BRIDGE AND RETAINING WALL
FOUNDATION INVESTIGATION REPORT
I-575 over M-9020 (Bells Ferry Road)
Northwest Corridor Project

GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cobb County, Georgia

WILLMER ENGINEERING INC.
Project No. ATL-171-3099D

Document No.: ATL-171-3099**D**
Revision: 1
Issue Date: August 22, 2008
Document Status: Issued for Use

Prepared For

GEORGIA TRANSPORTATION PARTNERS
Atlanta, Georgia

Prepared By

WILLMER ENGINEERING INC.
3772 Pleasantdale Road
Suite 165
Atlanta, Georgia 30340-4270

770.939.0089

August 22, 2008

VIA COURIER

Pete M. McMahon, PE
Georgia Transportation Partners
c/o PBS&J, Inc.
5665 New Northside Drive
Suite 400
Atlanta, Georgia 30328

SUBJECT: Bridge and Retaining Wall Foundation Investigation Report
I-575 over M-9020 (Bells Ferry Road)
Northwest Corridor Project
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cobb County, Georgia
Willmer Project No. ATL-171-3099D

Dear Mr. McMahon:

Willmer Engineering Inc. (Willmer) is pleased to provide this Bridge and Retaining Wall Foundation Investigation (BFI and WFI) report for the proposed widening of the I-575 bridge over M-9020 (Bells Ferry Road) in Cobb County, Georgia. The BFI and WFI were performed in general accordance with our contract with Georgia Transportation Partners (GTP), dated May 12, 2007. The objective of this investigation was to gather enough geotechnical information to support the costing plans to be developed by GTP. Additional borings will be performed in the design/build phase of the project to provide additional information as required. This report was prepared in general accordance with Georgia Department of Transportation (GDOT) guidance documents for bridge and retaining wall foundation investigation. This report was revised to incorporate GTP comments dated January 3 and 9, 2008, and GDOT comments dated July 18, 2008.

The attached summary presents the site and subsurface conditions along the proposed bridge and retaining wall alignments, and our geotechnical recommendations related to foundation design and construction.

We appreciate the opportunity to be of service to you on this project and look forward to a continuing relationship. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

Murthy S. Kotha
Project Engineer

Sujit K. Bhowmik, PhD, PE
Chief Engineer

James L. Willmer, PE
Executive Vice President/Principal Consultant

MSK/SKB/JLW:ks
I:\Word Processing\Projects\171-GEO\171-3099 Northwest Corridor Project (Bechtel)\Reports\3099 D - Bells Ferry Road\171-3099D REVISED BFI-RWI Report -M-9020 (Bells Ferry Road) - 8-22-08.doc

Attachments: **Bridge and Retaining Wall Foundation Investigations**

Figures

Figure 1 Project Location Map
Figure 2 Boring Location Plan
Figure 3 Generalized Subsurface Profile Section A-A' (Lt. Bridge & MSE Walls)
Figure 4 Generalized Subsurface Profile Section B-B' (Rt. Bridge & MSE Walls)

Appendix I

Boring Record Legend
Unified Soil Classification System Reference Sheet
Engineering Description of Rock Hardness
Boring Records: BB-1, BB-2, W-1 and W-2 (New Borings)
Laboratory Test Results

Appendix II

Boring Records: B-1L through B-3L and B-1R through B-4R (Borings from Existing GDOT BFI Report)

Revision History:

Revision	Issue Date	Document Status
A	December 11, 2007	Issued for Review
0	January 11, 2008	Issued for Use
1	August 22, 2008	Issued for Use

BRIDGE FOUNDATION INVESTIGATION	
Willmer Project Number	ATL-171-3099D
GDOT Project Number	CSNHS-0008-00(256)
Project P.I. Number	0008256
Location	I-575 Bridge over M-9020 (Bells Ferry Road), Cobb County, Georgia (see Figure 1)
GENERAL INFORMATION	
Project Description	The two existing I-575 bridges over M-9020 (Bells Ferry Road) are planned to be replaced with one new bridge as part of the proposed I-575 widening over Bells Ferry Road. The bridge will be a reinforced concrete structure with two 65-foot spans. The existing bridges have three spans and are supported on H-piles at the end bents and H-pile footings at the intermediate bents. The BFI report for the existing bridges was obtained from GDOT, and it includes seven borings performed by GDOT in 1977.
Geologic Information	The project alignment is geologically sited within the Piedmont Physiographic Province of Georgia, and is underlain by Metamorphosed Maffic Rock Formations which include amphibolite, mica schist and biotite gneiss.
Subsurface Features	Subsurface information for this project was obtained from two borings (BB-1 and BB-2) performed by Willmer as part of the present study (see Appendix I) and seven borings (B-1L through B-3L and B-1R through B-4R) performed by GDOT in 1977 as part of the BFI for the two existing bridges (see Appendix II). The subsurface profile at the two new boring locations is generally comprised of residuum underlain by partially weathered rock (PWR) and parent bedrock. The residual soils consist of loose to very dense silty sand/sandy silt. Although no fill material was encountered at the two borings performed for the BFI, fill was encountered at two borings (W-1 and W-2) drilled from the existing roadway (I-575) shoulders for the retaining wall investigation. The fill material consisted of loose to medium dense silty sand. During the present field investigation ground water was encountered at all boring locations between elevations 973 and 975 feet, and during the field investigation by GDOT in 1977, ground water was encountered between elevations 982 and 984 feet.

PWR AND AUGER REFUSAL ELEVATIONS (feet)			
Bent No.	**Reference Boring No.**	**Top of PWR**	**Auger Refusal**
1	B-1L	964	961
	B-1R	962	958
	BB-1	964	963
2	B-2L	960	*
	B-2R	960	*
	B-3R	972	968
3	BB-2	958	955
	B-3L	975	967
	B-4R	970	953
* Boring was not extended to auger refusal.			

