PROJECT DESCRIPTION

THE PROJECT CONSISTS OF PLACING A STRUCTURE FOR PROPOSED RAMP C OVER THE NORFOLK SOUTHERN RAILROAD. THE STRUCTURE AS PLANNED, IS A THREE-SPAN STRUCTURE, WHICH UTILIZES MSE RETAINING WALLS TO HOLD BACK THE ROADWAY EMBANKMENT AND CONTAIN THE FORWARD ABUTMENT. IT IS UNDERSTOOD THAT A SPILL THROUGH SLOPE IS CURRENTLY PROPOSED AT THE REAR ABUTMENT LOCATION.

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 A TOTAL OF ELEVEN BORINGS FOR THE RAMP C BRIDGE AND RETAINING WALLS. BORING B-1117A WAS DRILLED ON SEPTEMBER 19, 2005. ALL OTHER BORINGS CONSIDERED FOR THIS STRUCTURE WERE DRILLED FROM MARCH 15 TO OCTOBER 18, 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

BORINGS FOR THE PROPOSED BRIDGE GENERALLY ENCOUNTERED 1 TO 8 INCHES OF TOPSOIL AT THE GROUND SURFACE. BELOW THE TOPSOIL, BORINGS GENERALLY ENCOUNTERED COHESIVE SOILS CONSISTING OF SILT (A-4B) TO CLAY (A-7-6) TO DEPTHS RANGING FROM 8.0 TO 20.5 FEET BELOW THE GROUND SURFACE. BELOW THE COHESIVE SOILS, LAYERS OF COHESIONLESS SOILS CONSISTING OF GRAVEL WITH SAND (A-1-B) TO COARSE AND FINE SAND (A-3A) WERE GENERALLY ENCOUNTERED TO DEPTHS RANGING FROM 20.5 TO 33.0 FEET BELOW THE GROUND SURFACE, WHERE THE UNDERLYING BEDROCK WAS ENCOUNTERED.

BEDROCK WAS CONFIRMED BY CORING IN ALL BORINGS EXCEPT BORINGS B-1117A AND B-1122A. BORINGS B-1117 AND B-1118, DRILLED FOR THE REAR ABUTMENT AND PIER 1, RESPECTIVELY, ENCOUNTERED SOFT TO MEDIUM HARD BLACK SHALE (SUNBURY SHALE) AT THE TOP OF ROCK. IN THESE BORINGS, BEDROCK WAS GENERALLY ENCOUNTERED AT DEPTHS RANGING FROM 20.5 TO 33.0 FEET BELOW THE GROUND SURFACE. IN THESE BORINGS, HARD TO VERY HARD SANDSTONE WAS ENCOUNTERED BELOW THE SHALE LAYERS, AT AN APPROXIMATE ELEVATION OF 515. BORINGS B-1119 AND B-1120, DRILLED FOR THE PIER 2 AND FORWARD ABUTMENT LOCATIONS, RESPECTIVELY, GENERALLY ENCOUNTERED HARD TO VERY HARD GRAY SANDSTONE AT THE TOP OF ROCK. IN THESE BORINGS, BEDROCK WAS GENERALLY ENCOUNTERED AT DEPTHS RANGING FROM 25.0 TO 26.0 FEET BELOW THE GROUND SURFACE. THE RECOVERY IN EACH CORE RUN VARIED BETWEEN 90 AND 100 PERCENT. THE ROCK QUALITY DESIGNATION (ROD) OF THE BEDROCK RANGED BETWEEN 17 AND 97 PERCENT WITH AN AVERAGE OF 60 PERCENT, INDICATING FAIR QUALITY ROCK.

SEEPAGE WAS OBSERVED IN ALL OF THE BORINGS. SEEPAGE WAS FIRST OBSERVED AT DEPTHS RANGING FROM 10.0 TO 26.0 FEET BELOW THE GROUND SURFACE. MEASURABLE WATER LEVELS WERE OBSERVED IN ALL BORINGS EXCEPT TR-48 PRIOR TO ROCK CORING AT DEPTHS RANGING FROM 11.0 TO 28.1 FEET BELOW THE GROUND SURFACE.

LEGEND

DESCRIPTION	ODOT CLASS	CLASSIFIED MECH./VISUAL	
Gravel with Sand	A-1-b	8	17
Gravel with Sand and Silt	A-2-4	7	9
Gravel with Sand, Silt, and Clay	A-2-6	3	4
Coarse and Fine Sand	A-3a	4	8
Sandy Silt	A-4a	3	5
Silt	A-4b	2	3
Silt and Clay	A-6a	5	7
Silty Clay	A-6b	2	8
Clay	A-7-6	5	5
	TOTAL	39	66
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

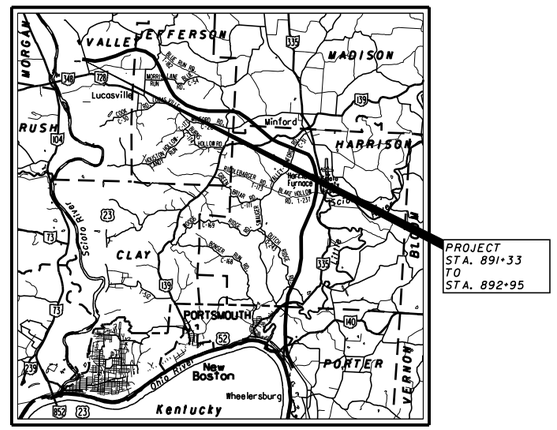
INDICATES STATIC WATER ELEVATION

TR —— TOP OF ROCK

WATER CONTENT NEARLY EQUAL TO OR GREATER THAN LIQUID LIMIT

X/Y/Z — FIGURES BESIDE THE BORING IN PROFILE INDICATE THE NUMBER OF BLOWS FOR STANDARD PENETRATION TEST
X = NUMBER OF BLOWS FOR FIRST 6 INCHES
Y = NUMBER OF BLOWS FOR SECOND 6 INCHES
Z = NUMBER OF BLOWS FOR THIRD 6 INCHES

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.



