PROJECT DESCRIPTION

THE PROJECT CONSISTS OF PLACING TWIN STRUCTURES FOR SR 823 OVER THE NORFOLK SOUTHERN RR AND US 23. THE STRUCTURE AS PLANNED, IS A THREE-SPAN STRUCTURE, WHICH UTILIZES MSE RETAINING WALLS TO HOLD BACK THE ROADWAY EMBANKMENT AND CONTAIN THE ABUTMENTS.

HISTORIC RECORDS

HISTORIC BORING RECORDS FOR THE AREA WERE REQUESTED FROM THE ODOT OFFICE OF GEOTECHNICAL ENGINEERING AND THE DISTRICT, HOWEVER, NO SUCH RECORDS EXISTED.

GEOLOGY

GENERALIZED GEOLOGICAL REFERENCES REPORT THAT THE SITE LIES ON THE EAST SIDE OF THE FLOOD PLAIN OF THE TEAYS STAGE, PORTSMOUTH RIVER, WHICH IS CURRENTLY THE EAST SIDE OF THE SCIOTO RIVER VALLEY. THIS AREA IS UNGLACIATED, HOWEVER THE SCIOTO RIVER VALLEY IS FILLED WITH ILLINOIAN AND WISCONSIN GLACIAL OUTWASH TO DEPTHS OF UP TO 90 FEET.

THE AREA OF THESE STRUCTURES IS CHARACTERIZED BY GENTLY TO MODERATELY SLOPING TOPOGRAPHY RISING FROM OF THE FLOODPLAIN OF THE SCIOTO RIVER. THE PROJECT AREA IS LOCATED IN THE SHAWNEE-MISSISSIPPIAN PLATEAU OF THE UNGLACIATED PORTION OF THE APPALACHIAN PLATEAU PHYSIOGRAPHIC REGION. THE SHAWNEE-MISSISSIPPIAN PLATEAU IS CHARACTERIZED BY DEVONIAN AGED TO PENNSYLVANIAN AGED ROCKS AND CONTAINS RESIDUAL, COLLUVIAL, ALLUVIAL, AND LACUSTRINE SOILS.

RECONNAISSANCE

SEVERAL SITE RECONNAISSANCE VISITS WERE MADE BETWEEN JUNE 2004 AND SEPTEMBER 2007. THE SURROUNDING AREA IS UTILIZED FOR AGRICULTURAL PURPOSES AND COMMERCIAL STORAGE. GROUND COVER IN THE PROJECT AREA CONSISTS OF GRASS, BRUSH, AND OCCASIONAL SMALL TREES.

SUBSURFACE EXPLORATION

THE SUBSURFACE EXPLORATION CONSISTED OF DRILLING NINE BORINGS FOR THE SR 823 BRIDGE AND RETAINING WALLS. SIX STRUCTURE BORINGS (TR-49 THROUGH TR-52, TR-50A, AND TR-49A) WERE DRILLED FOR PREVIOUSLY PROPOSED STRUCTURE CONFIGURATIONS. TWO ROADWAY BORINGS (B-1141 AND B-1142) WERE DRILLED IN THE VICINITY OF THE BRIDGE FOR THE PROPOSED ROADWAY. BORING B-54 WAS DRILLED NEAR THE FORWARD ABUTMENT LOCATION FOR THE CURRENTLY PROPOSED STRUCTURE CONFIGURATION. BORINGS TR-49 THROUGH TR-54 WERE DRILLED FROM JULY 7, 2004 TO MARCH 22, 2005. BORINGS B-1141 AND B-1142 WERE DRILLED FROM SEPTEMBER 21 TO OCTOBER 12, 2005. THE BORINGS WERE DRILLED WITH BOTH TRUCK AND ATV MOUNTED ROTARY DRILL RIGS, USING 3 1/4 -INCH I.D. HOLLOW STEM AUGERS TO ADVANCE THE HOLES THROUGH SOIL. DISTURBED SOIL SAMPLES WERE OBTAINED IN ACCORDANCE WITH THE STANDARD PENETRATION TEST (AASHTO T206) AT 1.5 TO 5.0-FOOT INTERVALS FOR THE FULL DEPTH OF THE SOIL PORTION OF THE BORINGS. UNDISTURBED SOIL SAMPLES WERE OBTAINED AT THE DEPTHS SHOWN ON THE LOGS AND IN THE PROFILE, IN ACCORDANCE WITH AASHTO T207. WHERE BEDROCK WAS ENCOUNTERED, THE BORINGS WERE ADVANCED AND THE ROCK WAS SAMPLED USING A TYPE NQ SERIES CORE BARREL, WATER METHOD.

