

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-01

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
16.8	2/3/09	8	16.0'	4 6 5 5	Wet medium dense orange coarse to fine sand w/trace of silt and gravel.	A-3		
						16" RECOVERY		
			9	18.0'	1 1 1 1	Wet very loose orange fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
19.6				20.0'		20" RECOVERY		
			10	20.0'	4 6 6 6	Wet medium dense brown fine sand w/some silt, trace of gravel and coarse sand.	A-2-4(0)	
				22.0'		17" RECOVERY		
22.4			11	22.0'	5 9 8 7	Wet medium dense brown fine sand w/some silt and gravel, trace of coarse sand.	A-2-4(0)	
				24.0'		19" RECOVERY		
25.2			12	24.0'	12 7 7 9	Wet medium dense brown fine sand w/some silt and gravel, trace of coarse sand.	A-2-4(0)	
				26.0'		20" RECOVERY		
			13	26.0'	4 5 5 6	Wet loose orange fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
28				28.0'		20" RECOVERY		
			14	28.0'	2 5 9 11	Wet medium dense orange fine sand w/some gravel and silt, trace of coarse sand.	A-2-4(0)	Charged augers @ 28.0'
				30.0'		17" RECOVERY		
30.8			15	30.0'	8 11 9 14	Wet medium dense brown fine to coarse sand w/some gravel and silt.	A-2-4(0)	
				32.0'		19" RECOVERY		
33.6			16	32.0'	5 8 14 18	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
				34.0'		18" RECOVERY		
		17	34.0'	10 9 15 18	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)		
			36.0'		13" RECOVERY			
36.4		18	36.0'	13 16 23 28	Saturated dense brown fine sand w/some coarse sand, trace of silt.	A-3		
			38.0'		16" RECOVERY			
39.2		19	38.0'	16 16 16 35	Saturated, brown, fine to coarse sandy clay, trace gravel.		pH sample sent to GTA	
			40.0'		12" RECOVERY			
					End of Boring			
42								

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Poorly graded clayey
silty sand



Silty low plasticity
clay



Poorly graded sand
with silt



Well graded sand
with silt



Silty sand

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SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-02

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	3 3 4 5	Wet loose brown fine sand w/some coarse sand, trace of silt.	A-3	
			18.0'		21" RECOVERY		
19.6		10	18.0'	3 4 6 6	Wet loose brownish orange fine sand w/some silt and coarse sand.	A-2-4(0)	
			20.0'		20" RECOVERY		
		11	20.0'	5 6 5	Saturated medium dense brownish orange fine sand w/some silt and coarse sand.	A-2-4(0)	Water encountered in auger at 20.1'.
			22.0'		20" RECOVERY		
22.4		12	22.0'	3 5 6 6	Saturated medium dense brownish orange fine sand w/some coarse sand, trace of silt.	A-3	
			24.0'		21" RECOVERY		
25.2		13	24.0'	4 6 7 7	Saturated medium dense brownish orange fine sand w/trace of silt and coarse sand.	A-3	
			26.0'		22" RECOVERY		
		14	26.0'	3 3 3 4	Saturated loose brown fine sand w/trace of silt and coarse sand.	A-3	
28			28.0'		22" RECOVERY		
		15	28.0'	4 5 6 8	Saturated medium dense brown fine sand w/some coarse sand, trace of silt.	A-3	
			30.0'		23" RECOVERY		
30.8		16	30.0'	4 4 6 6	Saturated loose brown fine sand w/trace of silt, coarse sand and gravel.	A-3	
			32.0'		21" RECOVERY		
33.6		17	32.0'	4 6 8 7	Saturated medium dense brown fine sand w/some coarse sand, trace of silt and gravel.	A-3	
			34.0'		23" RECOVERY		
		18	34.0'	6 7 8 11	Saturated medium dense brown fine sand w/trace of coarse sand and silt.	A-3	
			36.0'		22" RECOVERY		
36.4		19	36.0'	6 10 12 14	Saturated medium dense brown fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			38.0'		22" RECOVERY		
39.2		20	38.0'	4 8 10 11	Saturated medium dense brown silty, clayey, fine to coarse sand, trace gravel.		pH sample sent to GTA for testing.
			40.0'		23" RECOVERY		
					End of Boring.		
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/14/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Traylor Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-03

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	14 16 16 13	Moist dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
			18.0'		16" RECOVERY		
19.6		10	18.0'	9 7 8 9	Moist medium dense yellow coarse to fine sand w/trace of silt and gravel.	A-1-b	
			20.0'		21" RECOVERY		
22.4		11	20.0'	5 6 5 6	Moist medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
			22.0'		17" RECOVERY		
25.2		12	22.0'	7 6 7 6	Moist medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
			24.0'		19" RECOVERY		
28		13	24.0'	7 8 8 7	Moist medium dense yellowish orange coarse to fine sand w/trace of silt and gravel.	A-1-b	
			26.0'		18" RECOVERY		
30.8		14	26.0'	5 5 6 6	Wet medium dense yellowish orange coarse to fine sand w/trace of gravel and silt.	A-1-b	
			28.0'		20" RECOVERY		
33.6		15	28.0'	2 3 5 6	Wet loose orange fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
			30.0'		24" RECOVERY		
36.4		16	30.0'	4 4 7 10	Wet medium dense orange fine sand w/some coarse sand and silt.	A-2-4(0)	
			32.0'		12" RECOVERY		
39.2		17	32.0'	1 3 4 5	Saturated loose orange fine sand w/some silt and coarse sand, trace of gravel.	A-2-4(0)	
			34.0'		24" RECOVERY		
42		18	34.0'	W/R 3 5 6	Saturated loose orange fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
			36.0'		24" RECOVERY		
		19	36.0'	5 10 14 14	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			38.0'		18" RECOVERY		
		20	38.0'	11 11 14 13	No Sieve Analysis - pH sample retained by GTA.		
			40.0'		18" RECOVERY		
					End of Boring		

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Low plasticity
clay



Silty sand



Well graded sand
with silt

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-04

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
16.8	2/3/09	8	16.0'	5 8 11 11	Moist medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)		
					20" RECOVERY			
			9	18.0'	8 8 10 12	Moist medium dense yellowish orange and brown coarse sand and gravel w/some fine sand and silt.	A-1-b	
19.6				20.0'		17" RECOVERY		
			10	20.0'	10 14 16 21	Moist medium dense yellowish orange and brown gravel and coarse sand w/some fine sand, trace of silt.	A-1-b	
				22.0'		9" RECOVERY		
22.4			11	22.0'	10 13 13 8	Moist medium dense yellowish orange and brown coarse sand and gravel w/some fine sand, trace of silt.	A-1-b	
				24.0'		16" RECOVERY		
			12	24.0'	6 7 7 7	Moist medium dense yellow fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
25.2				26.0'		20" RECOVERY		
			13	26.0'	5 7 7 7	Wet medium dense yellow fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	
28				28.0'		23" RECOVERY		
			14	28.0'	3 3 4 4	Wet loose yellow fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
				30.0'		18" RECOVERY		
30.8			15	30.0'	2 2 5 9	Wet loose yellow fine sand w/some coarse sand, trace of silt.	A-3	Water encountered in auger at 30.1'.
				32.0'		18" RECOVERY		
			16	32.0'	1 1 3 5	Wet very loose yellow fine to coarse sand w/ trace of silt.	A-3	
33.6				34.0'		22" RECOVERY		
		17	34.0'	WOR 1 3 4	Wet very loose yellow fine to coarse sand w/ trace of silt and gravel.	A-3		
			36.0'		19" RECOVERY			
36.4		18	36.0'	4 8 13 14	Wet medium dense orange yellow and brown fine to coarse sand w/trace of silt and gravel.	A-3		
			38.0'		14" RECOVERY			
39.2		19	38.0'	8 10 13 14	Indication of saturated orange yellow...		pH sample sent to GTA for testing.	
			40.0'		19" RECOVERY			
					End of Boring.			
42								

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-05

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	5 5 7 8	Wet stiff brown fine sandy silt w/trace of gravel.	A-4(0)	
			18.0'		14" RECOVERY		
		10	18.0'	5 5 6 5	Wet medium dense light brown silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
19.6			20.0'		20" RECOVERY		
		11	20.0'	5 6 6 6	Wet medium dense light brown silty fine sand w/trace of coarse sand.	A-2-4(0)	Water encountered at 20.0'.
			22.0'		22" RECOVERY		
22.4		12	22.0'	6 7 7 7	Wet medium dense light brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			24.0'		23" RECOVERY		
		13	24.0'	5 6 6 7	Saturated medium dense light brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
25.2			26.0'		20" RECOVERY		
		14	26.0'	4 9 10 8	Saturated medium dense light brown fine sand w/some silt, trace of coarse sand.	A-2-4(0)	
28			28.0'		20" RECOVERY		
		15	28.0'	8 5 6 8	Saturated medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			30.0'		18" RECOVERY		
30.8		16	30.0'	5 5 7 11	Saturated medium dense orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			32.0'		20" RECOVERY		
		17	32.0'	3 4 5 8	Saturated loose orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	
33.6			34.0'		15" RECOVERY		
		18	34.0'	5 6 9 11	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			36.0'		15" RECOVERY		
36.4		19	36.0'	5 11 18 21	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			38.0'		16" RECOVERY		
39.2		20	38.0'	18 23 25 28	Indication of Saturated dense orange...		pH Sample sent to GTA for Testing.
			40.0'		14" RECOVERY		
					End of Boring.		
42							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Poorly graded gravel
with silt



Silt



Silty sand

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/3/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Traylor Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
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DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 688+84.40, 618.00' Lt. C.L.
Boring Surface Elev.: + 41.01