LOCATION MAP

LATITUDE: N 38°50'25" LONGITUDE: W 82°50'50"

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	

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.

RECON. - AMJ & SJR 09/05 to 09/07

DRILLING - DW 08/19 TO 08/19/04 & 06/13 TO 06/14/06

DRAWN - RLS & AMJ 3/09 TO 4/09

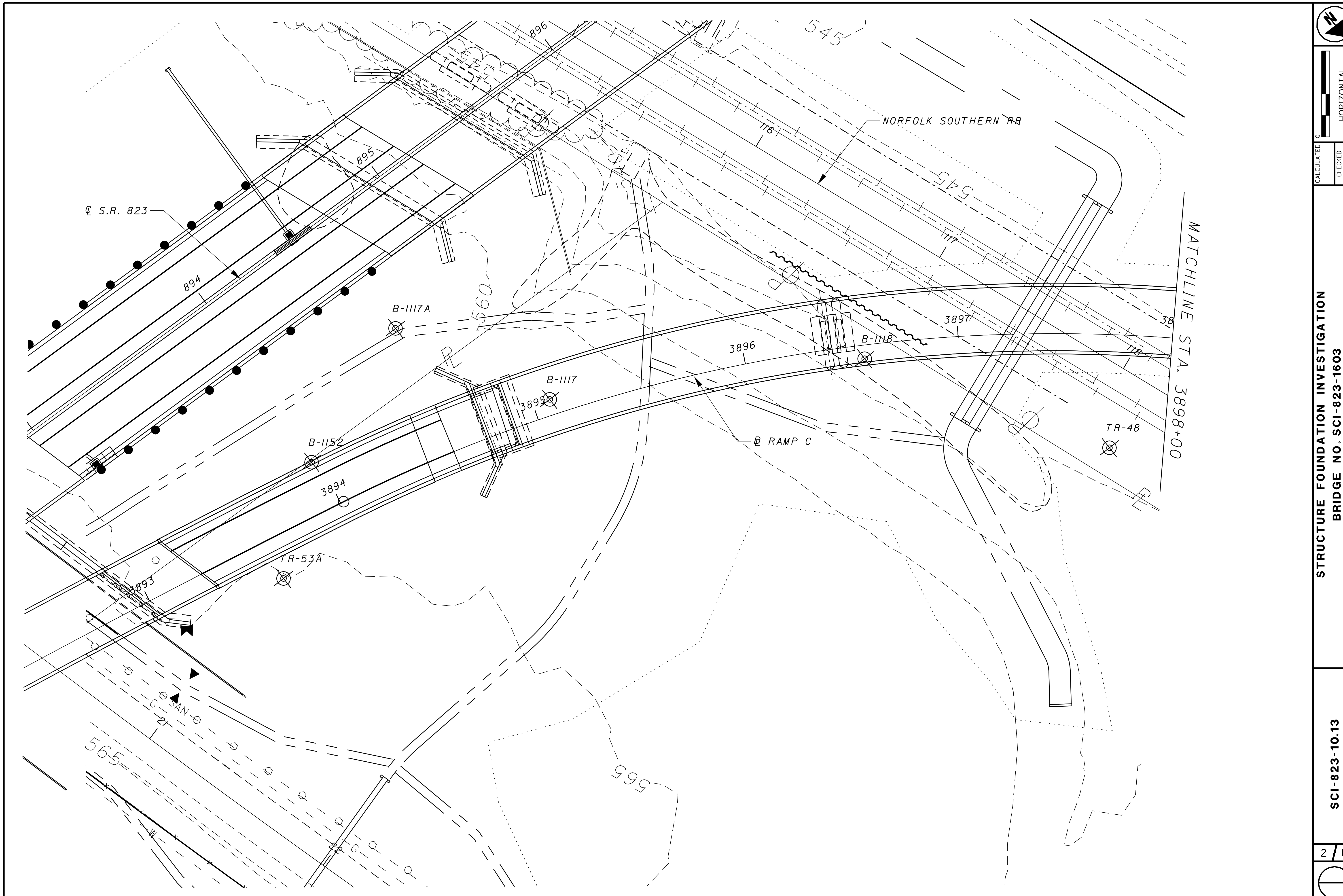
REVIEWED - AEN 4/20/09

DLZ
6121 HUNTLEY ROAD • COLUMBUS, OHIO 43229

PID NO. 79977

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-16.03
RAMP C OVER NORFOLK SOUTHERN RR

