# BRIDGE AND RETAINING WALL
# FOUNDATION INVESTIGATION REPORT
## Shallowford Road over I-575
## Northwest Corridor Project

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

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**WILLMER ENGINEERING INC.**
Project No. ATL-171-3099F

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

Prepared For

**GEORGIA TRANSPORTATION PARTNERS**
Atlanta, Georgia

Prepared By

**WILLMER ENGINEERING INC.**
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Suite 165
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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**
**Shallowford Road over I-575**
**Northwest Corridor Project**
GDOT Project No. CSNHS-0008-00(256), PI No. 0008256
Cobb County, Georgia
Willmer Project No. ATL-171-3099F

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 Shallowford Road bridge over I-575 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 sufficient 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 investigations. The report was revised to incorporate 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 F - Shallowford Road\171-3099F REVISED BFI - Shallowford Road 08-22-08 Report.doc*

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

**Figures**

| | |
|---|---|
| Figure 1 | Project Location Map |
| Figure 2A | Boring Location Plan (Bridges) |
| Figure 2B | Boring Location Plan (MSE Walls) |
| Figure 3 | Generalized Subsurface Profile Section A-A' |
| Figure 4 | Generalized Subsurface Profile Section B-B' |
| Figure 5A | Generalized Subsurface Profile Section C-C' (South) |
| Figure 5B | Generalized Subsurface Profile Section C-C' (North) |

**Appendix I**

Boring Record Legend
Unified Soil Classification System Reference Sheet
Engineering Description of Rock Hardness
Boring Records: BB-1 through BB-3, and W-1 through W-8 (New Borings)
Laboratory Test Results

**Appendix II**

Boring Records: B-1 through B- 6 (Borings from Existing GDOT BFI Report)

Revision History:

| Revision | Issue Date | Document Status |
|---|---|---|
| A | January 8, 2008 | Issued for Review |
| 0 | January 15, 2008 | Issued for Use |
| 1 | August 22, 2008 | Issued for Use |

| BRIDGE FOUNDATION INVESTIGATION | |
|---|---|
| **Willmer Project Number** | ATL-171-3099F |
| **GDOT Project Number** | CSNHS-0008-00(256) |
| **Project P.I. Number** | 0008256 |
| **Location** | Shallowford Road Bridge over I-575, Cobb County, Georgia (see Figure 1). |
| | |
| **GENERAL INFORMATION** | |
| **Project Description** | The existing Shallowford Road bridge over I-575 is planned to be replaced with two new bridges as part of the proposed I-575 widening project. Each bridge will be a single span and about 96 feet long reinforced concrete structure. New high occupancy vehicle (HOV) ramps from I-575 up to Shallowford Road will be constructed between the two bridges.<br><br>The existing bridge has two spans and is supported on H-pile bents at the end bents and H-pile footing at the intermediate bent. The BFI report for the existing bridge was obtained from GDOT, and it includes six borings performed by GDOT in 1976. Subsurface information from those six borings was used along with three new borings performed as part of the present study. |
| | |
| **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, hornblende gneiss and biotite gneiss. |
| | |
| **Subsurface Features** | Subsurface information for this project was obtained from three borings (BB-1 through BB-3) performed by Willmer as part of the present study (see Appendix I) and six borings (B-1 through B-6) performed by GDOT in 1976 as part of the BFI for the existing bridges (see Appendix II).<br><br>The subsurface profile is generally comprised of fill and residuum underlain by partially weathered rock and parent bedrock. Borings BB-1 and BB-2 did not encounter any fill. It should be noted that the available logs for the GDOT borings B-1 through B-6 do not differentiate between fill and residuum in the soil description. The fill material consists of soft to firm sandy silt. The residual soils consist of loose to very dense silty sand.<br><br>During the present field investigation, ground water was encountered at all boring locations between elevations 911 and 913 feet. However, no ground water was recorded on the GDOT boring logs (1976). |
| | |

| **PWR AND AUGER REFUSAL ELEVATIONS** (feet) | | | | |
|---|---|---|---|---|
| **Bridge** | **Bent No.** | **Reference Boring No.** | **Top of PWR** | **Auger Refusal** |
| West | 1 | B-1 | 907 | ** |
| | | B-2 | * | ** |
| | 2 | B-3 | 910 | ** |
| | | B-4 | 900 | ** |
| | | BB-1 | 911 | 895 |
| East | 1 | BB-2 | 903 | 887 |
| | | B-3 | 910 | ** |
| | | B-4 | 900 | ** |
| | 2 | B-5 | 896 | ** |
| | | B-6 | 890 | ** |
| | | BB-3 | 887 | 883 |

* Boring did not encounter PWR.
** Boring was not extended to auger refusal.

| **MAXIMUM PILE DESIGN LOADS** | | | |
|---|---|---|---|
| **Pile Type** | **Load Transfer (%)** | | **Design Load** |
| | **Friction** | **End Bearing** | |
| H-Piles | 20 | 80 | 10 BP 42 = 55 Tons |
| | | | 12 BP 53 = 70 Tons |
| | | | 14 BP 73 = 96 Tons |
| | | | 14 BP 89 = 117 Tons |

| **FOUNDATION RECOMMENDATIONS** | | | |
|---|---|---|---|
| **Bridge** | **Bent No.** | **Pile Footing (Type)** | **Pile Bent (Type)** |
| West | 1 | | H |
| | 2 | | H |
| East | 1 | | H |
| | 2 | | H |

| **PILE TIP ELEVATIONS (feet)** | | | | |
|---|---|---|---|---|
| **Bridge** | **Bent No.** | **Reference Boring No.** | **H-Pile** | |
| | | | **Minimum Tip** | **Estimated Tip** |
| West | 1-Left | B-1, B-3 | 906± | 906± |
| | 1-Right | B-2, BB-1 | 908± | 908± |
| | 2-Left | B-1, B-3 | 910± | 905± |
| | 2-Right | BB-1 | 910± | 901± |
| East | 1-Left | BB-2 | 910± | 900± |
| | 1-Right | B-4, BB-3 | 899± | 897± |
| | 2-Left | BB-2, B-5 | 895± | 893± |
| | 2-Right | BB-3 | 890± | 884± |

**NOTES**

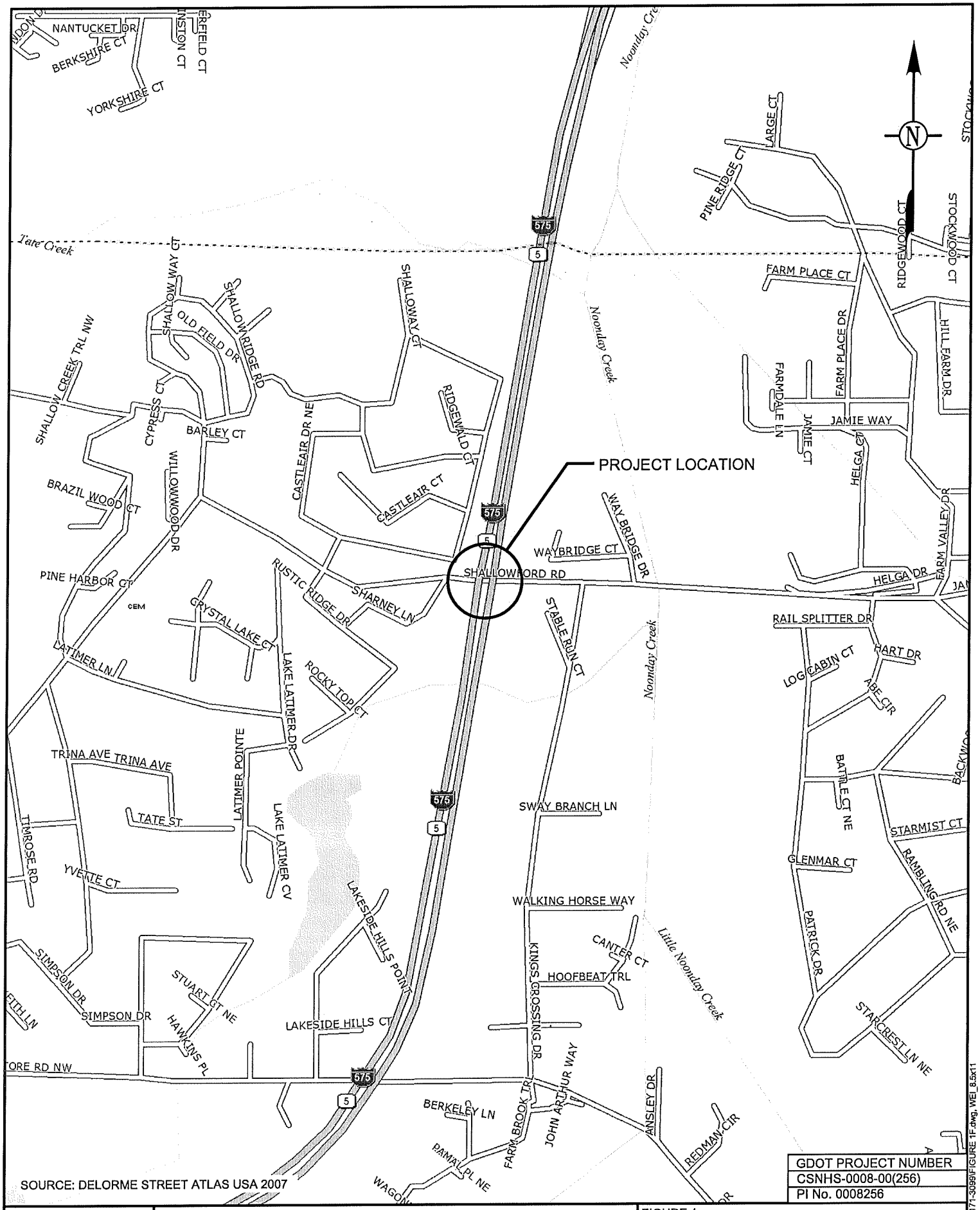
| | |
|---|---|
| **Elevations** | All elevations referenced in this report are based on Control Points No.130 (3/4" rebar, EL. 921.15 feet), No. 131 (3/4" rebar, EL. 928.35 feet) and No. 513 (5/8" rebar, EL. 924.75 feet) established by the surveyors. |
| | |
| **PDO** | Driving resistance after Minimum 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 and soft to firm sandy silt layers during construction of the MSE wall, we recommend that the piles at all bents 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 and Description** | Four MSE walls are proposed for the bridge abutments and new HOV ramps from I-575 up to Shallowford Road. Wall Nos. 10 and 11 extend from Station 448+00 along the two sides of the proposed HOV ramp to Station 463+00 (see Figures 2A and 2B). Wall Nos. 12 and 13 form the abutment and wing walls at Bents 1 and 4, respectively, of the Shallowford Road bridges over I-575 (see Figures 2A and 2B). The total length of each of Wall Nos. 10 and 11 is 1500 feet, and the lengths of Wall Nos. 12 and 13 are 190 and 170 feet, respectively. The maximum height of Wall Nos. 10 and 11 is about 28 feet with bottom elevations ranging from 915 to 927 feet and top elevations ranging from 922 to 949 feet. The maximum height of Wall No. 12 is about 25 feet with bottom elevations ranging from 920 to 922 feet and top elevations ranging from 928 to 947 feet. The maximum height of Wall No. 13 is about 20 feet with bottom elevations ranging from 920 to 922 feet and top elevations ranging from 928 to 941 feet. |
| | |
| **Subsurface Features** | The subsurface profile (see Figures 5A and 5B and boring logs for W-1 through W-8, BB-1, BB-2, B-3 and B-4) along the proposed walls is comprised of fill and residuum underlain by partially weathered rock (PWR). Fill material was not encountered at all boring locations. The fill consists of loose to medium dense silty sand and/or firm to stiff sandy silt. The residual soils consist of loose to dense silty sand, firm to stiff sandy silt and/or stiff clay with sand underlain by partially weathered rock.<br><br>Ground water was encountered at borings BB-1 through BB-3, W-3, W-5 and W-6 between elevations 903 and 913 feet. It should be noted that the borings 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:<br><br>Soil Unit Weight $\gamma$ = 125 pcf<br>Cohesion c = 0 psf<br>Angle of Internal Friction $\phi$ = 28 degrees<br>Coefficient of Sliding Friction $\mu$ = 0.40<br><br>The above design parameters assume the backfill material behind the MSE wall reinforced 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. The following steps are recommended for the MSE walls:<br><br>(i) Any soft/loose soils from beneath the wall should be over-excavated and replaced with compacted wall backfill material. The depth and extent of over-excavation should be determined by the project Geotechnical Engineer.<br><br>(ii) Allowable Bearing Pressures:<br><br>**Wall Nos. 10, 11 and 12**: For Wall Nos. 10, 11 and 12 we recommend a maximum allowable bearing pressure of 3,000 psf for use in design.<br><br>**Wall No. 13**: Soft sandy elastic silt was encountered up to a depth of about 10 feet below the bottom of the proposed MSE wall (see logs for BB-3, B-5 and B-6). We recommend this soil to be over-excavated and replaced with compacted MSE wall backfill material in accordance with the attached Removal/Rock Embankment and Endcap detail (Figure 6).The over-excavation should extend at least 5 feet laterally beyond each edge of the reinforced wall fill.<br><br>If the over-excavation extends near or below the ground water table, dewatering should be used to maintain the water table at a minimum depth of 2 feet below the excavated surface to facilitate proper compaction of the subgrade.<br><br>If there is standing water and it is not feasible to drain this area during construction, a mat of rock embankment should be placed to a height of 18 inches above the water level prior to placing normal fills.<br><br>With the subgrade prepared as described above, a maximum allowable soil bearing pressure of 3,000 psf is recommended for use in design.<br><br>(iii) If the design bearing pressure for the MSE walls exceed the above recommended maximum allowable bearing pressures, the MSE walls should be constructed in two stages to minimize differential settlement among the walls. 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 walls 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. After the waiting period, the MSE wall should be constructed to the final height.<br><br>(continued) |
| | |

| | |
|---|---|
| **Recommendations** (continued) | (iv) The backfill materials and drainage measures for the MSE walls should conform to GDOT standard specifications. |
| **Prepared By** | Murthy S. Kotha / Sujit K. Bhowmik, PhD, PE |
| | |
| **Senior Review By** | James L. Willmer, PE |

# FIGURES




SOURCE: DELORME STREET ATLAS USA 2007

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

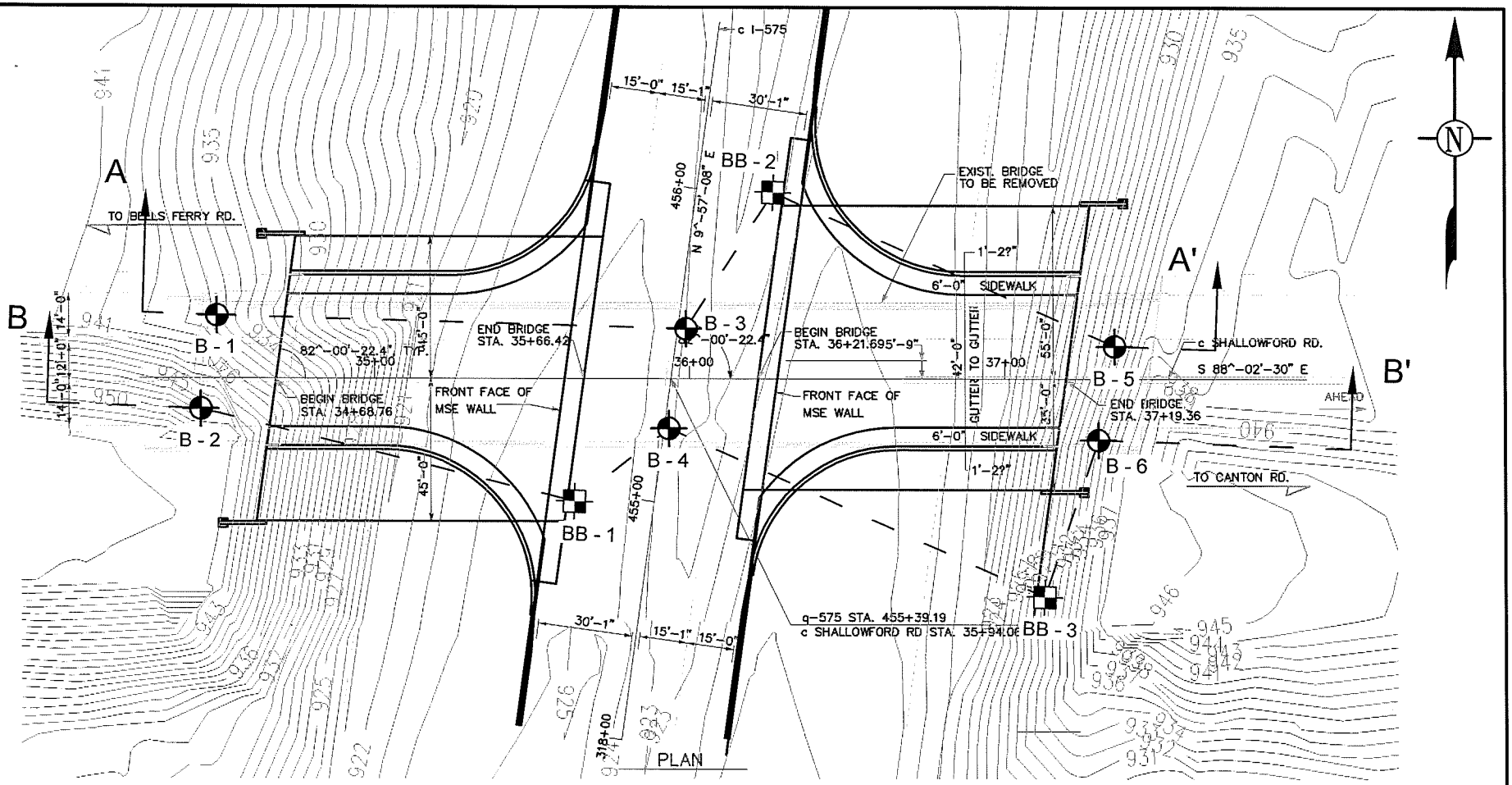
| |
|---|
| SCALE: 1" = 1000' |
| |
| DATE: 1/4/2008 |
| DRAWN BY: MDB |
| REVIEWED BY: MK |