Boring No.: B-4-06

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

Reference:
From Depth of: 0.0 **To:**
From Depth of: **To:** 40.0

Water Level Readings
Date **Time**

Time

Depth of Hole

Depth of Casing

Depth of Water

Elev. of Water

2/4/09

20.0

18.0

16.8

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
 No. of 2 in. Dia. Shelby Tubes:
 2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/4/09	1	0.0'	4 6 7 7	Moist stiff brown clayey coarse sandy silt w/ some fine sand and gravel.	A-4(0)	
			2.0'		12" RECOVERY		
2.8		2	2.0'	9 7 6 5	Moist medium dense orange coarse sand and gravel w/trace of silt and fine sand.	A-1-b	
			4.0'		18" RECOVERY		
		3	4.0'	3 4 3 5	Moist loose orange coarse sand w/trace of silt, fine sand and gravel.	A-1-b	
5.6			6.0'		18" RECOVERY		
		4	6.0'	7 6 5 5	Moist medium dense yellow coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
			8.0'		20" RECOVERY		
8.4		5	8.0'	3 3 4 4	Moist loose yellow coarse sand w/some fine sand, trace of silt and gravel.	A-1-b	
			10.0'		20" RECOVERY		
		6	10.0'	4 3 2 4	Moist loose orange coarse sand and gravel w/ trace of silt and fine sand.	A-1-b	
11.2			12.0'		20" RECOVERY		
		7	12.0'	6 11 6 5	Moist medium dense orange yellow coarse to fine sand and gravel w/trace of silt.	A-1-b	
			14.0'		17" RECOVERY		
14		8	14.0'	4 4 5 3	Wet loose orange fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-06

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		18" RECOVERY		
16.8		9	16.0'	4 3 3 4	Wet loose orange silty fine sand w/trace of gravel and coarse sand.	A-2-4(0)	
			18.0'		24" RECOVERY		
19.6		10	18.0'	3 3 3 3	Saturated loose orange silty fine sand w/trace of coarse sand and gravel.	A-2-4(0)	
			20.0'		14" RECOVERY		
		11	20.0'	2 5 7 10	Saturated medium dense orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			22.0'		20" RECOVERY		
22.4		12	22.0'	W/R 1 3 4	Saturated very loose orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			24.0'		15" RECOVERY		
25.2		13	24.0'	W/R 1 2 4	Saturated very loose orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
			26.0'		17" RECOVERY		
		14	26.0'	7 11 20 14	Saturated dense orange fine to coarse sand w/ some gravel, trace of silt.	A-3	
28			28.0'		20" RECOVERY		
		15	28.0'	8 11 14 18	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			30.0'		22" RECOVERY		
30.8		16	30.0'	11 13 18 21	Saturated dense orange fine to coarse sand w/ trace of silt.	A-3	
			32.0'		23" RECOVERY		
33.6		17	32.0'	11 12 14 13	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			34.0'		20" RECOVERY		
		18	34.0'	2 2 5 8	Saturated loose orange fine sand w/some coarse sand, trace of silt.	A-3	
			36.0'		21" RECOVERY		
36.4		19	36.0'	6 6 18 20	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			38.0'		18" RECOVERY		
39.2		20	38.0'	11 13 20 21	No Sieve Analysis		Sample retained by GTA for pH testing.
			40.0'		19" RECOVERY		
					End of Boring		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/4/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
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DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-07


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	8 9 8 9	Moist medium dense reddish orange and yellow mottled silty fine sand w/trace of coarse sand. 24" RECOVERY	A-2-4(0)	
19.6		9	18.0'	9 18 17 31	Moist dense orange gravel and coarse sand w/ some silt and fine sand. 12" RECOVERY	A-1-b	
22.4		10	20.0'	16 14 14 16	Moist medium dense yellowish orange coarse sand and gravel w/some fine sand, trace of silt. 17" RECOVERY	A-1-b	
25.2		11	22.0'	13 14 14 13	Moist medium dense orange coarse sand and gravel w/some fine sand, trace of silt. 18" RECOVERY	A-1-b	
28		12	24.0'	10 12 17 17	Moist medium dense orange coarse sand and gravel w/some fine sand, trace of silt. 13" RECOVERY	A-1-b	
30.8		13	26.0'	12 14 10 10	Moist medium dense orange gravel and coarse to fine sand w/some silt. 20" RECOVERY	A-1-b	
33.6		14	28.0'	3 4 6 8	Moist loose yellowish orange coarse to fine sand w/trace of silt and gravel. 20" RECOVERY	A-1-b	
36.4		15	30.0'	4 6 7 6	Wet medium dense yellowish orange coarse to fine sand w/trace of silt and gravel. 22" RECOVERY	A-1-b	
39.2		16	32.0'	WOR WOR 2 3	Wet very loose orange fine sand w/some silt, trace of gravel and coarse sand. 24" RECOVERY	A-2-4(0)	
42		17	34.0'	1 1 2 3	Saturated very loose orange fine sand w/some silt, trace of coarse sand. 24" RECOVERY	A-2-4(0)	Water Encountered at 34.4'.
		18	36.0'	2 4 5 4	Saturated loose orange fine sand w/some silt, trace of coarse sand. 17" RECOVERY	A-2-4(0)	pH Sample sent to GTA for testing.
		19	38.0'	4 6 8 8	Indication of Saturated medium dense orange... 18" RECOVERY		
			40.0'		End of Boring.		


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
KEY TO SYMBOLS


Symbol Description


Strata symbols

 Low plasticity
clay

 Clayey sand

 Silty sand

 Poorly graded sand
with silt

 Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/30/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 676+77.06, 300.00' Lt. C.L.

Boring No.: B-4-08

Boring Surface Elev.: + 59.89

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 40.0

Water Level Readings
Date 1/29/09

Time

Depth of Hole
40.0

Depth of Casing
38.0

Depth of Water
31.2

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
No. of 2 in. Dia. Shelby Tubes:
2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: Jason Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/29/09	1	0.5'	2 3 4	Moist firm brown clay w/some fine sand, trace of coarse sand and gravel. 15" RECOVERY	A-6(7)	6" of topsoil, 2" of frozen soil.
2.8		2	2.0'	4 4 3 5	Moist firm brown fine sandy clay w/some coarse sand, trace of gravel. 21" RECOVERY	A-6(7)	
5.6		3	4.0'	2 2 5 7	Moist loose orange silty coarse to fine sand w/trace of gravel. 18" RECOVERY	A-1-b	
		4	6.0'	7 10 9 9	Moist medium dense orange coarse sand w/some fine sand, silt and gravel. 19" RECOVERY	A-1-b	
8.4		5	8.0'	7 8 9 4	Moist medium dense orange coarse sand and gravel w/some fine sand, trace of silt. 20" RECOVERY	A-1-b	
11.2		6	10.0'	4 5 8 9	Moist medium dense orange fine to coarse sand w/some silt and gravel. 19" RECOVERY	A-2-4(0)	
		7	12.0'	5 2 2 3	Moist very loose orange coarse sand and gravel w/some fine sand, trace of silt. 16" RECOVERY	A-1-b	
14		8	14.0'	5 5	Moist stiff orange clay w/some fine sand, trace of gravel and coarse sand. 6" RECOVERY	A-6(13)	
		8A	15.0'	3 4	Moist loose reddish gray gravel w/some coarse to fine sand, trace of silt.	A-1-a	
			16.0'				

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-08

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	6 6 7 9	10" RECOVERY Moist stiff reddish gray clayey fine sandy silt w/some gravel, trace of coarse sand.	A-4(2)	
			18.0'		19" RECOVERY		
19.6		10	18.0'	7 11 8 24	Moist medium dense orange gravel and fine sand w/some coarse sand and silt.	A-1-b	
			20.0'		17" RECOVERY		
		11	20.0'	14 16 18 21	Moist dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
			22.0'		20" RECOVERY		
22.4		12	22.0'	10 10 9 11	Moist medium dense orange coarse sand and gravel w/trace of fine sand and silt.	A-1-b	
			24.0'		16" RECOVERY		
25.2		13	24.0'	20 30 28 29	Moist very dense orange gravel w/some coarse to fine sand, trace of silt.	A-1-a	
			26.0'		13" RECOVERY		
		14	26.0'	11 8 8 7	Moist medium dense yellow fine sand w/some coarse sand, gravel and silt.	A-2-4(0)	
28			28.0'		22" RECOVERY		
		15	28.0'	3 4 5 4	Moist loose yellow fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			30.0'		20" RECOVERY		
30.8		16	30.0'	3 5 5 5	Wet loose yellow fine sand w/some silt, trace of coarse sand and gravel.	A-2-4(0)	Water encountered at 31.2'.
			32.0'		20" RECOVERY		
		17	32.0'	1 1 4 5	Wet loose yellow fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	
33.6			34.0'		20" RECOVERY		
		18	34.0'	1 3 4 4	Wet loose orange coarse sand w/some fine sand, trace of gravel and silt.	A-1-b	
			36.0'		20" RECOVERY		
36.4		19	36.0'	4 7 9 13	Wet medium dense orange coarse to fine sand w/trace of gravel and silt.	A-1-b	
			38.0'		21" RECOVERY		
39.2		20	38.0'	4 7 9 13	Saturated medium dense yellow brown fine to coarse sand, trace silt.		pH Sample sent to GTA for testing.
			40.0'		24" RECOVERY		
					End of Boring.		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Well graded sand
with silt