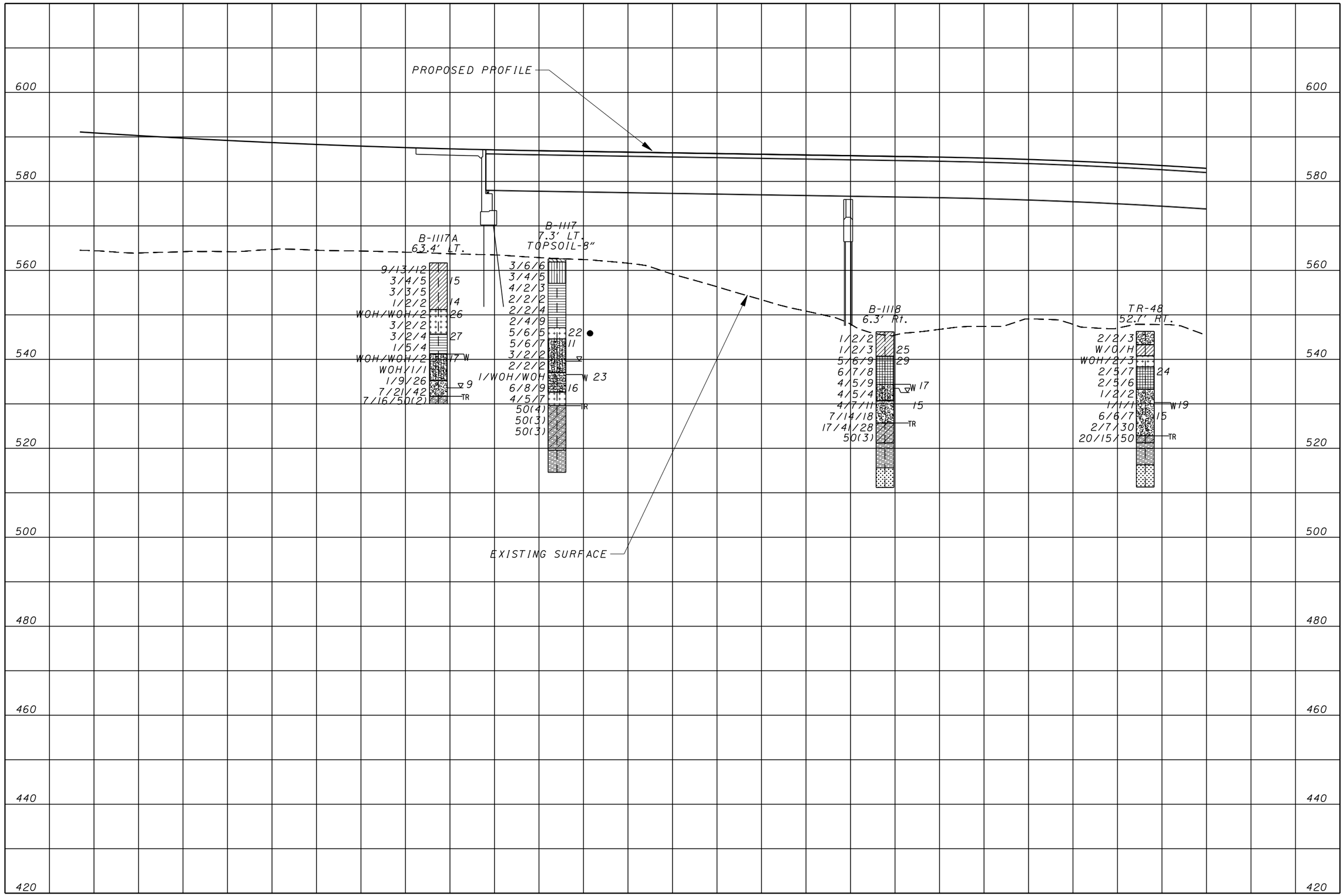
SCI-823-10.13



CALCULATED
CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

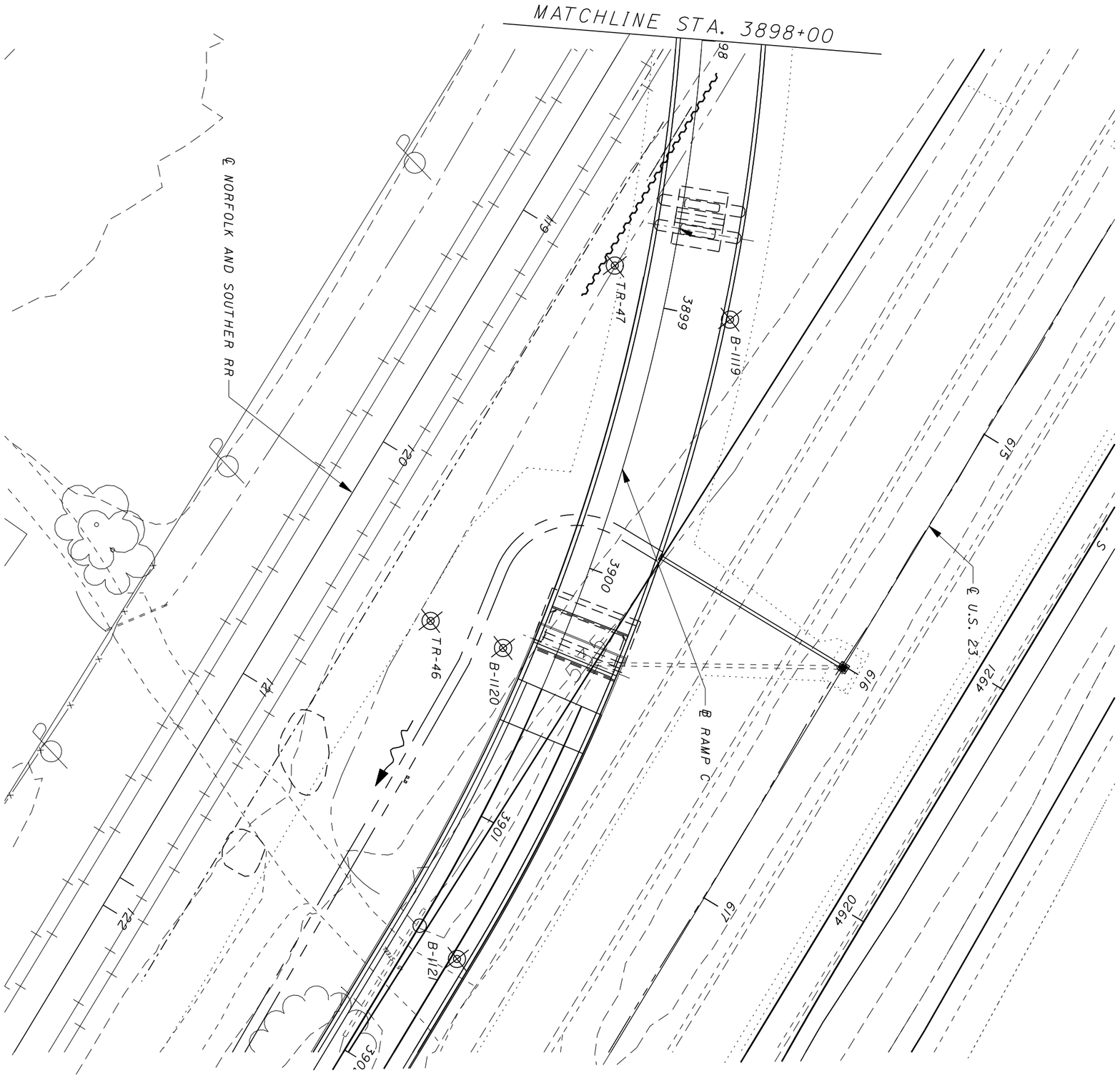
SCI-823-10.13



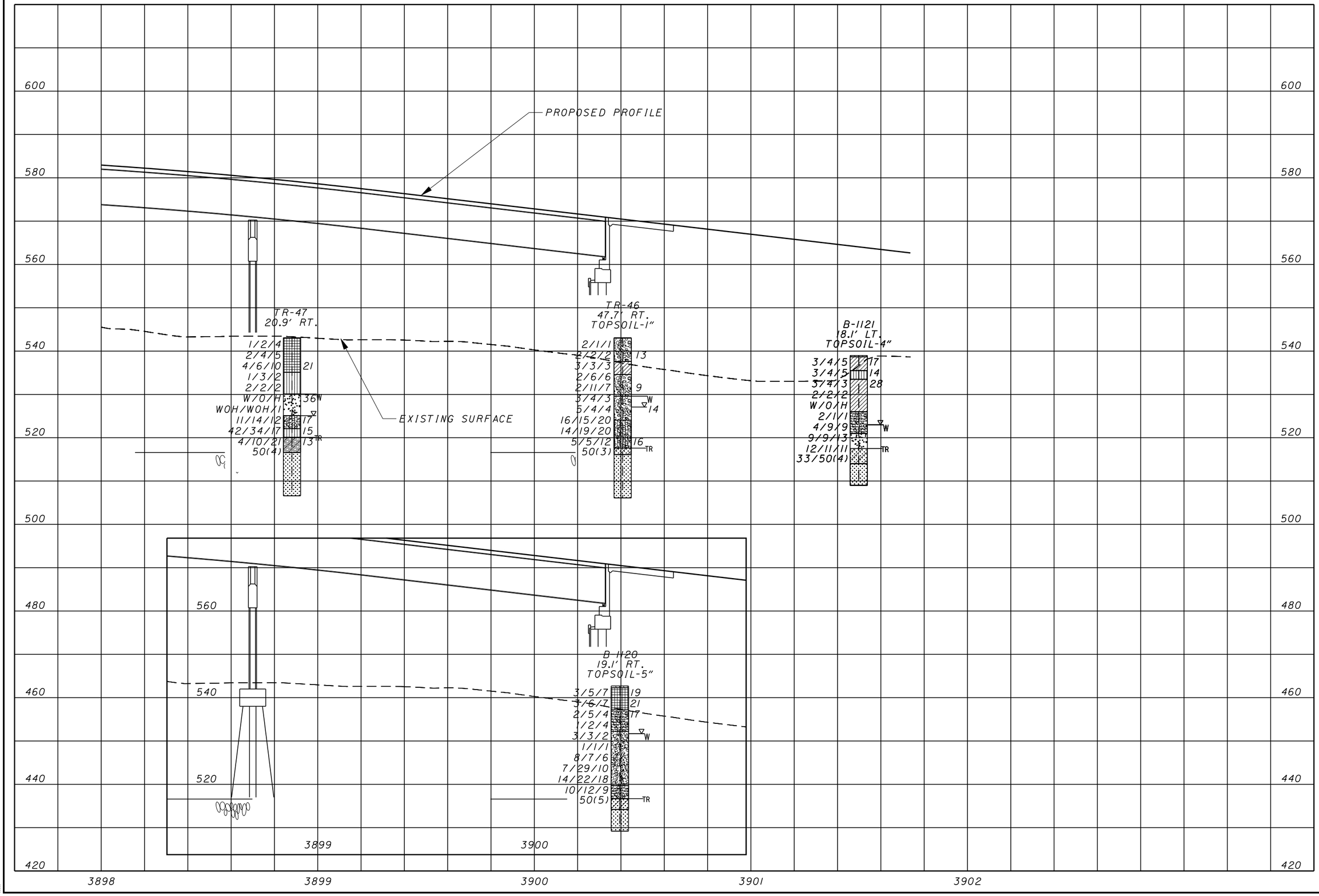
STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

CALCULATED | CHECKED

SCI-823.10.13



4/11	SCI-823-10.13	STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO. SCI-823-1603 RAMP C OVER NORFOLK SOUTHERN RR	CALCULATED CHECKED	0 HORIZONTAL SCALE IN FEET



CALCULATED | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

SCI-823-10.13

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

LOG OF: Boring TR-53A | Location: Sta. 3893+60.3, 19.3 ft. RT of US 23 Ramp C BL | Date Drilled: 3/15/05

