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FOUNDATION INVESTIGATION IN TO SCI-TR234-0122 OLLOW ROAD OVER CSX RE

STRUCTURE FOU BRIDGE N SHUMWAY HOLLO SHUMW

> 9 CI-823

#### PROJECT DESCRIPTION

THE PROJECT CONSISTS IN PART OF CONSTRUCTING A SINGLE-SPAN BRIDGE ON RELOCATED SHUMWAY HOLLOW ROAD OVER THE CSXT RAILROAD. THE STRUCTURE AS PLANNED, IS A SINGLE-SPAN STRUCTURE WITH MSE WALLS AT 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

#### **GEOLOGY**

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THE STRUCTURE SITE 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, GLACIAL, ALLUVIAL, AND LACUSTRINE SOILS. BEDROCK WITHIN THE STRUCTURE AREA IS PRIMARILY SANDSTONE OF THE LOGAN FORMATION OF MISSISSIPPIAN AGE. BEDROCK OF THE PENNSYLVANIAN BREATHITT FORMATION CAN BE FOUND AT THE TOP OF THE SLOPES TO THE WEST OF THE STRUCTURE, ROUGHLY ABOVE ELEVATION 860. NO MINING IS REPORTED IN THE IMMEDIATE VICINITY.

## **RECONNAISSANCE**

SEVERAL SITE RECONNAISSANCE VISITS WERE MADE BETWEEN AUGUST 2004 AND JANUARY 2007. THE SURROUNDING AREA IS DESCRIBED AS RURAL RESIDENTIAL. THE AREA OF THE PROPOSED STRUCTURE IS BORDERED ON THE WEST BY FARMLAND GENTLY SLOPING TO THE EAST AND COVERED WITH GRASS, BRUSH, AND SMALL TREES. THE STRUCTURE WILL BE CONSTRUCTED OVER A STEEP ROCK CUT CONSTRUCTED FOR THE CSX RAILROAD. SR 335 AND THE PORTSMOUTH REGIONAL AIRPORT BORDER THE PROJECT AREA TO THE EAST.

## SUBSURFACE EXPLORATION

THE SUBSURFACE EXPLORATION CONSISTED OF DRILLING FOUR FINAL AND THREE PRELIMINARY STRUCTURAL BORINGS. BORINGS B-24 THROUGH B-27 WERE DRILLED BETWEEN JANUARY 17 AND 30, 2007. TR-27 AND TR-28 WERE DRILLED FOR A PREVIOUS DESIGN CONFIGURATION ON AUGUST 18 AND 19, 2004. THE BORINGS WERE DRILLED WITH AN ATV MOUNTED ROTARY DRILL RIG, USING 31/4-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. 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 NO SERIÉS CORE BARREL, WATER METHOD.

# EXPLORATION FINDINGS

THE TEST BORINGS DISCOLSED NATIVE COHESIVE AND GRANULAR SOIL DEPOSITS BELOW THE SURFICIAL MATERIAL. THE COHESIVE DEPOSITS CONSISTED MAINLY OF MEDIUM STIFF TO VERY STIFF SILT AND CLAY (A-6A), MEDIUM STIFF CLAY (A-6B), AND MEDIUM STIFF TO HARD SANDY SILT (A-4A), WHILE THE GRANULAR SOIL DEPOSITS CONSISTED MAINLY OF LOOSE TO DENSE COARSE AND FINE SAND (A-3A) AND MEDIUM DENSE SAND (A-3). BORING B-26 ENCOUNTERED A RELATIVELY THIN SOFT SILT AND CLAY (A-6A) LAYER (APPROXIMATELY 2-FOOT THICK) ABOVE THE SANDSTONE. THE NATIVE SOIL DEPOSITS WERE 3.0 FEET THICK AT THE REAR ABUTMENT AND BETWEEN 16.5 AND 17.5 FEET THICK AT THE FORWARD ABUTMENT IT SHOULD BE NOTED THAT THE 17.5 FEET THICK AT THE FORWARD ABUTMENT. IT SHOULD BE NOTED THAT THE PRESENCE OF ORGANIC MATERIAL WAS NOTED IN BORING B-24, DRILLED AT THE REAR ABUTMENT LOCATION.