Silt



Poorly graded sand
with silt



Poorly graded gravel
with silt

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/29/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-10W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	5 6 7	Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel. 21" RECOVERY	A-1-b	
		9	18.0'	3 6 8 8	Moist stiff grayish red clayey silt w/some coarse to fine sand. 22" RECOVERY	A-4(3)	
19.6		10	20.0'	5 6 7	Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
		11	22.0'	2 5 7 10	Moist medium dense brownish orange coarse sand w/some fine sand and silt, trace of gravel. 20" RECOVERY	A-1-b	
22.4		12	24.0'	3 4 4 5	Moist loose light brown and orange fine to coarse sand w/some silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
25.2		13	26.0'	3 3 4 5	Wet loose light brown and orange fine to coarse sand w/some silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
28		14	28.0'	2 2 2 4	Wet very loose brown silty fine sand. 22" RECOVERY	A-2-4(0)	
		15	30.0'	3 3 2 3	Wet loose brown fine sand w/some silt, trace of coarse sand. 21" RECOVERY	A-2-4(0)	
30.8		16	32.0'	1 1 1 2	Wet very loose brown fine sand w/some silt, trace of coarse sand. 23" RECOVERY	A-2-4(0)	
33.6		17	34.0'	2 3 3 3	Wet loose brown fine sand w/some silt, trace of coarse sand and gravel. 23" RECOVERY	A-2-4(0)	
36.4		18	36.0'	3 8 6 9	Wet medium dense brownish black fine to coarse sand w/trace of silt and gravel. 22" RECOVERY	A-3	Water encountered at 36.1'.
		19	38.0'	3 8 7 8	Wet medium dense brownish black coarse to fine sand w/trace of silt and gravel. 22" RECOVERY	A-3	
39.2		20	40.0'	4 9 8 9	Wet medium dense brownish black fine to coarse sand w/trace of silt and gravel. 23" RECOVERY	A-3	Washed out augers using mud/water mix.
42		21	42.0'	4 6	Saturated medium dense brownish black fine	A-2-4(0)	Washed out augers using

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-10W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				10 12	sand w/some coarse sand and silt, trace of gravel.		mud/water mix.
44.8		22	44.0' 44.0'	7 8 11 10	19" RECOVERY Saturated medium dense brownish orange fine sand w/some coarse sand and silt, trace of gravel.	A-2-4(0)	Washed out augers using mud/water mix.
47.6		23	46.0' 46.0'	8 8 10 11	19" RECOVERY Saturated medium dense brownish orange fine to coarse sand w/some silt, trace of gravel.	A-2-4(0)	Washed out augers using mud/water mix.
50.4		24	48.0' 48.0'	7 9 12 15	22" RECOVERY No Sieve Analysis		pH sample sent to GTA for testing.
53.2			50.0'		22" RECOVERY End of Boring.		
56							
58.8							
61.6							
64.4							
67.2							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/30/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Traylor Mounted CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-11

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			16.0'		18" RECOVERY		
16.8		9	16.0'	4 3 5 6	Moist loose orange coarse sand w/ some gravel, trace of silt and fine sand.	A-1-b	
			18.0'		18" RECOVERY		
19.6		10	18.0'	3 4 6 7	Moist loose orange coarse sand, trace of silt, fine sand, and gravel.	A-1-b	
			20.0'		16" RECOVERY		
		11	20.0'	6 10 18 13	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of gravel.	A-1-b	Contains cemented sands.
			22.0'		14" RECOVERY		
22.4		12	22.0'	7 7 5 4	Wet medium dense yellow, orange, and white mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			24.0'		18" RECOVERY		
25.2		13	24.0'	3 4 3 4	Wet loose brown and light brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Water encountered at 24.2'.
			26.0'		21" RECOVERY		
		14	26.0'	3 4 6 10	Wet loose brown and light brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
28			28.0'		15" RECOVERY		
		15	28.0'	3 3 5 5	Wet loose orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			30.0'		14" RECOVERY		
30.8		16	30.0'	7 11 16 18	Wet medium dense orange fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			32.0'		18" RECOVERY		
33.6		17	32.0'	1 14 13 30	Wet medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Contains cemented sands.
			34.0'		24" RECOVERY		
		18	34.0'	13 14 19 22	Wet dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			36.0'		20" RECOVERY		
36.4		19	36.0'	28 36 21 42	Wet very dense orange fine to coarse sand, trace of silt and gravel.	A-3	
			38.0'		16" RECOVERY		
39.2		20	38.0'	11 21 21 20	Indication of wet dense orange fine to coarse sand, trace of silt and gravel.		pH sample sent to GTA for testing.
			40.0'		18" RECOVERY		
					End of Boring.		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/3/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-13

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	19 22 23 15	Saturated dense brown fine sand w/ some coarse sand and fine sand, trace of gravel.	A-2-4(0)	
			18.0'		20" RECOVERY		
		9	18.0'	4 5 9 10	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-3	
19.6			20.0'		18" RECOVERY		
		10	20.0'	8 10 22 25	Saturated dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			22.0'		20" RECOVERY		
22.4		11	22.0'	4 5 9 9	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			24.0'		22" RECOVERY		
		12	24.0'	4 5 9 11	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
25.2			26.0'		18" RECOVERY		
		13	26.0'	9 15 18 27	Saturated dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
28			28.0'		20" RECOVERY		
		14	28.0'	5 9 16 16	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			30.0'		20" RECOVERY		
30.8		15	30.0'	5 8 8 16	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			32.0'		18" RECOVERY		
		16	32.0'	8 14 25 25	Saturated dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
33.6			34.0'		20" RECOVERY		
		17	34.0'	5 5 10 13	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		18" RECOVERY		
36.4		18	36.0'	13 19 30 35	Saturated dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			38.0'		19" RECOVERY		
39.2		19	38.0'	3 9 14 20	Saturated medium dense brown fine sand with a trace of silt.		pH sample sent to GTA for testing.
			40.0'		22" RECOVERY		
					End of Boring		
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-14W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	8 8 7 7	Moist medium dense orange coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			18.0'		20" RECOVERY		
		10	18.0'	10 10 10 5	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
19.6			20.0'		13" RECOVERY		
		11	20.0'	1 4 3 4	Wet loose orange fine to coarse sand, trace of silt and gravel.	A-3	
			22.0'		22" RECOVERY		
22.4		12	22.0'	4 4 6 7	Wet loose yellow-orange coarse to fine sand, trace of silt and gravel.	A-1-b	
			24.0'		16" RECOVERY		
		13	24.0'	1 2 4 3	Wet loose yellow-orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
25.2			26.0'		22" RECOVERY		
		14	26.0'	12 8 8 8	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
28			28.0'		16" RECOVERY		
		15	28.0'	6 8 7 7	Saturated medium dense orange fine to coarse sand, trace of silt and gravel.	A-3	
			30.0'		24" RECOVERY		
30.8		16	30.0'	14 18 20 20	Saturated dense orange fine sand w/ some coarse sand, silt, and gravel.	A-2-4(0)	
			32.0'		10" RECOVERY		
		17	32.0'	7 7 9 12	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
33.6			34.0'		24" RECOVERY		
		18	34.0'	8 8 8 13	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			36.0'		22" RECOVERY		
36.4		19	36.0'	9 18 28 31	Saturated dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			38.0'		16" RECOVERY		
		20	38.0'	10 15 12 18	Saturated dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
39.2			40.0'		19" RECOVERY		
		21	40.0'	11 21 21 28	Saturated dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
42			42.0'		15" RECOVERY		
		22	42.0'	8 8	Saturated medium dense orange fine sand w/	A-2-4(0)	

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SEPTEMBER 2015

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-14W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				9 10	some coarse sand and silt.		
			44.0'		18" RECOVERY		
44.8		23	44.0'	5 5 8 10	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			46.0'		18" RECOVERY		
		24	46.0'	4 8 16 24	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
47.6			48.0'		24" RECOVERY		
		25	48.0'	4 5 8 17	Indication of saturated medium dense orange fine sand w/ some coarse sand, trace of silt.		pH sample sent to GTA for testing.
			50.0'		20" RECOVERY		
50.4					End of Boring		
					<div style="font-size: 4em; color: orange; margin: 0;">DRAFT</div> <div style="font-size: 8em; color: orange; margin: 0;">NOT FOR BIDDING</div> <div style="font-size: 8em; color: orange; margin: 0;">SEPTEMBER 2015</div>		
53.2							
56							
58.8							
61.6							
64.4							
67.2							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 695+80.95, 1,139.00' Lt. C.L.
Boring Surface Elev.: +47.53

Boring No.: B-4-15

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4 **Inches**
Hollow Stem Auger:

From Depth of: **To:**
From Depth of: 0.0 **To:** 40.0

Water Level Readings
Date **Time** **Depth of Hole** **Depth of Casing** **Depth of Water** **Elev. of Water**
 12/22/08 30.0 28.0 27.6

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: **Ft.;**
 No. of 2 in. Dia. Shelby Tubes: **Ft.;**
 2 1/2 in. Dia. Contin. Sample Boring: **Ft.;**
 Dia. U-Sample Boring: **Ft.**
 No. of U-Samples: **Ft.**
 Core Drilling in Rock: **Ft.**

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/22/08	1	1.0'	4 3	Moist firm brown silt w/ some clay, trace of fine to coarse sand and gravel.	A-4(2)	Cultivated Soil - 12".
2.8		2	2.0'	3 4 3 5	12" RECOVERY Moist firm brown silt w/ some coarse to fine sand and gravel.	A-4(0)	
5.6		3	4.0' 4.0'	3 6 5 5	22" RECOVERY Moist medium dense orange silty coarse to fine sand w/ some gravel.	A-2-4(0)	
		4	6.0' 6.0'	11 10 9 11	18" RECOVERY Moist medium dense orange clayey fine to coarse sand, trace of gravel.	A-2-4(0)	
8.4		5	8.0' 8.0'	6 10 14 13	19" RECOVERY Moist medium dense orange silty fine to coarse sand, trace of gravel.	A-2-4(0)	
11.2		6	10.0' 10.0'	11 13 9 11	16" RECOVERY Moist medium dense orange coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
14		7	12.0' 12.0'	4 8 8 9	22" RECOVERY Moist medium dense orange coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	
		8	14.0' 14.0'	3 7 10 7	18" RECOVERY Moist medium dense yellow coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
		9	16.0' 16.0'	9 8	16" RECOVERY Moist medium dense yellow coarse to fine	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-15


Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				8 10	sand w/ some silt, trace of gravel.		
			18.0'		17" RECOVERY		
		10	18.0'	5 6 7 8	Moist medium dense orange coarse sand and gravel, trace of fine sand and silt.	A-1-b	
19.6			20.0'		18" RECOVERY		
		11	20.0'	10 10 9 9	Moist medium dense yellow coarse sand w/ some gravel, fine sand, and silt.	A-1-b	
			22.0'		19" RECOVERY		
22.4		12	22.0'	4 5 8 8	Moist medium dense yellow coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
			24.0'		22" RECOVERY		
		13	24.0'	5 7 13	Moist medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
25.2			26.0'		17" RECOVERY		
		14	26.0'	22 16 13 11	Moist medium dense yellow gravel and coarse to fine sand, trace of silt.	A-1-b	
28			28.0'		4" RECOVERY		
		15	28.0'	1 2 2 6	Wet very loose orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			30.0'		22" RECOVERY		
30.8		16	30.0'	6 7 8 9	Wet medium dense yellow and light brown coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			32.0'		21" RECOVERY		
		17	32.0'	1 3 5 18	Wet loose yellow and light brown fine to coarse sand, trace of silt and gravel.	A-3	
33.6			34.0'		20" RECOVERY		
		18	34.0'	4 9 16 15	Wet medium dense brown fine to coarse sand w/ some gravel, trace of silt.	A-3	
			36.0'		16" RECOVERY		
36.4		19	36.0'	4 20 26 30	Saturated dense brown fine to coarse sand, trace of silt.	A-3	
			38.0'		22" RECOVERY		
		20	38.0'	5 6 11 10	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.		pH sample sent to GTA for testing.
39.2			40.0'		20" RECOVERY		
					End of Boring		
42							

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
KEY TO SYMBOLS


Symbol Description


Strata symbols


 Silty low plasticity clay

 Silt

 Silty sand

 Clayey sand

 Poorly graded sand with silt

 Well graded sand with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 12/22/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 697+74.42, 884.00' Lt. C.L.
Boring Surface Elev.: + 45.24

Boring No.: B-4-16

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube: 3
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4 **Inches**
Hollow Stem Auger:

From Depth of: **To:**
From Depth of: 0.0 **To:** 40.0

Water Level Readings	Date	Time	Depth of Hole	Depth of Casing	Depth of Water	Elev. of Water
	12/22/08		28.0	26.0	24.7	

Pay Quantities:
 2 1/2 in. Dia. Dry Sample Boring: **Ft.;** 3 **Dia. U-Sample Boring:** **Ft.**
 No. of 2 in. Dia. Shelby Tubes: **Ft.;** **No. of:** **U-Samples:**
 2 1/2 in. Dia. Contin. Sample Boring: **Ft.;** **Core Drilling in Rock:** **Ft.**

Boring Contractor: Walton Corporation
Driller: Gary Truver
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	12/22/08	1	1.0'	2	Moist firm brown clayey silt, trace of fine to coarse sand. 12" RECOVERY	A-4(10)	Cultivated Soil - 11".
			2.0'	2			
			2.0'	4			
2.8		2	2.0'	6		Moist stiff brown silt, trace of fine to coarse sand.	A-4(0)
			4.0'	6	18" RECOVERY Moist stiff brown silt w/ some clay and coarse to fine sand, trace of gravel.	A-4(1)	
		3	4.0'	1			
			6.0'	5	20" RECOVERY Moist very stiff brown silt w/ some coarse to fine sand, trace of gravel.	A-4(0)	
		4	6.0'	6			
			8.0'	9			
8.4		5	8.0'	3	18" RECOVERY Moist loose orange coarse sand, trace of fine sand, silt, and gravel.	A-1-b	
			10.0'	5	20" RECOVERY Moist medium dense orange coarse sand w/ some fine sand and silt, trace of gravel.	A-1-b	Press Sample - Shelby Tube.
		6	10.0'	6			
			12.0'	7			
11.2		U-1	12.0'	6			
			14.0'	6	22" RECOVERY Moist medium dense brown coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
		7	14.0'	6			
			16.0'	9	18" RECOVERY Moist medium dense brown coarse sand w/	A-1-b	
		8	16.0'	7			
				8			

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-16

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				9 8	some fine sand and gravel, trace of silt.		
			18.0'		22" RECOVERY		
		9	18.0'	5 6 8 7	Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
19.6			20.0'		23" RECOVERY		
		10	20.0'	6 8 9 11	Moist medium dense brown coarse to fine sand, trace of silt and gravel.	A-1-b	
			22.0'		23" RECOVERY		
22.4		11	22.0'	5 6 9 10	Moist medium dense brown coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			24.0'		24" RECOVERY		
		12	24.0'	14 11 7 9	Wet medium dense brown fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
25.2			26.0'		24" RECOVERY		
		13	26.0'	3 5 8 8	Wet medium dense yellow fine to coarse sand, trace of silt and gravel.	A-3	
28			28.0'		24" RECOVERY		
		14	28.0'	1 4 7 7	Wet medium dense yellow fine to coarse sand, trace of silt and gravel.	A-3	
			30.0'		21" RECOVERY		
30.8		15	30.0'	10 21 28 22	Wet dense brown and orange fine to coarse sand w/ some silt, trace of gravel.	A-3	Contains cemented sands.
			32.0'		10" RECOVERY		
		16	32.0'	10 20 20 20	Wet dense brown and orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
33.6			34.0'		20" RECOVERY		
		17	34.0'	4 9 14 17	Saturated medium dense brown and orange fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		24" RECOVERY		
36.4		18	36.0'	19 21 28 31	Saturated dense brown and orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			38.0'		20" RECOVERY		
39.2		19	38.0'	8 11 16 16	Saturated medium dense brown fine to coarse sand, trace of silt.		pH sample sent to GTA for testing.
			40.0'		22" RECOVERY		
					End of Boring		
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silt



Silty low plasticity
clay



Poorly graded sand
with silt



Well graded sand
with silt



Silty sand

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 12/22/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-17

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
16.8	1/21/09	9	16.0'	2 4 5 6	Saturated loose light brown coarse to fine sand, trace of silt and gravel.	A-1-b		
					15" RECOVERY			
			10	18.0'	5 6 7	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
19.6				20.0'		12" RECOVERY		
			11	20.0'	1 2 3	Saturated very loose fine sand w/ some coarse sand, silt, and gravel.	A-2-4(0)	
				22.0'		15" RECOVERY		
22.4			12	22.0'	7 8 11 10	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	Contains cemented sands.
				24.0'		20" RECOVERY		
			13	24.0'	5 6 8	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
25.2				26.0'		20" RECOVERY		
			14	26.0'	7 11 13 21	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
28				28.0'		19" RECOVERY		
			15	28.0'	7 8 9 10	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
				30.0'		20" RECOVERY		
30.8			16	30.0'	8 10 15 20	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
				32.0'		20" RECOVERY		
			17	32.0'	6 7 8 11	Saturated medium dense brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
33.6				34.0'		24" RECOVERY		
			18	34.0'	4 9 12 10	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			36.0'		18" RECOVERY			
36.4		19	36.0'	10 13 27 29	Saturated dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)		
			38.0'		15" RECOVERY			
39.2		20	38.0'	10 15 28 32	Saturated dense orange brown fine to coarse sand w/ some silt.		pH sample sent to GTA for testing.	
			40.0'		19" RECOVERY			
					End of Boring			
42								

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-18

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
16.8	1/23/09	9	16.0'	7 6 7 5	Moist medium dense yellow fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)		
19.6		10	18.0'	4 6 8 7	Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel. 23" RECOVERY	A-1-b		
22.4		11	20.0'	7 13 11 9	Moist medium dense orange coarse to fine sand w/ some gravel and silt. 20" RECOVERY	A-1-b		
25.2		12	22.0'	6 6 5 5	Wet medium dense orange fine sand w/ some coarse sand, silt, and gravel. 18" RECOVERY	A-2-4(0)		
28		13	24.0'	3 3 8 13	Saturated stiff light brown and orange mottled clay, trace of gravel and fine to coarse sand. 24" RECOVERY	A-7-6(14)		
30.8		14	26.0'	4 4 5 4	Saturated loose yellow fine sand w/ some coarse sand, trace of silt and gravel. 14" RECOVERY	A-3		
33.6		15	28.0'	3 6 9 10	Saturated medium dense orange and brown mottled fine sand w/ some coarse sand and silt, trace of gravel. 17" RECOVERY	A-2-4(0)	Contains cemented sand.	
36.4		16	30.0'	5 10 11 20	Saturated medium dense orange and brown mottled fine sand w/ some coarse sand, trace of gravel. 15" RECOVERY	A-3		
39.2		17	32.0'	8 12 20 20	Saturated dense orange and brown mottled fine sand w/ some silt and coarse sand, trace of gravel. 21" RECOVERY	A-2-4(0)		
		18	34.0'	8 12 15 22	Saturated medium dense orange and brown mottled fine sand w/ some coarse sand and silt, trace of gravel. 20" RECOVERY	A-2-4(0)		
		19	36.0'	10 16 25 36	Saturated dense orange and brown mottled fine sand w/ some silt and coarse sand, trace of gravel. 12" RECOVERY	A-2-4(0)	pH sample sent to GTA for testing.	
		20	38.0'	10 10 21 36	Saturated dense brown mottled fine to coarse sand with a trace of silt. 24" RECOVERY			
42						End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Low plasticity
clay