EXPLORATION FINDINGS

TEST BORINGS DISCLOSED PREDOMINANTLEY STIFF TO VERY STIFF COHESIVE SOILS CONSISTING OF SANDY SILT (A-4A) TO SILTY CLAY (A-6B) WERE ENCOUNTERED TO DEPTHS RANGING FROM 13.5 TO 20.5 FEET BELOW THE GROUND SURFACE. BENEATH THE COHESIVE SOILS, LAYERS OF COHESIONLESS SOILS CONSISTING OF GRAVEL WITH SAND AND SILT (A-2-4) TO COARSE AND FINE SAND (A-3A) WERE ENCOUNTERED TO THE TOP OF BEDROCK AT DEPTHS RANGING FROM 21.0 TO 34.5 FEET BELOW THE GROUND SURFACE.

BEDROCK WAS CONFIRMED BY CORING IN ALL BORINGS. BORINGS B-1141, B-1142, TR-51 AND TR-52 WERE DRILLED FOR THE REAR ABUTMENT AND PIER 1 LOCATIONS. IN THESE BORINGS, BEDROCK WAS ENCOUNTERED AT DEPTHS RANGING FROM 25.5 TO 34.5 FEET BELOW THE GROUND SURFACE, OR FROM ELEVATION 519.0 TO 526.0. SOFT TO MEDIUM HARD BLACK SHALE (SUNBURY SHALE) WAS ENCOUNTERED AT THE TOP OF ROCK. ALSO IN THESE BORINGS, HARD TO VERY HARD SANDSTONE WAS ENCOUNTERED BELOW THE SHALE LAYERS, AT DEPTHS RANGING FROM 28.5 TO 45.1 FEET BELOW THE GROUND SURFACE, OR FROM ELEVATION 513.6 TO 517.6. BORINGS TR-49 THROUGH TR-50, TR-49A, TR-50A, AND B-54 WERE DRILLED NEAR PIER 2 AND THE FORWARD ABUTMENT OF THE PROPOSED STRUCTURE. THESE BORINGS ENCOUNTERED HARD TO VERY HARD SANDSTONE AT THE TOP OF ROCK AT DEPTHS RANGING FROM 21.0 TO 31.0 FEET BELOW THE GROUND SURFACE, OR FROM ELEVATION 507.7 TO 519.5. THE RECOVERY IN EACH CORE RUN VARIED BETWEEN 45 AND 100 PERCENT. THE ROCK QUALITY DESIGNATION (ROD) OF THE BEDROCK RANGED BETWEEN 0 AND 100 PERCENT WITH AN AVERAGE OF 59 PERCENT, INDICATING FAIR ROCK QUALITY.

SEEPAGE WAS OBSERVED IN ALL BORINGS. SEEPAGE WAS FIRST OBSERVED AT DEPTHS RANGING FROM 11.0 TO 28.0 FEET BELOW THE GROUND SURFACE. MEASURABLE WATER LEVELS WERE OBSERVED IN BORINGS B-1141, B-1142, B-54, AND TR-51 AT DEPTHS RANGING FROM 20.2 TO 31.0 FEET PRIOR TO ROCK CORING OPERATIONS. THE FINAL WATER LEVELS INCLUDED WATER THAT WAS USED FOR ROCK CORING AND CONSEQUENTLY MAY NOT BE REPRESENTATIVE OF ACTUAL GROUNDWATER CONDITIONS.