AT THE EASTERN SLOPE, THE SOIL WAS RELATIVELY THIN, AND CONSISTED PRIMARILY OF RESIDUAL AND COLLUVIAL SOILS. UNDER THE SOIL, EXPOSED SANDSTONE WAS EVIDENT, BEGINNING APPROXIMATELY AT ELEVATION 645. THE EXPOSED ROCK WAS HIGHLY WEATHERED AND HIGHLY FRACTURED. BANDS OF INTERBEDDED SHALE OR SILTSTONE WERE PRESENT IN THE SANDSTONE SOUTH OF THE PROPOSED STRUCTURE, BELOW APPROXIMATE ELEVATION 638. AREAS OF ISOLATED SEEPAGE WERE EVIDENT IN THIS LAYER SOUTH OF THE PROPOSED STRUCTURE. ADDITIONALLY, SEVERAL HIGH ANGLE FRACTURES WERE NOTED IN THE ROCK FACE, HOWEVER, NO APPRECIABLE LATERAL MOVEMENT OF THE ROCK MASS WAS APPARENT. DRAINAGE CHANNELS HAVE BEEN ESTABLISHED ALONG THE BOTTOM OF THE RAILROAD CUT, WHICH CURRENTLY RUN NEAR THE REAR ABUTMENT LOCATION. THESE DRAINAGE PATHS HAVE DEPOSITED APPROXIMATELY 3 TO 5 FEEL OF SOIL, AS CONFIRMED BY THE BORINGS DRILLED FOR THE REAR ABUTMENT. THE REAR ABUTMENT

IN THE AREA OF THE PROPOSED STRUCTURE, BEDROCK WAS ENCOUNTERED IN ALL THE BORINGS AND WAS CONFIRMED BY CORING BETWEEN 10 AND 20 FEET OF ROCK IN EACH BORING. THE BEDROCK CONSISTED OF MEDIUM HARD TO HARD, SLIGHTLY TO HIGHLY WEATHERED, SLIGHTLY FRACTURED SANDSTONE. A LAYER OF SEVERELY WEATHERED ROCK, RANGING IN THICKNESS BETWEEN 1.5 TO 3 FEET WAS ENCOUNTERED ABOVE THE MORE COMPETENT CORED BEDROCK IN BORINGS B-24, B-25, AND TR-28.

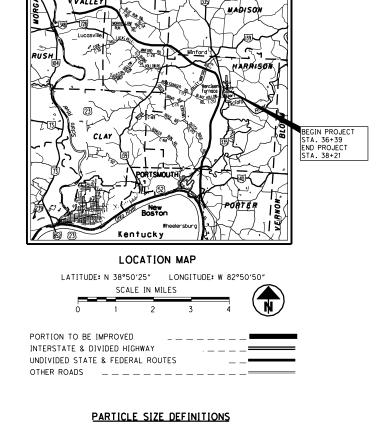
### **SPECIFICATIONS**

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JULY 2006.

DESC	<b>LEGEND</b> CRIPTION	ODOT CLASS		SIFIED /VISUAL
Grave and S	el with Sand ilt (A-2-4)	A-2-4	0	2
Fine S	Sand (A-3)	A-3	3	15
Sandy	/ Silt (A-4a)	A-4a	1	3
Silt o	and Clay (A-6a)	A-6a	6	2
Silty	Clay (A-6b)	A-6b	2	0
		TOTAL	12	22
Sands	stone	VISUAL		
Weatl	hered Sandstone	VISUAL		
Tops	oil	VISUAL		
<del> </del>	BORING LOCATION - PLAN VIEW  DRIVE SAMPLE AND/OR CORE BORING PLOTTED TO VERTICAL SCALE ONLY	G LOCATION		
w ———	INDICATES FREE WATER ELEVATION			
∇	INDICATES STATIC WATER ELEVATION			
▼	INDICATES STATIC WATER ELEVATION (DRILLING WATER USED)	N		
W/X/Y/Z	FIGURES BESIDE THE BORING IN PROFINDICATE THE NUMBER OF BLOWS FOR PENETRATION TEST  W = NUMBER OF BLOWS FOR FIRST X = NUMBER OF BLOWS FOR SECON Y = NUMBER OF BLOWS FOR THIRD Z = NUMBER OF BLOWS FOR FOUR	R STANDARD 6 INCHES ND 6 INCHES 6 INCHES	PPLICABLE	
50 (n)	INDICATES NUMBER OF BLOWS (50) TO BARREL SAMPLER A DEPTH OF (n) INC THAN THE NORMAL 6 INCH INCREMENT	HES OTHER		