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/23/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-19

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	4 4 4 5	Wet loose yellow coarse to fine sand, trace of silt and gravel.	A-3	
			18.0'		24" RECOVERY		
19.6		9	18.0'	W/R 3 4 4	Wet loose yellow coarse to fine sand, trace of gravel and silt.	A-1-b	
			20.0'		24" RECOVERY		
		10	20.0'	4 6 5 9	Wet medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
			22.0'		24" RECOVERY		
22.4		11	22.0'	4 5 14 17	Wet medium dense orange coarse to fine sand, trace of silt and gravel.	A-1-b	
			24.0'		24" RECOVERY		
25.2		12	24.0'	6 8 10 11	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			26.0'		21" RECOVERY		
		13	26.0'	8 7 7 9	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
28			28.0'		17" RECOVERY		
		14	28.0'	8 10 11 16	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			30.0'		19" RECOVERY		
30.8		15	30.0'	4 8 18 22	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			32.0'		19" RECOVERY		
33.6		16	32.0'	8 13 22 24	Saturated dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			34.0'		20" RECOVERY		
		17	34.0'	10 12 18 24	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			36.0'		19" RECOVERY		
36.4		18	36.0'	17 16 21 21	Saturated dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			38.0'		18" RECOVERY		
39.2		19	38.0'	17 11 16 17	Saturated medium dense orange medium dense fine to coarse sand with some silt and a trace of gravel.		pH sample sent to GTA for testing.
			40.0'		18" RECOVERY		
					End of Boring		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded sand
with silt



Silty sand



Well graded sand
with silt



Poorly graded sand

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/23/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-20

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				9 11	coarse to fine sand w/ some gravel, trace of silt. 20" RECOVERY		
19.6		10	18.0'	4 4 5 6	Wet loose yellow fine to coarse sand, trace of silt and gravel. 18" RECOVERY	A-3	
		11	20.0'	5 5 5 6	Wet loose yellow fine to coarse sand, trace of silt and gravel. 22" RECOVERY	A-3	
22.4		12	22.0'	3 6 12 13	Wet medium dense orange fine to coarse sand and gravel w/ some silt. 13" RECOVERY	A-1-b	
25.2		13	24.0'	5 10 5 6	Wet medium dense orange fine to coarse sand w/ some silt and gravel. 18" RECOVERY	A-2-4(0)	
28		14	26.0'	4 7 4 4	Wet medium dense orange coarse to fine sand w/ some silt, trace of gravel. 18" RECOVERY	A-1-b	
		15	28.0'	5 8 10 13	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 20" RECOVERY	A-2-4(0)	
30.8		16	30.0'	8 11 14 16	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
33.6		17	32.0'	8 11 14 16	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 22" RECOVERY	A-2-4(0)	
36.4		18	34.0'	9 11 13 18	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
		19	36.0'	8 18 24 25	Saturated dense orange fine to coarse sand, trace of silt and gravel. 14" RECOVERY	A-3	
39.2		20	38.0'	18 20 22 31	Saturated dense brown fine to coarse sand with some silt. 24" RECOVERY		pH sample sent to GTA for testing.
42			40.0'		End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Silty low plasticity
clay



Low plasticity
clay



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/22/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-21

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	5 6 7	Moist medium dense brown coarse to fine sand w/ some gravel and silt.	A-1-b	
			18.0'		20" RECOVERY		
		10	18.0'	5 5 7 6	Moist medium dense brown coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
19.6			20.0'		20" RECOVERY		
		11	20.0'	5 6 6 7	Moist medium dense brown and black fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			22.0'		21" RECOVERY		
22.4		12	22.0'	4 5 7 8	Moist medium dense brown and light brown fine to coarse sand w/ some gravel and silt.	A-2-4(0)	
			24.0'		19" RECOVERY		
		13	24.0'	4 3 4 4	Wet loose brown and light brown fine sand w/ some silt.	A-2-4(0)	
25.2			26.0'		22" RECOVERY		
		14	26.0'	4 4 4 5	Wet loose brown and light brown fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
28			28.0'		21" RECOVERY		
		15	28.0'	3 2 3 3	Wet loose brown coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			30.0'		21" RECOVERY		
30.8		16	30.0'	WR WR 1 2	Wet very loose brown coarse to fine sand, trace of silt and gravel.	A-1-b	
			32.0'		20" RECOVERY		
		17	32.0'	3 4 4 5	Saturated loose brown fine to coarse sand, trace of silt and gravel.	A-3	
33.6			34.0'		21" RECOVERY		
		18	34.0'	4 5 8 8	Saturated medium dense brown fine to coarse sand, trace of silt and gravel.	A-3	
			36.0'		20" RECOVERY		
36.4		19	36.0'	6 6 7 7	Saturated medium dense green fine to coarse sand, trace of silt and gravel.	A-3	
			38.0'		20" RECOVERY		
		20	38.0'	6 7 7 8	Saturated medium dense brown fine to coarse sand trace silt.		pH sample sent to GTA for testing
39.2			40.0'		18" RECOVERY		
					End of Boring		
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/14/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-22

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		U-1	16.0'		Moist orange brown fine to coarse sand trace silt and gravel.		Press Sample - Shelby Tube.
			17.5'		18" RECOVERY		
		9	18.0'	6 6 8 9	Moist medium dense brown fine to coarse sand w/ some gravel, trace of silt.	A-3	
19.6			20.0'		20" RECOVERY		
		10	20.0'	15 8 6 6	Wet medium dense brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			22.0'		19" RECOVERY		
22.4		11	22.0'	3 3 3 4	Wet loose brown and black fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			24.0'		22" RECOVERY		
		12	24.0'	3 5 7 6	Wet medium dense orange fine to coarse sand, trace of silt and gravel.	A-3	
25.2			26.0'		22" RECOVERY		
		13	26.0'	4 6 8 7	Wet medium dense orange coarse to fine sand, trace of silt and gravel.	A-1-b	Mud Rotary @ 26.0'.
28			28.0'		23" RECOVERY		
		14	28.0'	6 8 10 14	Wet medium dense light brown and brown fine to coarse sand w/ some gravel, trace of silt.	A-3	
			30.0'		21" RECOVERY		
30.8		15	30.0'	6 9 10 10	Wet medium dense light brown and brown fine to coarse sand, trace of silt and gravel.	A-3	
			32.0'		23" RECOVERY		
		16	32.0'	6 7 9 9	Saturated medium dense light brown and brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
33.6			34.0'		20" RECOVERY		
		17	34.0'	7 8 8 10	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		22" RECOVERY		
36.4		18	36.0'	7 9 11 14	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			38.0'		23" RECOVERY		
39.2		19	38.0'	3 5 6 8	Saturated medium dense brown fine to coarse sand trace silt.		pH sample sent to GTA for testing.
			40.0'		23" RECOVERY		
					End of Boring		
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/13/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-23

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	5 6 7	Moist medium dense orange-yellow mottled coarse to fine sand w/ some silt, trace of gravel. 24" RECOVERY	A-1-b	
		10	18.0'	7 7 7	Moist medium dense orange-yellow mottled coarse sand w/ some fine sand, trace of silt and gravel. 18" RECOVERY	A-1-b	
19.6		11	20.0'	8 8 6	Moist medium dense orange-yellow mottled coarse to fine sand w/ some silt, trace of gravel. 20" RECOVERY	A-1-b	
22.4		12	22.0'	9 9 16 19	Moist medium dense orange and yellow mottled coarse to fine sand w/ some gravel and silt. 19" RECOVERY	A-1-b	Contains cemented sands.
		13	24.0'	17 19 27 23	No Sample Recovery 0" RECOVERY		
25.2		14	26.0'	8 8 8 8	Moist medium dense orange fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
28		15	28.0'	10 9 10 10	Wet medium dense orange fine sand w/ some coarse sand and silt, trace of gravel. 21" RECOVERY	A-2-4(0)	
		16	30.0'	6 9 10 10	Wet medium dense yellow-orange-brown mottled silty fine to coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
30.8		17	32.0'	6 9 12 14	Wet medium dense yellow fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)	
33.6		18	34.0'	5 10 12 13	Wet medium dense yellow coarse to fine sand w/ some gravel, trace of silt. 24" RECOVERY	A-1-b	
36.4		19	36.0'	12 13 24 20	Wet dense yellow fine to coarse sand, trace of silt and gravel. 12" RECOVERY	A-3	
		20	38.0'	12 14 17 26	Saturated dense brown fine to coarse sand w/ some silt. 19" RECOVERY		pH sample sent to GTA for testing; contains cemented sands.
39.2			40.0'		End of Boring		
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silty sand



Clayey sand



Well graded sand
with silt



Poorly graded sand
with silt

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/19/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-24