WATER OBSERVATIONS: Water seepage at: 18.5'
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	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0	565.3													Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0.6	564.7	5 5 4		1		–	Topsoil - 7" Stiff gray SILTY CLAY (A-6b), trace gravel; contains shale fragments; damp.							
3.0	562.3	3 4 4	11	2		4.5+	Hard brown SANDY SILT (A-4a), some gravel, little clay; damp.	28	16	–	15	24	17	Non-Plastic
5.5	559.8	5 3 3	12	3			Loose brown COARSE AND FINE SAND (A-3a), some gravel, some silty clay; dry to damp.	21	20	–	36	23		Non-Plastic
		3 3 5	13	4										
		4 4 5	12	5										
15		4 7 9	10	6			@ 13.5'-15.0', medium dense.							
		5 3 2	8	7										
18.0	547.3													
20		1 2 1	8	8			Very loose dark brown GRAVEL WITH SAND (A-1-b), trace clay; wet.							
20.5	544.8	50/4	4	9			Severely weathered gray SHALE.							50+
22.5	542.8						Medium hard gray SHALE; moderately weathered, thinly laminated, arenaceous, slightly fractured, contains ferric sandstone bands, fissile after desiccation. @ 22.5'-28.0', highly fractured. @ 28.8'-28.9', high angle fracture. @ 23.5',27.8',31.3', clay seams. @ 29.2'-30.0', very fine sandstone.							
25		Core 120"	Rec 120"	RQD 78%	R-1									
30														
32.5	532.8						Bottom of Boring - 32.5'							
35														
40														
45														
50														
55														
60														

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

LOG OF: Boring B-1117 | Location: Sta. 3895+08.1, 7.3 ft. LT of US 23 Ramp C BL | Date Drilled: 9/19/05 to 9/20/05

WATER OBSERVATIONS: Water seepage at: 26.0'
Water level at completion: 23.0' (prior to coring) 20.0' (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	562.6													Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0.7	561.9	3 6 6		1			Topsoil = 8" POSSIBLE FILL: Loose to medium dense brown and gray SANDY SILT (A-4a), little coarse gravel, trace clay; damp. @ 0.7'-2.5', contains roots.							
		3 4 5	6	2										
5.5	557.1	4 2 3	3	3			POSSIBLE FILL: Medium stiff gray SILTY CLAY (A-6b), little gravel; contains organic material and sandstone fragments; moist.							
		2 2 2	2	4										
10		2 2 4	4	5										
		2 4 9	5	6										
15.5	547.1	5 6 5	12	7		3.0	Very stiff brown SILT (A-4b), little clay, little fine to coarse sand; contains coarse sand seams; wet.	0	2	–	13	70	15	
18.0	544.6	5 6 7	12	8			Loose to medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; moist to wet.	53	13	–	9	15	10	
20		3 2 2	8	9										
		2 2 2	12	10										
25.5	537.1	1 WOH WOH	12	11			Very loose brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); wet.	32	33	–	9	17	9	
		6 8 9	6	12			@ 28.5'-30.0', medium dense.	53	12	–	9	15	11	
30.0	532.6	4 5 7	6	13		0.5	Medium stiff gray SILT (A-4b), little fine to coarse sand, trace to little clay; wet.							
33.0	529.6	50/4	4	14			Severely weathered black SHALE, carbonaceous.							50+
35		50/3	3	15										50+
		50/3	2	16										50+
43.0	519.6	Core 60"	Rec 60"	RQD 28%	R1		Soft black SHALE; moderately weathered, carbonaceous, laminated, moderately fractured. @ 43.0'-44.0', broken zone. @ 44.9'-45.0', decomposed.							
48.0	514.6						Bottom of Boring - 48.0'							
50														
55														
60														

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

SCI-823-10.13

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

LOG OF: Boring B-1117A | Location: Sta. 3894+54.8, 63.4 ft. LT of US 23 Ramp C BL | Date Drilled: 08/02/07

WATER OBSERVATIONS: Water seepage at: 20.5'-30.5'
Water level at completion: 28.1' (inside hollowstem augers)

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	561.7	9 13 12	13	1		4.5+	POSSIBLE FILL: Hard brown and gray SILT AND CLAY (A-6a), little fine to coarse sand, trace to little gravel; damp.							
		3 4 5	11	2		4.0		10	9	–	5	42	34	
5		3 3 5	8	3		4.0								
							@ 8.0', medium stiff to stiff, some gravel.							
		1 2 2	2	4	ST1	1.0		23	11	–	6	30	30	
10														
10.5	551.2				ST2		POSSIBLE FILL: Medium stiff to stiff brownish gray SILT (A-4b), some clay, little fine to coarse sand, trace gravel; trace organic material; moist. @ 13.0', dark gray.							
		WOH WOH 2	14	5		1.0		1	5	–	6	57	31	
		3 2 2	10	6	ST3	1.0								
15														
16.0	545.7	3 2 4	16	7		1.75	Stiff brown SILTY CLAY (A-6b), trace fine to coarse sand; moist.	0	1	–	3	63	33	
		1 5 4	16	8		1.50	@ 19.0', trace to little gravel.							
20														
20.5	541.2	WOH WOH 2	14	9			Very loose brown GRAVEL WITH SAND AND SILT (A-2-4), some silty clay; wet.	32	28	–	8	18	14	Non-Plastic
		WOH 1 1	0	10										
25														
26.5	535.2	1 9 26	18	11A 11B			Dense to very dense brown and gray GRAVEL WITH SAND (A-1-b), little silty clay; wet.	51	16	–	14	19		Non-Plastic
		7 21 42	14	12										83
30.0	531.7						Severely weathered black SHALE.							50+
		7 16 50/2	12	13										
31.7	530.0						Bottom of Boring - 31.7'							
35														
40														
45														
50														
55														
60														

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

LOG OF: Boring B-1118 | Location: Sta. 3896+55.5, 6.3 ft. RT of US 23 Ramp C BL | Date Drilled: 10/18/05