MAXIMUM PILE DESIGN LOADS			
Pile Type	**Load Transfer (%)**		**Design Load**
	Friction	**End Bearing**	
H-Piles	10	90	10 BP 42 = 55 Tons
			12 BP 53 = 70 Tons
			14 BP 73 = 96 Tons
			14 BP 89 = 117 Tons

FOUNDATION RECOMMENDATIONS		
Bent No.	**Pile Footing (Type)**	**Pile Bent (Type)**
1		H
2		H
3		H

PILE TIP ELEVATIONS (feet)			
Bent No.	**Reference Boring No.**	**H-Pile**	
		Minimum Tip	**Estimated Tip**
1-Left	B-1L, B-2L	962	960
1-Right	BB-1	963	963
2-Left	B-2L	960 ±	960 ±
2-Right	B-2R, B-3R	964 ±	962 ±
3-Left	BB-2	955	955
3-Right	B-3R, B-4R	964	964

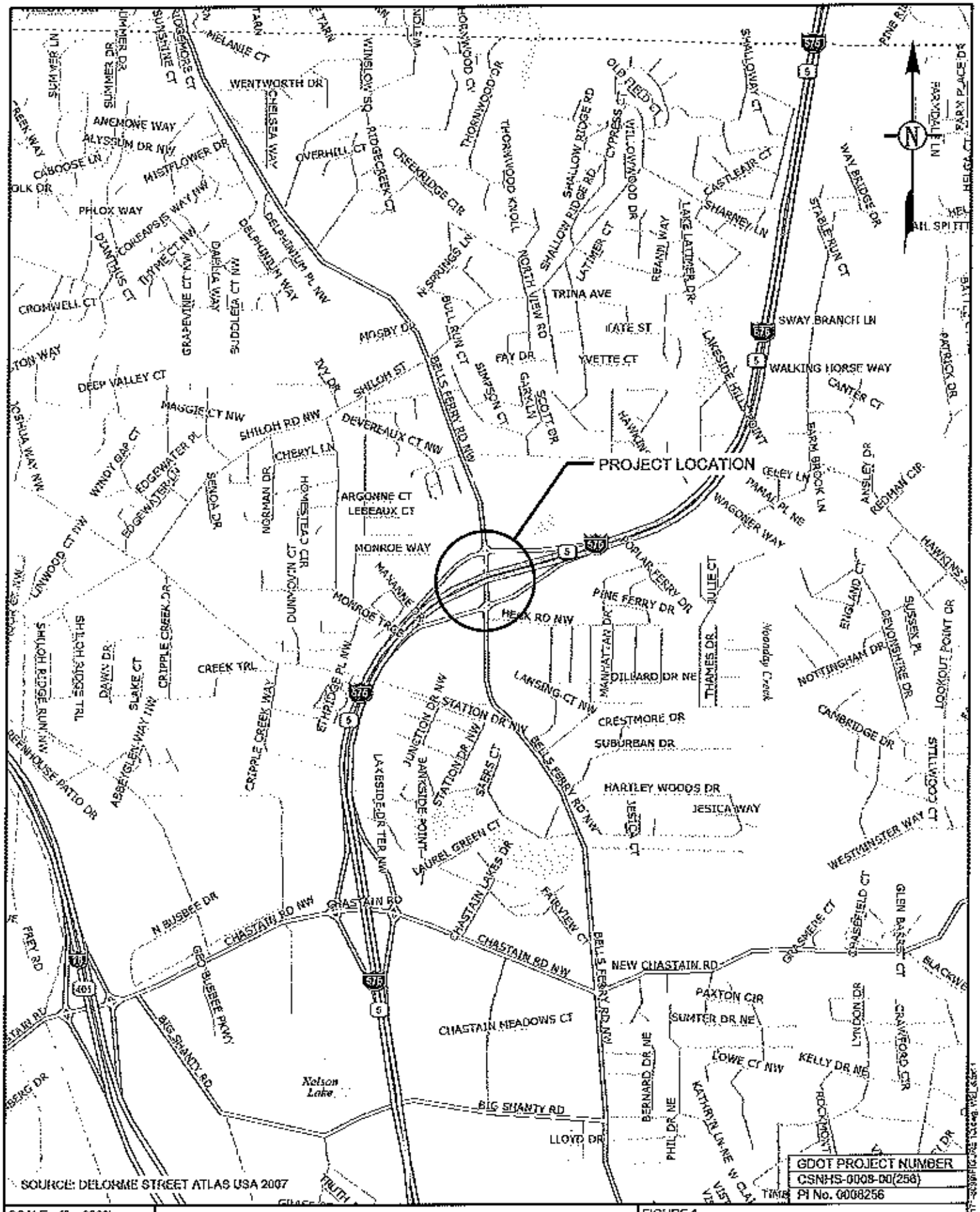
NOTES	
Elevations	All elevations referenced in this report are based on Control Points No. 293 (Scribe Mark-T, EL. 976.66 feet), No. 243 (60D Traverse, EL. 1007.25 feet) and No. 138 (3/4" rebar, EL. 1004.88 feet) established by the surveyors.
PDO	Driving resistance after Minimum Tip Elevations are achieved.

Points	Pile points are recommended for piles driven at all bents to insure adequate penetration through/into dense/very dense soils and PWR. The use of points should be at the direction of the project Geotechnical Engineer.
Down-drag Protection	To avoid inducing down-drag loads onto the piles from potential settlement of the loose to medium dense silty sand during construction of the MSE wall, we recommend that the piles at Bents 1 and 3 be protected from down-drag by using Jackets or other approved measures.
Waiting Period	None required (see MSE wall recommendations)
Special Problems	None.
As-built Information	As-built information should be forwarded to the Geotechnical Engineering Bureau upon completion of the foundation system.