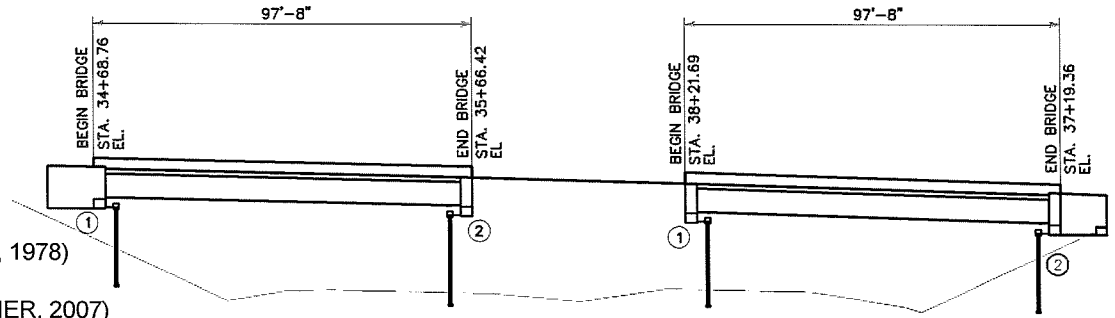
WILLMER ENGINEERING INC. WE

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

FIGURE 1
PROJECT LOCATION MAP
SHALLOWFORD ROAD OVER I-575
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099F

I:\AutoCAD\171-GEO\171-3099\FIGURE 1F.dwg, WEI_8.5x11




ELEVATION

LEGEND:

B - 1 BORING LOCATION (GDOT, 1978)

BB - 1 BORING LOCATION (WILLMER, 2007)

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

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

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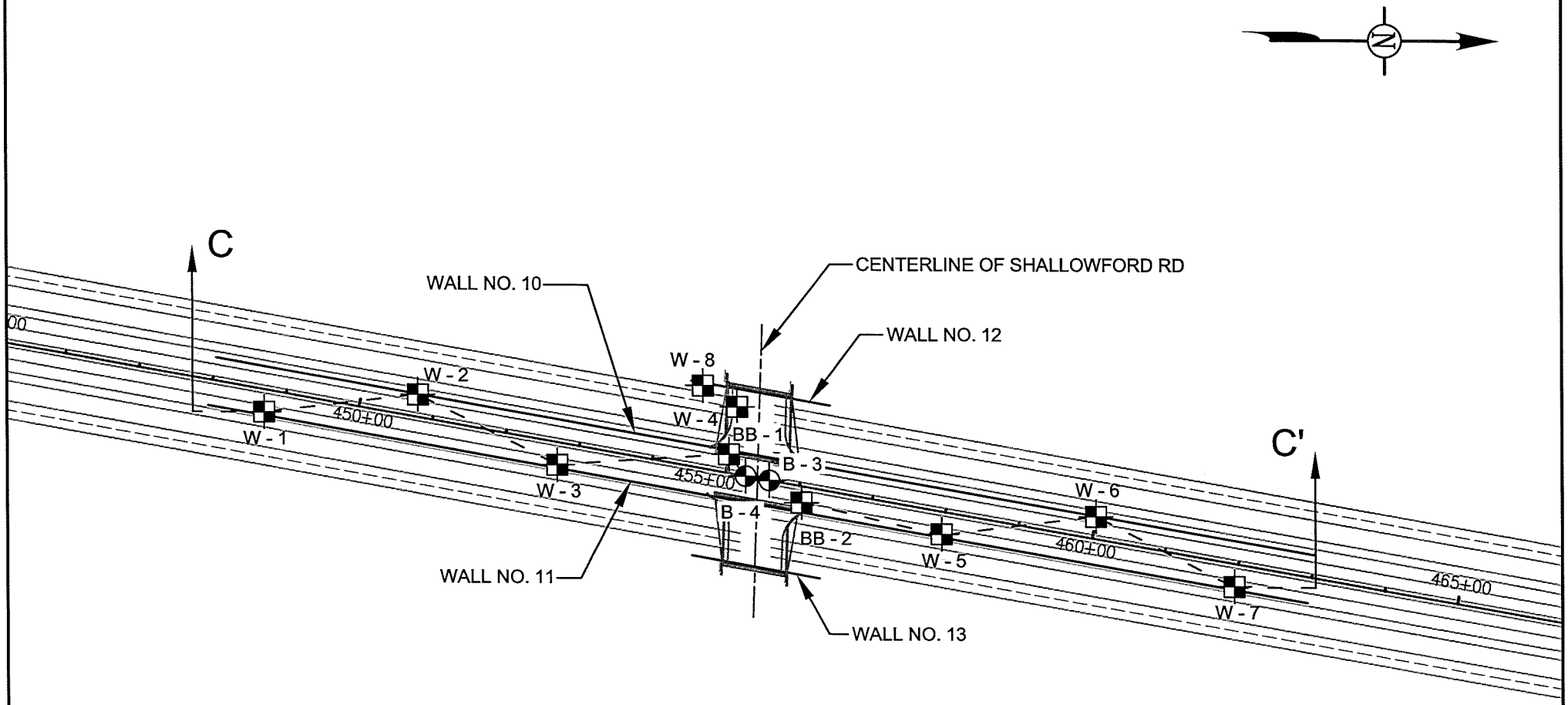
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2A
BORING LOCATION PLAN (BRIDGES)
SHALLOWFORD ROAD OVER I-575
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099F

I:\AutoCAD\171-GEO\171-3099\Revised Bridge plans\2004 Versions\Geo_Shallowford_PE_.dwg, WEL_11x8.5




LEGEND:

B - 3 BORING LOCATION (GDOT, 1976)

W - 1 BORING LOCATION (WILLMER, 2007)

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

| |
|---|
| SCALE: 1" = 200' |
| |
| DATE: 1/7/2008 |
| DRAWN BY: MDB |
| REVIEWED BY: MK |

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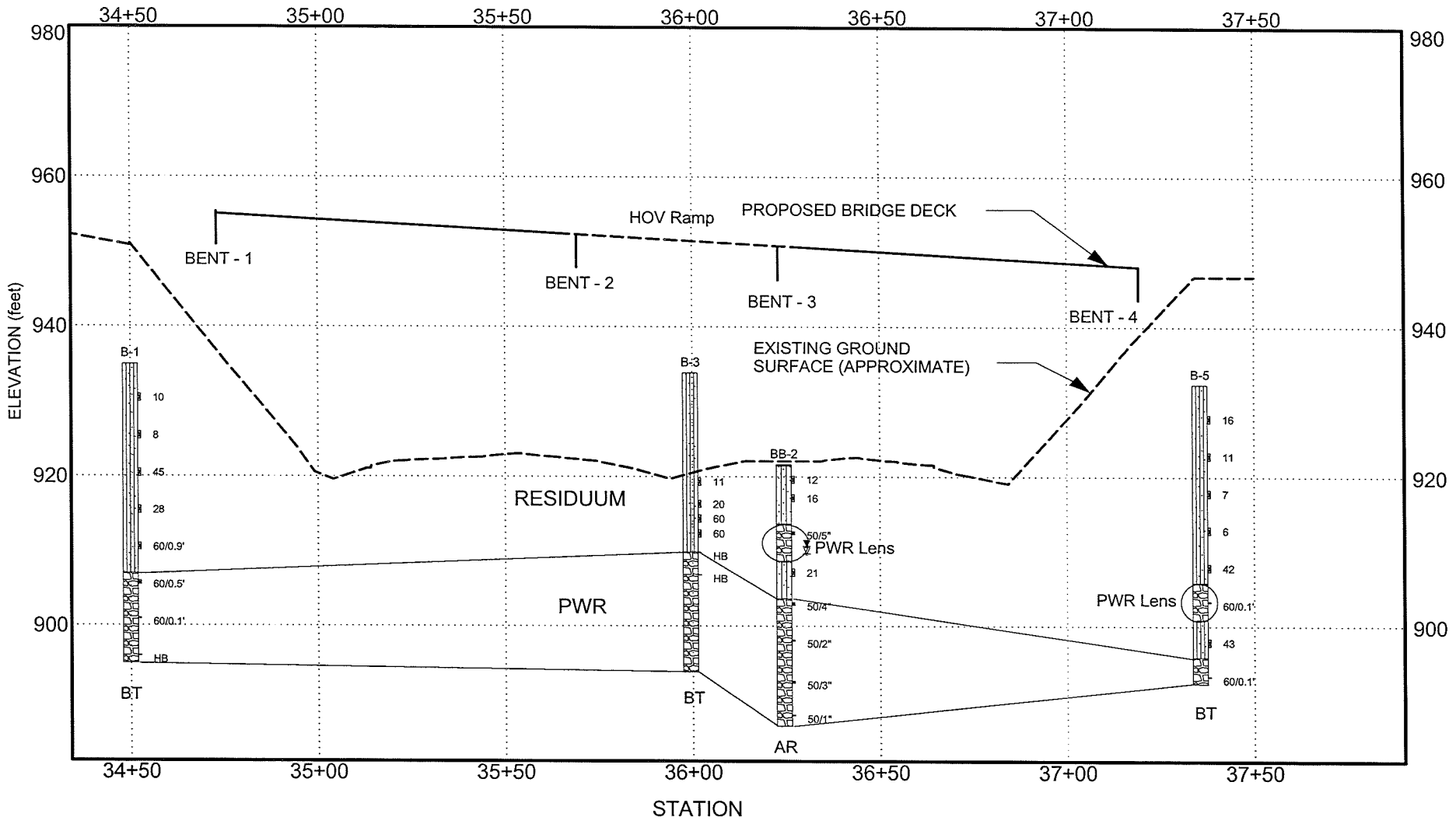
ATLANTA, GA 30340-4270

FIGURE 2B
BORING LOCATION PLAN (MSE WALLS)
SHALLOWFORD ROAD OVER I-575
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099F




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

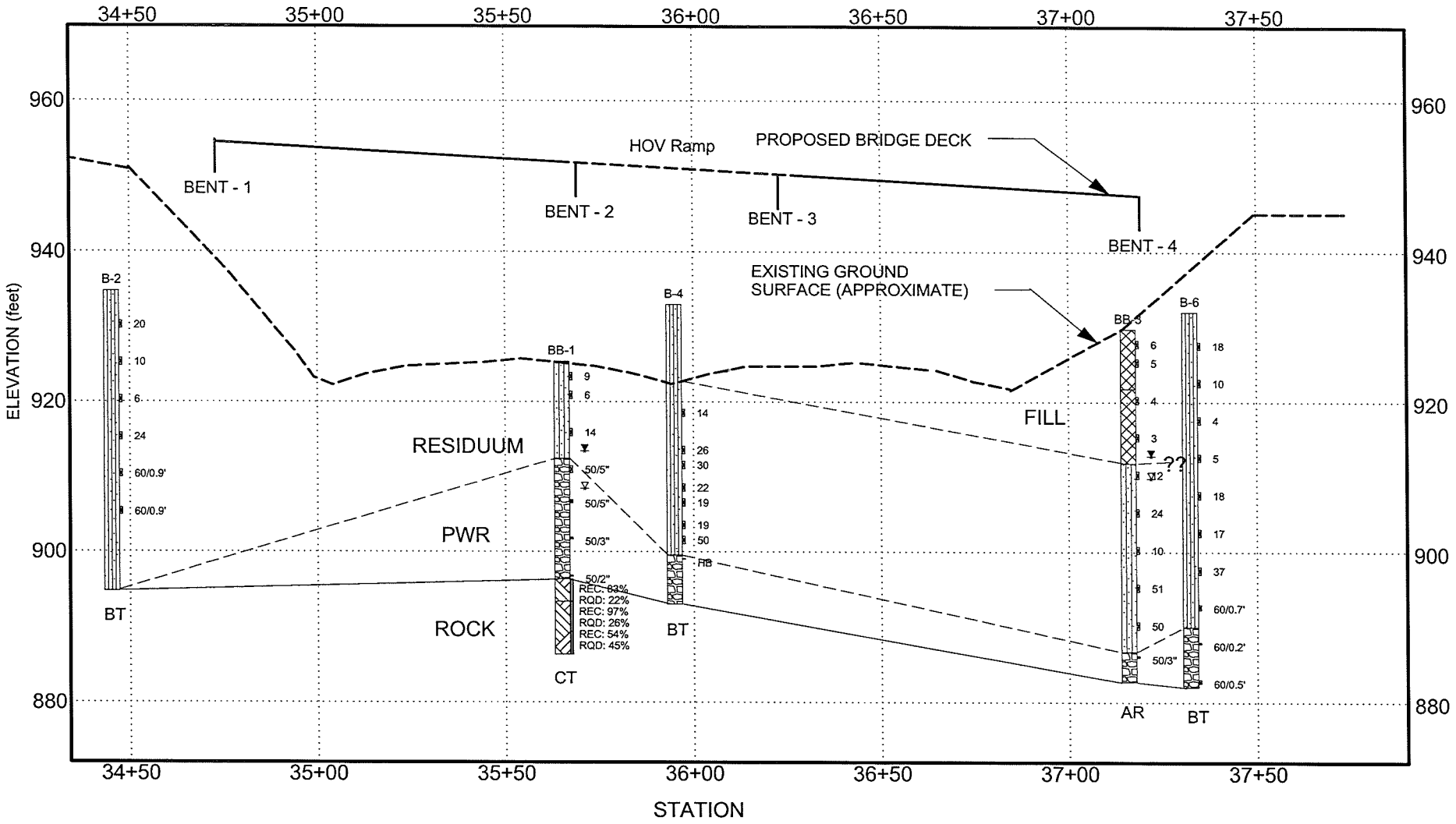
SCALE : 1 inch = 20 feet (vertical)
1 inch = 40 feet (horizontal)

Note: Borings B-1, B-3 and B-5 were drilled by GDOT in 1976.