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks	
16.8	1/19/09	9	16.0'	5 7 8 9	Moist medium dense brown silty fine sand, trace of gravel. 23" RECOVERY	A-2-4(0)		
19.6		10	18.0'	3 6 6 6	Moist stiff red and gray clayey fine sandy silt, trace of coarse sand. 21" RECOVERY	A-4(3)		
22.4		11	20.0'	11 11 10 11	Moist medium dense orange and yellow silty fine sand, trace of coarse sand. 23" RECOVERY	A-2-4(0)		
25.2		12	22.0'	9 5 9 9	Moist medium dense orange and yellow fine to coarse sand w/ some silt, trace of gravel. 22" RECOVERY	A-2-4(0)		
28		13	24.0'	9 9 12 15	Moist medium dense orange-brown coarse to fine sand and gravel w/ some silt. 19" RECOVERY	A-1-b		
30.8		14	26.0'	11 10 9 8	Moist medium dense orange, light brown, and yellow mottled fine to coarse sand, trace of silt and gravel. 18" RECOVERY	A-3		
33.6		15	28.0'	3 4 5 6	Moist loose orange, light brown, and yellow mottled fine to coarse sand w/ some silt, trace of gravel. 24" RECOVERY	A-2-4(0)		
36.4		16	30.0'	6 6 6 9	Wet medium dense orange, light brown, and yellow mottled coarse to fine sand, trace of silt, gravel, and organic matter. 19" RECOVERY	A-1-b		
39.2		17	32.0'	1 4 7 9	Wet medium dense orange and brown mottled fine to coarse sand w/ some silt, trace of gravel. 21" RECOVERY	A-2-4(0)		
		18	34.0'	3 3 3 6	Wet loose orange and brown mottled fine to coarse sand w/ some silt and gravel. 20" RECOVERY	A-2-4(0)		
		19	36.0'	6 9 12 15	Wet medium dense orange and brown mottled coarse to fine sand, trace of silt and gravel. 20" RECOVERY	A-1-b		
		20	38.0'	9 13 21 23	Saturated dense orange and brown fine to coarse sand w/ some silt. 23" RECOVERY		pH sample send to GTA for testing.	
42						End of Boring		

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silt



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Low plasticity
clay

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SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-25W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			17.0'		trace of silt, fine sand, and gravel.		
		9A	17.0'	6	10" RECOVERY	A-6(14)	Press Sample - Shelby Tube.
		U-1	18.0'	4	Moist stiff orange and light brown clay, trace of fine to coarse sand.		
			18.0'		6" RECOVERY No Sample Recovery		
19.6			20.0'		0" RECOVERY No Sample Recovery		
		10	20.0'	8 10 12 13			
			22.0'		0" RECOVERY		
22.4		11	22.0'	5 5 5 6	Moist loose yellow-orange mottled fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			24.0'		24" RECOVERY		
		12	24.0'	3 5 6 6	Moist medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
25.2			26.0'		20" RECOVERY		
		13	26.0'	4 5 6 8	Wet medium dense orange coarse to fine sand, trace of silt and gravel.	A-1-b	
28			28.0'		18" RECOVERY		
		14	28.0'	3 6 7 8	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			30.0'		21" RECOVERY		
30.8		15	30.0'	3 7 8 11	Wet medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			32.0'		24" RECOVERY		
		16	32.0'	3 2 4 7	Wet loose orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
33.6			34.0'		24" RECOVERY		
		17	34.0'	4 5 7 10	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			36.0'		21" RECOVERY		
36.4		18	36.0'	5 10 11 13	Saturated medium dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			38.0'		19" RECOVERY		
		19	38.0'	6 12 13 18	Saturated medium dense orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
39.2			40.0'		16" RECOVERY		
		20	40.0'	9 11 16 18	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
42			42.0'		17" RECOVERY		
		21	42.0'	10 11 14 14	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	

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**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-25W

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			44.0'		18" RECOVERY		
44.8		22	44.0'	9 10 13 16	Saturated medium dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			46.0'		24" RECOVERY		
47.6		23	46.0'	10 24 29 31	Saturated very dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	
			48.0'		13" RECOVERY		
		24	48.0'	20 24 22 32	Saturated dense orange brown silty fine to coarse sand.		pH sample sent to GTA for testing.
50.4			50.0'		24" RECOVERY		
					End of Boring		
53.2							
56							
58.8							
61.6							
64.4							
67.2							

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KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/27/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 704.32.72, 370.00' Lt. C.L.
Boring Surface Elev.: + 48.21

Boring No.: B-4-26

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 40.0

Water Level Readings
Date **Time**

Time

Depth of Hole

Depth of Casing

Depth of Water

Elev. of Water

1/20/09

Time

28.0

26.0

25.5

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
 No. of 2 in. Dia. Shelby Tubes:
 2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/20/09	1	0.0'	13 4 5 6	Moist stiff brown clayey fine sandy silt w/ some coarse sand, trace of gravel.	A-4(2)	
			2.0'		12" RECOVERY		
2.8		2	2.0'	3 4 6 7	Moist loose brown silty fine to coarse sand, trace of gravel.	A-2-4(0)	
			4.0'		20" RECOVERY		
		3	4.0'	8 10 10 11	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt.	A-1-b	
5.6			6.0'		18" RECOVERY		
		4	6.0'	13 16 10 12	Moist medium dense orange coarse sand and gravel w/ some silt, trace of fine sand.	A-1-b	
			8.0'		20" RECOVERY		
8.4		5	8.0'	10 6 6 6	Moist medium dense orange coarse sand and gravel w/ some silt, trace of fine sand.	A-1-b	
			10.0'		18" RECOVERY		
		6	10.0'	6 6 9 9	Moist medium dense orange coarse sand and gravel w/ some fine sand, trace of silt.	A-1-b	
11.2			12.0'		11" RECOVERY		
		7	12.0'	4 5	Moist stiff orange and yellow mottled clay, trace of fine to coarse sand.	A-6(13)	
			13.0'		12" RECOVERY		
		7A	13.0'	9 10	Moist medium dense orange and yellow mottled coarse sand w/ some silt and gravel, trace of fine sand.	A-1-b	
14			14.0'		12" RECOVERY		
		8	14.0'	4 5 4 10	Moist loose orange coarse sand, trace of	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-26

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'		gravel, silt, and fine sand.		
			16.0'	14 15 24 15	17" RECOVERY Moist dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-b	
19.6		10	18.0'	10 6 7 7	15" RECOVERY Moist medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
			20.0'		19" RECOVERY Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel.	A-1-b	
22.4		11	20.0'	10 9 8 7	20" RECOVERY Moist medium dense yellow coarse to fine sand w/ some silt, trace of gravel.	A-2-4(0)	
			22.0'	6 7 8 7	19" RECOVERY Wet medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
25.2		12	22.0'	6 6 6 6	21" RECOVERY Wet medium dense orange coarse to fine sand, trace of silt and gravel.	A-1-b	
			24.0'	4 4 8 7	22" RECOVERY Wet medium dense orange coarse to fine sand, trace of silt and gravel.	A-1-b	
28		13	24.0'	4 5 10 9	24" RECOVERY Wet medium dense orange fine to coarse sand, trace of silt and gravel.	A-3	
			26.0'	8 8 9 10	13" RECOVERY Saturated medium dense orange fine to coarse sand, trace silt.	A-2-4(0)	
30.8		14	28.0'	1 4 8 14	12" RECOVERY Saturated dense orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			30.0'	14 24 19 18	22" RECOVERY Saturated dense orange coarse to fine sand, trace of silt and gravel.	A-3	
33.6		15	32.0'	18 18 21 30	19" RECOVERY Saturated medium dense brown silty fine to coarse sand.		pH sample sent to GTA for testing.
			34.0'	8 8 14 18	18" RECOVERY End of Boring		
36.4		16	36.0'				
			38.0'				
39.2		17	38.0'				
			40.0'				
42							

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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt



Low plasticity
clay

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301, Maryland State Line to S.R. 1

Boring No.: SWM1-38-1

Contract: 25-113-01

Boring Location: Sta. 676+91, 230.00' Lt. C.L.

Boring Surface Elev.: + 62.0'

Reference:

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Spoon
S-Sampler:
U-Sampler:
Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 14.0

Water Level Readings

Date
2/10/09

Time

Depth of Hole
16.0

Depth of Casing

Depth of Water
Dry

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:

No. of 2 in. Dia. Shelby Tubes:

2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation

Driller: D. Burt

Helpers:

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	2/10/09	1	0.5'	3 3 4	Moist firm brown clayey silt, trace of fine sand.	A-4(7)	Cultivated Soil - 8"
			2.0'		13" RECOVERY		
		2	2.0'	6 6 5 5	Moist stiff brown silt w/ some clay and fine sand, trace of coarse sand.	A-4(2)	
3.5			4.0'		22" RECOVERY		
		3	4.0'	2 5 7 7	Moist stiff red-orange clayey fine sandy silt w/ some coarse sand and gravel.	A-4(3)	
			6.0'		11" RECOVERY		
		4	6.0'	6 6 6 5	Moist stiff orange fine sandy silt w/ some coarse sand and clay, trace of gravel.	A-4(0)	
7			8.0'		23" RECOVERY		
		5	8.0'	3 5 4 4	Moist loose orange silty coarse to fine sand, trace of gravel.	A-2-4(0)	
			10.0'		18" RECOVERY		
		6	10.0'	5 6 7 8	Moist medium dense orange coarse sand and gravel w/ some fine sand and silt.	A-1-b	
10.5			12.0'		18" RECOVERY		
		7	12.0'	3 4 5 6	Moist loose orange-yellow silty fine to coarse sand w/ some gravel.	A-2-4(0)	
14			14.0'		22" RECOVERY		
		8	14.0'	8 7 5	Moist medium dense orange fine to coarse sand w/ some silt and gravel.	A-2-4(0)	
			15.5'		18" RECOVERY		
		8A	15.5'	5	Wet stiff orange-gray mottled fine sandy clay w/ some organic matter, trace of coarse sand and gravel.	A-7-6(10)	
			16.0'		6" RECOVERY		
17.5					End of Boring		

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 2/12/2009 using a 3 1/4- inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All Blows are un corrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-27