RETAINING WALL INVESTIGATION	
Location	Two MSE retaining walls (Wall Nos. 6 and 7) are proposed for the bridge at I-575 over M-9020 (Bells Ferry Road). Wall No. 6 and 7 are comprised of the abutment walls and wing walls on the two sides at Bents 1 and 3, respectively. The total length of each wall is about 325 feet (see Figure 2) and the maximum height of the walls is about 35 feet. The bottom elevation of the walls at the bridge bents is about 978 feet.
Subsurface Features	The subsurface profile (see Figures 3 and 4 and boring logs for BB-1, BB-2, W-1 and W-2) along the proposed walls is comprised of fill and residuum underlain by partially weathered rock (PWR). The fill consists of loose to medium dense silty sand. The residual soils consist of loose to very dense silty sand and/or soft to stiff sandy silt underlain by partially weathered rock. Ground water was not encountered at borings W-1 and W-2. Groundwater was encountered at borings BB-1 and BB-2 between elevations 973 and 975 feet during the present field investigation, and between elevations 982 and 984 feet during the field investigation by GDOT in 1977. It should be noted that the borings for the present study were performed during an extended dry period, and ground water may be encountered at a higher elevation during construction.
Soil Parameters	The following soil design parameters are recommended for use for the proposed MSE walls: Soil Unit Weight γ = 125 pcf Cohesion c = 0 psf Angle of Internal Friction ϕ = 32 degrees Coefficient of Sliding Friction μ = 0.40 The above design parameters assume the backfill material behind the MSE wall fill to consist of silty sand compacted to the specified density, and the subgrade prepared as recommended below.

Recommendations	Based on the available boring data in the vicinity of the proposed MSE walls, the soil type and strength along the walls are expected to vary significantly. We recommend that the MSE walls be constructed in stages to minimize differential settlement along the walls. The following steps are recommended for the MSE walls. (i) Based on available information on location and elevation of the proposed MSE walls, the MSE walls at the bridge abutments will likely be along or adjacent to an existing concrete-lined ditch. Prior to MSE wall construction, the concrete-lined ditch should be removed and final grade achieved by placement of compacted structural fill. (ii) Any soft/loose soils from beneath the MSE walls should be over-excavated and replaced with compacted wall backfill material. The depth and extent of any over-excavation should be determined during construction by the project Geotechnical Engineer. (iii) The maximum allowable bearing pressures for Wall Nos. 6 and 7 are 2,500 psf and 2,000 psf, respectively. However, at the location of maximum wall height, the design bearing pressures will likely exceed the corresponding maximum allowable bearing pressures. Therefore, we recommend that the MSE walls be constructed in two stages. In the first stage, the wall should be constructed to half of its final height. A minimum 30-day waiting period should be allowed after the first stage before beginning the second stage of construction. Settlement of the MSE wall should be monitored upon completion of the first stage of construction. The length of the waiting period may be increased or decreased based on the settlement monitoring data, at the discretion of the project Geotechnical Engineer. (iv) After the waiting period, the MSE wall should be constructed to the final height. (v) The MSE wall backfill material and drainage measures should conform to GDOT standard specifications.
Prepared By	Murthy S. Kotha / Sujit K. Bhowmik, PhD, PE
Senior Review By	James L. Willmer, PE

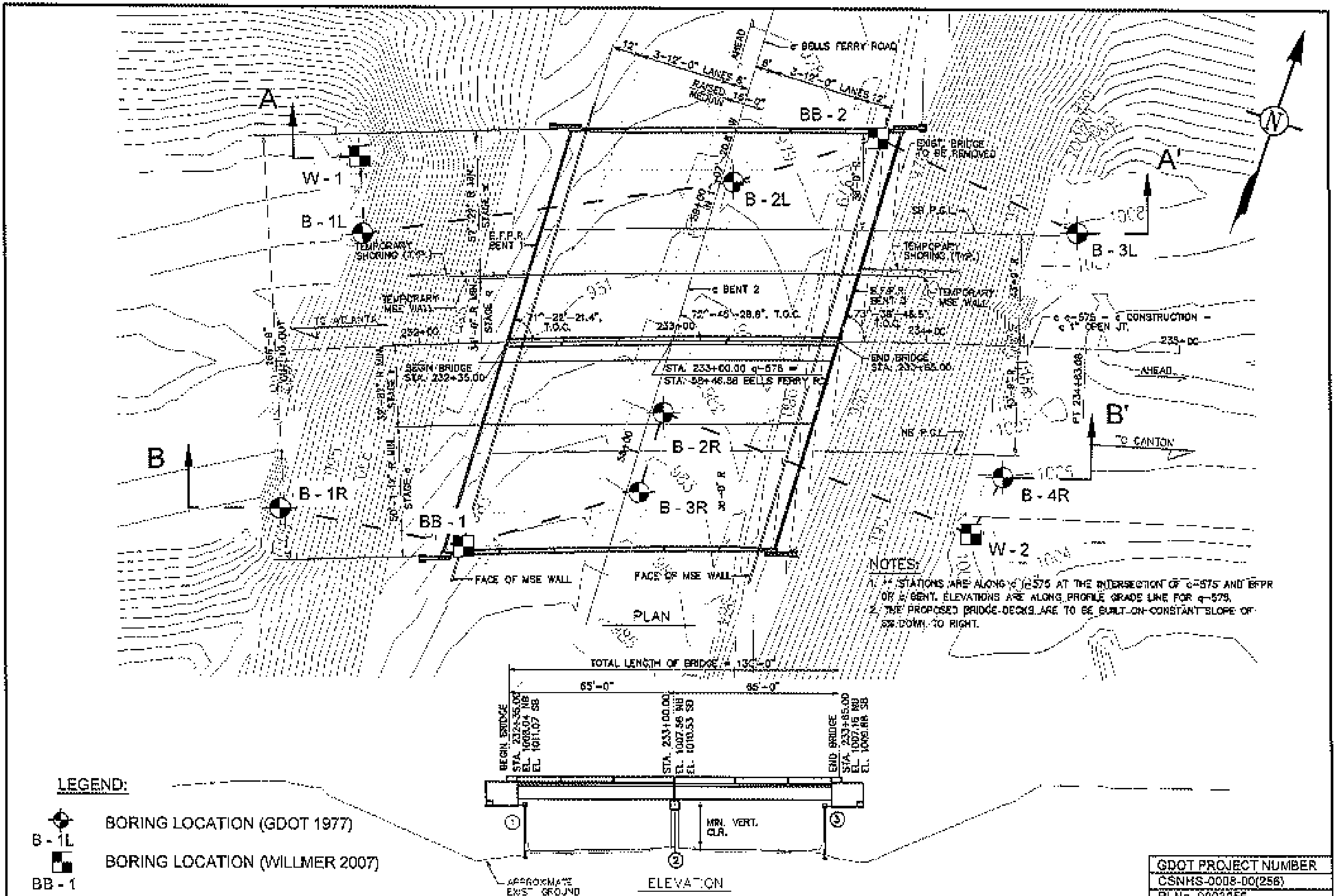
FIGURES



GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

SCALE: 1" = 2000'	WE	GEOTECHNICAL ENGINEERING CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 168 ATLANTA, GA 30340-4270
DATE: 12/6/2007		
DRAWN BY: MJB		
REVIEWED BY: MK		