## GENERALIZED SUBSURFACE PROFILE SECTION A-A'

Shallowford Road over I-575
GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256
Cobb County, Georgia

| PROJECT # | DATE | FIGURE |
|---|---|---|
| 171-3099F | Jan 02, 2008 | 3 |




LEGEND:
- ▼ - Groundwater Table @ 24 hours
- ▽ - Groundwater Table @ Time of Boring
- BT - Boring Terminated
- AR - Auger Refusal
- CT - Coring Terminated
- REC - Recovery
- RQD- Rock Quality Description
- PWR - Partially Weathered Rock
- HB - Hammer Bounce

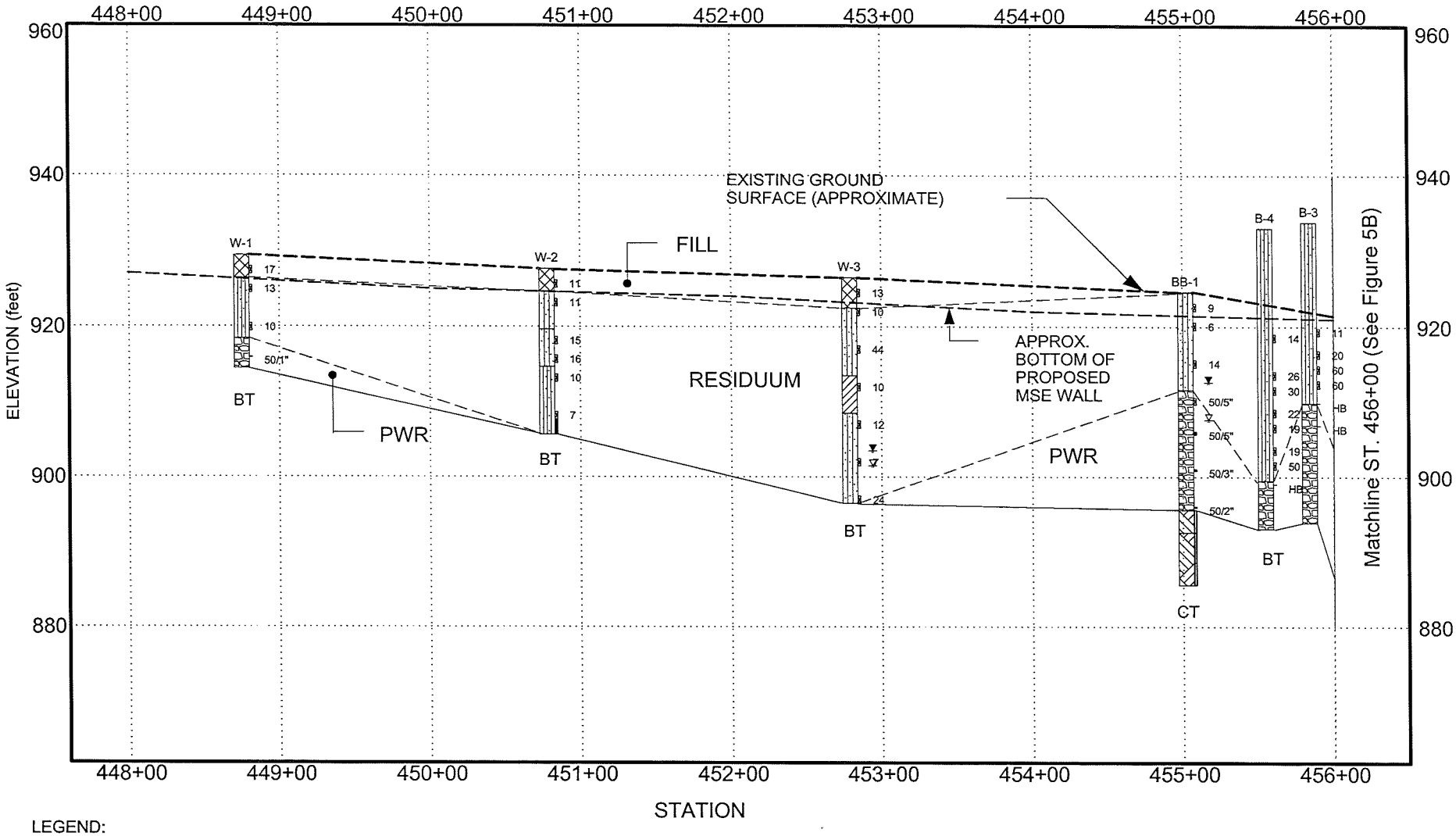
SCALE : 1 inch = 20 feet (vertical)
1 inch = 40 feet (horizontal)

Note: Borings B-2, B-4 and B-6 were drilled by GDOT in 1976.

## GENERALIZED SUBSURFACE PROFILE SECTION B-B'

Shallowford Road over I-575
GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256
Cobb County, Georgia

| PROJECT # | DATE | FIGURE |
|---|---|---|
| 171-3099F | Jan 03, 2008 | 4 |




LEGEND:
- ▼ - Groundwater Table @ 24 hours
- ▽ - Groundwater Table @ Time of Boring
- BT - Boring Terminated
- CT - Coring Terminated
- PWR - Partially Weathered Rock
- HB - Hammer Bounce
- REC - Recovery
- RQD - Rock Quality Description

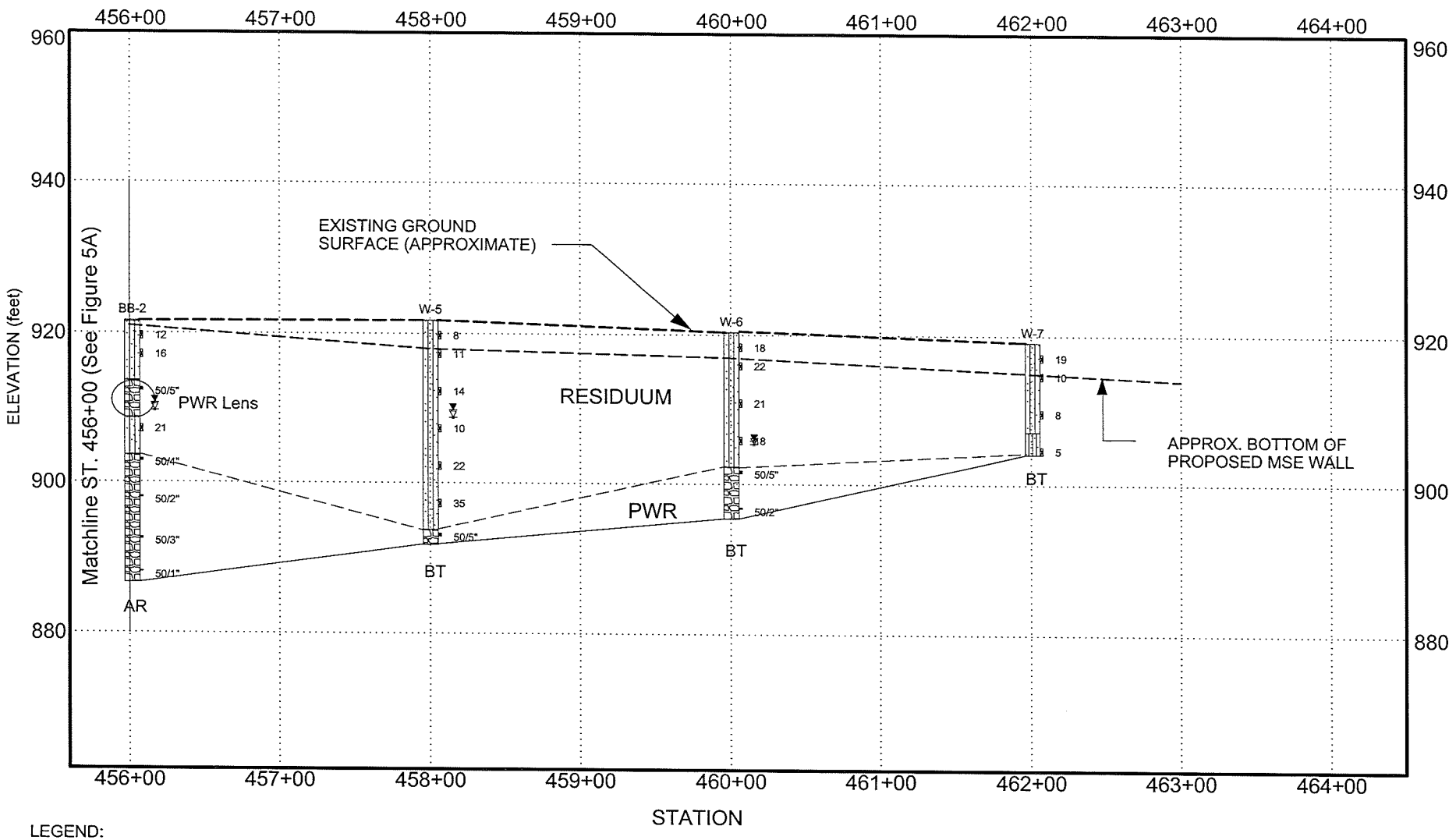
SCALE : 1 inch = 20 feet (vertical)
1 inch = 100 feet (horizontal)

Note: Borings B-3 and B-4 were drilled by GDOT in 1976 and they are plotted about 30 feet to the right of their actual location for clarity.

**GENERALIZED SUBSURFACE PROFILE**
**SECTION C-C' (South)**

Shallowford Road over I-575
GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256
Cobb County, Georgia

| PROJECT # | DATE | FIGURE |
|---|---|---|
| 171-3099F | Jan 04, 2008 | 5A |



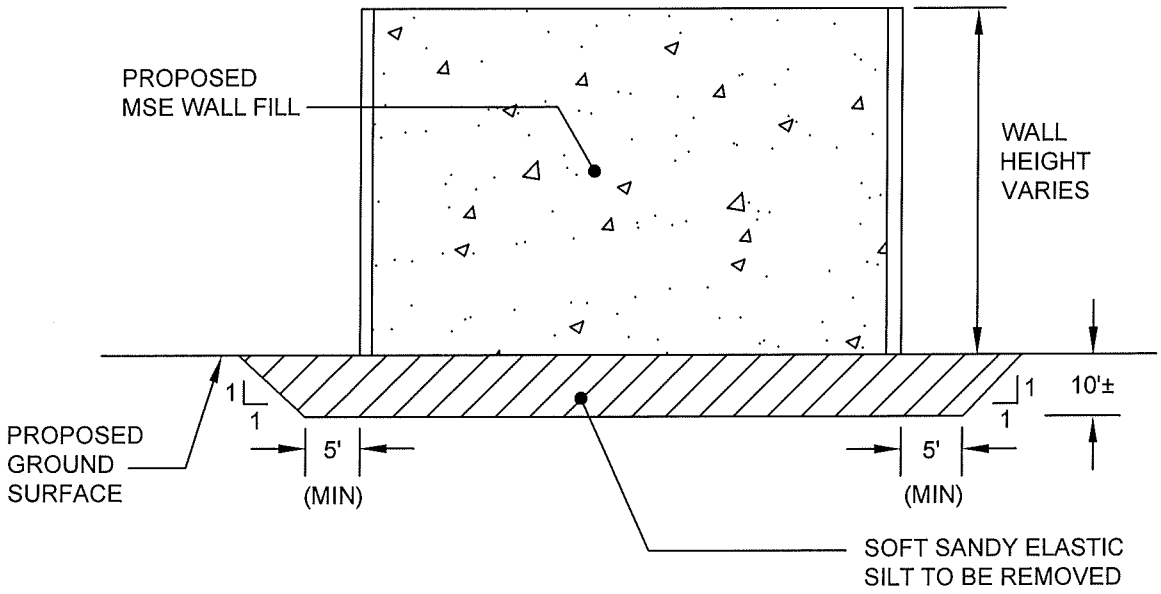

LEGEND:
- ▼ - Groundwater Table @ 24 hours
- ▽ - Groundwater Table @ Time of Boring
- BT - Boring Terminated
- AR - Auger Refusal
- PWR - Partially Weathered Rock

SCALE : 1 inch = 20 feet (vertical)
1 inch = 100 feet (horizontal)

## GENERALIZED SUBSURFACE PROFILE SECTION C-C' (North)

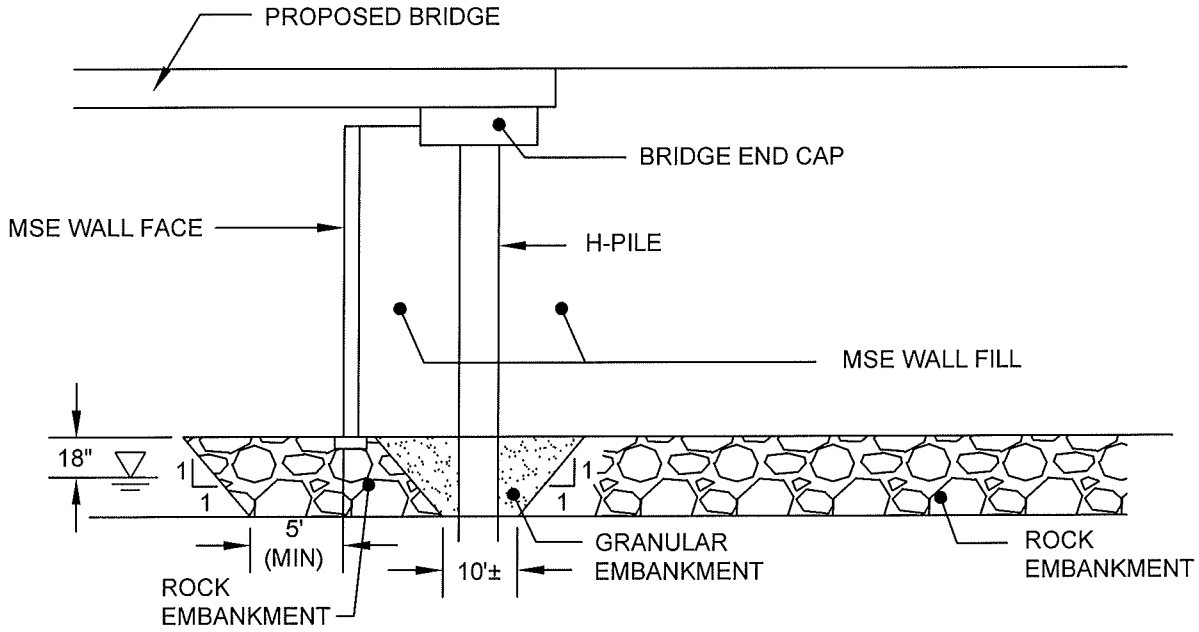
Shallowford Road over I-575
GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256
Cobb County, Georgia

| PROJECT # | DATE | FIGURE |
|---|---|---|
| 171-3099F | Jan 04, 2008 | 5B |




## REMOVAL DETAIL

NOT TO SCALE




## ROCK EMBANKMENT AT ENDCAP DETAIL

NOT TO SCALE

NOTES:

1. DETAIL APPLIES FROM STATION 37+19± TO 37+40± AS DIRECTED BY THE ENGINEER.

2. MATERIAL TO BE PLACED TO 18 INCHES ABOVE WATER LEVEL SHOULD BE ROCK EMBANKMENT, EXCEPT FOR THE AREAS IMMEDIATELY BENEATH THE ENDCAPS WHERE H-PILES WILL BE DRIVEN. IN THESE AREAS, GRANULAR EMBANKMENT SHOULD BE USED AS SHOWN.

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

| | | |
|---|---|---|
| SCALE: NTS | WILLMER ENGINEERING, INC. WE | GEOTECHNICAL ENGINEERING<br>CONSTRUCTION SERVICES<br>ENVIRONMENTAL SERVICES AND ENGINEERING<br>3772 PLEASANTDALE ROAD - SUITE 165<br>ATLANTA, GA 30340-4270 |
| DATE: 8/20/2008 | | |
| DRAWN BY: CBS | | |
| REVIEWED BY: SB | | |

FIGURE 6
ROCK EMBANKMENT DETAIL AT END BENT
SHALLOWFORD ROAD OVER I-575
NORTHWEST CORRIDOR PROJECT
COBB COUNTY, GEORGIA
WILLMER PROJECT No. ATL-171-3099F

I:\AutoCAD\171-GEO\171-3099\ROCK EMBANKMENT DETAIL AT END BENT.dwg, WEI_8.5x11

# APPENDIX I

WILLMER ENGINEERING INC. | 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 |

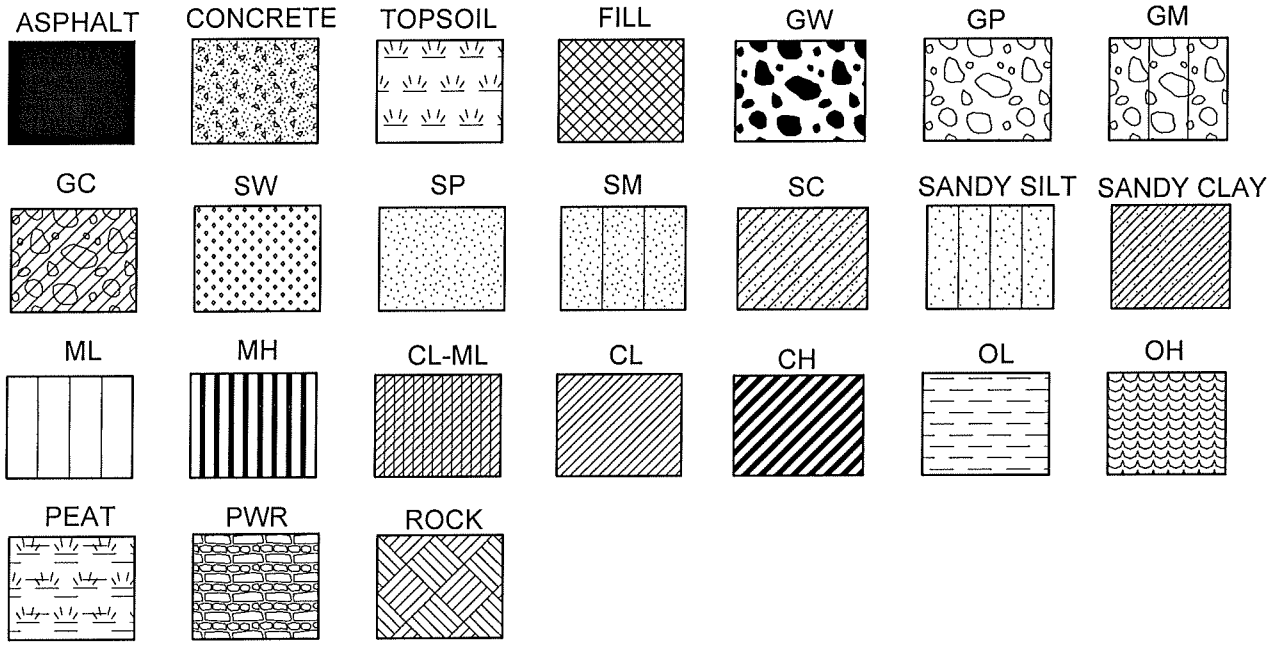
SANDS

| 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. | WE

Willmer Engineering Inc.
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Atlanta, Georgia 30340

# UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

| MAJOR DIVISIONS | | | LETTER SYMBOL | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|
| COARSE GRAINED SOILS<br><br>MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE | GRAVEL AND GRAVELLY SOILS<br><br>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<br><br>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<br><br>MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE | SILTS AND CLAYS<br><br>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<br>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 |

WILLMER 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. |

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

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

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **924.58** Station: **ST. 35+65, 40' Rt. of CL (Shlfrd. Rd.)**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: **1** Samples: **7** Overburden (ft): **29** Rock (ft): **10** Total Depth (ft): **39.0**

Logged By: **MK** Date Drilled: **10/15/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) | N-VALUE |
|---|---|---|---|---|---|---|---|
| | | | | | TOPSOIL = 1 inch SM | 924.6 | |
| 5 | | SS | | | RESIDUUM: Loose to medium dense brown silty medium to fine **SAND** (micaceous) | 920 | 9 |
| | | SS | | | | | 6 |
| 10 | | SS | | | | 915 | 14 |
| | | SS | | | PARTIALLY WEATHERED ROCK: PWR Sampled as very dense brown, black and tan silty medium to fine **SAND** with rock fragments (micaceous) | 910 | 50/5' |
| 15 | | SS | | | | | |
| 20 | | SS | | | | 905 | 50/5' |
| 25 | | SS | | | | 900 | 50/3' |
| | | SS | | | | | |
| 30 | | NQ | 83 | 22 | ROCK CORE: Gray and white moderately hard **BIOTITE GNEISS** with fractures | 895 | 50/2' |
| | | NQ | 97 | 26 | Gray and white moderately hard **BIOTITE GNEISS** | 890 | |
| 35 | | NQ | 54 | 45 | | | |

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

Bottom of MSE Wall (Approx.)