LEGEND

DESCRIPTION	ODOT CLASS	CLASSIFIED MECH.	CLASSIFIED VISUAL
Sandy Silt (A-4a)	A-1-a	1	4
Silt and Clay (A-6a)	A-1-b	3	6
Silty Clay (A-6b)	A-2-4	3	1
Clay (A-7-6)	A-2-6	3	6
Sandy Silt (A-4a)	A-3a	2	3
Silt and Clay (A-6a)	A-4a	3	14
Silty Clay (A-6b)	A-4b	2	1
Clay (A-7-6)	A-6a	3	23
Silty Clay (A-6b)	A-6b	2	11
Clay (A-7-6)	A-7-6	1	1
	TOTAL	23	70
Sandstone	VISUAL		
Shale	VISUAL		
Weathered Sandstone	VISUAL		
Weathered Shale	VISUAL		
Topsoil	VISUAL		

BORING LOCATION - PLAN VIEW

DRIVE SAMPLE AND/OR CORE BORING LOCATION PLOTTED TO VERTICAL SCALE ONLY

W — INDICATES FREE WATER ELEVATION

INDICATES STATIC WATER ELEVATION

INDICATES STATIC WATER ELEVATION (DRILLING WATER USED)

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

X/Y/Z
- X = NUMBER OF BLOWS FOR FIRST 6 INCHES
- Y = NUMBER OF BLOWS FOR SECOND 6 INCHES
- Z = NUMBER OF BLOWS FOR THIRD 6 INCHES

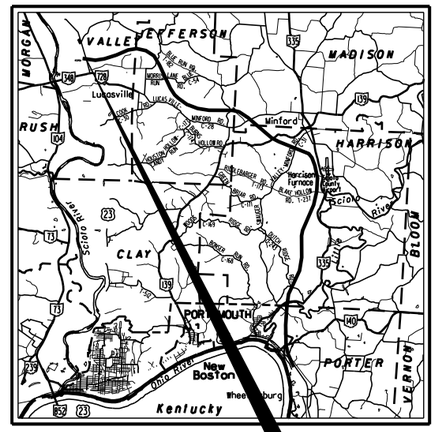
50 (n) INDICATES NUMBER OF BLOWS (50) TO DRIVE A SPLIT-BARREL SAMPLER A DEPTH OF (n) INCHES OTHER THAN THE NORMAL 6 INCH INCREMENT.

SPECIFICATIONS

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED NOVEMBER 1995.

AVAILABLE INFORMATION

ALL AVAILABLE SOIL AND BEDROCK INFORMATION THAT CAN BE CONVENIENTLY SHOWN ON THE SOIL PROFILE SHEETS HAS BEEN SO REPORTED. ADDITIONAL SUBSURFACE EXPLORATIONS 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 GEOTECHNICAL ENGINEERING AT 1600 WEST BROAD STREET OR THE OFFICE OF STRUCTURAL ENGINEERING AT 1980 WEST BROAD STREET.



LOCATION MAP

SCALE IN MILES

0 2 4 6 8

N

PARTICLE SIZE DEFINITIONS

12"	3"	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	

RECON. - AMJ AND SJR 06/04 to 06/06

DRILLING - DW 02/24/05, 06/21/06, 05/9-21/07

DRAWN - RLS & AMJ 8/09

REVIEWED - AEN 8/21/09

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

PID NO. 79977

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR & US 23

SCI-823-10.13

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NORFOLK SOUTHERN

℄ S.R. 823

B-1142

TR-52

TR-51

TR-50

TR-50A

B-54

TR-49A

TR-49

B-1141

RAMP C

NB U.S. 23

SB U.S. 23

895

896

897

898

899

900

3895

3896

4924

4923

HORIZONTAL SCALE IN FEET

0 10 20 40

CALCULATED

CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR & US 23

SCI-823-10.13

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PROPOSED PROFILE

EXISTING SURFACE

B-1141
34.0' RT.
TOPSOIL-2"
5/5/6
4/4/5
2/6/5
4/8/3
15/7/3
4/5/8
3/5/5
5/5/6
3/4/3 W 18
2/1/1
1/1/15
10/15/15 20 TR

B-1142
33.3' LT.
TOPSOIL-4"
5/7/7
3/5/5
2/1/5
11/5/6
5/5/4
5/5/8
5/7/6 18
5/4/4
4/5/5 16
5/4/4
5/5/5
18/50(10) 18 W
5/4/5 26
3/2/24 TR 25
50(4)
50(2)