FIGURE 1
PROJECT LOCATION MAP
I-575 OVER M-9020 (BELLS FERRY ROAD)
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099D



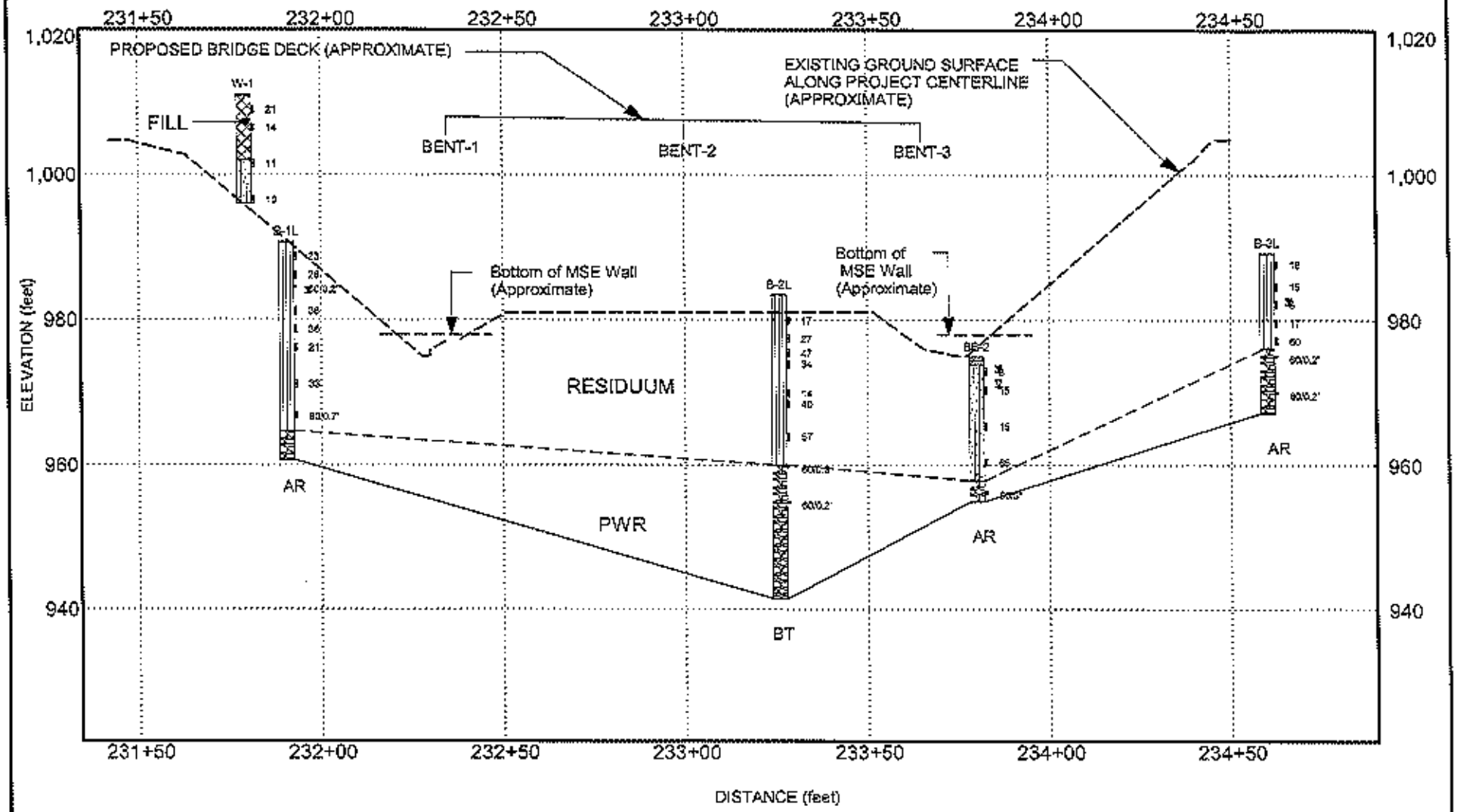
GDOT PROJECT NUMBER
CSNHS-0008-00(256)
PI No. 0008256

SCALE: 1" = 50'
DATE: 6/3/2008
DRAWN BY: MDB
REVIEWED BY: MK

WILLMER ENGINEERING INC.

GEOTECHNICAL ENGINEERING • CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD • SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2
BORING LOCATION PLAN
I-575 OVER M-9020 (BELLS FERRY ROAD)
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099D



LEGEND:
- ⧗ - Groundwater Table @ 24 hours
- ⧗ - Groundwater Table @ Time of Boring
- AR - Auger Refusal
- BT - Boring Terminated
- PWR - Partially Weathered Rock

