4.18 m [13.5' - 13.7'], severely weathered gray SANDSTONE.							50+
4.57 [15]		Core 1.219 m [48"]	Rec 1.092 m [43"]	RQD 73%		Soft gray CLAYSTONE, arenaceous; weathered. @ 4.18 m - 4.27 m [13.7' - 14.0'], hard gray SANDSTONE, contains a vertical fracture.							
4.91 [16.1]	224.51 [736.6]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 95%		Hard gray SANDSTONE, micaceous; slightly weathered. @ 5.12 m - 5.24 m [16.8' - 17.2'], calcareous . @ 5.55 m - 5.90 m [18.2' - 19.4'], calcareous .							
6.10 [20]						@ 6.16 m - 6.36 m [20.2' - 20.9'], argillaceous. @ 6.61 m - 6.71 m [21.7' - 22.0'], argillaceous.							
7.62		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%									

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-12 | Location: 39+803.2, 5.4 m Lt. of US 33 centerline | Date Drilled: 11/1/99

WATER OBSERVATIONS:
Water seepage at: 1.22 m [4.0']
Water level at completion: 0.76 m [2.5'] (before coring)
2.68 m [8.8'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No.	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
7.62 [25]	221.80 [727.7]					Hard gray SANDSTONE, micaceous; slightly weathered. @ 8.32 m - 8.40 m [27.3' - 27.5'], 45° fracture. @ 8.17 m - 8.44 m [26.8' - 27.7'], argillaceous.							
8.44 [27.7]	220.98 [725.0]					Bottom of Boring - 8.44 m [27.7']							
9.14 [30]													
10.67 [35]													
12.19 [40]													
13.72 [45]													
15.24													

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CALCULATED T.A.H. | CHECKED BY A.E.N.
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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-13 | Location: 39+840.49, 16.80 m Lt. of US 33 centerline | Date Drilled: 11/1-11/4/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 0.82 m [2.7'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0 [0]	234.32 [768.8]						Topsoil - 0.381 m [15"]								
0.40 [1.3]	233.92 [767.5]	2 13 4	.279 [11]	1		359 [3.75]	Very stiff to hard brown, red and gray SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; colluvial soil; damp.								
1.52 [5]		3 6 8	.279 [11]	2		431+ [4.5+]									
		8 9 10	.305 [12]	3		431+ [4.5+]									
3.05 [10]	230.97 [757.8]	2 3 5	.381 [15]	4		287 [3.0]									
3.35 [11.0]		12 24 37	.279 [11]	5		---	Hard gray SANDY SILT (A-4a); decomposed siltstone; damp, damp.								
4.11 [13.5]	230.21 [755.3]	21 50/.15	.203 [8]	6		---	Hard brown and gray SILT AND CLAY (A-6a); decomposed shale; damp.								
4.57 [15]		37 50/.15	.305 [12]	7		---									
5.64 [18.5]	228.68 [750.3]	33 50/.15	.305 [12]	8			Soft gray CLAYSTONE, severely weathered								
5.88 [19.3]	228.44 [749.5]	Core 0.838 m [33"]	Rec .533 m [21"]	RQD 30%			Soft gray CLAYSTONE; weathered.								
6.10 [20]							@ 6.71 m [22.0'], gray and red mottled.								
7.62		Core 1.524 m [60"]	Rec .559 m [22"]	RQD 22%											

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-14 | Location: 39+869.0, 7.8 m Lt. of US 33 centerline | Date Drilled: 11/10 & 11/11/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 8.93 m [29.3'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0 [0]	246.50 [808.7]						Topsoil - 0.457 m [18"]								
0.46 [1.5]	246.04	2													
0.61 [2.0]	245.89 [806.7]	13 14	.330 [13]	1		287 [3.0]	Very stiff brown and dark brown SILT AND CLAY (A-6a); organic; damp.								
1.07 [3.5]	245.43 [805.2]	4					Medium dense light brown GRAVEL (A-1-a); severely weathered to decomposed sandstone; damp.								
1.52 [5]		4 4 4	.203 [8]	2		431+ [4.5+]	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand; damp.								
1.83 [6.0]	244.67 [802.7]	4 5 7	.229 [9]	3			Medium dense brown and gray GRAVEL (A-1-a); severely weathered sandstone; damp.								
2.59 [8.5]	243.91 [800.2]	5					Hard black and dark brown SILTY CLAY (A-6b); decomposed shale; damp.								
3.05 [10.0]		11 50/.13	.330 [13]	4A 4B		431+ [4.5+]	@ 2.90 m [9.5'], color change to brown and gray.								
3.35 [11.0]	243.15 [797.7]	50/.08	.051 [2]	5		---	Hard gray SILT AND CLAY (A-6a); decomposed sandy siltstone; damp.								
4.21	242.29	50/.13	.127	6		---									
4.34 [14.2]	242.16 [794.5]	Core 1.143 m [45"]	Rec 1.143 m [45"]	RQD 80%			Medium hard dark gray and light gray SILTSTONE; laminated.								
4.57 [15.0]							Soft dark gray SHALE, carbonaceous; severey weathered.								
5.39 [17.7]	241.11 [791.0]	Core 1.524 m [60"]	Rec .432 m [17"]	RQD 0%			Soft gray SANDSTONE; fine to medium grained, severely weathered.								
6.10 [20]															
6.98 [22.9]	239.52 [785.8]	Core 1.219 m [48"]	Rec 1.219 m [48"]	RQD 0%			@ 6.77 m - 6.98 m [22.2' - 22.9'], Soft SHALE, carbonaceous, severely weathered. Soft brown SANDSTONE; fine to medium grained, severely weathered. @ 7.47 m - 7.56 m [24.5' - 24.8'], Soft gray SHALE, severly weathered.								
7.62															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-13 | Location: 39+840.49, 16.80 m Lt. of US 33 centerline | Date Drilled: 11/1-11/4/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 0.82 m [2.7'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62 [25]	226.70 [743.8]						Soft red CLAYSTONE; weathered.								
		Core 1.524 m [60"]	Rec 1.397 m [55"]	RQD 45%			@ 8.99 m [29.5'], gray and red mottled.								
9.14 [30]															
9.57 [31.4]	224.75 [737.4]	Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 78%			Medium hard gray SILTSTONE; moderately weathered. @ 9.66 m [31.7'], becomes calcareous.								
10.67 [35]							@ 10.67 m - 10.79 m [35.0' - 35.4'], partially healed fracture. @ 10.97 m - 11.06 m [36.0' - 36.3'], near vertical fracture. @ 11.09 m - 11.16 m [36.4' - 36.6'], limestone layer. @ 11.34 m [37.2'], clay seam.								
12.19 [40]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 97%											
12.62	221.70						Hard gray SANDSTONE, calcareous; slightly weathered.								
12.80 [42.0]	221.52 [726.8]						Bottom of Boring - 12.80 m [42.0']								
13.72 [45]															
15.24															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-14 | Location: 39+869.0, 7.8 m Lt. of US 33 centerline | Date Drilled: 11/10 & 11/11/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 8.93 m [29.3'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62 [25]	238.88 [783.7]						Soft brown SANDSTONE, fine to medium grained; severely weathered.								
8.05 [26.4]	238.45 [782.3]						Soft gray SHALE; severely weathered.								
		50/.08	.076 [3]	7											
9.14 [30]		50/.05	.051 [2]	8											
10.49	236.01	Core 1.372 m [54"]	Rec .686 m [27"]	RQD 19%			@ 10.24 m [33.6'], slightly calcareous.								
10.67 [35.0]	[774.3]						Medium hard gray LIMESTONE; weathered.								
12.19 [40]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 88%			@ 11.58 m [38.0'], becomes interbedded with weathered medium hard SHALE. @ 11.70 m - 11.77 m [38.4' - 38.6'], near vertical fracture. @ 12.22 m - 12.28 m [40.1' - 40.3'], ~30° fracture. @ 12.51 m - 12.65 m [41.0' - 41.5'], broken and fractured. @ 12.68 m - 12.80 m [41.6' - 42.0'], near vertical fracture.								
13.50	233.00	Core 1.524 m [60"]	Rec 1.270 m [50"]	RQD 47%			@ 13.29 m [43.6'], broken.								
[44.3] 13.72 [45]	[764.4]						Soft to medium hard red CLAYSTONE; weathered. @ 14.39 m - 14.45 m [47.2' - 47.4'], calcareous SILTSTONE, weathered. @ 14.45 m [47.4'], color change to purple and brown.								
14.63 [48.0]	231.87 [760.7]						Bottom of Boring - 14.63 m [48.0']								
15.24															

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CALCULATED T.A.H. | CHECKED BY A.E.N.
DATE 02/02/01
REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

8 / 10

838
949

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-15 | Location: 39+888.61, 19.81 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 1.37 m [4.5'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % PL X Natural ● LL X (10 20 30 40)	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 ○ 30 40)
0 [0]	244.44 [802.0]						Topsoil - 0.432 m [17"]								
0.43 [1.4]	244.01 [800.6]	2 6	.356 [14]		1		Medium dense to very dense light brown GRAVEL WITH SAND (A-1-b); decomposed to severely weathered sandstone; damp.								
1.52 [5]		24 50/.05	.203 [8]		2										50+
		39 50/.08	.229 [9]		3										50+
3.05 [10]		17 48 50/.08	.356 [14]		4										50+
3.35 [11.4]	241.09 [790.8]	32 50/.10	.254 [10]	5A 5B		--- ---	Hard dark brown SILTY CLAY (A-6b); decomposed shale; damp Hard brown and gray SILT AND CLAY (A-6a); decomposed siltstone; damp.								50+
4.57 [15]		24 28 50/.13	.356 [14]		6	431+ [4.5+]									50+
4.88 [16.0]	239.56 [788.0]	22 38 50/.10	.432 [17]	7A 7B		--- ---	Hard black SILT AND CLAY (A-6a); decomposed carbonaceous shale with coal stringers; damp.								50+
5.64 [18.5]	238.80 [783.5]	17 50/.10	.254 [10]		8	431+ [4.5+]	Hard gray SILTY CLAY (A-6b); decomposed shale; damp.								50+
5.85 [20.0]	238.59 [782.8]	Core 0.305 m [60"]	Rec 000 m [57"]	RQD 0%			Very soft black COAL; core loss.								
6.40 [21.0]	238.04 [781.0]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 55%			Soft dark gray SHALE, carbonaceous; weathered; LOSS.								
6.71 [22.0]	237.73 [779.5]						Medium hard gray SHALE, calcareous; weathered; broken.								
6.86 [22.5]	237.58 [779.5]						Hard gray LIMESTONE; moderately weathered. @ 7.04 m - 7.19 m [23.1' - 23.6'], Soft SHALE, weathered. @ 7.19 m - 7.38 m [23.6' - 24.2'], vertical fracture. @ 7.41 m - 7.80 m [24.3' - 25.6'], Soft SHALE weathered.								
7.62															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-59 | Location: Sta. 39+927.77, 2.21 m Lt. of US 33 centerline | Date Drilled: 4/5/00

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: none (before coring); 1.37 m [4.5'] (after coring, includes drilling water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % PL X Natural ● LL X (10 20 30 40)	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 ○ 30 40)
0	255.83														
0.18 [0.6]	255.65 [838.7]					215 [2.25]	Topsoil - 0.178 m [7"] Very stiff brown SILT AND CLAY (A-6a); some fine to coarse sand; contains sandstone fragments; damp.								
0.46 [1.5]	255.37 [837.8]	21 34 12	.330 [13]		1A 1B		Severely weathered brown SANDSTONE, argillaceous.								
1.52 [5]	254.31 [834.4]	50/.08	.076 [3]		2		@ 1.07 m - 1.16 m [3.5' - 3.8'], rust stained.								50+
		Core 1.372 m [54"]	Rec 1.168 m [46"]	RQD 76%			Medium hard to hard brown SANDSTONE, fine to coarse grained, micaceous; @ 2.07 m - 2.41 m [6.8' - 7.9'], loosely cemented.								
3.05 [10]		Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 97%			@ 3.26 m - 5.36 m [10.7' - 17.6'], gray, contains rust stains.								
4.57 [15]		Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 98%			@ 5.36 m - 7.47 m [17.6' - 24.5'], contains dark brown micaceous laminations. @ 5.39 m [17.7'], thin clay seam.								
6.10 [20]							@ 6.80 m [22.3'], thin clay seam.								
7.47 [24.5]	248.36 [814.8]						Bottom of Boring - 7.47 m [24.5]								

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-15 | Location: 39+888.61, 19.81 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 1.37 m [4.5'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % PL X Natural ● LL X (10 20 30 40)	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 ○ 30 40)
7.62 [25]	236.82 [777.0]						Hard gray LIMESTONE; moderately weathered.								
7.92 [26.0]	236.52 [776.0]	Core 1.524 m [60"]	Rec 1.092 m [43"]	RQD 58%			Soft gray CLAYSTONE, calcareous; weathered.								
9.14 [30]															
9.45 [31.0]	234.99 [771.0]						Bottom of Boring - 9.45 m [31.0'] Driller's note: hole caved in after completion.								
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

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CALCULATED T.A.H. | CHECKED BY A.E.N.
DATE 02/02/01
REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

9 / 10

839
949

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-58 | Location: 39+876.65, 15.36 m Rt. of US 33 centerline | Date Drilled: 4/3 &4/4/00

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: none (before coring) 4.27 m [14.0'] (after coring, includes drilling water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
0	259.27						Topsoil - 0.305 m [12"] Note: 381 mm [15"] topsoil removed prior to drilling.								
0.30 [1.0]	258.97 [849.6]	1 2 4	305 [12]		1	144 [1.5]	Stiff to very stiff brown SILTY CLAY (A-6b), little fine to coarse sand, contains limestone and sandstone fragments; damp to moist.								
1.52 [5]		2 3 4	229 [9]		2	239 [2.5]									
		2 6 8	279 [11]		3	168 [1.75]									
2.59 [8.5]	256.68 [842.1]	50/.10	076 [3]		4		Weathered SHALE fragments.							50+	
3.05 [10]															
3.66	255.61	30	279 [11]		5									50+	
3.84 [12.6]	255.43 [838.0]	Core 1.219 m [48"]	Rec 1.143 m [45"]	RQD 77%			Soft brown SHALE. @ 3.66 m - 3.75 m [12.0' - 12.3'], core loss. Medium hard to hard SANDSTONE, fine to coarse grained, micaceous. @ 3.84 m - 3.93 m [12.6' - 12.9'], high angle fracture cemented with clay. @ 4.66 m - 4.88 m [15.3' - 16.0'], medium hard brown SHALE, interbedded sandstone seams.								
4.57 [15]															
4.88 [16.0]	254.39 [834.6]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			Hard brown SANDSTONE, fine to coarse grained, micaceous, contains rust stains. @ 4.88 m - 6.40 m [16.0' - 21.0'], slightly vuggy.								
6.10 [20]															
		Core 1.194 m [47"]	Rec 1.194 m [47"]	RQD 100%											
7.62															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-58 | Location: 39+876.65, 15.36 m Rt. of US 33 centerline | Date Drilled: 4/3 &4/4/00

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: none (before coring) 4.27 m [14.0'] (after coring, includes drilling water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
15.24	244.03						Hard gray SANDSTONE. @ 15.54 m - 15.64 m [51.0' - 51.3'], carbonaceous shale, interbedded with coal.								
15.64 [51.3]	243.63 [799.3]	Core 1.524 m [60"]	Rec 1.372 m [54"]	RQD 73%			Soft to medium hard dark gray SHALE/CLAYSTONE. @ 16.31 m - 16.43 m [53.5' - 53.9'], possible core loss. @ 16.46 m - 16.64 m [54.0' - 54.6'], hard dark gray SILTSTONE, interbedded with SANDSTONE.								
16.76 [55.0]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 32%			@ 17.50 m - 18.56 m [57.4' - 60.9'], interbedded carbonaceous shale seams with coal fragments and COAL seams.								
18.29 [60]	240.68														
18.59 [61.5]	240.52 [789.1]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 68%			COAL Medium hard to hard dark gray SHALE/CLAYSTONE, contains occasional thin limestone threads. @ 18.75 m - 18.87 m [61.5' - 61.9'], possible core loss. @ 18.87 m - 18.93 m [61.9' - 62.1'], very broken.								
19.75 [65.0]	239.52 [785.8]						Hard gray LIMESTONE.								
20.12 [66.0]	239.15 [784.6]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 62%			Medium hard to hard dark gray SHALE/CLAYSTONE, contains occasional thin limestone threads. @ 20.79 m - 20.88 m [68.2' - 68.5'], very broken.								
21.34 [70]	237.63 [779.8]						@ 21.21 m - 21.43 m [69.6' - 70.3'], calcareous. @ 21.43 m - 21.55 m [70.3' - 70.7'], very broken.								
21.64 [71.0]							Bottom of Boring - 21.64 m [71.0']								
22.86															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-58 | Location: 39+876.65, 15.36 m Rt. of US 33 centerline | Date Drilled: 4/3 &4/4/00

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: none (before coring) 4.27 m [14.0'] (after coring, includes drilling water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL X Natural ● X LL 10 20 30 40
7.62 [25]	251.65 [825.6]	Core 1.854 m [73"]	Rec 1.854 m [73"]	RQD 100%			Hard brown and gray SANDSTONE, fine to coarse grained, micaceous, contains rust stains.								
9.14 [30]		Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 100%			@ 9.45 m [31.0'], 6 mm [0.25 "] clay seam.								
10.67 [35]							@ 11.22 m - 11.83 m [36.8' - 38.8'], medium hard, contains dark brown organic contaminants, loosely cemented.								
12.19 [40]		Core 3.048 m [120"]	Rec 2.946 m [116"]	RQD 95%			@ 13.35 m - 15.24 m [43.8' - 50.0'], contains dark gray micaceous laminations.								
13.72 [45]							@ 14.78 m [48.5'], contains thin coal laminations.								
15.24															

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CALCULATED T.A.H. | CHECKED BY A.E.N.
DATE 02/02/01
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DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-41030
OVER PRATTS FORK CREEK

ATH-33-40.981

10 / 10

840
949

GEOLOGY OF THE SITE

GENERALIZED GEOLOGIC REFERENCES REPORT THAT THE SITE IS LOCATED WITHIN THE UNGLACIATED SECTION OF THE ALLEGHENY PLATEAU. OVERBURDEN AT THE SITE CONSISTS OF THIN RESIDUAL SOILS ALONG RIDGETOPS AND HILLSIDES, COLLUVIAL SOILS AT THE BASE OF THE HILLSIDES, AND MINOR ALLUVIAL DEPOSITS ALONG STREAM CHANNELS. THE UNDERLYING BEDROCK AT THE SITE IS REPORTED TO BE SHALE, SANDSTONE, COAL, AND LIMESTONE OF MONONGAHELA SERIES ALONG THE HILLSIDES AND CONEMAUGH SERIES WITHIN THE VALLEY BOTTOM.

EXPLORATION

A TOTAL OF SIX BORINGS, SB-1 THROUGH SB-6, WERE DRILLED AT THE PROJECT BETWEEN OCTOBER 18, 1999 AND OCTOBER 28, 1999. THE BORINGS WERE DRILLED TO DEPTHS BETWEEN 9.75 AND 24.75 METERS (32.0 AND 81.2 FEET) BY MEANS OF A TRUCK-MOUNTED OR TRACK-MOUNTED (ATV) ROTARY-TYPE DILL RIG USING HOLLOWSTEM AUGERS. THE BORINGS WERE EXTENDED INTO BEDROCK AND BEDROCK WAS VERIFIED BY CORING IN ALL THE BORINGS.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

1. SOILS

AT THE GROUND SURFACE, 330 TO 483 MILLIMETERS (13 TO 19 INCHES) OF TOPSOIL WERE ENCOUNTERED BY THE BORINGS. BELOW THE TOPSOIL, THE BORINGS ENCOUNTERED PRIMARILY COHESIVE MATERIAL EXTENDING TO THE TOP OF BEDROCK. THE BORINGS ALONG THE HILLSIDES AND WITHIN THE VALLEY ENCOUNTERED PRIMARILY VERY STIFF TO HARD COHESIVE SOILS RANGING FROM CLAY (A-7-6) TO SILT AND CLAY (A-6a). A DECOMPOSED TO SEVERELY WEATHERED SILTSTONE, CLASSIFIED AS EITHER A VERY DENSE SANDY SILT (A-4a) OR A VERY STIFF SILTY CLAY (A-6b), WAS ENCOUNTERED JUST ABOVE COMPETENT ROCK IN BORINGS SB-3 AND SB-4.

2. BEDROCK

BEDROCK WAS ENCOUNTERED IN EACH OF THE SIX BORINGS DURING DRILLING AND GENERALLY CONSISTED OF VARYING DEPTHS OF SEVERELY WEATHERED BEDROCK OVERLYING MORE COMPETENT BEDROCK. COMPETENT BEDROCK WAS ENCOUNTERED IN THE BORINGS AT DEPTHS OF BETWEEN 2.29 AND 7.62 METERS (7.5 AND 25.0 FEET) AND GENERALLY CONSISTED OF SHALE, SILTSTONE, SANDSTONE, AND LIMESTONE.

3. GROUNDWATER

GROUNDWATER SEEPAGE WAS ENCOUNTERED IN BORING SB-4 AT DEPTHS OF BETWEEN 2.74 AND 2.92 METERS (9.0 AND 9.6 FEET) BELOW GROUND SURFACE. SEEPAGE WAS NOT DETECTED IN ANY OF THE OTHER BORINGS DURING DRILLING. WATER LEVELS PRIOR TO CORING WERE NOT DETECTED. AT COMPLETION OF DRILLING, WATER LEVELS RANGED FROM 0.91 TO 2.41 METERS (3.0 TO 7.9 FEET) BELOW GROUND SURFACE. HOWEVER, THE FINAL WATER LEVELS INCLUDED DRILLING WATER AND MAY NOT BE REPRESENTATIVE OF THE ACTUAL GROUNDWATER CONDITIONS AT THE SITE. IT IS ANTICIPATED THAT THE GROUNDWATER LEVEL AT THE SITE IS RELATED TO THE WATER LEVEL IN THE TRIBUTARY TO PRATTS FORK CREEK.

SYMBOLS OF ROCK TYPES

- SANDSTONE
- SILTSTONE
- WEATHERED CLAYSTONE
- WEATHERED LIMESTONE
- WEATHERED SANDSTONE
- WEATHERED SHALE
- WEATHERED SILTSTONE

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 INVESTIGATION 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.

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

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 50.80 mm O.D., 34.93 mm I.D., SPLIT-SPOON SAMPLER, AT CONTINUOUS, 0.75 m AND/OR 1.50 m DEPTH INTERVALS, DRIVEN BY MEANS OF A 63.5 kg HAMMER WITH A FREE FALL OF 0.76 m. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER THREE 0.15 m INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING A 76 mm O.D. THIN-WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILL RIG.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING AN NQ2 OR NXM CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS SHOW A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, NUMBER OF BLOWS FOR THE STANDARD PENETRATION TEST IN THREE 0.15 m INCREMENTS, AND A SAMPLE DESCRIPTION BASED ON LABORATORY TEST RESULTS, UTILIZING THE ODOT CLASSIFICATION SYSTEM. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, 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.

SCOUR ANALYSIS INFORMATION

BORING NUMBER	SAMPLE NUMBER	DEPTH (m)	ODOT CLASSIFICATION	D50 SIZE (mm)
SB-3	S-2B	1.10-1.50 (3.5'-5.0')	A-7-6	0.0053
SB-3	S-3A	1.80-2.30 (6.0'-7.5')	A-7-6	0.0730
SB-3	S-4	2.59-3.05 (8.5'-10.0')	A-6b	0.0068
SB-4	S-2	1.10-1.50 (3.5'-5.0')	A-6a	0.1040
SB-4	S-3	1.80-2.30 (6.0'-7.5')	A-6a	0.3970
SB-4	S-4	2.59-3.05 (8.5'-10.0')	A-6b	0.0066

LEGEND

- PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION
- TR — TOP OF ROCK
- W — INDICATES FREE WATER ELEVATION
- ▼ — INDICATES STATIC WATER ELEVATION
- X/Y/Z — FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR STANDARD PENETRATION TEST
  - X = NUMBER OF BLOWS FOR FIRST 150 mm
  - Y = NUMBER OF BLOWS FOR SECOND 150 mm
  - Z = NUMBER OF BLOWS FOR THIRD 150 mm
- 50 (n) — INDICATES NUMBER OF BLOWS (50) TO DRIVE A SPLIT-BARREL SAMPLER A DEPTH OF (n) MILLIMETERS OTHER THAN THE NORMAL 150 MILLIMETER INCREMENT.

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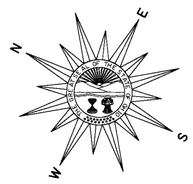
DRAWN BY	REVIEWED BY	DATE	CALCULATED	CHECKED BY
J.L.P.	T.A.H.	02/02/01	T.A.H.	A.E.N.

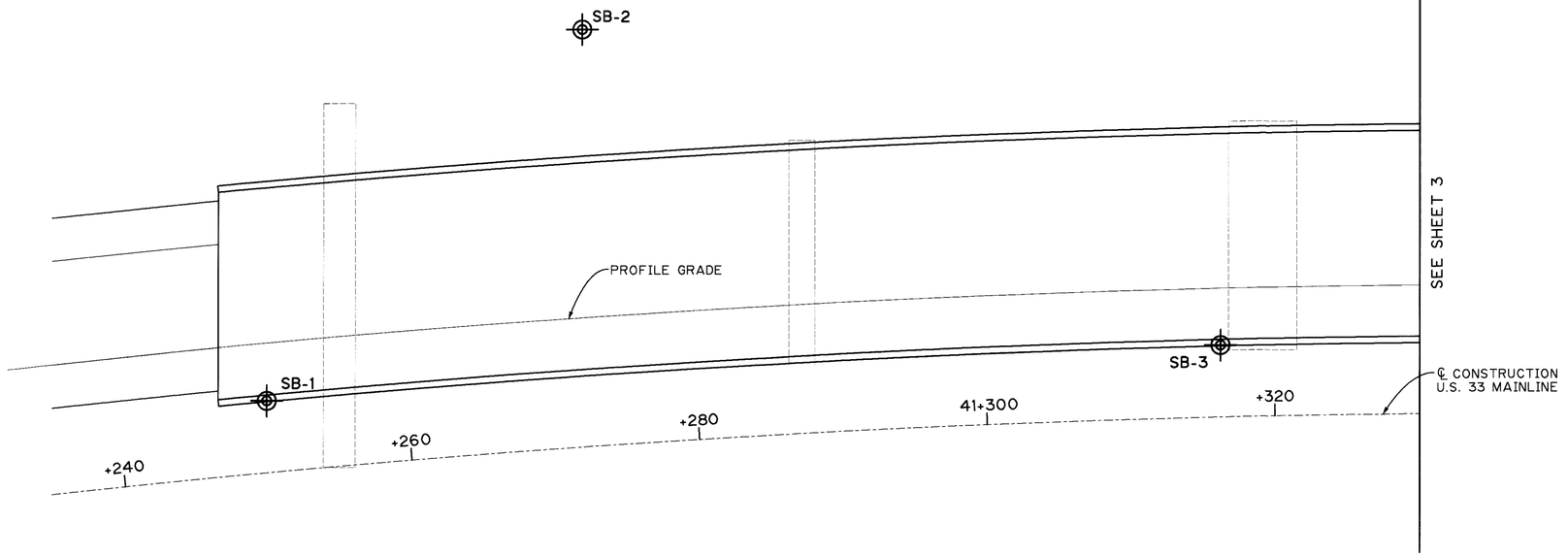
STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

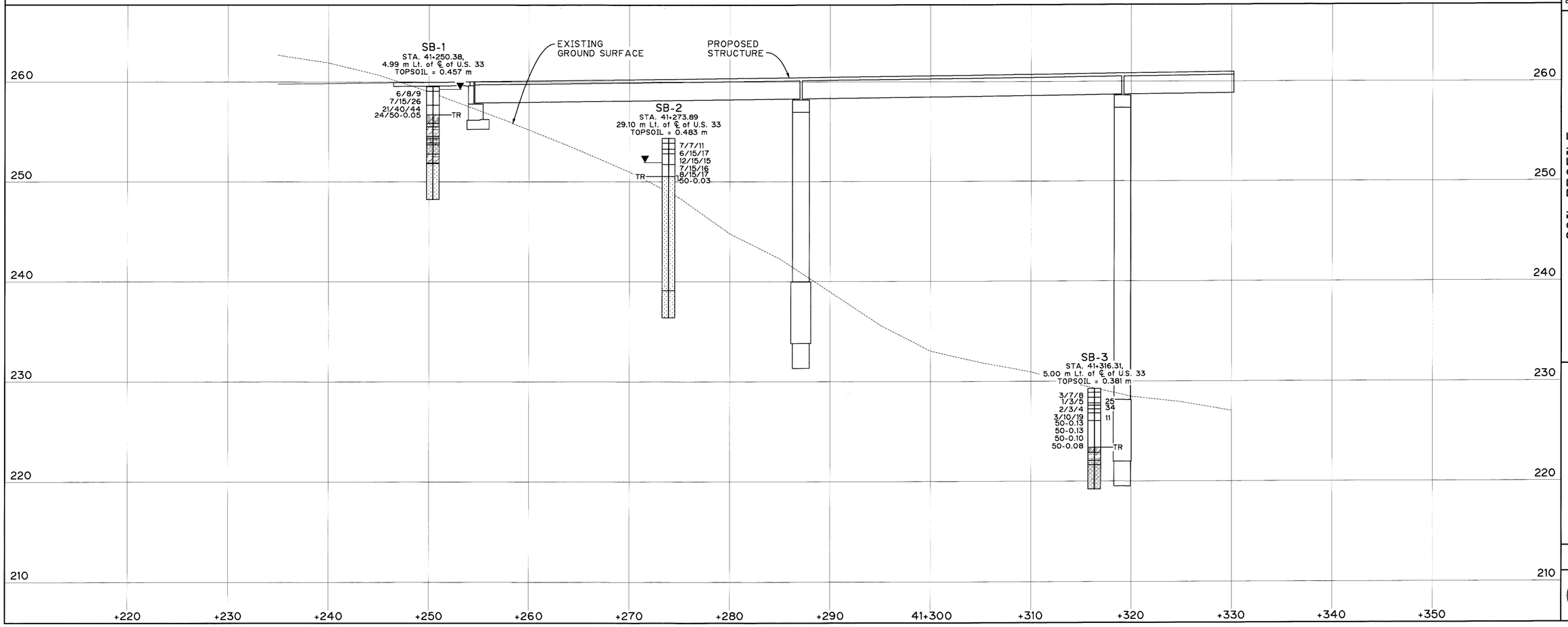
1 / 9

841
949





metric units



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6121 HUNTLEY ROAD ▪ COLUMBUS, OHIO 43229

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

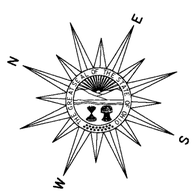
CALCULATED	CHECKED BY A.E.N.
DATE 02/02/01	
REVIEWED BY T.A.H.	
DRAWN BY J.L.P.	