TR-51
4.3.' RT.
1/2/1
1/2/3
2/3/6
3/3/4
1/1/1 19
W/O/H 28 W
W/O/H
16/7/8
7/14/11 15
1/3/5 27
20/50(3) TR

TR-50A
34.1' LT.
TOPSOIL-1"
3/2/3
2/1/2
2/3/3
1/2/3 23
1/2/3 18
WOH/2/3
1/1/2
WOH/1/3 21 W
2/5/11 12
2/7/50 TR
25/37/50(4)

TR-49
21.2' RT.
AGGREGATE-3"
8/9/9
3/3/4
3/6/5
1/1/1
1/1/2
1/1/2
1/1/1
6/6/10 W
4/9/21
13/18/18
5/9/17 TR
4/27/50(3)

TR-49A
10.9' RT
4/5/7
3/4/4
3/5/5
2/2/3
3/4/5 17
WOH/2/2 23
1/2/3 27
W/O/H W
5/9/18 30
2/2/6
6/5/8
10/43/50(4) TR
50(2)

TR-52
24.8' LT.
TOPSOIL-1"
2/2/3
3/5/7
10/7/4
1/2/3
2/2/3 8
2/3/3
3/5/6
2/2/2
2/4/4 14
WOH/WOH/1 W
W/O/H
13/15/5
22/50(5) TR

TR-50
23.7' LT.
TOPSOIL-3"
3/3/4
1/2/3
2/3/3
2/3/3
2/3/4
W/O/H W
6/7/31 W
10/15/32 TR

TR-54
16.7' LT.
TOPSOIL-3"
2/2/2
2/5/6 22
3/5/6 20
1/3/2
1/2/3 18
7/35/50(4) TR

600 580 560 540 520 500 480 460 440 420

895 896 897 898 899

CALCULATED | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR & US 23

SCI-823-10.13

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1141 | Location: Sta. 895+53.5, 34.0 ft. RT of SR 823 CL | Date Drilled: 10/12/05

WATER OBSERVATIONS: Water seepage at: 21.0'-30.0'; Water level at completion: 31.0' (prior to coring), 7.7' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	556.0						Topsoil - 2"						
		5 5 6	18	1			FILL: Loose to medium dense gray SANDY SILT (A-4a), trace clay, trace gravel; contains shale fragments; damp to moist.						
		4 4 5	18	2									
5		2 6 5	6	3									
		4 8 3	8	4									
10		15 7 3	5	5			@ 11.0', contains wood fragments.						
		4 5 8	3	6									
15.5	540.7						Loose to medium dense brown and gray GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); moist to wet. @ 16.0'-20.0', contains wood fragments.						
		3 5 5	0	7									
		5 5 6	3	8									
20		3 4 3	14	9			@ 21.0', brown.	57	15	–	7	8	13
		2 1 1	18	10			@ 23.5'-25.0', very loose.						
25		1 1 15	5	11									
28.0	528.2						Stiff brown SANDY SILT (A-4a), some clay, little gravel; wet.						
30	526.2	10 15 15	8	12		1.5		11	8	–	27	32	22
33.0	523.2						Medium hard to hard black SHALE; moderately to highly weathered, carbonaceous, thinly laminated to laminated, highly fractured. @ 33.3', 33.4', 33.5', 33.9', 34.7'-34.8', 35.1', 35.3', 35.4', 36.0', 37.2', 37.4'- 37.6', 38.0', 38.3', 38.8', 39.2', 39.3', 39.9', 40.1', 40.8', 41.1', low angle fractures.						
35		Core 120"	Rec 120"	RQD 78%	R1								
40													
42.6	513.6												
43.0	513.2						Hard gray SANDSTONE; fine grained, slightly weathered, micaceous, medium bedded, unfractured. Bottom of Boring - 43.0'						
45													
50													
55													
60													

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢ LL; Blows per foot - ○; 10 20 30 40