WATER OBSERVATIONS: Water seepage at: 11.8'-20.5'
Water level at completion: 12.7' (prior to coring)
15.6' (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	546.2	1 2 2	18	1		0.75	No topsoil Medium stiff to stiff brown SILT AND CLAY (A-6a), trace fine to coarse sand, trace gravel; moist.							
		1 2 3	18	2		1.5		1	2	–	5	62	30	
5														
5.5	540.7	5 6 9	18	3		2.5	Very stiff brown CLAY (A-7-6), some silt, trace fine sand; moist.	0	0	–	2	31	67	53
		6 7 8	18	4		2.0								
10							@ 11.0'-11.8', very soft to soft.							
11.8	534.4	4 5 9	18	5A 5B		0.25	Loose to medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; wet.	41	16	–	9	24	10	
		4 5 4	3	6										
15														
15.5	530.7	4 7 11	13	7			Medium dense to dense brown GRAVEL WITH SAND (A-1-b), little silt, trace clay; wet.	55	12	–	10	18	5	
		7 14 18	13	8										
20														
20.5	525.7	17 41 28	10	9			Severely weathered black SHALE.							89
		50/3	3	10										50+
25.0	521.2						Medium hard black SHALE; moderately weathered, carbonaceous, laminated, slightly to moderately fractured.							
		Core 120"	Rec 120"	RQD 78%	R1		@ 28.9'-29.1', broken zone.							
30														
30.6	515.6						Hard gray SANDSTONE; very fine to fine grained, slightly to moderately weathered, micaceous, thickly bedded, slightly fractured. @ 30.8', 33.6', 33.7', 34.8', low angle clay filled fractures. @ 30.8'-33.8', calcareous.							
35.0	511.2						Bottom of Boring - 35.0'							
40														
45														
50														
55														
60														

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

SCI-823-10.13

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

LOG OF: Boring TR-47 | Location: Sta. 3898+88.1, 20.9 ft. RT of US 23 Ramp C BL | Date Drilled: 03/17/05

WATER OBSERVATIONS:
Water seepage at: 13.0'-18.0'
Water level at completion: 18.0' (prior to coring)
9.0' (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	543.0						Topsoil - 1"							
	543.1	1 2 4	10	1		1.5	Stiff to very stiff brown and gray CLAY (A-7-6), trace fine sand; damp to moist. @ 1.0'-2.5', slightly organic.							
		2 4 5	13	2		2.5								
5		4 6 10	15	3		4.5	@ 6.0'-7.5', hard.	0	0	–	2	48	50	
8.0	535.1						Medium stiff brown SANDY SILT (A-4a), trace gravel, trace clay; moist to wet.							
		1 3 2	10	4		0.5								
10		2 2 2	7	5		–								
13.0	530.1						Very loose brown COARSE AND FINE SAND (A-3a), little silty clay; wet.							
		W O H	18	6				0	2	–	83	15		Non-Plastic
15		WOH WOH 1	18	7										
18.0	525.1						Stiff brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; moist.							
		11 14 12	10	8		1.5		30	11	–	24	22	13	
20														
21.0	522.1	42 34 17	12	9		–	Very stiff to hard dark gray SANDY SILT (A-4a), little clay, little gravel; damp to moist.	15	9	–	35	26	15	
23.0	520.1						Severely weathered black SHALE, carbonaceous.							
		4 10 21	11	10				29	23	–	31	12	5	51 → Non-Plastic
25														
26.5	516.6	50/4	4	11			Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, massive, slightly fractured. @ 26.7'-28.4', healed vertical fracture. @ 30.0'-30.2', healed vertical fracture. @ 30.2'-32.4', 34.7'-35.4', high angle bedding. @ 31.8'-32.4, broken zone with thin clay seam. @ 33.1'-33.6', low angle healed fracture. @ 33.1'-33.6', high angle healed fracture. @ 33.7', highly weathered fracture. @ 33.7'-34.0', very argillaceous.							50+
30		Core 120"	Rec 120"	RQD 74%	R1									
35														
36.5	506.6						Bottom of Boring - 36.5'							
40														
45														
50														
55														
60														

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

LOG OF: Boring TR-48 | Location: Sta. 3897+72.5, 52.7 ft. RT of US 23 Ramp C BL | Date Drilled: 3/21/05

WATER OBSERVATIONS:
Water seepage at: 16.0'-18.0'
Water level at completion: 8.0' (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	546.3						No Topsoil							
		2 2 3	14	1			FILL: Loose black GRAVEL WITH SAND (A-1-b); contains mostly coal fragments and cinders; damp.							
3.0	543.3													
		W O H	1	2			FILL: Very loose gray and black SILT AND CLAY (A-6a), little fine to coarse sand; contains roots, coal and cinder fragments; damp.							
5														
5.5	540.8	WOH 2 3	16	3		2.5	Very stiff brown SILT (A-4b), some clay, trace fine sand; moist.							
8.0	538.3						Very stiff brown and gray CLAY (A-7-6), trace fine sand; damp to moist.							
		2 5 7	17	4		3.5		0	0	–	2	43	55	
10		2 5 6	15	5		3.5								
13.0	533.3						Very loose brown GRAVEL WITH SAND (A-1-b), little silt, trace clay; moist to wet.							
		1 2 2	5	6										
15		1 1 1	8	7				37	27	–	17	19		Non-Plastic
		6 6 7	10	8			@ 18.5', medium dense; moist.	52	14	–	15	12	7	Non-Plastic
20														
		2 7 30	15	9			@ 21.0', dense, trace gravel, trace clay.							
23.5	522.8						Severely weathered black SHALE.							
		20 15 50	12	10										55 →
25.0	521.3						Soft to medium hard black SHALE; carbonaceous, slightly weathered, very thinly bedded, highly fractured. @ 25.3'-25.6', 26.0'-26.4', broken. @ 27.1'-27.2', sandstone seam.							
30.0	516.3	Core 120"	Rec 120"	RQD 97%	R1		Hard gray SANDSTONE; very fine to fine grained, argillaceous, micaceous, slightly weathered, massive, slightly fractured .							
35.0	511.3						Bottom of Boring - 35.0'							
40														
45														
50														
55														
60														