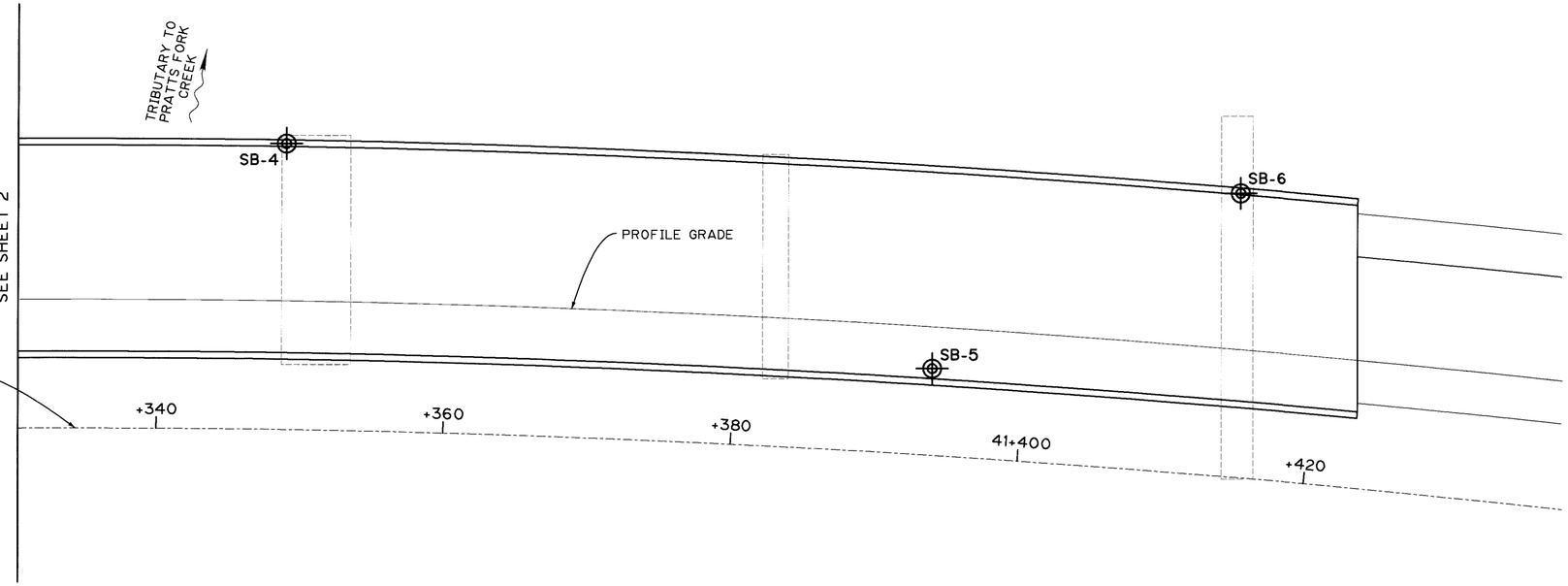
SOIL PROFILE
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

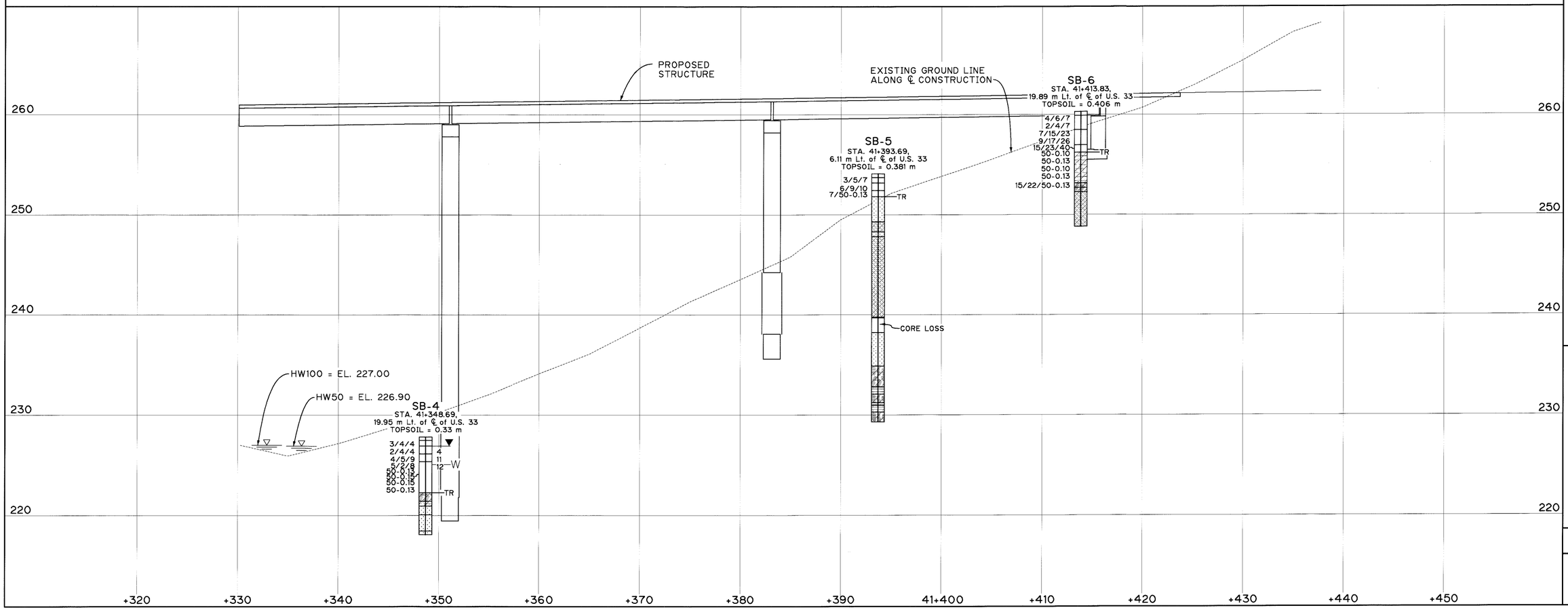
2 / 9

842
949





metric units



DLZ
6121 BAUTLEY ROAD • COLUMBUS, OHIO 43229

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

CALCULATED T.A.H.	CHECKED BY A.E.N.
DATE 02/02/01	
REVIEWED BY T.A.H.	
DRAWN BY J.L.P.	

SOIL PROFILE
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

3 / 9

843
949

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-1 | Location: Sta. 41+250.38, 4.99 m Lt. of US 33 centerline | Date Drilled: 10/26-10/28/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
0.27 m [0.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
0	259.52						Topsoil - 0.457 m [18"]							
0.46 [1.5]	259.06 [849.9]	6 8 9	.279 [11]	1		431+ [4.5+]	Hard brown, gray and red SILTY CLAY (A-6b); decomposed claystone; damp.							
1.52 [5]		7 15 26	.279 [11]	2		431+ [4.5+]								
1.83 [6.0]	257.69 [845.4]	21 40 44	.381 [15]	3		431+ [4.5+]	Hard brown SILT AND CLAY (A-6a), little gravel, trace fine to coarse sand; decomposed silty shale; damp. @ 2.59 m [8.5'], color change to red and brown.							84
2.80 [9.2]	256.72 [842.3]	24 50/.05	.203 [8]	4		431+ [4.5+]	Soft brown SHALE; severely weathered.							50+
3.05 [10]		Core 0.864 m [34"]	Rec .051 m [2"]	RQD 0%										
3.66 [12.0]	255.86 [839.4]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 22%			Hard gray SANDSTONE, micaceous; weathered.							
4.02 [13.2]	255.50 [838.3]						Hard gray SILTSTONE; weathered. @ 4.36 m - 4.51 m [14.3' - 14.8'], vertical fracture. @ 4.82 m [15.8'], 45° fracture.							
4.57 [15]														
4.97	254.55						Medium hard light gray SILTSTONE; weathered. @ 5.09 m [16.7'], clay seam.							
5.18 [17.0]	254.34 [834.4]	Core 1.524 m [60"]	Rec .813 m [32"]	RQD 33%			Soft red CLAYSTONE; severely weathered; broken.							
5.64	253.88						Medium hard to hard gray SILTSTONE, calcareous; weathered.							
5.82 [19.1]	253.70 [832.3]						Hard brown and gray fine grained SANDSTONE, argillaceous, micaceous; weathered. @ 6.64 m [21.8'], clay seam. @ 6.71 m [22.0'], clay seam.							
6.10 [20]														
6.74 [22.1]	252.78 [829.3]	Core 1.524 m [60"]	Rec .991 m [39"]	RQD 43%			Soft to medium hard dark gray SILTSTONE, slightly calcareous; severely weathered to weathered.							
7.62														

STANDARD PENETRATION (N): Blows per 0.30 m — 10 20 30 40

Moisture Content - %: PL — Natural — LL; 10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-1 | Location: Sta. 41+250.38, 4.99 m Lt. of US 33 centerline | Date Drilled: 10/26-10/28/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
0.27 m [0.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
7.62	251.90						Soft to medium hard gray SILTSTONE.							
7.69 [25.2]	251.83 [826.2]						Hard light gray SANDSTONE, micaceous, slightly calcareous; fine grained.							
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			@ 8.81 m [28.9'], color change to brown.							
9.14 [30]														
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%										
10.67 [35]														
11.28 [37.0]	248.24 [814.4]						Bottom of Boring - 11.28 m [37.0'] Note: hole caved in after pulling core steel.							
12.19 [40]														
13.72 [45]														
15.24														

STANDARD PENETRATION (N): Blows per 0.30 m — 10 20 30 40

Moisture Content - %: PL — Natural — LL; 10 20 30 40

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CALCULATED	CHECKED BY
T.A.H.	A.E.N.

DATE
02/02/01

REVIEWED BY	DRAWN BY
T.A.H.	J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

4/9

844
949

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-2 | Location: Sta. 41+273.89, 29.10 m Lt. of US 33 centerline | Date Drilled: 10/26/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: 2.41 m [7.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [ft]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % PL / Natural / LL	STANDARD PENETRATION (N) Blows per 0.30 m
0	254.34						Topsoil - 0.483 m [19"]								
0.48 [1.6]	253.86 [832.9]	7 7 11	279 [11]	1		431+ [4.5+]	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.								
1.07 [3.5]	253.27 [830.9]	6 15 17	356 [14]	2		431+ [4.5+]	Hard brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); decomposed to severely weathered siltstone; damp.								
1.52 [5]		12 15 15	356 [14]	3		431+ [4.5+]									
2.59 [8.5]	251.75 [826.0]	7 15 16	356 [14]	4		431+ [4.5+]	Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; decomposed to severely weathered silty shale; damp.								
3.05 [10]		8 15 17	305 [12]	5		431+ [4.5+]	@ 3.66 m - 3.69 m [12.0' - 12.1'], sandstone fragments.								
3.81 [12.5]	250.53 [821.9]	50/.03	025	6		431+ [4.5+]	Hard gray and brown fine grained SANDSTONE, micaceous, slightly calcareous; slightly weathered.								50+
4.57 [15]		Core 1.524 m [45"]	Rec 1.143 m [45"]			RQD 100%									
		Core 1.524 m [60"]	Rec 1.524 m [60"]			RQD 93%									
6.10 [20]		Core 1.524 m [60"]	Rec 1.524 m [60"]			RQD 95%	@ 7.04 m - 7.47 m [23.1' - 24.5'], arenaceous limestone.								
7.62															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-2 | Location: 41+273.9, 29.1m Lt. | Date Drilled: 10/26/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: 2.41 m [7.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [ft]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % PL / Natural / LL	STANDARD PENETRATION (N) Blows per 0.30 m
7.62 [25]	246.72 [809.4]						Hard gray and brown fine grained SANDSTONE, micaceous, slightly calcareous; slightly weathered.								
		Core 1.524 m [60"]	Rec 1.524 m [60"]			RQD 100%									
9.14 [30]		Core 1.524 m [60"]	Rec 1.321 m [52"]			RQD 86%	@ 8.90 m - 9.14 m [29.2' - 30.0'], ~45° fracture with rust staining and partial clay infilled.								
10.67 [35]		Core 1.524 m [60"]	Rec 1.422 m [56"]			RQD 93%									
12.19 [40]		Core 1.524 m [60"]	Rec 1.321 m [52"]			RQD 86%	@ 12.59 m [41.3'], argillaceous siltstone laminae become evident. @ 12.98 m - 13.08 m [42.6' - 42.9'], poorly cemented.								
13.72 [45]		Core 1.524 m [60"]	Rec 1.524 m [60"]			RQD 100%									
15.24															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-2 | Location: 41+273.9, 29.1m Lt. | Date Drilled: 10/26/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: 2.41 m [7.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [ft]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % PL / Natural / LL	STANDARD PENETRATION (N) Blows per 0.30 m
15.24 [50]	239.10 [784.4]	Core 1.524 m [60"]	Rec 1.499 m [59"]			RQD 98%	Hard gray and brown fine grained SANDSTONE, micaceous; slightly weathered. @ 15.94 m - 16.06 m [52.3' - 52.7'], carbonaceous.								
16.76 [55]		Core 0.762 m [30"]	Rec .762 m [30"]			RQD 100%									
17.92 [58.8]	236.42 [775.7]						Bottom of Boring - 17.92 m [58.8'] Note: Boring was offset uphill from original staked location due to its presence on the edge of a sandstone bluff								
19.81 [65]															
21.34 [70]															
22.86															

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DRAWN BY J.L.P. | CHECKED BY A.E.N. | REVIEWED BY T.A.H. | DATE 02/02/01 | CALCULATED T.A.H.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

5 / 9

845
949

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-3 | Location: Sta. 41+316.31, 5.00 m Lt. of US 33 centerline | Date Drilled: 10/18-19/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0	229.26						Topsoil - 0.381 m [15"]								
0.40	228.86 [750.9]	3 7 8	.457 [18]	1		335 [3.5]	Very stiff dark brown SILTY CLAY (A-6b), little fine to coarse sand, little gravel; contains sandstone fragments; damp.								
0.91	228.35 [749.2]														
1.46	227.80	1 3 5	.457 [18]	2A		168 [1.75]	Stiff brown and gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; contains rootlets; damp to moist.								
1.52	747.38			2B		192 [2.0]	Stiff brown and gray CLAY (A-7-6), trace fine to coarse sand; damp.	0	4	---	6	41	49		
1.67	227.59 [746.7]						Very stiff brown SILTY CLAY (A-7-6), "and" fine to coarse sand, trace to little gravel; moist.								
2.04	227.22 [745.5]	2 3 4	.457 [18]	3A 3B		263 [2.75]	Very stiff light brown and light gray SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; residual soil; damp.	6	27	---	17	23	27		
2.44	226.82 [744.2]														
3.05		3 10 19	.381 [15]	4		431+ [4.5+]	Hard light brown and light gray SILTY CLAY (A-6b), trace fine to coarse sand; decomposed silty shale; damp.	0	0	---	6	52	42		
3.20	226.06 [741.7]														
		50/.13	.076 [3]	5			Very dense gray and brown SANDY SILT (A-4a), trace clay; severely weathered sandy siltstone; damp.							50+	
4.57 [15]		50/.13	127 [5]	6										50+	
		50/.10	.076 [3]	7			@ 4.88 m [16.0'], becomes highly weathered.							50+	
5.88	223.38	50/.08	.076 [3]	8										50+	
6.10 [20]	[732.9]	Core 1.143 m [45"]	Rec 1.143 m [45"]	RQD 49%			Soft gray Silty SHALE; weathered to severely weathered. @ 5.94, 6.00, 6.19, 6.32 m [19.5', 19.7', 20.3', 20.75'], clay seams.								
6.40	222.86 [731.2]						Medium hard gray SILTSTONE, slightly micaceous; weathered. @ 6.71, 6.83, 6.98, 7.10 m [22.0', 22.4', 22.9', 23.3'], clay seams.								
7.19	222.07 [728.6]	Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 80%			Hard gray fine to coarse grained SANDSTONE, micaceous, pyritic; weathered. @ 7.32 m [24.0'], 0.03 m [0.1'] clay seam.								
7.62															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-3 | Location: Sta. 41+316.31, 5.00 m Lt. of US 33 centerline | Date Drilled: 10/18-19/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
7.62	221.64														
[25]	[727.2]						Hard gray SANDSTONE, micaceous; weathered; contains occassional shaley layers. @ 8.29 m [27.2'], 0.03 m [0.1'] clay seam.								
9.14		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%											
[30]															
10.06	219.20 [719.2]						Bottom of Boring - 10.06 m [33.0']								
10.67															
[35]															
12.19															
[40]															
13.72															
[45]															
15.24															

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DATE 02/02/01
REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

6 / 9

846
949

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-4 | Location: Sta. 41+348.69, 19.95 m Lt. of US 33 centerline | Date Drilled: 10/18/99

WATER OBSERVATIONS:
Water seepage at: 2.74 m [9.0']-2.93 m [9.6']
Water level at completion: 0.91 m [3.0'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0	227.83						Topsoil - 0.33 m [13"]								
0.34 [1.1]	227.49 [746.4]	3 4 4	.457 [18]	1		239 [2.5]	Very stiff brown and gray SILTY CLAY (A-6b), trace fine to coarse sand; damp.								
0.91 [3]	226.92 [744.5]	2 4 4	.279 [11]	2		287 [3.0]	Very stiff dark brown SILT AND CLAY (A-6a), little fine to coarse sand, some gravael; damp.	36	10	---	6	34	14		
1.52 1.68	226.15 [742.0]	4 5 9	.330 [13]	3		287 [3.0]	Very stiff red, brown and dark brown SILT AND CLAY (A-6a), some fine to coarse sand, some gravel; damp.	37	13	---	14	17	19		
2.44	225.39 [739.5]	5 2 8	.279 [11]	4		335 [3.5]	Very stiff gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; decomposed sandy siltstone; damp.	4	0	---	8	46	42		
3.05 [10]		50/.13	.127 [5]	5		192 [2.0]	@ 3.41 m [11.2'], becomes severely weathered.							50+	
4.57 [15]		50/.15	.127 [5]	6		---								50+	
		50/.15	.127 [5]	7		---								50+	
5.55	222.28	50/.13	.127 [5]	8		---								50+	
6.10 [20]	[729.3]	Core 1.168 m [46"]	Rec 1.092 m [43"]	RQD 83%			Soft to medium hard gray Silty SHALE, micaceous; weathered to highly weathered with decomposed layers. @ 5.70, 6.10, 6.13, 6.34 & 6.55 m [18.7', 20.0', 20.1', 20.95' & 21.5'], clay seams.								
6.40	221.43 [726.5]						Medium hard gray to dark gray SILTSTONE, micaceous, pyritic; weathered. @ 6.71 m [22.0'], 0.061 m [0.2'], near vertical fracture, partially healed with clay infilling.								
6.89	220.94 [724.9]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			Hard gray fine to medium grained SANDSTONE, calcareous, micaceous; slightly weathered.								
7.62															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-4 | Location: Sta. 41+348.69, 19.95 m Lt. of US 33 centerline | Date Drilled: 10/18/99

WATER OBSERVATIONS:
Water seepage at: 2.74 m [9.0']-2.93 m [9.6']
Water level at completion: 0.91 m [3.0'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62															
7.77	220.06 [722.0]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			Hard gray fine to medium grained SANDSTONE, micaceous; unweathered.								
9.14		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%											
9.38	218.45 [716.7]						Hard gray fine to medium grained SANDSTONE, calcareous, micaceous; unweathered.								
9.75	218.08 [715.5]						Bottom of Boring - 9.75 m [32.0']								
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

7 / 9

847
949

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0	254.08						DESCRIPTION								
							Topsoil - 0.381 m [15"]								
0.38	253.70	3													
	[832.3]	5	330	1A		287 [3.0]									
0.91	253.17	7	[13]	1B		431+ [4.5+]	Very stiff reddish brown SILT AND CLAY (A-6a), some fine to coarse sand, trace to little gravel; damp.								
	[830.6]														
		6					Hard, red and light brown SILT AND CLAY (A-6a), some fine to coarse sand, little to some gravel; decomposed claystone; damp.								
		9	305												
1.52		10	[12]	2		4.5+									
1.68	252.40														
	[828.1]						Hard light gray and light brown SILTY CLAY (A-6b), some fine to coarse sand, little to some gravel; decomposed to severely weathered silty shale; damp.								
		7	229												
2.29		50/.13	[9]	3		4.5+									
	251.79														
	[826.1]	Core 1.372 m [54"]	Rec 1.346 m [53"]	RQD 76%			Hard gray fine to coarse grained SANDSTONE, calcareous, micaceous; slightly weathered, contains slight rust staining. @ 2.50 m - 2.59 m [8.2' - 8.5'], near vertical fracture, rust stained.								
3.05															
[10]															
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 97%											
4.57															
4.78	249.30														
	[817.9]						Hard brown and gray SANDSTONE, slightly calcareous; weathered. @ 5.35 m [17.5'], highly weathered, highly broken (possible loss).								
		Core 1.524 m [60"]	Rec 1.372 m [54"]	RQD 82%											
5.79	248.29														
	[814.6]						Hard gray fine grained SANDSTONE, calcareous, micaceous; slightly weathered.								
6.10															
6.25	247.83														
	[813.1]						Hard brown fine to coarse grained SANDSTONE, micaceous; slightly weathered to weathered. @ 6.89 m - 7.06 m [22.6' - 23.1'], highly weathered, highly broken (possible loss). @ 7.06 m - 7.24 m [23.1' - 23.8'], vertical fracture, rust stained.								
		Core 1.524 m [60"]	Rec 1.346 m [53"]	RQD 84%											
7.62															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62	246.46						DESCRIPTION								
[25]	[808.6]						Hard brown fine to coarse grained SANDSTONE, micaceous; slightly weathered to weathered. @ 7.92 m [26.0'], highly weathered, highly broken zone.								
		Core 1.524 m [60"]	Rec 1.168 m [46"]	RQD 70%											
9.14															
[30]							@ 9.63 m - 9.88 m [31.6' - 32.4'], slightly argillaceous.								
		Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 95%											
10.67															
[35]															
		Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 99%											
12.19															
[40]															
		Core 1.524 m [60"]	Rec 1.346 m [53"]	RQD 68%			@ 12.86 m - 13.38 m [42.2' - 43.9'], highly weathered, highly broken (possible loss). @ 13.41 m [44.0'], occassional shalely pieces.								
13.72															
[45]															
14.30	239.78														
14.39	239.69	Core 1.524 m [60"]	Rec 305 m [12"]	RQD 0%			Hard gray SANDSTONE; weathered. CORE LOSS - weathered alternating shale and sandstone seen in nearby rock outcropping								
15.24	[786.4]														

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
15.24	238.84						DESCRIPTION								
[50]	[783.6]						CORE LOSS - weathered alternating shale and sandstone seen in nearby rock outcropping								
15.85	238.23														
	[781.6]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 95%			Hard gray fine to coarse SANDSTONE, slightly micaceous; slightly weathered; contains discontinuous coal laminae.								
16.76															
[55]															
		Core 1.524 m [60"]	Rec 1.168 m [46"]	RQD 68%			@ 17.43 m [57.2'], weathered shale layer (possible loss). @ 17.62 m [57.8'], siltstone layer. @ 17.74 m - 18.07 m [58.2' - 59.3'], weathered shale layer (possible loss).								
18.29															
[60]															
19.20	234.88	Core 1.524 m [60"]	Rec 1.295 m [51"]	RQD 37%											
	[770.6]						Soft to medium hard dark gray to black SHALE, carbonaceous; weathered to decomposed (possible loss). @ 19.32 m [63.4'] and 19.84 m [65.1'], coal blossom. @ 19.93 m - 20.27 m [65.4' - 66.5'], highly weathered to decomposed shale with coal blossoms.								
19.81															
[65]							@ 20.27 m - 20.45 m [66.5' - 67.1'], Soft, black COAL.								
		Core 1.524 m [60"]	Rec 1.092 m [43"]	RQD 10%			@ 20.67 m - 20.76 m [67.8' - 68.1'], slickensided near vertical shear. @ 20.79 m - 21.28 m [68.2' - 69.8'], clay seam (possible loss).								
21.27	232.81														
	[763.8]						Hard light gray and dark gray LIMESTONE; weathered. @ 20.97 m - 21.76 m [68.8' - 71.4'], vertical fracture. @ 21.73 m - 21.76 m [71.3' - 71.4'], clay seam.								
21.98	232.10														
	[761.5]	Core 1.524 m [60"]	Rec 1.219 m [48"]	RQD 40%			Very soft to soft dark gray SHALE; highly weathered to decomposed (possible loss).								
22.86															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
22.86	231.22						DESCRIPTION								
[75]	[758.6]						Soft to medium hard gray LIMESTONE; highly weathered; slightly leached.								
23.13	230.95						Hard gray LIMESTONE; weathered. @ 23.20 m - 23.29 m [76.1' - 76.4'], vertical fracture. @ 23.59 m - 23.70 m [77.4' - 77.8'], broken.								
	[757.7]	Core 1.27 m [50"]	Rec 1.270 m [50"]	RQD 82%											
23.90	230.18														
	[755.2]						Medium hard gray SHALE; weathered to slightly weathered. @ 23.90 m - 23.99 m [78.4' - 78.7'], slightly calcareous.								
24.38															
[80]															
24.75	229.33														
	[752.4]						Bottom of Boring - 24.75 m [81.2'] Note: Boring was offset uphill from original staked location due to difficult access.								
25.91															
[85]															
27.43															
[90]															
28.96															
[95]															
30.48															

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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. ATH-33-42635
OVER TRIBUTARY TO PRATTS FORK CREEK

ATH-33-40.981

848
949

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-6 | Location: Sta. 41+413.83, 19.89 m Lt. of US 33 centerline | Date Drilled: 10/25/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m	Moisture Content - % PL Natural LL
0	260.30						Topsoil - 0.406 m [16"]								
0.40 [1.3]	259.90 [852.7]	4 6 7	457 [18]	1		407 [4.25]	Hard brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; micaceous; damp. @ 1.07 m [3.5'], brown and gray.							10	
1.52 [5]	258.47	2 4 7	254 [10]	2		431+ [4.5+]									
1.83 [6.0]	[846.0]	7 15 23	457 [18]	3		431+ [4.5+]	Hard brown and red SILTY CLAY (A-6b); decomposed claystone; damp. @ 2.59 m [8.5'], some fine to coarse sand, little gravel.							63	
3.05 [10]	256.95	9 17 26	279 [11]	4		431+ [4.5+]	@ 3.20 m [10.5'], cobbles or boulder								
3.35 [11.0]	[843.0]	15 23 40	432 [17]	5		359 [3.75]	Very stiff to hard brown and dark brown SANDY SILT (A-4a), little clay, trace gravel; decomposed silty shale; damp.							50+	
4.11 [13.5]	256.19 [840.5]	50/.10	026 [1]	6			Soft brown and gray SILTSTONE; weathered to severely weathered.								
4.57 [15]		50/.13	127 [5]	7			@ 4.88 m - 5.64 m [16.0' - 18.5'], arenaceous.							50+	
		50/.10	102 [4]	8										50+	
6.10 [20]		50/.13	127 [5]	9										50+	
7.16 [23.5]	253.14 [830.5]	15 22 50/.13	432 [17]	10A 10B			Soft brown silty SHALE; severely weathered.							50+	
7.62															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-6 | Location: Sta. 41+413.83, 19.89 m Lt. of US 33 centerline | Date Drilled: 10/25/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Core / Rec (m) [in]	RQD	DESCRIPTION
7.62 [25]	252.68 [829.0]	Core 0.787 m [31"] Rec .533 m [21"]	RQD 48%	Medium hard brown SHALE; weathered.
8.05 [26.4]	252.25 [827.6]	Core 1.524 m [60"] Rec 1.524 m [60"]	RQD 100%	Hard gray fine grained SANDSTONE, slightly calcareous; slightly weathered to weathered. @ 8.60 m - 8.84 m [28.2' - 29.0'], limestone lens. @ 9.24 m - 9.27 m [30.3' - 30.4'], limestone lens. @ 9.39 m - 9.51 m [30.8' - 31.2'], limestone lens.
9.14 [30]				
10.67 [35]		Core 1.575 m [62"] Rec 1.575 m [62"]	RQD 100%	
11.49 [37.7]	248.81 [816.3]			Bottom of Boring - 11.49 m [37.7']
12.19 [40]				
13.72 [45]				
15.24				

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - % PL Natural LL: 10 20 30 40

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

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GEOLOGY OF THE SITE

GENERALIZED GEOLOGIC REFERENCES REPORT THAT THE SITE IS LOCATED WITHIN THE UNGLACIATED SECTION OF THE ALLEGHENY PLATEAU. OVERBURDEN AT THE SITE CONSISTS OF THIN RESIDUAL SOILS ALONG RIDGETOPS AND HILLSIDES, COLLUVIAL SOILS AT THE BASE OF THE HILLSIDES, AND ALLUVIAL DEPOSITS ALONG STREAM CHANNELS. THE UNDERLYING BEDROCK AT THE SITE IS REPORTED TO BE SHALE, SANDSTONE, COAL, AND LIMESTONE OF MONONGAHELA SERIES ALONG THE HILLSIDES AND CONEMAUGH SERIES WITHIN THE VALLEY BOTTOM.

EXPLORATION

A TOTAL OF FIVE BORINGS, SB-16 THROUGH SB-20, WERE DRILLED AT THE PROJECT SITE BETWEEN DECEMBER 14, 1999 AND DECEMBER 29, 1999. THE BORINGS WERE DRILLED TO DEPTHS BETWEEN 7.62 AND 16.34 METERS (25.0 AND 53.6 FEET) BY MEANS OF A TRUCK-MOUNTED OR TRACK-MOUNTED (ATV) ROTARY-TYPE DILL RIG USING HOLLOWSTEM AUGERS. THE BORINGS WERE EXTENDED INTO BEDROCK AND BEDROCK WAS VERIFIED BY CORING IN ALL THE BORINGS.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

1. SOILS

AT THE GROUND SURFACE, 102 TO 254 MILLIMETERS (4 TO 10 INCHES) OF TOPSOIL WERE ENCOUNTERED BY THE BORINGS. BELOW THE TOPSOIL THE BORINGS ENCOUNTERED PRIMARILY COHESIVE MATERIAL EXTENDING TO BEDROCK IN THE HILLSIDE BORINGS NORTH OF CR 40 (SB-16 AND SB-17), AND LAYERS OF BOTH COHESIVE AND GRANULAR MATERIAL IN THE BORINGS SOUTH OF CR 40 IN THE FLOODPLAIN OF THE STREAM (SB-18, SB-19, AND SB-20). BORINGS SB-16 AND SB-17 ENCOUNTERED PRIMARILY VERY STIFF TO HARD COHESIVE SOILS RANGING FROM CLAY (A-7-6) TO SILT AND CLAY (A-6a) WITH OCCASIONAL SANDY SILT (A-4a) LAYERS. BORING SB-18, LOCATED IMMEDIATELY SOUTH OF THE STREAM CHANNEL, ENCOUNTERED PRIMARILY SOFT TO MEDIUM STIFF SILT AND CLAY (A-6a), SILTY CLAY (A-6b), AND CLAY (A-7-6), WITH A VERY LOOSE SAND (A-3a) BETWEEN DEPTHS OF 1.68 AND 3.20 METERS (5.5 AND 10.5 FEET). BORINGS SB-19 AND SB-20 WERE LOCATED WITHIN THE FLOODPLAIN BETWEEN SHADE RIVER AND AN UNNAMED TRIBUTARY TO SHADE RIVER. BOTH BORINGS ENCOUNTERED PRIMARILY VERY LOOSE TO LOOSE SANDS (A-3 AND A-3a) CONTAINING ORGANIC MATERIAL BELOW 2.29 METERS (7.5 FEET) OF A MEDIUM STIFF TO STIFF SILT AND CLAY (A-6a). A VERY STIFF CLAY (A-7-6) WHICH WAS DECOMPOSED CLAYSTONE WAS ENCOUNTERED AT DEPTHS OF 9.02 TO 10.06 METERS (29.6 TO 33.0 FEET).