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring B-1142 | Location: Sta. 894+83.0, 33.3 ft. LT of SR 823 CL | Date Drilled: 9/21/05 to 9/22/05

WATER OBSERVATIONS: Water seepage at: 28.0'; Water level at completion: 23.3' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.3	560.1						Topsoil - 4"						
		5 7 7	5	1		4.0	FILL: Very stiff to hard gray SILTY CLAY (A-6b), trace gravel; damp.						
		3 5 5	6	2		4.25							
5		2 1 5	5	3		2.5	@ 6.0', moist.						
8.0	552.4						FILL: Stiff brown SILT AND CLAY (A-6a), little gravel, trace fine to coarse sand; moist.						
		11 5 6	6	4		1.0							
10		5 5 4	4	5		1.0	@ 11.0', brown and gray.						
13.0	547.4						FILL: Stiff to very stiff black SANDY SILT (A-4a), trace gravel; contains brick fragments and organic material; moist.						
		5 5 8	18	6		2.0							
15.5	544.9						Very stiff brown SILT (A-4b), some clay, trace fine to coarse sand, trace gravel; damp to moist.						
		5 7 6	18	7		3.5		0	3	–	6	62	29
		5 4 4	18	8		3.0							
20.5	539.9						Loose to medium dense brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); contains red sandstone fragments; moist.						
		4 5 5	8	9				30	26	–	16	11	17
23.0	537.4						Soft brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; wet.						
25		5 4 4	2	10		0.5							
25.5	534.9						Loose to medium dense brown COARSE AND FINE SAND (A-3a), "and" clay, little silt, little gravel; wet.						
		5 5 5	1	11									
29.0	531.4	18 50 10	12	12A 12B			Very dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; moist.	31	28	–	12	21	8
30.0	530.4						Loose to medium dense gray SANDY SILT (A-4a), little clay, trace gravel; wet.						
		5 4 5	18	13				0	1	–	37	47	15
34.5	525.9	3 2 24	18	14A 14B			Severely weathered black SHALE, carbonaceous.	1	1	–	42	44	12
35		50/4	4	15									
		50/2	2	16									
40													
43.5	516.9						Medium hard black SHALE; moderately to highly weathered, carbonaceous, medium bedded, moderately fractured. @ 43.6'-44.0', high angle fracture.						
45.1	515.3	Core 60"	Rec 60"	RQD 75%	R1		Very hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, medium bedded, slightly fractured to unfractured. @ 48.0'-48.5', multiple fractures. @ 48.0', moderate siltstone and sandstone laminae.						
48.5	511.9						Bottom of Boring - 48.5'						
50													
55													
60													

STANDARD PENETRATION (N): Natural Moisture Content, % - ●; PL ⊢ LL; Blows per foot - ○; 10 20 30 40; 60 →; 50+; 50+

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR & US 23

SCI-823-10.13

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-50 | Location: Sta. 897+47.1, 23.7 ft. LT of SR 823 CL | Date Drilled: 7/7/04

WATER OBSERVATIONS: Water seepage at: 13.5', 16.0'
Water level at completion: 14.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.3	540.2						Topsoil - 3"							
		3 3 4	16	1		4.5+	Very stiff to hard brown SILT AND CLAY (A-6a), little fine to coarse sand, trace gravel; damp to moist.							
		1 2 3	14	2		2.0								
5		2 3 3	13	3		3.25								
		2 3 3	16	4		2.5								
10		2 3 4	13	5		2.75								
		W O H	6	6		1.0	@ 13.5'-17.2', stiff, contains interbedded sand seams.							
15														
17.2	523.3	6 7 31	16	7a 7b		1.0 1.25								
		10 15 32	4	8			Severely weathered brown and gray SANDSTONE fragments.							
21.0	519.5						Soft to medium hard gray SANDSTONE; decomposed, argillaceous, broken.							
		Core 42"	Rec 19"	RQD 0%	R-1		@ 24.4'-24.5', dark gray carbonaceous shale.							
25.2	515.3						Hard gray SANDSTONE; very fine to fine grained, micaceous, argillaceous, massive, slightly to highly fractured.							
		Core 78"	Rec 70"	RQD 53%	R-2		@ 25.3'-25.7', 25.8'-25.9', 27.5'-27.8', 30.3'-30.3', high angle fractures.							
30							@ 26.1',28.3',29.6', thin clay seams.							
		Core 42"	Rec 42"	RQD 100%	R-3									
34.5	506.0						Bottom of Boring - 34.5'							
35														
40														
45														
50														
55														
60														