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	7 7 5 5	Moist medium dense orange and yellow coarse to fine sand w/ some silt, trace of gravel. 23" RECOVERY	A-1-b	
		10	18.0'	5 6 5 6	Moist medium dense orange and yellow coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY	A-1-b	
19.6		11	20.0'	3 5 5	Moist loose orange and yellow coarse to fine sand w/ some silt, trace of gravel. 21" RECOVERY	A-1-b	
		12	22.0'	5 8 20 26	Moist medium dense yellow, orange, and brown coarse to fine sand w/ some silt and gravel. 18" RECOVERY	A-1-b	
		13	24.0'	14 17 24 21	Moist dense yellow, orange, and brown gravel and coarse sand w/ some fine sand, trace of silt. 18" RECOVERY	A-1-b	
25.2		14	26.0'	22 18 11 13	Moist medium dense yellow, orange, and brown gravel and coarse sand w/ some fine sand, trace of silt. 18" RECOVERY	A-1-b	
		15	28.0'	2 3 4 5	Wet loose yellow fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
		16	30.0'	5 5 7 7	Saturated medium dense yellow fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
30.8		17	32.0'	2 3 3 4	Saturated loose yellow fine to coarse sand, trace of silt. 24" RECOVERY	A-3	
		18	34.0'	10 6 4 4	Saturated loose orange fine to coarse sand, trace of silt and gravel. 24" RECOVERY	A-3	
		19	36.0'	8 9 10 10	Saturated medium dense orange fine sand w/ some silt and coarse sand, trace of gravel. 24" RECOVERY	A-2-4(0)	
		20	38.0'	5 6 7 9	Saturated medium dense orange brown silty fine to coarse sand. 24" RECOVERY		pH sample sent to GTA for testing.
39.2			40.0'		End of Boring		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

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NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/20/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-28

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	10 8 7 6	Moist medium dense brown and light brown coarse to fine sand, trace of silt and gravel.	A-3	
			18.0'		22" RECOVERY		
		9	18.0'	6 7 8 9	Moist medium dense brown and light brown coarse sand w/ some gravel and fine sand, trace of silt.	A-1-b	
19.6			20.0'		20" RECOVERY		
		10	20.0'	6 8 10 9	Wet medium dense brown coarse to fine sand, trace of silt and gravel.	A-1-b	
			22.0'		23" RECOVERY		
22.4		11	22.0'	6 7 7 4	Wet medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
			24.0'		20" RECOVERY		
		12	24.0'	5 5 7 5	Wet medium dense brown silty fine sand, trace of coarse sand.	A-2-4(0)	
25.2			26.0'		20" RECOVERY		
		13	26.0'	3 4 7 5	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand.	A-2-4(0)	
			28.0'		22" RECOVERY		
28		14	28.0'	6 8 12 11	Saturated medium dense brown and orange fine sand w/ some coarse sand and gravel, trace of gravel.	A-2-4(0)	
			30.0'		22" RECOVERY		
		15	30.0'	8 10 12 11	Saturated medium dense brown and orange fine sand w/ some silt and coarse sand, trace of gravel.	A-2-4(0)	
30.8			32.0'		21" RECOVERY		
		16	32.0'	5 5 8 10	Saturated medium dense brown and orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
33.6			34.0'		21" RECOVERY		
		17	34.0'	7 8 12 12	Saturated medium dense brown and orange fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		20" RECOVERY		
36.4		18	36.0'	7 12 15 19	Saturated medium dense brown and orange fine sand w/ some silt and coarse sand.	A-2-4(0)	
			38.0'		21" RECOVERY		
		19	38.0'	17 22 29 33	Saturated dense brown fine to coarse sand with some silt.		pH sample sent to GTA for testing.
39.2			40.0'		22" RECOVERY		
					End of Boring		
42							

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty low plasticity
clay



Silt



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-29

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				10	coarse sand, trace of fine sand and silt. 13" RECOVERY		
		9A	17.5'	19	Moist medium dense black gravel w/ some	A-1-a	
		10	18.0'	50/3"	coarse sand, trace of fine sand and silt. 5" RECOVERY		
19.6			20.0'		0" RECOVERY		
		11	20.0'	11 10 11 11	No Sample Recovery		
			22.0'		0" RECOVERY		
22.4		12	22.0'	3 4 5 5	Moist loose light brown fine to coarse sand, trace of silt and gravel.	A-3	
			24.0'		20" RECOVERY		
		13	24.0'	4 5 6 5	Moist medium dense light brown coarse to fine sand, trace of silt and gravel.	A-1-b	
25.2			26.0'		20" RECOVERY		
		14	26.0'	3 6 4 5	Wet loose light brown fine sand w/ some coarse sand and silt.	A-2-4(0)	
28			28.0'		21" RECOVERY		
	1/19/09	15	28.0'	1 1 5 6	Wet loose light brown fine to coarse sand, trace of silt and gravel.	A-3	
			30.0'		16" RECOVERY		
30.8		16	30.0'	2 6 9 12	Wet medium dense light brown fine to coarse sand, trace of silt.	A-3	
			32.0'		14" RECOVERY		
		17	32.0'	7 17 23 27	No Sample Recovery		
33.6			34.0'		0" RECOVERY		
		18	34.0'	8 13 15 22	Saturated medium dense brown fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
			36.0'		19" RECOVERY		
36.4		19	36.0'	14 23 32 33	Saturated very dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			38.0'		17" RECOVERY		
		20	38.0'	10 16 15 33	Saturated dense orange brown fine to coarse sand with some silt.		pH sample sent to GTA for testing.
39.2			40.0'		16" RECOVERY		
					End of Boring		
42							

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NOT FOR BIDDING
SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/15/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-33

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		9	16.0'	5 6 7 6	Moist medium dense brown coarse sand w/ some gravel, trace of silt and fine sand. 21" RECOVERY	A-1-b	
19.6		10	18.0'	15 11 8 6	Moist medium dense light brown and brown coarse to fine sand, trace of silt and gravel. 19" RECOVERY	A-1-b	
22.4		11	20.0'	6 4 5 7	Moist loose light brown and brown coarse to fine sand, trace of silt and gravel. 19" RECOVERY	A-1-b	
25.2		12	22.0'	6 6 7 6	Moist medium dense light brown and brown coarse to fine sand, trace of silt and gravel. 21" RECOVERY	A-1-b	
28		13	24.0'	5 5 5 7	Moist loose light brown and brown coarse sand w/ some fine sand, trace of silt and gravel. 19" RECOVERY	A-1-b	
30.8		14	26.0'	4 5 5 7	Wet loose brown fine to coarse sand, trace of silt. 20" RECOVERY	A-3	
33.6		15	28.0'	1 3 6 6	Wet loose brown coarse to fine sand, trace of silt and gravel. 22" RECOVERY	A-1-b	
36.4		16	30.0'	1 4 5 9	Saturated loose brown fine to coarse sand, trace of silt and gravel. 23" RECOVERY	A-3	
39.2		17	32.0'	3 4 4 5	Saturated loose brown fine to coarse sand, trace of silt and gravel. 22" RECOVERY	A-3	
		18	34.0'	5 6 12 22	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel. 23" RECOVERY	A-3	
		19	36.0'	11 14 22 31	Saturated dense brown fine sand w/ some coarse sand, trace of silt and gravel. 20" RECOVERY	A-3	
		20	38.0'	11 12 24 28	Saturated dense brown fine sand w/ some coarse sand, trace of silt. 21" RECOVERY	A-3	
			40.0'		End of Boring.		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty low plasticity
clay



Low plasticity
clay



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/2/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-34

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
16.8		8	16.0'	6 7 10 11	Moist medium dense yellow coarse sand w/ some fine sand, trace of silt and gravel.	A-1-b	
			18.0'		19" RECOVERY		
19.6		9	18.0'	11 13 11 10	Moist medium dense yellow fine to coarse sand w/ some silt, trace of gravel.	A-1-b	
			20.0'		24" RECOVERY		
		10	20.0'	11 13 12 10	Moist medium dense orange coarse sand w/ some fine sand and gravel, trace of silt.	A-1-b	
			22.0'		24" RECOVERY		
22.4		11	22.0'	5 6 9 9	Moist medium dense yellow coarse to fine sand, trace of silt and gravel.	A-1-b	
			24.0'		19" RECOVERY		
25.2		12	24.0'	5 6 6 10	Moist medium dense yellow coarse to fine sand w/ some gravel, trace of silt.	A-1-b	
			26.0'		19" RECOVERY		
		13	26.0'	8 10 13 13	Moist medium dense yellow coarse to fine sand, trace of gravel and silt.	A-1-b	
28			28.0'		24" RECOVERY		
		14	28.0'	3 5 6 9	Wet medium dense yellow fine to coarse sand, trace of silt and gravel.	A-3	Water encounter at 28.3'.
			30.0'		23" RECOVERY		
30.8		15	30.0'	2 6 10 16	Wet medium dense yellow fine to coarse sand, trace of silt and gravel.	A-3	
			32.0'		24" RECOVERY		
33.6		16	32.0'	7 11 14 33	Saturated medium dense orange fine to coarse sand, trace of silt and gravel.	A-3	
			34.0'		24" RECOVERY		
		17	34.0'	10 11 14 26	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	Contains cemented sands.
			36.0'		20" RECOVERY		
36.4		18	36.0'	20 25 41 28	Saturated very dense orange fine sand w/ some coarse sand and silt.	A-2-4(0)	Contains cemented sands.
			38.0'		20" RECOVERY		
39.2		19	38.0'	18 25 23 36	Saturated dense fine to coarse sand trace silt.		pH sample sent to GTA for testing. Contains cemented sands.
			40.0'		22" RECOVERY		
					End of Boring.		
42							

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Clayey sand



Silty sand



Poorly graded sand
with silt



Well graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 12/23/2008 using a 3 1/4-inch diameter hollow stem auger. Rig is a Track CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-35