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

SCI-823-10.13

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

LOG OF: Boring B-1119 | Location: Sta. 3898+99.1, 24.8 ft. LT of US 23 Ramp C BL | Date Drilled: 7/18/05

WATER OBSERVATIONS: Water seepage at: 10.0'-25.0'
Water level at completion: 12.0' (prior to coring)
5.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft) 542.0	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) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0.3	541.7						Topsoil - 4"							
		6 6 5 7		1		3.0	Very stiff brown SANDY SILT (A-4a), little clay, trace gravel; possible organic; damp.							
3.0	539.0													
5		4 5 7	12	2		4.5+	Hard brown CLAY (A-7-6), trace fine to coarse sand, trace gravel; damp.							
5.5	536.5													
		4 4 5	12	3		2.0	Stiff to very stiff brown SILTY CLAY (A-6b), "and" fine to coarse sand, trace gravel; moist.	9	11	–	32	22	26	
8.0	534.0													
10		3 3 3	10	4			Very loose to loose brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; wet.	46	18	–	9	18	9	
		1 1 1	8	5										
13.0	529.0													
15		1 1 2	14	6			Very loose to loose brown COARSE AND FINE SAND (A-3a), little gravel, trace clay; trace silt; wet.							
		2 4 3	12	7				12	47	–	22	19		Non-Plastic
18.0	524.0													
20		5 8 9	13	8			Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), little clay; contains sandstone fragments; wet.	36	22	–	11	18	13	Non-Plastic
20.5	521.5													
		4 5 17	12	9			Medium dense to dense brown COARSE AND FINE SAND (A-3a), little silt, little clay; contains sandstone fragments; moist.	14	6	–	48	20	12	Non-Plastic
		7 17 19	14	10										
25.0	517.0						Very hard gray SANDSTONE; very fine to fine grained, moderately to highly weathered, argillaceous, micaceous, thinly bedded to medium bedded, highly fractured, iron-staining @ 28.7'-28.9', high angle fractures.							
		Core 60"	Rec 59"	RQD 30%	R-1									
30.0	512.0						Bottom of Boring - 30.0'							

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

LOG OF: Boring B-1120 | Location: Sta. 3900+39.5, 19.1 ft. RT of US 23 Ramp C BL | Date Drilled: 7/18/05

WATER OBSERVATIONS: Water seepage at: 11.0'-19.0'
Water level at completion: 11.0' (prior to coring)
5.0' (inside hollowstem augers)

Depth (ft)	Elev. (ft) 542.7	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) Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0	542.7						Topsoil - 5"							
0.4	542.3													
		3 5 7 9		1		4.5+	Very stiff to hard brown CLAY (A-7-6), "and" silt, trace fine to coarse sand; damp.	0	1	–	2	44	53	
		3 6 7	15	2		3.25		0	0	–	2	49	49	
5	537.2													
5.5		2 5 4	12	3			Loose brown GRAVEL WITH SAND, SILT AND CLAY (A-2-6); moist to wet.	16	30	–	20	14	20	
		1 2 4	8	4										
10	532.2													
10.5		3 3 2	6	5			Loose brown GRAVEL WITH SAND (A-1-b), some clay; wet.							
		1 1 1	8	6										
15		8 7 6	7	7			@ 18.5'-22.5', dense.							
		7 29 10	6	8										
20		14 22 18	6	9										
23.0	519.7													
25		10 12 9	14	10			Medium dense brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); contains sandstone fragments; moist.							
26.0	516.7	50/5	6	11			Severely weathered brown SANDSTONE.							
28.5	514.2						Hard gray SANDSTONE; very fine to fine grained, moderately weathered, micaceous, argillaceous, laminated to medium bedded, moderately to highly fractured. @ 32.8'-33.1', broken.							
30		Core 60"	Rec 54"	RQD 17%	R-1									
33.5	509.2						Bottom of Boring - 33.5'							
35														
40														
45														
50														
55														
60														

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

DRAWN | CHECKED

SCI-823-10.13

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

LOG OF: Boring TR-46 | Location: Sta. 3900+40.8, 47.7 ft. RT of US 23 Ramp C BL | Date Drilled: 03/17/05

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)
	543.1						WATER OBSERVATIONS: Water seepage at: 13.5'-19.0'; Water level at completion: 16.0' (prior to coring) 5.0' (includes drilling water)							Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0.1	543.0						Topsoil - 1"							
		2 1 1	2	1			FILL: Very loose brown and black GRAVEL WITH SAND (A-1-b), some silty clay; contains roots; damp. @ 1.0'-2.5', organic odor.							
5		2 2 2	4	2				44	19	–	13	16	8	
5.5	537.6						Stiff to very stiff brown SILT AND CLAY (A-6a), little fine to coarse gravel, trace fine to coarse sand; damp to moist.							
		3 3 3	18	3		2.0								
8.5	534.6						Medium dense brown and gray GRAVEL WITH SAND (A-1-b), little silty clay; moist.							
10		2 6 6	12	4										
		2 11 7	11	5				56	15	–	9	16	4	Non-Plastic
13.5	529.6						Loose brown GRAVEL WITH SAND (A-1-b), some silt, trace clay; wet.							
		3 4 3	8	6										
15		5 4 4	12	7				33	31	–	13	20	3	Non-Plastic
							@ 18.0', heaving sand.							
19.0	524.1	16 15 20	14	8			Dense light brown GRAVEL WITH SAND AND SILT (A-2-4), trace to little clay; moist to wet.							
20		14 19 20	8	9										
							@ 23.0', gray.							
		5 5 12	14	10				30	11	–	24	25	10	
25.5	517.6						Severely weathered gray SANDSTONE, argillaceous, micaceous.							
		50/3	3	11										
27.0	516.1						Hard gray SANDSTONE; very fine to fine grained, slightly weathered, argillaceous, micaceous, thickly bedded to massive, slightly fractured. @ 29.4',31.4',35.9', very thin clay seams. @ 29.8',30.8', thin clay seams. @ 31.6'-32.0', broken zone with clay and rock fragments. @ 33.4'-33.7', clay seam. @ 33.7'-34.2', cross bedded.							
30		Core 120"	Rec 118"	RQD 83%	R1									
35														
37.0	506.1						Bottom of Boring - 37.0'							
40														
45														
50														
55														
60														