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-50A | Location: Sta. 898+09.3, 34.1 ft. LT of SR 823 CL | Date Drilled: 3/22/05

WATER OBSERVATIONS: Water seepage at: 18.0'-25.0'
Water level at completion: 18.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.1	539.2						Topsoil - 1"							
		3 2 3	10	1			FILL: Loose dark brown SANDY SILT (A-4a), trace gravel; contains roots; damp.							
3.0	536.3						Stiff brown SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; moist.							
		2 1 2	8	2		1.0								
5		2 3 3	13	3		2.0								
		1 2 3	16	4		1.5		1	4	–	6	56	33	
10.5	528.8						Stiff brown SILTY CLAY (A-6b), some gravel, some fine to coarse sand; moist.	32	20	–	12	18	18	
		1 2 3	18	5		1.25								
		WOH 2 3	18	6		1.5								
15														
		1 1 2	18	7		1.25								
18.0	521.3						Very loose brown GRAVEL WITH SAND (A-1-b), little to some clay; wet.	16	40	–	23	21		Non-Plastic
		WOH 1 3	16	8										
20							@ 21.0', medium dense.	42	24	–	20	14		Non-Plastic
		2 5 11	16	9										
24.5	514.8	2 7 50	18	10			Severely weathered brownish gray SANDSTONE.							57
25														
		25 37 50/4	10	11										87
27.5	511.8						Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, medium bedded, moderately fractured.							
30														
		Core 120"	Rec 117"	RQD 68%	R1		@ 28.1',-28.7', 29.0'-29.1', filled fractures.							
							@ 33.3', 34.3'-34.4', 36.2', 37.2', clay-filled fractures.							
37.5	501.8						Bottom of Boring - 37.5'							
40														
45														
50														
55														
60														

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR AND US 23

SCI-823-10.13

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-51 | Location: Sta. 896+74.9, 4.3 ft. RT of SR 823 CL | Date Drilled: 03/17/05

WATER OBSERVATIONS: Water seepage at: 13.0'-18.0'; Water level at completion: 21.0' (prior to coring), 13.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.1	544.4						Topsoil - 2"							
		1 2 1	7	1		2.0	Stiff dark brown SILT AND CLAY (A-6a), little fine to coarse sand, trace fine to coarse gravel; damp to moist.							
5														
5.5	539.0	1 2 3	13	2		1.0								
		2 3 6	8	3		3.5	Very stiff brown SILTY CLAY (A-6b), trace fine to coarse sand, trace fine to coarse gravel; damp.							
8.0	536.5													
10		3 3 4	10	4			Very loose to loose brown GRAVEL WITH SAND (A-1-b), little clay, trace silt; damp.							
		1 1 1	7	5			@ 11.0', moist.	43	28	–	11	7	11	Non-Plastic
13.0	531.5													
15		W O H	18	6			Very loose brown COARSE AND FINE SAND (A-3a), little gravel, trace clay; wet.	12	28	–	45	15		Non-Plastic
		W O H	18	7										
18.0	526.5													
20		18 7 8	18	8			Medium dense reddish brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; contains sandstone fragments; damp to moist.							
		7 14 11	14	9				19	19	–	30	24	8	Non-Plastic
23.0	521.5													
25		1 3 5	11	10		1.5	Stiff gray CLAY (A-7-6), trace fine sand; moist.	0	0	–	1	43	56	
25.5	519.0						Severely weathered black SHALE carbonaceous.							
		20 50/3	8	11										50+
27.5	517.0						Medium hard black SHALE; moderately weathered, pyritic, laminated, broken. @ 28.1'-28.2', gray.							
30		Core 120"	Rec 116"	RQD 71%	R1		Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, moderately fractured. @ 28.7'-28.8', pyritic. @ 31.8', very thin clay seam. @ 33.1'-33.3', clay and gravel infilled fracture. @ 34.5', very thin clay infilled fracture. @ 35.5'-36.2', broken zone with clay infilling. @ 36.6'-36.8', highly weathered.							
35														
37.5	507.0						Bottom of Boring - 37.5'							
40														
45														
50														
55														
60														