Auger refusal encountered at 29 feet below the existing ground surface.

Coring terminated at 39 feet below the existing ground surface.

Groundwater was encountered at 17 feet below the existing ground surface at the time of boring and at 12 feet below the existing ground surface at 24 hours after boring completion.

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

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. BB-2
Sheet 1 of 1
Location: **BENT - 3**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **921.64** Station: **ST. 36+23, 60' Lt. of CL (Shlfrd. Rd.)**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **8** Overburden (ft): **35** Rock (ft): -- Total Depth (ft): **35.0**

Logged By: **PT** Date Drilled: **10/8/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | | ELEVATION (feet) |
|---|---|---|---|---|---|---|---|
| 0 | | | | | TOPSOIL = 2 inches | SM | 921.6 |
| | | SS | | | RESIDUUM: Medium dense brown, gray and tan silty medium to fine **SAND** (micaceous) | | 920 |
| 5 | | SS | | | | | |
| | | | | | | | 915 |
| 10 | | SS | | | PARTIALLY WEATHERED ROCK : Sampled as very dense black and brown silty medium to fine **SAND** with rock fragments (micaceous) | PWR | 910 |
| | | | | | RESIDUUM : Medium dense black and brown silty medium to fine **SAND** (micaceous) | SM | |
| 15 | | SS | | | | | 905 |
| 20 | | SS | | | PARTIALLY WEATHERED ROCK; Sampled as very dense black, brown and tan to gray silty medium to fine **SAND** with rock fragments | PWR | 900 |
| | | SS | | | | | |
| 25 | | | | | | | 895 |
| 30 | | SS | | | | | 890 |
| | | SS | | | | | |
| 35 | | | | | Auger refusal encountered at 35 feet below the existing ground surface. | | |

Groundwater was encountered at 12 feet below the existing ground surface at the time of boring and at 11 feet below the 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.)

| N-VALUE |
|---|
| 12 |
| 16 |
| 50/5" |
| 21 |
| 50/4" |
| 50/2" |
| 50/3" |
| 50/1" |

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

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. BB-3
Sheet 1 of 1
Location: **BENT - 4**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **929.78** Station: **ST. 37+17, 65' Rt. of CL (Shlfrd. Rd.)**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **10** Overburden (ft): **47** Rock (ft): -- Total Depth (ft): **47.0**

Logged By: **PT** Date Drilled: **10/8/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) | STANDARD PENETRATION TEST DATA (blows/foot) | N-VALUE |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | FILL: Firm to soft reddish brown medium to fine sandy elastic **SILT** with rock fragments (micaceous) — FILL | 929.8 | | |
| 5 | | SS | | | | 925 | | 6 |
| | | SS | | | | | | 5 |
| 10 | | SS | | | | 920 | | 4 |
| 15 | | SS | | | | 915 | | 3 |
| 20 | | SS | | | RESIDUUM: Medium dense, loose, dense and very dense gray, white and black silty medium to fine **SAND** with rock fragments (micaceous) — SM | 910 | | 12 |
| 25 | | SS | | | | 905 | | 24 |
| 30 | | SS | | | | 900 | | 10 |
| 35 | | SS | | | | 895 | | 51 |
| 40 | | SS | | | | 890 | | 50 |
| 45 | | SS | | | PARTIALLY WEATHERED ROCK: Sampled as very dense gray, brown and tan silty medium to fine **SAND** with rock fragments — PWR | 885 | | 50/3" |

Auger refusal encountered at 47 feet below the existing ground surface.

Groundwater was encountered at 20 feet below the existing ground surface at the time of boring and at 17 feet below the existing ground surface at 24 hours after boring completion.

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-3**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-1
Sheet 1 of 1
Location: **Wall No. 11**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **929.40** Station: **ST. 448+75, 30' Rt. of CL**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **4** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **15.0**

Logged By: **PT** Date Drilled: **10/9/07**

| 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 |
|---|---|---|---|---|---|---|---|---|
| | | SS | | | FILL: Medium dense reddish brown silty medium to fine **SAND** with rock fragments — FILL | 929.4 | | 17 |
| 5 | | SS | | | RESIDUUM: Stiff reddish brown and tan medium to fine sandy **SILT** — ML | 925 | Bottom of MSE Wall (Approx.) | 13 |
| 10 | | SS | | | | 920 | | 10 |
| | | SS | | | PARTIALLY WEATHERED ROCK: Sampled as very dense red, brown and tan silty medium to fine **SAND** with rock fragments — PWR | 915 | | 50/1" |
| 15 | | | | | | | | |

Boring terminated at 15 feet below the existing ground surface.

Groundwater was not encountered at the time of boring completion.

**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**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-2
Sheet 1 of 1
Location: **Wall No. 10**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **927.64** Station: **ST. 450+75, 30' Lt. of CL**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **7** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **22.0**

Logged By: **PT** Date Drilled: **10/9/07**

| VERTICAL DEPTH (ft) | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) | N-VALUE |
|---|---|---|---|---|---|---|
| 0 | SS | | | FILL: Medium dense reddish brown silty medium to fine **SAND** with rock fragments — FILL | 927.6 | |
| | SS | | | RESIDUUM: Medium dense brown silty medium to fine **SAND** (micaceous) — SM | 925 | 11 |
| 5 | SS | | | | | 11 |
| | SS | | | Medium dense gray, brown and black silty medium to fine **SAND** with rock fragments — SM | 920 | 15 |
| 10 | SS | | | | | 16 |
| | SS | | | Stiff to firm brown and tan medium to fine sandy **SILT** — ML | 915 | 10 |
| 15 | SS | | | | | |
| | SS | | | | 910 | 7 |
| 20 | ST | | | Boring terminated at 22 feet below the existing ground surface. | | |

Groundwater was not encountered at the time of 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. **W-2**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-3
Sheet 1 of 1
Location: **Wall No. 11**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **926.45** Station: **ST. 452+75, 30' Rt. of CL**

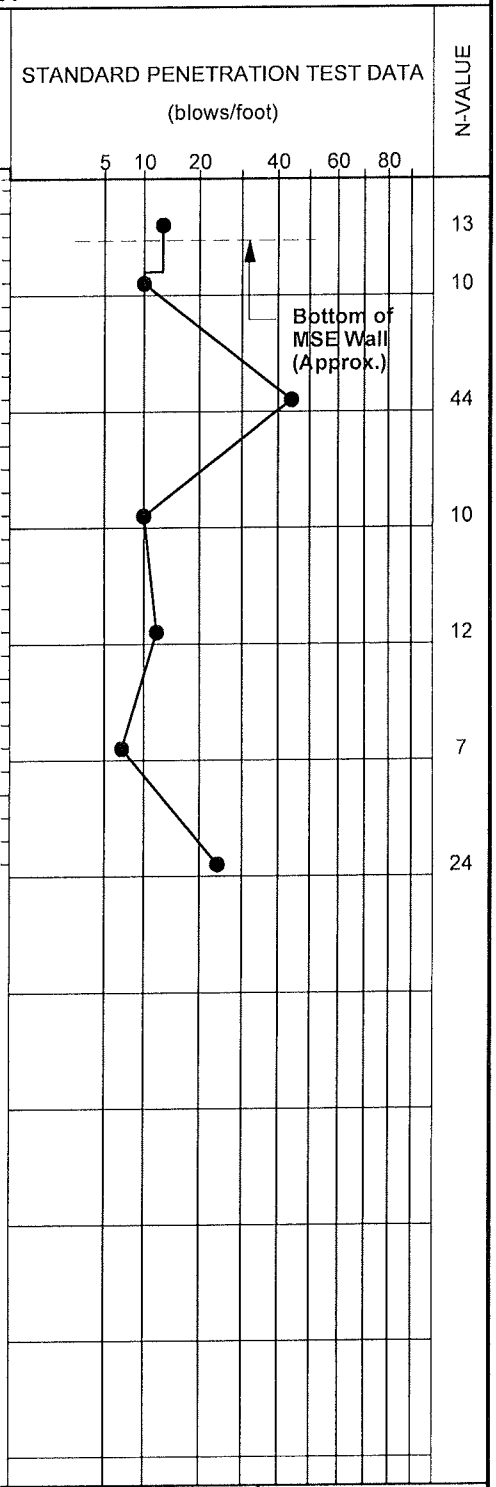
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **7** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **30.0**

Logged By: **PT** Date Drilled: **10/9/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) |
|---|---|---|---|---|---|---|
| 0 | | SS | | | FILL: Stiff reddish brown and tan medium to fine sandy **SILT** — FILL | 926.5 |
| 5 | | SS | | | RESIDUUM: Loose to dense brown, black and tan silty medium to fine **SAND** with rock fragments — SM | 925 |
| 10 | | SS | | | | 920 |
| 15 | | SS | | | Stiff tan **CLAY** with fine sand — CL | 915 |
| 20 | | SS | | | Loose and medium dense brown, gray and tan silty medium to fine **SAND** — SM | 910 |
| 25 | | SS | | | | 905 |
| 30 | | SS | | | Boring terminated at 30 feet below the existing ground surface. | 900 |

Groundwater was encountered at 25 feet below the existing ground surface at the time of boring and 23 feet below the existing ground surface at 24 hours after boring completion.




**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-3**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-4

Sheet 1 of 1
Location: **Wall No. 12**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **923.23** Station: **ST. 455+00, 90' Lt. of CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: -- Samples: **6** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **20.0**
Logged By: **PT** Date Drilled: **10/10/07**

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| | | SS | | | RESIDUUM : Firm reddish brown and brown medium to fine sandy **SILT** (micaceous) | ML | 923.2 | | 6 |
| 5 | | SS | | | | | 920 | Bottom of MSE Wall (Approx.) | 5 |
| | | | | | Medium dense to dense gray, white and brown silty coarse to fine **SAND** (micaceous) | SM | 915 | | 15 |
| 10 | | SS | | | | | 910 | | 35 |
| 15 | | SS | | | | | | | |
| | | SS | | | PARTIALLY WEATHERED ROCK : Sampled as very dense gray, white and brown silty medium to fine **SAND** with rock fragments (micaceous) | PWR | 905 | | 50/4" |
| 20 | | | | | Boring terminated at 20 feet below the existing ground surface. | | | | |

Groundwater was not encountered at the time of boring completion.

Undisturbed sample taken from an offset hole (5 feet from the original location)

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-4**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

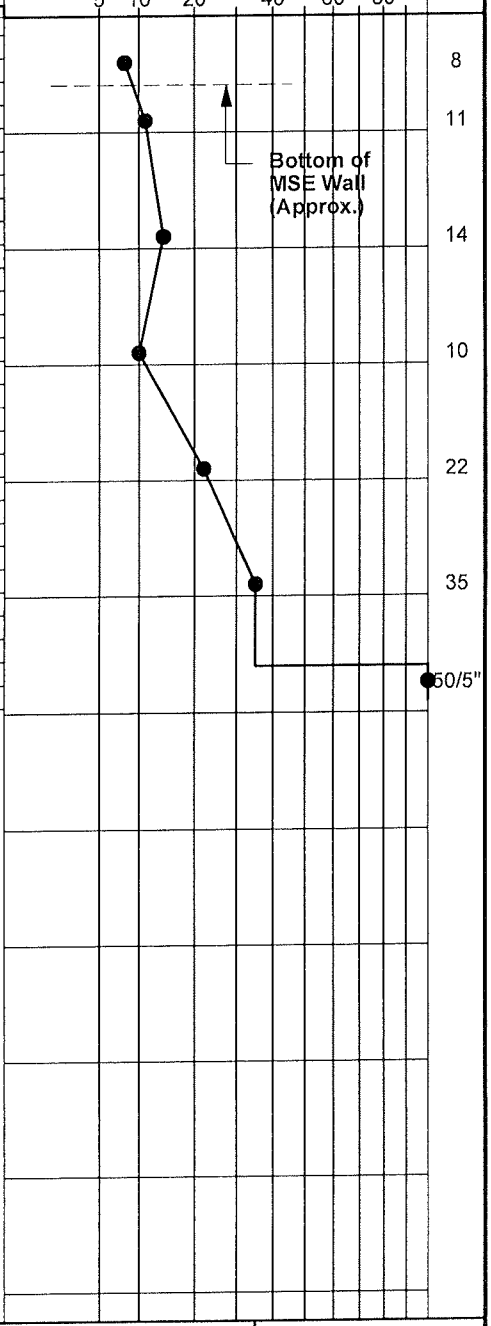
# HOLE No. W-5
Sheet 1 of 1
Location: **Wall No. 11**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **921.77** Station: **ST. 458+00, 30' Rt. of CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: -- Samples: **7** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **30.0**
Logged By: **PT** Date Drilled: **10/9/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) |
|---|---|---|---|---|---|---|
| 0 | | SS | | | RESIDUUM: Loose, medium dense and dense brown silty medium to fine **SAND** (micaceous) SM | 921.8 |
| 5 | | SS | | | | 920 |
| | | SS | | | | |
| 10 | | SS | | | | 915 |
| 15 | | SS | | | | 910 |
| 20 | | SS | | | | 905 |
| 25 | | SS | | | | 900 |
| | | SS | | | PARTIALLY WEATHERED ROCK : Sampled as very dense black, gray and brown silty medium to fine **SAND** PWR | 895 |
| 30 | | | | | Boring terminated at 30 feet below the existing ground surface. | |

Groundwater was encountered at 13 feet below the existing ground surface at the time of boring and at 12 feet below the existing ground surface at 24 hours after boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)




| N-VALUE |
|---|
| 8 |
| 11 |
| 14 |
| 10 |
| 22 |
| 35 |
| 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. **W-5**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-6

Sheet 1 of 1
Location: **Wall No. 10**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **920.37** Station: **ST. 460+00, 30' Lt. of CL**
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**
Core Boxes: -- Samples: **6** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **25.0**
Logged By: **PT** Date Drilled: **10/9/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) | STANDARD PENETRATION TEST DATA (blows/foot) | N-VALUE |
|---|---|---|---|---|---|---|---|---|
| 0 | | SS | | | RESIDUUM : Medium dense gray to brown and tan silty medium to fine **SAND** (micaceous) SM | 920.4 | | |
| | | SS | | | | 920 | | 18 |
| 5 | | SS | | | | 915 | | 22 |
| 10 | | SS | | | | 910 | | 21 |
| 15 | | SS | | | | 905 | | 18 |
| 20 | | SS | | | PARTIALLY WEATHERED ROCK : Sampled as very dense gray, white and tan silty coarse to fine **SAND** PWR | 900 | | 50/5" |
| 25 | | SS | | | | | | 50/2" |

Bottom of MSE Wall (Approx.)

Boring terminated at 25 feet below the existing ground surface.