# 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.



JEFFERSON

	12"	3		nm	0 m		0.0 mr		005 nm
Boulders		Cobbles	Gravel	Coarse	Sand	Fine	Sand	Silt	Clay
			No. SIF		No. SIE		No. SIE	200 VE	

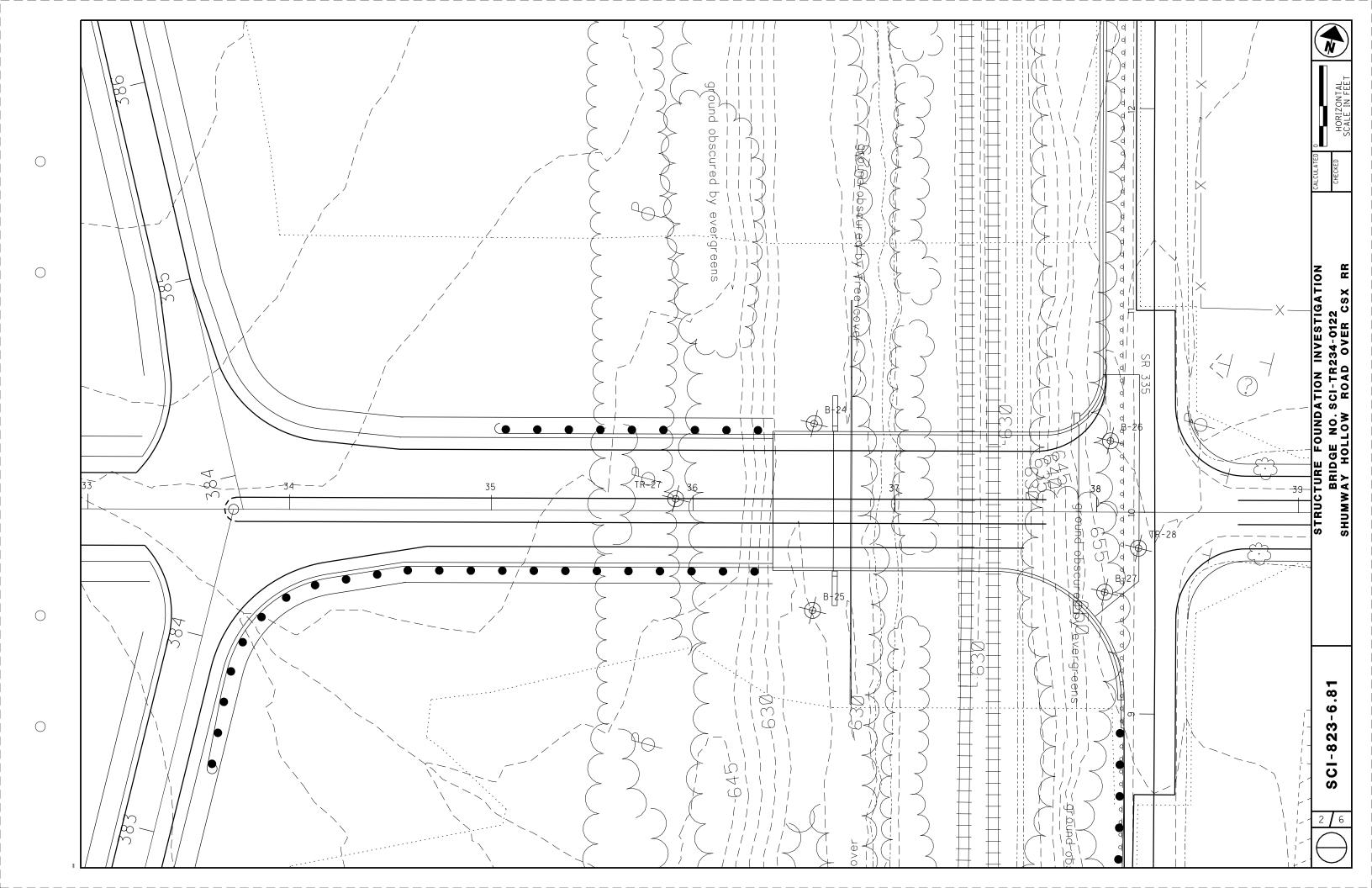
DRILLING - DW 08/18 TO 08/19/04 & 01/17 TO 01/30/07