2. BEDROCK

BEDROCK WAS ENCOUNTERED IN EACH OF THE FIVE BORINGS DURING DRILLING AND GENERALLY CONSISTED OF VARYING THICKNESSES OF SEVERELY WEATHERED BEDROCK OVERLYING MORE COMPETENT BEDROCK. COMPETENT BEDROCK WAS ENCOUNTERED IN THE BORINGS AT DEPTHS OF BETWEEN 4.74 AND 14.81 METERS (15.0 AND 48.6 FEET) AND GENERALLY CONSISTED OF SOFT TO MEDIUM HARD CLAYSTONE AND MEDIUM HARD TO HARD SILTSTONE AND SANDSTONE.

3. GROUNDWATER

GROUNDWATER SEEPAGE WAS FIRST ENCOUNTERED IN BORINGS SB-18, SB-19, AND SB-20 AT DEPTHS OF BETWEEN 2.01 AND 3.35 METERS (6.69 TO 11.0 FEET) BELOW THE EXISTING GROUND SURFACE. SEEPAGE WAS NOT DETECTED IN BORINGS SB-16 AND SB-17. WATER LEVELS PRIOR TO CORING WERE DETECTED IN BORINGS SB-18 AND SB-20 AT DEPTHS OF 6.10 AND 11.43 METERS (20.0 AND 37.5 FEET), RESPECTIVELY. AT COMPLETION OF DRILLING, WATER LEVELS RANGED FROM 3.05 TO 6.10 METERS (10.0 TO 20.0 FEET). HOWEVER, THE FINAL WATER LEVELS INCLUDED DRILLING WATER AND MAY NOT BE REPRESENTATIVE OF THE ACTUAL GROUNDWATER CONDITIONS AT THE SITE.

SYMBOLS OF ROCK TYPES

CLAYSTONE OR WEATHERED CLAYSTONE

WEATHERED SANDSTONE

WEATHERED SILTSTONE

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 INVESTIGATION 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.

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

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 50.80 mm O.D., 34.93 mm I.D., SPLIT-SPOON SAMPLER, AT CONTINUOUS, 0.75 m AND/OR 1.50 m DEPTH INTERVALS, DRIVEN BY MEANS OF A 63.5 kg HAMMER WITH A FREE FALL OF 0.76 m. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER THREE 0.15 m INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING A 76 mm O.D. THIN-WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILL RIG.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING AN NQ2 OR NXM CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS SHOW A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, NUMBER OF BLOWS FOR THE STANDARD PENETRATION TEST IN THREE 0.15 m INCREMENTS, AND A SAMPLE DESCRIPTION BASED ON LABORATORY TEST RESULTS, UTILIZING THE ODOT CLASSIFICATION SYSTEM. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, 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.

SCOUR ANALYSIS INFORMATION

BORING NUMBER	SAMPLE NUMBER	DEPTH (m)	ODOT CLASSIFICATION	D50 SIZE (mm)
SB-18	S-3	1.83-2.29 (6.0'-7.5')	A-3a	0.129
SB-18	S-5	3.35-3.81 (11.0'-12.5')	A-6b	0.0076
SB-18	S-6	4.11-4.57 (13.5'-15.0')	A-7-6	0.0054

LEGEND

PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION

TR — TOP OF ROCK

W— INDICATES FREE WATER ELEVATION

INDICATES STATIC WATER ELEVATION

X/Y/Z — FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR STANDARD PENETRATION TEST
X = NUMBER OF BLOWS FOR FIRST 0.15 m
Y = NUMBER OF BLOWS FOR SECOND 0.15 m
Z = NUMBER OF BLOWS FOR THIRD 0.15 m

50 (n) — INDICATES NUMBER OF BLOWS (50) TO DRIVE A SPLIT-BARREL SAMPLER A DEPTH OF (n) METERS OTHER THAN THE NORMAL 0.15 m INCREMENT.

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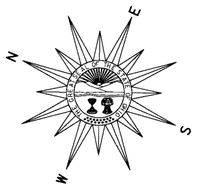
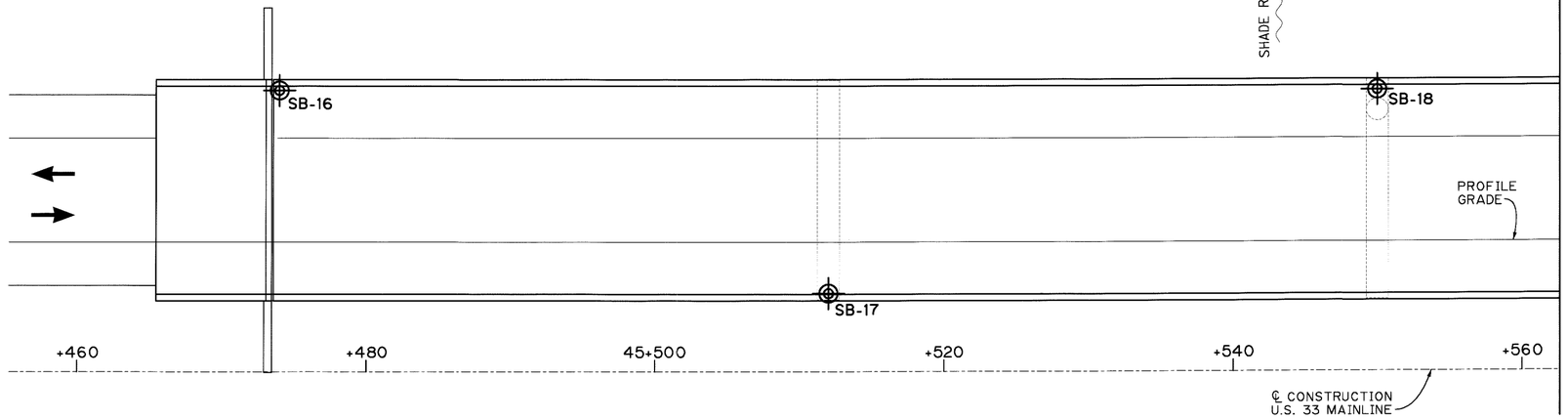
CALCULATED T.A.H. | CHECKED BY A.E.N. | DATE 02/02/01 | REVIEWED BY T.A.H. | DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-02439
U.S. 33 OVER SHADE RIVER

ATH-33-40.981





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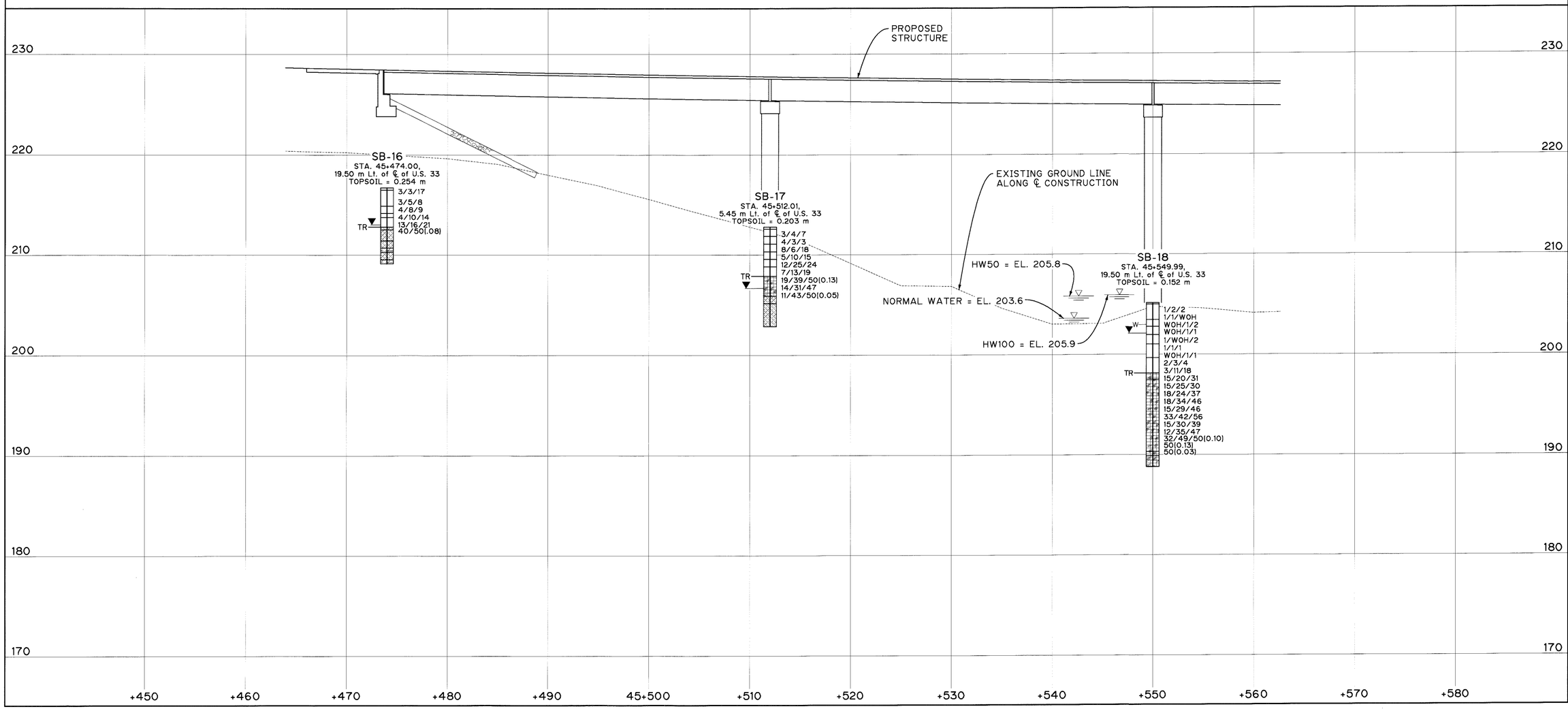

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SCALE IN METERS 0 10
HORIZONTAL SCALE: 1:200

CALCULATED	CHECKED BY
T.A.H.	A.E.N.

DATE	
02/02/01	

REVIEWED BY	
T.A.H.	

DRAWN BY	
J.L.P.	

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-02439
OVER SHADE RIVER AND COUNTY ROAD 40

ATH-33-40.981

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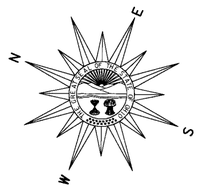

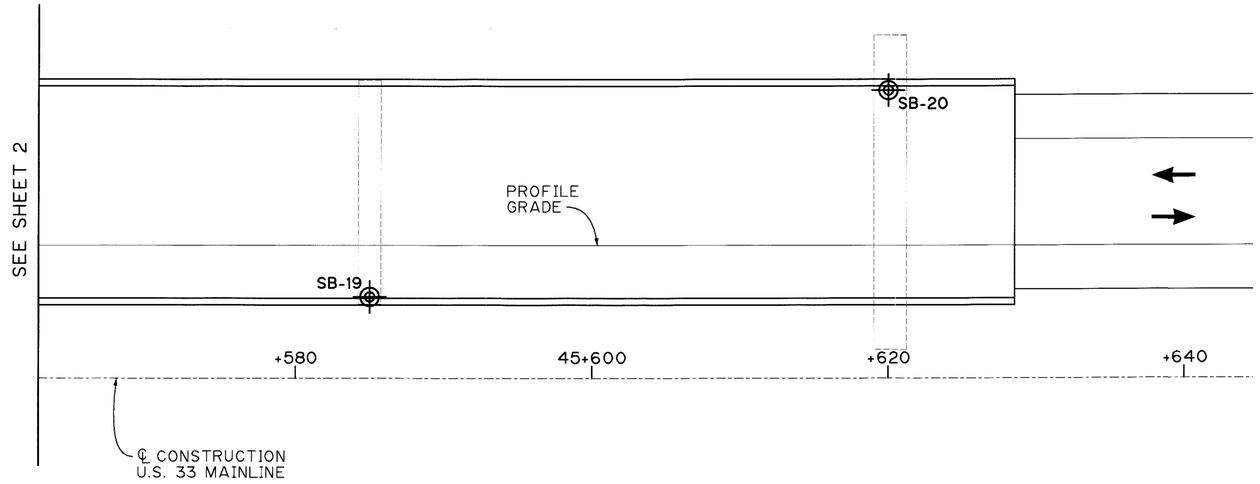

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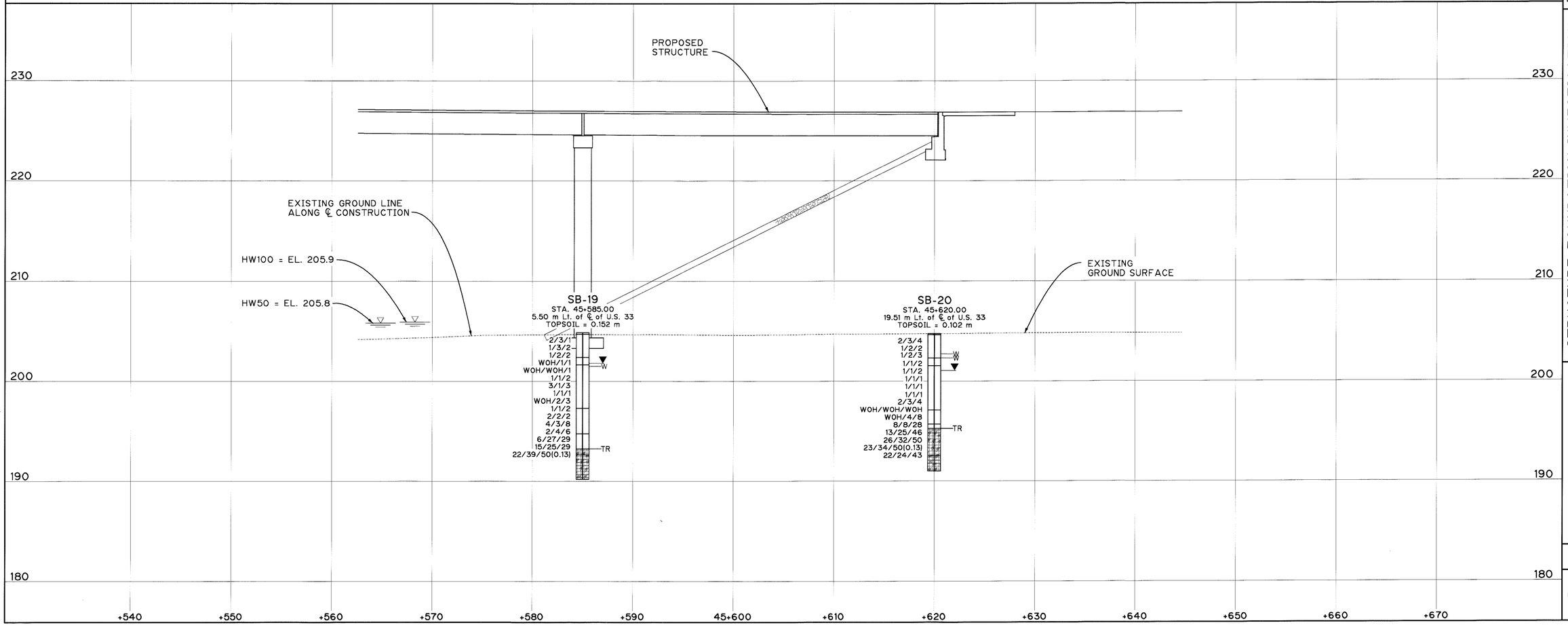

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6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

DRAWN BY	REVIEWED BY	DATE	CALCULATED	CHECKED BY
J.L.P.	T.A.H.	02/02/01	T.A.H.	A.E.N.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-02439
U.S. 33 OVER SHADE RIVER

ATH-33-40.981

3 / 6

852
949

Client: Ohio Department of Transportation | **Project:** ATH-33-40.981 | **Job No.** 9821-3200.00

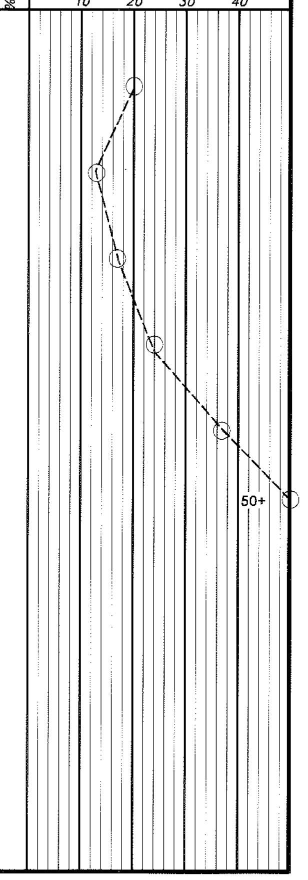
LOG OF: Boring SB-16 | **Location:** 45+474.00, 19.50 m left of US 33 centerline. | **Date Drilled:** 12-14-99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry (before coring)
3.75 m [12.3'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	216.76						
0.25 [0.8]	216.51 [710.3]						Topsoil - 0.254 m [10"]
		3 3 17	.330 [13]	1		215 [2.25]	Very stiff to hard brown SILT AND CLAY (A-6a), little to some fine to coarse sand; contains organic material; damp.
1.52 [5]		3 5 8	.279 [11]	2		383 [4.0]	
1.86 [6.1]	214.90 [705.1]	4 8 9	.305 [12]	3		431+ [4.5+]	Hard mottled red and gray CLAY (A-7-6), trace fine to coarse sand; decomposed claystone; damp.
2.59 [8.5]	214.17 [702.7]	4 10 14	.279 [11]	4		239 [2.5]	COAL, decomposed; damp. @ 2.93 m - 2.99 m [9.6' - 9.8'], very stiff dark gray UNDERCLAY (A-7-6); damp.
2.99 [9.8]	213.77 [701.3]	13 16 21	.330 [13]	5		431+ [4.5+]	Hard gray and yellow SILTY CLAY (A-6b); decomposed shale; damp.
3.96 [13.0]	212.80 [698.2]						Very soft to soft brown and gray fine grained SANDSTONE; severely weathered.
4.24 [13.9]	212.52 [697.2]	40 50/.08	.102 [4]	6A 6B			Soft to medium hard brown and gray fine grained SANDSTONE, argillaceous, micaceous; severely weathered to weathered.
4.57 [15]		Core 0.762 m [30"]	Rec .711 m [28"]	RQD 40%			
5.33 [17.5]	211.43 [693.7]	Core 0.762 m [30"]	Rec .762 m [30"]	RQD 93%			Medium hard to hard gray fine grained SANDSTONE, argillaceous, micaceous; weathered.
6.04 [19.8]	210.72 [691.3]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 90%			Medium hard gray SILTSTONE, argillaceous; weathered.
6.46 [21.2]	210.30 [690.0]						Hard gray SANDSTONE, micaceous, pyritic; weathered. @ 7.00 m - 7.09 m [23.0' - 23.3'], near vertical fracture. @ 7.16 m [23.5'], grades into SILTSTONE.
7.22 [23.7]	209.54 [687.5]						Medium hard to hard gray SILTSTONE, pyritic; weathered.
7.62	209.14						Bottom of Boring - 7.62 m [25.0']

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) — Blows per 0.30 m ○ — 10 20 30 40; Moisture Content - % — PL Natural LL



Client: Ohio Department of Transportation | **Project:** ATH-33-40.981 | **Job No.** 9821-3200.00

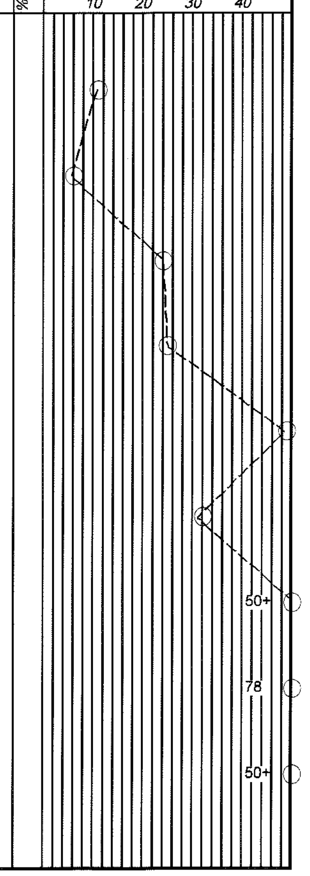
LOG OF: Boring SB-17 | **Location:** 45+512.01, 5.45 m left of US 33 centerline. | **Date Drilled:** 12-14-99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry (before coring)
6.10 m [20.0'] (after coring, includes core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	212.77						
0.20 [0.7]	212.57 [697.4]						Topsoil - 0.203 m [8"]
		3 4 7	.279 [11]	1		335 [3.5]	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.
0.91 [3.0]	211.86 [695.1]	4 3 3	.178 [7]	2			Loose brown and light brown SANDY SILT (A-4a); damp.
1.68 [5.5]	211.09 [692.6]	8 6 18	.279 [11]	3		287 [3.0]	Very stiff light brown SILT AND CLAY (A-6a), little fine to coarse sand, trace to little gravel; decomposed shale; damp.
2.44 [8.0]	210.33 [690.1]	5 10 15	.279 [11]	4		431+ [4.5+]	Hard gray and yellow SILTY CLAY (A-6b), trace to little fine to coarse sand, trace to little gravel; decomposed shale; damp.
3.05							
3.20 [10.5]	209.57 [687.6]	12 25 24	.457 [18]	5			Dense brown and gray SANDY SILT (A-4a); decomposed shale; damp.
3.96 [13.0]	208.81 [685.1]	7 13 19	.279 [11]	6		431+ [4.5+]	Hard red CLAY (A-7-6); decomposed claystone; damp.
4.57 [15]							
4.88 [16.0]	207.89 [682.1]	19 39 50/.13	.381 [15]	7			Soft red CLAYSTONE; severely weathered.
6.10 [20]		14 31 47	.356 [14]	8			
		11 43 50/.05	.330 [13]	9			
6.86 [22.5]	205.91 [675.6]	Core 0.762 m [30"]	Rec .762 m [30"]	RQD 33%			Medium hard to hard brown fine grained SANDSTONE; weathered to severely weathered; contains rust staining.
7.62							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) — Blows per 0.30 m ○ — 10 20 30 40; Moisture Content - % — PL Natural LL



Client: Ohio Department of Transportation | **Project:** ATH-33-40.981 | **Job No.** 9821-3200.00

LOG OF: Boring SB-17 | **Location:** 45+512.01, 5.45 m left of US 33 centerline. | **Date Drilled:** 12-14-99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry (before coring)
6.10 m [20.0'] (after coring, includes core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62 [25]	205.15 [673.1]	Core 0.864 m [34"]	Rec .864 m [34"]	RQD 88%			Hard gray fine to medium grained SANDSTONE; weathered to severely weathered; contains rust staining.
9.14 [30]		Core 1.422 m [56"]	Rec 1.422 m [56"]	RQD 79%			@ 9.72 m - 9.88 m [31.9' - 32.4'], gray shale layer. @ 9.88 m - 10.18 m [32.4' - 33.4'], brown.
9.91 [32.5]	202.86 [665.6]						Bottom of Boring - 9.91 m [32.5']
10.67 [35]							
12.19 [40]							
13.72 [45]							
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) — Blows per 0.30 m ○ — 10 20 30 40; Moisture Content - % — PL Natural LL

DLZ

CALCULATED T.A.H.	CHECKED BY A.E.N.
DATE 02/02/01	
REVIEWED BY T.A.H.	
DRAWN BY J.L.P.	

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-02439
U.S. 33 OVER SHADE RIVER

ATH-33-40.981

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-18 | Location: 45 + 549.99, 19.50 m left of US 33 centerline. | Date Drilled: 12-20-99

WATER OBSERVATIONS: Water seepage at: 2.19 m [7.2'] | Water level at completion: 6.10 m [20.0'] (before coring) 3.05 m [10.0'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0 [0.5]	204.98 [672.0]						Topsoil - 0.152 m [6"]								
		1 2 2	178 [7]	1		96 [1.0]	Soft to medium stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand; contains organic material; damp to moist. @ 0.91 m - 1.68 m [3.0' - 5.5'], contains sandy silt (A-4a) seams.								
1.52 [5.5]	203.30 [667.0]	1 WOH [14]	356	2		24 [0.25]									
		WOH 1 2	279 [11]	3			Very loose brown and gray COARSE AND FINE SAND (A-3a), little to some clayey silt; contains organic material; wet. @ 2.74 m - 3.20 m [9.0' - 10.5'], organic with wood fragments, and contains silt and clay (A-6a) seams.	0	6	---	62	19	13	Non-plastic
3.05 [10.5]	201.78 [662.0]	WOH 1 1	381 [15]	4A 4B											
		1 WOH 2	457 [18]	5		96 [1.0]	Medium stiff to stiff gray SILTY CLAY (A-6b), trace to little fine to coarse sand; contains organic material; moist.	0	1	---	8	50	41		
4.11 [13.5]	200.87 [659.0]	1 1 1	457 [18]	6		48 [0.5]	Soft to medium stiff gray CLAY (A-7-6), trace to little fine to coarse sand; moist. @ 4.88 m - 5.49 m [16.0' - 18.0'], some red and gray rock fragments.	0	1	---	5	46	47		
4.57 [15]		WOH 1 1	457 [18]	7		48 [0.5]									
5.49 [18.0]	199.49 [654.5]	2 3 4	279 [11]	8		168 [1.75]	Stiff red and yellow CLAY (A-7-6); decomposed claystone; damp to moist. @ 6.40 m - 7.01 m [21.0' - 23.0'], becomes very stiff, damp.								
6.10 [20]		3 11 18	254 [10]	9		359 [3.75]									
7.01 [23.0]	197.97 [649.5]	15 20 31	356 [14]	10			Soft red and gray CLAYSTONE; severely weathered.								
7.62 [25]	197.36 [647.5]	15 25 30	279 [11]	11			Soft red and gray CLAYSTONE; severely weathered.								
9.14 [30]		18 24 37	330 [13]	12											
		18 34 45	330 [13]	13											
10.67 [35]		15 29 46	330 [13]	14											
		33 42 56	330 [13]	15			@ 11.58 m [38.0'], becomes red, yellow and gray.								
12.19 [40]		15 30 39	279 [11]	16											
		12 35 47	356 [14]	17											
13.72 [45]		32 49 50/.10	305 [12]	18											
		50/.13	127 [5]	19											
14.81 [48.6]	190.17 [623.9]	50/.03	025	20			Medium hard red CLAYSTONE; weathered to moderately weathered.								
15.24		Core 0.762 m	Rec .533 m	RQD 67%											

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-18 | Location: 45 + 549.99, 19.50 m left of US 33 centerline. | Date Drilled: 12-20-99

WATER OBSERVATIONS: Water seepage at: 2.19 m [7.2'] | Water level at completion: 6.10 m [20.0'] (before coring) 3.05 m [10.0'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Core 0.762 m [30"]	Rec .660 m [26"]	RQD 60%	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
15.24 [50]	189.74 [622.5]					Medium hard red CLAYSTONE; weathered to moderately weathered.								
16.34 [53.6]	188.64 [618.9]					Bottom of Boring - 16.34 m [53.6']								
16.76 [55]														
18.29 [60]														
19.81 [65]														
21.34 [70]														
22.86														

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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-02439
U.S. 33 OVER SHADE RIVER

ATH-33-40.981

DRAWN BY	REVIEWED BY	DATE	CALCULATED
J.L.P.	T.A.H.	02/02/01	T.A.H.
			CHECKED BY A.E.N.

5 / 6

854
949

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-19 | Location: 45 + 585.00, 5.50 m left of US 33 centerline. | Date Drilled: 12-22-99

WATER OBSERVATIONS:
Water seepage at: 3.35 m [11.0']
Water level at completion: dry (before coring)
3.05 m [10.0'] (after coring, includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0	204.84						DESCRIPTION								
0.15 [0.5]	[671.8]	2 3 1	.152 [6]	1		96 [1.0]	Topsoil - 0.152 m [6"] Medium stiff to stiff brown SILT AND CLAY (A-6a), trace fine sand; contains organic material; damp to moist.								
1.52 [5]		1 3 2	.152 [6]	2		72 [0.75]									
2.44 [8.0]	202.40 [664.0]	1 2 2	.330 [13]	3		48 [0.5]									
3.05	201.64	WOH 1 1	.203 [8]	4			Very loose brown SANDY SILT (A-4a); wet.								
3.20 [10.5]	[661.5]	WOH WOH 1	.203 [8]	5			Very loose to loose gray COARSE AND FINE SAND (A-3a), trace to little clayey silt, trace gravel; contains organic material; wet.								
4.57 [15]		1 1 2	.356 [14]	6			@ 4.18 m - 4.57 m [13.7' - 15.0'], contains wood fragments.								
		3 1 3	.356 [14]	7											
6.10 [20]		1 1 1	.432 [17]	8			@ 5.64 m [18.5'], 0.15 m (6") sand heave.								
		WOH 2 3	.406 [16]	9			@ 7.16 m [23.5'], 0.20 m (8") sand heave.								
7.62		1 1 2	.356 [14]	10			@ 7.16 m - 7.62 m [23.5' - 25.0'], little to some clayey silt, trace to little gravel.								