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-52 | Location: Sta. 895+21.1, 24.8 ft. LT of SR 823 CL | Date Drilled: 03/15/05

WATER OBSERVATIONS: Water seepage at: 23.0'-30.0'; Water level at completion: 27.0' (prior to coring), 6.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.1	557.9						Topsoil - 1"							
		2 2 3	4	1		4.5+	Hard gray SILTY CLAY (A-6b), trace to little fine to coarse sand; contains shale fragments; damp.							
5														
		3 5 7	10	2		4.5+								
		10 7 4	9	3		4.5+								
		1 2 3	8	4		4.5+								
10														
10.5	547.5	2 2 3	7	5			Loose gray GRAVEL WITH SAND AND SILT (A-2-4), trace to little clay; damp.	66	4	–	2	18	10	Non-Plastic
13.0	545.0													
15		2 3 3	16	6		3.75	Very stiff gray SILT AND CLAY (A-6a), trace fine to coarse sand, trace fine to coarse gravel; moist.							
		3 5 6	16	7		4.0	@ 16.0', brown.							
20		2 2 2	18	8		1.0	@ 18.5'-20.0', stiff, moist to wet.							
20.5	537.5													
		2 4 4	12	9			Loose brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); damp.	35	20	–	17	14	14	
23.0	535.0													
25		WOH WOH 1	18	10		<0.25	Very soft brown CLAY (A-7-6), trace fine sand; wet.							
25.5	532.5													
		W O H	18	11			Very loose brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); wet.							
		13 15 5	17	12			@ 28.5-30.0', medium dense.							
30														
32.0	526.0						Severely weathered black SHALE.							
		22 50/5	10	13										50+
35.0	523.0						Medium hard black SHALE; moderately weathered, carbonaceous, laminated, broken to moderately fractured.							
40		Core 120"	Rec 120"	RQD 35%	R1									
40.4	517.6						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded, slightly fractured.							
45.0	513.0						Bottom of Boring - 45.0'							
50														
55														
60														

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR AND US 23

SCI-823-10.13

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-49 | Location: Sta. 898+89.3, 21.2 ft RT of SR 823 CL | Date Drilled: 7/7/04

WATER OBSERVATIONS: Water seepage at: 19.0'
Water level at completion: 22.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.3	539.5						Aggregate - 3"							
	539.8	8 9 9	15	1		4.5+	Stiff to very stiff brown SILT AND CLAY (A-6a), little fine to coarse sand, little to some gravel; damp. @ 0.3'-2.5', hard. @ 3.5'-7.5', contains rock fragments.							
5		3 3 4	16	2		1.75								
		3 6 5	15	3		3.0								
10		1 1 1	18	4		1.75								
		1 1 2	15	5		2.25								
13.5	526.3													
		1 1 2	16	6			Very loose brown SANDY SILT (A-4a), some clay; moist.							
16.0	523.8													
		1 1 1	18	7		0.5	Soft to medium stiff brown SILT AND CLAY (A-6a), little fine to coarse sand; moist.							
18.5	521.3													
20		6 6 10	13	8			Medium dense to dense brown GRAVEL WITH SAND (A-1-b), some fine to coarse sand, little to some silty clay; wet.							
		4 9 21	14	9										
25		13 18 18	17	10										
		5 9 7	13	11										
28.5	511.3													
30		4 27 50/3	11	12			Severely weathered gray SANDSTONE fragments.							77
32.0	507.8						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured. @ 35.4'-35.9', probable core loss. @ 37.6'-37.8',38.5',38.9'- 39.2',39.4'-39.5',40.4'-40.7', decomposed argillaceous bands with fractures.							
35		Core 120"	Rec 110"	RQD 70%	R-1									
40														
42.0	497.8						Bottom of Boring - 42.0'							
45														
50														
55														
60														