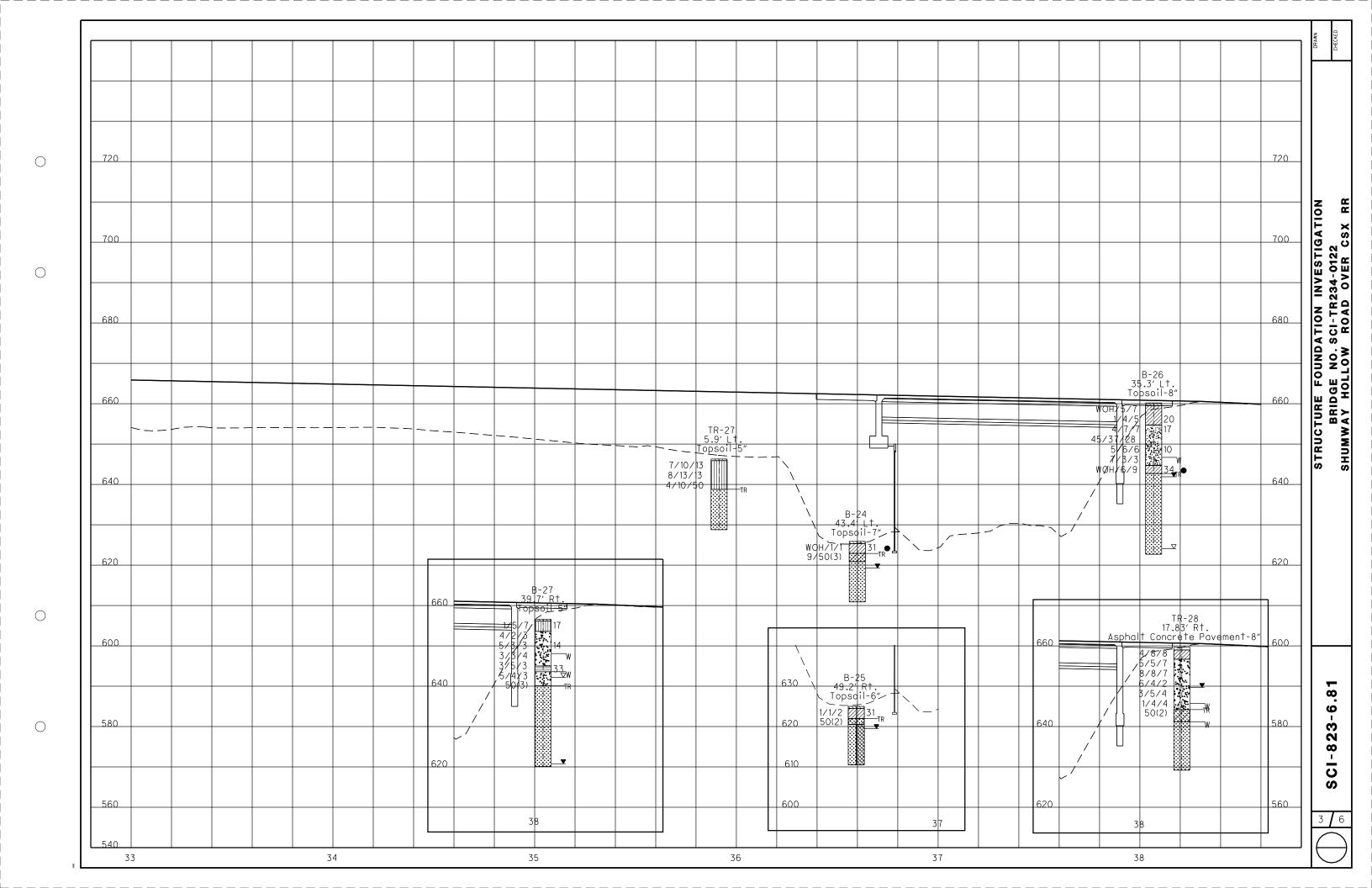
**DRAWN -** RLS & AMJ 3/09 TO 5/09

**REVIEWED -** AEN 5/11/09

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Client: TranSystems, Inc. LOG OF: Boring TR-27 Loca	DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229 * (6    Project: SCI-823-0.00     Project: SCI-823-0.00     Date Drilled: 8/28	Job No.0121-3070.03	ClientiranSystems, Inc. LOG OF: Boring B-24 Location:	DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO    Project: SCI-823-0.00   Sta. 36+59.8, 43.4 ft. LT of Rel. TR234 CL   Date		No. 0121-3070.03	DRAWN
Depth (ft) (ft) (gt) (gt) (gt) (gt) (gt) (gt) (gt) (g	OBSERVATIONS: Water seepage at: None seeter Water level at completion: None (boring collapsed @ 6.0')  DESCRIPTION	GRADATION  DUSY: W W W W W W W W W W W W W W W W W W W	Depth Elev. (ff) (ff) (ff) (ff) (ff) (ff) (ff) (ff	6.6' (inside hollowstem	water)	ARD PENETRATION (N) poisture Content, % er foot - 0 20 30 40	STRUCTURE FOUNDATION INVESTIGATION  BEIDGE NO SCI-TESSA-0433
							4 / 823-6.81