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-20 | Location: 45+620.00, 19.51 m left of US 33 centerline | Date Drilled: 12-29-99

WATER OBSERVATIONS:
Water seepage at: 2.01 m [6.6'], 2.43 m [8.0']
Water leve at completion: 11.43 m [37.5'] (before coring)
3.66 m [12.0'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0	204.73						DESCRIPTION								
0.10 [0.3]	204.63 [671.4]	2 3 4	.330 [13]	1		168 [1.75]	Topsoil - 0.102 m [4"] Stiff brown SILT AND CLAY (A-6a), trace to little fine sand; contains organic material; damp.								
1.52 [5]		1 2 2	.178 [7]	2		48 [0.5]	@ 0.91 m - 2.44 m [3.0' - 8.0'], medium stiff, moist.								
2.44 [8.0]	202.29 [663.7]	1 2 3	.381 [15]	3A 3B		24 [0.25] 72 [0.75]	@ 2.01 m [6.6'], sand seam, wet.								
3.05	201.53	1 1 2	.356 [14]	4			Very loose brown FINE SAND (A-3); contains organic material; wet.								
3.20 [10.5]	[661.2]	1 1 2	.203 [8]	5			Very loose brown and gray COARSE AND FINE SAND (A-3a), trace to little clayey silt; contains organic material; moist.								
4.57 [15]		1 1 1	.330 [13]	6											
		1 1 1	.152 [6]	7											
6.10 [20]		1 1 1	.432 [17]	8											
		2 3 4	.127 [5]	9			@ 7.01 m - 7.62 m [23.0' - 25.0'], wet.								
7.62		WOR WOR WOH	.279 [11]	10											

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-19 | Location: 45 + 585.00, 5.50 m left of US 33 centerline. | Date Drilled: 12-22-99

WATER OBSERVATIONS:
Water seepage at: 3.35 m [11.0']
Water level at completion: dry (before coring)
3.05 m [10.0'] (after coring, includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62	197.22						DESCRIPTION								
[25]	[647.0]	2 2 2	.305 [12]	11			Loose to medium dense gray and brown COARSE AND FINE SAND (A-3a), little clayey silt, little gravel; wet.								
9.14 [30]		4 3 8	.457 [18]	12			@ 9.45 m - 10.06 m [31.0' - 33.0'], trace to little gravel.								
10.06 [33.0]	194.78 [639.0]	2 4 6	.457 [18]	13											
10.67 [35]		6 27 29	.279 [11]	14		239 [2.5]	Very stiff red and gray CLAY (A-7-6); decomposed claystone; damp.								
11.58 [38.0]	193.26 [634.1]	15 25 29	.203 [8]	15		335 [3.5]									
12.19 [40]	192.65 [632.1]	22 39 50/.13	.305 [12]	16			Soft red yellow and gray CLAYSTONE; severely weathered.								
		Core 0.762 m [30"]	Rec .533 m [21"]	RQD 60%			Medium hard red and gray CLAYSTONE, arenaceous; moderately to severely weathered.								
13.72 [45]		Core 1.676 m [66"]	Rec .686 m [40"]	RQD 24%											
14.63 [48.0]	190.21 [624.0]						Bottom of Boring - 14.63 m [48.0']								
15.24															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-20 | Location: 45+620.00, 19.51 m left of US 33 centerline | Date Drilled: 12-29-99

WATER OBSERVATIONS:
Water seepage at: 2.01 m [6.6'], 2.43 m [8.0']
Water leve at completion: 11.43 m [37.5'] (before coring)
3.66 m [12.0'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62	197.11						DESCRIPTION								
[25]	[646.7]	WOH 4 8	.457 [18]	11			Loose brown and gray COARSE AND FINE SAND (A-3a), trace to little clayey silt; contains organic material; moist to wet.								
9.02 [29.6]	195.71 [642.1]	8 8 28	.432 [17]	12		287 [3.0]	@ 7.92 m - 9.02 m [26.0' - 29.6'], medium dense.								
9.45 [31.0]	195.28 [640.7]	13 25 46	.229 [9]	13			Very stiff red and gray CLAY (A-7-6); decomposed claystone; damp.								
10.67 [35]		26 32 50	.381 [15]	14			Soft red, gray and brown CLAYSTONE; severely weathered.								
		23 34 50/.13	.254 [10]	15											
12.19 [40]	192.54 [631.7]	22 24 43	.330 [13]	16											
		Core 1.524 m [60"]	Rec .889 m [35"]	RQD 22%			Soft to medium hard red, gray and brown CLAYSTONE.								
13.72 [45]	191.01 [626.7]						Bottom of Boring - 13.72 m [45.0']								
15.24															

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

CALCULATED T.A.H.
CHECKED BY A.E.N.
DATE 02/02/01
REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-02439
U.S. 33 OVER SHADE RIVER

ATH-33-40.981

6 / 6

855
949

GEOLOGY OF THE SITE

GENERALIZED GEOLOGIC REFERENCES REPORT THAT THE SITE IS LOCATED WITHIN THE UNGLACIATED SECTION OF THE ALLEGHENY PLATEAU. OVERBURDEN AT THE SITE CONSISTS OF THIN RESIDUAL SOILS ALONG RIDGETOPS AND HILLSIDES, COLLUVIAL SOILS AT THE BASE OF THE HILLSIDES, AND ALLUVIAL DEPOSITS ALONG STREAM CHANNELS. THE UNDERLYING BEDROCK AT THE SITE IS REPORTED TO BE SHALE, SANDSTONE, COAL, AND LIMESTONE OF MONONGAHELA SERIES ALONG THE HILLSIDES AND CONEMAUGH SERIES WITHIN THE VALLEY BOTTOM.

EXPLORATION

A TOTAL OF EIGHT STRUCTURE BORINGS, SB-26 THROUGH SB-33, WERE DRILLED AT THE PROJECT BETWEEN JANUARY 18, 2000 AND FEBRUARY 9, 2000. THE BORINGS WERE DRILLED TO DEPTHS BETWEEN 7.22 AND 10.36 METERS (23.7 AND 34.0 FEET) BY MEANS OF A TRUCK-MOUNTED OR TRACK-MOUNTED (ATV) ROTARY-TYPE DILL RIG USING HOLLOWSTEM AUGERS. THE BORINGS WERE EXTENDED INTO BEDROCK AND BEDROCK WAS VERIFIED BY CORING IN ALL THE BORINGS.

INVESTIGATIONAL FINDINGS AND OBSERVATIONS

1. SOILS

AT THE GROUND SURFACE, 102 TO 457 MILLIMETERS (4 TO 18 INCHES) OF TOPSOIL WERE ENCOUNTERED BY THE BORINGS. BELOW THE TOPSOIL, THE BORINGS ENCOUNTERED LAYERS OF BOTH COHESIVE AND GRANULAR MATERIAL EXTENDING TO BEDROCK, EXCEPT THE BORINGS AT THE FORWARD ABUTMENTS, SB-29 AND SB-33, WHICH ENCOUNTERED ONLY COHESIVE MATERIAL. GENERALLY, THE MATERIALS ENCOUNTERED VARIED FROM VERY LOOSE TO STIFF SANDY SILT (A-4a) TO VERY STIFF TO HARD CLAY (A-7-6). A VERY LOOSE TO LOOSE GRAVEL WITH SAND (A-1-b) AND A MEDIUM DENSE FINE SAND (A-3) WERE ALSO ENCOUNTERED IN BORINGS SB-31 AND SB-32, RESPECTIVELY.

2. BEDROCK

BEDROCK WAS ENCOUNTERED IN EACH OF THE EIGHT BORINGS DURING DRILLING AND GENERALLY CONSISTED OF BETWEEN 0.15 AND 3.66 METERS (0.5 AND 12.0 FEET) OF SEVERELY WEATHERED ROCK OVERLYING MORE COMPETENT ROCK. COMPETENT BEDROCK WAS ENCOUNTERED IN THE BORINGS AT DEPTHS OF BETWEEN 4.42 AND 5.85 METERS (14.5 AND 19.2 FEET) AND GENERALLY CONSISTED OF SOFT TO MEDIUM HARD SHALE AND CLAYSTONE AND MEDIUM HARD TO HARD SANDSTONE AND LIMESTONE.

3. GROUNDWATER

GROUNDWATER SEEPAGE WAS FIRST ENCOUNTERED IN THE BORINGS AT DEPTHS RANGING FROM 1.07 TO 4.88 METERS (3.5 TO 16.0 FEET) BELOW THE EXISTING GROUND SURFACE. WATER LEVELS PRIOR TO CORING WERE DETECTED ONLY IN BORING SB-28 AT A DEPTH OF 3.96 METERS (13.0 FEET) BELOW THE EXISTING GROUND SURFACE. AT COMPLETION OF DRILLING, WATER LEVELS RANGED FROM 0.15 AND 6.10 METERS (0.5 AND 20.0 FEET) BELOW THE EXISTING GROUND SURFACE. HOWEVER, THE FINAL WATER LEVELS INCLUDED DRILL WATER AND THEREFORE MAY NOT BE REPRESENTATIVE OF THE ACTUAL GROUNDWATER CONDITIONS AT THE SITE.

SYMBOLS OF ROCK TYPES

- LIMESTONE
- SANDSTONE
- WEATHERED LIMESTONE
- WEATHERED SANDSTONE
- WEATHERED SHALE

PARTICLE SIZE DEFINITIONS

Boulders	Cobbles	Gravel	Coarse Sand	Fine Sand	Silt	Clay

Boundaries: 300 mm (Boulders/Cobbles), 75 mm (Cobbles/Gravel), 2.0 mm (Gravel/Coarse Sand; No. 10 SIEVE), 0.42 mm (Coarse Sand/Fine Sand; No. 40 SIEVE), 0.074 mm (Fine Sand/Silt; No. 200 SIEVE), 0.005 mm (Silt/Clay)

NOTES

ALL AVAILABLE SOIL AND BEDROCK INFORMATION WHICH CAN BE CONVENIENTLY SHOWN ON THE STRUCTURE FOUNDATION INVESTIGATION 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.

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

GENERAL INFORMATION

DRIVE SAMPLES

DRIVE SAMPLE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG EMPLOYING A 50.80 mm O.D., 34.93 mm I.D., SPLIT-SPOON SAMPLER, AT CONTINUOUS, 0.75 m AND/OR 1.50 m DEPTH INTERVALS, DRIVEN BY MEANS OF A 63.5 kg HAMMER WITH A FREE FALL OF 0.76 m. THE NUMBER OF BLOWS REQUIRED TO DRIVE THE SAMPLER THREE 0.15 m INCREMENTS IS CONSIDERED THE STANDARD PENETRATION TEST.

PRESS SAMPLES

PRESS SAMPLES ARE TAKEN BY MEANS OF MECHANICALLY POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING A 76 mm O.D. THIN-WALL PRESS SAMPLING TUBE. THE PRESS SAMPLING TUBE IS ADVANCED BY CONTINUOUS UNIFORM PRESSURE APPLIED BY THE DRILL RIG.

CORE BORINGS

CORE BORINGS ARE MADE BY MEANS OF A MECHANICALLY-POWERED, ROTARY-TYPE DRILL RIG, EMPLOYING AN NQ2 OR NXM CORE BARREL WITH AN INDUSTRIAL DIAMOND CUTTING HEAD.

SAMPLING AND TESTING

THE BORING LOG SHEETS SHOW A GRAPHIC PLOT OF THE INFORMATION OBTAINED, INCLUDING DEPTH AND ELEVATION OF THE SAMPLE, TYPE OF SAMPLE, NUMBER OF BLOWS FOR THE STANDARD PENETRATION TEST IN THREE 0.15 m INCREMENTS, AND A SAMPLE DESCRIPTION BASED ON LABORATORY TEST RESULTS, UTILIZING THE ODOT CLASSIFICATION SYSTEM. RESULTS OF STRENGTH AND CONSOLIDATION TESTING, IF PERFORMED ON UNDISTURBED SAMPLES, 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.

SCOUR ANALYSIS INFORMATION

BORING NUMBER	SAMPLE NUMBER	DEPTH (m)	ODOT CLASSIFICATION	D50 SIZE (mm)
SB-27	S-3	1.83-2.29 (6.0'-7.5')	A-4a	0.0948
SB-31	S-3	1.83-2.29 (6.0'-7.5')	A-1-b	0.432
SB-31	S-4	2.59-3.05 (8.5'-10.0')	A-4a	0.0961

LEGEND

PRESS SAMPLE, DRIVE SAMPLE, AND/OR CORE BORING LOCATION

TR — TOP OF ROCK

W— INDICATES FREE WATER ELEVATION

▼— INDICATES STATIC WATER ELEVATION

FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR STANDARD PENETRATION TEST

X/Y/Z
- X = NUMBER OF BLOWS FOR FIRST 0.15 m
- Y = NUMBER OF BLOWS FOR SECOND 0.15 m
- Z = NUMBER OF BLOWS FOR THIRD 0.15 m

50 (n) — INDICATES NUMBER OF BLOWS (50) TO DRIVE A SPLIT-BARREL SAMPLER A DEPTH OF (n) METERS OTHER THAN THE NORMAL 0.15 METER INCREMENT.

DLZ

CALCULATED T.A.H. | CHECKED BY A.E.N. | DATE 02/02/01 | REVIEWED BY T.A.H. | DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-0581O
OVER TRIBUTARY TO SHADE RIVER

ATH-33-40.981

metric units

℄ FUTURE S.R. 681

TRIBUTARY TO SHADE RIVER

SB-26

SB-27

SB-28

SB-29

PROFILE GRADE

PROFILE GRADE

+860

+880

48+900

+920

+940

℄ CONSTRUCTION U.S. 33

PROPOSED STRUCTURE

EXISTING GROUND SURFACE

FUTURE S.R.681

HW100 = EL. 202.17

HW50 = EL. 202.09

NORMAL WATER = EL. 201.00

SB-26
STA. 48+860.00
19.50 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.203 m
3/7/5
2/3/4
2/3/4
1/1/2
2/3/20
30/50(0.00)
W-W
TR

SB-27
STA. 48+878.44
7.79 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.254 m
2/2/2
1/2/2
1/1/2
1/2/3
50(0.05)
W
W-TR

SB-28
STA. 48+920.46
23.24 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.457 m
2/2/3
4/7/8
4/11/18
15/50/50(0.05)
22/20/25
5/6/38
50(0.13)
16/50(0.05)
TR
W

SB-29
STA. 48+940.13
7.11 m Lt. of ℄ of U.S. 33
TOPSOIL = 0.406 m
2/2/4
2/3/8
6/10/11
17/27/33
15/18/43
27/29/47
18/29/50(0.10)
50(0.08)
TR
W

210

200

190

+820 +830 +840 +850 +860 +870 +880 +890 48+900 +910 +920 +930 +940 +950 +960

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

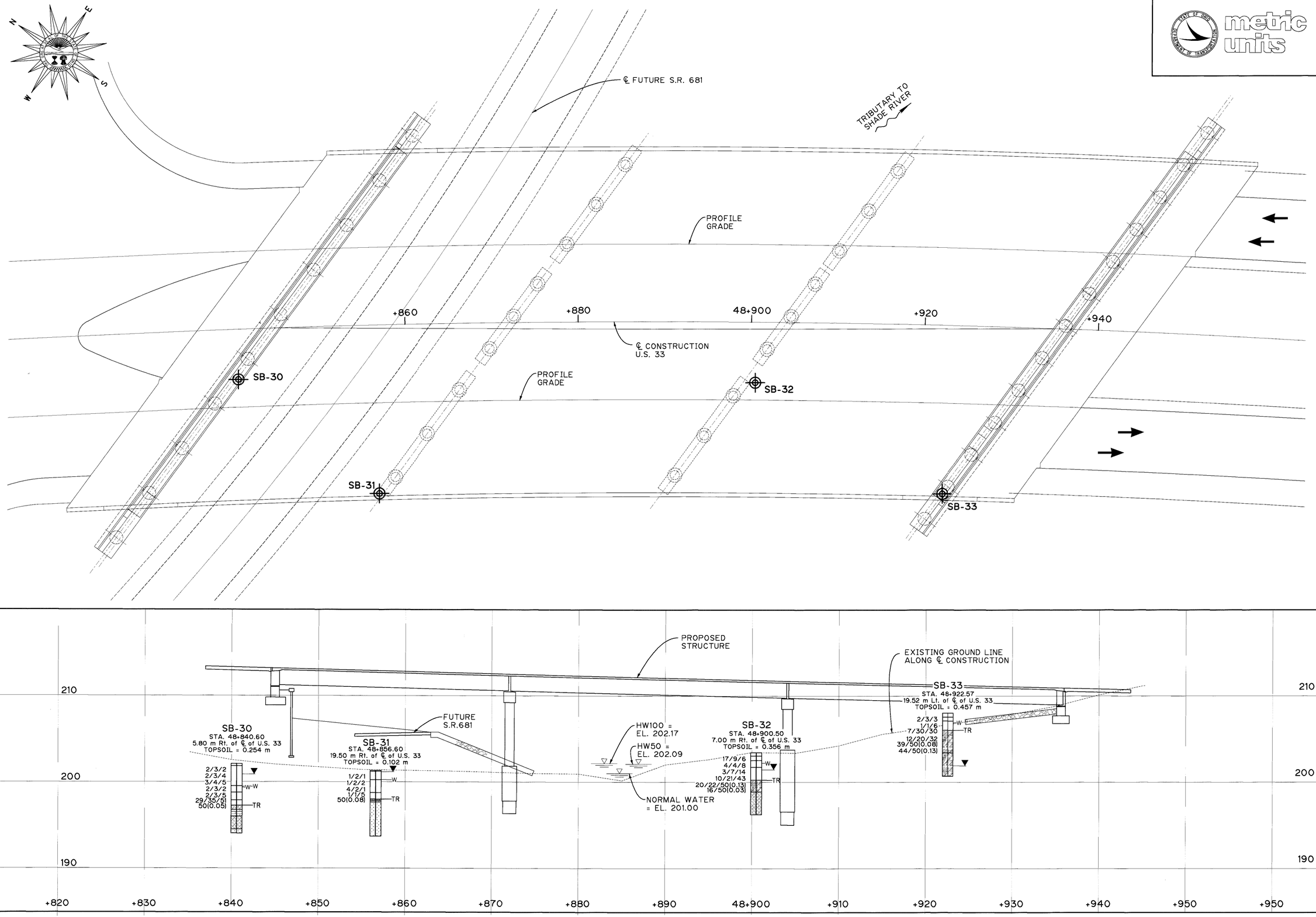
CALCULATED T.A.H.	CHECKED BY A.E.N.		
DATE 02/02/01			
REVIEWED BY T.A.H.			
DRAWN BY J.L.P.			

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-05810
OVER TRIBUTARY TO SHADE RIVER

ATH-33-40.981

2 / 7

857
949



metric units

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

SCALE IN METERS 0 10
HORIZONTAL SCALE: 1 : 200

CALCULATED	CHECKED BY
T.A.H.	A.E.N.

DRAWN BY	REVIEWED BY	DATE
J.L.P.	T.A.H.	02/02/01

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-05810
OVER TRIBUTARY TO SHADE RIVER

ATH-33-40.981

3 / 7

858
949

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-26 | Location: Sta. 48+860.00, 19.50 m left of US 33 centerline | Date Drilled: 2/1/00

WATER OBSERVATIONS: Water seepage at: 1.86 m[6.1'], 1.92 m[6.3']
Water level at completion: dry prior to core 1.07 m[3.5']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	SPT Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0	201.66						Topsoil - 0.203 m [8"]								
0.20 [0.7]	201.46 [660.9]	3 7 5	.229 [9]	1		239 [2.5]	Very stiff dark brown SILT AND CLAY (A-6a), little fine to coarse sand; moist.								
1.52 [5]		2 3 4	.305 [12]	2		168 [1.75]	@ 1.07 m - 1.52 m [3.5' - 5.0'], becomes stiff, brown.								
		2 3 4	.330 [13]	3	1	24 [0.25]	@ 1.83 m - 3.81 m [6.0' - 12.0'], soft, gray, with some fine to coarse sand.								
3.05 [10]		1 1 2	.381 [15]	4	2	24 [0.25]	@ 2.59 m - 3.66 m [8.5' - 12.0'], contains few coal fragments.								
3.66 [12.0]	198.00 [649.6]	2 3 20	.381 [15]	5A 5B		48 [0.5]	Severly weathered gray SHALE, micaceous.								
4.42	197.24	30 50/.00	.127 [5]	6											
4.57 [15]	[647.1]	Core 0.533 m [21"]	Rec .533 m [21"]	RQD 100%			Medium hard gray fine grained SANDSTONE, micaceous; weathered.								
4.83 [15.2]	197.03 [646.4]						Hard light gray LIMESTONE, micaceous, arenaceous; weathered to slightly weathered.								
5.18 [17.0]	196.48 [644.6]	Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 100%			Medium hard to hard gray fine to medium grained SANDSTONE, micaceous; weathered tc slightly weathered.								
6.10 [20]															
7.62															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-27 | Location: Sta. 48+878.44, 7.79 m left of US 33 centerline | Date Drilled: 1/31/00

WATER OBSERVATIONS: Water seepage at: 2.16 m [7.1'], 2.65 m [8.7']
Water level at completion: dry prior to core 4.24 m [13.9']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	SPT Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0	200.86						Topsoil - 0.254 m [10"]								
0.25 [0.8]	200.61 [658.2]	2 2 2	.178 [7]	1		<24 [<0.25]	Very soft brown SILT AND CLAY (A-6a), little fine to coarse sand; contains wood fragments; moist.								
1.52 [5]		1 2 2	.051 [2]	2		---									
1.68 [5.5]	199.18 [653.5]	1 1 2	.381 [15]	3			Very loose gray SANDY SILT (A-4a), little clay; moist.	0	1	---	57	27	15		Non-plastic
2.65 [8.7]	198.21 [650.3]	1 2 3	.254 [10]	4			Gray SANDSTONE fragments; moist to wet								
3.05	197.65														
3.21 [10.5]	[648.5]						Severely weathered gray SHALE fragments, micaceous.								
3.51 [11.5]	197.35 [647.5]	50/.05 Core 1.372 m [54"]	.051 Rec 1.372 m [54"]	5 RQD 100%			Hard light gray LIMESTONE, arenaceous, slightly micaceous; slightly weathered.								
3.96 [13.0]	196.90 [646.0]						Medium hard gray SANDSTONE, arenaceous, slightly micaceous, slightly calcareous; weathered.								
4.57 [15]		Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 100%											
6.10 [20]															
7.62															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-26 | Location: Sta. 48+860.00, 19.50 m left of US 33 centerline | Date Drilled: 2/1/00

WATER OBSERVATIONS: Water seepage at: 1.86 m[6.1'], 1.92 m[6.3']
Water level at completion: dry prior to core 1.07 m[3.5']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	SPT Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
7.62	194.04														
[25]	[636.6]						Medium hard to hard gray fine to medium grained SANDSTONE, micaceous; weathered to slightly weathered.								
7.99 [26.2]	193.67 [635.4]						Bottom of Boring - 7.99 m [26.2']								
9.14 [30]															
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-27 | Location: Sta. 48+878.44, 7.79 m left of US 33 centerline | Date Drilled: 1/31/00

WATER OBSERVATIONS: Water seepage at: 2.16 m [7.1'], 2.65 m [8.7']
Water level at completion: dry prior to core 4.24 m [13.9']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Agg.	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	SPT Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
7.62	193.24														
[25]	[634.0]						Medium hard gray SANDSTONE, arenaceous, slightly micaceous, slightly calcareous; weathered.								
7.92 [26.0]	192.94 [633.0]						Bottom of Boring - 7.92 m [26.0']								
9.14 [30]															
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

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DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. MEG-33-0581O
OVER TRIBUTARY TO SHADE RIVER

ATH-33-40.981

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859
949

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-28 | Location: Sta. 48+920.46, 23.24 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS: Water seepage at: 4.88 m [16.0'] / Water level at completion: 3.96 m [13.0'] prior to coring, 2.19 m [7.2'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0 [0]	202.32 [663.8]						Topsoil - 0.457 m [18"]								
0.46 [1.5]	201.86 [662.3]	2 2 3	229 [9]	1		120 [1.25]	Stiff to very stiff brown and gray SANDY SILT (A-4a), little gravel; damp to moist.								
1.37 [4.5]	200.95 [659.3]	4 7 8	229 [9]	2A		192 [2.0]									
1.52 [5.0]				2B		287 [3.0]	Very stiff brown SILTY CLAY (A-6b), trace fine to coarse sand, (decomposed shale); damp. @ 1.83 m - 2.59 m [6.0' - 8.5'], becomes brown, red and gray.								
2.59 [8.5]	199.73 [655.3]	4 11 18	330 [13]	3		359 [3.75]									
3.05 [10]		15 50 50/.05	279 [11]	4			Soft to medium hard gray SHALE, arenaceous; severely weathered.								
		22 20 25	330 [13]	5			@ 4.11 m - 4.42 m [13.5' - 14.5'], decomposed layer.								
4.57 [15]		5 6 38	356 [14]	6											
		50/.13	127 [5]	7											
5.64 [18.5]	196.68 [645.3]	16 50/.05	127 [5]	8			Medium hard gray fine to coarse SANDSTONE; severely weathered.								
5.85 [19.2]	196.47						Hard gray fine to medium grained SANDSTONE, micaceous, slightly argillaceous; moderately weathered.								
6.10 [20.0]		Core 1.397 m [55"]	Rec 1.041 m [41"]	RQD 73%											
7.62															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-29 | Location: Sta. 48+940.13, 7.11 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS: Water seepage at: 3.51 m [11.5'] / Water level at completion: dry prior to coring, 2.13 m [7.0'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0 [0]	209.36 [686.9]						Topsoil - 0.406 m [16"]								
0.40 [1.3]	208.96 [685.6]	2 2 4	305 [12]	1		192 [2.0]	Stiff brown SILT AND CLAY (A-6a); damp.								
0.91 [3.0]	208.45 [683.9]	2 3 8	229 [9]	2		431+ [4.5+]	Hard brown and red SILTY CLAY (A-6b); (decomposed shale); damp.								
1.52 [5]	207.53 [680.9]	6 10 11	229 [9]	3		431+ [4.5+]	Hard red CLAY (A-7-6); (decomposed claystone); damp.								
2.44 [8.0]	206.92 [678.9]	17 27 33	381 [15]	4			Soft brown SHALE; severely weathered.								
3.05 [10.5]	206.16 [676.4]	15 18 43	305 [12]	5			Soft purple and brown CLAYSTONE; severely weathered.								
3.96 [13.0]	205.40 [673.9]	27 29 47	279 [11]	6			Soft to medium hard gray SHALE, arenaceous; severely weathered.								
4.57 [15]		18 29 50/.10	356 [14]	7			@ 5.64 m [18.5'], becomes weathered.								
		50/.08	076 [3]	8											
6.10 [20]	203.26 [666.9]	Core 1.219 m [48"]	Rec 635 m [25"]	RQD 38%			@ 6.10 m - 7.32 m [20.0' - 24.0'], slightly broken. @ 6.77 m - 6.98 m [22.2' - 22.9'], vertical fracture with rust staining.								
7.41 [24.3]	201.95 [662.6]						Soft to medium hard red CLAYSTONE; weathered.								

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-28 | Location: Sta. 48+920.46, 23.24 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS: Water seepage at: 4.88 m [16.0'] / Water level at completion: 3.96 m [13.0'] prior to coring, 2.19 m [7.2'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
7.62 [25]	194.70 [638.8]	Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 98%			Hard gray fine to medium grained SANDSTONE, micaceous, slightly argillaceous; moderately weathered.								
8.78 [28.8]	193.54 [635.0]						Bottom of Boring - 8.78 m [28.8']								
9.14 [30]															
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-29 | Location: Sta. 48+940.13, 7.11 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS: Water seepage at: 3.51 m [11.5'] / Water level at completion: dry prior to coring, 2.13 m [7.0'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
7.62 [25]	201.74 [661.9]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 95%			Soft to medium hard red CLAYSTONE; weathered.								
8.02 [26.3]	201.34 [660.6]						Medium hard gray SHALE, arenaceous; weathered.								
9.14 [30]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			@ 8.84 m - 9.94 m [29.0' - 32.6'], weathered to severely weathered.								
9.94 [32.6]	199.42 [654.3]						Soft to medium hard red CLAYSTONE; weathered to severely weathered.								
10.36 [34.0]	199.00 [652.9]						Bottom of Boring - 10.36 m [34.0']								
10.67 [35]															
12.19 [40]															
13.72 [45]															
15.24															

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STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO.-MEG 33-05810
OVER TRIBUTARY TO SHADE RIVER

ATH-33-40.981

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860
949

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-30 | Location: Sta. 48+840.60, 5.80 m right of US 33 centerline | Date Drilled: 1-18-00

WATER OBSERVATIONS: Water seepage at: 2.65 m [8.7'], 2.77 m [9.1']; Water level at completion: dry (before coring); 1.22 m [4.0'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0	202.10						Topsoil - 0.254 m [10"]								
0.25	201.85														
[0.8]	[662.2]	2					Stiff to very stiff brown SILT AND CLAY (A-6a), some fine to coarse sand; contains roots, slightly organic; moist.								
		3	.356			215									
		2	[14]	1		[2.25]									
		2													
		3	.330				@ 1.68 m - 2.59 m [5.5' - 8.5'], rust-stained, contains few coal fragments, no roots or organics.								
1.52		4	[13]	2		---									
[5]															
		3													
		4	.254												
		5	[10]	3		120									
						[1.25]									
2.59	199.51														
[8.5]	[654.6]	2					Loose brown SANDY SILT (A-4a), little clay; contains sandstone and coal fragments; moist.								
		3	.254												
3.05		2	[10]	4											
[10]															
3.35	198.75														
[11.0]	[652.1]	2					Very soft gray SHALE, micaceous; severely weathered.								
		3	.279												
		5	[11]	5			@ 4.11 m - 4.27 m [13.5' - 14.0'], gray, brown and reddish brown, contains sandstone fragments.								
4.27	197.83	29													
[14.0]	[649.0]	35	.457				Very dense dark brown SANDY SILT (A-4a), little silty clay, trace gravel; severely weathered sandstone; damp to moist.								
4.57		51	[18]	6A											
[15]				6B											
4.88	197.22														
[16.0]	[647.0]	50/.05	.051	7			Medium hard brown SANDSTONE; severey weathered;								
		Core 0.61 m [24"]	Rec .610 m [24"]	RQD 67%			@ 5.03 m - 5.36 m [16.5' - 17.6'], becomes hard, gray.								
5.36	196.74														
[17.6]	[645.5]	Core 0.61 m [24"]	Rec .610 m [24"]	RQD 92%			Hard gray LIMESTONE, arenaceous; slightly weathered.								
6.13	195.97														
[20.1]	[642.9]	Core 1.829 m [72"]	Rec 1.829 m [72"]	RQD 100%			Hard gray SANDSTONE; weathered to slightly weathered.								
							@ 7.21 m - 7.24 m [23.6' - 23.8'], argillaceous. @ 7.32 m [24.0'], very thin argillaceous layer.								
7.62															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-31 | Location: Sta. 48 + 856.60, 19.50 m right of US 33 centerline | Date Drilled: 1-19-00

WATER OBSERVATIONS: Water seepage at: 1.07 m [3.5']; Water level at completion: dry (before coring); 0.15 m [0.5'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0	201.31						Topsoil - 0.102 m [4"]								
0.10	201.21														
[0.3]	[660.1]	1					Medium stiff brown SANDY SILT (A-4a), little clay; moist.								
		2	.381			72									
		1	[15]	1		[0.75]									
1.07	200.24														
[3.5]	[657.0]	1					Very loose to loose brown GRAVEL WITH SAND (A-1-b), little silt, trace clay; wet.								
		2	.330												
1.52		2	[13]	2											
[5]															
		4													
		2	.203					23	27	---	34	11	5		Non-plastic
		1	[8]	3											
2.59	198.72														
[8.5]	[652.0]	1					Medium stiff gray SANDY SILT (A-4a), little clay, trace gravel; moist.								
		1	.178			72		3	17	---	34	28	18		
3.05		5	[7]	4		[0.75]									
[10]															
3.35	197.96														
3.51	197.80	50/.08	.076	5			Medium hard gray SANDSTONE, argillaceous, micaceous; severely weathered.								
3.69	197.62														
[12.1]	[648.4]	Core 1.067 m [42"]	Rec 1.067 m [42"]	RQD 90%			Hard light gray LIMESTONE, arenaceous; slightly weathered; contains micaceous layers.								
4.57							Hard gray and light gray fine to coarse grained SANDSTONE, micaceous; slightly weathered; contains calcareous layers and limestone clasts.								
[15]		Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 92%											
6.10															
[20]		Core 1.524 m [60"]	Rec 1.346 m [53"]	RQD 88%			@ 6.71 m - 6.86 m [22.0' - 22.5'], clay seam.								
7.62							Bottom of Boring - 7.62 m [25.0']								

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-30 | Location: Sta. 48+840.60, 5.80 m right of US 33 centerline | Date Drilled: 1-18-00

WATER OBSERVATIONS: Water seepage at: 2.65 m [8.7'], 2.77 m [9.1']; Water level at completion: dry (before coring); 1.22 m [4.0'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
7.62	194.48						DESCRIPTION								
[25]	[638.1]						Hard gray SANDSTONE; unweathered.								
8.08	194.02						@ 7.88 m [25.9'], becomes calcareous.								
[26.5]	[636.5]						Bottom of Boring - 8.08 m [26.5']								
9.14															
[30]															
10.67															
[35]															
12.19															
[40]															
13.72															
[45]															
15.24															

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BRIDGE NO.-MEG 33-05810
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ATH-33-40.981

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861
949

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-32 | Location: Sta. 48+900.50, 7.00 m right of US 33 centerline | Date Drilled: 2-7-00

WATER OBSERVATIONS:
Water seepage at: 1.22 m [4.0']
Water level at completion: dry prior to coring
1.98 m [6.5'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0	203.44 [667.5]						Topsoil - 0.356 m [14"]								
0.37 [1.2]	203.07 [666.2]	17 9 6	.254 [10]	1			Medium dense brown FINE SAND (A-3); trace sandstone fragments; damp.								
0.91 [3.0]	202.53 [664.5]	4 4 8	.279 [11]	2		239 [2.5]	Very stiff brown and gray SILTY CLAY (A-6b), little to some fine to coarse sand, little gravel; damp.								
1.52 [5.5]	201.76 [661.9]	3 7 14	.305 [12]	3		311 [3.25]	Very stiff to hard brown and gray CLAY (A-7-6); (decomposed claystone); damp.								
3.05	200.24	10 21 43	.279 [11]	4		407 [4.25]									
3.20 [10.5]	[657.0]	20 22 50/.13	.229 [9]	5			Soft gray SHALE, arenaceous; severely weathered.								
		16 50/.03	.102 [4]	6											
4.57 [15]	198.87 [652.5]	Core 1.118 m [44"]	Rec 1.118 m [44"]	RQD 100%			Hard gray SANDSTONE, micaceous contains dark gray argillaceous laminae; moderately weathered. @ 5.15 m - 5.27 m [16.9' - 17.3'], weathered shale layer.								
6.10 [20]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%											
7.22 [23.7]	196.22 [643.8]						Bottom of Boring - 7.22 m [23.7']								
7.62															

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-33 | Location: Sta. 48+922.57, 19.52 m left of US 33 centerline | Date Drilled: 2-9-00

WATER OBSERVATIONS:
Water seepage at: 1.10 m [3.6']
Water level at completion: dry prior to coring
6.10 m [20.0'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
0	208.02 [682.5]						Topsoil - 0.457 m [18"]								
0.46 [1.5]	207.56 [681.0]	2 3 3	.279 [11]	1		239 [2.5]	Very stiff brown SILTY CLAY (A-6b), little fine to coarse sand, little gravel; damp.								
0.91 [3.0]	207.11 [679.5]	1 1 6	.178 [7]	2		239 [2.5]	Very stiff red and gray CLAY (A-7-6); damp.								
1.52 [5]															
1.98 [6.5]	206.04 [676.0]	7 30 30	.279 [11]	3A		--	Soft brown SHALE, arenaceous; severely weathered.								
				3B			@ 2.59 m [8.5'], becomes gray.								
3.05 [10]		12 20 32	.330 [13]	4											
		39 50/.08	.229 [9]	5											
		44 50/.13	.279 [11]	6											
4.57 [15]	203.45 [667.5]	Core 1.219 m [48"]	Rec .762 m [30"]	RQD 63%			Soft to medium hard brown SHALE; severely weathered to weathered.								
6.10 [20]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			@ 6.55 m [21.5'], moderately hard, weathered. @ 6.52 m [21.4'] & 6.95 m [22.8'], 45° slickensided shear.								
7.32 [24.0]	200.70 [658.5]						Bottom of Boring - 7.32 m [24.0']								
7.62															

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CALCULATED T.A.H. | CHECKED BY A.E.N.
DATE 02/02/01
REVIEWED BY T.A.H.
DRAWN BY J.L.P.