Groundwater was encountered at 15 feet below the existing ground surface at the time of boring and at 14.5 feet below the existing ground surface at 24 hours after boring completion.

**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-6**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-7
Sheet 1 of 1
Location: **Wall No. 11**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **919.09** Station: **ST. 462+00, 30' Rt. of CL**

Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

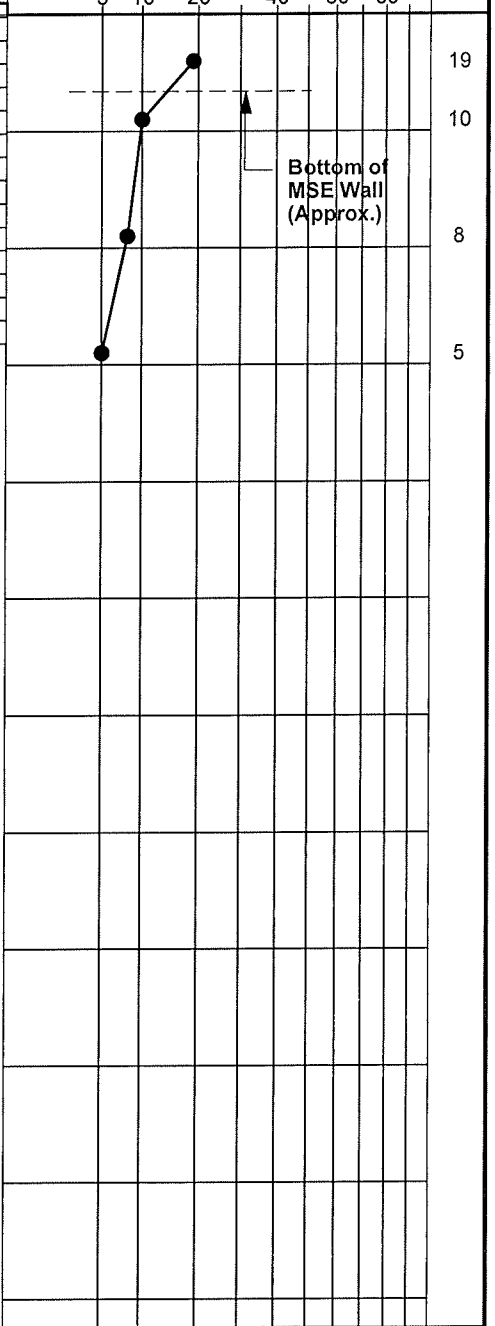
Core Boxes: -- Samples: **4** Overburden (ft): -- Rock (ft): -- Total Depth (ft): **15.0**

Logged By: **PT** Date Drilled: **10/9/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | ELEVATION (feet) |
|---|---|---|---|---|---|---|
| 0 | | | | | | 919.1 |
| | | SS | | | RESIDUUM : Medium dense to loose red, brown and tan silty medium to fine **SAND** **SM** | |
| 5 | | SS | | | | 915 |
| | | SS | | | | 910 |
| 10 | | | | | Firm gray and tan fine sandy **SILT** **ML** | |
| | | SS | | | | 905 |
| 15 | | | | | Boring terminated at 15 feet below the existing ground surface. | |

Groundwater was not encountered at the time of boring completion.

STANDARD PENETRATION TEST DATA (blows/foot)




N-VALUE: 19, 10, 8, 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. **W-7**

SPTN 171-3099F.GPJ 1/3/08

WILLMER ENGINEERING INC. | WE

Project: **Shallowford Road over I-575**
Location: **Cobb County, Georgia**
Project Number: **171-3099F; GDOT Proj. # : CSNHS-0008-00(256); PI # : 0008256**

# HOLE No. W-8
Sheet 1 of 1
Location: **Wall No. 12**

Azimuth: -- Angle from Horizontal: **90** Surface Elevation (ft): **934.63** Station: **ST. 454+50, 110' Lt. of CL**

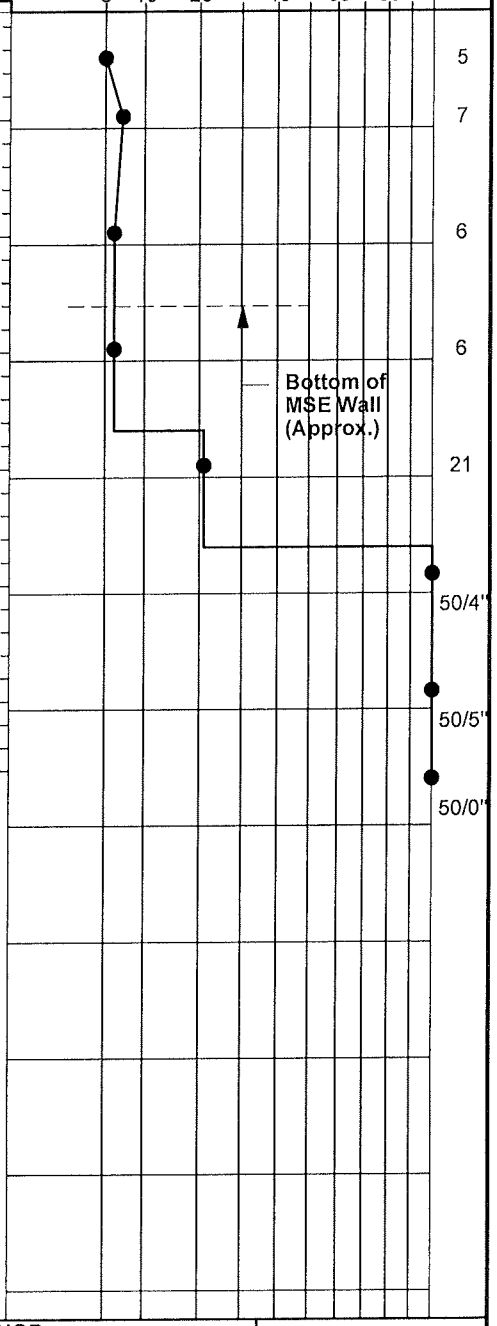
Drilling Equipment: **CME 550** Drilling Method: **HSA Auto Hammer**

Core Boxes: -- Samples: **8** Overburden (ft): **33** Rock (ft): -- Total Depth (ft): **33.0**

Logged By: **PT** Date Drilled: **11/20/07**

| VERTICAL DEPTH (ft) | GRAPHIC LOG | SAMPLE TYPE | REC% | RQD % | MATERIAL DESCRIPTION | | ELEVATION (feet) |
|---|---|---|---|---|---|---|---|
| 0 | | SS | | | FILL : Firm reddish brown to brown medium to fine sandy elastic **SILT** with rock fragments and trace organic odour (micaceous) | FILL | 934.6 |
| 5 | | SS<br>ST | | | | | 930 |
| 10 | | SS | | | Loose brown to reddish brown and tan silty medium to fine **SAND** with trace organic odour | FILL | 925 |
| 15 | | SS<br>ST | | | | | 920 |
| 20 | | SS | | | RESIDUUM : Medium dense gray, tan and brown silty medium to fine **SAND** (micaceous) | SM | 915 |
| 25 | | SS | | | PARTIALLY WEATHERED ROCK : Sampled as very dense black, gray and orange brown silty medium to fine **SAND** with rock fragments (micaceous) | PWR | 910 |
| 30 | | SS<br>SS | | | | | 905 |
| | | | | | Auger refusal encountered at 33 feet below the existing ground surface.<br><br>Groundwater was not encountered at the time of boring completion. | | |

STANDARD PENETRATION TEST DATA (blows/foot)



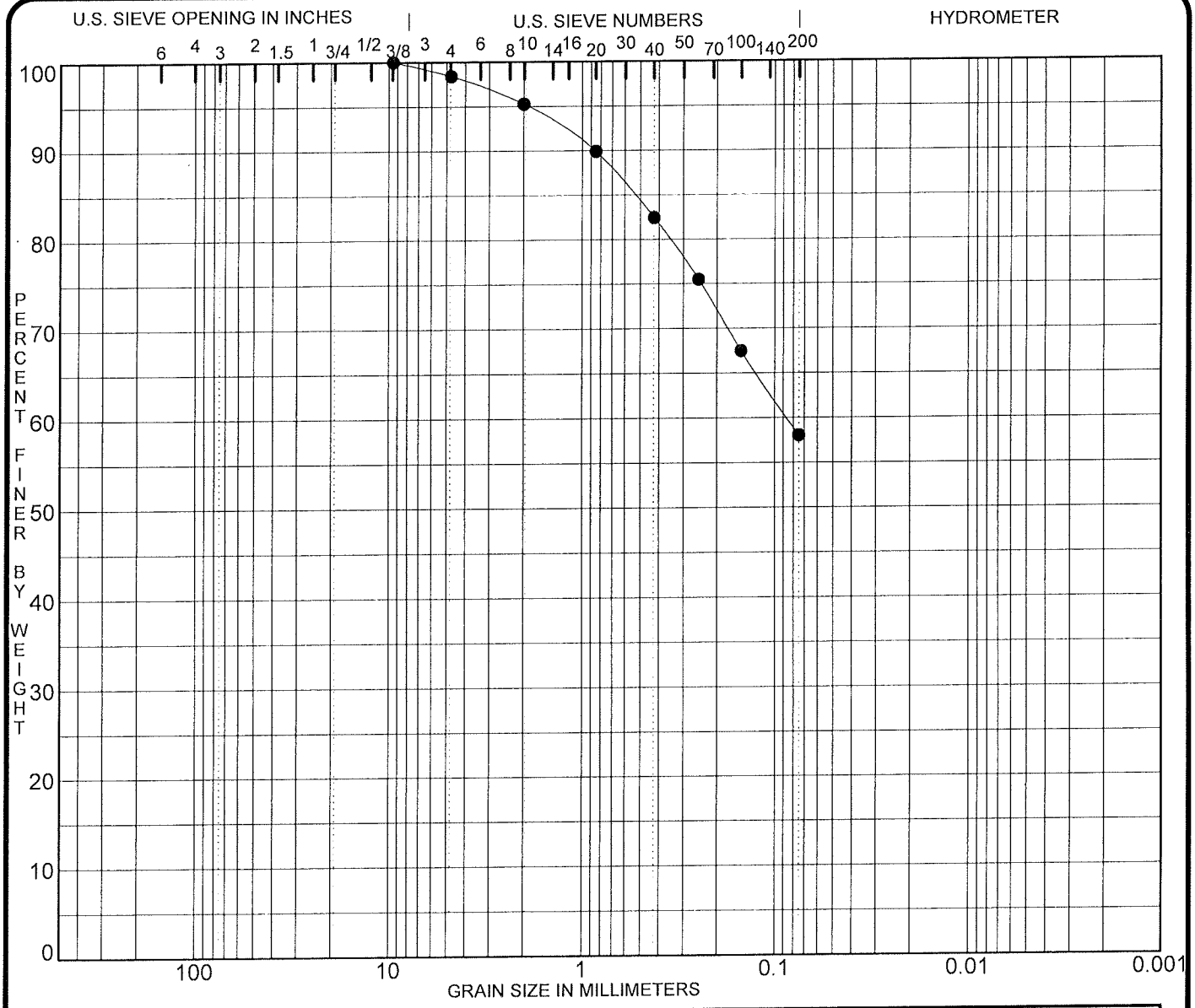

| N-VALUE |
|---|
| 5 |
| 7 |
| 6 |
| 6 |
| 21 |
| 50/4" |
| 50/5" |
| 50/0" |

**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-8**

SPTN 171-3099F.GPJ 12/28/07




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Soil Description | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● BB-3 (S-3) (8.5-10 ft) | Brown medium to fine sandy elastic SILT (micaceous) | | | | | | |

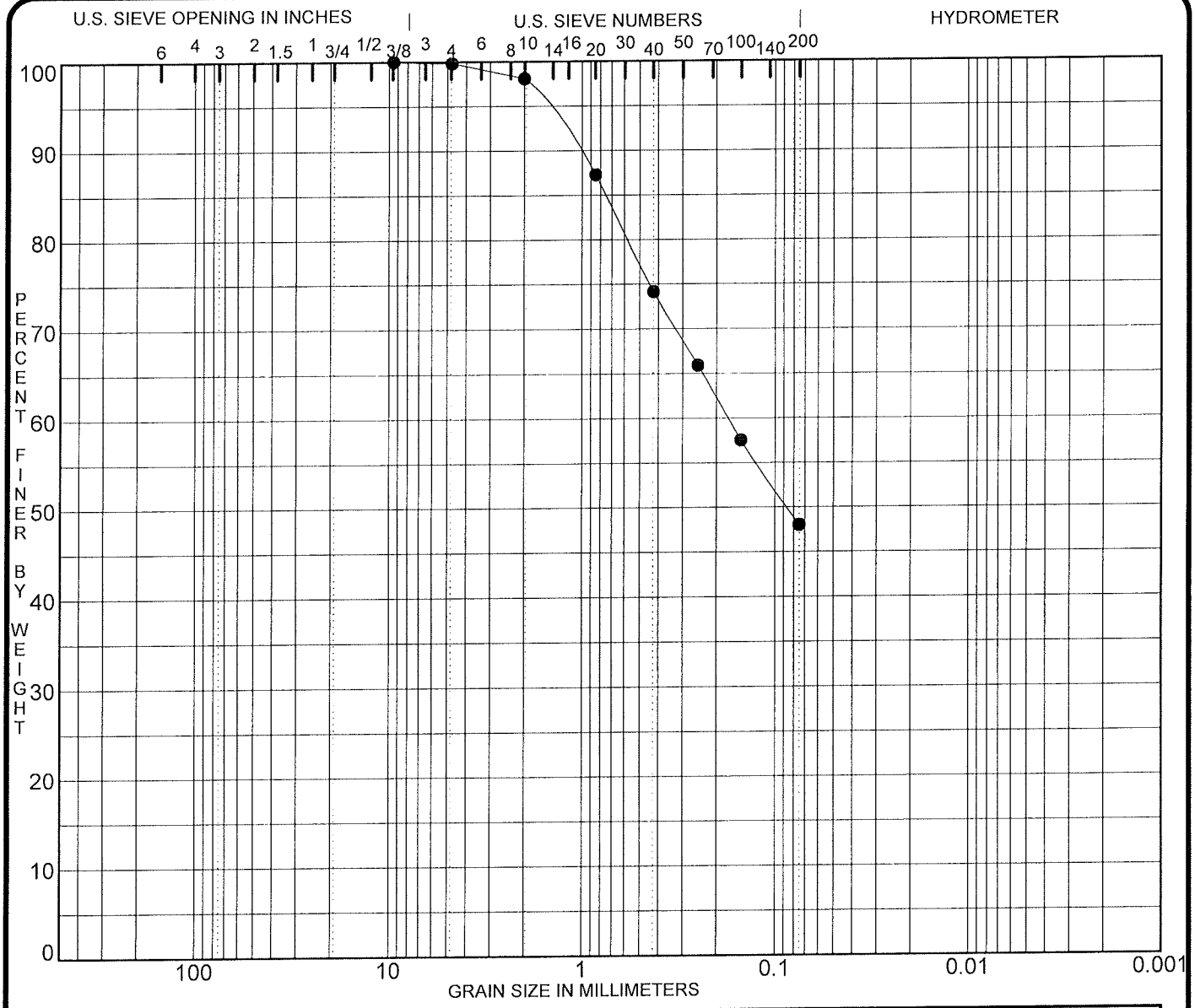
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● BB-3 (S-3) (8.5-10 ft) | 9.50 | 0.09 | | | 1.6 | 40.4 | 58.0 | |

PROJECT **Shallowford Rd. over I-575, Cobb Co., GA**
**.GDOT Proj. #: CSNHS-0008-00(256), PI #:0008256**

JOB NO. **171-3099 F**
DATE **1/8/08**

WILLMAR ENGINEERING, INC. WE

# GRADATION CURVE




| 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 (micaceous) | | | | | | |