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enı: G OF:			ns, Inc 3-25	•	L	ocation: S	ProjectsCI-823-0.00 ta. 36+59.3, 49.2 ft. RT of Rel. TR234 CL Date Drilled:	1/	17/0	07					J	ו מט	V. OV	121-,	3070	.03
3.7	30.1		(in)	Sam No	ple •	Hand	WATER OBSERVATIONS: Water seepage at: None				ATI	ON	$\exists$							
pth E	Elev. (ft)	Blows per 6"	Recovery	Drive	Press / Cor	Penetro- meter (tsf)	Water level at completion: None (prior to coring) 5.5' (inside hollowstem augers, includes drilling water) DESCRIPTION	% Aggregate		% M. Sand			% Clay	Nati	ura PL	l Mc ⊢	ist	ure oot		
()	524.5		L		ш.		Topsoil - 6" Stiff brown SILT AND CLAY (A-6a), trace fine sand,	~	~	8	~	0.00	->-	П	ΪП	П	Ĭ	Щ	Щ	ΪШ
_		1 1 2	18	1		1.25	trace gravel; moist.	2	0		2	53	43	$\prod$		Ш	-	HH	╇╢	
.0—6	622.0	5072		2			Severely weathered gray SANDSTONE, argillaceous,	1					ľ	**	$\dagger \dagger \dagger$	$\dagger \dagger$	+	$\mathbb{H}$	Щ	Щ
.5 = 6	520.5	007 2					micaceous.  Hard gray SANDSTONE interbedded with SILTSTONE; very									Ш				1115
- - -							fine to fine grained, slightly weathered, argillaceous, micaceous, thinly laminated, slightly fractured.  @ 4.5'-5.0', 6.2'-7.0', broken zones.													
-		Core	Rec 120"	RQD 85%	R1											Ш				
		120″	120"	85%			@ 10.5'-11.0', qu = 10,295 psi.									Ш				
1							@ 11.6', 11.7', 13.5', low angle clay filled									Ш				
-							fractures.									Ш				
.5 = 6	510.5						Dattom of Davice 14.5/									Ш				
							Bottom of Boring - 14.5′									Ш				
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lient:		onSyst		Inc.	_		Project: SCI-823-0.00		, = :	. ,					,	Job	No .C	)121-:	3070	0.03	_
OG OF	: Bor	ing	B-26	Sam No			ta. 38+06.7, 35.3 ft. LT of Rel. TR234 CL Date Drillec	: 01		)/07 GRAE		ON	$\neg$					—	—	—	_
	Elev. (f†)	ं	Recovery (in)	Drive	Press / Core	Hand Penetro- meter (tsf)	ÖBSERVATIONS: Water seepage at: 13.5'-15.0' Water level at completion: 36.1' (prior to coring) 18.3' (inside hollowstem augers, includes drilling water) DESCRIPTION	% Aggregate	% C. Sand	% M. Sand	% F. Sand		% Clay		ura PL	l Mo	istu	PENE ure (	Cont	tent • LL	, %
0 <del>-</del> 0.7 <u>-</u> -	659.5	-		1		1.25	Topsoil - 8"  Medium stiff to stiff brown SILT AND CLAY (A-6a), some fine to coarse sand, trace gravel; damp to moist.														