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO.-MEG 33-05810
OVER TRIBUTARY TO SHADE RIVER

ATH-33-40.981

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862
949

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-7 | Location: 39+650.23, 24.68 m Lt. of US 33 centerline | Date Drilled: 11/8/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
7.32 m [24.0'] (with core water)

STANDARD PENETRATION (N) Blows per 0.30 m

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

Moisture Content - % PL Natural LL

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	258.23						
	[847.2]						Topsoil - 0.33 m [13"]
0.34	257.89						
[1.1]	[846.1]	5					
		6	.330				Hard brown SILT AND CLAY (A-6a); decomposed caystone; damp.
		12	[13]	1		431+ [4.5+]	
		6					
		8	.152				
1.52	256.71	10	[6]	2		431+ [4.5+]	
[5]	[842.2]	Core	Rec	RQD			Hard gray SANDSTONE, fine grained, micaceous; slightly weathered.
1.80	256.43	0.61 m [24"]	.381 m [15"]	42%			
[5.9]	[841.3]						Medium hard brown SANDSTONE, fine to medium grained, micaceous; weathered; friable.
		Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 52%			@ 2.19 m - 2.32 m [7.2' - 7.6'], decomposed layer.
							@ 2.56 m - 2.59 m [8.4' - 8.5'], vertical fracture.
							@ 2.71 m - 2.77 m [8.9' - 9.1'], clay seam.
2.90	255.33						
[9.5]	[837.7]						Hard gray SANDSTONE, fine grained, micaceous; slightly weathered.
		Core 1.524 m [60"]	Rec 1.346 m [53"]	RQD 68%			
4.05	254.18						
[13.3]	[833.9]						Hard gray LIMESTONE; moderately weathered.
4.57							@ 4.42 m - 4.57 m [14.5' - 15.0'], contains fine to medium sand.
[15]							
4.85	253.38						
[15.9]	[831.3]						Soft to medium hard brown SANDSTONE; fine to medium grained, severely weathered.
		Core 1.524 m [60"]	Rec 1.321 m [52"]	RQD 35%			@ 5.55 m - 5.61 m [18.2' - 18.4'] & 6.22 m - 6.43 m [20.4'-21.1'] clayey decomposed layers.
							@ 5.76 m [18.9'], 6.52 m [21.4'], 6.71 m [22.0'], clayey seams.
6.10							
[20]							
							@ 6.71 m - 6.77 m [22.0' - 22.2'], severely weathered.
		Core 1.524 m [60"]	Rec 1.397 m [55"]	RQD 28%			
7.62							

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-7 | Location: 39+650.23, 24.68 m Lt. of US 33 centerline | Date Drilled: 11/8/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
7.32 m [24.0'] (with core water)

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m [in]	Rec (m)	Drive	Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	250.61													
[25]	[822.2]							Soft to medium hard brown SANDSTONE; fine to medium grained, severely weathered. @ 7.77 m - 8.11 m [25.5' - 26.6'], highly friable with clay seams. @ 8.14 m - 8.23 m [26.7' - 27.0'], clayey layer.						
		Core 1.524 m [60"]	Rec .965 m [38"]	RQD 28%										
9.14														
[30]								@ 9.72 m [31.9'] & 9.85 m [32.3'], clay seams.						
		Core 1.524 m [60"]	Rec 1.041 m [41"]	RQD 25%				@ 10.33 m - 10.36 m [33.9' - 34.0'], vertical fracture. @ 10.52 m - 11.19 m [34.5' - 36.7'], severely weathered with possible core loss.						
10.67														
[35]														
11.28	246.95													
[37.0]	[810.2]	Core 1.524 m [60"]	Rec .940 m [37"]	RQD 0%				Soft to moderately hard gray SANDSTONE, argillaceous; weathered; friable, slightly carbonaceous.						
12.19														
[40]														
12.80	245.43													
[42.0]	[805.2]	Core 1.524 m [60"]	Rec 1.422 m [56"]	RQD 55%				Soft dark gray SHALE, carbonaceous.						
13.29	244.94													
[43.6]	[803.6]							Hard gray SANDSTONE; fine to medium grained, slightly weathered.						
13.72														
13.93	244.30													
[45.7]	[801.5]							Medium hard dark gray SANDSTONE, silty and argillaceous; severely weathered.						
14.33	243.90													
[47.0]	[800.2]							Bottom of Boring - 14.33 m [47.0']						
15.24														

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-8 | Location: 39+683.1, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/10/99

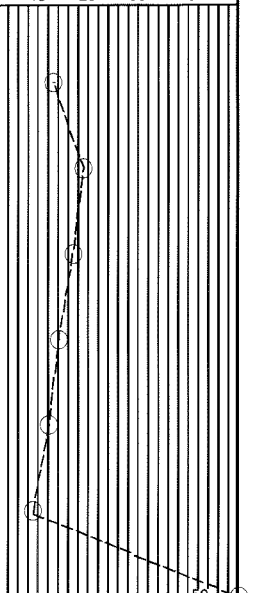
WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.15 m [3.8'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	238.22						
	[781.6]						Topsoil removed by dozer ~ 0.406 m [16"]
		4 6 7	.432 [17]	1		431+ [4.5+]	Hard dark brown SILT AND CLAY (A-6a); damp.
1.07	237.15						
[3.5]	[778.1]	6				24	Soft gray SILT (A-4b); organic; moist.
1.28	236.94	9	.356	2A		[0.25]	
1.52	[777.4]	10	[14]	2B		431+ [4.5+]	Very stiff to hard brown, light brown and gray SILTY CLAY (A-6b), some fine to coarse sand, some gravel; coluvial soil; damp.
[5.0]							
		6 8 9	.254 [10]	3		431+ [4.5+]	
		6 6 8	.457 [18]	4		335 [3.5]	
3.05							
[10]							
3.35	234.87						
[11.0]	[770.6]	4 5 7	.279 [11]	5		96 [1.0]	Stiff to very stiff dark brown SILT AND CLAY (A-6a), some to "and" gravel, some fine to coarse sand; coluvial soil; moist.
		2 4 5	.381 [15]	6		287 [3.0]	
4.57							
[15]							
5.03	233.19	8					
[16.5]	[765.1]	22 28	.457 [18]	7		431+ [4.5+]	Hard gray SILT AND CLAY (A-6a); decomposed siltstone; damp.
5.64	232.58						
[18.5]	[763.1]	50/.08	.076 [3]	8			Limestone fragments
6.10	232.12						
6.25	231.97	Core	Rec	RQD			Very soft brown CLAYSTONE; severely weathered.
6.31	231.91	1.524 m [60"]	1.067 m [42"]	63%			Hard gray LIMESTONE; weathered.
[20.7]	[760.9]						Medium hard gray CLAYSTONE, slightly calcareous; weathered.
7.62							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40



Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-8 | Location: 39+683.1, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.15 m [3.8'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	[in] Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION
7.62	230.60						
[25] 8.02	[756.6] 230.20	Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 80%			Medium hard red and gray CLAYSTONE; weathered.
[26.3] 8.69	[755.2] 229.53						Medium hard gray SILTY CLAYSTONE, slightly calcareous; weathered. @ 8.44 m [27.7'], slickensided shear.
[28.5] 9.14	[753.1] 229.08						Medium hard gray SILTSTONE, slightly calcareous; weathered; contains limestone clasts.
[30] 10.67	[751.6]						Bottom of Boring - 9.14 m [30.0']
[35] 12.19							
[40] 13.72							
[45] 15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

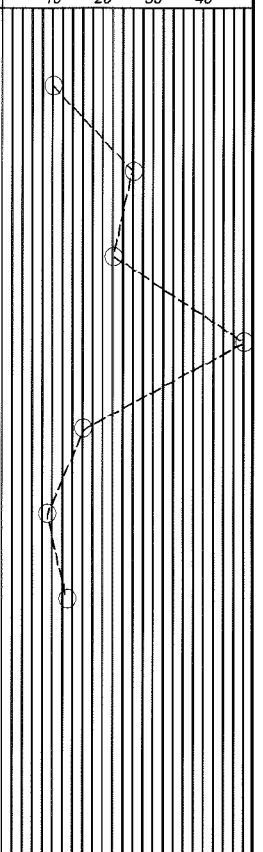
LOG OF: Boring SB-9 | Location: 39+721.5, 19.8 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring; 1.15 m [3.8'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	234.75						Topsoil removed by dozer ~ 0.229 m [9"]						
		3 4 6	.432 [17]	1		311 [3.25]	Very stiff brown SILTY CLAY (A-6b), trace to little fine to coarse sand; damp.						
1.07 [3.5]	233.68 [766.7]	9 11 15	.457 [18]	2		431+ [4.5+]	Hard brown and light brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp.						
1.52 [5]	232.92 [764.2]	9 10 12	.406 [16]	3			Medium dense dark brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); damp.						
		18 13 35	.381 [15]	4			@ 2.59 m - 3.05 m [8.5' - 10.0'], dense, light brown.						
3.05 [10]	231.24 [758.7]	7 8 8	.432 [17]	5		120 [1.25]	Stiff brown SILTY CLAY (A-6b); contains fine sand seams; moist.						
4.11 [13.5]	230.64 [756.7]	3 4 5	.330 [13]	6			Loose to medium dense light brown, dark brown and gray GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); damp to moist.						
4.57 [15]													
5.18 [17.0]	229.57 [753.2]	3 4 9	.432 [17]	7		---	Hard purple, brown and gray SILTY CLAY (A-6b); severely weathered claystone; damp.						
6.10 [20]													
6.40 [21.0]	228.35 [749.2]	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 75%			Soft to medium hard gray SILTY CLAYSTONE; weathered. @ 6.40 m - 7.01 m [21.0' - 23.0'], slightly calcareous.						
							@ 7.41 m [24.3'], contains limestone clasts.						
7.62							@ 7.62 m [25.0'], contains limestone clasts.						

STANDARD PENETRATION (N) — Blows per 0.30 m (10 20 30 40)

Moisture Content - % (PL Natural LL; 10 20 30 40)



Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-9 | Location: 39+721.5, 19.8 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.15 m [3.8'] (w ith core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62	227.13														
[25] 7.96	[745.2] 226.79	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 75%			Soft to medium hard gray SILTY CLAYSTONE; weathered.								
[26.1]	[744.1]						Medium hard gray SILTSTONE; weathered.								
9.14															
[30] 9.45	225.30														
[31.0]	[739.2]						Bottom of Boring - 9.45 m [31.0']								
10.67															
[35]															
12.19															
[40]															
13.72															
[45]															
15.24															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-10 | Location: 39+743.0, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS:
Water seepage at: 3.51 m [11.5']
Water level at completion: dry prior to coring
0.98 m [3.2'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	231.30						Topsoil - 0.305 m [12"]						
	[758.9]												
0.30	231.00												
[1.0]	[757.9]	2					Very stiff dark brown SILT (A-4b), trace fine sand; slightly organic; damp.						
0.61	230.69	4	.432	1		287							
[2.0]	[756.9]	10	[17]			[3.0]	Medium dense brown COARSE AND FINE SAND (A-3a), trace silty clay, trace gravel; damp.						
1.07	230.23												
[3.5]	[755.3]	6					Hard brown, gray and black SILTY CLAY (A-6b), trace fine to coarse sand; damp.						
		5	.457										
1.52		8	[18]	2		383							
[5]						[4.0]							
1.83	229.47												
[6.0]	[752.9]	5					Medium dense brown COARSE AND FINE SAND (A-3a), some clayey silt, trace gravel; damp to moist.						
		5	.381										
		5	[15]	3									
2.59	228.71												
[8.5]	[750.4]	1					Soft brown and gray SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; moist.						
		2	.457				@ 2.62 m - 2.68 m [8.6' - 8.8'], coal and carbonaceous						
3.05		2	[18]	4		48	shale fragments.						
[10]						[0.5]							
3.51	227.79												
[11.5]	[747.3]	4					Medium dense brown and red GRAVEL WITH SAND (A-1-b); moist to wet.						
		4	.406										
		6	[16]	5									
4.11	227.19												
[13.5]	[745.4]	6					Hard gray SILTY CLAY (A-6b); decomposed silty shale; damp.						
		21	.432										
4.57		14	[17]	6		431+							
[15]						[4.5+]							
		14											
		31	.457										
		36	[18]	7		431+							
						[4.5+]							
5.64	225.66												
[18.5]	[740.4]	40	.229				Severely weathered gray SILTY SHALE.						
		50/.08	[9]	8		431+							
6.10	225.20					[4.5+]							
[20]	[738.8]	Core	Rec	RQD			Soft gray SHALE; severely weathered.						
		3.048	2.794	92%									
6.52	224.78	m	m										
[21.4]	[737.5]	[120"]	[110"]				Hard gray SANDSTONE, fine to medium grained, micaceous; slightly weathered.						
7.62													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

67
50+

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-10 | Location: 39+743.0, 5.5 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS:
Water seepage at: 3.51 m [11.5]
Water level at completion: dry prior to coring
0.98 m [3.2'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	223.68												
[25]	[733.9]	Core 3.048 m [120"]	Rec 2.794 m [110"]	RQD 92%			Hard gray SANDSTONE, fine to medium grained, micaceous; slightly weathered.						
9.14	222.16						@ 9.11 m [29.9"], very thin clay seam.						
[30]	[728.9]						Bottom of Boring - 9.14 m [30.0']						
10.67													
[35]													
12.19													
[40]													
13.72													
[45]													
15.24													

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-11 | Location: 39+781.4, 19.8 m Lt. of US 33 centerline | Date Drilled: 11/10/99

WATER OBSERVATIONS:
Water seepage at: 1.83 - 2.29 m [6.0' - 7.5']
Water level at completion: 0.94 m [3.1'] prior to coring
2.88 m [9.4'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	229.52												
0.24	229.28						Topsoil - 0.254 m [10"]						
[0.8]	[752.2]	2					Stiff dark brown SANDY SILT (A-4a), some clay; moist.						
		2	.356	1		144							
0.91	228.61	2	[14]			[1.5]		0	4	---	28	41	27
[3.0]	[750.0]												
		2					Loose brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; moist.						
		2	.127	2									
1.52		2	[5]					9	25	---	31	22	14
[5]							@ 1.83 m [6.0'], becomes medium dense, wet.						
		1											
		2	.381	3									
2.29	227.23	24	[15]					17	21	---	31	21	11
[7.5]	[745.5]												
		50/.08	.076	4		---	Hard gray SILT AND CLAY (A-6a); decomposed siltstone; damp.						
3.05			[3]										
[10]							@ 3.35 m - 3.51 m [11.0' - 11.5'], soft gray SILTSTONE, severely weathered to weathered..						
3.51	226.01	54	.076										
[11.5]	[741.5]	50/.00	[3]	5									
		Core	Rec	RQD			Hard gray SILTSTONE; slightly weathered.						
		0.61 m	.508 m	18%									
		Core	Rec	RQD									
4.48	225.04	3.048	3.048	94%									
4.57	[738.3]	m	m										
[15]		[120"]	[120"]				Hard gray SANDSTONE, fine to medium grained, micaceous; slightly weathered.						
							@ 5.00 m - 5.12 m [16.4' - 16.8'], calcareous layer.						
							@ 5.24 m - 5.35 m [17.2' - 17.5'], calcareous layer.						
							@ 5.39 m - 5.43 m [17.7' - 17.8'], calcareous layer.						
							@ 5.84 m - 5.85 m [19.1' - 19.2'], calcareous layer.						
6.10													
[20]							@ 6.25 m - 6.28 m [20.5' - 20.6'], calcareous layer.						
6.43	223.09												
[21.1]	[731.9]						Hard gray SILTSTONE; slightly weathered.						
7.16	222.36												
[23.5]	[729.5]						Bottom of Boring - 7.16 m [23.5']						
7.62													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

50+

50+

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-12 | Location: 39+803.2, 5.4 m Lt. of US 33 centerline | Date Drilled: 11/1/99

WATER OBSERVATIONS:
Water seepage at: 1.22 m [4.0']
Water level at completion: 0.76 m [2.5'] (before coring)
2.68 m [8.8'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (in)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
0	229.42						Topsoil - 0.356 m [14"]							
0.37	[752.7] 229.05													
[1.2]	[751.5]	1 2 2	.381 [15]	1		192 [2.0]	Stiff to very stiff brown SILT AND CLAY (A-6a), some fine to coarse sand; moist.	0	6	---	28	46	21	
0.91	228.51													
[3.0]	[749.7]	2 2 10	.279 [11]	2			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little clay; damp.	38	21	---	15	16	10	
1.52														
[5] 1.83	227.59													
[6.0]	[746.7]	24 50/.10	.254 [10]	3		---	Hard gray SANDY SILT (A-4a); decomposed to severely weathered siltstone; damp.							50+
		50/.13	.127 [5]	4		---								50+
3.05														
[10]		38 50/.05	.203 [8]	5		---								50+
4.18	225.24	50/.08	.076	6			@ 4.11 m - 4.18 m [13.5' - 13.7'], severely weathered gray SANDSTONE.							50+
[13.7] 4.57	[739.0]	Core 1.219 m [48"]	Rec 1.092 m [43"]	RQD 73%			Soft gray CLAYSTONE, arenaceous; weathered. @ 4.18 m - 4.27 m [13.7' - 14.0'], hard gray SANDSTONE, contains a vertical fracture.							
[15] 4.91	224.51													
[16.1]	[736.6]						Hard gray SANDSTONE, micaceous; slightly weathered. @ 5.12 m - 5.24 m [16.8' - 17.2'], calcareous . @ 5.55 m - 5.90 m [18.2' - 19.4'], calcareous .							
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 95%										
6.10														
[20]							@ 6.16 m - 6.36 m [20.2' - 20.9'], argillaceous. @ 6.61 m - 6.71 m [21.7' - 22.0'], argillaceous.							
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%										
7.62														

GRADATION

Moisture Content - %
PL Natural LL
10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-12 | Location: 39+803.2, 5.4 m Lt. of US 33 centerline | Date Drilled: 11/1/99

WATER OBSERVATIONS:
Water seepage at: 1.22 m [4.0']
Water level at completion: 0.76 m [2.5'] (before coring)
2.68 m [8.8'] (after coring)

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - % PL Natural LL: 10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62 [25]	221.80 [727.7]											

DESCRIPTION

Hard gray SANDSTONE, micaceous, slightly weathered.

@ 8.32 m - 8.40 m [27.3' - 27.5'], 45° fracture.
@ 8.17 m - 8.44 m [26.8' - 27.7'], argillacecus.

8.44 [27.7]	220.98 [725.0]											

Bottom of Boring - 8.44 m [27.7']

9.14 [30]

10.67 [35]

12.19 [40]

13.72 [45]

15.24

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-13 | Location: 39+840.49, 16.80 m Lt. of US 33 centerline | Date Drilled: 11/1-11/4/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
0.82 m [2.7'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m	Rec (m) [in]	Drive	Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	234.32													
	[768.8]							Topsoil - 0.381 m [15"]						
0.40	233.92		2											
[1.3]	[767.5]		13 4	.279 [11]	1		359 [3.75]	Very stiff to hard brown, red and gray SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; colluvial soil; damp.						
			3 6 8	.279 [11]	2		431+ [4.5+]							
1.52														
[5]			8 9 10	.305 [12]	3		431+ [4.5+]							
			2 3 5	.381 [15]	4		287 [3.0]							
3.05														
[10]														
3.35	230.97													
[11.0]	[757.8]		12 24 37	.279 [11]	5		---	Hard gray SANDY SILT (A-4a); decomposed siltstone; damp. damp.						
4.11	230.21													
[13.5]	[755.3]		21 50/.15	.203 [8]	6		---	Hard brown and gray SILT AND CLAY (A-6a); decomposed shale; damp.						
4.57														
[15]			37 50/.15	.305 [12]	7		---							
5.64	228.68													
[18.5]	[750.3]		33	.305				Soft gray CLAYSTONE, severely weathered						
5.88	228.44		50/.15	[12]	8									
6.10	[749.5]		Core 0.838 m [33"]	Rec .533 m [21"]	RQD 30%			Soft gray CLAYSTONE; weathered.						
[20]								@ 6.71 m [22.0'], gray and red mottled.						
			Core 1.524 m [60"]	Rec .559 m [22"]	RQD 22%									
7.62														

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

61
50+
50+
50+

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-13 | Location: 39+840.49, 16.80 m Lt. of US 33 centerline | Date Drilled: 11/1-11/4/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
0.82 m [2.7'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62	226.70						
[25]	[743.8]						Soft red CLAYSTONE; weathered.
		Core 1.524 m [60"]	Rec 1.397 m [55"]	RQD 45%			
							@ 8.99 m [29.5'], gray and red mottled.
9.14							
[30]							
9.57	224.75						
[31.4]	[737.4]						Medium hard gray SILTSTONE; moderately weathered.
		Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 78%			
							@ 9.66 m [31.7'], becomes calcareous.
10.67							
[35]							@ 10.67 m - 10.79 m [35.0' - 35.4'], partially healed fracture.
							@ 10.97 m - 11.06 m [36.0' - 36.3'], near vertical fracture.
							@ 11.09 m - 11.16 m [36.4' - 36.6'], limestone layer.
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 97%			@ 11.34 m [37.2'], clay seam.
12.19							
[40]							
12.62	221.70						
12.80	221.52						Hard gray SANDSTONE, calcareous; slightly weathered.
[42.0]	[726.8]						Bottom of Boring - 12.80 m [42.0']
13.72							
[45]							
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N): Blows per 0.30 m (10 20 30 40)

Moisture Content - % (PL Natural LL; 10 20 30 40)

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-14 | Location: 39+869.0, 7.8 m Lt. of US 33 centerline | Date Drilled: 11/10 & 11/11/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
8.93 m [29.3'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	246.50 [808.7]						Topsoil - 0.457 m [18"]						
0.46	246.04	2											
0.61 [2.0]	245.89 [806.7]	13 14	.330 [13]	1		287 [3.0]	Very stiff brown and dark brown SILT AND CLAY (A-6a); organic; damp.						
1.07 [3.5]	245.43 [805.2]	4					Medium dense light brown GRAVEL (A-1-a); severely weathered to decomposed sandstone; damp.						
1.52 [5]		4 4	.203 [8]	2		431+ [4.5+]	Hard brown SILT AND CLAY (A-6a), some fine to coarse sand; damp.						
1.83 [6.0]	244.67 [802.7]	4											
2.59	243.91	5 7	.229 [9]	3			Medium dense brown and gray GRAVEL (A-1-a); severely weathered sandstone; damp.						
[8.5]	[800.2]	5											
3.05 [10.0]		11 50/.13	.330 [13]	4A 4B		431+ [4.5+]	Hard black and dark brown SILTY CLAY (A-6b); decomposed shale; damp. @ 2.90 m [9.5'], color change to brown and gray.						
3.35 [11.0]	243.15 [797.7]	50/.08	.051 [2]	5		---	Hard gray SILT AND CLAY (A-6a); decomposed sandy siltstone; damp.						
4.21	242.29	50/.13	.127	6		---							
4.34	242.16	Core	Rec	RQD			Medium hard dark gray and light gray SILTSTONE; laminated.						
4.57 [15.0]	[794.5]	1.143 m [45"]	1.143 m [45"]	80%			Soft dark gray SHALE, carbonaceous; severey weathered.						
5.39 [17.7]	241.11 [791.0]	Core 1.524 m [60"]	Rec .432 m [17"]	RQD 0%			Soft gray SANDSTONE; fine to medium grained, severely weathered.						
6.10 [20]													
6.98	239.52	Core	Rec	RQD			@ 6.77 m - 6.98 m [22.2' - 22.9'], Soft SHALE, carbonaceous, severely weathered.						
[22.9]	[785.8]	1.219 m [48"]	1.219 m [48"]	0%			Soft brown SANDSTONE; fine to medium grained, severely weathered. @ 7.47 m - 7.56 m [24.5' - 24.8'], Soft gray SHALE, severly weathered.						
7.62													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

50+
50+
50+

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-14 | Location: 39+869.0, 7.8 m Lt. of US 33 centerline | Date Drilled: 11/10 & 11/11/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
8.93 m [29.3'] (with core water)

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
7.62 [25]	238.88 [783.7]						Soft brown SANDSTONE, fine to medium grained; severely weathered.							
8.05 [26.4]	238.45 [782.3]						Soft gray SHALE; severely weathered.							
		50/.08	.076 [3]	7										50+
9.14 [30]		50/.05	.051 [2]	8										50+
10.49	236.01	Core 1.372 m [54"]	Rec .686 m [27"]	RQD 19%			@ 10.24 m [33.6'], slightly calcareous.							
10.67 [35.0]	[774.3]						Medium hard gray LIMESTONE; weathered.							
12.19 [40]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 88%			@ 11.58 m [38.0'], becomes interbedded with weathered medium hard SHALE. @ 11.70 m - 11.77 m [38.4' - 38.6'], near vertical fracture. @ 12.22 m - 12.28 m [40.1' - 40.3'], ~30° fracture. @ 12.51 m - 12.65 m [41.0' - 41.5'], broken and fractured. @ 12.68 m - 12.80 m [41.6' - 42.0'], near vertical fracture.							
13.50 [44.3]	233.00 [764.4]	Core 1.524 m [60"]	Rec 1.270 m [50"]	RQD 47%			@ 13.29 m [43.6'], broken.							
13.72 [45]							Soft to medium hard red CLAYSTONE; weathered.							
14.63 [48.0]	231.87 [760.7]						@ 14.39 m - 14.45 m [47.2' - 47.4'], calcareous SILTSTONE, weathered. @ 14.45 m [47.4'], color change to purple and brown.							
15.24							Bottom of Boring - 14.63 m [48.0']							

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-15 | Location: 39+888.61, 19.81 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.37 m [4.5'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)	Moisture Content - % PL Natural LL (10 20 30 40)
0	244.44 [802.0]						Topsoil - 0.432 m [17"]								
0.43	244.01 [800.6]	2 6 6	.356 [14]	1			Medium dense to very dense light brown GRAVEL WITH SAND (A-1-b); decomposed to severely weathered sandstone; damp.								
1.52		24 50/.05	.203 [8]	2										50+	
[5]		39 50/.08	.229 [9]	3										50+	
3.05		17 48 50/.08	.356 [14]	4										50+	
[10] 3.35	241.09														
3.47	240.97	32	.254	5A		---	Hard dark brown SILTY CLAY (A-6b); decomposed shale; damp								
[11.4]	[790.6]	50/.10	[10]	5B		---	Hard brown and gray SILT AND CLAY (A-6a); decomposed siltstone; damp.							50+	
4.57		24 28 50/.13	.356 [14]	6		431+ [4.5+]								50+	
[15] 4.88	239.56														
[16.0]	[786.0]	22		7A		---	Hard black SILT AND CLAY (A-6a); decomposed carbonaceous shale with coal stringers; damp.								
5.64	238.80	38 50/.10	.432 [17]	7B		---								50+	
[18.5]	[783.5]	17	.254				Hard gray SILTY CLAY (A-6b); decomposed shale; damp.								
5.85	238.59	50/.10	[10]	8		431+ [4.5+]								50+	
6.10	[782.8]														
[20.0]		Core	Rec	RQD			Very soft black COAL; core loss.								
6.40	238.04	0.305	.000	0%											
[21.0]	[781.0]	Core	Rec	RQD			Soft dark gray SHALE, carbonaceous; weathered; LOSS.								
6.71	237.73	1.524	1.448	55%											
6.86	237.58	m	m				Medium hard gray SHALE, calcareous; weathered; broken.								
[22.5]	[779.5]	[60"]	[57"]				Hard gray LIMESTONE; moderately weathered. @ 7.04 m - 7.19 m [23.1' - 23.6'], Soft SHALE, weathered. @ 7.19 m - 7.38 m [23.6' - 24.2'], vertical fracture. @ 7.41 m - 7.80 m [24.3' - 25.6'], Soft SHALE weathered.								
7.62															

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-15 | Location: 39+888.61, 19.81 m Lt. of US 33 centerline | Date Drilled: 11/11/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
1.37 m [4.5'] (with core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	236.82												
[25]	[777.0]						Hard gray LIMESTONE; moderately weathered.						
7.92	236.52												
[26.0]	[776.0]	Core 1.524 m [60"]	Rec 1.092 m [43"]	RQD 58%			Soft gray CLAYSTONE, calcareous; weathered.						
9.14													
[30]													
9.45	234.99												
[31.0]	[771.0]						Bottom of Boring - 9.45 m [31.0']						
							Driller's note: hole caved in after completion.						
10.67													
[35]													
12.19													
[40]													
13.72													
[45]													
15.24													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-59 | Location: Sta. 39+927.77, 2.21 m Lt. of US 33 centerline | Date Drilled: 4/5/00