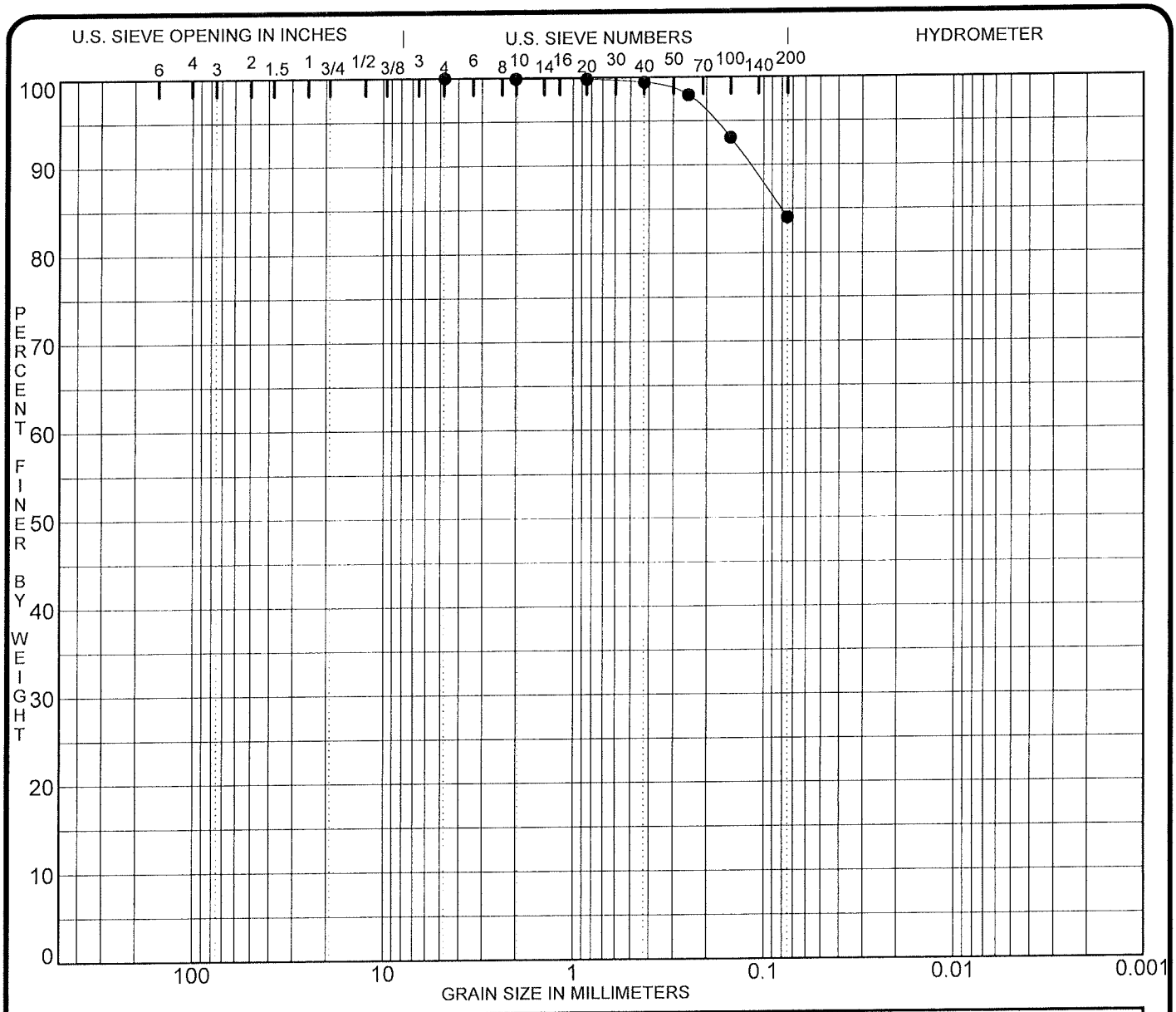
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● W-2 (3.5-5 ft) | 9.50 | 0.17 | | | 0.2 | 51.8 | 48.0 | |

PROJECT **Shallowford Rd. over I-575, Cobb Co., GA**
**GDOT Proj. #: CSNHS-0008-00(256), PI #:0008256**

JOB NO. **171-3099 F**
DATE **1/8/08**

WILLMER ENGINEERING INC. WE

# GRADATION CURVE




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Soil Description | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● W-3 (13.5-15 ft) | Tan CLAY with fine sand | | | | | | |

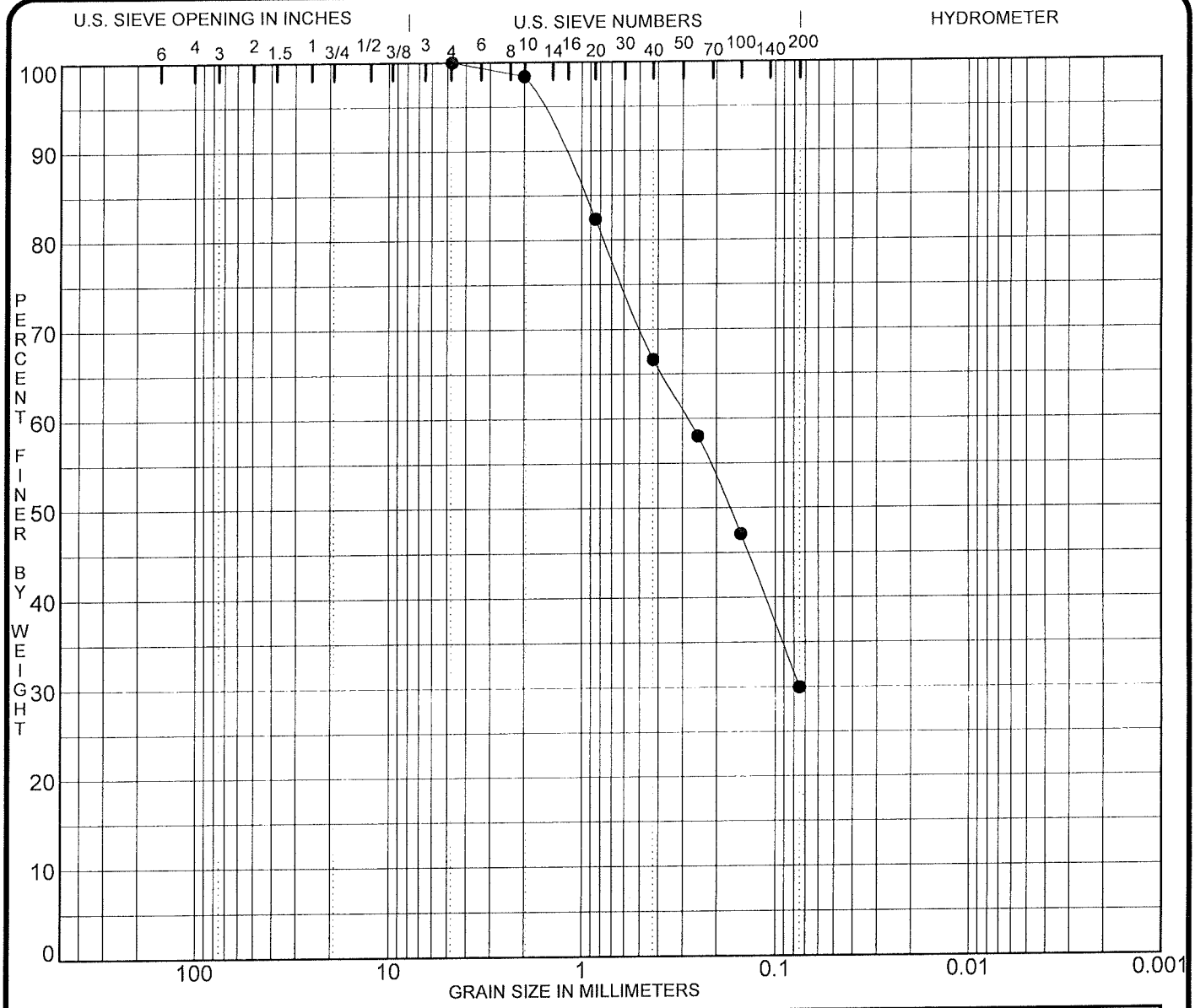
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● W-3 (13.5-15 ft) | 4.75 | | | | 0.0 | 16.0 | 84.0 | |

PROJECT **Shallowford Rd. over I-575, Cobb Co., GA**
**GDOT Proj. #: CSNHS-0008-00(256), PI #:0008256**

JOB NO. **171-3099 F**
DATE **1/8/08**

WILLMER ENGINEERING INC. WE

# GRADATION CURVE




| COBBLES | GRAVEL | | SAND | | | SILT OR CLAY |
|---|---|---|---|---|---|---|
| | coarse | fine | coarse | medium | fine | |

| Specimen Identification | Soil Description | MC% | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|
| ● W-5 (13.5-15 ft) | Brown silty medium to fine SAND (micaceous) | | | | | | |

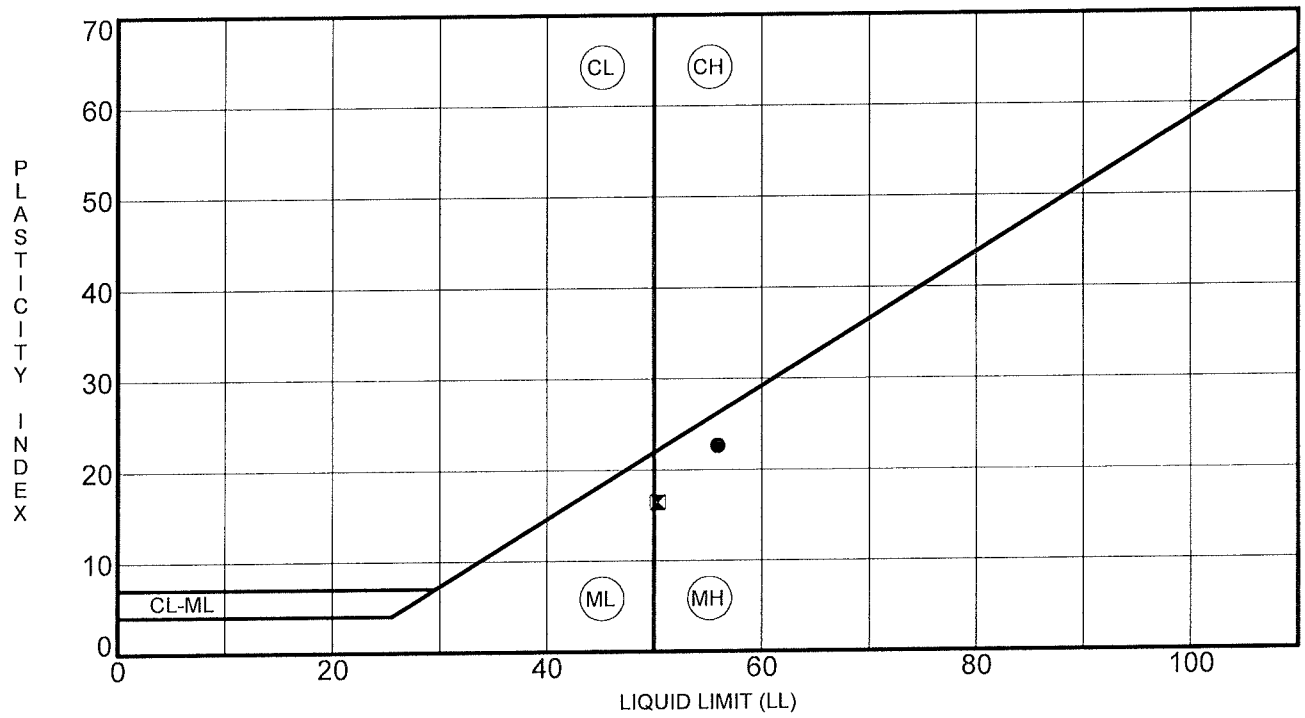
| Specimen Identification | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|
| ● W-5 (13.5-15 ft) | 4.75 | 0.28 | 0.075 | | 0.0 | 70.1 | 29.9 | |

PROJECT **Shallowford Rd. over I-575, Cobb Co., GA**
**GDOT Proj. #: CSNHS-0008-00(256), PI #:0008256**

JOB NO. **171-3099 F**
DATE **1/8/08**

WILLMER ENGINEERING INC. WE

# GRADATION CURVE




| | Specimen Identification | LL | PL | PI | Fines | Classification |
|---|---|---|---|---|---|---|
| ● | BB-3, S-2 (3.5-5 ft) | 56 | 33 | 23 | | Reddish brown sandy elastic SILT (micaceous) (MH) |
| ⊠ | W-8, S-1 (1-2.5 ft) | 50 | 34 | 16 | | White and reddish brown sandy elastic SILT (micaceous) (MH) |

PROJECT **Shallowford Rd. over I-575, Cobb Co., GA**
**GDOT Proj. #: CSNHS-0008-00(256), PI #:0008256**

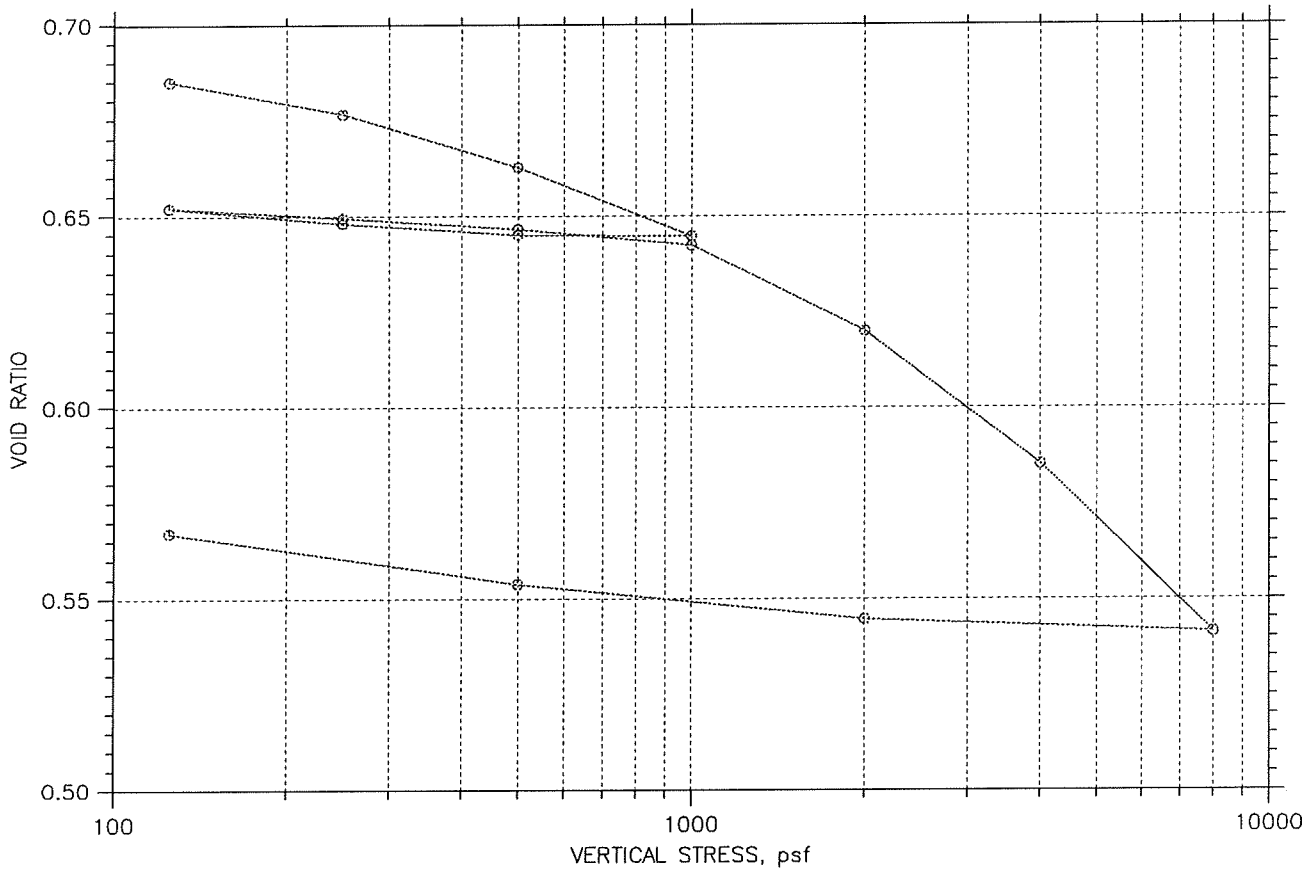
JOB NO. **171-3099 F**
DATE **1/8/08**

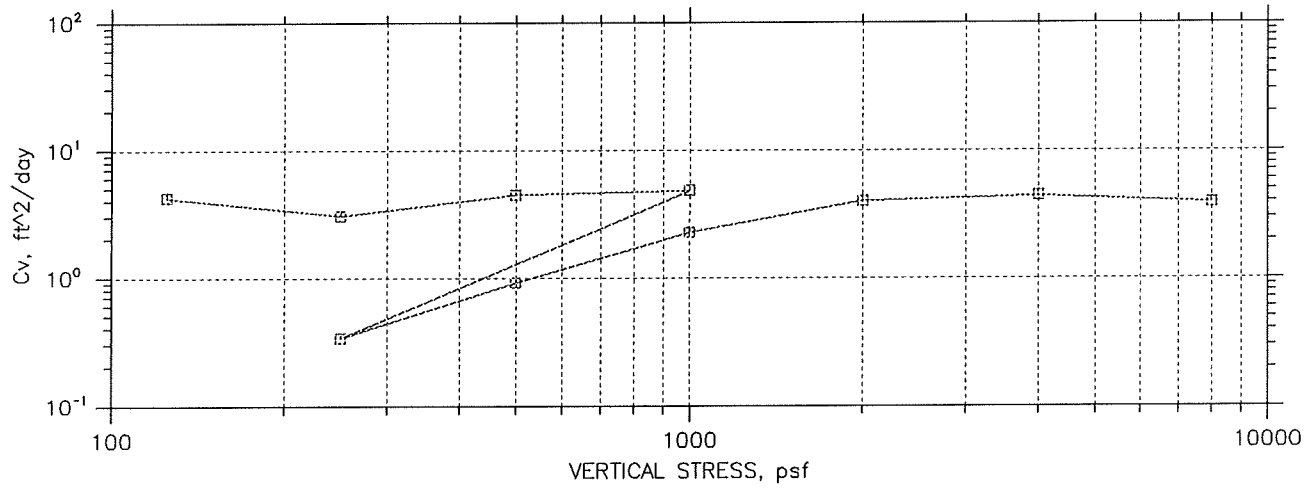
WILLMER ENGINEERING, INC. WE

# ATTERBERG LIMIT RESULTS

# CONSOLIDATION TEST DATA

SUMMARY REPORT




| | | | |
|---|---|---|---|
| | Project: Shallowford Rd./I-575 | Location: Cobb County, GA | Project No.: 171-3099 F |
| | Boring No.: W-2 | Tested By: kulin | Checked By: M.K. |
| | Sample No.: 450+75 30'L | Test Date: 10/26/07 | Depth: **20-22** feet |
| VE | Test No.: 3542 | Sample Type: Shelby Tube | Elevation: --- |
| | Description: Reddish brown medium to fine sandy SILT (slightly micaceous) | | |
| | Remarks: ASTM D2435 | | |
| | | | |