5.5 	-654.7	1 4 5	18	2		0.75		3	3		32	30	32					$\ \cdot\ $			
-	-034.6	4 7 7	18	3			Medium dense brown FINE SAND (A-3), trace coarse sand, trace silty clay; damp.														
10 —		45 37 28	18	4			@ 8.5'-10.0', very dense.													¢	55 -
-		5 6 6	18	5				0	7		87		6		•	<b>D</b> T			-No	n-5	as
- 15.5 <b>—</b> 15.55	644.7	3 3	12	6			@ 13.5', loose, wet.														
- - 17.5	642.7	WОН 6 9	18	7		0.5	Soft to medium stiff brown SILT AND CLAY (A-6a), trace fine sand, moist to wet.  Hard gray SANDSTONE; medium grained, unweathered to	0	0		1	56	43			b		Ж	╟╋		
20—							slightly weathered, micaceous, thinly bedded, slightly fractured.														
-		Core 120″	Rec 120"	RQE 100%	R1		@ 22.5′-23.0′, qu = 10,454 psi, Er = 2,484,015 psi.														
25 —																					
-	630.2						@ 27.8′-27.9′, broken zone.														
30 <del></del>			Rec 120"	ROE 95%	R2		@ 32.0′-32.5′, qu = 12,453 psi.														
- 35 <b>—</b>																					
- - 37.5 <u>-</u>	-622.7						Bottom of Boring - 37.5'	$\frac{1}{1}$													
40—																					
-																					
45 —																					
-																					
50—																					
-																					
55 <del>-</del>																					
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STRUCTURE FOUNDATION INVESTIGATION BRIDGE NO.SCI-TR234-0122 SHUMWAY HOLLOW ROAD OVER CSX RR

SCI-823-6.81

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	DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229	* (614)888-0040		DLZ OHIO INC. * 6121 HUNTLEY ROAD, COLUMBUS, OHIO 43229		
Client: TranSystems, Inc.	Project: SCI-823-0.00	Job No. 0121-3070.03	Client: TranSystems, Inc.	Project: SCI-823-0.00	Job No. 0121-3070.03	DRAWN HFCKE
Depth Elev. (ft)		ed: 01/29/07 to 01/30/07  GRADATION		on: Sta. 38+20.7, 17.8 ft. RT of Rel. TR234 CL Date Drille  WATER OBSERVATIONS: Water seepage at: 14.0′, 18.5′  Water level at completion: 10.0′ (includes drilling water)  DESCRIPTION  Asphalt Concrete Pavement - 8″  Very stiff to hard brown SILT AND CLAY (A-6a), trace	Job No. 0121-3070.03  Index 02/02/05  GRADATION  Purple Size Size Size Size Size Size Size Siz	SCI-823-6.81 SCI-823-6.81 SCI-823-6.81 SCI-823-6.81

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