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

LOG OF: Boring B-1121 | Location: Sta. 3901+49.8, 18.1 ft. LT of US 23 Ramp C BL | Date Drilled: 7/19/05

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)
	539.0						WATER OBSERVATIONS: Water seepage at: 16.0'-21.0'; Water level at completion: 16.0' (prior to coring) 9.0' (inside hollowstem augers)							Natural Moisture Content, % - ● PL ⊢ LL Blows per foot - ○ 10 20 30 40
0.3	538.7						Topsoil - 4"							
		3 4 5	13	1		4.5+	FILL: Hard dark brown SILT AND CLAY (A-6a), little fine to coarse sand, little gravel; damp.	16	9	–	7	38	30	
3.5	535.5													
		3 4 5	8	2		–	FILL: Medium stiff brown SANDY SILT (A-4a), some clay, trace gravel; wet.	7	16	–	24	31	22	
5.5	533.5						Stiff gray SILT AND CLAY (A-6a), trace to little fine to coarse sand, trace gravel; moist.							
		3 4 3	13	3		1.0		2	4	–	6	57	31	
		2 2 2	16	4		1.25								
10														
		W O H	17	5		1.0	@ 11.0', some fine to coarse sand.							
13.0	526.0						Very loose brown GRAVEL WITH SAND, SILT, AND CLAY (A-2-6); moist to wet.							
		2 1 1	10	6										
15							@ 16.0'-17.5', medium dense.							
		4 9 9	9	7										
18.0	521.0						Medium dense brown COARSE AND FINE SAND (A-3a), some clay, trace gravel; wet.							
		9 9 13	12	8										
20														
21.5	517.5	12 11 11	13	9			Severely weathered gray SANDSTONE.							
		33 50/4	8	10										
25.0	514.0						Very hard gray SANDSTONE; very fine to fine grained, slightly weathered, micaceous, argillaceous, medium bedded, moderately fractured. @ 25.3'-25.4', 26.3'-26.4', 29.1'-29.5', filled fractures. @ 29.7'-30.0', calcareous.							
		Core 60"	Rec 57"	RQD 65%	R1									
30.0	509.0						Bottom of Boring - 30.0'							

DRAWN | CHECKED

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

SCI-823-10.13

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

LOG OF: Boring B-1152 | Location: Sta. 3893+96.5, 23.1 ft. LT of US 23 Ramp C BL | Date Drilled: 10/18/2005 to 10/19/2005

WATER OBSERVATIONS:
Water seepage at: 15.5'-20.5'
Water level at completion: 21.6' (prior to coring)
13.9' (inside hollowstem augers)

Depth (ft)	Elev. (ft)	Blows per 6"	Recovery (in)	Sample No. Drive	Sample No. Press / Core	Hand Penetro-meter (tsf)	DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand	% Silt	% Clay	STANDARD PENETRATION (N)
0.3	562.7						Topsoil - 3"							
		8 12 18	18	1		4.5+	FILL: Very stiff to hard brownish gray SILTY CLAY (A-6b), trace fine to coarse sand, trace gravel; damp.							
5		6 7 9	18	2		4.0								
5.5	557.5						POSSIBLE FILL: Medium dense brown GRAVEL WITH SAND (A-1-b), trace clay; dry to damp.							
		6 8 8	10	3										
		8 9 8	18	4				32	43	–	19	6		Non-Plastic
10		7 12 12	11	5										
		8 7 8	14	6										
15.5	547.5						Medium dense brown GRAVEL WITH SAND AND SILT (A-2-4), trace clay; moist.							
		5 4 5	16	7										
		6 8 11	18	8										
20														
21.0	542.0	27 50/3	9	9			Severely weathered gray SHALE.							50+
22.0	541.0						Very soft to medium hard gray SHALE interbedded with SANDSTONE; very fine to fine grained, highly weathered to decomposed, micaceous, thinly laminated to medium bedded, highly fractured to broken.							
25		Core 120"	Rec 120"	RQD 50%	R1		@ 29.3'-32.9', light gray.							
30.0	533.0						Very soft to medium hard gray SHALE; highly weathered to decomposed, micaceous, medium bedded, broken. @ 30.5'-32.9', calcareous. @ 32.0'-32.7', lost recovery.							
32.9	530.1	Core 60"	Rec 52"	RQD 82%	R2		Medium hard black SHALE; highly weathered, carbonaceous, laminated, moderately fractured.							
35							@ 35.6', low angle fracture.							
37.0	526.0						Bottom of Boring - 37.0'							
40														
45														
50														
55														
60														

STRUCTURE FOUNDATION INVESTIGATION
BRIDGE NO. SCI-823-1603
RAMP C OVER NORFOLK SOUTHERN RR

DRAWN | CHECKED

SCI-823-10.13