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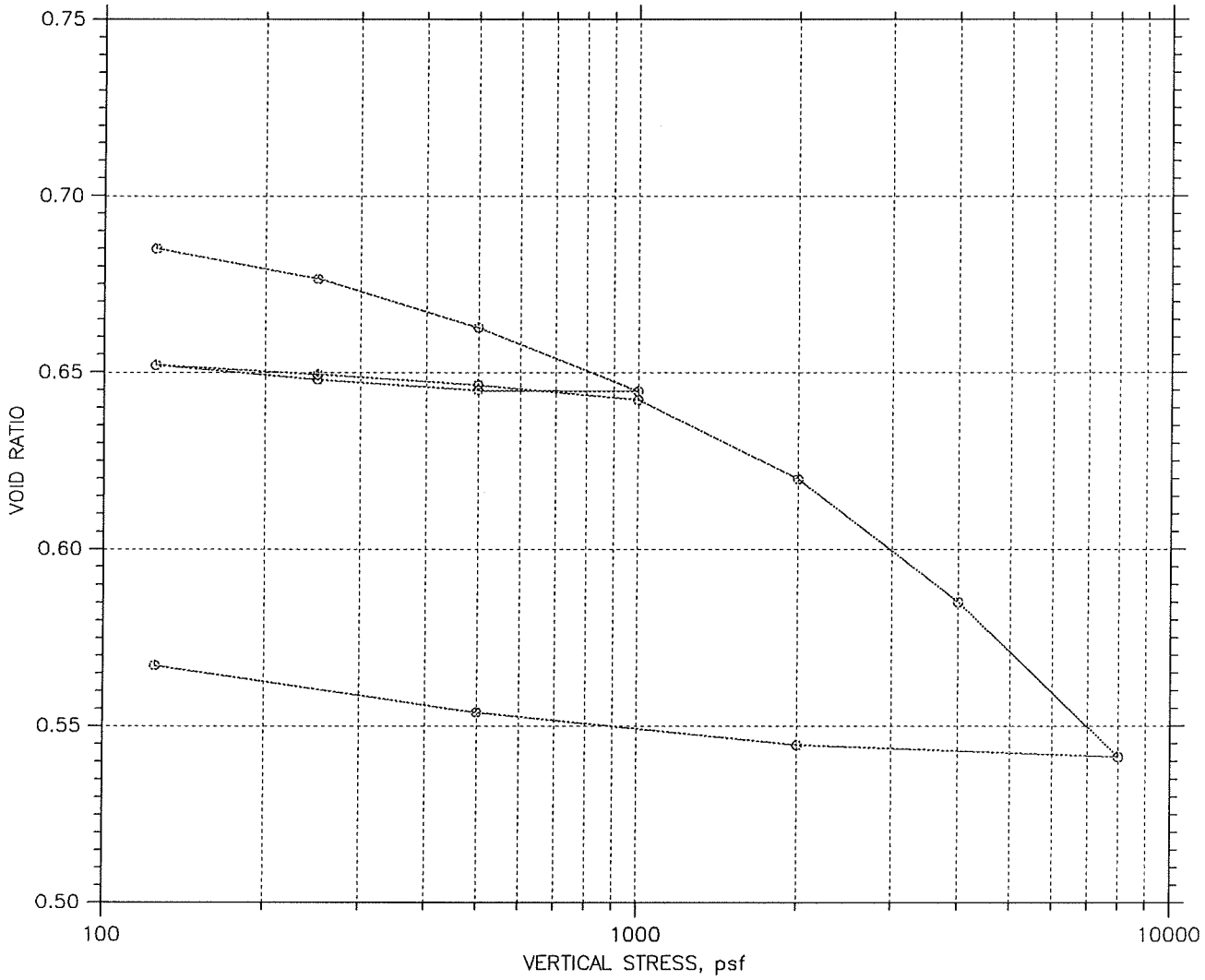
# CONSOLIDATION TEST DATA

SUMMARY REPORT




| | | | | | Before Test | After Test |
|---|---|---|---|---|---|---|
| Overburden Pressure: 0 psf | | | | Water Content, % | 22.41 | 22.74 |
| Preconsolidation Pressure: 0 psf | | | | Dry Unit Weight, pcf | 98.95 | 106.8 |
| Compression Index: 3.81959e-313 | | | | Saturation, % | 86.93 | 107.45 |
| Diameter: 2.5 in | | Height: 1 in | | Void Ratio | 0.69 | 0.57 |
| LL: 0 | PL: 0 | PI: 0 | GS: 2.68 | | | |

| | | | |
|---|---|---|---|
| | Project: Shallowford Rd./I-575 | Location: Cobb County, GA | Project No.: 171-3099 F |
| | Boring No.: W-2 | Tested By: kulin | Checked By: M.K. |
| | Sample No.: 450+75 30'L | Test Date: 10/26/07 | Depth: **20-22** feet |
| WE | Test No.: 3542 | Sample Type: Shelby Tube | Elevation: --- |
| | Description: Reddish brown medium to fine sandy SILT (slightly micaceous) | | |
| | Remarks: ASTM D2435 | | |

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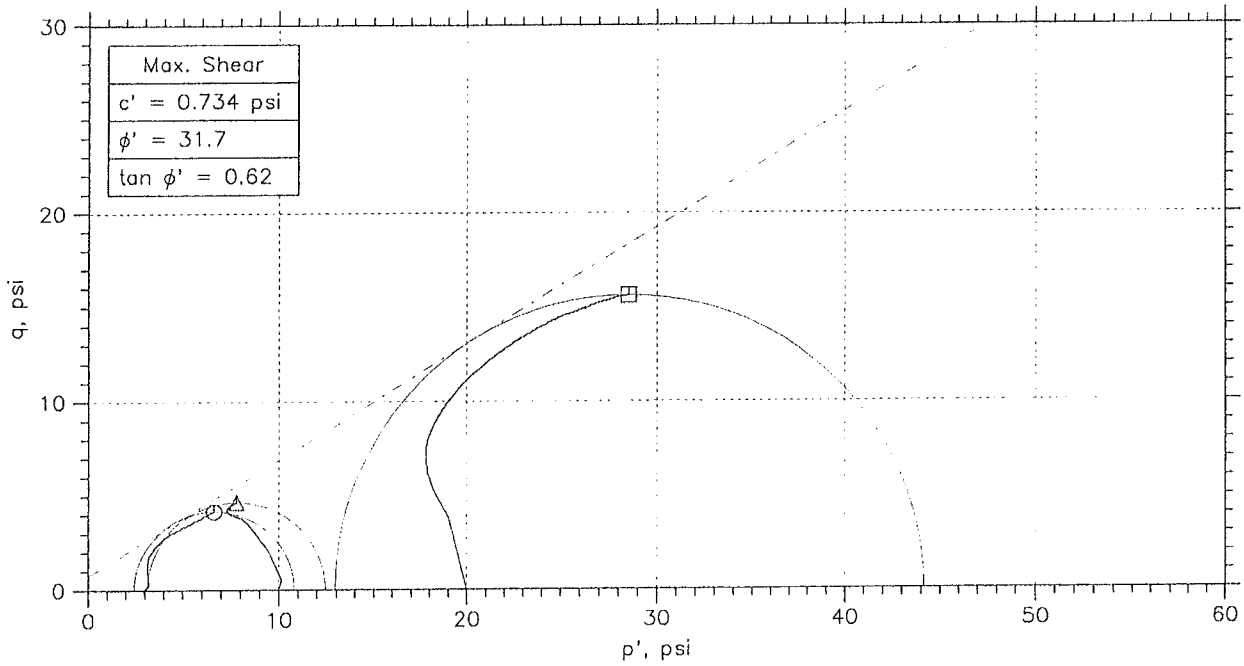
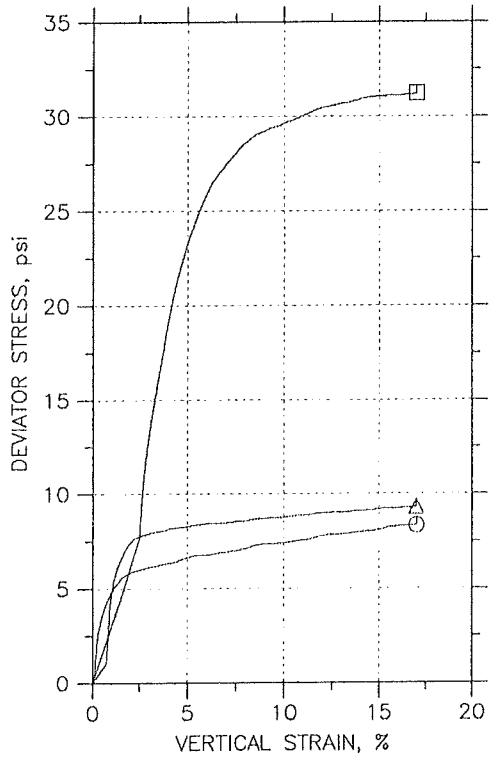
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




| Symbol | | ⊙ | △ | ⊡ | |
|---|---|---|---|---|---|
| Sample No. | | ST-1 | ST-1 | ST-1 | |
| Test No. | | 8110.1 | 8110.2 | 8110.3 | |
| Depth | | 5-7 Ft | 5-7 ft. | 5-7 Ft. | |
| Initial | Diameter, in | 2.864 | 2.86 | 2.852 | |
| | Height, in | 5.603 | 6.002 | 5.998 | |
| | Water Content, % | 30.9 | 35.7 | 31.9 | |
| | Dry Density, pcf | 80.84 | 72.91 | 87.35 | |
| | Saturation, % | 78.3 | 74.6 | 94.6 | |
| | Void Ratio | 1.05 | 1.27 | 0.894 | |
| Before Shear | Water Content, % | 40.9 | 48.2 | 36.0 | |
| | Dry Density, pcf | 79.37 | 72.65 | 84.69 | |
| | Saturation*, % | 100.0 | 100.0 | 100.0 | |
| | Void Ratio | 1.08 | 1.28 | 0.953 | |
| | Back Press., psi | 131. | 130. | 130. | |
| Ver. Eff. Cons. Stress, psi | | 3.003 | 10. | 20. | |
| Shear Strength, psi | | 4.163 | 4.653 | 15.61 | |
| Strain at Failure, % | | 17 | 17 | 17 | |
| Strain Rate, %/min | | 0.1 | 0.1 | 0.1 | |
| B-Value | | 0.96 | 0.95 | 0.97 | |
| Estimated Specific Gravity | | 2.65 | 2.65 | 2.65 | |
| Liquid Limit | | --- | --- | --- | |
| Plastic Limit | | --- | --- | --- | |

MACTEC

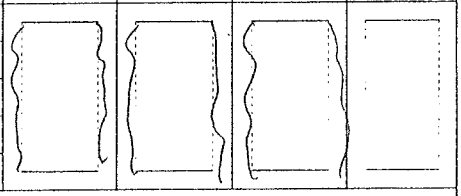
Project: Shallowford Rd over I-575

Location: Sta. 454+50

Project No.: 6155070329

Boring No.: Sta. 454+50 ; W-8

Sample Type: Shelby Tube



Description: Reddish brown sandy elastic Silt (micaceous)

Remarks:

Phase calculations based on start and end of test.

* Saturation is set to 100% for phase calculations.

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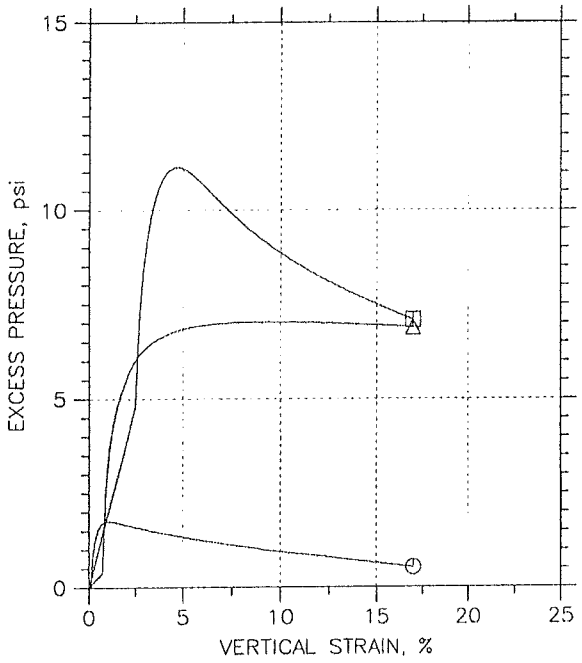
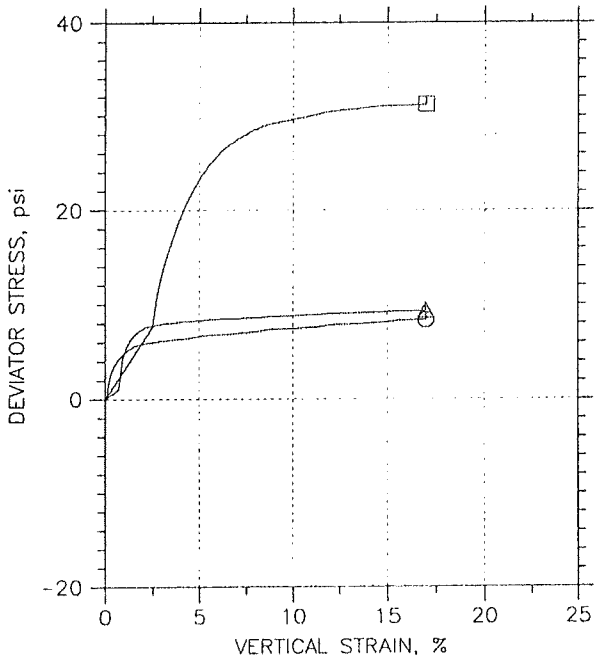
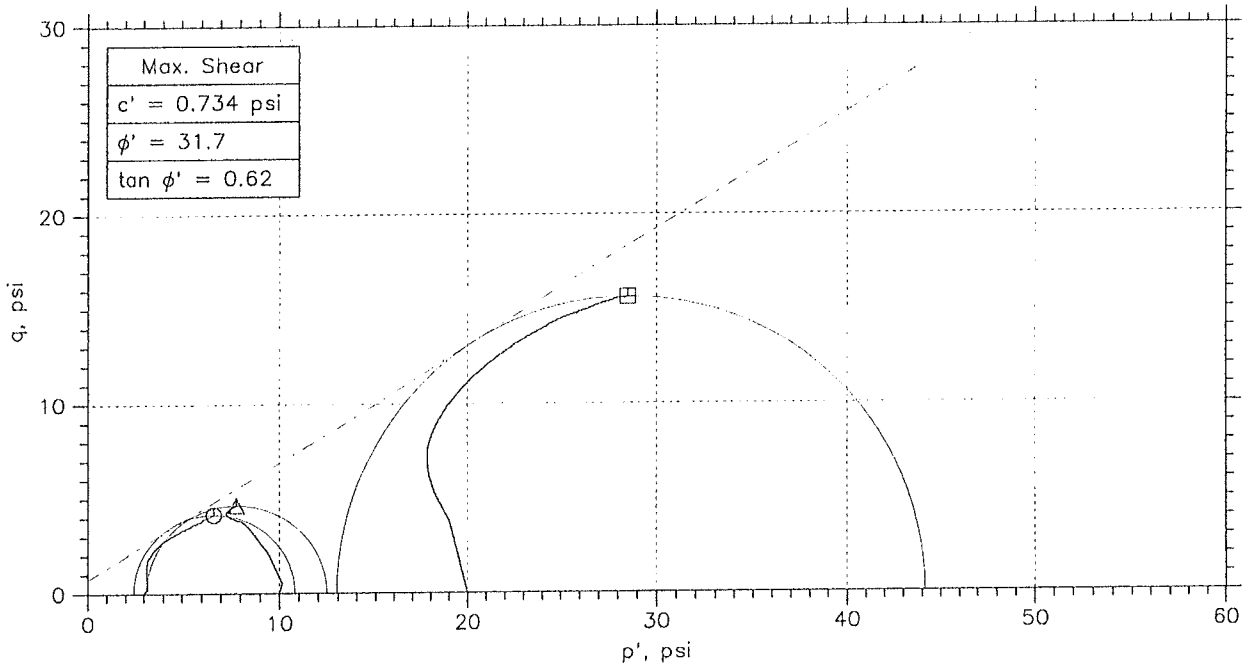
# CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