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: none (before coring)
1.37 m [4.5'] (after coring, includes drilling w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	255.83						
0.18 [0.6]	255.65 [838.7]					215 [2.25]	Topsoil - 0.178 m [7"]
0.46 [1.5]	255.37 [837.8]	21		1A			Very stiff brown SILT AND CLAY (A-6a), some fine to coarse sand; contains sandstone fragments; damp.
		34	.330				
		12	[13]	1B			Severely weathered brown SANDSTONE, argillaceous.
		50/.08	.076 [3]	2			@ 1.07 m - 1.16 m [3.5' - 3.8'], rust stained.
1.52 [5]	254.31 [834.4]	Core 1.372 m [54"]	Rec 1.168 m [46"]	RQD 76%			Medium hard to hard brown SANDSTONE, fine to coarse grained, micaceous. @ 2.07 m - 2.41 m [6.8' - 7.9'], loosely cemented.
3.05 [10]		Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 97%			@ 3.26 m - 5.36 m [10.7' - 17.6'], gray, contains rust stains.
4.57 [15]		Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 98%			@ 5.36 m - 7.47 m [17.6' - 24.5'], contains dark brown micaceous laminations. @ 5.39 m [17.7'], thin clay seam.
6.10 [20]							@ 6.80 m [22.3'], thin clay seam.
7.47 [24.5]	248.36 [814.8]						Bottom of Boring - 7.47 m [24.5']

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

50+

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-58 | Location: 39+876.65, 15.36 m Rt. of US 33 centerline | Date Drilled: 4/3 &4/4/00

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: none (before coring)
4.27 m [14.0'] (after coring, includes drilling water)

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL Natural LL; 10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	259.27						
0.30 [1.0]	258.97 [849.6]	1 2 4	.305 [12]	1		144 [1.5]	Topsoil - 0.305 m [12"] Note: 381 mm [15"] topsoil removed prior to drilling. Stiff to very stiff brown SILTY CLAY (A-6b), little fine to coarse sand; contains limestone and sandstone fragments; damp to moist.
1.52 [5]		2 3 4	.229 [9]	2		239 [2.5]	
		2 6 8	.279 [11]	3		168 [1.75]	
2.59 [8.5]	256.68 [842.1]	50/.10	.076 [3]	4			Weathered SHALE fragments.
3.05 [10]							
3.66	255.61	30 50/.13	.279 [11]	5			
3.84 [12.6]	255.43 [838.0]	Core 1.219 m [48"]	Rec 1.143 m [45"]	RQD 77%			Soft brown SHALE. @ 3.66 m - 3.75 m [12.0' - 12.3'], core loss. Medium hard to hard SANDSTONE, fine to coarse grained, micaceous. @ 3.84 m - 3.93 m [12.6' - 12.9'], high angle fracture cemented with clay. @ 4.66 m - 4.88 m [15.3' - 16.0'], medium hard brown SHALE, interbedded sandstone seams.
4.57 [15]							
4.88 [16.0]	254.39 [834.6]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			Hard brown SANDSTONE, fine to coarse grained, micaceous, contains rust stains. @ 4.88 m - 6.40 m [16.0' - 21.0'], slightly vuggy.
6.10 [20]							
		Core 1.194 m [47"]	Rec 1.194 m [47"]	RQD 100%			
7.62							

50+

50+

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-58 | Location: 39+876.65, 15.36 m Rt. of US 33 centerline | Date Drilled: 4/3 &4/4/00

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: none (before coring)
4.27 m [14.0'] (after coring, includes drilling water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62	251.65						
[25]	[825.6]	Core 1.854 m [73"]	Rec 1.854 m [73"]	RQD 100%			Hard brown and gray SANDSTONE, fine to coarse grained, micaceous, contains rust stains.
9.14							
[30]							@ 9.45 m [31.0'], 6 mm [0.25 "] clay seam.
		Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 100%			
10.67							
[35]							@ 11.22 m - 11.83 m [36.8' - 38.8'], medium hard, contains dark brown organic contaminants, loosely cemented.
12.19							
[40]		Core 3.048 m [120"]	Rec 2.946 m [116"]	RQD 95%			@ 13.35 m - 15.24 m [43.8' - 50.0'], contains dark gray micaceous laminations.
13.72							
[45]							@ 14.78 m [48.5'], contains thin coal laminations.
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N): Blows per 0.30 m (10 20 30 40)

Moisture Content - % (PL Natural LL; 10 20 30 40)

Client: ODOT District 10 | Project: ATH-33-40.891 (US 33 over Pratts Fork) | Job No. 9821-3200.00

LOG OF: Boring SB-58 | Location: 39+876.65, 15.36 m Rt. of US 33 centerline | Date Drilled: 4/3 &4/4/00

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: none (before coring)
4.27 m [14.0'] (after coring, includes drilling water)

STANDARD PENETRATION (N) Blows per 0.30 m

Moisture Content - % PL Natural LL

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	[in] Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
15.24 [50]	244.03 [800.6]						Hard gray SANDSTONE. @ 15.54 m - 15.64 m [51.0' - 51.3'], carbonaceous shale, interbedded with coal.						
15.64 [51.3]	243.63 [799.3]	Core 1.524 m [60"]	Rec 1.372 m [54"]	RQD 73%			Soft to medium hard dark gray SHALE/CLAYSTONE. @ 16.31 m - 16.43 m [53.5' - 53.9'], possible core loss. @ 16.46 m - 16.64 m [54.0' - 54.6'], hard dark gray SILTSTONE, interbedded with SANDSTONE.						
16.76 [55.0]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 32%			@ 17.50 m - 18.56 m [57.4' - 60.9'], interbedded carbonaceous shale seams with coal fragments and COAL seams.						
18.29 [60]													
18.59	240.68												
18.75 [61.5]	240.52 [789.1]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 68%			COAL. Medium hard to hard dark gray SHALE/CLAYSTONE, contains occasional thin limestone threads. @ 18.75 m - 18.87 m [61.5' - 61.9'], possible core loss. @ 18.87 m - 18.93 m [61.9' - 62.1'], very broken.						
19.75	239.52												
19.81 [65.0]	[785.8]						Hard gray LIMESTONE.						
20.12 [66.0]	239.15 [784.6]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 62%			Medium hard to hard dark gray SHALE/CLAYSTONE, contains occasional thin limestone threads. @ 20.79 m - 20.88 m [68.2' - 68.5'], very broken. @ 21.21 m - 21.43 m [69.6' - 70.3'], calcareous. @ 21.43 m - 21.55 m [70.3' - 70.7'], very broken.						
21.34 [70]													
21.64 [71.0]	237.63 [779.6]						Bottom of Boring - 21.64 m [71.0']						
22.86													

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-1 | Location: Sta. 41+250.38, 4.99 m Lt. of US 33 centerline | Date Drilled: 10/26-10/28/99

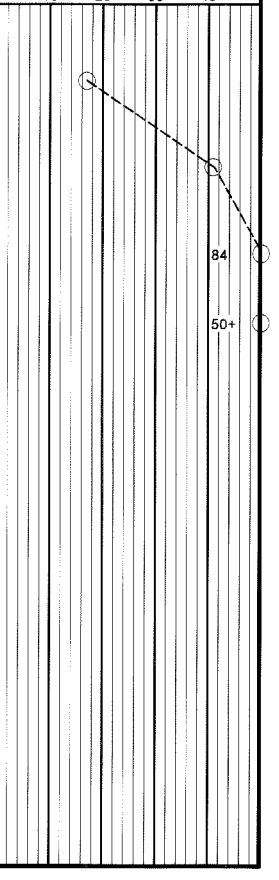
WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
0.27 m [0.9'] (includes core water)

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [m]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	259.52												
							Topsoil - 0.457 m [18"]						
0.46	259.06	6											
[1.5]	[849.9]	8 9	.279 [11]	1		431+ [4.5+]	Hard brown, gray and red SILTY CLAY (A-6b); decomposed claystone; damp.						
		7 15 26	.279 [11]	2		431+ [4.5+]							
1.52													
[5]													
1.83	257.69												
[6.0]	[845.4]	21 40 44	.381 [15]	3		431+ [4.5+]	Hard brown SILT AND CLAY (A-6a), little gravel, trace fine to coarse sand; decomposed silty shale; damp.						
2.80	256.72						@ 2.59 m [8.5'], color change to red and brown.						
[9.2]	[842.3]	24 50/.05	.203 [8]	4		431+ [4.5+]	Soft brown SHALE; severely weathered.						
3.05		Core 0.864 m [34"]	Rec .051 m [2"]	RQD 0%									
[10]													
3.66	255.86												
[12.0]	[839.4]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 22%			Hard gray SANDSTONE, micaceous; weathered.						
4.02	255.50												
[13.2]	[838.3]						Hard gray SILTSTONE; weathered. @ 4.36 m - 4.51 m [14.3' - 14.8'], vertical fracture.						
4.57													
[15]							@ 4.82 m [15.8'], 45° fracture.						
4.97	254.55												
5.18	254.34						Medium hard light gray SILTSTONE; weathered.						
[17.0]	[834.4]	Core 1.524 m [60"]	Rec .813 m [32"]	RQD 33%			@ 5.09 m [16.7"], clay seam. Soft red CLAYSTONE; severely weathered; broken.						
5.64	253.88												
5.82	253.70						Medium hard to hard gray SILTSTONE, calcareous; weathered.						
[19.1]	[832.3]						Hard brown and gray fine grained SANDSTONE, argillaceous, micaceous; weathered.						
6.10							@ 6.64 m [21.8'], clay seam. @ 6.71 m [22.0'], clay seam.						
[20]													
6.74	252.78												
[22.1]	[829.3]	Core 1.524 m [60"]	Rec .991 m [39"]	RQD 43%			Soft to medium hard dark gray SILTSTONE, slightly calcareous; severely weathered to weathered.						
7.62													



Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-1 | Location: Sta. 41+250.38, 4.99 m Lt. of US 33 centerline | Date Drilled: 10/26-10/28/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring
0.27 m [0.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m	Rec (m) [in]	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62	251.90					
7.69 [25.2]	251.83 [826.2]					Soft to medium hard gray SILTSTONE.
		Core 1.524 m [60"]		Rec 1.524 m [60"]	RQD 100%	Hard light gray SANDSTONE, micaceous, slightly calcareous; fine grained.
9.14 [30]						@ 8.81 m [28.9'], color change to brown.
		Core 1.524 m [60"]		Rec 1.524 m [60"]	RQD 100%	
10.67 [35]						
11.28 [37.0]	248.24 [814.4]					Bottom of Boring - 11.28 m [37.0']
12.19 [40]						Note: hole caved in after pulling core steel.
13.72 [45]						
15.24						

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-2 | Location: Sta. 41+273.89, 29.10 m Lt. of US 33 centerline | Date Drilled: 10/26/99

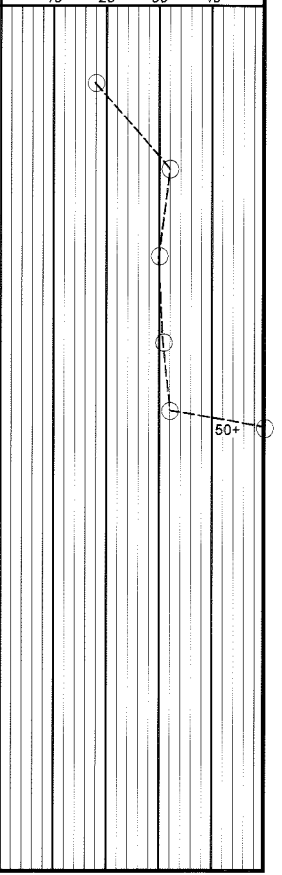
WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: 2.41 m [7.9'] (includes core water)

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m

Moisture Content - %
PL Natural LL

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	DESCRIPTION
0	254.34												
0.48	253.86	7											Topsoil - 0.483 m [19"]
[1.6]	[832.9]	7 11	.279 [11]	1		431+ [4.5+]							Hard brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.
1.07	253.27												
[3.5]	[830.9]	6 15 17	.356 [14]	2		431+ [4.5+]							Hard brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); decomposed to severely weathered siltstone; damp.
1.52													
[5]		12 15 15	.356 [14]	3		431+ [4.5+]							
2.59	251.75												
[8.5]	[826.0]	7 15 16	.356 [14]	4		431+ [4.5+]							Hard brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; decomposed to severely weathered silty shale; damp.
3.05													
[10]		8 15 17	.305 [12]	5									@ 3.66 m - 3.69 m [12.0' - 12.1'], sandstone fragments.
3.81	250.53	50/.03	.025	6		431+ [4.5+]							
[12.5]	[821.9]	Core 1.143 m [45"]	Rec 1.143 m [45"]	RQD 100%									Hard gray and brown fine grained SANDSTONE, micaceous, slightly calcareous; slightly weathered.
4.57													
[15]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 93%									
6.10													
[20]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 95%									@ 7.04 m - 7.47 m [23.1' - 24.5'], arenaceous limestone.
7.62													



Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-2 | Location: 41+273.9, 29.1m Lt. | Date Drilled: 10/26/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: 2.41 m [7.9'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	246.72												
[25]	[809.4]						Hard gray and brown fine grained SANDSTONE, micaceous, slightly calcareous; slightly weathered.						
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%									
							@ 8.90 m - 9.14 m [29.2' - 30.0'], ~45° fracture with rust staining and partial clay infilled.						
9.14													
[30]													
		Core 1.524 m [60"]	Rec 1.321 m [52"]	RQD 86%									
10.67													
[35]													
		Core 1.524 m [60"]	Rec 1.422 m [56"]	RQD 93%									
12.19													
[40]							@ 12.59 m [41.3'], argillaceous siltstone laminae become evident.						
		Core 1.524 m [60"]	Rec 1.321 m [52"]	RQD 86%			@ 12.98 m - 13.08 m [42.6' - 42.9'], poorly cemented.						
13.72													
[45]													
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%									
15.24													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: ODOT District 10	Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary)	Job No. 9821-3200.00
LOG OF: Boring SB-2	Location: 41+273.9, 29.1m Lt.	Date Drilled: 10/26/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: 2.41 m [7.9'] (includes core water)

STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)

Moisture Content - % (PL Natural LL; 10 20 30 40)

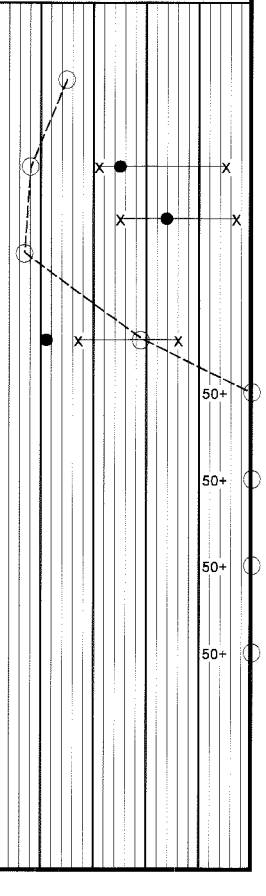
Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
15.24	239.10												
[50]	[784.4]	Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 98%			Hard gray and brown fine grained SANDSTONE, micaceous; slightly weathered. @ 15.94 m - 16.06 m [52.3' - 52.7'], carbonaceous.						
16.76													
[55]		Core 0.762 m [30"]	Rec .762 m [30"]	RQD 100%									
17.92	236.42												
[58.8]	[775.7]						Bottom of Boring - 17.92 m [58.8'] Note: Boring was offset uphill from original staked location due to its presence on the edge of a sandstone bluff						
19.81													
[65]													
21.34													
[70]													
22.86													

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-3 | Location: Sta. 41+316.31, 5.00 m Lt. of US 33 centerline | Date Drilled: 10/18-19/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m [in]	Rec (m) [in]	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
0	229.26												
						Topsoil - 0.381 m [15"]							
0.40	228.86	3											
	[750.9]		7	.457		Very stiff dark brown SILTY CLAY (A-6b), little fine to							
		1	8	[18]	335	coarse sand, little gravel; contains sandstone fragments;							
0.91	228.35				[3.5]	damp.							
	[749.2]												
		2A	1		168	Stiff brown and gray SILTY CLAY (A-6b), trace fine to							
1.46	227.80		3	.457	[1.75]	coarse sand, trace gravel; contains rootlets; damp to moist.							
1.52	747.38	2B	5	[18]	192	Stiff brown and gray CLAY (A-7-6), trace fine to	0	4	---	6	41	49	
1.67	227.59				[2.0]	coarse sand; damp.							
	[746.7]					Very stiff brown SILTY CLAY (A-7-6), "and" fine to coarse							
2.04	227.22	3A	2			sand, trace to little gravel; moist.	6	27	---	17	23	27	
	[745.5]		3	.457		Very stiff light brown and light gray SILTY CLAY (A-6b),							
		3B	4	[18]	263	little fine to coarse sand, trace gravel; residual soil;							
2.44	226.82				[2.75]	damp.							
	[744.2]												
			3			Hard light brown and light gray SILTY CLAY (A-6b), trace							
			10	.381		fine to coarse sand; decomposed silty shale;							
3.05		4	19	[15]	431+	damp.	0	0	---	6	52	42	
3.20	226.06				[4.5+]								
	[741.7]												
			50/.13	.076		Very dense gray and brown SANDY SILT (A-4a), trace clay;							
		5		[3]		severely weathered sandy siltstone; damp.							
			50/.13	.127									
		6		[5]									
4.57													
[15]													
			50/.10	.076		@ 4.88 m [16.0'], becomes highly weathered.							
		7		[3]									
			50/.08	.076									
		8		[3]									
5.88	223.38												
6.10	[732.9]		Core	Rec	RQD	Soft gray Silty SHALE; weathered to severely weathered.							
[20]			1.143	1.143	49%	@ 5.94, 6.00, 6.19, 6.32 m [19.5', 19.7', 20.3', 20.75'], clay							
6.40	222.86		m	m		seams.							
	[731.2]		[45"]	[45"]		Medium hard gray SILTSTONE, slightly micaceous; weathered.							
						@ 6.71, 6.83, 6.98, 7.10 m [22.0', 22.4', 22.9', 23.3'], clay							
						seams.							
7.19	222.07		Core	Rec	RQD								
	[728.6]		1.524	1.473	80%	Hard gray fine to coarse grained SANDSTONE, micaceous,							
			m	m		pyritic; weathered.							
7.62			[60"]	[58"]		@ 7.32 m [24.0'], 0.03 m [0.1'] clay seam.							



Client: ODOT District 10	Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary)	Job No. 9821-3200.00
LOG OF: Boring SB-3	Location: Sta. 41+316.31, 5.00 m Lt. of US 33 centerline	Date Drilled: 10/18-19/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

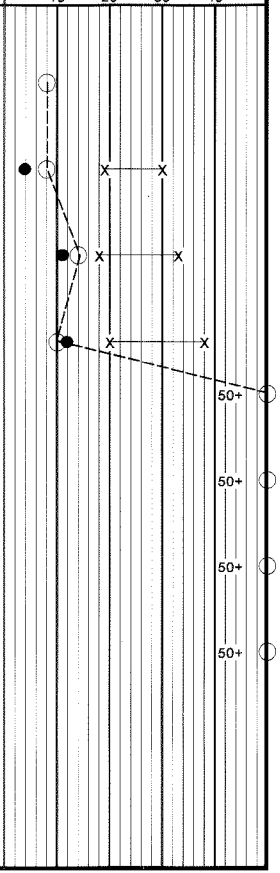
Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	221.64												
[25]	[727.2]						Hard gray SANDSTONE, micaceous; weathered; contains occassional shaley layers.						
							@ 8.29 m [27.2'], 0.03 m [0.1'] clay seam.						
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%									
9.14													
[30]													
10.06	219.20												
	[719.2]						Bottom of Boring - 10.06 m [33.0']						
10.67													
[35]													
12.19													
[40]													
13.72													
[45]													
15.24													

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-4 | Location: Sta. 41+348.69, 19.95 m Lt. of US 33 centerline | Date Drilled: 10/18/99

WATER OBSERVATIONS:
Water seepage at: 2.74 m [9.0']-2.93 m [9.6']
Water level at completion: 0.91 m [3.0'] (includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m	Rec (m) [in]	Drive	Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	227.83							Topsoil - 0.33 m [13"]						
0.34	227.49													
[1.1]	[746.4]	3	4 4	.457 [18]	1		239 [2.5]	Very stiff brown and gray SILTY CLAY (A-6b), trace fine to coarse sand; damp.						
0.91	226.92													
[3]	[744.5]	2	4 4	.279 [11]	2		287 [3.0]	Very stiff dark brown SILT AND CLAY (A-6a), little fine to coarse sand, some gravael; damp.	36	10	---	6	34	14
1.52														
1.68	226.15													
	[742.0]	4	5 9	.330 [13]	3		287 [3.0]	Very stiff red, brown and dark brown SILT AND CLAY (A-6a), some fine to coarse sand, some gravel; damp.	37	13	---	14	17	19
2.44	225.39													
	[739.5]	5	2 8	.279 [11]	4		335 [3.5]	Very stiff gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; decomposed sandy siltstone; damp.	4	0	---	8	46	42
3.05														
[10]			50/.13	.127 [5]	5		192 [2.0]	@ 3.41 m [11.2'], becomes severely weathered.						
			50/.15	.127 [5]	6		---							
4.57														
[15]			50/.15	.127 [5]	7		---							
			50/.13	.127 [5]	8		---							
5.55	222.28													
6.10	[729.3]	Core 1.168 m [46"]	Rec 1.092 m [43"]	RQD 83%				Soft to medium hard gray Silty SHALE, micaceous; weathered to highly weathered with decomposed layers. @ 5.70, 6.10, 6.13, 6.34 & 6.55 m [18.7', 20.0', 20.1', 20.95' & 21.5'], clay seams.						
[20]														
6.40	221.43													
	[726.5]							Medium hard gray to dark gray SILTSTONE, micaceous, pyritic; weathered.						
6.89	220.94	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%				@ 6.71 m [22.0'], 0.061 m [0.2'], near vertical fracture, partially healed with clay infilling.						
	[724.9]							Hard gray fine to medium grained SANDSTONE, calcareous, micaceous; slightly weathered.						
7.62														



Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-4 | Location: Sta. 41+348.69, 19.95 m Lt. of US 33 centerline | Date Drilled: 10/18/99

WATER OBSERVATIONS:
Water seepage at: 2.74 m [9.0']-2.93 m [9.6']
Water level at completion: 0.91 m [3.0'] (includes core water)

STANDARD PENETRATION (N) Blows per 0.30 m

Moisture Content - % PL Natural LL

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62													
7.77	220.06 [722.0]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			Hard gray fine to medium grained SANDSTONE, micaceous; unweathered.						
9.14		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%									
9.38	218.45 [716.7]						Hard gray fine to medium grained SANDSTONE, calcareous, micaceous; unweathered.						
9.75	218.08 [715.5]						Bottom of Boring - 9.75 m [32.0']						
10.67 [35]													
12.19 [40]													
13.72 [45]													
15.24													

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

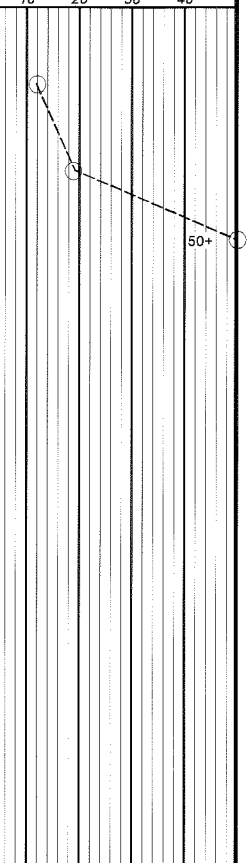
LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m [in]	Rec (m) [in]	Drive	Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	254.08													
								Topsoil - 0.381 m [15"]						
0.38	253.70	3												
	[832.3]	5	.330		1A		287 [3.0]							
		7	[13]		1B		431+ [4.5+]	Very stiff reddish brown SILT AND CLAY (A-6a), some fine to coarse sand, trace to little gravel; damp.						
0.91	253.17													
	[830.6]							Hard, red and light brown SILT AND CLAY (A-6a), some fine to coarse sand, little to some gravel; decomposed claystone; damp.						
		6												
		9	.305											
1.52		10	[12]		2		4.5+							
1.68	252.40													
	[828.1]							Hard light gray and light brown SILTY CLAY (A-6b), some fine to coarse sand, little to some gravel; decomposed to severely weathered silty shale; damp.						
		7	.229											
2.29	251.79	50/.13	[9]		3		4.5+							
	[826.1]	Core 1.372 m [54"]	Rec 1.346 m [53"]		RQD 76%			Hard gray fine to coarse grained SANDSTONE, calcareous, micaceous; slightly weathered, contains slight rust staining. @ 2.50 m - 2.59 m [8.2' - 8.5'], near vertical fracture, rust stained.						
3.05														
[10]														
		Core 1.524 m [60"]	Rec 1.524 m [60"]		RQD 97%									
4.57														
4.78	249.30													
	[817.9]							Hard brown and gray SANDSTONE, slightly calcareous; weathered.						
		Core 1.524 m [60"]	Rec 1.372 m [54"]		RQD 82%			@ 5.35 m [17.5'], highly weathered, highly broken (possible loss).						
5.79	248.29													
	[814.6]							Hard gray fine grained SANDSTONE, calcareous, micaceous; slightly weathered.						
6.10														
6.25	247.83													
	[813.1]							Hard brown fine to coarse grained SANDSTONE, micaceous; slightly weathered to weathered.						
		Core 1.524 m [60"]	Rec 1.346 m [53"]		RQD 84%			@ 6.89 m - 7.06 m [22.6' - 23.1'], highly weathered, highly broken (possible loss). @ 7.06 m - 7.24 m [23.1' - 23.8'], vertical fracture, rust stained.						
7.62														

STANDARD PENETRATION (N) — Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL Natural LL; 10 20 30 40



Client: ODOT District 10	Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary)	Job No. 9821-3200.00
LOG OF: Boring SB-5	Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline	Date Drilled: 10/19-20/99

WATER OBSERVATIONS: Water seepage at: none; Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m 10 20 30 40	Moisture Content - % PL Natural LL 10 20 30 40
7.62	246.46														
[25]	[808.6]						Hard brown fine to coarse grained SANDSTONE, micaceous; slightly weathered to weathered. @ 7.92 m [26.0'], highly weathered, highly broken zone.								
		Core 1.524 m [60"]	Rec 1.168 m [46"]	RQD 70%											
9.14															
[30]							@ 9.63 m - 9.88 m [31.6' - 32.4'], slightly argillaceous.								
		Core 1.524 m [60"]	Rec 1.473 m [58"]	RQD 95%											
10.67															
[35]															
		Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 99%											
12.19															
[40]															
		Core 1.524 m [60"]	Rec 1.346 m [53"]	RQD 68%			@ 12.86 m - 13.38 m [42.2' - 43.9'], highly weathered, highly broken (possible loss). @ 13.41 m [44.0'], occassional shalely pieces.								
13.72															
[45]															
14.30	239.78														
14.39	239.69	Core 1.524 m [60"]	Rec .305 m [12"]	RQD 0%			Hard gray SANDSTONE; weathered. CORE LOSS - weathered alternating shale and sandstone seen in nearby rock outcropping								
	[786.4]														
15.24															

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Sample No. Blows per 0.15 m	Rec. [in] Rec (m)	Drive	Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
15.24	238.84												
[50]	[783.6]						CORE LOSS - weathered alternating shale and sandstone seen in nearby rock outcropping						
15.85	238.23												
	[781.6]	Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 95%			Hard gray fine to coarse SANDSTONE, slightly micaceous; slightly weathered; contains discontinuous coal laminae.						
16.76													
[55]													
		Core 1.524 m [60"]	Rec 1.168 m [46"]	RQD 68%			@ 17.43 m [57.2'], weathered shale layer (possible loss). @ 17.62 m [57.8'], siltstone layer. @ 17.74 m - 18.07 m [58.2' - 59.3'], weathered shale layer (possible loss).						
18.29													
[60]													
19.20	234.88	Core 1.524 m [60"]	Rec 1.295 m [51"]	RQD 37%									
	[770.6]						Soft to medium hard dark gray to black SHALE, carbonaceous; weathered to decomposed (possible loss). @ 19.32 m [63.4'] and 19.84 m [65.1'], coal blossom. @ 19.93 m - 20.27 m [65.4' - 66.5'], highly weathered to decomposed shale with coal blossoms.						
19.81													
[65]													
		Core 1.524 m [60"]	Rec 1.092 m [43"]	RQD 10%			@ 20.27 m - 20.45 m [66.5' - 67.1'], Soft, black COAL. @ 20.67 m - 20.76 m [67.8' - 68.1'], slickensided near vertical shear. @ 20.79 m - 21.28 m [68.2' - 69.8'], clay seam (possible loss).						
21.27	232.81												
	[763.8]						Hard light gray and dark gray LIMESTONE; weathered. @ 20.97 m - 21.76 m [68.8' - 71.4'], vertical fracture. @ 21.73 m - 21.76 m [71.3' - 71.4'], clay seam.						
21.98	232.10												
	[761.5]	Core 1.524 m [60"]	Rec 1.219 m [48"]	RQD 40%			Very soft to soft dark gray SHALE; highly weathered to decomposed (possible loss).						
22.86													

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-5 | Location: Sta. 41+393.69, 6.11 m Lt. of US 33 centerline | Date Drilled: 10/19-20/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m	Rec (m) [in]	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
22.86	231.22					
[75] 23.13	[758.6] 230.95					Soft to medium hard gray LIMESTONE; highly weathered; slightly leached.
	[757.7]					Hard gray LIMESTONE; weathered. @ 23.20 m - 23.29 m [76.1' - 76.4'], vertical fracture. @ 23.59 m - 23.70 m [77.4' - 77.8'], broken.
23.90	230.18	Core 1.27 m [50"]	Rec 1.270 m [50"]	RQD 82%		
	[755.2]					Medium hard gray SHALE; weathered to slightly weathered. @ 23.90 m - 23.99 m [78.4' - 78.7'], slightly calcareous.
24.38						
[80] 24.75	229.33					
	[752.4]					Bottom of Boring - 24.75 m [81.2']
						Note: Boring was offset uphill from original staked location due to difficult access.
25.91						
[85]						
27.43						
[90]						
28.96						
[95]						
30.48						

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL Natural LL; 10 20 30 40

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-6 | Location: Sta. 41+413.83, 19.89 m Lt. of US 33 centerline | Date Drilled: 10/25/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
0	260.30						Topsoil - 0.406 m [16"]							
0.40	259.90	4												
[1.3]	[852.7]	6	.457				Hard brown SILTY CLAY (A-6b), little fine to coarse sand,							
		7	[18]	1		407	trace gravel; micaceous; damp.							
						[4.25]								
		2					@ 1.07 m [3.5'], brown and gray.							
		4	.254											
1.52		7	[10]	2		431+								
[5]						[4.5+]								
1.83	258.47													
[6.0]	[848.0]	7					Hard brown and red SILTY CLAY (A-6b); decomposed							
		15	.457				claystone; damp.							
		23	[18]	3		431+								
						[4.5+]								
		9					@ 2.59 m [8.5'], some fine to coarse sand, little gravel.							
		17	.279											
3.05		26	[11]	4		431+								
[10]						[4.5+]	@ 3.20 m [10.5'], cobbles or boulder.							
3.35	256.95													
[11.0]	[843.0]	15					Very stiff to hard brown and dark brown SANDY SILT (A-4a),							
		23	.432				little clay, trace gravel; decomposed silty shale; damp.							
		40	[17]	5		359								
4.11	256.19					[3.75]								
[13.5]	[840.5]	50/.10	.025	6			Soft brown and gray SILTSTONE; weathered to severely							
			[1]				weathered.							
4.57														
[15]							@ 4.88 m - 5.64 m [16.0' - 18.5'], arenaceous.							
		50/.13	.127	7										
			[5]											
		50/.10	.102	8										
			[4]											
6.10														
[20]														
		50/.13	.127	9										
			[5]											
7.16	253.14													
[23.5]	[830.5]	15		10A			Soft brown silty SHALE; severely weathered.							
		22	.432											
7.62		50/.13	[17]	10B										