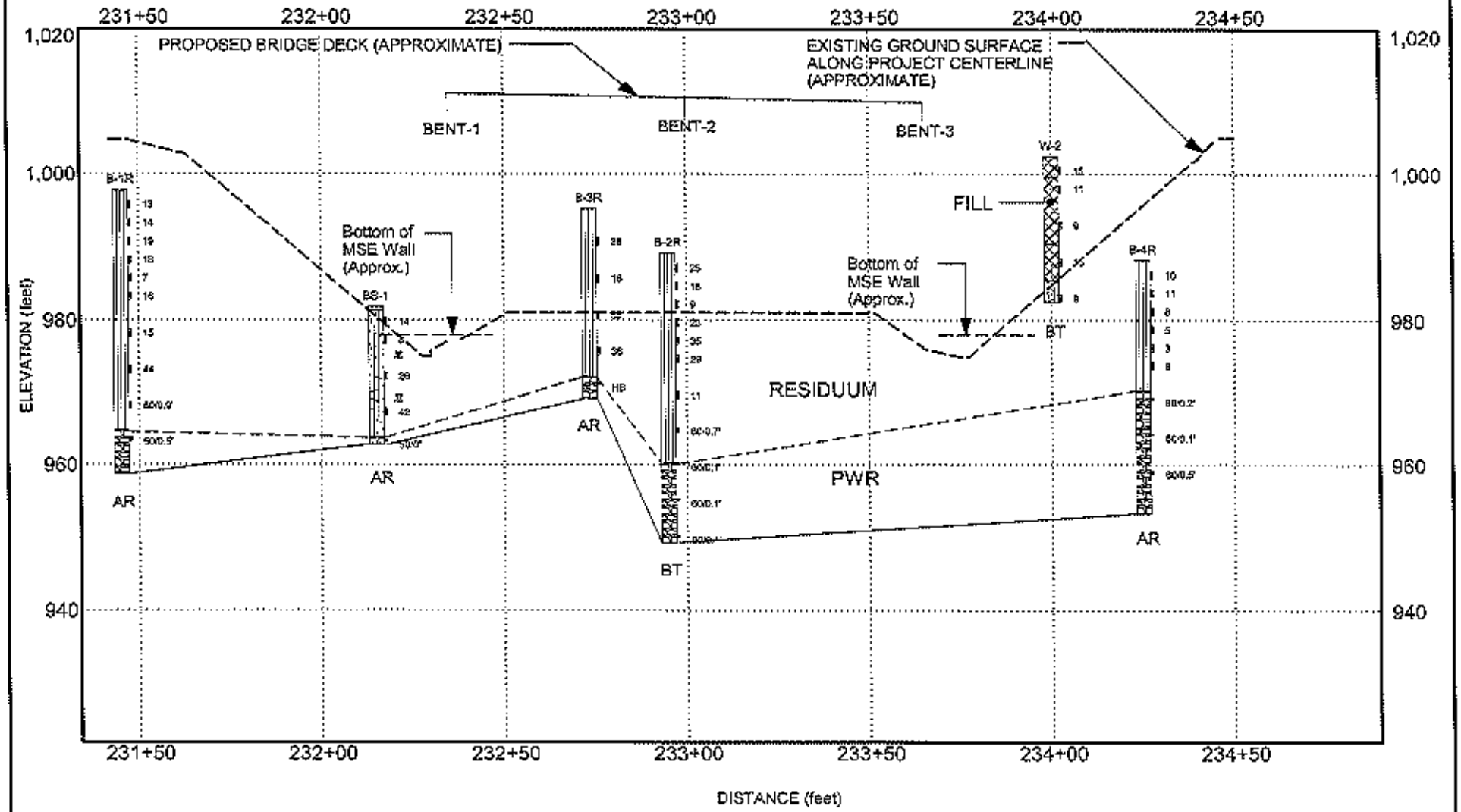
SCALE : 1 inch = 20 feet (vertical)
1 inch = 40 feet (horizontal)

NOTE:
1. Borings B-1L, B-2L and B-3L were performed by GDOT in 1977.
2. Boring B-1L is plotted 10 feet right from the actual location for clarity.

GENERALIZED SUBSURFACE PROFILE
SECTION A-A'
(LT. BRIDGE and MSE Walls)

I-575 over M-9020 (Bells Ferry Road)
GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256
Cobb County, Gerogia

PROJECT #	DATE	FIGURE
171-3099D	August 20, 2008	3



LEGEND:
- ∓ - Groundwater Table @ 24 hours
- ∓ - Groundwater Table @ Time of Boring
- AR - Auger Refusal
- BT - Boring Terminated
- PWR - Partially Weathered Rock
- HB- Hammer Bounce

SCALE : 1 inch = 20 feet (vertical)
1 inch = 40 feet (horizontal)

NOTE:
1. Borings B-1R, B-2R, B-3R and B-4R were performed by GDOT in 1977.
2. Boring B-3R is plotted 10 feet left and W-2 is plotted 20 feet left from the actual boring location for clarity.

GENERALIZED SUBSURFACE PROFILE
SECTION B-B'
(RT. BRIDGE and MSE Walls)

I-575 over M-9020 (Bells Ferry Road)
GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256
Cobb County, Gerogia

PROJECT #	DATE	FIGURE
171-3099D	August 20, 2008	4

APPENDIX I

WE

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count , the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

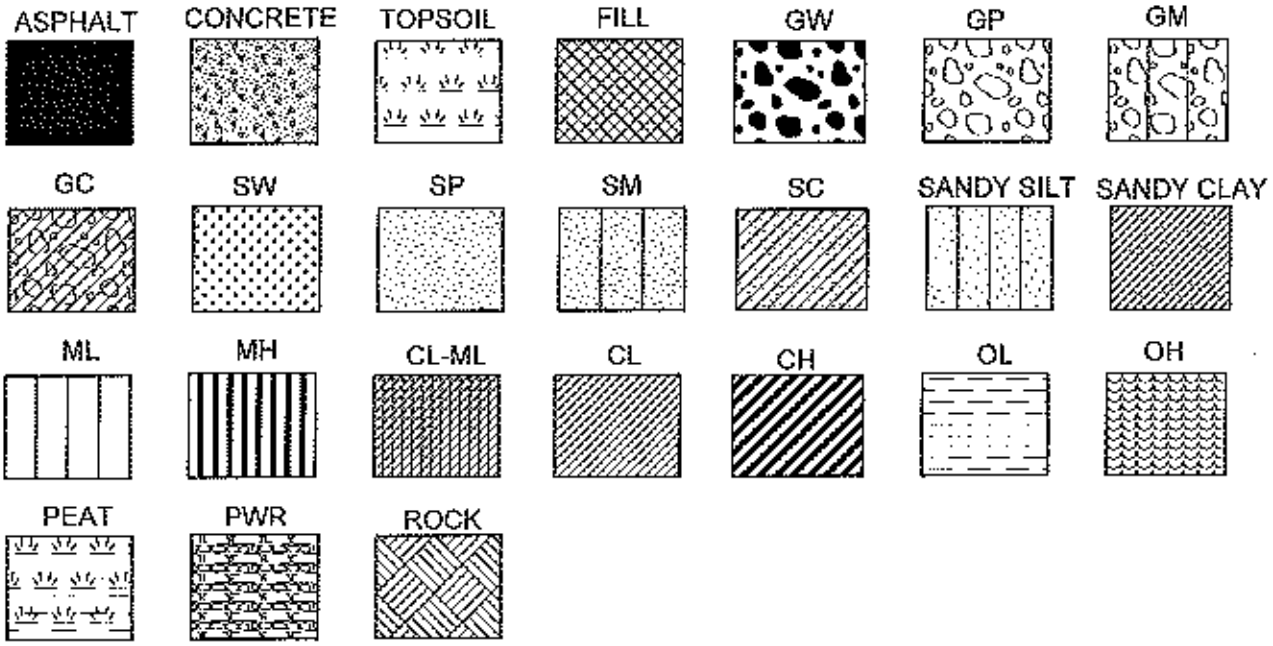
SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