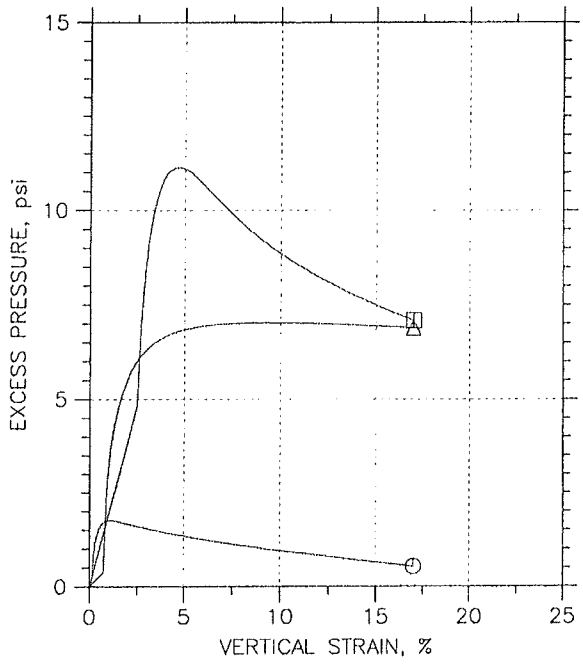

| | Sample No. | Test No. | Depth | Tested By | Test Date | Checked By | Check Date | Test File |
|---|---|---|---|---|---|---|---|---|
| ⊙ | ST-1 | 8110.1 | 5-7 Ft | HJ | 12/7/07 | JW | 1/7/08 | 8110.1_2547.dat |
| △ | ST-1 | 8110.2 | 5-7 ft. | HJ | 12/7/07 | JW | 1/7/08 | 8110.2a_2546.dat |
| ⊡ | ST-1 | 8110.3 | 5-7 Ft. | HJ | 12/7/07 | JW | 1/7/08 | 8110.3a_2580.dat |
| | | | | | | | | |

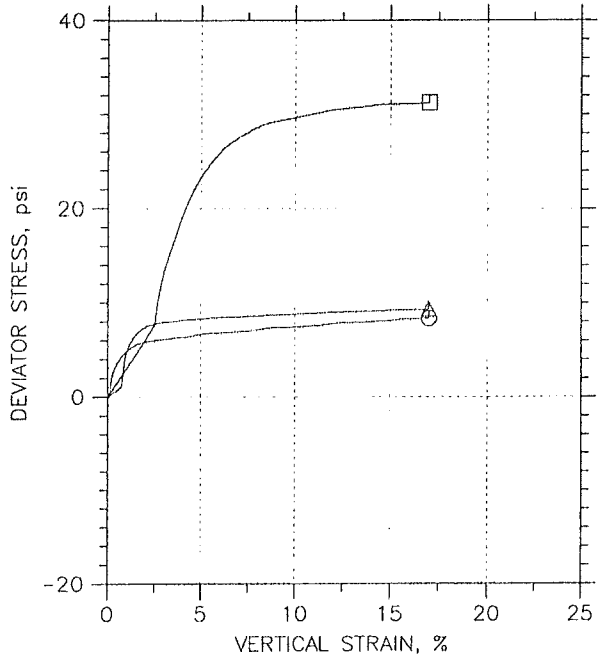
MACTEC

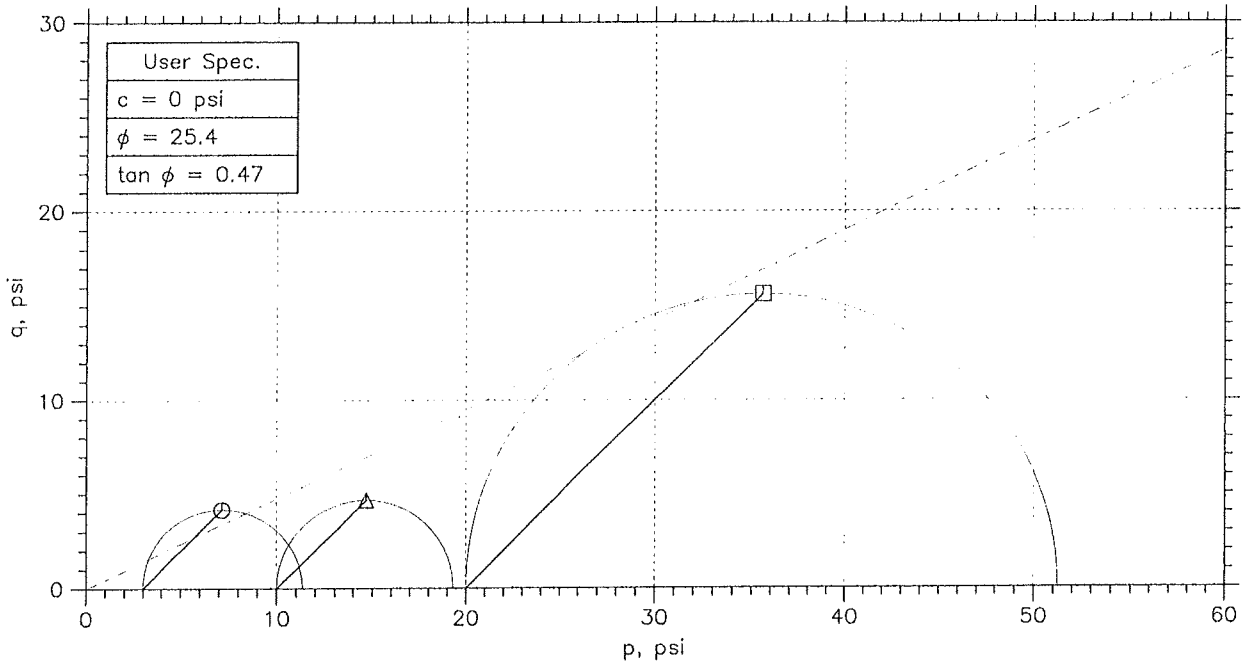
| | | |
|---|---|---|
| Project: Shallowford Rd over I-575 | Location: Sta. 454+50 | Project No.: 6155070329 |
| Boring No.: Sta. 454+50, W-8 | Sample Type: Shelby Tube | |
| Description: Reddish brown sandy elastic Silt (micaceous) | | |
| Remarks: | | |

Mon, 07-JAN-2008 13:47:27

# CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767




| | Sample No. | Test No. | Depth | Tested By | Test Date | Checked By | Check Date | Test File |
|---|---|---|---|---|---|---|---|---|
| ⏲ | ST-1 | 8110.1 | 5-7 Ft | HJ | 12/7/07 | JW | 1/7/08 | 8110.1_2547.dat |
| △ | ST-1 | 8110.2 | 5-7 ft. | HJ | 12/7/07 | JW | 1/7/08 | 8110.2a_2546.dat |
| ⊡ | ST-1 | 8110.3 | 5-7 Ft. | HJ | 12/7/07 | JW | 1/7/08 | 8110.3a_2580.dat |
| | | | | | | | | |

MACTEC

| | | |
|---|---|---|
| Project: Shallowford Rd over I-575 | Location: Sta. 454+50 | Project No.: 6155070329 |
| Boring No.: Sta. 454+50, W-8 | Sample Type: Shelby Tube | |
| Description: Reddish brown sandy elastic Silt (micaceous) | | |
| Remarks: | | |

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APPENDIX II

DOT 490

# DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND TEST, FOREST PARK, GEORGIA
SOILS ENGINEERING AND GEOLOGY BRANCH

## BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00(256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 5-11-76

LOCATION Shallowford Road over I-575 BORING NO. B-1

BENT NO. 1 West Br. FOOTING [illegible] GROUND ELEV. 934.94

PROPOSED FOOTING ELEV. _____ PARTY CHIEF Pulliam

| ELEV. | BORING LOG | SAMPLE | BLOW | UNIFIED | W | γ | Gs | C. | ∅ | BC | LL | PI | % 200 | % CLAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gr. El. | | | | | | | | | | | | | |
| | Loose Mitc. Micas Sandy Silt | 1s | 10 | | | | | | | | | | | |
| 930 | | 2s | 8 | | | | | | | | | | | |
| 920 | Dense Mitc. Micas Sandy Silt | 3s | 45 | | | | | | | | | | | |
| | | 4s | 28 | | | | | | | | | | | |
| 910 | Very Dense Same | 5s | 60=9' | | | | | | | | | | | |
| | Very Dense Mitc. Micas Silty Sand | 6s | 60=5' | | | | | | | | | | | |
| 900 | | | 60=1' | | | | | | | | | | | |
| | Very Dense (Weathered R.) End Drilling | 8s | HB | | | | | | | | | | | |

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 TEST, FOREST PARK, GEORGIA
SOILS ENGINEERING AND GEOLOGY BRANCH

## BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00(256)
PROJECT PI No. 0008256 COUNTY Cobb DATE 5-12-76

LOCATION Shallowford Road over I-575 BORING NO. B-2

BENT NO. 1 West Br. FOOTING GROUND ELEV. 934.79

PROPOSED FOOTING ELEV. PARTY CHIEF Pulliam

| ELEV. | BORING LOG | SAMPLE | BLOW | UNIFIED | W | γ | Gs | C. | ∅ | BC | LL | PI | % 200 | % CLAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gr. El. 7 | | | | | | | | | | | | | |
| | Medium Dense Mltc. Micas | 1u | | | | | | | | | | | | |
| 930 | | 2s | 20 | | | | | | | | | | | |
| | Loose Mltc. Micas | 3u | | | | | | | | | | | | |
| | | 4s | 10 | | | | | | | | | | | |
| 920 | Sandy Silt | 5s | 6 | | | | | | | | | | | |
| | Medium Dense Same | 6s | 24 | | | | | | | | | | | |
| 910 | Very Dense | 7s | 60=9' | | | | | | | | | | | |
| | | 8s | 60=9' | | | | | | | | | | | |
| | Mltc. Micas | | | | | | | | | | | | | |
| 900 | Sandy Silt | | | | | | | | | | | | | |
| | End Drilling | | | | | | | | | | | | | |

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DOT 490

# DEPARTMENT OF TRANSPORTATION

OFFICE OF MATERIALS AND TEST, FOREST PARK, GEORGIA
SOILS ENGINEERING AND GEOLOGY BRANCH

## BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00(256)
PROJECT PI No. 0008256 COUNTY Cobb DATE 5 – 11 – 76

LOCATION Shallowford Road over I-575 BORING NO. B-3
1- East Br.
BENT NO. 2- West Br. FOOTING GROUND ELEV. 933.84

PROPOSED FOOTING ELEV. PARTY CHIEF Pulliam

| ELEV. | BORING LOG | SAMPLE | BLOW | UNIFIED | W | γ | Gs | C. | Ø | BC | LL | PI | % 200 | % CLAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gr. El. | | | | | | | | | | | | | |
| 930 | Loose Mltc. Micas Sandy Silt | | | | | | | | | | | | | |
| 920 | Medium Dense Mltc. Micas Sandy Silt | 1s | 11 | | | | | | | | | | | |
| | | 2s | 20 | | | | | | | | | | | |
| | Very Dense Same | 3s | 60 | | | | | | | | | | | |
| 910 | | 4s | 60 | | | | | | | | | | | |
| | | 5s | HB | | | | | | | | | | | |
| | | 6s | HB | | | | | | | | | | | |
| | Very Dense | | | | | | | | | | | | | |
| 900 | (Weathered Rock) | | | | | | | | | | | | | |
| | End Drilling | | | | | | | | | | | | | |

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

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## BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00(256)
PROJECT PI No. 0008256 COUNTY Cobb DATE 5-12-76

LOCATION Shallowford Road over I-575 BORING NO. B-4
1- East Br.
BENT NO. 2- West Br. FOOTING GROUND ELEV. 933.04

PROPOSED FOOTING ELEV. PARTY CHIEF Pulliam

| ELEV. | BORING LOG | SAMPLE | BLOW | UNIFIED | W | γ | Gs | C. | Ø | BC | LL | PI | % 200 | % CLAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gr. El. 7 | | | | | | | | | | | | | |
| 930 | Loose Mitc. Micas Sandy Silt | | | | | | | | | | | | | |
| 920 | Medium Dense Mitc. Micas Sandy Silt | 1s | 14 | | | | | | | | | | | |
| | | 2s | 26 | | | | | | | | | | | |
| | Dense Same | 3s | 30 | | | | | | | | | | | |
| 910 | | 4s | 22 | | | | | | | | | | | |
| | Medium Dense Mitc. | 5s | 19 | | | | | | | | | | | |
| | Micas Sandy Silt | 6s | 19 | | | | | | | | | | | |
| | | 7s | 50 | | | | | | | | | | | |
| 900 | Dense Same | | | | | | | | | | | | | |
| | Very Dense (Weathered Rock) | 8s | H.B. | | | | | | | | | | | |
| | Very Dense (Rock) | | | | | | | | | | | | | |
| 890 | End Drilling | | | | | | | | | | | | | |

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## BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00(256)
PROJECT PI No. 0008256 COUNTY Cobb DATE 5 - 11 - 76

LOCATION Shallowford Road over I-575 BORING NO. B-5
2- East Br.

BENT NO. _____ FOOTING _____ GROUND ELEV. 932.34

PROPOSED FOOTING ELEV. _____ PARTY CHIEF Pulliam

| ELEV. | BORING LOG | SAMPLE | BLOW | UNIFIED | W | γ | Gs | C. | ∅ | BC | LL | PI | % 200 | % CLAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gr. El. 7 | | | | | | | | | | | | | |
| 930 | Medium Dense | | | | | | | | | | | | | |
| | Mltc. Micas | 1s | 16 | | | | | | | | | | | |
| | Sandy Silt | 2s | 11 | | | | | | | | | | | |
| 920 | | | | | | | | | | | | | | |
| | Loose Mltc. Micas | 3s | 7 | | | | | | | | | | | |
| 910 | Sandy Silt | 4s | 6 | | | | | | | | | | | |
| | Dense Same | 5s | 42 | | | | | | | | | | | |
| | Very Dense Mltc. Micas Silt Sand (W.R.) | 6s | 60=10 | | | | | | | | | | | |
| 900 | Dense Mltc. Micas Sandy Silt | 7s | 43 | | | | | | | | | | | |
| | Very Dense Same | 8s | 60=1" | | | | | | | | | | | |
| 890 | End Drilling | | | | | | | | | | | | | |

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## BRIDGE SUBSURFACE INVESTIGATION

CSNHS-0008-00(256)

PROJECT PI No. 0008256 COUNTY Cobb DATE 5-11-76

LOCATION Shallowford Road over I-575 BORING NO. B-6

BENT NO. 2- East Br. FOOTING GROUND ELEV. 932.09

PROPOSED FOOTING ELEV. PARTY CHIEF Pulliam

| ELEV. | BORING LOG | SAMPLE | BLOW | UNIFIED | W | γ | Gs | C. | ∅ | BC | LL | PI | % 200 | % CLAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gr. El. 7 | | | | | | | | | | | | | |
| 930 | Medium Dense Mitc. Micas Sandy Silt | 1s | 18 | | | | | | | | | | | |
| | Loose Mitc. Micas Sandy Silt | 2s | 10 | | | | | | | | | | | |
| 920 | Very Loose Same | 3s | 4 | | | | | | | | | | | |
| | Loose Mitc. Micas Sandy Silt | 4s | 5 | | | | | | | | | | | |
| 910 | Medium Dense | 5s | 18 | | | | | | | | | | | |
| | Same | 6s | 17 | | | | | | | | | | | |
| 900 | Dense Mitc. Micas Sandy Silt | 7s | 37 | | | | | | | | | | | |
| | | 8s | 60=7" | | | | | | | | | | | |
| 890 | Very Dense Same | 9s | 60=2" | | | | | | | | | | | |
| | | 10s | 60=5" | | | | | | | | | | | |
| 880 | End Drilling | | | | | | | | | | | | | |

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 or relies on the information in his bidding or in his construction operations and finds that [illegible]

This boring investigation report is not [illegible]