GRADATION

Moisture Content - %
PL Natural LL

Client: ODOT District 10 | Project: ATH-33-40.981 (US 33 over Pratts Fork Tributary) | Job No. 9821-3200.00

LOG OF: Boring SB-6 | Location: Sta. 41+413.83, 19.89 m Lt. of US 33 centerline | Date Drilled: 10/25/99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry prior to coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
7.62	252.68						
[25]	[829.0]	Core 0.787 m [31"]	Rec .533 m [21"]	RQD 48%			Medium hard brown SHALE; weathered.
8.05	252.25						
[26.4]	[827.6]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			Hard gray fine grained SANDSTONE, slightly calcareous; slightly weathered to weathered. @ 8.60 m - 8.84 m [28.2' - 29.0'], limestone lens. @ 9.24 m - 9.27 m [30.3' - 30.4'], limestone lens. @ 9.39 m - 9.51 m [30.8' - 31.2'], limestone lens.
9.14							
[30]							
		Core 1.575 m [62"]	Rec 1.575 m [62"]	RQD 100%			
10.67							
[35]							
11.49	248.81						
[37.7]	[816.3]						Bottom of Boring - 11.49 m [37.7']
12.19							
[40]							
13.72							
[45]							
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL Natural LL; 10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-16 | Location: 45+474.00, 19.50 m left of US 33 centerline. | Date Drilled: 12-14-99

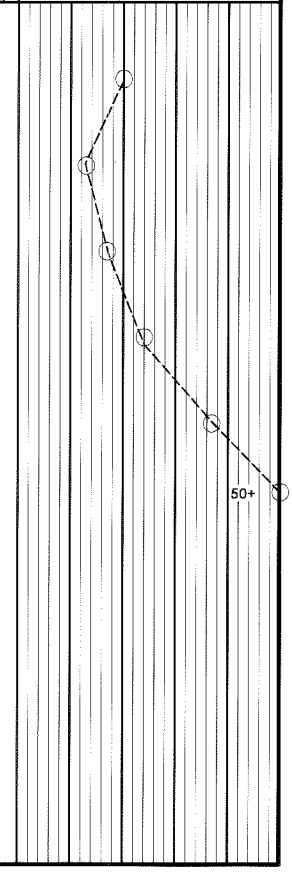
WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry (before coring)
3.75 m [12.3'] (after coring, includes drill water)

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL Natural LL; 10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (in)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	216.76						
0.25	216.51						Topsoil - 0.254 m [10"]
[0.8]	[710.3]	3		1		215	Very stiff to hard brown SILT AND CLAY (A-6a), little to
		3	.330			[2.25]	some fine to coarse sand; contains organic material; damp.
		17	[13]				
		3					
		5	.279				
1.52		8	[11]	2		383	
[5]						[4.0]	
1.86	214.90						
[6.1]	[705.1]	4					Hard mottled red and gray CLAY (A-7-6), trace fine to coarse
		8	.305				sand; decomposed claystone; damp.
		9	[12]	3		431+	
2.59	214.17					[4.5+]	
[8.5]	[702.7]	4					COAL, decomposed; damp.
		10	.279				@ 2.93 m - 2.99 m [9.6' - 9.8'], very stiff dark gray
2.99	213.77	14	[11]	4		239	UNDERCLAY (A-7-6); damp.
[9.8]	[701.3]					[2.5]	
		13					Hard gray and yellow SILTY CLAY (A-6b); decomposed
		16	.330				shale; damp.
		21	[13]	5		431+	
3.96	212.80					[4.5+]	
[13.0]	[698.2]						
4.24	212.52	40	.102	6A			Very soft to soft brown and gray fine grained SANDSTONE; severely weathered.
[13.9]	[697.2]	50/.08	[4]	6B			
4.57							Soft to medium hard brown and gray fine grained
[15]		Core	Rec	RQD			SANDSTONE, argillaceous, micaceous; severely weathered
		0.762	.711	40%			to weathered.
		m	m				
		[30"]	[28"]				
5.33	211.43						
[17.5]	[693.7]	Core	Rec	RQD			Medium hard to hard gray fine grained SANDSTONE,
		0.762	.762	93%			argillaceous, micaceous; weathered.
		m	m				
		[30"]	[30"]				
6.04	210.72						
[19.8]	[691.3]	Core	Rec	RQD			Medium hard gray SILTSTONE, argillaceous; weathered.
		1.524	1.448	90%			
6.46	210.30	m	m				
[21.2]	[690.0]	[60"]	[57"]				Hard gray SANDSTONE, micaceous, pyritic; weathered.
							@ 7.00 m - 7.09 m [23.0' - 23.3'], near vertical fracture.
7.22	209.54						@ 7.16 m [23.5'], grades into SILTSTONE.
[23.7]	[687.5]						Medium hard to hard gray SILTSTONE, pyritic; weathered.
7.62	209.14						Bottom of Boring - 7.62 m [25.0']



Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-17 | Location: 45+512.01, 5.45 m left of US 33 centerline. | Date Drilled: 12-14-99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry (before coring)
6.10 m [20.0'] (after coring, includes core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	212.77												
0.20 [0.7]	212.57 [697.4]						Topsoil - 0.203 m [8"]						
		3 4 7	.279 [11]	1		335 [3.5]	Very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; damp.						
0.91 [3.0]	211.86 [695.1]												
		4 3 3	.178 [7]	2			Loose brown and light brown SANDY SILT (A-4a); damp.						
1.68 [5.5]	211.09 [692.6]												
		8 6 18	.279 [11]	3		287 [3.0]	Very stiff light brown SILT AND CLAY (A-6a), little fine to coarse sand, trace to little gravel; decomposed shale; damp.						
2.44 [8.0]	210.33 [690.1]												
		5 10 15	.279 [11]	4		431+ [4.5+]	Hard gray and yellow SILTY CLAY (A-6b), trace to little fine to coarse sand, trace to little gravel; decomposed shale; damp.						
3.05 [10.5]	209.57 [687.6]												
		12 25 24	.457 [18]	5			Dense brown and gray SANDY SILT (A-4a); decomposed shale; damp.						
3.96 [13.0]	208.81 [685.1]												
		7 13 19	.279 [11]	6		431+ [4.5+]	Hard red CLAY (A-7-6); decomposed claystone; damp.						
4.57 [15]													
4.88 [16.0]	207.89 [682.1]	19 39 50/.13	.381 [15]	7			Soft red CLAYSTONE; severely weathered.						
		14 31 47	.356 [14]	8									
6.10 [20]													
		11 43 50/.05	.330 [13]	9									
6.86 [22.5]	205.91 [675.6]	Core 0.762 m [30"]	Rec .762 m [30"]	RQD 33%			Medium hard to hard brown fine grained SANDSTONE; weathered to severely weathered; contains rust staining.						
7.62													

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

50+
78
50+

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-17 | Location: 45+512.01, 5.45 m left of US 33 centerline. | Date Drilled: 12-14-99

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: dry (before coring)
6.10 m [20.0'] (after coring, includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	205.15												
[25]	[673.1]	Core 0.864 m [34"]	Rec .864 m [34"]	RQD 88%			Hard gray fine to medium grained SANDSTONE; weathered to severely weathered; contains rust staining.						
		Core 1.422 m [56"]	Rec 1.422 m [56"]	RQD 79%									
9.14													
[30]													
9.91	202.86						@ 9.72 m - 9.88 m [31.9' - 32.4'], gray shale layer. @ 9.88 m - 10.18 m [32.4' - 33.4'], brown.						
[32.5]	[665.6]						Bottom of Boring - 9.91 m [32.5']						
10.67													
[35]													
12.19													
[40]													
13.72													
[45]													
15.24													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-18 | Location: 45 + 549.99, 19.50 m left of US 33 centerline. | Date Drilled: 12-20-99

WATER OBSERVATIONS:
Water seepage at: 2.19 m [7.2']
Water level at completion: 6.10 m [20.0'] (before coring)
3.05 m [10.0'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m; Moisture Content - % PL Natural LL
0	204.98						DESCRIPTION							10 20 30 40
0.15 [0.5]	204.83 [672.0]						Topsoil - 0.152 m [6"]							
		1 2 2	.178 [7]	1		96 [1.0]	Soft to medium stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand; contains organic material; damp to moist.							
		1 1 WOH	.356 [14]	2		24 [0.25]	@ 0.91 m - 1.68 m [3.0' - 5.5'], contains sandy silt (A-4a) seams.							
1.52														
1.68 [5.5]	203.30 [667.0]	WOH 1 2	.279 [11]	3			Very loose brown and gray COARSE AND FINE SAND (A-3a), little to some clayey silt; contains organic material; wet.	0	6	---	62	19	13	Non-plastic
		WOH 1 1	.381 [15]	4A 4B			@ 2.74 m - 3.20 m [9.0' - 10.5'], organic with wood fragments, and contains silt and clay (A-6a) seams.							
3.05														
3.20 [10.5]	201.78 [662.0]	1 WOH 2	.457 [18]	5		96 [1.0]	Medium stiff to stiff gray SILTY CLAY (A-6b), trace to little fine to coarse sand; contains organic material; moist.	0	1	---	8	50	41	
4.11														
[13.5] 4.57	[659.0]	1 1 1	.457 [18]	6		48 [0.5]	Soft to medium stiff gray CLAY (A-7-6), trace to little fine to coarse sand; moist.	0	1	---	6	46	47	
[15]		WOH 1 1	.457 [18]	7		48 [0.5]	@ 4.88 m - 5.49 m [16.0' - 18.0'], some red and gray rock fragments.							
5.49	199.49													
[18.0] 6.10	[654.5]	2 3 4	.279 [11]	8		168 [1.75]	Stiff red and yellow CLAY (A-7-6); decomposed claystone; damp to moist.							
[20]		3 11 18	.254 [10]	9		359 [3.75]	@ 6.40 m - 7.01 m [21.0' - 23.0'], becomes very stiff, damp.							
7.01	197.97													
[23.0] 7.62	[649.5]	15 20 31	.356 [14]	10			Soft red and gray CLAYSTONE; severely weathered.							51

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-18 | Location: 45 + 549.99, 19.50 m left of US 33 centerline. | Date Drilled: 12-20-99

WATER OBSERVATIONS:
Water seepage at: 2.19 m [7.2']
Water level at completion: 6.10 m [20.0'] (before coring)
3.05 m [10.0'] (after coring, includes drill water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
7.62	197.36													
[25]	[647.5]						Soft red and gray CLAYSTONE; severely weathered.							
		15 25 30	.279 [11]	11										55
		18 24 37	.330 [13]	12										61
9.14														
[30]														
		18 34 45	.330 [13]	13										79
		15 29 46	.330 [13]	14										75
10.67														
[35]														
		33 42 56	.330 [13]	15										98
							@ 11.58 m [38.0'], becomes red, yellow and gray.							
		15 30 39	.279 [11]	16										69
12.19														
[40]														
		12 35 47	.356 [14]	17										82
		32 49 50/.10	.305 [12]	18										50+
13.72														
[45]														
		50/.13	.127 [5]	19										50+
14.81	190.17													
[48.6]	[623.9]	50/.03	.025	20			Medium hard red CLAYSTONE, weathered to moderately weathered.							50+
		0.762 m	.533 m	RQD 67%										
15.24														

Moisture Content - % PL Natural LL

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-18 | Location: 45 + 549.99, 19.50 m left of US 33 centerline. | Date Drilled: 12-20-99

WATER OBSERVATIONS:
Water seepage at: 2.19 m [7.2']
Water level at completion: 6.10 m [20.0'] (before coring)
3.05 m [10.0'] (after coring, includes drill water)

STANDARD PENETRATION (N) Blows per 0.30 m (10 20 30 40)

Moisture Content - % PL Natural LL (10 20 30 40)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
15.24	189.74												
[50]	[622.5]	Core 0.762 m [30"]	Rec .660 m [26"]	RQD 60%			Medium hard red CLAYSTONE; weathered to moderately weathered.						
16.34	188.64												
[53.6]	[618.9]						Bottom of Boring - 16.34 m [53.6']						
16.76													
[55]													
18.29													
[60]													
19.81													
[65]													
21.34													
[70]													
22.86													

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-19 | Location: 45 + 585.00, 5.50 m left of US 33 centerline. | Date Drilled: 12-22-99

WATER OBSERVATIONS:
Water seepage at: 3.35 m [11.0']
Water level at completion: dry (before coring)
3.05 m [10.0'] (after coring, includes core w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % (PL / Natural / LL)
0	204.84						Topsoil - 0.152 m [6"]							
0.15 [0.5]	[671.6]	2 3 1	.152 [6]	1		96 [1.0]	Medium stiff to stiff brown SILT AND CLAY (A-6a), trace fine sand; contains organic material; damp to moist.							
1.52 [5]		1 3 2	.152 [6]	2		72 [0.75]								
2.44 [8.0]	202.40 [664.0]	1 2 2	.330 [13]	3		48 [0.5]								
3.05		WOH 1 1	.203 [8]	4			Very loose brown SANDY SILT (A-4a); wet.							
3.20 [10.5]	201.64 [661.5]	WOH WOH 1	.203 [8]	5			Very loose to loose gray COARSE AND FINE SAND (A-3a), trace to little clayey silt, trace gravel; contains organic material; wet.							
4.57 [15]		1 1 2	.356 [14]	6			@ 4.18 m - 4.57 m [13.7' - 15.0'], contains wood fragments.							
		3 1 3	.356 [14]	7										
6.10 [20]		1 1 1	.432 [17]	8			@ 5.64 m [18.5'], 0.15 m (6") sand heave.							
		WOH 2 3	.406 [16]	9			@ 7.16 m [23.5'], 0.20 m (8") sand heave.							
7.62		1 1 2	.356 [14]	10			@ 7.16 m - 7.62 m [23.5' - 25.0'], little to some clayey silt, trace to little gravel.							

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

GRADATION
% Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

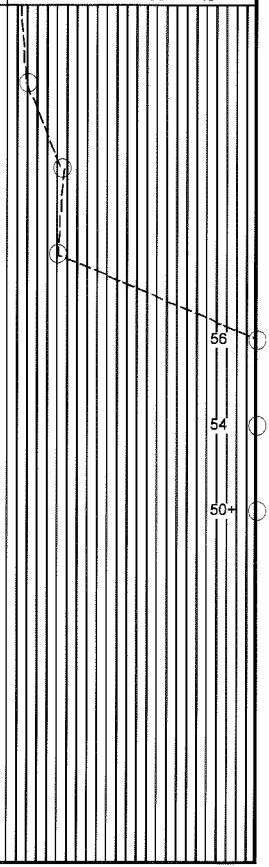
LOG OF: Boring SB-19 | Location: 45 + 585.00, 5.50 m left of US 33 centerline. | Date Drilled: 12-22-99

WATER OBSERVATIONS:
Water seepage at: 3.35 m [11.0']
Water level at completion: dry (before coring)
3.05 m [10.0'] (after coring, includes core water)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62 [25]	197.22 [647.0]						Loose to medium dense gray and brown COARSE AND FINE SAND (A-3a), little clayey silt, little gravel; wet.						
		2 2 2	.305 [12]	11									
		4 3 8	.457 [18]	12									
9.14 [30]							@ 9.45 m - 10.06 m [31.0' - 33.0'], trace to little gravel.						
		2 4 6	.457 [18]	13									
10.06 [33.0]	194.78 [639.0]						Very stiff red and gray CLAY (A-7-6); decomposed claystone; damp.						
		6 27 29	.279 [11]	14		239 [2.5]							
10.67 [35]													
		15 25 29	.203 [8]	15		335 [3.5]							
11.58 [38.0]	193.26 [634.1]						Soft red yellow and gray CLAYSTONE; severely weathered.						
		22 39 50/.13	.305 [12]	16									
12.19 [40]	192.65 [632.1]	Core 0.762 m [30"]	Rec .533 m [21"]	RQD 60%			Medium hard red and gray CLAYSTONE, arenaceous; moderately to severely weathered.						
		Core 1.676 m [66"]	Rec #### m [40"]	RQD 24%									
13.72 [45]													
14.63 [48.0]	190.21 [624.0]						Bottom of Boring - 14.63 m [48.0']						
15.24													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40



Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-20 | Location: 45+620.00, 19.51 m left of US 33 centerline | Date Drilled: 12-29-99

WATER OBSERVATIONS:
Water seepage at: 2.01 m [6.6'], 2.43 m [8.0']
Water leve at completion: 11.43 m [37.5'] (before coring)
3.66 m [12.0'] (after coring, includes drill w ater)

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	204.73												
0.10 [0.3]	204.63 [671.4]						Topsoil - 0.102 m [4"]						
		2 3 4	.330 [13]	1		168 [1.75]	Stiff brown SILT AND CLAY (A-6a), trace to little fine sand; contains organic material; damp.						
							@ 0.91 m - 2.44 m [3.0' - 8.0'], medium stiff, moist.						
		1 2 2	.178 [7]	2		48 [0.5]							
1.52 [5]													
		1 2 3	.381 [15]	3A 3B		24 [0.25] 72 [0.75]	@ 2.01 m [6.6'], sand seam, wet.						
2.44 [8.0]	202.29 [663.7]												
		1 1 2	.356 [14]	4			Very loose brown FINE SAND (A-3); contains organic material; wet.						
3.05													
3.20 [10.5]	201.53 [661.2]												
		1 1 2	.203 [8]	5			Very loose brown and gray COARSE AND FINE SAND (A-3a), trace to little clayey silt; contains organic material; moist.						
4.57 [15]		1 1 1	.330 [13]	6									
		1 1 1	.152 [6]	7									
6.10 [20]		1 1 1	.432 [17]	8									
		2 3 4	.127 [5]	9			@ 7.01 m - 7.62 m [23.0' - 25.0'], wet.						
7.62		WOR WOR WOH	.279 [11]	10									

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-20 | Location: 45+620.00, 19.51 m left of US 33 centerline | Date Drilled: 12-29-99

WATER OBSERVATIONS:
Water seepage at: 2.01 m [6.6'], 2.43 m [8.0']
Water leve at completion: 11.43 m [37.5'] (before coring)
3.66 m [12.0'] (after coring, includes drill w ater)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetro-meter (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m
7.62	197.11													
[25]	[646.7]	WOH 4 8	.457 [18]	11			Loose brown and gray COARSE AND FINE SAND (A-3a), trace to little clayey silt; contains organic material; moist to wet. @ 7.92 m - 9.02 m [26.0' - 29.6'], medium dense.							
9.02	195.71	8 8	.432											
[29.6]	[642.1]	28	[17]	12		287 [3.0]	Very stiff red and gray CLAY (A-7-6); decomposed claystone; damp.							
9.45	195.28													
[31.0]	[640.7]	13 25 46	.229 [9]	13			Soft red, gray and brown CLAYSTONE; severely weathered.							71
10.67		26 32 50	.381 [15]	14										82
[35]		23 34 50/.13	.254 [10]	15										50+
12.19	192.54	22 24 43	.330 [13]	16										67
[40]	[631.7]	Core 1.524 m [60"]	Rec .889 m [35"]	RQD 22%			Soft to medium hard red, gray and brown CLAYSTONE.							
13.72	191.01													
[45]	[626.7]						Bottom of Boring - 13.72 m [45.0']							
15.24														

GRADATION

STANDARD PENETRATION (N) Blows per 0.30 m: 10 20 30 40

Moisture Content - %: PL Natural LL; 10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-26 | Location: Sta. 48+860.00, 19.50 m left of US 33 centerline | Date Drilled: 2/1/00

WATER OBSERVATIONS:
Water seepage at: 1.86 m[6.1'], 1.92 m [6.3']
Water level at completion: dry prior to core
1.07 m[3.5']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	201.66												
0.20 [0.7]	201.46 [660.9]						Topsoil - 0.203 m [8"]						
		3 7 5	.229 [9]	1		239 [2.5]	Very stiff dark brown SILT AND CLAY (A-6a), little fine to coarse sand; moist.						
							@ 1.07 m - 1.52 m [3.5' - 5.0'], becomes stiff, brown.						
		2 3 4	.305 [12]	2		168 [1.75]							
1.52 [5]							@ 1.83 m - 3.81 m [6.0' - 12.0'], soft, gray, with some fine to coarse sand.						
		2 3 4	.330 [13]	3	1	24 [0.25]							
							@ 2.59 m - 3.66 m [8.5' - 12.0'], contains few coal fragments.						
		1 1 2	.381 [15]	4	2	24 [0.25]							
3.05 [10]													
3.66 [12.0]	198.00 [649.6]	2 3 20	.381 [15]	5A 5B		48 [0.5]	Severly weathered gray SHALE, micaceous.						
4.42	197.24	30 50/.00	.127 [5]	6									
4.57 [15.2]	[647.1] [646.4]	Core 0.533 m [21"]	Rec .533 m [21"]	RQD		100%	Medium hard gray fine grained SANDSTONE, micaceous; weathered.						
4.63	197.03						Hard light gray LIMESTONE, micaceous, arenaceous; weathered to slightly weathered.						
5.18 [17.0]	196.48 [644.6]	Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD		100%	Medium hard to hard gray fine to medium grained SANDSTONE, micaceous; weathered tc slightly weathered.						
6.10 [20]													
7.62													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

50+

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-26 | Location: Sta. 48+860.00, 19.50 m left of US 33 centerline | Date Drilled: 2/1/00

WATER OBSERVATIONS:
Water seepage at: 1.86 m[6.1'], 1.92 m[6.3']
Water level at completion: dry prior to core
1.07 m[3.5']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION
7.62	194.04						
[25]	[636.6]						Medium hard to hard gray fine to medium grained SANDSTONE, micaceous; weathered to slightly weathered.
7.99	193.67						
[26.2]	[635.4]						Bottom of Boring - 7.99 m [26.2']
9.14							
[30]							
10.67							
[35]							
12.19							
[40]							
13.72							
[45]							
15.24							

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-27 | Location: Sta. 48+878.44, 7.79 m left of US 33 centerline | Date Drilled: 1/31/00

WATER OBSERVATIONS:
Water seepage at: 2.16 m [7.1'], 2.65 m [8.7']
Water level at completion: dry prior to core
4.24 m [13.9']

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m	Rec (m) [in]	Drive	Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N) Blows per 0.30 m	Moisture Content - % PL Natural LL
0	200.86							DESCRIPTION							10 20 30 40	10 20 30 40
0.25	200.61							Topsoil - 0.254 m [10"]								
[0.8]	[658.2]		2													
			2 2	.178 [7]	1		<24 [<0.25]	Very soft brown SILT AND CLAY (A-6a), little fine to coarse sand; contains wood fragments; moist.								
			1				---									
			2 2	.051 [2]	2											
1.52																
1.68	199.18															
[5.5]	[653.5]		1													
			1 2	.381 [15]	3			Very loose gray SANDY SILT (A-4a), little clay; moist.	0	1	---	57	27	15		Non-plastic
2.65	198.21															
[8.7]	[650.3]		1													
			2 3	.254 [10]	4			Gray SANDSTONE fragments; moist to wet								
3.05																
3.21	197.65															
[10.5]	[648.5]															
3.51	197.35		50/.05	.051	5			Severely weathered gray SHALE fragments, micaceous.								50+
[11.5]	[647.5]		Core 1.372 m [54"]	Rec 1.372 m [54"]	RQD 100%			Hard light gray LIMESTONE, arenaceous, slightly micaceous; slightly weathered.								
3.96	196.90															
[13.0]	[646.0]							Medium hard gray SANDSTONE, arenaceous, slightly micaceous, slightly calcareous; weathered.								
4.57																
[15]																
			Core 3.048 m [120"]	Rec 3.048 m [120"]	RQD 100%											
6.10																
[20]																
7.62																

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-27 | Location: Sta. 48+878.44, 7.79 m left of US 33 centerline | Date Drilled: 1/31/00

WATER OBSERVATIONS:
Water seepage at: 2.16 m [7.1'], 2.65 m [8.7']
Water level at completion: dry prior to core
4.24 m [13.9']

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62 [25]	193.24 [634.0]						Medium hard gray SANDSTONE, arenaceous, slightly micaceous, slightly calcareous; weathered.						
7.92 [26.0]	192.94 [633.0]						Bottom of Boring - 7.92 m [26.0']						
9.14 [30]													
10.67 [35]													
12.19 [40]													
13.72 [45]													
15.24													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40 981 | Job No. 9821-3200.00

LOG OF: Boring SB-28 | Location: Sta. 48+920.46, 23.24 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS:
Water seepage at: 4.88 m [16.0']
Water level at completion: 3.96 m [13.0'] prior to coring
2.19 m [7.2'] after coring

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	202.32 [663.8]						Topsoil - 0.457 m [18"]						
0.46 [1.5]	201.86 [662.3]	2 2 3	.229 [9]	1		120 [1.25]	Stiff to very stiff brown and gray SANDY SILT (A-4a), little gravel; damp to moist.						
1.37	200.95	4 7 8	.229 [9]	2A 2B		192 [2.0] 287 [3.0]							
1.52 [5.0]	[659.3]	4 11 18	.330 [13]	3		359 [3.75]	Very stiff brown SILTY CLAY (A-6b), trace fine to coarse sand; (decomposed shale); damp. @ 1.83 m - 2.59 m [6.0' - 8.5'], becomes brown, red and gray.						
2.59 [8.5]	199.73 [655.3]	15 50 50/.05	.279 [11]	4			Soft to medium hard gray SHALE, arenaceous; severely weathered.						
3.05 [10]		22 20 25	.330 [13]	5			@ 4.11 m - 4.42 m [13.5' - 14.5'], decomposed layer.						
4.57 [15]		5 6 38	.356 [14]	6									
		50/.13	.127 [5]	7									
5.64 [18.5]	196.68 [645.3]	16	.127				Medium hard gray fine to coarse SANDSTONE; severely weathered.						
5.85	196.47	50/.05	[5]	8									
6.10 [20.0]		Core 1.397 m [55"]	Rec 1.041 m [41"]	RQD 73%			Hard gray fine to medium grained SANDSTONE, micaceous, slightly argillaceous; moderately weathered.						
7.62													

50+
50+
50+

Client: Ohio Department of Transportation	Project: ATH-33-40.981	Job No. 9821-3200.00
LOG OF: Boring SB-28	Location: Sta. 48+920.46, 23.24 m left of US 33 centerline	Date Drilled: 2-8-00

WATER OBSERVATIONS:
Water seepage at: 4.88 m [16.0']
Water level at completion: 3.96 m [13.0'] prior to coring
2.19 m [7.2'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	194.70												
[25]	[638.8]	Core 1.524 m [60"]	Rec 1.499 m [59"]	RQD 98%			Hard gray fine to medium grained SANDSTONE, micaceous, slightly argillaceous; moderately weathered.						
8.78	193.54												
[28.8]	[635.0]						Bottom of Boring - 8.78 m [28.8']						
9.14													
[30]													
10.67													
[35]													
12.19													
[40]													
13.72													
[45]													
15.24													

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

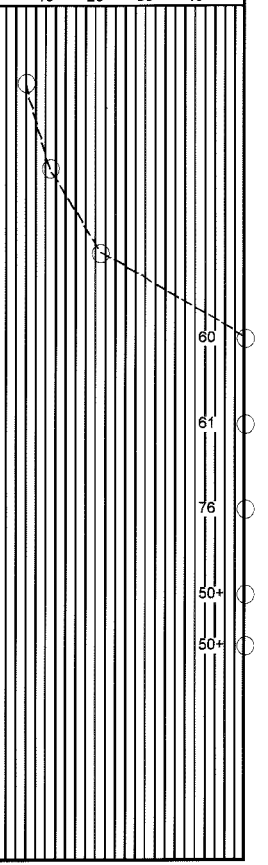
LOG OF: Boring SB-29 | Location: Sta. 48+940.13, 7.11 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS:
Water seepage at: 3.51 m [11.5']
Water level at completion: dry prior to coring
2.13 m [7.0'] after coring

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	209.36						Topsoil - 0.406 m [16"]						
[686.9]													
0.40	208.96	2											
[1.3]	[685.6]	2 4	.305 [12]	1		192 [2.0]	Stiff brown SILT AND CLAY (A-6a); damp.						
0.91	208.45												
[3.0]	[683.9]	2					Hard brown and red SILTY CLAY (A-6b); (decomposed shale); damp.						
		3 8	.229 [9]	2		431+ [4.5+]							
1.52													
[5]													
1.83	207.53												
[6.0]	[680.9]	6					Hard red CLAY (A-7-6); (decomposed claystone); damp.						
		10 11	.229 [9]	3		431+ [4.5+]							
2.44	206.92												
[8.0]	[678.9]						Soft brown SHALE; severely weathered.						
		17 27 33	.381 [15]	4									
3.05													
3.20	206.16												
[10.5]	[676.4]						Soft purple and brown CLAYSTONE; severely weathered.						
		15 18 43	.305 [12]	5									
3.96	205.40												
[13.0]	[673.9]						Soft to medium hard gray SHALE, arenaceous; severely weathered.						
		27 29 47	.279 [11]	6									
4.57													
[15]													
		18 29 50/.10	.356 [14]	7									
							@ 5.64 m [18.5'], becomes weathered.						
		50/.08	.076 [3]	8									
6.10	203.26												
[20]	[666.9]	Core 1.219 m [48"]	Rec .635 m [25"]	RQD 38%			@ 6.10 m - 7.32 m [20.0' - 24.0'], slightly broken.						
							@ 6.77 m - 6.98 m [22.2' - 22.9'], vertical fracture with rust staining.						
7.41	201.95												
[24.3]	[662.6]						Soft to medium hard red CLAYSTONE; weathered.						



Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-29 | Location: Sta. 48+940.13, 7.11 m left of US 33 centerline | Date Drilled: 2-8-00

WATER OBSERVATIONS:
Water seepage at: 3.51 m [11.5']
Water level at completion: dry prior to coring
2.13 m [7.0'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION
7.62	201.74						
[25]	[661.9]	Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 95%			Soft to medium hard red CLAYSTONE; weathered.
8.02	201.34						
[26.3]	[660.6]						Medium hard gray SHALE, arenaceous; weathered.
		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			@ 8.84 m - 9.94 m [29.0' - 32.6'], weathered to severely weathered.
9.14							
[30]							
9.94	199.42						
[32.6]	[654.3]						Soft to medium hard red CLAYSTONE; weathered to severely weathered.
10.36	199.00						
[34.0]	[652.9]						Bottom of Boring - 10.36 m [34.0']
10.67							
[35]							
12.19							
[40]							
13.72							
[45]							
15.24							

GRADATION

% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-30 | Location: Sta. 48+840.60, 5.80 m right of US 33 centerline | Date Drilled: 1-18-00

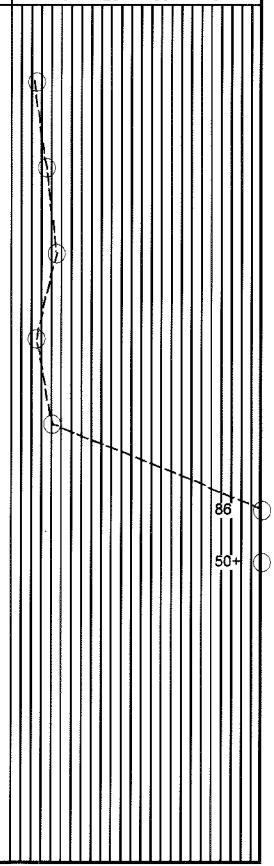
WATER OBSERVATIONS:
Water seepage at: 2.65 m [8.7'], 2.77 m [9.1']
Water level at completion: dry (before coring)
1.22 m [4.0'] (after coring)

GRADATION: % Aggregate | % C. Sand | % M. Sand | % F. Sand | % Silt | % Clay

STANDARD PENETRATION (N) — Blows per 0.30 m

Moisture Content - % — PL | Natural | LL

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION
0	202.10						
0.25 [0.8]	201.85 [662.2]						Topsoil - 0.254 m [10"]
		2 3 2	.356 [14]	1		215 [2.25]	Stiff to very stiff brown SILT AND CLAY (A-6a), some fine to coarse sand; contains roots, slightly organic; moist.
1.52 [5]		2 3 4	.330 [13]	2		---	@ 1.68 m - 2.59 m [5.5' - 8.5'], rust-stained, contains few coal fragments, no roots or organics.
		3 4 5	.254 [10]	3		120 [1.25]	
2.59 [8.5]	199.51 [654.6]	2 3 2	.254 [10]	4			Loose brown SANDY SILT (A-4a), little clay; contains sandstone and coal fragments; moist.
3.05 [10]							
3.35 [11.0]	198.75 [652.1]	2 3 5	.279 [11]	5			Very soft gray SHALE, micaceous; severely weathered.
							@ 4.11 m - 4.27 m [13.5' - 14.0'], gray, brown and reddish brown, contains sandstone fragments.
4.27 [14.0]	197.83 [649.0]	29 35 51	.457 [18]	6A 6B			Very dense dark brown SANDY SILT (A-4a), little silty clay, trace gravel; severely weathered sandstone; damp to moist.
4.57 [15]							
4.88 [16.0]	197.22 [647.0]	50/.05	.051	7			Medium hard brown SANDSTONE; severely weathered;
5.36 [17.6]	196.74 [645.5]	Core 0.61 m [24"]	Rec .610 m [24"]	RQD 67%			@ 5.03 m - 5.36 m [16.5' - 17.6'], becomes hard, gray.
		Core 0.61 m [24"]	Rec .610 m [24"]	RQD 92%			Hard gray LIMESTONE, arenaceous; slightly weathered.
6.13 [20.1]	195.97 [642.9]	Core 1.829 m [72"]	Rec 1.829 m [72"]	RQD 100%			Hard gray SANDSTONE; weathered to slightly weathered.
							@ 7.21 m - 7.24 m [23.6' - 23.8'], argillaceous.
7.62							@ 7.32 m [24.0'], very thin argillaceous layer.



Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-30 | Location: Sta. 48+840.60, 5.80 m right of US 33 centerline | Date Drilled: 1-18-00

WATER OBSERVATIONS:
Water seepage at: 2.65 m [8.7'], 2.77 m [9.1']
Water level at completion: dry (before coring)
1.22 m [4.0'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62 [25]	194.48 [638.1]						Hard gray SANDSTONE; unweathered.						
8.08 [26.5]	194.02 [636.5]						@ 7.88 m [25.9'], becomes calcareous.						
							Bottom of Boring - 8.08 m [26.5']						
9.14 [30]													
10.67 [35]													
12.19 [40]													
13.72 [45]													
15.24													

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-31 | Location: Sta. 48 + 856.60, 19.50 m right of US 33 centerline | Date Drilled: 1-19-00

WATER OBSERVATIONS:
Water seepage at: 1.07 m [3.5']
Water level at completion: dry (before coring)
0.15 m [0.5'] (after coring)

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m [in]	Rec (m)	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	201.31												
0.10	201.21						Topsoil - 0.102 m [4"]						
[0.3]	[660.1]	1 2 1	.381 [15]	1		72 [0.75]	Medium stiff brown SANDY SILT (A-4a), little clay; moist.						
1.07	200.24												
[3.5]	[657.0]	1 2 2	.330 [13]	2			Very loose to loose brown GRAVEL WITH SAND (A-1-b), little silt, trace clay; wet.						
[5]		4 2 1	.203 [8]	3				23	27	---	34	11	5
2.59	198.72												
[8.5]	[652.0]	1 1 5	.178 [7]	4		72 [0.75]	Medium stiff gray SANDY SILT (A-4a), little clay, trace gravel; moist.	3	17	---	34	28	18
3.05													
[10]													
3.35	197.96												
3.51	197.80	50/.08	.076	5			Medium hard gray SANDSTONE, argillaceous, micaceous; severely weathered.						
3.69	197.62						Hard light gray LIMESTONE, arenaceous; slightly weathered; contains micaceous layers.						
[12.1]	[648.4]	Core 1.067 m [42"]	Rec 1.067 m [42"]	RQD 90%			Hard gray and light gray fine to coarse grained SANDSTONE, micaceous; slightly weathered; contains calcareous layers and limestone clasts.						
4.57													
[15]		Core 1.524 m [60"]	Rec 1.448 m [57"]	RQD 92%									
6.10													
[20]		Core 1.524 m [60"]	Rec 1.346 m [53"]	RQD 88%			@ 6.71 m - 6.86 m [22.0' - 22.5'], clay seam.						
7.62							Bottom of Boring - 7.62 m [25.0']						

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Non-plastic

50+

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-32 | Location: Sta. 48+900.50, 7.00 m right of US 33 centerline | Date Drilled: 2-7-00

WATER OBSERVATIONS:
Water seepage at: 1.22 m [4.0']
Water level at completion: dry prior to coring
1.98 m [6.5'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	203.44												
	[667.5]						Topsoil - 0.356 m [14"]						
0.37	203.07	17											
[1.2]	[666.2]	9	.254										
		6	[10]	1			Medium dense brown FINE SAND (A-3); trace sandstone fragments; damp.						
0.91	202.53												
[3.0]	[664.5]												
		4					Very stiff brown and gray SILTY CLAY (A-6b), little to some fine to coarse sand, little gravel; damp.						
		4	.279										
1.52		8	[11]	2		239							
1.68	201.76					[2.5]							
[5.5]	[661.9]												
		3					Very stiff to hard brown and gray CLAY (A-7-6); (decomposed claystone); damp.						
		7	.305										
		14	[12]	3		311							
						[3.25]							
		10											
		21	.279										
3.05		43	[11]	4		407							
3.20	200.24					[4.25]							
[10.5]	[657.0]												
		20					Soft gray SHALE, arenaceous; severely weathered.						
		22	.229										
		50/.13	[9]	5									
		16	.102										
		50/.03	[4]	6									
4.57	198.87												
[15]	[652.5]												
		Core 1.118 m [44"]	Rec 1.118 m [44"]	RQD 100%			Hard gray SANDSTONE, micaceous contains dark gray argillaceous laminae; moderately weathered.						
							@ 5.15 m - 5.27 m [16.9' - 17.3'], weathered shale layer.						
6.10		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%									
[20]													
7.22	196.22												
[23.7]	[643.8]						Bottom of Boring - 7.22 m [23.7']						
7.62													

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

64
50+
50+

Client: Ohio Department of Transportation | Project: ATH-33-40.981 | Job No. 9821-3200.00

LOG OF: Boring SB-33 | Location: Sta. 48+922.57, 19.52 m left of US 33 centerline | Date Drilled: 2-9-00

WATER OBSERVATIONS:
Water seepage at: 1.10 m [3.6']
Water level at completion: dry prior to coring
6.10 m [20.0'] after coring

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	Moisture Content - % (PL X—● Natural —X LL)
0	208.02						DESCRIPTION							
	[682.5]						Topsoil - 0.457 m [18"]							
0.46	207.56	2												
[1.5]	[681.0]	3	.279				Very stiff brown SILTY CLAY (A-6b), little fine to coarse sand, little gravel; damp.							
		3	[11]	1		239								
0.91	207.11					[2.5]								
[3.0]	[679.5]						Very stiff red and gray CLAY (A-7-6); damp.							
		1												
		1	.178											
1.52		6	[7]	2		239								
[5]						[2.5]								
1.98	206.04	7												
[6.5]	[676.0]	30	.279	3A		--								
		30	[11]	3B			Soft brown SHALE, arenaceous; severely weathered.							
							@ 2.59 m [8.5'], becomes gray.							
		12												
		20	.330											
3.05		32	[13]	4										
[10]														
		39	.229											
		50/.08	[9]	5										
		44	.279											
		50/.13	[11]	6										
4.57	203.45													
[15]	[667.5]						Soft to medium hard brown SHALE; severely weathered to weathered.							
		Core 1.219 m [48"]	Rec .762 m [30"]	RQD 63%										
6.10														
[20]		Core 1.524 m [60"]	Rec 1.524 m [60"]	RQD 100%			@ 6.55 m [21.5'], moderately hard, weathered.							
							@ 6.52 m [21.4'] & 6.95 m [22.8'], 45° slickensided shear.							
7.32	200.70													
[24.0]	[658.5]						Bottom of Boring - 7.32 m [24.0']							
7.62														

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

60
52
50+
50+

1998 Year

Job. No. PID 18288 #17778

Changes

County Athens

Project Identification ATH-33-40.981

File No. DRS

CONSULTANT PROJECT

Begin Sta. 39+600 End Sta. 49+890.950

Name of Consultant DLZ

Name of Drilling Contractor DLZ and Resource International

Contents of File Soil Sheets and Reports

Review Comments

* Includes info on MEG-335.810 (card #17027) landslide

Date of Report _____ No. of Tracings _____

Date Received _____ Filed with Year _____

Remarks Metric

DLZ
ENGINEERS • ARCHITECTS • SCIENTISTS
PLANNERS • SURVEYORS

February 4, 2005

Mr. Doug Morgan, P.E.
Ohio Department of Transportation
District 10
338 Muskingum Drive
Marietta, Ohio 45750

Re: ATH-33-40.981, PID # 18288
S.R. 681 Re-alignment - Preliminary Wall Type Study
Responses to Comments from OSE

Dear Mr. Morgan;

Following are DLZ's response to comments on the retaining walls required for the realignment of SR 681.

Comment: OSE understands that the re-alignment of the SR 681 was approved by the District previously. In addition, OSE understands that the proposed re-alignment was selected based upon alternate alignment study and cost estimates.
Response: Yes, the re-alignment was approved by the District. Various ramp and alignment alternatives were reviewed to establish the proposed alignment.

Comment: The proposed horizontal and vertical alignment of proposed SR 681 under the existing bridge (MEG-33-05810 over Trib. to Shade River & Future S.R. 681) would require a soil nail wall immediately in front of the rear abutment in order to accommodate the realigned SR 681. We agree with the consultant's recommendation that a soil nail wall be the most appropriate wall type for this application. We understand the consultant has evaluated the geotechnical investigation report and has concluded that the soils exhibit properties necessary for a permanent soil nail wall application.
Response: Concur.

Comment: We agree with the alternate wall type study recommendation prepared by the consultant for the retaining wall adjacent to the existing pier number 1. This wall is necessary to support the embankment for the realigned SR-681. The consultant needs to insure that adequate headroom will be available to construct the proposed wall.
Response: We have contacted one contractor regarding the feasibility of installing the shafts with the limited headroom and have concluded that it was practical. We will contact others as well.

Comment: The consultant should consider increasing the rock socket diameter to accommodate mis-location of the drilled shafts in the field. Additional construction control criteria besides what is in the current CMS should be considered for the drilled shafts.
Response: We will consider increasing the rock socket diameter for the drilled shafts to account for mis-location in the field. Currently, rock socket diameter is 30" for the HP 14x73 piles and 24" for the HP 12x53 piles. The 12x53 piles will have approximately 3.5" of cover and the 14x73 piles will have approximately 5" of cover. We will consider specifying 30" diameter sockets for both pile sizes. We will specify additional construction control criteria for the shafts beyond what is specified in the current CMS.

Comment: We agree that the steel casing for the drilled shafts may be left in place.
Response: Our recommendation was to remove the casing to ensure good contact between the soil and the shaft. However, this will probably disturb the H-piles and they may not be vertical. We are considering a splice above the existing grade that will be field adjustable to ensure a plumb wall above grade, and allow precast lagging to be used. The splice will also allow the contractor to have fewer obstructions in the work area during shaft installation, as all the shafts can be installed and then spliced above grade.

Comment: The consultant should consider providing reinforcing steel cages within the drilled shafts.
Response: Please clarify., Does OSE wanting reinforcing cages in addition to the H-pile, or in place of? We will compare the cost to determine which alternative is more economical.

Comment: We agree that Type B rock channel protection should be provided in front of the drilled shaft/pile lagging wall as recommended.
Response: Concur.

Comment: SR 681 Embankment drainage behind the proposed wall should be addressed and designed as recommended.
Response: Concur.

Comment: The consultant should re-evaluate the recommended waiting period. The existing soils are granular in nature and should compress in relatively short period of time.
Response: In response to this comment, one of the pier borings, SB-31, encountered a very loose to loose gravel layer, which would compress relatively quickly. However, the remainder of the borings at the site encountered primarily cohesive soils or sandy silts (A-4a) with 42% or more fines. We feel that two months is not an unreasonable amount of time to allow these soils to consolidate. The waiting period could be reduced to one month, but there would be increased risk for additional settlement after the road is constructed.

There are few items that need further discussion with OSE. DLZ will contact OSE to discuss the items directly.

Please feel free to contact us if you have any further questions.

Sincerely,

DLZ OHIO, INC.

Manoj Sethi, P.E.
Executive Vice President

Copy: Mr. Jawdat Siddiqi, OSE
Johnny Ng
Marty Shumway
Dorothy Adams
File 9821-1016-00

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DLZ

PROJECT MEMORANDUM

Date: January 5, 2005

To: Doug Morgan, P.E.
ODOT District 10 Production

From: Dorothy A. Adams, P.E.

Subject: ATH-33/SR 681 Relocation
Subsurface Exploration Report

Contained herein are the findings of the subsurface exploration for the relocated SR 681 at US 33 project in Darwin, Ohio. The boring logs are attached.

FIELD EXPLORATION

The exploration consisted of drilling four borings, B-1 through B-4, between December 16 and December 21, 2004, at the locations shown on the attached boring plan. The borings were spaced approximately 23 meters apart and six meters behind the rear abutment and were advanced to depths between 12.80 and 15.09 meters (42.0 and 49.5 feet) using a truck-mounted, rotary-type drill rig.

An additional three borings, B-5 through B-7, were drilled along the alignment of the proposed new ramp connecting westbound US 33 to proposed relocated SR 681. Boring B-6 was drilled at the location of the culvert on the new ramp. These borings ranged in depth from 5.76 and 9.14 meters (18.9 and 30.0 feet). Information concerning the drilling procedures is attached.

SUBSURFACE CONDITIONS

The borings drilled adjacent to the existing bridge at SR 681 encountered 0.279 to 0.305 meters (11 to 12 inches) of Portland cement concrete over 0.152 to 1.245 meters (6 to 49 inches) of aggregate base at the road surface. Boring B-1, which was drilled off the pavement, encountered 0.305 meters (12 inches) of topsoil at the ground surface. Below the topsoil and pavement layers, the borings primarily encountered a fill consisting of loose to medium dense Coarse and Fine Sand (A-3a) and Gravel with Sand (A-1-b). The fill material appeared to be consistent with a weathered and decomposed sandstone that had been compacted, and was likely obtained from the nearby rock slopes that were excavated during the construction of US 33.

Natural soil was first encountered at depths between 7.16 and 8.35 meters (23.5 and 27.4 feet), corresponding to elevations 204.70 to 205.61 meters, and consisted primarily of stiff to hard

6121 HUNTLEY ROAD COLUMBUS, OHIO 43229-1003 PHONE: (614) 888-0040 FAX: (614) 888-6415

cohesive soil to the top of weathered bedrock. The weathered bedrock was first encountered at depths between 8.53 and 13.26 meters (28.0 and 43.5 feet) and consisted primarily of shale bedrock in various states of decomposition. The borings were terminated at auger refusal, which was presumed to be the top of competent rock.

The borings drilled for the new ramp encountered 0.102 meters (4 inches) of topsoil at the ground surface. Below the topsoil, the soils consisted primarily of stiff to hard cohesive material to the top of bedrock. A soft to medium stiff Sandy Silt (A-4a) and a loose to medium dense Coarse and Fine Sand (A-3a) were also encountered in Boring B-6. Weathered bedrock was encountered in all the borings, at depths between 2.59 and 4.88 meters (8.5 and 16.0 feet), and consisted of severely weathered siltstone, sandstone, and shale. A 20-foot long section of bedrock was cored in Boring B-6, which consisted primarily of medium hard to hard gray sandstone, with a small amount of soft dark gray shale.

Groundwater seepage was first encountered in the borings between depths of 1.83 and 7.16 meters (6.0 and 23.5 feet) at the bridge and between depths of 0.76 and 1.83 meters (2.5 and 6.0 feet) along the new ramp. At the completion of drilling, no final water levels were detected in Borings B-1, B-2, and B-7. The final water level measurements were at depths of 6.43 and 14.39 meters (21.1 and 47.2 feet) in Borings B-3 and B-4, respectively. In the borings drilled for the new ramp, the final water level measurements were at depths between 1.34 and 3.81 meters (4.4 and 12.5 feet) The final water level in Boring B-6 includes water added for coring rock. Actual groundwater conditions may vary.

Attachments: General Information – Drilling Procedures and Logs of Borings
Legend – Boring Log Terminology
Boring Location Plan
Boring Logs

cc: file

M:\proj\9821\1016\00\geotech\Prelim Rpt.doc

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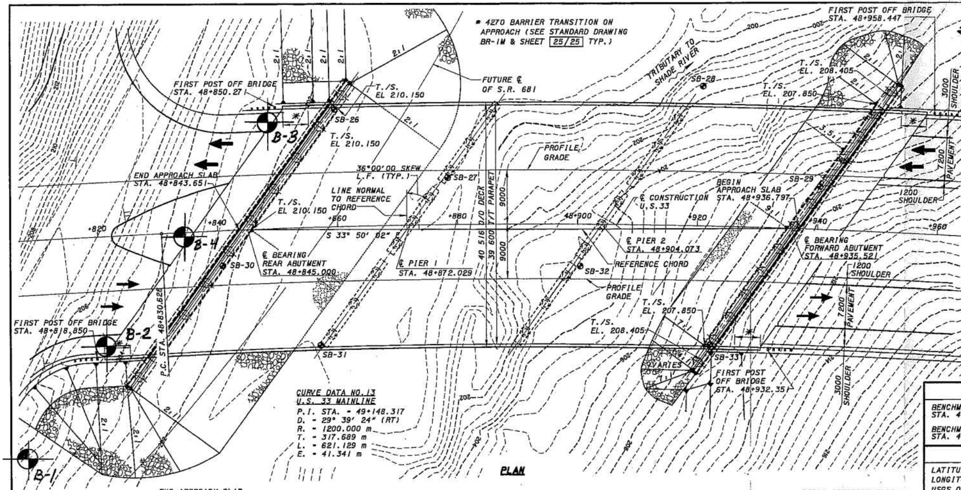
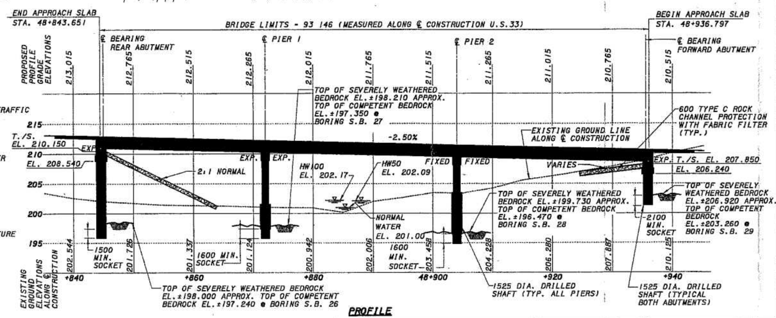


PLAN



PROFILE

LEGEND

ADT	-	AVERAGE DAILY TRAFFIC
ADTT	-	AVERAGE DAILY TRUCK TRAFFIC
APPROX.	-	APPROXIMATE
℄	-	CENTERLINE
C./C.	-	CENTER TO CENTER
DIA.	-	DIAMETER
D.S.	-	DRILLED SHAFT
EL.	-	ELEVATION
EXP.	-	EXPANSION
FIX.	-	FIXED
L.F.	-	LEFT FORWARD
MAX.	-	MAXIMUM
P.C.	-	POINT OF CURVATURE
STA.	-	STATION
T./T.	-	TOE TO TOE
T./S.	-	TOP OF SLOPE
TYP.	-	TYPICAL

metric units

NOTES:

1. EARTHWORK LIMITS SHOWN ARE APPROXIMATE. ACTUAL SLOPES SHALL CONFORM TO PLAN CROSS-SECTIONS.
2. ⊕ - BORING LOCATIONS.
3. ▨ - 600 TYPE C ROCK CHANNEL PROTECTION WITH FILTER.
4. ALL UNITS ARE MILLIMETERS UNLESS NOTED OTHERWISE. STATIONS AND ELEVATIONS ARE GIVEN IN METERS.
5. REFERENCE CHORD IS DEFINED AS THE STRAIGHT LINE CHORD BETWEEN STA. 48+845.000 (℄ BRG., REAR ABUTMENT) AND STA. 48+935.521 (℄ BRG., FORWARD ABUTMENT).
6. FOR REFERENCE CHORD DIAGRAM, SEE SHEET 2/25.
7. FOR SUPERELEVATION TRANSITION DIAGRAMS, SEE SHEETS 2/25.
8. R/W IS BEYOND LIMITS OF THIS DRAWING. SEE R/W PLANS FOR DETAILS.

BENCHMARK

BENCHMARK IRON PIN AND CAP STA. 48+840 ALONG ℄ U.S.33 — EL. 202.44

BENCHMARK IRON PIN AND CAP STA. 48+960 ALONG ℄ U.S.33 — EL. 212.81

LOCATION

LATITUDE: N39°08'43"
LONGITUDE: W 82°01'29"
USGS QUADRANGLE: SHADE

TRAFFIC

2001 ADT - 4170 — ADTT - 375
2021 ADT - 5740 — ADTT - 517

HYDRAULIC DATA

DRAINAGE AREA - 4.37 km^2
Q50 - 18.82 m^3/s
HW50 - 202.09
V50 - 1.4 m/s
CLEARANCE ABOVE HW50 - 6.8 m
Q100 - 22.01 m^3/s
HW100 - 202.17
V100 - 1.5 m/s

PROPOSED STRUCTURE DATA - LEFT

TYPE: THREE-SPAN PRESTRESSED CONCRETE I-BEAM AND COMPOSITE DECK WITH STUB ABUTMENTS AND CAP AND COLUMN TYPE PIERS
SPANS: 26 500, 32 000, 32 000 C./C. BEARINGS ALONG REFERENCE CHORD
ROADWAY: 39 600 T/T BARRIER
SKEW: 36° LEFT FORWARD REFERENCE CHORD
DESIGN LOADING: MS 22.5 AND THE ALTERNATE MILITARY LOADING
WEARING SURFACE: MONOLITHIC CONCRETE
ALIGNMENT: 1200m RADIUS CURVE RIGHT
SUPERELEVATION: 0.049 MAX.
APPROACH SLABS: AS-1-81M (7600 LONG)

DLZ

DESIGNED FAQ	DRAWN RTP	REVIEWED JH	DATE 02/02/01
CHECKED TEU	REVISED PHB	REVISED PHB	STRUCTURE FILE NUMBER 5300584

MEIGS COUNTY
STA. 48+843.651
STA. 48+936.797

SITE PLAN
BRIDGE NO. MEG-33-05810
OVER TRIB. TO SHADE RIVER & FUTURE S.R. 681

ATH-33-40.981

02/09/2001 09:09:54 PM

Client:	Ohio Department of Transportation	Project:	ATH-33/SR 681 Realignment	Job No.	9821-1016.00

LOG OF: Boring B-1 **Location:** Approx. Sta. 48+806, 35 m Rt. of US 33 CL **Date Drilled:** 12/16/04

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: none

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m^2) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	212.69 [697.8]						**Topsoil - 0.305 m [12"]**						
0.30	212.39 [696.8]												
[1.0]		3 5 4	.457 [18]	1			FILL: Loose to medium dense brown COARSE AND FINE SAND (A-3a), little to some silt, trace gravel; damp.						
		4 5 6	.457 [18]	2									
1.52													
[5]		7 12 16	.457 [18]	3									
		7 13 13	.457 [18]	4									
3.05													
[10]		6 8 9	.457 [18]	5									
		5 6 8	.457 [18]	6		359 [3.75]	@ 4.11 m - 4.27 m [13.5' - 14.0'], sandy silt (A-4a) seam.						
4.57													
[15]		4 9 8	.457 [18]	7		311 [3.25]	@ 4.88 m - 5.33 m [16.0' - 17.5'], contains occasional sandy silt fragments.						
		5 14 16	.457 [18]	8									
6.10													
[20]		5 4 6	.457 [18]	9			@ 6.40 m - 6.86 m [21.0' - 22.5'], contains few gray shale fragments.						
7.16	205.53												
[23.5]	[674.3]	4 4 7	.457 [18]	10		144 [1.5]	Stiff brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; contains few reddish brown shale fragments; moist.						
7.62													

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Client: Ohio Department of Transportation | Project: ATH-33/SR 681 Realignment | Job No. 9821-1016.00

LOG OF: Boring B-1 | Location: Approx. Sta. 48+806, 35 m Rt. of US 33 CL | Date Drilled: 12/16/04

WATER OBSERVATIONS:
Water seepage at: none
Water level at completion: none

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	DESCRIPTION
7.62	205.07												
[25]	[672.8]												Very stiff brown and reddish brown SILTY CLAY (A-6b), little fine to coarse sand, trace gravel; damp.
		4 6 8	.457 [18]	11		239 [2.5]							
8.53	204.16												
[28.0]	[669.8]												Severely weathered brown and gray SHALE.
		4 7 14	.457 [18]	12									
9.14													
[30]													
		15 20 24	.457 [18]	13									
10.67													
[35]													
		17 33 47	.457 [18]	14									
12.19													
[40]													@ 12.80 m [42.0'], auger refusal. Limestone fragments in spoon.
12.80	199.89												
[42.0]	[655.8]	50/.00	.000 [0]	15									Bottom of Boring - 12.80 m [42.0']
13.72													
[45]													
15.24													

80

50+

Client:	Ohio Department of Transportation	Project:	ATH-33/SR 681 Realignment	Job No.	9821-1016.00
LOG OF:	Boring B-2	Location:	Approx. Sta. 48+819, 18 m Rt. of US 33 CL	Date Drilled:	12/17/04

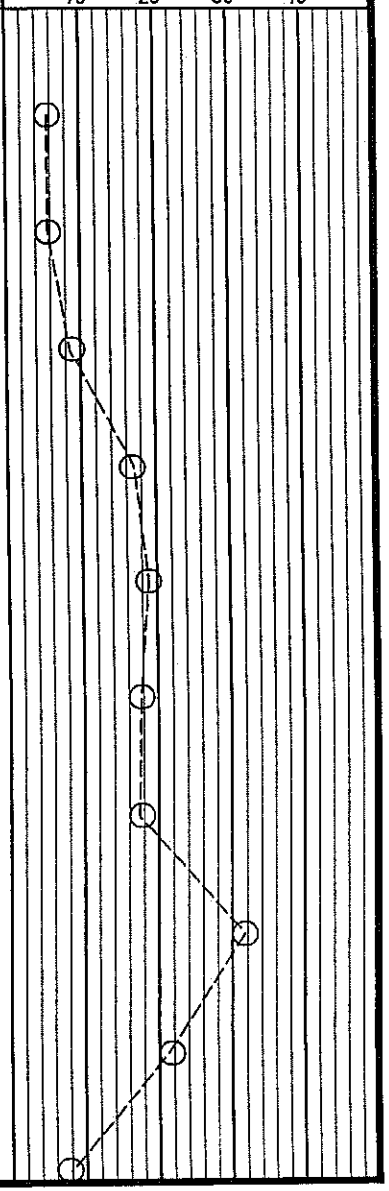
WATER OBSERVATIONS:
Water seepage at: 7.16 m [23.5']
Water level at completion: none

Depth (m) [ft]	Elev. (m) [ft]	Blows per 0.15 m	Rec (m) [in]	Sample No. Drive	Sample No. Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0	213.23 [699.6]						Portland Cement Concrete - 0.305 m [12"] Aggregate Base - 0.305 m [12"]						
0.61 [2.0]	212.62 [697.6]	3 4 2	.305 [12]	1			FILL: Loose brown FINE SAND (A-3), trace silt; damp.						
1.52 [5]	211.40 [693.6]	1 2 4	.457 [18]	2			FILL: Loose to medium dense brown and gray COARSE AND FINE SAND (A-3a), little silt, trace to little gravel; damp to moist.						
3.05 [10]		4 4 5	.457 [18]	3									
4.57 [15]		8 9 8	.457 [18]	4									
5.49 [18.0]	207.74 [681.6]	5 8 11	.457 [18]	5									
6.10		5 8 10	.457 [18]	6									
6.25 [20.5]	206.98 [679.1]	4 5 13	.457 [18]	7	96 [1.0]		@ 5.03 m - 5.18 m [16.5' - 17.0'], silty clay seam.						
7.62		7 12 29	.457 [18]	8			FILL: Dense gray GRAVEL WITH SAND (A-1-b), little silt, little gravel; consists primarily of weathered sandstone fragments; damp to moist.						
		12 11 11	.457 [18]	9			FILL: Loose to medium dense brown COARSE AND FINE SAND (A-3a), little silt, trace gravel; damp.						
		5 4 4	.457 [18]	10									

GRADATION

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40



Client:	Ohio Department of Transportation	Project:	ATH-33/SR 681 Realignment	Job No.	9821-1016.00

LOG OF: Boring B-2 **Location:** Approx. Sta. 48+819, 18 m Rt. of US 33 CL **Date Drilled:** 12/17/04

WATER OBSERVATIONS:
Water seepage at: 7.16 m [23.5']
Water level at completion: none

Depth (m) [ft]	Elev. (m) [ft]	Sample No.	Blows per 0.15 m	Rec (m) [in]	Drive	Press	Hand Penetrometer (kN/m²) [tsf]	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
7.62	205.61													
[25]	[674.6]							Severely weathered gray SHALE fragments.						
8.08	205.15	1	4 3	.457 [18]	11		120 [1.25]	Stiff brown SANDY SILT (A-4a), some fine to coarse sand, trace gravel; moist.						
[26.5]	[673.1]													
8.53	204.70													
[28.0]	[671.6]	3	8 13	.457 [18]	12		431+ [4.5+]	Hard dark brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; ORGANIC; damp.						
9.14														
[30]														
9.75	203.48													
[32.0]	[667.6]	4	7 11	.457 [18]	13		311 [3.25]	Very stiff to hard brown, reddish brown, gray, and purple CLAY (A-7-6), trace fine to coarse sand, trace gravel; damp.						
10.67														
[35]														
		6	11 14	.457 [18]	14		431+ [4.5+]	@ 11.73 m - 12.19 m [38.5' - 40.0'], brown and gray.						
12.19														
[40]														
13.26	199.97							@ 13.56 m [44.5'], auger refusal.						
[43.5]	[656.1]	23		.152	15			Severely weathered gray SHALE and SHALE fragments.						
13.56	199.67	50/.00		[6]										
13.72	[655.1]							Bottom of Boring - 13.56 m [44.5']						
[45]														
15.24														

STANDARD PENETRATION (N)
Blows per 0.30 m
10 20 30 40

Moisture Content - %
PL Natural LL
10 20 30 40

50+