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
			17.0'		6" RECOVERY		
		9A	17.0'	11	Saturated very stiff light brown fine sandy clay, trace of coarse sand.	A-2-4(0)	
			18.0'	10			
		10	18.0'	5	11" RECOVERY	A-2-4(0)	
			18.0'	5	Saturated medium dense brown fine sand w/ some coarse sand, silt, and gravel.		
19.6			20.0'	10	9" RECOVERY		
		11	20.0'	6	Saturated loose brown fine sand w/ some coarse sand and silt, trace of gravel.	A-3	
			20.0'	5	18" RECOVERY		
			22.0'	7	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.		
22.4		12	22.0'	5	20" RECOVERY	A-3	
			22.0'	5	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt.		
			24.0'	8	16" RECOVERY		
		13	24.0'	4	Saturated medium dense brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
25.2			24.0'	12	24" RECOVERY		
			26.0'	13	Saturated medium dense brown fine sand w/ some silt and coarse sand.		
28		14	26.0'	4	20" RECOVERY	A-2-4(0)	
			28.0'	8	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.		
		15	28.0'	19	20" RECOVERY	A-2-4(0)	
			28.0'	10	Saturated medium dense brown fine sand w/ some silt and coarse sand, trace of gravel.		
			30.0'	10	20" RECOVERY		
30.8		16	30.0'	7	Saturated medium dense brown fine sand, trace of silt and coarse sand.	A-3	
			30.0'	9	24" RECOVERY		
			32.0'	10	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand.		
33.6		17	32.0'	18	18" RECOVERY	A-2-4(0)	
			32.0'	9	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand.		
			34.0'	8	18" RECOVERY		
		18	34.0'	WOR	Saturated loose brown fine sand, trace of coarse sand and silt.	A-3	
			34.0'	4	21" RECOVERY		
			36.0'	6	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand and gravel.		
36.4		19	36.0'	5	23" RECOVERY	A-2-4(0)	
			36.0'	7	Saturated medium dense brown fine sand w/ some silt, trace of coarse sand and gravel.		
			38.0'	10	23" RECOVERY		
		20	38.0'	19	Saturated dense brown fine to coarse sand, trace silt and gravel.		pH sample sent to GTA for testing.
39.2			38.0'	31	24" RECOVERY		
			40.0'	41	End of Boring.		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Low plasticity
clay



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/9/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-36

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				8 7	w/ some silt, trace of gravel.		
			18.0'		18" RECOVERY		
19.6		10	18.0'	3 5 6 6	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			20.0'		14" RECOVERY		
		11	20.0'	4 6 7 7	Wet medium dense orange fine to coarse sand w/ some silt, trace of gravel.	A-2-4(0)	
			22.0'		16" RECOVERY		
22.4		12	22.0'	7 13 11 8	Saturated medium dense orange-brown mottled fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			24.0'		20" RECOVERY		
25.2		13	24.0'	1 4 9 13	Saturated medium dense orange and brown mottled fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			26.0'		22" RECOVERY		
		14	26.0'	9 14 24 24	Saturated dense orange-brown mottled fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
28			28.0'		23" RECOVERY		
		15	28.0'	7 8 12 15	Saturated medium dense orange-brown fine sand w/ some coarse sand, trace of silt.	A-3	
			30.0'		18" RECOVERY		
30.8		16	30.0'	8 14 15 28	Saturated medium dense orange-brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			32.0'		20" RECOVERY		
33.6		17	32.0'	6 6 11 16	Saturated medium dense orange-brown fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			34.0'		23" RECOVERY		
		18	34.0'	4 5 6 7	Saturated medium dense orange-brown fine sand w/ some coarse sand, trace of silt.	A-3	
			36.0'		20" RECOVERY		
36.4		19	36.0'	5 12 14 20	Saturated dense orange-brown fine sand w/ some silt and coarse sand.	A-2-4(0)	
			38.0'		23" RECOVERY		
39.2		20	38.0'	5 16 18 19	Saturated dense brown fine to coarse sand trace silt.		pH sample sent to GTA for testing.
			40.0'		24" RECOVERY		
					End of Boring.		
42							

KEY TO SYMBOLS

Symbol Description

Strata symbols



Poorly graded clayey
silty sand



Silty sand



Poorly graded sand
with silt

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/12/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01
Boring Location: Sta. 701+30.97, 1,658.00' Lt. C.L.
Boring Surface Elev.: +26.04

Boring No.: B-4-37

Wt. of Casing Hammer:
Wt. of Sample Hammer: 140
Type of: D-Sampler: Split Barrel
 S-Sampler:
 U-Sampler:
 Core Bit:

Lbs.
Lbs.
O.D.
O.D.
O.D.
O.D.

Average Fall:
Average Fall: 30
O.D. of Sampler: 2
O.D. of Samp. Tube:
O.D. of Samp. Tube:
O.D. of Rock Core:

IN.
IN.
IN.
IN.
IN.

Casing Size: 3 1/4
Hollow Stem Auger:

Inches

From Depth of:
From Depth of: 0.0

To:
To: 40.0

Water Level Readings
Date 1/12/09

Time

Depth of Hole 12.0

Depth of Casing 10.0

Depth of Water 8.6

Elev. of Water

Pay Quantities:

2 1/2 in. Dia. Dry Sample Boring:
 No. of 2 in. Dia. Shelby Tubes:
 2 1/2 in. Dia. Contin. Sample Boring:

Ft.;
Ft.;

No. of:
Core Drilling in Rock:

Dia. U-Sample Boring:
U-Samples:

Ft.
Ft.

Boring Contractor: Walton Corporation
Driller: Dave Burt
Helpers: D. Zmijewski

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
	1/12/09	1	1.0'	5 6	Moist stiff brown fine to coarse sandy silt w/ some gravel, trace of clay.	A-4(0)	11" of cultivated soil.
2.8		2	2.0'	5 10 10 8	Moist medium dense orange gravel and coarse sand w/ some fine sand, trace of silt.	A-1-a	
		U-1	4.0'		10" RECOVERY Wet brown fine to coarse sand trace gravel.		Press Shelby Tube.
5.6		3	6.0'	10 5 7 7	21" RECOVERY Moist medium dense orange coarse to fine sand and gravel w/ some silt.	A-1-b	
8.4		4	8.0'	5 1 1 2	18" RECOVERY Wet very loose brown and orange fine sand w/ some gravel, silt, and coarse sand.	A-2-4(0)	Water encountered at 8.6'.
11.2		5	10.0'	2 2 3	10" RECOVERY Wet very loose brown and orange fine sand w/ some coarse sand and silt, trace of gravel.	A-2-4(0)	
		6	12.0'	1 2 2 3	24" RECOVERY Wet very loose brown and orange coarse to fine sand, trace of silt and gravel.	A-1-b	
14		7	14.0'	1 2 3 5	24" RECOVERY Wet loose brown and orange coarse to fine sand, trace of silt and gravel.	A-1-b	
		8	16.0'	12 8	24" RECOVERY Wet medium dense brown and orange coarse	A-1-b	

Remarks:

Reviewed By: Maureen Kelley

Soils Supervisor: Randy Ferguson

**STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

F.A. Project: U.S. 301 Maryland State Line to I-95
Contract: 28-113-01

Boring No.: B-4-37

Depth (ft.)	Daily Progress	No.	Sample Depth	Blows/6"	Sample Description	Class./G.I.	Remarks
				6 8	to fine sand and gravel, trace of silt.		
			18.0'		18" RECOVERY		
19.6		9	18.0'	1 3 5 6	Saturated loose brown and orange fine to coarse sand, trace of silt and gravel.	A-3	
			20.0'		23" RECOVERY		
		10	20.0'	6 6 7 9	Saturated medium dense brown and orange fine sand w/ some coarse sand, trace of silt.	A-3	
			22.0'		22" RECOVERY		
22.4		11	22.0'	1 4 4 5	Saturated loose brown and orange fine sand w/ some coarse sand, trace of silt.	A-3	
			24.0'		20" RECOVERY		
25.2		12	24.0'	1 2 4 5	Saturated loose brown and orange fine sand w/ some coarse sand, trace of silt.	A-3	Contains cemented sands.
			26.0'		22" RECOVERY		
		13	26.0'	1 2 5 7	Saturated loose brown and orange fine sand w/ some coarse sand, trace of silt.	A-3	Contains cemented sands.
28			28.0'		23" RECOVERY		
		14	28.0'	1 3 3 5	Saturated loose orange fine sand w/ some coarse sand, trace of silt.	A-3	
			30.0'		24" RECOVERY		
30.8		15	30.0'	9 10 11 12	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt.	A-3	
			32.0'		23" RECOVERY		
33.6		16	32.0'	3 4 4 3	Saturated loose orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
			34.0'		24" RECOVERY		
		17	34.0'	1 3 8 12	Saturated medium dense orange fine sand w/ some coarse sand, trace of silt and gravel.	A-3	
36.4			36.0'		22" RECOVERY		
		18	36.0'	10 11 11 10	Saturated medium dense brown fine to coarse sand some silt trace gravel.		pH sample sent to GTA for testing.
			38.0'		24" RECOVERY		
39.2		19	38.0'	19 25 33 24	Saturated very dense dark gray clayey fine sand, trace of coarse sand.	A-2-4(0)	
			40.0'		6" RECOVERY		
					End of Boring.		
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SEPTEMBER 2015

KEY TO SYMBOLS

Symbol Description

Strata symbols



Silty sand



Well graded sand
with silt



Poorly graded sand
with silt



Poorly graded clayey
silty sand

DRAFT
NOT FOR BIDDING
SEPTEMBER 2015

Notes:

1. Exploratory borings were drilled on 1/12/2009 using a 3 1/4-inch diameter hollow stem auger. Rig is a ATV CME 55.
2. Groundwater levels recorded at the time of drilling and re-checked the following day.
3. Surveyed boring location and elevation was provided by Century Engineering.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs.
6. All blow counts are uncorrected.