NOTES:

Groundwater Measurements:

- Water level at time of backfilling
- Water level at time of boring
- Caved level at 24 hours



Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED #4 SIEVE	CLEAN GRAVELS LITTLE OR NO FINES	(GW)	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			(GP)	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	(GM)	SILTY GRAVELS and GRAVEL-SAND-SILT MIXTURES
			(GC)	CLAYEY GRAVELS and GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING #4 SIEVE	CLEAN SAND LITTLE OR NO FINES	(SW)	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(SP)	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	(SM)	SILTY SANDS and SAND-SILT MIXTURES
			(SC)	CLAYEY SANDS and SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		(ML)	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			(CL)	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			(OL)	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		(MH)	INORGANIC ELASTIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
			(CH)	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			(OH)	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			(PT)	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

Wagner Engineering Inc. WE

ENGINEERING DESCRIPTION
OF
ROCK HARDNESS

Hardness	Description
Very hard	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of geologist's pick.
Hard	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
Moderately hard	Can be scratched with knife or pick. can be excavated by hard blow of point of a geologist's pick. Hand specimens can be detached by moderate blow.
Medium	Can be grooved or gouged 1/16 inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1 inch maximum size by hard blows of the point of a geologist's pick.
Soft	Can be gouged or grooved readily with knife or pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
Very soft	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1 inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail.
Partially Weathered Rock	For engineering purposes, partially weathered rock (PWR) is locally defined as residual soils exhibiting Standard Penetration Test N-values in excess of 50 blows for 6 inches of penetration.

WILLE ENGINEERING INC. | WE

Project: I-575 over M-9020 (Bells Ferry Road)
Location: Cobb County, Georgia
Project Number: 171-3099D; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256

HOLE No. BB-1
Sheet 1 of 1
Location: BENT - 1

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 981.80 Station: ST. 232+15, 80' Rt. of CL
Drilling Equipment: CME 550 Drilling Method: HSA
Core Boxes: -- Samples: 5 Overburden (ft): 19 Rock (ft): -- Total Depth (ft): 19.0
Logged By: MK Date Drilled: 10/1/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	ROD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
					CONCRETE = 6 inches	981.8	
		SS			RESIDUUM: Loose, medium dense and dense reddish brown to brown and tan silty medium to fine **SAND** with quartz fragments	SM	
		SS					14
5		SS				980	8
						975	
10		SS					26
						970	
15		SS					42
						965	
		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense brown and tan silty medium to fine **SAND** with rock fragments	PWR	50/0"

Auger refusal encountered at 19 feet below existing ground surface

Groundwater was encountered at 13 feet below existing ground surface at time of boring and at 7 feet below existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

Bottom of MSE Wall (Approx.)

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. BB-1

GPTN 171-3099D.GPJ 12/6/07

WILLIAMS ENGINEERING INC. WE

Project: I-575 over M-9020 (Bells Ferry Road)
Location: Cobb County, Georgia
Project Number: 171-3099D; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256

HOLE No. BB-2
Sheet 1 of 1
Location: BENT - 2

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 974.89 Station: ST. 233+85, 80' Lt. of CL
Drilling Equipment: CME 550 Drilling Method: HSA
Core Boxes: -- Samples: 5 Overburden (ft): 20 Rock (ft): -- Total Depth (ft): 20.0
Logged By: MK Date Drilled: 10/1/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)
0					CONCRETE = 5 inches	974.9
					GRADED AGGREGATE BASE = 7 inches (GAB)	
		SS			RESIDUUM: Loose to very dense reddish brown to brown and tan silty medium to fine **SAND** with rock fragments (SM)	
5		SS				970
10		SS				965
15		SS				960
					PARTAILLY WEATHERED ROCK: Sampled as very dense black, brown and tan silty medium to fine **SAND** with rock fragments (PWR)	
20		SS				955

Auger refusal encountered at 20 feet below existing ground surface

Groundwater was encountered at 4 feet below existing ground surface at time of boring and at 2 feet below existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)

5 10 20 40 60 80

Bottom of MSE Wall El 978.0 (Approx.)

N-VALUE
8
15
15
65
50/5"

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. BB-2

8FTN_171-3099D.GPJ 12/8/07

Williams Engineering, Inc. WE

Project: I-575 over M-9020 (Bells Ferry Road)
Location: Cobb County, Georgia
Project Number: 171-3099D; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256

HOLE No. W-1
Sheet 1 of 1
Location: MSE Wall No.6

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 1011.01 Station: ST. 231+80, 75' Lt. of CL
Drilling Equipment: CME 550 Drilling Method: HSA
Core Boxes: -- Samples: 4 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 15.0
Logged By: MK Date Drilled: 10/4/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 1 inch / FILL	1011.0		
		SS			FILL : Medium dense reddish brown and tan silty medium to fine **SAND** with GAB and rock fragments	1010		21
5		SS						14
						1005		
		SS			RESIDUUM : Loose to medium dense silty medium to fine **SAND** (slightly micaceous) SM			11
10						1000	Bottom of MSE Wall (Approx.)	
		SS						10
15								
					Boring terminated at 15 feet below existing ground surface			
					Groundwater was not encountered at time of boring.			