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-49A | Location: Sta. 899+54.2, 10.9 ft. RT of SR 823 CL | Date Drilled: 3/21/05

WATER OBSERVATIONS: Water seepage at: 18.0'-28.0'
Water level at completion: 14.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	538.1						No Topsoil							
		4 5 7	17	1		4.5+	Hard brown SANDY SILT (A-4a), some clay, some gravel; contains sandstone fragments; damp.							
5		3 4 4	16	2		4.0								
		3 5 5	16	3		1.5	@ 6.0', stiff, moist.							
10		2 2 3	17	4		1.0								
		3 4 5	18	5		1.5	@ 11.0', little gravel.	23	16	–	9	30	22	
13.0	525.1													
15		WOH 2 2	18	6		<0.25	Very soft brown SILT AND CLAY (A-6a), trace to little fine to coarse sand; wet.	0	5	–	16	54	25	
		1 2 3	18	7		<0.25		0	0	–	1	67	32	
18.0	520.1													
20		W O H 3		8			Loose to medium dense brown GRAVEL (A-1-a), some to "and" fine to coarse sand, little clay; wet. @ 18.5'-20.0', very loose.							
		5 9 18	12	9				62	16	–	8	14		Non-Plastic
25		2 2 6	18	10										
		6 5 8	13	11										
30	508.1	10 43 50/4	16	12			@ 28.5'-30.0', very dense. Severely weathered gray SANDSTONE							50+
35	503.1	50/2	1	13			Medium hard to hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, argillaceous, micaceous, massive, highly fractured to broken.							
		Core 120"	Rec 84"	RQD 13%	R1									
45	493.1						Bottom of Boring - 45.0'							
50														
55														
60														

GRADATION

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢ LL
Blows per foot - ○
10 20 30 40

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR AND US 23

SCI-823-10.13

Client: TranSystems, Inc. | Project: SCI-823-0.00 | Job No. 0121-3070.03

LOG OF: Boring TR-54 | Location: Sta. 3891+87.0, 16.7 ft. LT of US 23 Ramp C BL | Date Drilled: 3/16/05

WATER OBSERVATIONS:
Water seepage at: None
Water level at completion: None (prior to coring)
11.0' (includes drilling water)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetrometer (tsf)	DESCRIPTION	GRADATION % Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay
0.2	566.7						Topsoil - 3"						
	566.9	2 2 2	14	1		1.0	Stiff to very stiff brown SILTY CLAY (A-6b), trace fine sand; damp. @ 0.0'-2.5', contains roots.						
5		2 5 6	17	2		3.5		0	0	–	4	61	35
5.5	561.4						Very stiff brown SILT (A-4b), some clay, little fine sand; damp.						
		3 5 6	18	3		2.25		0	0	–	12	67	21
8.0	558.9						Loose dark brown COARSE AND FINE SAND (A-3a), trace to little clay, trace gravel; damp.						
10		1 3 2	11	4									
		1 2 3	13	5				7	38	–	37	18	
13.6	553.3	7 35 50/4	14	6			Severely weathered gray SHALE.						
15.0	551.9						Medium hard gray SHALE; arenaceous, decomposed to highly weathered, laminated, moderately fractured. @ 15.0'-17.3', broken with high angles fractures and thin clay seams. @ 18.9'-19.0', 20.6'-20.9', high angle fractures.						
20		Core 120"	Rec 120"	RQD 83%	R-1								
22.6	544.3						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, medium bedded, slightly fractured.						
23.5	543.4						Hard gray SHALE; highly weathered, arenaceous, very thinly bedded, slightly fractured.						
25.0	541.9						Bottom of Boring - 25.0'						
30													

STANDARD PENETRATION (N)
Natural Moisture Content, % - ●
PL ⊢——⊣ LL
Blows per foot - ○
10 20 30 40
Non-Plastic
50+

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1601
SR823 OVER NORFOLK SOUTHERN RR AND US 23

SCI-823-10.13

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