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. W-1

SSTN 171-3099D.GPJ 12/5/07

WILLMER ENGINEERING, INC. | WE

Project: I-575 over M-9020 (Bells Ferry Road)
Location: Cobb County, Georgia
Project Number: 171-3099D; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256

HOLE No. W-2
Sheet 1 of 1
Location: MSE Wall No. 7

Azimuth: -- Angle from Horizontal: 90 Surface Elevation (ft): 1002.50 Station: ST. 234+20, 75' Rt. of CL
Drilling Equipment: CME 550 Drilling Method: HSA
Core Boxes: -- Samples: 5 Overburden (ft): -- Rock (ft): -- Total Depth (ft): 20.0
Logged By: MK Date Drilled: 10/3/07

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 1 inch / FILL FILL : Medium dense reddish brown and tan silty medium to fine SAND / FILL	1002.5	
5		SS			Loose and medium dense reddish brown and tan silty medium to fine SAND with gravel	1000	15 11
10		SS				995	9
					Medium dense dark brown silty medium to fine SAND with organic odor FILL	990	
15		SS					13
					RESIDUUM : Loose reddish brown silty coarse to fine SAND SM	985	
20		SS					9
					Boring terminated at 20 feet below existing ground surface Groundwater was not encountered at time of boring.		

STANDARD PENETRATION TEST DATA (blows/foot)
5 10 20 40 60 80

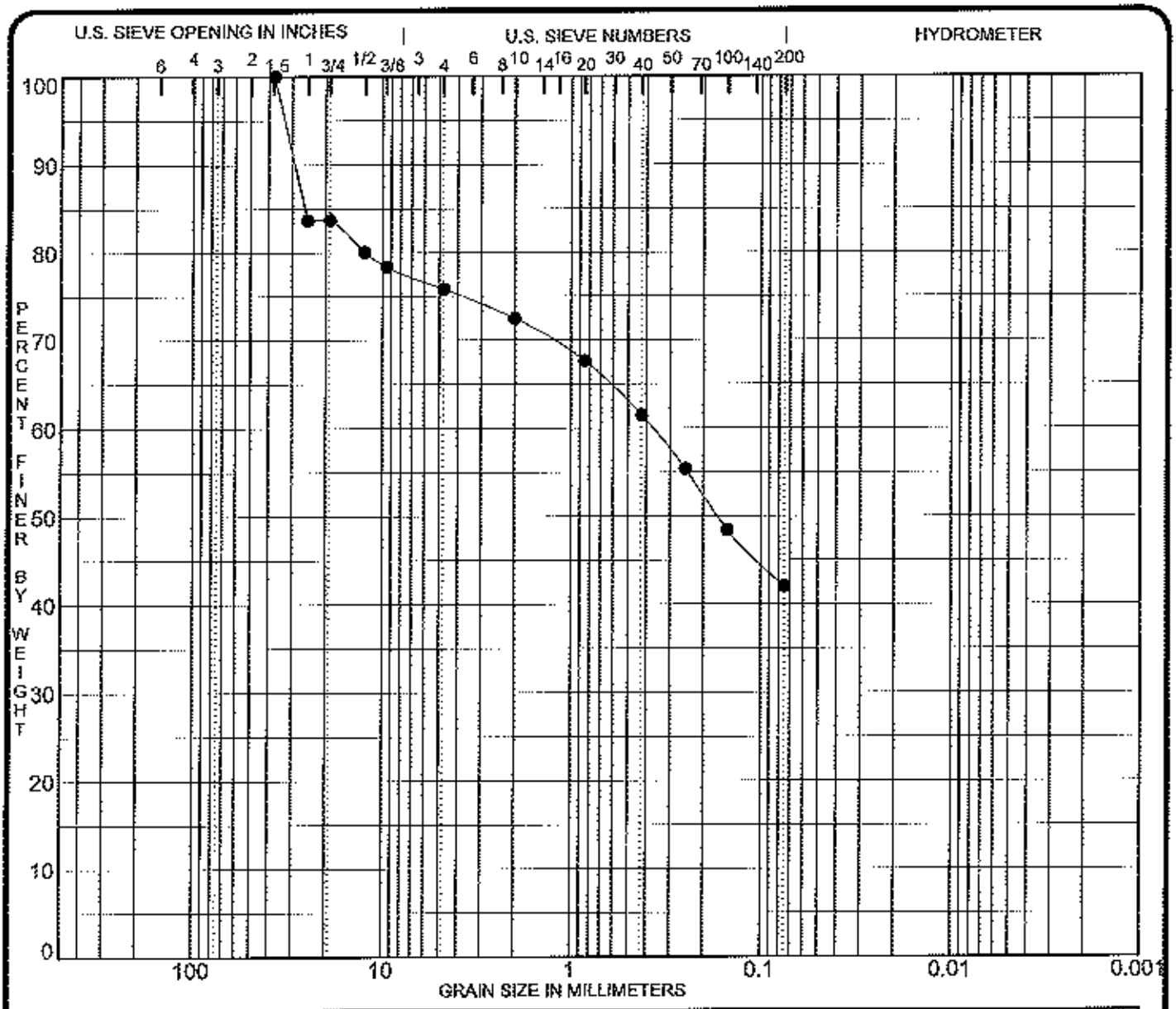
Bottom of MSE Wall (Approx)

SAMPLER TYPE
SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD
HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No.
W-2

171-3099D.GPJ, 12/6/07



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Soil Description	MC%	LL	PL	PI	Cc	Cu
● W-2 (3.5-5 ft)	Brown silty medium to fine SAND with gravel (micaceous)						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● W-2 (3.5-5 ft)	37.50	0.37			24.2	33.7	42.1	

PROJECT I-575/M-9020 (Bells Ferry Rd), Cobb County,GA
GDOT Proj. # CSNHS-0008-00(256); PI # 0008256

JOB NO. 171-3099 D
DATE 12/7/07

WE SOLUTIONS, INC. WE

GRADATION CURVE

APPENDIX II

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 3/1/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-1L

BENT NO. 1 FOOTING GROUND ELEV. 990.66

PROPOSED FOOTING ELEV. PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
	Gr. El.												
990	Med.Dense Mitc. Micas. Clayey Sandy Silt	1s	23										
Swt	Dse. Mitc. Micas. Sdy. Slt	2s	26										
	V.Dse. Weathered Boulder	3s	60=2"										
980	Dse. Mitc. Micas. Sandy Silt W/Weath. Rock	4s	36										
		5s	36										
	Medium Dense Same	6s	21										
970	Dse. Mitc. Micas. Sandy Silt W/Weathered Rock	7s	33										
	Very Dense Same	8s	60=7"										
	V.Hd.Weath. Granite												
960	Refusal												

The Department of Transportation in making this foundation report available to contractors assumes no responsibility for its accuracy.

No claim will be considered if the contractor relies on this information in his bidding or in his construction operations and finds that it is inaccurate.

This foundation investigation report is not considered as a part of the Plans and Specifications or Contract on the job.

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

PROJECT CSNHS-0008-00 (256) PI No. 0008256 COUNTY Cobb DATE 2/28/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-1R

BENT NO. 1 FOOTING ______ GROUND ELEV. 997.75

PROPOSED FOOTING ELEV. ______ PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
1000	Gr. El.												
	Med.Dense Red Micos. Clayey Sdy. Silt	1s	13										
		2s	14										
990		3s	19										
	Medium Dense Mltc. Sandy Silt	4s	18										
	Loose Same	5s	7										
960	Medium Dense Mltc. Micos. Sandy Silt W/ Weathered Rock	6s	16										
		7s	15										
970	Dense Same	8s	44										
	Very Dense Weath. Granite	9s	60÷9'										
		10s	60÷5'										
960	Rock												
	Refusal												

The Department of Transportation in making this foundation report ... assumes no responsibility ...
No claim will ... or relief ...
in the ... it is ...
This ...
con...

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 3/1/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-2L

BENT NO. 2 FOOTING — GROUND ELEV. 983.44

PROPOSED FOOTING ELEV. — PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
	Gr. El. 7												
980	Med. Dense Mitc. Micas. Clayey Sandy Silt	1s	17										
		2s	27										
	Dse. Mitc. Micas. Sdy Silt W/ Weathered Rock	3s	47										
		4s	34										
970	Medium Dense Same	5s	14										
	Dse. Mitc. Micas. Sdy. Silt W/ Weathered Rock	6s	40										
		7s	57										
960	Very Dense Same	8s	60=3"										
		9s	60=2"										
950	Very. Hard Weath. Granite												
940	End Drilling												

The Department of Transportation in making [illegible] available to contractors [illegible] responsibility for its accuracy.

[illegible] derived if the contractor [illegible] interpretation in his bidding or [illegible] operations and finds that [illegible]

[illegible] investigation report is not [illegible] a part of the Plans and Specifications [illegible] on the job.

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 2/28/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-2R

BENT NO. 2 FOOTING GROUND ELEV. 989.16

PROPOSED FOOTING ELEV. PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
990	Gr. El												
	Dense Mitc. Micas. Sandy Silt	1s	25										
	Medium Dense Same	2s	18										
980	Lse. Mitc. Micas. Sdy. Slt	3s	9										
	Medium Dense Same	4s	23										
	Dse. Mitc. Sdy. Silt W/ Weathered Rock	5s	35										
		6s	29										
970	Medium Dense Mitc. Sandy Silt W/Gravel	7s	11										
		8s	60=7"										
960	Very Dense Weath. Granite	9s	60=1"										
			60=1"										
950			60=1"										
	End Drilling												

...of interpretation in making ... to contractors ... for its accuracy. ... the contacts ... kking of ... that ... not ... ...

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

PROJECT CSNHS-0008-00 (256) PI No. 0008256 COUNTY Cobb DATE 3/1/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-3L

BENT NO. 3 FOOTING -- GROUND ELEV. 989.16

PROPOSED FOOTING ELEV. PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø		
990	Gr. El.														
	Med. Dense Mltc. Micas. Clayey Sandy Silt	1s	18												
Swt.	Medium Dense Mltc. Micas. Sandy Silt	2s	15												
980	Lse. Same W/ Gravel	3s	6												
	med. dense mltc. micas. sdy. silt w/ gravel	4s	17												
	Very Dense Mltc. Micas. Sandy Silt W/ Weathered Rock	5s	60												
		6s	60=2'												
970		7s	60=2'												
	Very Hard Rock														
	Refusal														

DOT 490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 3/2/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-3R

BENT NO. 2 FOOTING GROUND ELEV. 995.25

PROPOSED FOOTING ELEV. PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
	Gr. El.												
990	Medium Dse. to Dense Mitc. Micas. Sdy. Silt	1s	26										
		2s	16										
980	Very Dense Same		55										
	Dense Mitc. Micas. Sandy Silt	4s	36										
970	V. Dse. Weathered Rock	5s	HB										
	Very Hard Rock												
	Practical Refusal												

The Department of Transportation in making this foundation report available to contractors, assumes no responsibility for its accuracy.

No claim will be considered if the contractor relies on this information in his bidding or in his construction operations and finds that it is inaccurate.

This foundation investigation report is not considered as a part of the Plans and Specifications or Contract on this job.

DOT-490

DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND RESEARCH, FOREST PARK, GEORGIA

SOILS ENGINEERING AND GEOLOGY BRANCH

BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00 (256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 2/28/77

LOCATION I-575 over M-9020 (Bells Ferry Road) BORING NO. B-4R

BENT NO. 3 FOOTING GROUND ELEV. 988.25

PROPOSED FOOTING ELEV. PARTY CHIEF Hollis

ELEV.	BORING LOG		BLOW	UNIFIED	γ	W	Gs	% 200	% CLAY	LL	PI	C	ø
990	Gr. El. 7												
	Stiff Mltc. Sandy Silty Clay	1s	10										
	Same	2s	11										
980	Loose Mltc. Micas. Sandy Silt	3s	8										
		4s	5										
	V.Lse.Gray Micas.Sdy.Slt	5s	3										
	Loose Mltc. Micas. Sandy Silt	6s	8										
970		7s	60=2"										
	V.Dse.Weath. Rock	8s	60=1"										
960		9s	60=5"										
	Refusal												

The Department of Transportation is making this foundation report available to contractors assumes no responsibility for its accuracy.

No claim will be considered if the contractor relies on this information in his bidding or in his construction operations and finds that it is inaccurate.

This foundation investigation report is not [illegible] as a [illegible] of the [illegible] and specifications [illegible]